2003-2004

ENVIRONMENTAL REVIEW COMMISSION

MINUTES

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ENVIRONMENTAL REVIEW COMMISSION
January 16, 2003

The Environmental Review Commission (ERC) met on Thursday, 16 January 2003 at 9:30 a.m. in Room 544 of the Legislative Office Building.

Senator Fountain Odom presided over the 16 January 2003 meeting. The following members were present: Senators Albertson, Clodfelter, Kinnaird and Odom and Representatives Gibson, Hackney, Hill, Warwick and Weiss. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Tim Dodge, Research Assistant, Kevin Howell, Research Intern, and Mary Watson, Commission Clerk were also present.

On 18 December 2002, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice was included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Senator Odom called the meeting to order. Senator Odom called on Representative Gibson for his remarks.

Representative Gibson thanked Senator Odom for all he had done for the ERC over the past years, serving as Co-Chair.

George Givens, Commission Counsel, was asked to explain the agenda.

Mr. Givens asked visitors to sign the visitor registration sign-in sheet and asked members to sign and send forward their reimbursement forms. He also asked visitors who were not currently on the mailing list to fill out a mailing list form if they wanted to receive meeting notices via e-mail or regular mail.

Mr. Givens announced that the planning meeting for this meeting was held at 10:00 a.m. on Wednesday, 8 January 2003 in Room 605 of the Legislative Office Building.

Mr. Givens announced that Rick Zechini, Assistant Commission Counsel, left the General Assembly in November to go to work for the North Carolina Realtor's Association. They are in the process of selecting a replacement and hope to have someone on board by February 2003.

Mr. Givens also recognized Kevin Howell, a senior at N. C. State University, majoring in political and biological sciences, who is interning with the research division and will be assigned to a member during the session.

Mr. Givens also noted the absence of Susan Iddings, Assistant Commission Counsel, who is on vacation.

Mr. Givens recognized several visitors present. He said that in May, Allen Klimeck, Air Quality Division of DENR, was appointed Director of the Division of Water Quality; Keith Overcash, former Deputy Director of Air Quality was appointed Division Director in October; and in November Jim Simons, former Chief Engineer of Land Quality Section was made Director of the Division of Land Resources.

Mr. Givens said that the ERC would meet again next week on Wednesday, 28 January 2003.

Mr. Givens called attention to a handout that lists final disposition of bills recommended by the Commission during the Short Session of the 2001 General Assembly. This handout is listed as **Exhibit D**.

Mr. Givens also recognized and thanked outgoing members of the Commission, Senator Odom and Representative Warwick for their past service on the ERC.

Dr. David H. Moreau, Chairman, Environmental Management Commission, DENR, gave the quarterly report by the Environmental Management Commission (EMC) as to its operations, activities, programs, and progress. A copy of Dr. Moreau's presentation is listed as **Exhibit E**.

Dr. Moreau reported first on the area of air quality, saying that the activities of the EMC over the past quarter have been largely limited to relatively minor changes to the air quality regulations. A lot of technical changes have been made; however, no major issues have emerged.

Dr. Moreau said that in the area of groundwater, permanent pay for performance rules were adopted. There were initiated actions to establish groundwater standards for nine particular substances.

Representative Hackney asked Dr. Moreau to explain the pay for performance rules that were adopted.

Dr. Moreau said that these rules change the procedures by which the cleanup of the underground contamination sites is conducted. The pay, based on performance, is an agreement that specifies a series of cleanup milestones, generally percentage reduction in the contamination as the basis for payment in the cleanup instead of an open-ended contract.

Dr. Moreau said that with regard to water quality, review of the water quality standards have been completed and changes were proposed to a few of the items for which standards have been written; i.e. arsenic, cyanide, methylene and blue active substances, total residual chlorine and MTBE. The MTBE standard was referred back to water quality for further information based on new research prepared by EPA.

Dr. Moreau said that the most controversial issue they have dealt with is the Phase II stormwater regulations. Phase I was the initial steps taken by the EPA under the Clean Water Act, requiring stormwater management programs in communities of over 100,000 persons. The second part of those regulations now covers all urbanized areas of the country, where urbanized areas are defined as any area in the census for which the density is greater than 1,000 persons per square mile. Those regulations had to be met by March 2000 for the application of that program.

Dr. Moreau said that temporary rules were adopted that was narrowly tailored to deal with the federal program. There is a problem with the federal program as it affects North Carolina. The implicit assumption in those federal rules is that a county would cover any program that is not covered by a municipality. Under the assumption that, if a public storm sewer system exists outside of a municipality, the county owns it. This is not true in North Carolina because of the way the State's Department of Transportation is set up. This has created a problem because some of the urbanized areas to which the program applies fall outside of municipal boundaries and the EMC has been struggling to develop a set of rules where the program can be implemented fairly.

Senator Kinnaird asked Dr. Moreau if President Bush's changes to the Environment and regulations would cause a review and changes of the standards.

Dr. Moreau said that there had been no discussion about changing the stormwater regulations. The changes made by the Bush administration deals with isolated wetlands and performance for power plants.

Dr. Moreau then referred to his handout on buffers. He commented about questions on buffers on the Catawba River. The proposal will come before the EMC in February.

Senator Odom asked Dr. Moreau about the variances on buffers and asked if they were contained in his report.

Dr. Moreau said it was the handout entitled Riparian Buffer Rules-2002 Summary, included in Exhibit E.

Dr. Moreau concluded by saying that the Basinwide Planning Program was progressing on schedule. A report of detailed activities is also included with Exhibit E.

Senator Odom asked why Orange County is referenced in the buffer rules handout. Coleen Sullins, Chief, Water Quality Section, Division of Water Quality, DENR, answered by saying that Orange County is the only county that has adopted and implemented the program for the EMC and division within Orange County.

Coleen Sullins, Chief, Water Quality Section, Division of Water Quality, DENR, gave a PowerPoint report on the development and implementation of rules and programs to control stormwater runoff. A copy of Ms. Sullins presentation is listed as **Exhibit F**.

Senator Clodfelter asked Ms. Sullins if there were any differences in the requirements for Phase II from Phase I.

Ms. Sullins said the main difference associated with Phase II is the post construction stormwater management controls. The regulations under Phase I did not specifically require for that to be dealt with. However, when the federal government adopted the Phase II regulations, they said not only did they expect the Phase II communities to implement them, but that the Phase I permits would come in for renewal.

Ms. Sullins said that most of the Phase I permits are in for renewal this year and the smaller communities have to make their application by March of 2003, depending on the census data.

Senator Odom asked Ms. Sullins to give specific examples of what would be required under the post construction stormwater management for new development.

Ms. Sullins said the way the regulations are set up for the post construction stormwater controls require that the new development and redevelopment control the one year, twenty-four hour storm runoff. This is a first step in the process. The temporary rules also have in them a level at which you do not have to implement controls.

Senator Kinnaird asked Ms. Sullins if maintenance was a concern around post construction. Ms. Sullins said that it was and required that the BMP's be operated and maintained.

Senator Clodfelter asked Ms. Sullins if the regulations define what constitutes redevelopment.

Ms. Sullins said that the regulations do indeed define what is redevelopment and it is modeled on regulations that are in place in the coastal areas. Typically what they are looking for is no net increase in impact associated with redevelopment.

Representative Gibson asked Ms. Sullins if anyone was working on the fiscal impact.

Ms. Sullins said there was a fiscal note developed under the federal regulations and it was in the process of being updated in regards to this new set of rules.

Representative Gibson asked if this model was based on what Phase I cost and commented that Phase II would experience a whole new set of problems.

Ms. Sullins said that as far as she knows, there is no federal money available; however, the federal government is providing for a broader use of the monies.

Ms. Sullins said that in 1991, the statutes were amended to enable local governments to set up utilities associated with stormwater. There is an issue of the level of the community's ability to step in and varies significantly across the State with local governments.

Ms. Sullins said that the program at the federal level provides for a five-year window of implementation to get the program set up. In North Carolina there are a number of things that have been done to make things easier for local governments.

Ms. Sullins said that the collection system issues have been a hot button item and there has been an ongoing initiative to get these under permits.

Ms. Sullins said that another aspect of the program that the department is looking to provide assistance on is the educational aspect and developing a program at the state level.

Representative Gibson asked if the State had any choice in doing this program.

Ms. Sullins said that it was a federal requirement under the Clean Water Act.

Ms. Sullins said the temporary rules were approved by the EMC in 2002 and the local governments are required to make application by 2003.

Ms. Sullins said that the permanent rulemaking process is underway. These permanent rules will be taken out for public notice in February.

Mr. Givens followed up on Representative Gibson's question on legal authority of local governments to set up the stormwater utilities. He said this was dealt with in HB1602 in the 2000 Session. He asked Ms. Sullins to provide information on river basins and the sequence they would be in for the Phase II program.

Mr. Givens also said that the permanent rules would be subject to review by the ERC in 2004.

Mr. Givens said that the following organizations have requested time on our agenda for next week regarding the rulemaking process. North Carolina League of Municipalities, the North Carolina Association of County Commissioners, the North Carolina Homebuilders Association and the North Carolina Coastal Federation.

Representative Hackney asked Mr. Givens if there was any litigation remaining over the rulemaking process.

Both Mr. Givens and Ms. Sullins said they were not aware of any.

Mr. Givens said that although this is a federal requirement, there is some controversy as to whether and to what extent the State should exceed or go beyond the federal mandate.

Dr. Moreau commented that out of all of the requirements, the one that is really the greatest matter of concern is the post construction responsibility.

Mr. John N. Morris, Director, Division of Water Resources, DENR, gave the annual report on the development of the State Water Supply Plan. A status report on Water Supply Planning for January 1, 2002 through September 30, 2002 is listed as **Exhibit G**.

Mr. Morris stated that the drought over the past year has caused significant economic damage. The 2002 drought was a record-breaking drought in the Piedmont and Western Piedmont. Fortunately, the weather took a turn for the better and reservoirs are beginning to rapidly recover.

Mr. Morris said that the shallow groundwater in the mountains and around our streams is what keeps them going when there is no rainfall. In 2002, many of the monitoring wells hit an all-time low. Mr. Morris said that the forecast is still favorable for above average rainfall through March.

Mr. Morris said that the drought held some valuable lessons for us. For instance, some water supply systems are more vulnerable than they should be and steps are underway to take care of that problem. Governor Easley has made funds available on a priority basis to help some of these communities connect to a more stable water supply source.

Mr. Morris said that another lesson learned was that some communities are not prepared for droughts. Every community needs a good emergency plan and steps are underway to make sure that this is done.

Mr. Morris said that the most alarming part of the 2002 drought was the water stored in our major River Basins could be depleted with the result that we could have a drastic falloff in flows in our rivers causing severe problems.

Mr. Morris said that the Catawba and Yadkin River Basins caused the most concern. Re-licensing in these two basins is going on now and it is especially critical that we develop the information we need to work within the federal process to assure a sound water supply in those two basins.

Mr. Morris said that we have to work with our neighboring states as well as the federal government to develop a long-range basin plan.

Mr. Morris said, that while we cannot predict when a drought will occur, we need to deal with the long-range water supply needs of the State. We

need to assure that North Carolina's water supply will not have a limit on economic growth.

Mr. Morris added that we need for local governments to have plans in place by having emergency water sources available and have plans for reducing water use on an increasingly severe basis so that the most important health and safety needs can be met.

Mr. Morris said that much of this work is underway. In 2003, we will be giving our local government water supply plans their five-year update.

Mr. Morris said that another thing needed was to plan for water supply on a river basin basis. Water is a local and regional issue rather than a statewide issue. Water is too heavy and cheap to move a long distance. For example, Greensboro was one of the hardest hit communities by the drought and they took a proactive approach to avoid a problem by purchasing water from their neighbors. Greensboro purchased water from Winston-Salem, Kernersville and High Point and they are planning to purchase water from Burlington.

Mr. Morris said that there is legislation that came through ERC in 1989 created a sound basis for local government water supply plans. There are over 500 of these plans and he suggested looking at their website, www.ncwater.org.

Mr. Morris said that question has been asked about how much water do we have left in North Carolina and how much do we need. Mr. Morris said that both the amount of water that is available and the amount of water needed are not fixed numbers but are subject to management. This issue has to be attached on a river basin basis with good objective information and with the participation of those people who are using the water and depending on it.

Mr. Morris said there was a pilot project in the Cape Fear Basin that was successful toward this approach. A river basin plan was developed that projected water needs for 50 years in the future using a hydrologic model.

Mr. Morris said that the Cape Fear model, done before 2002, identified three communities in the basin that were particularly vulnerable to water supply problems—Vass, Robbins and Carthage.

Mr. Morris said that what we need to do is expand this basin planning approach to other basins with the participation of municipalities and others who were involved in water use.

Mr. Morris said the third thing we need to do is to have sustainable groundwater management. This is similar to the basin management concept but has to be crafted on the water groundwater behaves. There is a sixteen-year schedule to development management strategies for aquifers.

Mr. Morris said the fourth thing North Carolina needs to do is to achieve better efficiency of water use. This can be a big part of the solution to our water supply needs.

Mr. Morris added that water reuse is an important part of water use efficiency. Treated wastewater can be used for irrigation, some industrial processes and other uses. Mr. Morris said that his department is preparing recommendations for the 2003 General Assembly session.

Mr. Morris said that North Carolina has a relatively generous supply of water and feels like we can keep our water supply if we do the right things in the future.

Representative Gibson asked Senator Albertson and Representative Warwick if they were happy with the way the Rural Center was handling our water supply problem.

Senator Albertson said that we were moving in the right direction, but there was work to be done.

Representative Warwick said that the Rural Center had done a good job in engaging local people in the process.

Senator Albertson added that this past year was a wake-up call for us and we need to keep moving in this direction and we need to be good stewards of our water supply.

Senator Odom said he appeared to him that the Department is in a good position to use the drought as a foundation for the ways in which we treat our water even before we have a drought.

Senator Odom asked Mr. Morris if there was ever any effort to enlarge the reservoirs for handling more water.

Representative Gibson added that there were 37 different federal and state agencies involved with changing any natural limit to any standing water body.

Mr. Morris added that in the Yadkin Basin, they found that as the hydroelectric projects operated by Alcoa and CP&L followed their federal licenses and they discovered that High Rock and Badin Lakes would be drained completely which mean a severe fish kills and a health problem.

Mr. Morris said that they got together in 2002 with the South Carolina authorities with the two utilities and with the Federal Energy Regulatory Commission who decided that it would not be a good idea to drain the two lakes and completely run out of water. The solution was that South Carolina agreed to a much smaller supply of water out of the lakes.

Senator Clodfelter asked if part of the Catawba problem was due to the water disappearing naturally to replenish the groundwater rather than withdrawal.

Mr. Morris said there might have been some of that but the major demand on the Catawba lakes was meeting the minimum flow requirements for South Carolina.

Mr. Morris added that Duke Power did a great job of detecting this drought trend early and maintained higher water levels than normal to have a margin of safety.

Representative Gibson complimented Alcoa and Progress Energy for communicating with the six county regions on this water supply problem.

Representative Weiss added to suggestion of additional ability of adding water to the reservoirs that our sedimentation laws have a lot to do with that, because we have this runoff, it fills up our reservoirs. She said that the ERC recommended legislation to strengthen our sedimentation laws. She said she hoped we would remember that when we try to make progress with drought control and other things.

Senator Albertson said that the way we have water when we need it is to add to the reservoirs when they are full.

Mr. Givens said that Mr. Morris, Dr. Moreau and he attended a daylong conference on resource management sponsored by Z. Smith Reynolds. He asked Mr. Morris about page 3 of his report regarding the paragraph indicating that some 14 local governments and others have failed to submit a water supply plan as August 31, 2003. He asked if this was typical and what was being done about it.

Mr. Morris said they generally had excellent compliance with the water supply plans and is now starting on the third generation of these plans. Usually the smaller communities with not much staff were the ones who were delinquent in completing their plans. There are some incentives for some to complete their plans.

Mr. Grover C. Nicholson, III, Chief, Underground Storage Tank Section, Division of Waste Management, DENR, gave a report on the Leaking Petroleum Underground Storage Tank Cleanup Program. A copy of Mr. Nicholson's remarks and a copy of the Status Report are listed as **Exhibit H**.

Mr. Nicholson said that a typical clean-up cost of a 550-gallon home-heating oil tank costs about $20,000. If the soil contamination extends under the house, and the foundation of the house is shored up, the price goes up to $80,000. So, a policy decision was made that it was neither reasonable nor necessary at a low-risk site to shore-up a house and endanger the foundation. The solution to that is a notice of residual petroleum on the property coupled with a notice of no further action required from the Department.

Senator Kinnaird asked Mr. Nicholson if it takes some time for the petroleum to dissipate where it is not of any danger to the soil.

Mr. Nicholson said that petroleum does degrade in soil and groundwater over time. Sometimes it takes 10 years 100 years depending on soil types. Even with a notice of residual petroleum on a property, the property is not put out of use indefinitely. If someone wants to dig a basement or a well on contaminated soil, there is some chance that natural continuation has occurred and the levels of contamination have fallen below unrestricted use.

Mr. Nicholson said there is also always an opportunity for someone to do remediation for that specific project.

Senator Odom asked Mr. Nicholson if heating oil does naturally dissipate with time.

Mr. Nicholson answered in the affirmative.

Senator Odom told Mr. Nicholson that he agreed with a notice opposed with removing a foundation and spending money on remediation and said he was pleased with this.

Senator Odom suggested that some of the low risk sites have nothing done to them and to have some type of notice given with potential for problems. And, if down the road there was a problem, it could be revisited and some of the money from the Non-Commercial Fund could be used.

Senator Albertson said he had more concerns from UST's in the past year. He said that one of his constituents had been trying to have a site cleaned up for the past four years and he was having trouble doing so. He wanted to know why it takes so long to get anything done.

Representative Gibson asked Mr. Givens if the UST working group was headed toward the right way in addressing pay for performance.

Mr. Givens said that a new series of meetings would be held soon to identify these concerns including pay for performance.

Representative Warwick asked Mr. Nicholson what who receives the notices that are sent out when contamination is found on a site.

Mr. Nicholson said the tank owner files the notice of residual petroleum in the chain of title on a property in the Register of Deeds office. The Department also has the authority to do this if the tank owner does not.

Representative Warwick asked what the potential number of residential sites was in the State that were contaminated.

Mr. Nicholson said that he estimated 250,000 home heating oil tanks in the state; however, all of them were not low-risk and/or leaking.

Representative Warwick asked Mr. Nicholson how many times thus far had notices been sent out.

Mr. Nicholson said that so far they had used notices twice.

Representative Hill asked Mr. Nicholson on low-risk commercial sites is there some point and time that they could be released.

Mr. Nicholson said that as a resource focusing mechanism, what they are doing is not working on low-risk sites unless there is a property transfer involved. They have their hands full with the medium and high-risk sites. So, they are typically not issuing "no further action" letters on low-risk sites.

Representative Hill asked Mr. Nicholson if Wilmington is in his area.

Mr. Nicholson answered in the affirmative.

Representative Hill suggested that Mr. Nicholson notify residents in the Wilmington area that they are typically not issuing "no further action" letters on low-risk sites.

Mr. Nicholson said that one of the problems with controlling the UST Program Funds, the way they are presently set up. He said that the Commercial Fund is set up with a deductible amount. Typically, when a leak is discovered, the first $20,000 is paid toward the assessment and remediation of that leak. A typical price tag on a clean up is $100,000 to $125,000 on a site. That means that the Fund picks up the balance. For the non-commercial fund, there is no deductible, so the fund picks up the entire amount of assessment and remediation.

Mr. Nicholson said that the tank owner becomes physically uninvolved in the process very early. Once they hit their deductible, it is of no concern to them how much money it costs to do the job and they are hiring the contractor.

Mr. Nicholson said that what they would like to see is a co-payment in both instances and probably eliminate the deductible, which would keep the tank owner involved in watching the contractor to get the best price from start to finish of the clean up.

Senator Odom said that this seemed logical but suggested this be pursued with caution.

Senator Kinnaird said that there was some program that had problems with contractors charging for very little work and asked if this was the UST program.

Mr. Givens answered by saying that consultants and contractors have been an issue in this program for some time.

Mr. Givens said that one of the factors that affect the availability of reimbursement rate under the non-commercial fund is the transfer of $2 million out of that Fund to the General Fund.

Mr. Givens said that he had asked the Department to assemble a list of all such transfers for the ERC's information.

Senator Kinnaird asked if the UST Funds were some that the Governor had access to last year.

Senator Odom said that both the Governor and the Appropriations Committee had access to these funds.

Mr. Nicholson concluded by saying that trying to implement secondary containment on commercial tanks would help catch the leak before it hit soil and groundwater and save a lot of money.

Mr. Nicholson said that part of the fix is a legislative fix that eliminates the 50 percent restriction on use of funds.

Senator Odom asked Mr. Nicholson about page 2 of the report with regard to inspection. He said it did not make sense that it would take one day for one person to make an inspection. He asked that someone follow up on this.

Mr. Givens told Senator Odom that the Working Group would address this issue in their meetings.

Mr. Richard E. Rogers, Jr., Director, Office of Conservation and Community Affairs, DENR, gave an update with regards to the Department's land and water conservation initiative and reports on land acquisition and million-acre initiative. Three handouts, the 2001-2002 Annual Report on North Carolina Parks and Recreation Trust Fund, the Award Report on the Natural Heritage Trust Fund, and the 2002 Annual Report on the NC Million Acre Initiative are listed as **Exhibit I**.

Mr. Rogers said that there have been meeting across the state to get feedback on the issue of protecting and conserving our natural resources. They are currently in the process of compiling a draft map with regard to conservation in the State and also compiling a report to be presented at a statewide conference on land and water conservation on April 16-17, 2003 to be held at the Raleigh Convention Center.

Mr. Rogers reviewed the handout on the Parks and Recreation Trust Fund.

Senator Kinnaird asked Mr. Rogers what happened to the Jocasse Gorges purchase.

Dr. Phil McKnelly, Director of Parks and Recreation Division of DENR, was called on to answer this question. He said that the Jocasse Gorges land

had been purchased and a master plan was being developed for this purchase. When that master plan was completed and accepted, they would begin on the development of the land.

Next, Mr. Rogers reported on the Natural Heritage Trust Fund and the Conservation Tax Credit Program.

Mr. Rogers commented that the Conservation Tax Credit Program was one of the great programs in state government, which provides tax credit for the donation of property for conservation easements.

Mr. Rogers added that the total acres donated since the conception of this program in 1983, has been 98,800 acres with a total value of $252 million dollars. In the tax year of 2001, 15,600 acres were donated at a value of $80 million and a total of 86 donations made by individual and corporations.

Senator Odom asked Mr. Rogers if there was a handout on this subject and Mr. Rogers assured Senator Odom that a report would be ready next week.

Mr. Rogers then covered the report on the Million Acre Initiative. He noted that while great things are going on, they are not happening at the rate that is needed. The Institute of Government reported that it would take $125 million in additional funds if the proper amount of acreage was acquired per year. Right now, an additional $180 million is needed in order to make our goal with regard to this program.

Senator Odom asked Mr. Rogers if for the calendar year 1999-2000, there was 112,000 and calendar year 2001 there was 863 for a total of 175,000 acres that has been added as a credit toward the one million acres.

Senator Odom asked Mr. Rogers if that included what was already under protection.

Mr. Rogers said that it was not.

Senator Odom asked Mr. Rogers how many acres they expected to acquire in 2002.

Mr. Rogers said they expected about 80,000 acres.

Senator Clodfelter asked Mr. Rogers how much of that 175,000 acres would have been acquired without the million acre initiative.

Mr. Rogers said that considering there was new funding in the program, he would imagine the same amount would have been acquired.

Senator Odom recognized and welcomed Mr. D. G. Martin and Mrs. Catherine Bauman, Director of Government Affairs for the Southeast Region for the Trust for Public Land.

Mr. William E. Holman, Executive Director, Clean Water Management Trust Fund, gave the annual report on implementation of the Clean Water Management Trust Fund. A copy of this report is listed as **Exhibit J**.

Mr. Holman said that the longer annual report is available for any members who would like to have one.

Mr. Holman said that the major water issue in the past year was the drought. The General Assembly took positive action on this issue with recognition of connection between water quantity and water quality. He said that some of the projects they have funded have enhanced the State's efforts of dealing with water supply.

Mr. Holman said that wastewater reuse projects had also been started, one in Chatham County.

Mr. Holman also said that about half of the funding the General Assembly provided was in turn provided to local governments.

Mr. Holman highlighted some of the successes of calendar year 2002. He said that Trustees approved 89 grants for a total of $65 million. They were able to fund about one-third of the requests. Projects were spending half of their money on acquisition of lands or easements for buffers and wetlands and about one fourth for restoration and storm water projects and another quarter for wastewater projects.

Mr. Holman concluded by saying that he looked forward to working with the General Assembly again this year. He said that they partner with other trust funds and hoped that funding would continue.

Senator Kinnaird asked Mr. Holman if the Bush Administration's changes in regulations on wetland affect us locally.

Mr. Holman said that if the federal regulations are rolled back, the state regulations on isolated wetlands would remain in place.

Senator Kinnaird asked if this affected us, would our targets be slightly different.

Mr. Holman said that they would look for opportunities in protecting both regulated and unregulated wetlands.

Representative Hackney added that it was the Supreme Court of the United States that created the gap and the Bush Administration was trying to fill in the gap. They are promulgating regulations that would allow part of the field that was taken off the table by the Supreme Court to come under regulation.

Senator Odom encouraged members to be in attendance at next week's meeting on 23 January 2003.

The meeting was adjourned at 12:00 Noon.

Senator Fountain Odom	Mary R. Watson
Presiding Co-Chair	Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Handout: Final disposition of bills recommended by the Commission during the Short Session of the 2001 General Assembly
EXHIBIT E:	Quarterly Report on Environmental Management Commission (EMC) activities
EXHIBIT F:	Powerpoint Presentation by Coleen Sullins on NC Phase II Stormwater Regulations
EXHIBIT G:	Annual report presented by John N. Morris, Director, Division of Water Resources, DENR, on the development of the State Water Supply Plan.
EXHIBIT H:	Handouts: Semi-annual report on the Leaking Petroleum Underground Storage Tank Cleanup Program
EXHIBIT I:	Annual Reports on North Carolina Parks and Recreation Trust Fund, Natural Heritage Trust Fund and the 2002 Annual Report on the NC Million Acre Initiative
EXHIBIT J:	Report on Clean Water Management Trust Fund Presented by Bill Holman, Executive Director

January 16, 2003 ERC Meeting
EXHIBIT A

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18 December 2002

TO: Interested Parties – Environmental Review Commission

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meetings; Additional Information**

COMMISSION MEETING:

The Environmental Review Commission will meet at 9:30 a.m. Thursday 16 January 2003 and at 9:30 a.m. Thursday 23 January 2003 in Room 544 of the Legislative Office Building in Raleigh.

At these meetings, the Commission will hear reports from State agencies, consider studies for which the Commission is responsible, discuss topics to be considered at future meetings, and attend to other matters.

PLANNING MEETING:

To facilitate development of the agenda for the 16 and 23 January 2003 meetings and subsequent meetings of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel will hold an informal planning meeting at **10:00 a.m. on Wednesday 8 January 2003 in Room 605 of the Legislative Office Building**. Persons who wish to participate in the development of the agenda for meetings of the Commission, or who are interested in any matter before the Commission, are invited to attend.

FUTURE MEETINGS:

The General Assembly will convene for the 2003 Session of the General Assembly at 12:00 noon on Wednesday 29 January 2003.

The Commission may meet at other times while the General Assembly is in session (G.S. 120-70.44). If the Commission meets while the General Assembly is in session, written notice will not be mailed to persons on the mailing list. Rather, notice will be given at a session of the Senate and House of Representatives as provided by G.S. 143-318 (b). The Commission will resume a schedule of regular monthly meetings following adjournment of the 2003 Session of the General Assembly. Mailed notices of Commission meetings will resume at that time.

ADDITIONAL INFORMATION:

Persons who have questions about the Commission meeting, the planning meeting for the Commission meeting, or other matters related to the Commission may contact the Commission Counsel at (919) 733-2578.

Posted: 18 December 2002
Press ___
Committee Record ___
Interested Parties ✓

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

SENATOR FOUNTAIN ODOM
CO-CHAIRMAN
1109 GREENWOOD CLIFF
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(919) 733-2578

18 December 2002

TO: Members of the Environmental Review Commission

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meetings; Additional Information**

COMMISSION MEETING:

The Environmental Review Commission will meet at 9:30 a.m. Thursday 16 January 2003 and at 9:30 a.m. Thursday 23 January 2003 in Room 544 of the Legislative Office Building in Raleigh.

At these meetings, the Commission will hear reports from State agencies, consider studies for which the Commission is responsible, discuss topics to be considered at future meetings, and attend to other matters.

RETIRING MEMBERS PLEASE NOTE:

During the 2002 Regular Session, the General Assembly amended G.S. 120-70.42 (Membership; cochairs; vacancies; quorum) by adding the following:

> "Except as otherwise provided in this subsection, a member of the Commission shall continue to serve for so long as the member remains a member of the General Assembly and no successor has been appointed. A member of the Commission who does not seek reelection or is not reelected to the General Assembly may complete a term of service on the Commission until the day on which a new General Assembly convenes. A member of the Commission who resigns or is removed from service in the General Assembly shall be deemed to have resigned or been removed from service on the Commission."

The purpose of this amendment is to allow members of the Commission who are not returning as members of the General Assembly in the 2003 Regular Session to complete their term of service on the Commission. Members to whom this provision applies will be paid travel expenses as though they were public (non-legislative) members of the Commission.

FUTURE MEETINGS:

The General Assembly will convene for the 2003 Session of the General Assembly at 12:00 noon on Wednesday 29 January 2003.

The Commission may meet at other times while the General Assembly is in session (G.S. 120-70.44). If the Commission meets while the General Assembly is in session, written notice will not be mailed to persons on the mailing list. Rather, notice will be given at a session of the Senate and House of Representatives as provided by G.S. 143-318 (b). The Commission will resume a schedule of regular monthly meetings following adjournment of the 2003 Session of the General Assembly. Mailed notices of Commission meetings will resume at that time.

ADDITIONAL INFORMATION:

Persons who have questions about the Commission meeting, the planning meeting for the Commission meeting, or other matters related to the Commission may contact the Commission Counsel at (919) 733-2578.

January 16, 2003 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

DATE 1-16-03

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Doug Lassiter	NCSTA	336 784 5311
Laura DeVivo	DENR	
Kim Hibbard	NC League of Munic.	715-3936
Jim Lowry	NC Utility Contractors Assn	383-0044
Tom Bonn	NC Service Station Assn	851-3614
Rick Zechini	NC Assn. of Realtors	856-9155
Don Rayno	NCDENR-DWR	715-3047
Mark Lynn	NC Ports	910.790.2296
Bob Steelman	NC Forestry Assn	834-3943
Thomas M Reeder	NCDENR - DLR	733-4574
Dexter Matthews	Waste Management ENR	7334996
Doug Howey	NC Petroleum Marketers Assn	782-4411
Paula S. Thomas	EMEC	420-0590
Lisa D Martin	NCHBA	676-9090
Jerry Hardesty	Nicholas Co	781-0361

VISITOR REGISTRATION SHEET

DATE 1-16-03

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Beth Anne Murdock	NCPC	781 0361
DAVID M. BARNES	Poyner + Spruill LLP	
David Jerose	ENRISCO	570-0186
Bill Pate	NC Div of Public Health	715-6432
Joe Wiseman	CDM	787-5620
Marlin Dayvault	NC Sierra Club	933-8467
Bill Flournoy	DENR	715-4191
Steve Wall	Conservation Council	839-0020
Boyd DeVane	DWQ	733-5083 x550
Grady McCallie	NC Conservation Network	857-4698
David Vogel	NC Div. Soil & Water Conservation	715-6097
Alan Klimek	NC Div Water Quality	733-7015
Dave Moreau	EMC	919 962 4756
Pamela Millward	NCREC	919 875-3700
Bradley Bennett	DWQ	919-733-5083
Coleen H. Sullins	DWQ	919-733-5083 x550

VISITOR REGISTRATION SHEET

DATE 1-16-03

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Beth Warren	Att'y Gen's Office	716-6900
Tammy Harvey	"	"
Hawley Irvax	Office of the Governor	715-1455
Wade Rawlins	News & Observer	829-4528
Grover Nicholson	NC DENR	733-1300
Colleen Kachurek	Hofler, Caldwell	831-1801
Steve Woodson	NCFB	782-1705

VISITOR REGISTRATION SHEET

DATE 1-16-03

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Erica Upton Peterson	NC agribusiness Council	782-4063

January 16, 2003 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

SENATOR FOUNTAIN ODOM
CO-CHAIRMAN
1109 GREENWOOD CLIFF
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JEFF W. HUDSON
ASSISTANT COMMISSION COUNSEL
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(919) 733-2578

AGENDA
9:30 a.m. Thursday 16 January 2003
Room 544 – Legislative Office Building

1. Call to order
   Senator Fountain Odom, Presiding

2. Introductory remarks by Cochairs
   Senator Fountain Odom
   Representative Pryor Gibson

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Quarterly report by the Environmental Management Commission (EMC) as to its operations, activities, programs, and progress (G.S. 143B-282(b))
   Dr. David H. Moreau, Chairman
   Environmental Management Commission, DENR

5. Report on the development and implementation of rules and programs to control stormwater runoff (G.S. 143-214.7(e))
   Coleen Sullins, Chief
   Water Quality Section, Division of Water Quality, DENR

6. Annual report on the development of the State Water Supply Plan (G.S. 143-355(n))
   John N. Morris, Jr., Director
   Division of Water Resources, DENR

7. Annual report on the Leaking Petroleum Underground Storage Tank Cleanup Program (G.S. 143-215.94M)
   Grover C. Nicholson, III, Chief
   Underground Storage Tank Section, Division of Waste Management, DENR

8. Update on the State's land and water conservation initiatives
   Annual report on allocations from the Parks and Recreation Trust Fund from the prior fiscal year (G.S. 113-44.15(c))

   Semiannual report on acquisitions made with funds from the Natural Heritage Trust Fund (G.S. 113-77.9(e)); Biennial report on the Natural Heritage Trust Program (G.S. 113A-164.4(7))

   Annual report on implementation of the Conservation Easements Program and inventory of all conservation easements held by the Department of Environment and Natural Resources (G.S. 113A-235(c))

   Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands (G.S. 113A-241(c))

   Richard E. Rogers, Jr., Director
   Office of Conservation and Community Affairs, DENR

9. Annual report on implementation of the Clean Water Management Trust Fund (G.S. 113-145.6A(a))
   William E. Holman, Executive Director
   Clean Water Management Trust Fund

10. Commission discussion and announcements

11. Adjourn

FUTURE MEETINGS:

9:30 a.m. Thursday 23 January 2003
Location: 544 Legislative Office Building

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Leaking Underground Storage Tank Working Group
10:00 a.m. Monday 3 February 2003 – 605 Legislative Office Building

January 16, 2003 ERC Meeting
EXHIBIT D

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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MEMORANDUM
January 16, 2003

To: Environmental Review Commission
From: Tim Dodge, Research Assistant for Environmental Issues
Re: Handouts

Attached to this memorandum you will find copies of the following documents:

1. List of the final disposition of bills recommended by the Commission during the 2002 Short Session of the 2001 General Assembly.

2. Reports submitted to the Environmental Review Commission (Commission) since the last report distribution in May 2002 that will not be presented orally in January 2003:
   - *Annual Report on Implementation of the Resident Inspectors Program at Commercial Hazardous Waste Facilities.* Division of Waste Management, DENR. October 2002. Statutory Authority: G.S. 130A-295.02(m).
   - *Quarterly Status Report on Permitting and Inspecting Animal Waste Management Systems for the Period Beginning April 1, 2002, and ending June 30, 2002.* Division of Water Quality, DENR. October 2002. Statutory Authority: G.S. 143-215.10M.

3. Spreadsheet summary of reports to be submitted to the Commission.

4. Spreadsheet summary of studies to be conducted by the Commission.

Please contact George Givens, Jeff Hudson, or me if you have any questions or comments.

Final Disposition of Bills Recommended by ERC in 2002

short title	Bill Numbers	Sponsors	Final Disposition
2002 Environmental Technical Corrections	HB 1570	Gibson	provisions placed in HB 1007; SL 2002-165
	SB 1261	Albertson	
Amend CAMA Variance Process	HB 1544*	Weiss	SL 2002-68
	SB 1254	Odom	
Amend Notice Period for Water Quality Permits	SB 1250	Odom	Senate Agriculture, Environment & Natural Resources
Amend Pollution Abatement Tax Exclusion	HB 1577	Gibson	SL 2002-104
	SB 1253*	Odom	
Clarify LUST Land-Use Restrictions/ Deed Recordation	HB 1575*	Gibson	SL 2002-90
	SB 1227	Plyer	
Elk Knob added to State Parks System			Provisions placed in HB 1545; SL 2002-89
Environmental Reports Amendments	HB 1572*	Gibson	SL 2002-148
	SB 1258	Albertson	
Establish Electronics Recycling Program	HB 1565	Hackney Dedmon	House Environment/ Senate Finance
	SB 1255	Odom Albertson	
Extend Animal Waste Management System Inspection Pilot	HB 1537*	Hill Gibson	SL 2002-176
Extend Certain Compliance Deadlines	HB 1584*	McComas	SL 2002-24
Hazardous Waste Generator Fee Increase	HB 1563	Hackney Blue	House Finance/ House Finance
	SB 1259	Albertson Clodfelter	
Inactive Hazardous Sites Amendments	HB 1564*	Hackney Blue	SL 2002-154
Land Conservation Statute Amendments			SL 2002-155
	SB 1252*	Odom Albertson	
Merge Radiation Protection into Division of Environmental Health	HB 1574	Gibson	SL 2002-70
	SB 1251*	Odom	

* Indicates version which became law.

short title	Bill Numbers	Sponsors	Final Disposition
Natural Areas Added to State Parks System	HB 1545*	Baker Gibson	SL 2002-89
	SB 1226	Foxx Berger	
Nature & Historic Preserve and Park System Removals			SL 2002-149
	SB 1211*	Horton	
No Airboats on Lake Tillery	HB 1579	Gibson	Senate State and Local Government
Nolichucky River Basin/Basinwide Water Quality Mgt.	HB 1541	Buchanan Gibson	Senate State and Local Government
Park and Rec Mutual Aid Agreement Authority	2002-111		SL 2002-111
	SB 1262*	Albertson Clodfelter	
Scrap Tire Amendment	HB 1573	Gibson	Sunset repeal provisions placed in HB 1578; SL 2002-10
	SB 1249	Odom Albertson	
Sedimentation Act Amendments	HB 1568	Weiss Hackney	Senate Finance / Senate Finance
	SB 1263	Albertson Clodfelter	
Winery Wastewater Management			House Rules
	SB 1210	Horton	

* Indicates version which became law.

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

October 4, 2002

Mr. George Givens, Commission Counsel
Environmental Review Commission
Room 545
Legislative Office Building
Raleigh, NC 27601-1096

Dear Mr. Givens:

In 1990, the General Assembly ratified Senate Bill 1631, AN ACT TO REQUIRE RESIDENT INSPECTORS AT COMMERCIAL HAZARDOUS WASTE FACILITIES. As a result, Article 9, G.S. 130A-295.02 requires the Division of Waste Management to employ resident inspectors to monitor the activities of all the commercial hazardous waste facilities within the state to ensure their compliance with laws and rules administered by the Department of Environment and Natural Resources.

The act further requires that reports be submitted to the Environmental Review Commission and the Joint Legislative Commission on Governmental Operations regarding the implementation of this program. On July 20, 1992, the General Assembly ratified House Bill 528 [Article 9, G.S. 130A-295.02(m)], which requires the program to make an annual report beginning September 1, 1992.

The Resident Inspector Program's 2002 Annual Report covering FY 2001-2002 is attached. If you have any questions, please contact Michael Brailsford, program supervisor for the Resident Inspector Program, Hazardous Waste Section at (919) 733-4996, ext. 359.

Sincerely,

William Ross
Secretary

mb/WR
Enclosure

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR

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RESIDENT INSPECTOR PROGRAM

2002 ANNUAL REPORT

Presented to

The Environmental Review Commission
and
The Joint Legislative Commission
On Governmental Operations

September 1, 2002

NCDENR
North Carolina Department of
Environment and Natural Resources

HAZARDOUS WASTE SECTION

www.enr.state.nc.us

State of North Carolina
Michael F. Easley
Governor

Department of Environment and Natural Resources
William G. Ross
Secretary

Division of Waste Management
Dexter R. Matthews
Director

Hazardous Waste Section
Jill B. Pafford
Chief

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www.enr.state.nc.us

Resident Inspector Program
Michael Brailsford
Program Supervisor
(919) 733-4996, ext. 359
or (704) 947-9512

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RESIDENT INSPECTOR PROGRAM
2002 ANNUAL REPORT

This annual report is presented to the Joint Legislative Commission on Governmental Operations and the Environmental Review Commission pursuant to Article 9; G.S. 130A 295.02(m). The report covers the activities of the Resident Inspector Program from July 1, 2001 through June 30, 2002.

I. OVERVIEW

The Resident Inspector Program has been operating for more than 11 years in the Division of Waste Management. This program monitors all aspects of the commercial hazardous waste facilities in North Carolina and assures compliance with all laws and rules administered by the Department of Environment and Natural Resources. It may also enforce laws or rules administered by any other state agency through a memorandum of agreement.

The Resident Inspector Program was established "... to enhance the ability of the Department to protect the public health and the environment by providing the Department with the authority and resources necessary to maintain a rigorous inspection and enforcement program at commercial hazardous waste facilities" [G.S. 130A-295.02(f)].

II. PROGRAM STAFFING

For this fiscal year, the program was comprised of two resident inspectors, one administrative assistant and a program supervisor (See Attachment 1 for Organization Chart). The Resident Inspector Program resides within the Hazardous Waste Section's Compliance Branch.

III. THE RESIDENT INSPECTOR

Most state agencies perform their compliance monitoring inspections as required from their respective regulations. The Resident Inspector Program, however, is unique in that its inspection strategy is a multi-media approach; which covers all regulatory responsibilities for which DENR is authorized, such as hazardous waste management and treatment requirements, air emission requirements, water treatment and discharge requirements, etc.

There are inherent overlaps of DENR's regulatory requirements inherently overlap regulations administered by other departments. Two examples include the Department of Labors Occupational Safety & Health Act, and the Department of Transportation's hazardous materials transportation regulations. Deviations from these various departments' regulations could adversely affect public health and the environment, as well as a facility's compliance with air, water or hazardous waste management regulations. As part of the Resident Inspector Program's comprehensive approach to monitoring commercial hazardous waste facilities, resident inspectors also evaluate these sites for potential violations in other regulatory areas. When necessary, they make recommendations to the facilities and/or make referrals to the authorized agency or agencies. The mandated frequency of inspection at each facility gives resident inspectors the time needed to achieve this degree of oversight.

To prepare resident inspectors for their multimedia approach to inspections, initial training typically consists of Hazardous Waste Operations and Emergency Response (24 or 40 hours), Environmental Surveillance, RCRA Hazardous Waste Training, Hazardous Materials Transportation and the care and use of Level B / Personal Protective Equipment.

Annual training for resident inspectors includes an eight-hour Health & Safety Basic Refresher, Level B Update and Environmental Surveillance Update. Depending upon the inspector's area of expertise and responsibility, other miscellaneous training may be received, including Hazardous Waste Incineration, Ambient Air Monitoring, Air Pollution Control Devices, Chemical Safety Audit, OSHA Inspector's Course, Hazardous Materials Management and various EPA regulatory workshops.

IV. SUBJECT FACILITIES

To be subject to oversight by the Resident Inspector Program, the facility must be a commercial hazardous waste facility. The term "commercial," as it relates to a hazardous waste facility is defined as a facility " ... that accepts hazardous waste from the general public or another person for a fee" [G.S. 130A-290(a)(3)]. Presently, there are 12 permitted and one "interim status" commercial hazardous waste facilities in North Carolina under the jurisdiction of the Resident Inspector Program. The "interim status" facility (Carolina Solite Corporation) and two permitted facilities (Giant Resource Recovery and EnviroChem Environmental Services) continue with their previously announced intention to close all hazardous waste operations at their North Carolina locations.

V. FACILITY CATEGORY RANKINGS

Each commercial hazardous waste facility is ranked to determine its program fees and minimum inspection frequency. The frequency of the inspections at each facility is dependent upon its qualification as a "special purpose" commercial hazardous waste facility and the category ranking assigned to it.

Currently, all existing commercial hazardous waste facilities in North Carolina qualify as special purpose facilities. (See Attachment 2 for current category rankings and primary waste management activities for these facilities.) The designated Categories of 1, 2 or 3 correspond to a minimum inspection frequency of two, four or six times per month, respectively.

VI. FUNDING & EXPENSES

The Resident Inspector Program is completely funded by fees collected from the commercial hazardous waste facilities that require a permit. These fees are based upon each facility's category ranking and the volume of hazardous waste handled. The category ranking system is designed to be an indirect measure of the costs associated with the oversight at each commercial hazardous waste facility. With the overall reduction of hazardous waste generation by industry, the commercial hazardous waste facilities tonnage throughput has decreased. Consequently, the fees received from these facilities have decreased.

For FY 2001-2002, the budget was developed using anticipated revenues from the Resident Inspector Program . The fees estimate was approximately $275,000. Due to the impact to general industry by the "September 11" disaster, the actual hazardous waste tonnage received by many of the commercial facilities was significantly lower than projected. A detailed list of the individual tonnage received by each of the commercial hazardous waste facilities in FY 2001-2002 can be found in Attachment 3.

The Actual Program receipts in FY 2001-2002 totaled $252,616. Anticipating the economic downturn resulting from "9-11," budget restrictions for travel, training and supplies were imposed and expenses were held to a minimum of $232,756 in accordance with state budget mandates. Consequently, the program supervisor has taken on inspection responsibilities in order to meet program mandates.

VII. INSPECTION GOALS & ACHIEVEMENT

During the past fiscal year, the program staff conducted a total of 570 inspections. The additional 66 inspections over the required minimum of 504 were performed to monitor closure activities at two facilities and to stem poor compliance performance at other facilities. A detailed list of the inspections performed by program staff at the commercial hazardous waste facilities in FY 2001-2002 can be found in Attachment 4.

VIII. ENFORCEMENT & COMPLIANCE

Enforcement Activities

Excessive personnel turnover at two of the commercial TSDF facilities relates directly to poor compliance. However, the commercial hazardous waste facilities generally continue to be cooperative. In most cases, they have rapidly responded with corrective action when deficiencies or violations were cited or recommendations were made.

When either of these actions do not result in timely and consistent compliance, more severe enforcement action, such as compliance orders with administrative penalties, is taken.

During the past fiscal year, resident inspectors issued seven Notices of Violation to the commercial facilities (see Attachment 5). Additionally, one compliance order with an administrative penalty of $27,500 was issued to Heritage Environmental Services. This translates to an overall compliance rate of 98.4 percent.

Compliance Assistance Activities

Compliance assistance activities offered under this program are conducted routinely during the inspectors' site visits. Since the inspectors visit these facilities at least twice a month, they have the opportunity to become familiar with each facility's operation and may offer compliance assistance in several ways.

Inspectors identify past trouble areas and work with the facility toward a permanent solution. They also increase scrutiny of these areas during each visit to keep the facility's compliance awareness high. Inspectors communicate frequently with facility management and front-line workers to clarify the permit and current regulatory requirements, the reasons for the requirements, and the potential risks incurred at noncompliance. Inspectors continue to schedule customized roundtable-training workshops at each specific facility. These workshops cover the most frequent violations observed at commercial facilities, the most frequent violations observed at their particular facility, any potential areas of concern, and positive facility operations.

If a facility repeats a violation, the primary inspector and program supervisor will set up an informal enforcement conference with the local facility compliance managers, the plant manager and, if applicable, the corporate compliance officers. They discuss the facility's current compliance issues and work with the facility to find a permanent solution which may include formal enforcement.

IX. PUBLIC MEETINGS / HEARINGS & PERMIT RENEWALS

Resident Inspector Program staff continue to attend public meetings/hearings that involve existing and proposed commercial hazardous waste facilities in this state. A continuing program goal is for the staff to be fully aware of public concerns and to be conscious of these concerns during oversight efforts at these facilities. Program staff have provided assistance in facility compliance audits by generators, consultants, other agencies and the public. Program staff also work with area schools to provide information in the classroom about environmental responsibility and how the facilities help with that responsibility.

Resident Inspector Program staff members continue to work with the Facility Management Branch, the permitting arm of the Hazardous Waste Section, and the commercial hazardous waste facility during the permit application process and permit renewal review periods. Working closely together provides clarification for both programs, addresses areas of mutual concern and assists in ensuring the permit application accurately reflects the facility as it is operated, or vice-versa.

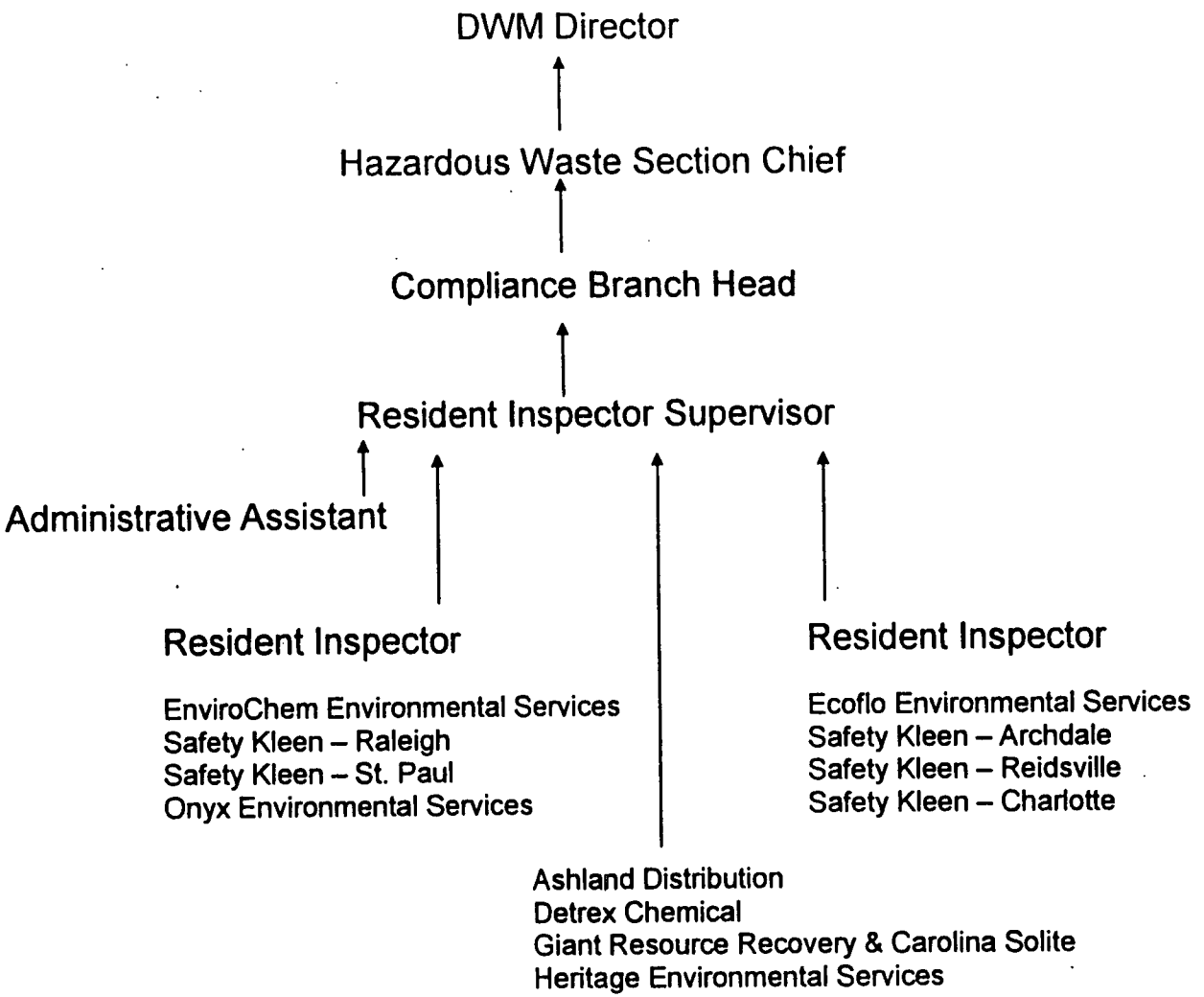
X. SUMMARY

At the conclusion of the program's 11 year history, Resident Inspector staff continue to provide rigorous oversight of the commercial hazardous waste facilities in this state. This is reflected in the facilities' overall compliance rate of 98.4 percent. Staff constantly seek new approaches and initiatives to improve the department's ability to protect public health and the environment. Staff also work to ensure that new regulatory requirements are fully understood by the facilities so they can be rapidly and correctly implemented. Proactive approaches, such as workshops, program oversight and compliance assistance efforts, have clearly demonstrated a heightened level of compliance at the commercial hazardous waste facilities in North Carolina.

ATTACHMENTS

ATTACHMENT 1
RESIDENT INSPECTOR PROGRAM

ORGANIZATIONAL CHART



ATTACHMENT 2
RESIDENT INSPECTOR PROGRAM

CATEGORY RANKINGS & PRIMARY MANAGEMENT

Commercial Hazardous Waste Facilities (FY 2001-2002)

FACILITY	CURRENT CATEGORY RANKING	Primary Waste Management
Ashland Distribution Co.	1	Container Storage
Detrex Chemical	1	Chlorinated Solvent Reclamation
ECOFLO, Inc.	3	Hazardous Waste Consolidation, Fuels Blending, Container Storage
EnviroChem Environmental Services	2	Container Storage
Giant Resource Recovery *	2	Fuels Blending
Heritage Environmental Services	3	Aqueous Treatment, Fuels Blending, Hazardous Waste Consolidation
ONYX Environmental Services	2	Container Storage
Safety-Kleen / Archdale	1	Mineral Spirits Reclamation
Safety-Kleen / Charlotte	1	Mineral Spirits Reclamation
Safety-Kleen / Raleigh	1	Mineral Spirits Reclamation
Safety-Kleen / St. Pauls	1	Mineral Spirits Reclamation
Safety-Kleen TS / Reidsville	3	Hazardous Waste Consolidation, Fuels Blending, Container Storage
Solite Corporation*	+	Energy Recovery

* Giant Resource Recovery & Solite Corporation are located together and are inspected at the same time –

+ Solite Corporation is a special purpose facility - interim status - Currently in closure

ATTACHMENT 3
RESIDENT INSPECTOR PROGRAM

RESIDENT INSPECTOR PROGRAM
ANNUAL HAZARDOUS WASTE TONNAGE RECEIVED REPORT
FY 2001/2002

COMMERICAL FACILITY	TONNAGE 2001/2002	TONNAGE 2000/2001	TONNAGE 1999/2000	TONNAGE 1998/1999
ASHLAND	3,108.87	3,711.66	3,978.10	4,005.39
DETREX	1,643.76	2,364.60	2,582.80	1,556.86
ECOFLO	4,131.37	6,221.00	6,092.37	9,617.43
ENVIROCHEM	0	176.39	873.74	588.15
GIANT/SOLITE	0	0	2,433.00	5,069.87
HERITAGE	2,501.15	4,850.90	5,519.38	5,309.26
ONYX	1,325.55	1,434.29	1,381.18	1,765.33
SK-ARCHDALE	728.90	854.30	858.70	923.46
SK-CHARLOTTE	653.30	865.20	952.00	1,011.12
SK-RALEIGH	676.50	829.80	863.54	924.01
SK-ST PAUL	396.00	482.90	534.22	643.90
SK-REIDSVILLE	5,333.92	4,788.78	5,207.73	13,791.65
TOTAL	**20,499.32**	**26,579.82**	**31,276.76**	**45,206.43**

ATTACHMENT 4
RESIDENT INSPECTOR PROGRAM

INSPECTION TOTALS

Commercial Hazardous Waste Facilities (FY 2001-2002)

FACILITY	REQUIRED INSPECTIONS	ACTUAL INSPECTIONS
Ashland Distribution Co.	24	29
Detrex Chemical	24	33
ECOFLO, Inc.	72	72
EnviroChem Environmental Services	48	67
Giant Resource Recovery & Solite Corp.	48	55
Heritage Environmental Services	72	87
ONYX Environmental Services	48	50
Safety-Kleen / Archdale	24	24
Safety-Kleen / Charlotte	24	27
Safety-Kleen / Raleigh	24	26
Safety-Kleen / St. Pauls	24	25
Safety-Kleen TS / Reidsville	72	75
TOTAL	**504**	**570**

ATTACHMENT 5
RESIDENT INSPECTOR PROGRAM

ENFORCEMENT OVERVIEW at COMMERCIAL HAZARDOUS WASTE FACILITIES (7/1/91 through 6/30/02)

FACILITY	NOVs FY 01-02	NOVs To Date	Compliance Orders FY 01-02	Compliance Orders To Date
ASHLAND	1	9	0	0
DETREX	1	11	0	1
ECOFLO	0	9	0	0
ENVIROCHEM [1]	0	8	0	1
GIANT [2]	0	12	0	0
HERITAGE	2	29	1	3
ONYX	0	10	0	1
SK-ARCHDALE [3]	1	14	0	0
SK-CHARLOTTE [3]	2	14	0	0
SK-RALEIGH [3]	0	11	0	0
SK-ST PAUL [3]	0	15	0	0
SK-REIDSVILLE [4]	0	15	0	0
SOLITE [5]	0	8	0	1
TOTALS	7	165	1	7

[1] EnviroChem Environmental Services, Inc. - Currently in closure

[2] Giant Resource Recovery (formerly Oldover) - Currently in closure

[3] SK = Safety-Kleen Corporation

[4] Safety-Kleen Technical Services (formerly Laidlaw)

[5] Solite Corporation has ceased operation as a hazardous waste burner - Currently in closure

Michael F. Easley, Governor
William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director
Division of Water Quality

MEMORANDUM

TO: Representative Pryor Allan Gibson, III
Co-Chairman, Environmental Review Commission
Room 419-A
Legislative Office Building

Senator Fountain Odom
Co-Chairman, Environmental Review Commission
Room 300-B
Legislative Office Building

FROM: William G. Ross Jr., Secretary WGR

RE: Quarterly Status Report on Permitting and Inspecting Animal Waste Management Systems for Period Beginning April 1, 20021 and Ending June 30, 2002

Pursuant to Chapter 15, Section 15.2(a) of the 1997 Session Laws, the Department of Environment and Natural Resources submits the subject quarterly report.

This report details the inspections and operational reviews completed in North Carolina during the second quarter of 2002 for both the Division of Water Quality and the Division of Soil and Water Conservation. The tables show the type of inspection and the number of inspections completed quarterly and year to date. The Pilot Project conducted by the Division of Soil and Water Conservation is still in effect for 2002. The tables also show the number of permits issued as well as violations and deficiencies by region.

The enclosed tables list totals for each of the Department's Regional Offices as well as state totals. The Regional Offices are noted as follows: ARO – Asheville Regional Office, FRO – Fayetteville Regional Office, MRO – Mooresville Regional Office, RRO – Raleigh Regional Office, WARO – Washington Regional Office, WIRO – Wilmington Regional Office, and WSRO – Winston-Salem Regional Office.

If there is a need for any additional information or clarification, please do not hesitate to contact us.

WGR/awk

Attachment

cc: Alan W. Klimek, P.E.

For Period Beginning April 1, 2002 and Ending June 30, 2002*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total number of Animal Operations Requiring Inspections and Operation Reviews during 2002	38	758	107	269	558	688	113	2527
DWQ Total number of inspections completed	7	224	32	114	195	208	38	818
Routine DWQ annual compliance inspections	7	218	31	107	177	185	32	757
Inspections conducted due to complaints	0	2	0	1	0	4	1	8
Follow-up of previous review or inspection	0	3	0	6	9	11	5	34
Emergency Notification	0	1	0	0	2	1	0	4
Other inspections	0	0	1	0	7	7	0	15
DSWC Total number of compliance inspections completed** (Brunswick, Columbus, and Jones County Only)	-	-	-	-	2	2	-	4
Routine DSWC annual compliance inspections	-	-	-	-	0	0	-	0
Inspections conducted due to complaints	-	-	-	-	0	2	-	2
Follow-up of previous review or inspection	-	-	-	-	1	0	-	1
Emergency Notification	-	-	-	-	1	0	-	1
Other inspections	-	-	-	-	0	0	-	0
DSWC Total number of operation reviews completed	0	43	32	52	73	156	6	362
Routine operation reviews	0	43	31	52	70	153	6	355
Inspections conducted due to complaints	0	0	1	0	0	0	0	1
Follow-up of previous review	0	0	0	0	3	2	0	5
Emergency Notification	0	0	0	0	0	0	0	0
Other inspections	0	0	0	0	0	1	0	1
Other Agency Total number of operation reviews completed***	0	0	0	0	0	0	0	0
Routine operation reviews	0	0	0	0	0	0	0	0

*Quarterly numbers are reported as of 06/30/02 and may vary from actual due to delays in data entry and continued refinements to database.

** Pilot Project. Compliance Inspections will only be conducted in Brunswick, Columbus, and Jones County by DSWC. Operation reviews are normally conducted in the Pilot Counties in the spring and compliance inspections are conducted in the fall. As of July 1, 1999, Brunswick County became part of the Pilot Project.

***Other Agencies include Soil and Water Conservation Districts and NRCS.

Average time to complete a compliance inspection or operation review is approximately 6 hours. It is anticipated that this time will increase as the number of farms that have certified animal waste management plans and permits increases.

For Period Beginning April 1, 2002 and Ending June 30, 2002

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Number of Permits Issued to Animal Operations	0	21	2	8	9	19	5	64
Swine	0	21	1	6	9	19	2	58
Cattle	0	0	1	2	0	0	3	6
Poultry	0	0	0	0	0	0	0	0
Horses	0	0	0	0	0	0	0	0

For Period Beginning April 1, 2002 and Ending June 30, 2002

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Deficiencies and Violations[1] found during DSWC operation reviews and DWQ inspections*	0	13	6	16	32	29	14	110
Number of facilities receiving a deficiency or violation from inspections	0	10	0	10	16	26	12	74
Enforcement actions initiated for violations noted during this quarter**	0	4	1	2	0	1	0	8

*Violation totals include violations noted during both operation reviews and compliance inspections and may include multiple violations at a single facility.

**Enforcement actions being developed by the regional staff are normally not shown as actions initiated during that quarter. These actions will be included in the next year to date totals.

Deficiencies and Violations Identified[1]	Total number of inspections with identified problem	Percent of total problems identified	Percent of total inspections completed (1,394)
Discharges from Animal Waste Management System	13	11.8	0.9
Of the total discharges identified, the number of discharges that reached surface waters of the state	(6)***	(5.5)	(0.4)
Inadequate Freeboard (Certified Farms)	8	7.3	0.6
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(1)	(0.9)	(0.1)
No Certified Operator in Charge	16	14.5	1.1
Evidence of over application	46	41.8	3.3
Does not meet setbacks	2	1.8	0.1
Inadequate land	4	3.6	0.3
Crop differs from that stated in Certified Animal Waste Management Plan	21	19.1	1.5
Totals	110****	100	

***Of the discharges to surface waters, 2 were from cattle operations, and 4 were from swine operations and 0 were from poultry operations.

****1,394 inspections and reviews were conducted. There were 7 potential problems evaluated on each report. Therefore the total possible deficiencies and violations that could have been noted was 9,758. The 110 problems identified represents 1.1% of the total potential number.

[1] From the period of 01/01/02 through 06/30/02, DWQ has issued roughly 22 Notice of Deficiencies, approximately 59 Notice of Violations. This number can only be estimated due to the slight time delay between the issuance of a NOD or NOV from the DWQ regional staff, and the receiving of the copy of the letter by the DWQ Central Office.

For Period Beginning April 1, 2002 and Ending June 30, 2002*

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM								
Deficiencies and Violations[1] Identified	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Discharges from Animal Waste Management Systems	0	4	0	1	2	3	3	13
Of the total discharges identified, the number of discharges that reached surface waters of the state	(0)	(2)	(0)	(0)	(1)	(1)	(2)	(6)
Inadequate Freeboard (Certified Farms)	0	0	0	3	3	0	2	8
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(0)	(0)	(0)	(0)	(0)	(0)	(1)	(1)
No Certified Operator in Charge	0	1	0	6	5	3	1	16
Evidence of over application	0	7	2	4	17	16	0	46
Does not meet setbacks	0	0	0	1	1	0	0	2
Inadequate land	0	1	0	0	0	3	0	4
Crop differs from that stated in Certified Animal Waste Management Plan	0	0	4	1	4	4	8	21
Totals	0	13	6	16	32	29	14	110

* Quarterly numbers are reported as of 06/30/02 and may vary from actual due to delays in data entry and continued refinements to database.

For Period Beginning April 1, 2002 and Ending June 30, 2002*

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM					
Deficiencies and Violations Identified[1]	Swine	Cattle	Poultry	Horses	State Totals
Discharges from Animal Waste Management System	10	3	0	0	13
Of the total discharges identified, the number of discharges that reached surface waters of the state	(4)	(2)	(0)	(0)	(6)
Inadequate Freeboard (Certified Farms)	6	1	1	0	8
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(0)	(1)	(0)	(0)	(1)
No Certified Operator in Charge	14	2	0	0	16
Evidence of over application	44	2	0	0	46
Does not meet setbacks	2	0	0	0	2
Inadequate land	4	0	0	0	4
Crop differs from that stated in Certified Animal Waste Management Plan	9	11	0	1	21
Totals	89	19	1	1	110

*Quarterly numbers are reported as of 06/30/02 and may vary from actual due to delays in data entry and continued refinements to database.

[1] From the period of 01/01/02 through 06/30/02, DWQ has issued roughly 21 Notice of Deficiencies, approximately 72 Notice of Violations. This number can only be estimated due to the slight time delay between the issuance of a NOD or NOV from the DWQ regional staff, and the receiving of the copy of the letter by the DWQ Central Office.

Year to Date Totals for 2002*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total number of Animal Operations Requiring Inspections and Operation Reviews during 2002	38	758	107	269	558	688	113	2531
DWQ Total number of inspections completed**	14	472	45	197	344	385	80	1537
Routine DWQ annual compliance inspections	14	450	42	166	311	337	65	1385
Inspections conducted due to complaints	0	6	0	2	0	7	3	18
Follow-up of previous review or inspection	0	6	0	15	18	24	12	75
Emergency notification	0	4	0	0	4	3	0	11
Other inspections	0	6	3	14	11	14	0	48
DSWC Total number of compliance inspections completed*** (Brunswick, Columbus, and Jones County Only)	-	-	-	-	5	4	-	9
Routine DSWC annual compliance inspections	-	-	-	-	0	0	-	0
Inspections conducted due to complaints	-	-	-	-	0	3	-	3
Follow-up of previous review or inspection	-	-	-	-	4	0	-	4
Emergency notification	-	-	-	-	1	0	-	1
Other inspections	-	-	-	-	0	1	-	1
DSWC Total number of operation reviews completed**	7	134	70	116	259	308	38	932
Routine operation reviews	7	134	69	116	239	302	38	905
Inspections conducted due to complaints	0	0	1	0	0	0	0	1
Follow-up of previous review	0	0	0	0	13	3	0	16
Emergency Notification	0	0	0	0	0	0	0	0
Other inspections	0	0	0	0	7	3	0	10
Other Agency Total number of operation reviews completed****	0	0	0	1	0	15	0	16
Routine operation reviews	0	0	0	1	0	15	0	16

*Year to date numbers are reported as of 06/30/02 and may vary from actual due to delays in data entry and continued refinements to database.

**Inspections and operation reviews may include facilities that are no longer in operation and/or multiple inspections or operation reviews at one facility.

***Pilot Project. Compliance Inspections will only be conducted in Brunswick, Columbus, and Jones County by DSWC. Operation reviews are normally conducted in the Pilot Counties in the spring and compliance inspections in the fall. As of July 1, 1999, Brunswick County became part of the Pilot Project.

****Other Agencies include Soil and Water Conservation Districts and NRCS.

Average time to complete a compliance inspection or operation review is approximately 6 hours. It is anticipated that this time will increase as the number of farms that have certified animal waste management plans and permits increases.

Year to Date Totals for 2002

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Number of Permits Issued to Animal Operations	1	46	3	15	15	32	10	122
Swine	0	45	2	10	15	32	3	107
Cattle	1	0	1	5	0	0	7	14
Poultry	0	1	0	0	0	0	0	1
Horses	0	0	0	0	0	0	0	0

Year to Date Totals for 2002

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Deficiencies and Violations[1] found during DSWC operation reviews and DWQ inspections**	1	32	13	27	48	58	18	197
Number of facilities receiving a deficiency or violation from inspections	1	26	0	17	24	52	16	136
Enforcement actions initiated for violations noted in 2002 Calendar Year***	0	6	2	2	0	2	0	12

**Violation totals include violations noted during both operation reviews and compliance inspections and may include multiple violations at a single facility.

***Enforcement actions being developed by the regional staff are normally not shown as actions initiated during that quarter. These actions will be included in the next year to date totals.

Deficiencies and Violations Identified[1]	Total number of inspections with identified problem	Percent of total problems identified	Percent of total inspections completed (2,494)
Discharges from Animal Waste Management System	28	14.2	1.1
Of the total discharges identified, the number of discharges that reached surface waters of the state	(10)****	(5.1)	(0.4)
Inadequate Freeboard (Certified Farms)	36	18.3	1.4
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(12)	(6.1)	(0.5)
No Certified Operator in Charge	18	9.1	0.7
Evidence of over application	70	35.3	2.8
Does not meet setbacks	2	1	0.1
Inadequate land	8	4.1	0.3
Crop differs from that stated in Certified Animal Waste Management Plan	35	17.8	1.4
Totals	197*****	100	

****Of the discharges to surface waters, 2 were from cattle operations, 8 were from swine operations and 0 were from poultry operations.

*****2,494 inspections and reviews were conducted. There were 7 potential problems evaluated on each report. Therefore the total possible deficiencies and violations that could have been noted was 17,458. The 197 problems identified represents 1.1% of the total potential number.

[1] From the period of 1/1/02 through 06/30/02, DWQ has issued roughly 42 Notice of Deficiencies, approximately 132 Notice of Violations. This number can only be estimated to date due to the slight time delay between the issuance of a NOD or NOV from the DWQ regional staff and the receiving of the copy of the letter by the DWQ Central Office.

Year to Date Totals for 2002*

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM								
Deficiencies and Violations[1] Identified	**ARO**	**FRO**	**MRO**	**RRO**	**WARO**	**WIRO**	**WSRO**	**State Totals**
Discharges from Animal Waste Management Systems	0	9	0	5	3	8	3	28
Of the total discharges identified, the number of discharges that reached surface waters of the state	(0)	(4)	(0)	(0)	(1)	(3)	(2)	(10)
Inadequate Freeboard (Certified Farms)	1	2	2	8	12	8	3	36
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(0)	(0)	(1)	(8)	(0)	(0)	(3)	(12)
No Certified Operator in Charge	0	1	0	6	5	5	1	18
Evidence of over application	0	13	3	5	21	26	2	70
Does not meet setbacks	0	0	0	1	1	0	0	2
Inadequate land	0	3	0	0	0	4	1	8
Crop differs from that stated in Certified Animal Waste Management Plan	0	4	8	2	6	7	8	35
Totals	1	32	13	27	48	58	18	197

*Year to date numbers are reported as of 06/30/02 and may vary from actual due to delays in data entry and continued refinements to database.

Year to Date Totals for 2002*

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM					
Deficiencies and Violations Identified[1]	**Swine**	**Cattle**	**Poultry**	**Horses**	**State Totals**
Discharges from Animal Waste Management System	24	4	0	0	8
Of the total discharges identified, the number of discharges that reached surface waters of the state	(8)	(2)	(0)	(0)	(10)
Inadequate Freeboard (Certified Farms)	29	6	1	0	36
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(3)	(8)	(1)	(0)	(12)
No Certified Operator in Charge	16	2	0	0	18
Evidence of over application	64	6	0	0	70
Does not meet setbacks	2	0	0	0	2
Inadequate land	7	1	0	0	8
Crop differs from that stated in Certified Animal Waste Management Plan	17	16	0	2	35
Totals	159	35	1	2	197

*Year to date numbers are reported as of 06/30/02 and may vary from actual due to delays in data entry and continued refinements to database.

[1] From the period of 1/1/01 through 06/30/02, DWQ has issued roughly 42 Notice of Deficiencies, approximately 132 Notice of Violations. This number can only be estimated due to the slight time delay between the issuance of a NOD or NOV from the DWQ regional staff, and the receiving of the copy of the letter by the DWQ Central Office.

Status of Reports to the ERC Required by Law

Organized by topics: air quality, coastal issues, environmental health, fishing, general, hazardous substances, land quality, parks and conservation, solid waste, water quality, water quantity, wetlands

air quality

DAQ	Report To/ Authority	Report Due	Status*
Study issues related to monitoring emissions of mercury and the development and implementation of standards and plans to implement programs to evaluate available control technologies; shall estimate the benefits and costs of alternative strategies to	EMC, ERC S.L. 2002-4, Section 12	Annually (Interim 1 Sep 2003) (Findings 1 Sep 2005)	
Study issues related to the development and implementation of standards and plans to implement programs to control emissions of carbon dioxide (CO2) from coal-fired generating units and other stationary sources; evaluate available control technologies and	EMC, ERC S.L. 2002-4, Section 13	Annually (Interim 1 Sep 2003) (Findings 1 Sep 2005)	

DENR	Report To/ Authority	Report Due	Status*
Progress in increasing the use of alternative-fueled and low-emissions light-duty cars and trucks in privately owned fleets	ERC GS 143-215.107C(c)	Annually (Oct 1)	16 Mar 00 27 Sep 00 oral
Cost of the Title V program	ERC, Fiscal Research GS 143-215.3A(c)	Annually (1 Nov)	Mar 00 mail 3/29/00 May 02 oral 5/21/02

DENR, Utilities Commission	Report To/ Authority	Report Due	Status*
Implementation of SL 2002-4 (Clean Smokestacks)	ERC, Joint Legislative Utility Review Committee S.L. 2002-4, Section 14	Annually (1 Jun 2003)	

Department of Administration	Report To/ Authority	Report Due	Status*
Progress in dev, implement plan w/DENR, DOT for 75% of new State cars, light trucks alt-fueled or low-emission by 1/1/2004.	ERC GS 143-215.107C(b)	Annually (Sep 1)	Sep 00 Distrib 1/18/01 Mar 02 Distrib 5/21/02

Department of Transportation	Report To/ Authority	Report Due	Status*
Evaluation/ adjustment of region served by each Metropolitan Planning Organization	ERC, Joint Legislative Transportation Oversight Committee GS 136-202(d)	Nov 1 of each year regions evaluated and adjusted (every 5 years, including year following federal census)	

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

Plan developed with DOA, Commerce, DENR to reduce VMT & vehicle emissions from private sector employee travel.	ERC, Joint Legislative Transportation Oversight Committee GS 143-215.107C(e)	Annually (Oct 1)	16 Mar 00 oral 27 Sep 00 distrib

EMC	**Report To/ Authority**	**Report Due**	**Status***
Progress in rulemaking to regulate NOx from complex sources (EMC Quarterly Report)	ERC SL 1999-328(4.9)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 (Jan 03 oral 1/16/03)
Desirability of requiring and the feasibility of obtaining reductions in emissions of oxides of nitrogen (Nox) and sulfur dioxide (SO2) beyond those required by G.S. 143-215.107D.	ERC, General Assembly SL 2002-4, Section 11	Annually, starting 2005 (Sep 1)	

Office of State Personnel	**Report To/ Authority**	**Report Due**	**Status***
Plan developed with DOA, DOT, DENR to reduce VMT & vehicle emissions from State employee travel.	ERC, Joint Legislative Transportation Oversight Committee SL 1999-328(4.6)	Annually (Oct 1)	09/00 Oral 12/00 Mar 02 Distrib 5/21/02
Promotion of telecommuting, as recommended by State Auditor	ERC SL 1999-328(4.8)	Annually (Oct 1)	09/00 Oral 12/00 Distrib 1/18/01 Feb 02 Distrib 5/21/02

fishing

CRC, EMC, and MFC	**Report To/ Authority**	**Report Due**	**Status***
Progress in developing and implementing Coastal Habitat Protection Plans	ERC, S&A GS 143B-279.8(e)	Annually (Sep 1)	Sep 99 oral 11/23/99 Sep 00 oral 01/11/01 Sep 01 distrib 01/30/02

DENR	**Report To/ Authority**	**Report Due**	**Status***
Fish kills within the preceding year	ERC GS 143B-279.7(c)	Annually (Dec 1)	Dec 99 oral 1/20/00 Jan 01 oral 1/18/01 Feb 02 oral 2/21/02

DENR (Secretary)	**Report To/ Authority**	**Report Due**	**Status***
Individual Coastal Habitat Protection Plans	ERC, S&A GS 143B-279.8(f)	30 days after complete or substantially revise draft plan	

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

Scientific Adv Council on Water Res & Coastal Fisheries Mgmt	Report To/ Authority	Report Due	Status*
Implementation of a coordinated water resources and coastal fisheries management program	Secretary, Governor, ERC, Gov Ops GS 143-215.22K(c)	Annually (Oct 1)	

general

DENR	Report To/ Authority	Report Due	Status*
Cost of State's environmental permitting program	ERC, Fiscal Research GS 143-215.3A(c)	Annually (Nov 1)	April 00 distrib
Cost of implementing the Mining Act of 1971	ERC GS 74-54.1(c)	Annually (Sep 1)	Jan 02 distrib 01/30/02
One Stop Permit Assistance Pilot Projects	ERC, NER subcommittees, Fiscal Research S.L. 2000-67(13.7) S.L. 2001-424 (19.6)	April 1, 2001; April 1, 2002; April 1, 2003	Apr 01 mail 05/04/01
Study organization of DENR	NER Subcommittees, ERC SL 2000-67(13.2)	January 15, 2001	

DENR (Division of Environmental Health)	Report To/ Authority	Report Due	Status*
Results of field test, recommendations, and status of any recommended revisions to rules governing sanitation of hospitals, nursing homes, rest homes, and other institutions.	ERC SL 2002-160, Sec. 4	1 Mar 2003	

DENR (Secretary)	Report To/ Authority	Report Due	Status*
State of the Environment Report	General Assembly,ERC GS 143B-279.5(a)	Feb 15 of each odd-numbered year	Feb 1, 2000

EMC	Report To/ Authority	Report Due	Status*
EMC operation, activities, programs, and progress (see also other reports with "EMC Quarterly Report" noted at the end of the topic line)	ERC GS 143B-282(b)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15); upon request	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 (Jan 03 oral 1/16/03)

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

Utilities Commission	Report To/ Authority	Report Due	Status*
Investigation of green power and public benefit fund voluntary check-off programs, as well as additional items listed in 2002-167, Sec. 6(a).	ERC, Commission on the Future of Electric Service in North Carolina 2002-167, Sec. 6	15 Mar 03	

hazardous substances

DENR	Report To/ Authority	Report Due	Status*
Implementation of the Resident Inspectors Program at commercial hazardous waste facilities	ERC GS 130A-295.02(m)	Annually (Sep 1)	Sep 99 distrib 11/99 Oct 00 distrib 1/18/01 Oct 01 distrib 10/29/01 Oct 2002 (distrib 1/16/03)
Evaluation of effectiveness of Brownfields Property Reuse Act	ERC GS 130A-310.40	Annually (Oct 1)	interim oral 3/16/00 11/00 oral 1/18/01 Feb 02 oral 2/21/02

DENR (Division of Waste Management)	Report To/ Authority	Report Due	Status*
Implementation of comprehensive hazardous waste management plan; implementation of the comprehensive hazardous waste plan, including an evaluation of how well the State and private parties are managing and cleaning up hazardous waste.	ERC GS 130A-294(i) SL 2002-148, Sec. 4	Annually (1 Oct)	8/11/00 distrib 1/18/01

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Inactive Hazardous Waste Sites Program	ERC GS 130A-310.10	Annually (Oct 1)	11/00 oral 1/18/01 11/01 mail 11/09/01 1/30/02 oral

DENR, Office of State Budget and Management	Report To/ Authority	Report Due	Status*
Amount and source of available funds used for 10% cost share required for Superfund cleanup of NPL sites, the o&m costs associated w/ these cleanups, and the cleanup of priority inactive hazardous substance or waste sites	ERC, Gov Ops SL 1999-237(15.6)(b)	30 days after spend Superfund/ Inactive Haz Sites funds	-Sep 00 (Mecklenburg) distrib 1/18/01 - May 01 distrib 10/29/01 - Dec 01 distrib 01/30/02 - Feb 02 distrib 03/21/02

parks and conservation

DENR	Report To/ Authority	Report Due	Status*
Report on the conservation easement program + inventory of all conservation easements held by DENR	ERC GS 113A-235(c)	Annually (Nov 1)	12/00 oral 12/21/00 Feb 02 oral 2/21/02 (Jan 03 oral 1/16/03)

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

DENR (North Carolina Parks and Recreation Authority)	Report To/ Authority	Report Due	Status*
Activities and allocations from the Parks and Recreation Trust Fund from the prior fiscal year	ERC, Gov Ops, NER, Fiscal Research GS 113-44.15(c)	Annually (Oct 1) + progress (March 15)	Mar 01 mail 05/04/01 Oct 01 mail 10/29/01 Feb 02 distrib 03/21/02 (Jan 03 oral 1/16/03)

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Acquisitions made with funds from the Natural Heritage Trust Fund	ERC, NHTF Trustees, Gov Ops, NER, Fiscal Research GS 113-77.9(e)	Semiannually, within 30 days of each revision	10/18/00 oral 10/13/00 Mar 01 mail 05/04/01 Aug 01 distrib 10/29/01 Feb 02 oral 2/21/02 (Jan 03 oral 1/16/03)
Progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands	ERC, Governor GS 113A-241(c)	Annually (Sep 1)	Sep 00 oral 10/13/00 Oral 2/21/02 (Jan 03 oral 1/16/03)

solid waste

DENR	Report To/ Authority	Report Due	Status*
Solid Waste Management Annual Report (see also other reports with "SWM Annual Report" noted at the end of the topic line)	Governor, ERC GS 130A-309.06(c)	Annually (Jan 15)	Mar 99 mail, oral 11/4/99 Mar 00 oral 4/6/00 Jan 02 oral 1/30/02
Assessment of the recycling industry and recyclable materials market (SWM Annual Report)	ERC GS 130A-309.06(c)(6)	Annually (Jan 15)	Jan 02 oral 1/30/02
Condition and use of funds in the Solid Waste Management Trust Fund (SWM Annual Report)	ERC GS 130A-309.12(c) GS 130A-309.06(c)(8)	Annually (Jan 15)	Sep 99 oral 11/04/99 Sep 00 oral 11/27/00 Jan 02 oral 1/30/02
Scrap Tire Disposal Account (SWM Annual Report)	ERC GS 130A-309.63(e) GS 130A-309.06(c)(10)	Annually (Jan 15)	May 99 mail Oct 99 oral 4/6/00 Oct 00 oral 11/27/00 Jan 02 oral 1/30/02
Management of white goods (SWM Annual Report)	ERC, Revenue Laws Study Committee GS 130A-309.85 GS 130-309.06(c)(11)	Annually (Jan 15)	Feb 99 oral Feb 00 oral 4/6/00 Jan 02 oral 1/30/02
Removal of Abandoned Vessels Pilot Program	ERC S.L. 2000-74	interim, January 1, 2002; final January 1, 2003	Feb 02 distrib 2/21/02

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DENR (Div. of Pollution Prevention and Environmental Assistanc	Report To/ Authority	Report Due	Status*
Recycled materials specified or used in DOT contracts (SWM Annual Report)	ERC, Gov Ops, Trans Oversight GS 136-28.8(g) GS 130A-309.06(c)(12)	Annually (Jan 15)	Dec 99 oral 4/6/00 Dec 00 oral Jan 02 oral 1/30/02
Purchase of materials and supplies with recycled content by State institutions (SWM Annual Report)	ERC, Gov Ops GS 143-58.2(f) GS 130A-309.06(c)(13)	Annually (Jan 15)	Dec 99 oral 4/6/00 Dec 00 oral Jan 02 oral 1/30/02

DOT and DOA	Report To/ Authority	Report Due	Status*
Bid procedures and the purchase and use of reusable, refillable, repairable, more durable, and less toxic supplies and products (SWM Annual Report)	ERC GS 130A-309.14(a1)(3) GS 130A-309.06(c)(9)	Annually (Jan 15)	Oct 00 Distrib 1/18/01 Jan 02 oral 1/30/02

Governor	Report To/ Authority	Report Due	Status*
Litter enforcement, prevention, and removal efforts.	ERC, JLTOC, NER Subcommittees SL 2001-512, Sec. 9 and 10 GS 147-12(b)	Semiannually (March 1 and Sep 1)	Mar 02 oral 3/21/02

State Board of Education	Report To/ Authority	Report Due	Status*
Recycling efforts of public schools in the State	ERC, Joint Legislative Education Oversight Committee SL 2001-512, Sec. 11	Annually by Dec 15 (2003-2007)	

water quality - general

Clean Water Management Trust Fund (Chair, Board of Trustees)	Report To/ Authority	Report Due	Status*
Implementation of the Clean Water Management Trust Fund; Projects awarded grants	ERC, Gov Ops, NER Subcommittees, Fiscal Research GS 113-145.6A(a) SL 2002-148 (Sec. 3)	Annually (Dec 1)	Nov 99 oral 11/4/99 Jan 01 in Feb 02 oral 2/21/02 (Jan 03 oral 1/16/03)

DENR	Report To/ Authority	Report Due	Status*
Status of permitting and inspecting animal waste management systems/ Animal Waste Compliance Report	ERC, Fiscal Research GS 143-215.10M SL 2002-148 (Sec. 6)	Annually (Oct 1)	Sep 00 oral 11/27/00 Nov 01 oral 01/30/02 Apr 02 dist 5/28/02 Nov 2002 (dist 01/16/03)
Two Year Action Plan for Livestock Operations	ERC SL 1999-329(13.4) SL 2002-148(Sec 2)	1 Oct 2002 1 Oct 2003	Jan 02 oral 1/30/02 May 02 oral 5/21/02

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Wastewater Discharge Elimination System program	ERC, Fiscal SL 2001-452(2.9)	Annually (15 Oct)	

DENR (Division of Water Quality)	Report To/ Authority	Report Due	Status*
Compliance/ enforcement of water quality laws for facilities that discharge into surface waters	ERC, Fiscal Research GS 143-215.9A SL 2002-148(Sec. 5)	Annually (Oct 1)	Oct 00 oral 11/27/00 Nov 01 oral 01/30/02 May 02 distrib 5/28/02
Effectiveness of Pilot Program for Inspection of Municipal and Domestic Wastewater Treatment Works	ERC, Fiscal Research SL 1999-329(9.2)	Interim: Apr 15 & Oct 15, 2000; Apr 15, 2001; Final: Jul 15, 2001	Oral 11/27/00 Final Report 5/21/02
Effectiveness of Surface Water Identification Training and Certification Program	ERC SL 2001-404(2)	Sep 1, 2002; Sep 1, 2003; and Mar 1, 2004	

DENR (Divisions of Water Quality, Soil & Water Conservation)	Report To/ Authority	Report Due	Status*
Pilot program for inspection of animal waste management systems, including a comparison of the costs of conducting operations reviews and inspections under the pilot program with the costs of conductng ors and insps pursuant to 143-215.10D and 143-215.10F	ERC, Fiscal Research SL 1999-329(3.3) SL 2001-254(6) SL 2002-176 (1.2)	Interim: Oct 15, 2001; Apr 15, 2002;15 April 2002; 15 April 2003 Final: Oct 1, 2003.	Sep 00 oral 11/27/00 Dec 01 in May 02 oral 5/21/02

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Study alternative dry-cleaning processes and equipment	ERC SL 2000-19(21)	interim, Nov 1, 2000; final, Sept 1, 2001	Jan 01 in Dist 1/18/01 Oral 2/21/02

DENR (Soil and Water Conservation Commission)	Report To/ Authority	Report Due	Status*
Effectiveness of projects funded under the agricultural cost-share program for nonpoint source pollution reduction	ERC, Fiscal Research GS 143-215.74(e)	Annually (Jan 31)	Jan 99 oral Oct 00 Distrib 1/18/01

DENR, EMC	Report To/ Authority	Report Due	Status*
Basinwide Water Quality Management Plans	ERC GS 143-215.8B	Annually (Oct 1)	Jan 01 distrib 1/18/01 Feb 02 oral 2/21/02 Apr 02 oral 4/25/02

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EMC	Report To/ Authority	Report Due	Status*
Progress in developing and implementing wastewater collection system permit program (EMC Quarterly Report)	ERC 143-215.9B	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 (Jan 03 oral 1/16/03)
Implementation of stormwater runoff rules and programs	ERC GS 143-214.7(e)	Annually (Oct 1)	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 (Jan 03 oral 1/16/03)
Extent to which facilities seeking new or modified discharge permits are funded with public funds; their impact on water quality; whether there are cost-effective alt. technologies that would achieve greater water quality benefit (EMC Quarterly Report)	ERC GS 143-215.1(h)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 (Jan 03 oral 1/16/03)
Implementation of the Neuse River Basin NSW Management Stategy, Progress in achieving 30% nitrogen reduction goal and other Neuse River water quality milestones, Impact of Neuse River NSW Management Strategy on the regulated community	ERC SL 1998-221(1.9)	Annually Dec 1, 2000; Dec 1, 2001	Oral 1/18/01 Mar 02 distrib 3/21/02 Apr 02 oral 4/25/02 (Jan 03 oral 1/16/03)
Progress in developing engineering standards to allow regional interconnection of municipal and domestic wastewater collection systems (EMC Quarterly Report)	ERC SL 1999-329(11.1)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 (Jan 03 oral 1/16/03)
Lower Neuse Basin Association	**Report To/ Authority**	**Report Due**	**Status***
Progress on grants and projects	ERC, Fiscal Research SL 1995 (1996 2nd Ext Ses) - 18 (27.8)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Jan 00 oral 3/16/00 Aug 00 distrib 01/18/01 Nov 00 distrib 01/18/01 Feb 01 mail 05/04/01 Feb 02 oral 2/21/02
UNC System (UNC-CH Water Resources Research Institute)	**Report To/ Authority**	**Report Due**	**Status***
Modeling and Monitoring of the Neuse River	ERC, Gov Ops, SAC GS 143-215.8C	Progress reports Jan 1/ July 1 until complete	Jan 99 oral 11/23/99 Jan 01 oral 1/18/01
Upper Neuse River Basin Association	**Report To/ Authority**	**Report Due**	**Status***
Activities and programs to develop cooperative, comprehensive, integrated State-local watershed management plan for the Upper Neuse Rier Basin to serve as a model watershed management approach	ERC, Gov Ops, Fiscal Research SL 1998-212(14.15)	Mar 1 each year until plan is complete (begin 1999)	Mar 00 oral 4/6/00 Feb 02 oral 2/21/02

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Water Quality Workgroup	Report To/ Authority	Report Due	Status*
Status of tasks: Synth current science on water quality;Identify knowledge gaps, fill with projects;Maintain water quality data website; Org & eval existing water quality databases; Prioritize knowledge gaps for $; Develop Rivernet mon syst.	SAC, ERC, NER Chairs, Chancellor of NCSU G.S. 143-215.8D	Annually (Jan 30)	Jan 00 oral 3/16/00 Jan 02 oral 2/21/02

water quality - ground

DENR	Report To/ Authority	Report Due	Status*
Implementation of Pay for Performance Program	ERC SL 2001-442	Annually (in UST report) (beginning Mar 1, 2002 and ending Oct 1, 2006)	Oct 02 in

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Contamination, site, and fiscal information related to the Dry-Cleaning Solvent Cleanup Act of 1997	ERC GS 143-215.104U	Annually (Oct 1)	Oct 99 oral 2/17/00; oral 4/25/00 Oct 00 Distrib 1/18/01 Jan 02 oral 2/21/02
Leaking Petroleum Underground Storage Tank Cleanup Program	ERC GS 143-215.94M SL 2002-148(Sec. 7)	Annually (1 Sept)	Mar 01 distrib 10/29/01 Sep 01 distrib 01/30/02 Mar 02 distrib 03/21/02 (Jan 03 oral 1/16/03)

water quantity

DENR	Report To/ Authority	Report Due	Status*
Evaluate water conservation measures being implemented in the State and identify incentive programs and other voluntary programs that can help foster water conservation and reuse.	ERC, EMC SL 2002-167, Sec. 5	Interim 15 Mar 03 Final 15 Feb 04	

DENR (Division of Water Resources)	Report To/ Authority	Report Due	Status*
Implementation of State Water Supply Plan	ERC, Gov Ops GS 143-355(n)	Annually (Sep 1)	Sep 99 in, oral 1/20/00 Oct 00 oral 1/18/01 Jan 02 oral 1/30/02 (Jan 03 oral 1/16/03)

EMC	Report To/ Authority	Report Due	Status*
Study impact of development on frequency and intensity of flood events (EMC Report)	ERC SL 2000-150(4)	February 15 2001	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 (Jan 03 oral 1/16/03)

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wetlands

DENR

	Report To/ Authority	Report Due	Status*
Implementation of Wetlands Restoration Program and use of Wetlands Restoration Fund, including inventory of property and easements	ERC GS 143-214.13	Annually (Nov 1)	Nov 99 oral 1/20/00 Dec 00 oral 1/11/01 Dec 01 oral 01/30/02

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Studies to be Conducted by the Environmental Review Commission

Organized by topics: air quality, coastal issues, environmental health, fishing, general, hazardous substances, land quality, parks and conservation, solid waste, water quality, water quantity, wetlands

air quality

ERC	Report To/ Authority	Report Due
Study and recommend ways to reduce fee for motor vehicle emissions inspection, including the option of requiring biennial inspections rather than annual inspections.	General Assembly SL 2001-504(20)	2003 General Assembly

coastal issues

ERC	Report To/ Authority	Report Due
Study the standards for the granting of variances by the Coastal Resources Commission under the Coastal Area Management Act (G.S. 113A-120.1).	General Assembly SL 2001-494, Sec. 5	2002 Regular Session of the 2001 General Assembly.

general

ERC	Report To/ Authority	Report Due
Availability and use of alternative energy sources in the state, including the use of biomass resources.	General Assembly SL 2001-491, Part XIV	2002 Regular Session or 2003 General Assembly

ERC (in consultation with Public Health Study Commission)	Report To/ Authority	Report Due
Local Health Directors: Issues related to the appointment of local health directors and the potential benefits of expanding to all 100 counties the authority that certain boards of county commissioners have under G.S. 153A-77.	General Assembly S.L. 2001-491, Part XIV	2002 Regular Session or 2003 General Assembly

parks and conservation

ERC	Report To/ Authority	Report Due
Strategies to attain the State's goal of preserving one million acres of open space over the next ten years, and the long-term protection and restoration of water quality.	General Assembly SL 2001-491, Part XIV	2002 Regular Session or 2003 General Assembly

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solid waste

ERC	Report To/ Authority	Report Due
Abandoned Mobile Homes: strategies to discourage or prevent the abandonment or improper disposal of mobile homes and facilitate the environmentally friendly disposal of mobile homes.	General Assembly SL 2001-491, Part XIV	2002 Regular Session or 2003 General Assembly

water quality - general

ERC	Report To/ Authority	Report Due
Stormwater Programs and Policies; strategies necessary to attain the goal of preventing environmental degradation of the State's water and groundwater resources, particularly due to stormwater.	General Assembly SL 2001-491, Part XIV	2002 Regular Session or 2003 General Assembly

water quality - ground

ERC	Report To/ Authority	Report Due
Evaluate the appropriation from the Leaking Petroleum Underground Storage Tank (LUST) Cleanup Funds to the LUST Cleanup Program to determine whether adjustments in the amount of the appropriation should be made.	General Assembly SL 2001-454, Sec. 2	2003 General Assembly

water quantity

ERC (in consultation with the Joint Legislative Growth Strategies	Report To/ Authority	Report Due
Interconnection of public water systems or wastewater systems to regional systems and requiring that reasonable alternatives be reviewed before constructing or altering a public water system.	General Assembly SL 2001-491, Part XIV	2002 Regular Session or 2003 General Assembly

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January 16, 2003 ERC Meeting
EXHIBIT E

QUARTERLY REPORT

TO THE

ENVIRONMENTAL REVIEW COMMISSION

ON

ENVIRONMENTAL MANAGEMENT COMMISSION ACTIVITIES

January 2003

YEAR 2002 – 2003 SECOND QUARTER REPORT TO ERC

I. Quarterly Report On **Air Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

II. Quarterly Report On **Ground Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

III. Quarterly Report On **Surface Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

I. AIR QUALITY ACTIVITIES

AGENDA ITEM _____: Hearing Officer's Report on the Adoption of and Amendments to Various Rules.

EXPLANATION:

On August 20, 2002, Mr. Dan Besse held a public hearing on the adoption of and amendments to various air quality rules.

Three rules are proposed to be amended to correct addresses, and division or department names.

The visual emission standard is proposed to be changed for hot mix asphalt batch plants from an allowable 40 percent opacity for older plants to 20 percent opacity.

Rules on emissions of particulates are proposed to be amended to make the wording in the rules consistent.

The general sulfur dioxide emission standard rule is proposed to be amended to exclude incinerators covered under incinerator rules with sulfur dioxide emission standards.

The visible emission rule is proposed to be amended to revise requirements for determining compliance when continuous opacity monitors are used and to exempt from this rule sources that have specific opacity standards in other rules.

An alternate coal sampling collection methodology "sampling as fired" is proposed to be added to two rules on monitoring sulfur dioxide emissions. The rules require a demonstration that sampling as fired provides a more accurate estimation of sulfur dioxide emissions than sampling each shipment.

The rule concerning the control of gasoline vapor emissions at bulk terminals is proposed to be modified to include the control of emissions resulting from storage tank degassing operations. The modification includes a requirement for 90 percent control of total emissions, which is based on uncontrollable emissions being released to the atmosphere during the time it takes to float the floating roof during refilling of the storage tank.

A new rule is proposed to establish a process to certify gasoline truck tank tester facilities by the Division of Air Quality, which replaces a federal self-certification program. All gasoline truck tanks will be required to be certified leak tight by a certified testing facility.

The rule for petitioning for an alternative operational is proposed to be amended to remove obsolete language and the requirement for approval of the U.S. Environmental Protection Agency (EPA) of alternative control.

A new rule is proposed to allow controls superior to the required control for volatile organic compounds.

A permitting rule is proposed to be amended to correct a filing error by removing language that had been removed as a result of an earlier hearing but was subsequently reinserted.

The hearing record was sent to you earlier.

RECOMMENDATION:

The Director recommends that the Commission adopt the proposed amendments and rules contained in Chapter II of the hearing record and authorize the Chair to sign the certifications on behalf of the Commission.

EMC ACTION: Approved all but the rule on source categories whose permits are to be noticed for public comment. The hearing officer did not present this rule for adoption; he wanted to further evaluate the public comments on it.

Agenda Item _____ :

Reconsideration of the Amendments to Particulates from Hot Mix Asphalt Plants

At its October meeting, the Commission adopted amendments to 15A NCAC 2D .0506, Particulates from Hot Mix Asphalt Plants, which were a subject of a public hearing held on August 20, 2002. Mr. Dan Besse was the hearing officer.

As a result of public comment, a paragraph was added to the rule to limit fugitive emissions not covered elsewhere under the rule to 10 percent opacity averaged over one minute.

The Carolina Asphalt Pavement Association has asked for withdrawal of this amendment based on the rule differing substantially from the proposed rule. This additional requirement differs substantially from the proposed rule. It affects the interest of person who could not have reasonably have determined that the rule would affect their interest based on the proposed text of the rule or the hearing notice. It addresses a subject matter or an issue not addressed in the proposed text of the rule. It produces an effect that could not reasonably have been expected based on the proposed text.

Recommendation:

The Director recommends that the Commission return the rule to the Air Quality Committee to decide the appropriate action to take on the amendment to the hot mix asphalt plant rule.

EMC ACTION: EMC approved renoticing rule for additional comment.

AGENDA ITEM _____: Consideration of Re-certification of Mecklenburg County Local Program

EXPLANATION:

Mecklenburg County has reorganized its environmental program. As a result of the reorganization, the Board of County Commissioners, which also serves as the air pollution control board for the Mecklenburg County local air quality program, has requested that the Mecklenburg County local program be re-certified to reflect the reorganization.

The new certification reflects the current and future Mecklenburg County organizational structure. The new certification certifies the Mecklenburg County Board of Commissioners and its designated administrative unit to operate the local air quality program. The current certification certifies the Mecklenburg County Department of Environmental Protection, which has been reorganized into a larger Mecklenburg County administrative unit.

Other changes in the certification are that the new certification records the dates of previous re-certifications and that the EMC retains jurisdiction over facilities owned and operated by Mecklenburg County.

Attached are a letter from the chairman of the Mecklenburg County Board of Commissioners requesting re-certification and the new certification.

RECOMMENDATION:

The Director recommends that the Commission approve the new certification for Mecklenburg County.

EMC ACTION: Approved by the EMC.

AGENDA ITEM : Request to Proceed to Public Hearing on the Amendments to Various Air Quality Rules

The Environmental Management Commission is requested to approve one or more public hearings to consider amendments to seven nitrogen oxide emission standard rules and two permitting rules.

Seven nitrogen oxide rules are proposed to be amended to make clarifications. The U.S. Environmental Protection Agency has asked for several clarifications to the nitrogen oxide rules. Clarifications are being made for monitoring requirements, stationary internal combustion engines, using the trading program, and using the compliance supplement pool. Three corrections are also proposed to be made. They are correcting the location of Duke's Cliffside plant, the name of a boiler at Blue Ridge Paper Products, and an allocation for a combustion turbine at Butler Warner Generating.

Definitions for "minor modification" and "significant modification" are proposed to be added to the permit fee definition rule.

The exclusionary rule for cotton gins is proposed to be amended to remove specifying the ginning seasons and the requirement for the Commissioner of Agriculture to request extending the ginning season if it exceeds the length specified in the rule. Instead of using the bales ginned during the ginning season, the bales ginned during a calendar year is used to determine if the cotton gin qualifies for this rule.

RECOMMENDATIONS: The Director recommends that the Commission authorize a public hearing(s) on these amendments and that the Chairman appoint a member(s) of the Commission to serve as hearing officer(s).

EMC ACTION: Approved by the EMC.

Agenda Item _____: Response to Objections by the Rules Review Commissions to Several Volatile Organic Compound Emissions Rules

Explanation:

The Rules Review Commission has objected to five rules:

- 15A NCAC 2D .0912, General Provisions On Test Methods And Procedures
- 15A NCAC 2D .0952, Petition For Alternative Controls For RACT
- 15A NCAC 2D .0959, Petition For Superior Alternative Controls
- 15A NCAC 2D .0960, Certification Of Leak Tightness Tester

Rule 15A NCAC 2D .0912 was objected to based on lack of statutory authority and ambiguity. There were two objections. The first objection is on the language that requires stack testing to be done by a person qualified by training or experience in the field of air pollution testing. In response to this objection, the qualification language is proposed to be removed. The second objection deals with the Director approving a source test. The rule current does not specify the criteria that the Director will use to approve a test. In response to this objection, criteria is proposed to be added. The criteria are that all the information required to be included in the notification is included and that the correct testing procedures are used.

Rule 15A NCAC 2D .0952 was objected to based on ambiguity. It is unclear what the agency would consider a nuisance condition. In response to this objection, the nuisance language is proposed to be removed.

Rule 15A NCAC 2D .0959 was objected to based on ambiguity. It is unclear what the agency would consider a nuisance condition. In response to this objection, the nuisance language is proposed to be removed.

Rule 15A NCAC 2D .0960 was objected to based on ambiguity. It is unclear what the Division's standard is for a sticker. The rule requires stickers provided by the testing facility to meet the Division's standard. (A testing facility may use its own stickers or sticker provided by the Division.) In response to this objection, the Division's standard is removed and is replaced with language requiring the sticker to contain the same information that is on the stickers provided by the Division and to have the same dimensions.

Recommendation: The Director recommends that the Commission approve the revised rules in response to the objections of the Rules Review Commission.

EMC ACTION: Approved by the EMC.

FUTURE EMC AND AIR QUALITY COMMITTEE AGENDA ITEMS

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Feb 03		-MWC Compliance Date Change (390) -Revision of AAL for Hydrogen Sulfide (378)	Hearing Request BMWC Compliance Date Change (390) -Special Order of Consent Rules Specifically for the Division of Air Quality (365) Adoption -Correcting a Filing Error Regarding 2Q .0306
Mar 03		-Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Small Wood Fire Boiler Permit Exemption (285) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Clarify 2D .0933 Re Shoe-Mounted Secondary Seals (363) -Glass Melting Furnaces (328) -2Q .0105 to Change Address Where Permits May Be Reviewed (384) -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) BClarify Crusher Requirements to Use Wet Suppression at All Times (313) BChange Emergency Generator Exemption in 2Q .0102 (388) -Local Zoning Consistency Determination (331) -Add Insignificant Activities to 2Q .0706(a)(1) (336)	

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Mar 03 cont.		-General Fugitive Dust Control (276) -Revision of Standards for Air Curtain Burners; Addition of No Nuisance Requirements to Land Clearing Burning; Revise 2D .1906 to add Municipalities (2544, 288) -Exempt NSPS Dry Cleaners from Permitting (366) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Correction of Column Titles in 2Q .0203 (372) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Exclusionary Rule for Concrete Batch Plants (380) -Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381) -Concrete Batch Plants (284)	
Apr 03			Hearing Request -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Small Wood Fire Boiler Permit Exemption (285) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Clarify 2D .0933 Re Shoe-Mounted Secondary Seals (363) -Glass Melting Furnaces (328) -2Q .0105 to Change Address Where Permits May Be Reviewed (384) -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Apr 03 cont.			Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) BClarify Crusher Requirements to Use Wet Suppression at All Times (313) BChange Emergency Generator Exemption in 2Q .0102 (388) -Local Zoning Consistency Determination (331) -Add Insignificant Activities to 2Q .0706(a)(1) (336) -General Fugitive Dust Control (276) -Revision of Standards for Air Curtain Burners; Addition of No Nuisance Requirements to Land Clearing Burning; Revise 2D .1906 to add Municipalities (2544, 288) -Exempt NSPS Dry Cleaners from Permitting (366) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Correction of Column Titles in 2Q .0203 (372) -Correction and Clarification in 2Q .0102 (375) -Rewording of Laboratory Exemption in 2D .0902 and Correct Cross-Reference in 2D .0902 -Concrete Batch Plants (284) -Exempting Space Heaters From Permitting (379) -Exclusionary Rule for Concrete Batch Plants (380) -Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381) <u>Adoption</u> -112(j) Revisions (377)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
May 03			
July 03			Adoption -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Small Wood Fire Boiler Permit Exemption (285) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Clarify 2D .0933 Re Shoe-Mounted Secondary Seals (363) -Glass Melting Furnaces (328) -2Q .0105 to Change Address Where Permits May Be Reviewed (384) -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) BClarify Crusher Requirements to Use Wet Suppression at All Times (313) BChange Emergency Generator Exemption in 2Q .0102 (388) -Local Zoning Consistency Determination (331)
July 03 cont.			-Add Insignificant Activities to 2Q .0706(a)(1) (336) -General Fugitive Dust Control (276) -Revision of Standards for Air Curtain Burners; Addition of No Nuisance Requirements to Land Clearing Burning; Revise 2D .1906 to add Municipalities (2544, 288) -Exempt NSPS Dry Cleaners from Permitting (366)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			-Revision of Small Definitional Level for Peak Shaving Generators (371) -Correction of Column Titles in 2Q .0203 (372) -Correction and Clarification in 2Q .0102 (375) -Concrete Batch Plants (284) -Exempting Space Heaters From Permitting (379) -Exclusionary Rule for Concrete Batch Plants (380) -Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381) -Rewording of Laboratory Exemption in 2D .0902 and Correct Cross-Reference in 2D .0902
Sept 03		-Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Amend Definition of AApplicable Requirement≅ to add reference to 2D .900,.1400, and .1200 (334) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Implementation of New AuthorityXI/M Codes (323a1) -Implementation of New AuthorityXsales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325)	
Sept 03		-Boilers and Industrial Furnaces Burning	

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
cont.		Hazardous Waste (330) -Portable Crushers (385) BCorrect Cross-Reference in 2D .1208 (389) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367)	
Oct 03			Hearing Request -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Amend Definition of AApplicable Requirement≅ to add reference to 2D .900,.1400, and .1200 (334) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Implementation of New AuthorityXI/M Codes (323a1) -Implementation of New AuthorityXsales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Boilers and Industrial Furnaces Burning Hazardous Waste (330) -Portable Crushers (385) BCorrect Cross-Reference in 2D .1208 (389) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367)
Dec 03		-Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and	Adoption -Revision of AAL for Carbon Tetrachloride (376)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Dec 03 cont.		ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382)	-Distributed Power Generation Using Diesel and Other Fuels (347) -Amend Definition of AApplicable Requirement≅ to add reference to 2D .900,.1400, and .1200 (334) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Implementation of New AuthorityXI/M Codes (323a1) -Implementation of New AuthorityXsales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Boilers and Industrial Furnaces Burning Hazardous Waste (330) -Portable Crushers (385) BCorrect Cross-Reference in 2D .1208 (389) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367)
Feb 04			Hearing Request -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382)
Mar 04 Apr 04			
May 04			<u>Adoption</u> -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			-Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382)

December 2002 EMC Agenda Item # 02-59:

ACTION ITEM FROM THE DIVISION OF WASTE MANAGEMENT – UNDERGROUND STORAGE TANK SECTION ***(Item went to the EMC in three parts)*:**

ACTION ITEM A: Request to Waive the Groundwater Committee 30-Day Review Period To Allow the Committee To Consider Approval Of The Proposed Permanent Pay For Performance Rule.

ACTION ITEM B: Request To Adopt the Permanent Pay For Performance Rule.

EXPLANATION:

On March 15, 2002, the Environmental Management Commission adopted temporary rules to specify pay-for-performance cleanups for underground storage tank releases. Sections 1 and 2 of House Bill 1063 gave the Commission the authority to allow performance-based cleanups of sites where petroleum has been discharged or released from underground storage tanks. A performance-based or pay-for-performance contract is an agreement that specifies a series of cleanup milestones (generally, percentage reductions in contaminant levels) that must be achieved before payments can be made to the cleanup firm. Tank owners, operators, and landowners of sites eligible for reimbursement from the Commercial and Noncommercial Leaking Petroleum Underground Storage Tank Cleanup Funds may allow their sites to be considered by the Division for this pilot program. The Division of Waste Management may also utilize money from the Cleanup Funds and other sources specifically intended to be used for performance-based cleanups at state-lead cleanup sites. Sites selected by the Division for performance-based cleanups will be posted for competitive bidding in the North Carolina Interactive Purchasing System. A performance-based contract will be awarded to the qualified environmental services firm that submits the lowest bid for an acceptable remedial proposal for the advertised site.

On November 1, 2002, permanent Pay for Performance Rules were published in the North Carolina Register with a hearing date of November 18, 2002. The public comment period ended on December 2, 2002. No comments were received regarding this rulemaking.

On December 11, 2002, the EMC Groundwater Committee recommended that the full Commission adopt the rule as published in the NC Register.

EMC Action:

On December 12, 2002, the Environmental Management Commission combined Action Items 02-59 (A) through 02-59 (B) into one action item and approved the Pay for Performance Rule from the Division of Waste Management – Underground Storage Tank Section. This rule can now proceed with the remaining steps in the rulemaking process contained in NCGS 150B.

December 2002 EMC Agenda Item # 02-63:

ACTION ITEM FROM THE DIVISION OF WATER QUALITY – GROUNDWATER SECTON: Request for Approval to Proceed with Public Notice and Hearing to Establish Groundwater Quality Standards for Nine Substances in title 15A NCAC 2L .0202 (*Benzoic Acid, Bis(chloroethyl)ether (BCEE), Dibenzofuran, Dibromochloromethane, Ethyl Acetate, Hexachlorobutadiene, 2-Hexanone, 1,1,2,2-Tetrachloroethane, 1,2,4-Trichlorobenzene)*

EXPLANATION:

This amendment to 15A NCAC 2L .0202, Groundwater Quality Standards, will establish groundwater standards for nine substances in title 15A NCAC 2L .0202. The proposed rule changes are being made to incorporate the most updated health information and concentration levels as Groundwater Quality Standards in 15A NCAC 2L .0202. The concentrations shown in this agenda item are currently in place as interim maximum allowable concentrations established pursuant to 15A NCAC 2L. 0202 (c).

Pursuant to a recommendation by the Groundwater Committee at the July 2002 meeting, a 60-Day Notice of Rulemaking Proceedings was published the North Carolina Register on August 1, 2002. A Notice of Rulemaking Proceedings is to give the public advanced notice that rulemaking is in progress and to allow them to comment on the proposed activity. The Groundwater Section received no comments in response to this notice to add these standards to title 15A NCAC 2L .0202.

These substances are shown with the proposed Groundwater Quality Standard and unless otherwise noted, numeric standards for these substances are shown in milligrams per liter as follows:

SUBSTANCE	PROPOSED CONCENTRATION
Benzoic Acid	28.0
Bis(chloroethyl)ether (BCEE)	3.1×10^{-5}
Dibenzofuran	0.028
Dibromochloromethane	4.1×10^{-4}
Ethyl Acetate	2.60
Hexachlorobutadiene	4.4×10^{-4}
2-Hexanone	0.28
1,1,2,2-Tetrachloroethane	1.7×10^{-4}
1,2,4-Trichlorobenzene	0.07

EMC Action:

On December 12, 2002, the Environmental Management Commission gave the Division permission to proceed with public notice and hearing on these nine substances. In making this recommendation, the Commission understood that the names, concentrations, and descriptions of substances that are proposed in the amendment that will appear at public hearing are those specified by the Division of Public Health.

GROUNDWATER GWC/EMC FUTURE AGENDAS*

	Committee Agenda	EMC Agenda
Feb 2003	> DWQ- GWS ITEMS < 1. Presentations from the Groundwater Section.	* no agenda items at this time *
Mar 2003	> DWQ-GWS ITEMS< **1. Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** **2. Approval of the Flynt/Wansona Variance Request.** **3. Request to Proceed with a 60-Day Notice of Rulemaking to AMEND the 15A NCAC 2C .0200 – Injection Well Rules.** ***(EMC GW Committee Delegated to approve subject matter Notices).***	* no agenda items at this time *
Apr 2003	> DWQ-GWS ITEMS< **1. Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** **2. Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards in 15A NCAC 2L .0202.** **3. Request to APPROVE Changes to Eleven Groundwater Quality Standards in title 15A NCAC 2L ,0202** 4. Information from the Well Contractors Certification Commission Regarding Changes to Well Contractor Application Requirements in Rule 15A NCAC 27 .0301.	> DWQ-GWS ITEMS< **1. Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** **2. Approval of the Flynt/Wansona Variance Request.**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

	Committee Agenda	EMC Agenda
May 2003	> DWQ-GWS ITEMS< 1. **Request for APPROVAL to Proceed with Public Notice and Hearing to AMEND the 15A NCAC 2C .0200 – Injection Well Rules.** 2. **Request for APPROVAL to Proceed with Public Notice and Hearing to ADOPT Nine New Groundwater Quality Standards to Title 15A NCAC 2L .0202.** > DWM-UST SECTION ITEM < 1. Status of the State Trust Fund for Cleanup of Underground Storage Tanks.	> DWQ-GWS ITEMS< 1. **Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards in 15A NCAC 2L .0202.** 2. **Request to APPROVE Changes to Eleven Groundwater Quality Standards in title 15A NCAC 2L .0202** 3. **Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

III. SURFACE WATER QUALITY ACTIVITIES

SURFACE WATER QUALITY ACTIVITIES

Agenda Item:

Request for Approval of Proposed Temporary NPDES Phase 2 Stormwater Rules

Explanation:

In July 2002 the EMC and DWQ held five public hearings to gather public input on draft NPDES Phase 2 Stormwater Rules. These hearings were held in Asheville, Kernersville, Smithfield, Washington and Wilmington. The hearing officers have reviewed comments received and worked with the Division on development of a final draft of the rules that will be presented to the full EMC for review and approval. The rules will be presented for approval as temporary rules to allow for implementation of the federal phase 2 NPDES stormwater program. A permanent rulemaking process will follow and will be brought back to the WQC and EMC at a later meeting.

Recommendation:

The Hearing Officers recommend that the Commission approve the proposed temporary NPDES Phase 2 Stormwater Rules.

EMC ACTION:

The EMC approved the proposed temporary NPDES Phase 2 Stormwater Rules with minor modifications.

Agenda Item:

Hearing Officer's Report on the Proposed Changes to the Surface Water Quality Standards and Classification Rules for the Triennial Review

Explanation:

In April and May, the Water Quality Committee (WQC) and the Environmental Management Commission (EMC), respectively, approved proceeding to Public Hearings with the proposed rule changes for the 2000 to 2003 Triennial Review of surface water quality standards. The Triennial Review of water quality standards is mandated to occur every three years by the Clean Water Act. The proposed changes approved for public hearings by the EMC included modifications to the arsenic, cyanide, methylene blue active substances (MBAS), and total residual chlorine (TRC) standards, and the addition of a methyl tert-butyl ether (MTBE) standard. In addition, the EMC solicited public comments on the existing water quality and thermal variances and possible future changes to the bacteriological and nutrient criteria at the Triennial Review hearings.

The public hearings were conducted in Raleigh and Wilmington on July 30 and August 1, respectively. Ten individuals elected to make comments at the public hearings. In addition, 14 written comments regarding the Triennial Review were received prior to the close of the public comment period on August 15th. These oral and written comments covered a wide range of topics including all the proposed standard modifications, the variances, the possible bacteriological and nutrient criteria changes, and other subjects and issues. Numerous comments were received from the regulated community regarding the proposed change to the TRC standard. Numerous comments were received from the environmental interest groups regarding the variances and the subject of modifications to the bacteriological and nutrient criteria. A complete summary of these, and all the submitted comments, and a response to each by DWQ Staff are included in the Hearing Officer's Report of Proceedings (ROP), which was mailed to the members of the EMC.

Recommendation:

The Hearing Officer recommends that the Commission adopt the recommendations that are contained in the ROP. These recommendations are:

1. That the EMC adopt changes to the surface water quality standards as summarized below:

    - Adopt a human health standard for arsenic of 10 ug/l for all waters of the State (both salt and fresh). In addition, adopt an instream standard for arsenic of 10 ug/l for all water supply (WS) classified waters of the State.

- Remove the current freshwater action level standard of 17 ug/l for TRC and replace this with an instream surface water quality standard of 17 ug/l of TRC for all freshwaters of the State.

- Modify the existing freshwater cyanide standard of 5 ug/l to allow dischargers the option of developing a site-specific standard based upon the aquatic life at the site in accordance with EPA procedures.

- Establish a new surface water quality standard for MTBE. This standard is proposed to be 12 ug/l for all water supply (WS) classified waters. In addition, establish a human health standard for MTBE of 1,158 ug/l for all other waters (both salt and fresh).

- Remove the existing MBAS surface water quality aquatic life standard of 500 ug/l and replace this with an aesthetic MBAS standard of 500 ug/l for water supply (WS) classified waters.

2. Forward all the submitted comments regarding water quality and thermal variances to the NPDES Permitting Unit of DWQ for further review and consideration by appropriate parties at the time of the next scheduled renewal of these variances.

3. Forward to the appropriate individuals all the submitted comments concerning the implementation of nutrient criteria and the establishment of new (*E. coli* or enterococci) bacteriological criteria for further review and consideration at the time these criteria are developed.

If approved, the effective date of these rule amendments would be April 1, 2003.

EMC ACTION:

The EMC approved all the Hearing Officer's recommendations, except for the proposed change to the MTBE water quality standard. The Commission referred this proposal back to the Water Quality Committee for further review, based upon the latest data available from the Environmental Protection Agency.

Agenda Item:

Hearing Officer's Report on the Proposed Permanent Amendments to Rule 2B .0234, Neuse River Basin Nutrient Sensitive Waters Management Strategy: Wastewater Discharge Requirements

Explanation:

The Water Quality Committee (WQC) and the Environmental Management Commission (EMC) approved proceeding to Public Hearing in April and May, respectively with the proposed permanent amendments to Rule 2B .0234. In addition to corrections and revisions previously approved with the temporary rule, the proposed amendments include minor adjustments in the group total nitrogen allocations (subsection (5)) and a permit requirement for the group compliance association (subsection (9)).

The Public Hearing was conducted in Goldsboro on August 21, 2002. There were nine individuals present, but no one signed up to speak. The hearing record remained open until September 3, 2002. Written comments were received from the North Carolina Wildlife Resources Commission, Contentnea Metropolitan Sewerage District, Heater Utilities and the Carolina Chapter of the National Association of Water Companies, The Lower Neuse Basin Association and the Neuse River Foundation

The Hearing Officer has reviewed the proposed rule amendments and the comments received and has identified minor changes to be included in the rule as proposed.

Recommendation:

The Hearing Officer recommends that the Commission adopt the revised rule text contained in the Report of Proceedings. If approved, the effective date of these rule amendments would be April 1, 2003.

EMC ACTION:

The EMC approved the proposed rules as contained in the Report of Proceedings with minor modifications.

Agenda Item:

Tar-Pamlico Agriculture Rule Annual Report and Request for Approval of Accounting Method

Explanation:

One of several rules adopted under the Tar-Pamlico nutrient strategy was the agriculture rule, 15A NCAC 2B .0256, which was effective September 1, 2001. The rule requires that within one year, the EMC approve an accounting method that is to track implementation of BMPs and associated nitrogen loading reductions relative to the 30 percent reduction goal. Staff will present the Basin Oversight Committee's recommendation that the EMC approve the Nitrogen Loss Estimation Worksheet, a spreadsheet-based empirical modeling tool that was developed for the Neuse Basin by a team of university, agency, and industry participants over several years and was recently adapted for the Tar-Pamlico Basin. The rule also requires the BOC to summarize annual reports of the county-level Local Advisory Committees and present them to the EMC each October. Staff will provide the Commission with the first annual report on rule implementation, which does not require any action. Materials for these items were mailed to the members of the EMC.

Recommendation:

Staff requests that the Commission approve the Nitrogen Loss Estimation Worksheet tool as the accounting method for nitrogen under the Tar-Pamlico agriculture rule.

EMC ACTION:

The EMC approved the Nitrogen Loss Estimation Worksheet tool as the accounting method for nitrogen under the Tar-Pamlico agriculture rule as requested by Staff.

SURFACE WATER QUALITY WQC/EMC FUTURE AGENDAS

	WQC Agenda	EMC Agenda
Jan 2003	No Meeting Scheduled.	No Meeting Scheduled.
Feb 2003	• Request Approval of Water Supply Ordinance for Johnston County • Request Sending Final Draft of Broad River Basinwide Plan to EMC for Approval • Report on the Sign-up and Approval for the Tar-Pamlico Agricultural Accounting Method • Tar-Pamlico Model Stormwater Plan • Reclassifications: Request Permission to Proceed to EMC for: Dan River, from C to WS-IV; Calabash River, from SA to Class C. • Stormwater Phase II Rules: Request Approval of Permanent Rule Text for Public Hearings • Catawba Buffer Rule: Request Approval of Sending Permanent Rule Text for Public Hearings • Recommendation to Modify the Major Variance Request Procedures • Request Consideration of Approval of Several Major Variances to the Riparian Protection Area Rules. • NC Coastal Habitat Protection Plan/Update on Shellbottom and Hardbottom Options • Turbidity Info Item: Update WQC on Joint discussion of WQC/SCC representatives or of joint agreement between DLR and DWQ regarding Turbidity Issues..	• Request Final Approval of Draft Broad River Basinwide Plan • Stormwater Rules: Request Approval of Sending Permanent Rule Text to Public Hearings (Request 30-day waiver, as recommended by WQC) • Catawba Buffer Rule: Request Approval of Sending Permanent Rule Text to Public Hearings (Request 30-day waiver, as recommended by WQC) • Declaratory Rulings: Request Approval of Sending Permanent Rule Text to Public Hearings (recommendation for 30 d waiver needed from the Steering Committee, as recommended by the Dec EMC)
March 2003	• Mercury Items: New Mercury methodology will be in use by Sep 2003. Grant for research in Lumber River Basin to try and assess source of Hg. (Presentation requested by Dec 02 WQC) • ESB Monitoring Program for Basinwide Planning: At Dec 02 WQC, questions were asked about how the monitoring program is designed, what waters included, excluded, etc. Info item presentation is to be planned. • Possible Item: Request Approval of Greensboro's Use of Special Studies WS Watershed Map for WS Buffers • Request Consideration of Approval of Major Variances to the Riparian Protection Area Rules for Dominion Energy Person County Site	• No items have been formalized at this time for the March EMC meeting.

*Dates shown are current projections. Actual schedules are subject to changes.

QUARTERLY REPORT

TO THE

ENVIRONMENTAL REVIEW COMMISSION

ON

ENVIRONMENTAL MANAGEMENT COMMISSION ACTIVITIES

October 2002

YEAR 2002 – 2003 FIRST QUARTER REPORT TO ERC

I. Quarterly Report On **Air Quality** Activities

A. Major EMC Agenda Items During Quarter
[Noting to Report. Air Quality had no Agenda Items for the July and September EMC Meetings.]

B. Future EMC And Committee Agenda Items

II. Quarterly Report On **Ground Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

III. Quarterly Report On **Surface Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

I. AIR QUALITY ACTIVITIES

FUTURE EMC AND AIR QUALITY COMMITTEE AGENDA ITEMS

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Oct 02	BClarify Crusher Requirements to Use Wet Suppression at All Times (313)	-Correction to 2D .1400 (374) -Revision of 2Q .0806 (373) -Special Order of Consent Rules Specifically for the Division of Air Quality -Add Definition for Significant and Minor Modifications for Permit Fees	Adoption -Correction to VOC Petition for Alternative Controls and Expanding Reasons for Petitioning -Correct Mailing Address in 2D .0105 -Correct Division Name in 2D .0912 -Correct Department Name in 2D .0954 -112(j) Revisions (377) -Correct 2D .0516 to Reference Incinerator Rules -Coal Sampling Option -Gasoline Leak Tank Tester Certification -Consistent Wording of Particulate Rules -Petroleum Terminal Rule to Add Requirements for Degassing -Revision of Visible Emissions and Excess Emissions Rules (383)
Dec 02			Hearing Request -Correction to 2D .1400 (374) -Revision of 2Q .0806 (373) -Special Order of Consent Rules Specifically for the Division of Air Quality -Add Definition for Significant and Minor Modifications for Permit Fees
Feb 03			
Mar 03			

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Apr 03		-Local Zoning Consistency Determination -Removal of Permit Exemption for Incinerators -Add Insignificant Activities to 2Q .0706(a)(1) -General Fugitive Dust Control -Revision of Standards for Air Curtain Burners; Addition of No Nuisance Requirements to Land Clearing Burning; Revise 2D .1906 to add Municipalities -Exempt NSPS Dry Cleaners from Permitting -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Exemption of Incinerators with Specific VE Standards from 2D .0521 (368) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Correction of Column Titles in 2Q .0203 (372) -Correction and Clarification in 2Q .0102 (375) -Revision of AAL for Hydrogen Sulfide (378) -Exempting Space Heaters From Permitting (379) -Exclusionary Rule for Concrete Batch Plants (380) -Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Concrete Batch Plants -Revision of AAL for Hydrogen Sulfide (378)	Request Hearing -Distributed Power Generation Using Diesel and Other Fuels -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Revision of AAL for Carbon Tetrachloride (376) -Amend Definition of AApplicable Requirement≅ to add reference to 2D .900,.1400, and .1200 -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride -Concrete Batch Plants -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -AAL for MDI, DI, Acrylamide, Chromium VI -Small Wood Fire Boiler Permit Exemption -Elimination of 40% Opacity -New Rule on Good O&M Maintenance -Particulate Emissions from Spray/Finish Booths and Woodworking -Implementation of New AuthorityXI/M Codes -Implementation of New AuthorityXsales and service of analyzers -Reporting Requirements Conform with General Statutes -Clarify 2D .0933 Re Shoe-Mounted Secondary Seals -Exempt Air Curtain Burners from Air Toxic Rules -Mercury Emissions from Combustion Sources -Glass Melting Furnaces -Permit Exemption for County Grain Elevators and Mills -Boilers and Industrial Furnaces -2Q .0105 to Change Address Where Permits May Be Reviewed (384) -Portable Crushers (385)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Apr 03 Cont.			-Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) BClarify Crusher Requirements to Use Wet Suppression at All Times(313)
May 03			Request Hearing -Local Zoning Consistency Determination -Removal of Permit Exemption for Incinerators -Add Insignificant Activities to 2Q .0706(a)(1) -General Fugitive Dust Control -Revision of Standards for Air Curtain Burners; Addition of No Nuisance Requirements to Land Clearing Burning; Revise 2D .1906 to add Municipalities -Exempt NSPS Dry Cleaners from Permitting -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Exemption of Incinerators with Specific VE Standards from 2D .0521 (368) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Correction of Column Titles in 2Q .0203 (372) -Correction and Clarification in 2Q .0102 (375) -Revision of AAL for Hydrogen Sulfide (378) -Exempting Space Heaters From Permitting (379) -Exclusionary Rule for Concrete Batch Plants

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			(380) -Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Concrete Batch Plants -Revision of AAL for Hydrogen Sulfide (378)
July 03			<u>Adoption</u> -Distributed Power Generation Using Diesel and Other Fuels -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Revision of AAL for Carbon Tetrachloride (376) -Amend Definition of AApplicable Requirement≅ to add reference to 2D .900,.1400, and .1200 -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -AAL for MDI, DI, Acrylamide, Chromium VI -Small Wood Fire Boiler Permit Exemption -Elimination of 40% Opacity

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			-New Rule on Good O&M Maintenance -Particulate Emissions from Spray/Finish Booths and Woodworking -Implementation of New AuthorityXI/M Codes -Implementation of New AuthorityXsales and service of analyzers -Reporting Requirements Conform with General Statutes -Clarify 2D .0933 Re Shoe-Mounted Secondary Seals -Exempt Air Curtain Burners from Air Toxic Rules -Mercury Emissions from Combustion Sources -Glass Melting Furnaces -Permit Exemption for County Grain Elevators and Mills -Boilers and Industrial Furnaces Burning Hazardous Waste -Local Zoning Consistency Determination -Removal of Permit Exemption for Incinerators
Jul 03 Cont.			-Add Insignificant Activities to 2Q .0706(a)(1) -General Fugitive Dust Control -Revision of Standards for Air Curtain Burners; Addition of No Nuisance Requirements to Land Clearing Burning; Revise 2D .1906 to add Municipalities -Exempt NSPS Dry Cleaners from Permitting -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Exemption of Incinerators with Specific VE

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			Standards from 2D .0521 (368) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Correction of Column Titles in 2Q .0203 (372) -Correction and Clarification in 2Q .0102 (375) -Revision of AAL for Hydrogen Sulfide (378) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Exclusionary Rule for Concrete Batch Plants (380) -Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Concrete Batch Plants -Revision of AAL for Hydrogen Sulfide (378)

II. GROUNDWATER ACTIVITIES

July 2002 EMC Agenda Item # 02-34:

ACTION ITEM FROM THE DIVISION OF WASTE MANAGEMENT – UNDERGROUND STORAGE TANK SECTION: Request to Proceed with Permanent Rulemaking for the Pay For Performance Rule and Publishing of Permanent Rule in the NC Register.

EXPLANATION:

The Environmental Management Commission adopted a temporary rule on May 14, 2002 that became effective July 1, 2002. The temporary rulemaking adopted 15A NCAC 2P .0408 that specifies performance-based cleanups of releases from underground storage tanks. A performance-based or pay-for-performance contract is an agreement that specifies a series of cleanup milestones (generally, percentage reductions in contaminant levels) that must be achieved before payments can be made to the cleanup firm. Tank owners, operators, and landowners of sites eligible for reimbursement from the Commercial and Noncommercial Leaking Petroleum Underground Storage Tank Cleanup Funds may allow their sites to be considered by the Division for this pilot program. The Division may also utilize money from the Cleanup Funds and other sources specifically intended to be used for performance-based cleanups at state-lead cleanup sites. Sites selected by the Division for performance-based cleanups will be posted for competitive bidding in the North Carolina Interactive Purchasing System. A performance-based contract will be awarded to the qualified environmental services firm that submits the lowest bid for an acceptable remedial proposal for the advertised site. No comments were received by the agency when the temporary rule was given notice in the North Carolina Register.

EMC Action:

On July 11, 2002, the Environmental Management Commission gave the Division permission to proceed with permanent rulemaking including a notice of the text of the rule and public hearing. This rule will proceed with the remaining steps in the rulemaking process contained in North Carolina General Statute 150B.

GROUNDWATER GWC/EMC FUTURE AGENDAS*

	Committee Agenda	EMC Agenda
Dec 2002	> DWQ-GWS ITEMS< 1. **Approval of the Flynt/Wansona Variance Request.** 2. **Request to Proceed with a 60-Day Notice of Rulemaking to AMEND the 15A NCAC 2C .0200 – Injection Well Rules.** ***(EMC GW Committee delegated to approve subject matter notices).***	> DWQ-GWS ITEM < 1. **Request to Proceed with a Notice and Hearing on Nine New Groundwater Quality Standards to title 15A NCAC 2L .0202.**
Feb 2003	> DWQ-GWS ITEMS< 1. **Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** 2. **Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** 3. **Request for Approval to Proceed with Public Notice and Hearing to AMEND the 15A NCAC 2C .0200 – Injection Well Rules.** > DWM-UST SECTION ITEM < 1. **Request to APPROVE a Permanent Rule that will Allow Performance Based Cleanups at Leaking Petroleum Underground Storage Tank Sites (WAIVE THE 30 DAY REQUIREMENT)**	> DWQ-GWS ITEM< 1. **Approval of the Flynt/Wansona Variance Request.** > DWM-UST SECTION ITEM < 2. **Request to APPROVE a Permanent Rule that will Allow Performance Based Cleanups at Leaking Petroleum Underground Storage Tank Sites (WAIVE THE 30 DAY REQUIREMENT)**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

	Committee Agenda	EMC Agenda
Mar 2003	> DWQ-GWS ITEMS< 1. **Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards in 15A NCAC 2L .0202.** 2. Information from the Well Contractor's Certification Commission Concerning Permanent Rulemaking to change Application Requirements in title 15A NCAC 27 .0301.	> DWQ-GWS ITEMS< 1. **Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** 2. **Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** 3. **Request for Approval to Proceed with Public Notice and Hearing to AMEND the 15A NCAC 2C .0200 – Injection Well Rules.**
Apr 2003	> DWQ-GWS ITEM< 1. **Request to APPROVE Changes to Eleven Groundwater Quality Standards in title 15A NCAC 2L .0202.**	> DWQ-GWS ITEM< 1. **Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards in 15A NCAC 2L .0202.**
May 2003	> DWQ-GWS ITEM< (* no items at this time *)	> DWQ-GWS ITEM< 1. **Request to APPROVE Changes to Eleven Groundwater Quality Standards in title 15A NCAC 2L .0202.**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

III. SURFACE WATER QUALITY ACTIVITIES

SURFACE WATER QUALITY ACTIVITIES

Agenda Item:

Request for Approval of the Final *Neuse River Basinwide Water Quality Plan*

Explanation:

The *Neuse River Basinwide Water Quality Plan* is the first in the third cycle of basinwide plans that the Division is preparing for all 17 of the state's major river basins.

The draft Neuse River Basinwide Water Quality Plan was approved by the Water Quality Committee in April 2002 to be taken to public meetings. Three public meetings were held in Goldsboro, Raleigh and New Bern in May 2002 with 75 people in attendance. Revisions were made and some information was added to the draft plan based on comments. Copies of the revised plans were sent to EMC members in the EMC package.

This Basinwide Plan is a planning document that will guide the Division's management actions in this river basin over the next five years and beyond. The management actions are based on existing rules and policy. Therefore, approval and endorsement of this plan by the Commission would affirm that the management actions set forth in this plan are consistent with the rules adopted by the Commission and with the decision-making policies under which the Division has acted in the past.

Recommendation:

It is recommended that the *Neuse River Basinwide Water Quality Plan* be approved and endorsed by the Commission as a guide to water quality program management and implementation by the Division of Water Quality as it carries out its Water Quality Program duties and responsibilities in this river basin.

EMC ACTION:

The EMC approved the *Neuse River Basinwide Water Quality Plan* as recommended.

Agenda Item:

Request for Approval of the Final *Chowan River Basinwide Water Quality Plan*

Explanation:

The *Chowan River Basinwide Water Quality Plan* is in the second cycle of basinwide plans that the Division is preparing for all 17 of the state's major river basins.

The draft Chowan River Basinwide Water Quality Plan was approved by the Water Quality Committee in December 2002 to be taken to public meetings. One public meeting was held in Ahoskie in May 2002 with 40 people in attendance. Revisions were made and some information was added to the draft plan based on comments. Copies of the revised plans were sent to EMC members in the EMC package.

This Basinwide Water Quality Plan is a planning document that will guide the Division's management actions in this river basin over the next five years and beyond. The management actions are based on existing rules and policy. Therefore, approval and endorsement of this plan by the Commission would affirm that the management actions set forth in this plan are consistent with the rules adopted by the Commission and with the decision-making policies under which the Division has acted in the past.

Recommendation:

It is recommended that the *Chowan River Basinwide Water Quality Plan* be approved and endorsed by the Commission as a guide to water quality program management and implementation by the Division of Water Quality as it carries out its Water Quality Program duties and responsibilities in this river basin.

EMC ACTION:

The EMC approved the *Chowan River Basinwide Water Quality Plan* as recommended.

Agenda Item:

Request for Approval of the *Final Pasquotank River Basinwide Water Quality Plan*

Explanation:

The *Pasquotank River Basinwide Water Quality Plan* is in the second cycle of basinwide plans that the Division is preparing for all 17 of the state's major river basins.

The draft Pasquotank River Basinwide Water Quality Plan was approved by the Water Quality Committee in December 2002 to be taken to public meetings. One public meeting was held in Elizabeth City in May 2002 with 25 people in attendance. Revisions were made and some information was added to the draft plan based on comments. Copies of the revised plans were sent to EMC members in the EMC package.

This Basinwide Water Quality Plan is a planning document that will guide the Division's management actions in this river basin over the next five years and beyond. The management actions are based on existing rules and policy. Therefore, approval and endorsement of this plan by the Commission would affirm that the management actions set forth in this plan are consistent with the rules adopted by the Commission and with the decision-making policies under which the Division has acted in the past.

Recommendation:

It is recommended that the *Pasquotank River Basinwide Water Quality Plan* be approved and endorsed by the Commission as a guide to water quality program management and implementation by the Division of Water Quality as it carries out its Water Quality Program duties and responsibilities in this river basin.

EMC Action:

The EMC approved the *Pasquotank River Basinwide Water Quality Plan* as recommended.

Agenda Item:

Request for Approval of the Nutrient Response Model For Jordan Lake

Explanation:

Staff sought EMC approval of the Jordan Lake Nutrient Response Model. The nutrient response model was developed by the seven municipalities that requested an extension to the TN compliance date under conditions outlined in SB1366. The seven municipalities were the City of Burlington, City of Graham, City of Greensboro, City of Mebane, Orange Water and Sewer Authority, Town of Pittsboro, and the City of Reidsville. The model has been completed and was presented to the Water Quality Committee in April, 2002. After EMC approval, staff will use the model to develop a management strategy for the Jordan Lake watershed.

Recommendation:

That the EMC approve the Jordan Lake Nutrient Response Model.

EMC ACTION:

The EMC approved the Jordan Lake Nutrient Response Model.

Agenda Item:

Request for Adoption of Rules for Discharges to Isolated Wetlands and Waters (15A NCAC 2H .1300)

Explanation:

Four public hearings were held in April 2002 across the state to present proposed permanent rules for discharges to isolated wetlands and waters and to receive public comment on the proposed rules as well as 14 specific issues included with the Notice. Most comments supported the rules primarily because the rules are designed to replace the federal wetland permitting system that was in place in 1996 (401 Water Quality Certification rules) but were subsequently changed by federal court cases in January 2001. Many comments from the environmental community stated that many isolated wetlands are small and therefore may need more protection than non-isolated wetlands. In contrast, those forwarding comments from the development community believe that the EMC does not have authority to adopt wetland rules or a wetland permitting system. Many in the development industry also stated that if the EMC proceeds to adopt rules that the rules should be as clear as possible and as close to the existing wetland permitting processes as possible. In response, the Hearing Officers and staff have made changes for clarity. The Hearing Officers' Report, sent under separate cover, explains the detail of each proposed change, contains a summary of the process, and also includes all comments received.

Recommendation:

That the EMC adopt the permanent rules as recommended in the Hearing Officers' Report to become effective April 1, 2003. In the meantime, the existing temporary rule will remain in effect.

EMC ACTION:

The EMC voted to adopt the rules as recommended in the Hearing Officers' Report.

Agenda Item:

Hearing Officer's Report on the Proposed Reclassification of the Swift Creek Watershed (Edgecombe, Franklin, Nash, Vance and Warren Counties; Tar-Pamlico River Basin) to Class C ORW NSW (Nutrient Sensitive Waters), Class C NSW+, Class B NSW+ and Water Supply-IV (WS-IV) NSW+

Explanation:

The Pamlico-Tar River Foundation staff requested that Swift Creek in the Tar Pamlico River Basin be reclassified to Outstanding Resource Waters (ORW). The reason given for the request was to provide protection for the resources and quality of these waters.

DWQ water quality studies conducted in 1996 and 1997 indicated that only an approximately 14-mile stretch of surface water, which traverses from S.R. 1003 to S.R. 1004 in Nash County, has excellent water quality. This 14-mile stretch is comprised of a portion of Sandy Creek, which is a tributary to Swift Creek, and a portion of Swift Creek. These studies combined with additional data revealed that this stretch contains many important animal species, such as the federally and state listed endangered Tar River spiny mussel. There is also a portion of a significant natural heritage area that is of national significance located in this stretch. Thus, based on the water quality and existing resource values, this 14-mile stretch of surface water qualifies for the ORW designation.

The remainder of the creek's watershed also contains several important resource values. There are five significant natural heritage areas in addition to the remainder of the above-mentioned area, four natural communities recognized by the Natural Heritage Program (NHP), a special animal habitat, a natural area registered with the NHP, and several important species including the red cockaded woodpecker and dwarf wedgemussel, which are federally (and in the case of the woodpecker also state) listed as endangered.

Due to the presence of the resource values in the watershed and the excellent water quality of the 14-mile stretch, the 14-mile stretch is proposed to receive both the ORW classification and the ORW management strategy (to be signified by the addition of the ORW designation to the classifications of these waters), and the remainder of the watershed is proposed to receive the ORW management strategy without the ORW classification (to be signified by the addition of a "+" symbol to the classifications of these waters).

If reclassified, regulations that affect new development activities, landfills, USTs and DOT activities as well as new and expanding wastewater discharges would apply. However, there are no new proposed discharges, no proposed expansions of existing discharges, and no proposed significant development (including landfills and USTs) with one exception: a portion of one development project may be impacted by the proposed reclassification. Furthermore, DOT regulations for their planned activities in the proposed watershed will require use of Best Management Practices (BMPs). Forestry, animal, dam/resource, and agricultural

practices will not be affected. Please also note that all new activities within 50 feet of NSW waters in the Tar-Pamlico River Basin are subject to the currently existing Tar-Pamlico Basin Riparian Buffer Protection rules.

In September and October 2001, the Water Quality Committee and the Commission, respectively, approved the request to proceed with rule-making for the proposed reclassification. A public hearing was held in February 2002 in Rocky Mount. 26 written comments and seven verbal comments regarding the proposed reclassification were received. One verbal comment and two written comments were against the proposed reclassification; the remaining comments were in favor of the proposed reclassification. The Hearing Officer's Report of Proceedings sent to the members of the EMC includes further details.

Recommendation:

The Hearing Officer recommends that the proposed reclassification be approved by the Commission. If reclassified as proposed, the effective date will be April 1, 2003.

EMC ACTION:

The EMC approved the proposed reclassification as recommended by the Hearing Officer.

Agenda Item:

Request for Adoption of Proposed Amendments to the Wastewater Discharge Rules (15A NCAC 2H .0103 & .0106)

Explanation:

The EMC enacted temporary amendments to 15A NCAC 2H .0103 and .0106 in May 2001 in response to the potential for an outbreak of Foot and Mouth Disease and the realization that such an outbreak would create decontamination wastewater. The permanent rules were broadened to deem permitted discharges associated with biological or chemical decontamination activities performed as a result of an emergency declared by the Governor or the Director of the Division of Emergency Management and conducted by or under the direct supervision of the federal or state on-scene coordinator. The permanent amendments also outline additional requirements and conditions, such as that the discharge is not radiologically contaminated. The rulemaking was appropriately noticed and a public hearing was scheduled. However, no persons, other than agency staff, attended. No written comments were received regarding the proposed permanent amendments. The Hearing Officer's report, sent under separate cover, contains full details.

Recommendation:

That the EMC adopt the permanent amendments as recommended in the Hearing Officer's Report to become effective April 1, 2003.

EMC ACTION:

The EMC voted to adopt the permanent amendments as recommended in the Hearing Officer's Report.

SURFACE WATER QUALITY WQC/EMC FUTURE AGENDAS

	WQC AGENDA	EMC AGENDA
Oct 2002	• Request for Approval of Jordan Lake Nutrient Management Strategy Schedule • Request for Approval of Water Supply Watershed Protection Ordinance (Town of Lillington) • Request for Consideration of a Major Variance for Piedmont Triad International Airport (FedEx Site) • Tar-Pam Ag Rule Annual Report & Approval of Accounting Method • Annual Progress report on Neuse Ag Rule • Revised Natural Resources Conservation Service Nutrient Management Standard	• Request for Approval of Proposed Surface Water Quality Standards for the 2000-2003 Triennial Review • Request for Approval of Proposed Amendments to the Neuse River Basin Nutrient Sensitive Waters Management Strategy: Wastewater Discharge Requirements • Request for Approval of Proposed Temporary NPDES Phase 2 Stormwater Rules • Tar-Pam Ag Rule Annual Report & Approval of Accounting Method
Nov 2002	No Meeting Scheduled.	No Meeting Scheduled.
Dec 2002	• Request for Permission to Proceed with Proposed Reclassifications of the Rocky River, Dan River, and Uwharrie River • Request to Send the Draft Yadkin River Basinwide Plan to Public Meetings • Possible Item – Request Approval of Greensboro's Use of Special Studies Water Supply Watershed Maps for Water Supply Buffers	• No items have been finalized yet for the December EMC Meeting.

*Dates shown are projections. Actual schedules could vary 1-3 months in either direction.

ERC UPDATE

IMPLEMENTATION OF THE NEUSE RIVER BASIN NSW (NUTRIENT SENSITIVE WATER) MANAGEMENT STRATEGY

JANUARY 16, 2003

The Environmental Management Commission adopted rules in December of 1997 requiring that point source discharges and nonpoint source discharges reduce nitrogen contributions to the Neuse River basin by 30% by the year 2003. The attached documents:

- "Annual Progress Report on the Neuse Agricultural Rule" and
- A letter from the Lower Neuse Basin Association

provide information supporting the conclusion that the 30% reduction has occurred in the basin.

Annual Progress Report on the Neuse Agricultural Rule
(15A NCAC 2B .0238)

A report to Environmental Management Commission by the Neuse Basin Oversight Committee

Summary

The Neuse Basin Oversight Committee (BOC) has received and approved annual reports from 17 Local Advisory Committees (LACs) in September 2002. As a result, for the basin as a whole, the agricultural community has achieved a 34% nitrogen (N) reduction compared to the overall baseline. Eleven LACs have achieved their nitrogen reduction goal established by the BOC, which is a 30 percent N reduction from their baselines. Nitrogen loss from agricultural land has been reduced by over 40 percent compared to the baseline numbers for Carteret, Craven, Johnston, Wake/Franklin and Wilson counties. Nitrogen loss reduction from agricultural land was accomplished through best management practice (BMP) installation, fertilizer application reduction and cropland attenuation. The BOC continues to encourage counties that have already achieved their N reduction goal to implement additional BMPs to reduce N loss. The BOC will focus additional efforts to assist counties that currently have not met their reduction goals to implement additional BMPs and to seek alternative BMPs to achieve the N reduction goals.

Background

In December 1997, the N.C. Environmental Management Commission (EMC) adopted the Neuse River Basin Nutrient Sensitive Waters (NSW) Management Strategy. For the first time in state history, mandatory controls are applied not only on point source pollution but also on nonpoint source pollution in the Neuse River basin. The strategy has 8 rules that affect both urban and rural areas. The strategy is aimed at reducing the average annual load of nitrogen delivered to the Neuse River Estuary from point and nonpoint sources by a minimum of 30 percent of the average annual load from the period 1991 through 1995 by the year 2003.

The Neuse agricultural rule provides each farmer with the option of becoming part of a collective local strategy for implementing BMPs or implementing standard BMPs as specified in the rule. A Basin Oversight Committee and 17 Local Advisory Committees were established to implement the Neuse agricultural rule and to assist farmers with complying with the rule.

The BOC is made up of eight individuals appointed by the Secretary of the Department of Environment & Natural Resources (DENR). The BOC includes representatives from the following agencies and interest groups: Division of Water Quality (DWQ), Division of Soil and Water Conservation (DSWC), Natural Resource Conservation Service (USDA-NRCS), North Carolina Department of Agriculture and Consumer Service (NCDA&CS), North Carolina Cooperative Extension Service (NCCES), agricultural community, scientific community and environmental community. Responsibilities of the

BOC include developing a method to track and account for net nitrogen reductions from agricultural operations in the basin, approving local nitrogen reduction strategies, and presenting annual reports to the EMC on the progress toward reaching the goal.

Each of the 17 county-level LACs is made up of seven or more individuals representing local agricultural agencies and farmers. The local agricultural agencies include DSWC, NCDA&CS, local NRCS, NCCES and local Soil and Water Conservation District (SWCD). Responsibilities of LACs include conducting farmer sign-up, establishing county agricultural baseline, developing local nitrogen reduction strategy, and preparing annual progress report. Several of the LACs cover more than one county.

Community meetings about the Neuse agricultural rule were held in 17 counties in the basin with assistance from NCCES. A fact sheet about the rule was developed and distributed to all counties within the basin. The sign-up process for farmers to enroll in the local option started in 1998. Both agricultural and mass media publications targeting farmers in the basin carried announcements about the sign-up process. The LACs successfully conducted the farmer sign-up between 1998 and 1999 with assistance from DSWC. Approximately 90 percent of cropland (estimated 800,000 acres) in the Neuse River Basin representing about 3,400 farmers was enrolled in the local option between 1998 and 1999.

Neuse Agricultural Baseline and Local Reduction Strategies

The Nitrogen Loss Evaluation Worksheet (NLEW) was developed to meet the requirement of a scientifically valid accountability method for nitrogen reduction. The NLEW tool, which was based on soil loss, was initially developed in 1995 by the USDA - Natural Resource Conservation Service (NRCS) as a field-based procedure to estimate and report nitrogen loading from agricultural fields. As the need for a nitrogen accounting tool became more important, a multiagency team was formed in 1996 under the leadership of researchers from N.C. State University (NCSU) to begin a critical reevaluation of NLEW. The NLEW committee also included representatives from DWQ, NCSU, DSWC, and NRCS. As a result of the review, NLEW was completely redesigned, including significant research results. The algorithms for NLEW were completely modified. The NLEW tool was developed to serve the following purpose:

1. Estimate nitrogen loading from agricultural sources into the Neuse River during the baseline period of 1991 to 1995;
2. Facilitate local BMP planning and implementation; and
3. Track and account for reduction in nitrogen loss due to the implementation of BMPs, crop and land use changes throughout the basin.

In March 2000, the EMC approved the accountability process of which NLEW is the critical part. Two major training sessions, conducted by DENR and NCSU, were held in central locations for the upper and lower basin. Over 200 LAC members including local agricultural agency staff and farmers attended the training.

Before the county agricultural baselines could be developed, NLEW was computerized. After developing the county agricultural baselines, the baseline N levels were reported to and examined by the BOC then reported to the EMC. To verify the county baseline numbers, a statistical sampling project in the Neuse River Basin was funded. The primary results of this study were reported to the BOC in February 2002. Early information indicates that the baseline figures are high in some counties due to lack of information about existing buffers. The BOC will compare this statistical analysis and work with LACs to make any needed adjustment to county baseline estimates.

NLEW was also used to prepare the local nitrogen reduction strategies. Each strategy is a consensus determination by the LAC. Each is based on the types and amounts of the approved BMPs that they believe need to be implemented to collectively produce the required 30 percent reduction from baseline numbers. The LACs determined which practices would be most acceptable to participating farmers and predicted the number of acres to which they felt these practices could be applied. Table 1 summarizes the BMP implementation goals from the approved local nitrogen reduction strategies.

Table 1. BMP Implementation Goals for all 17 Neuse Basin LACs to Achieve 30% Reduction in Agriculture Nitrogen

BMPs	Acreage (ac)
20' vegetated buffer	1,100
30' vegetated buffer	700
20' forested buffer	270
50' riparian buffer	2,000
Cover Crop	5,200
Nutrient management	280,000
Water control structure	42,000

Current Status

Nitrogen Reduction from Baseline in 2001

All seventeen LACs submitted their first annual reports to the BOC in May 2002. Eleven LACs have achieved their nitrogen reduction goal established by the BOC, which is a 30 percent N reduction from their baseline. Nitrogen loss from agricultural land has been reduced by over 40 percent compared to the baseline numbers for Carteret, Craven, Johnston, Wake/Franklin and Wilson counties. As a result, for the basin as a whole, the agricultural community has achieved a 34% N reduction compared to the overall baseline. Nitrogen loss reduction from agricultural land was accomplished through BMP installation, better management of fertilizer and loss of cropland acreage to development. Table 2 lists each county baseline within the basin, its proposed reduction goal and N reduction from baseline in 2001.

Table 2. Summary of County Baseline and its N Reduction from Baseline in 2001

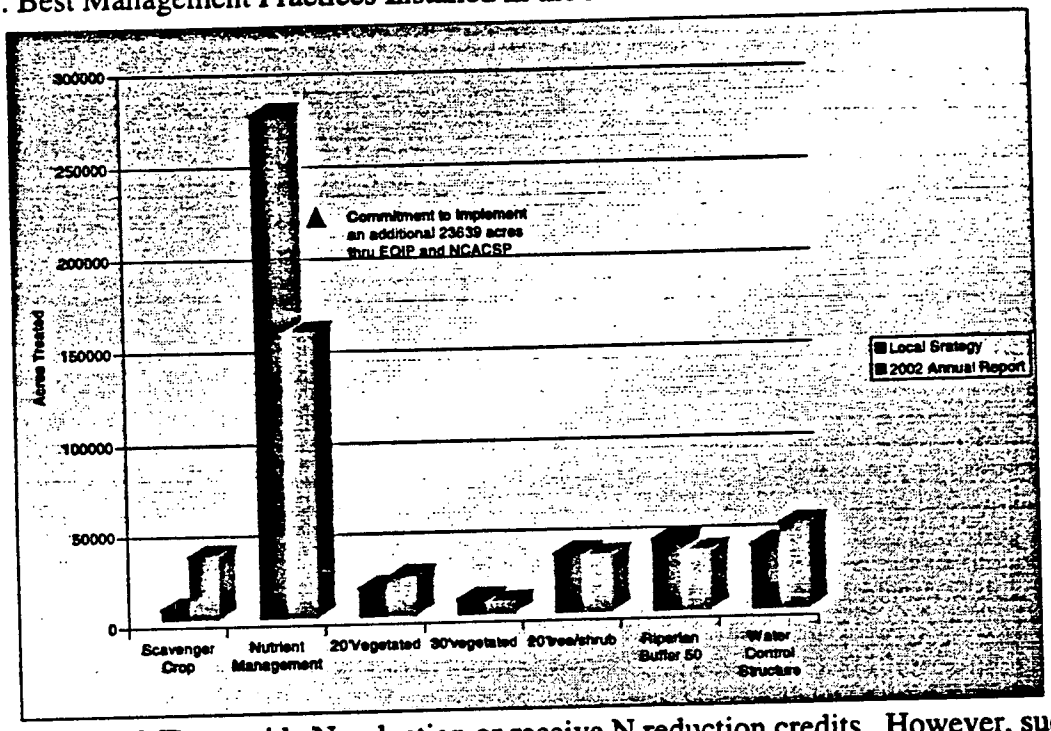
County	Baseline N Loss* in lbs.	Proposed Percent Reduction	2001 N Loss* in lbs.	Percent of N Reduction From Baseline in 2001
Carteret	1284833	>30%	700893	45.4%
Craven	3928696	>30%	2106696	46.4%
Durham	81542	>30%	60009	26.4%
Granville	60057	20.5%	46627	22.4%
Greene	4034046	30%	2542740	37.0%
Johnston	6094690	30%	3194085	47.6%
Jones	2736562	>30%	1808779	33.9%
Lenoir	3994989	>30%	3421915	14.3%
Nash	872259	30%	609184	30.2%
Orange	181276	18%	146034	19.4%
Pamlico	2043961	>30%	1257096	38.5%
Person	339822	30%	231542	31.9%
Pitt	2892783	30%	2230805	22.9%
Wake/Franklin	597078	30%	339857	43.1%
Wayne	5816298	30%	4354422	25.1%
Wilson	1939073	>30%	1133232	41.6%
Collectively for the entire Neuse River Basin	37414381		24927010	34.5%

* The total nitrogen loss value is for comparative purposes only. It represents fertilizer that was applied and neither used by crops nor intercepted by BMPs in a Soil Management Unit, based on NLEW calculations. It may not represent the actual loss from the Soil Management Unit.

BMP Installation

A significant number of BMPs have been installed since 1996. It is estimated that approximately half of enrolled croplands received treatment from the installed BMPs. Figure 1 indicates that farmers installed more water control structures, planted more scavenger crops, and established more 20 foot vegetated buffers and 20 foot tree buffers than were proposed by LACs in their local N reduction strategies. The BOC is confident that all BMP installation targets will be exceeded during the next year with the assistance of the CREP program and expected increase of financial and technical assistance provided in the 2002 Farm Bill.

Figure 1. Best Management Practices Installed in the Neuse River Basin from 1996 to 2001



Not all types of BMPs provide N reduction or receive N reduction credits. However, such BMPs do have water quality benefits. Many BMPs are designed to reduce sediment and other nutrients, such as phosphorus, from agricultural lands to surface water and shallow groundwater. Table 3 lists these other types of BMPs installed from 1996 to 2001. Units of BMPs reported in the table are the actual BMP footprint acreage, not acreage treated by these BMPs. Approximately 480 thousand tons of soil has been saved from installation of these BMPs.

Table 3. Additional BMPs Installed in the Neuse River Basin from 1996 to 2001

Best Management Practice	Units
Conservation Tillage	52202 acres
Conservation Tillage 3 Yr.	2086 acres
Long Term No Till	7377 acres
Terraces	3711 ft
Diversion	121530 ft
Sod Based Rotation	1550 acres
Strip Cropping	44 acres
Field Border	342 foot print acres
Grassed Waterway	237 foot print acres
Livestock Exclusion	10029 ft
Streambank Stabilization	50 ft
Filter Strip	53 foot print acres

* Information obtained from NC Agricultural Cost Share Reports 12/1995 through 4/2002. This does not include Best Management Practices that were voluntarily installed through various federal programs or without government assistance.

Implementation Cost

In large measure, the success of this program is due to funding from both traditional and non-traditional sources to pay for cost-share, best management practices; fund informational literature and workshops for farmers; and to cover some of the expense of developing our accountability process. These figures do not include the extensive staff time from the DSWC, local SWCD, NCDA&CS, NCCES, and USDA-NRCS.

Listed below are the major sources that we have identified. These figures are for work done through 2001. This is a comprehensive but not complete list. Most of projects or programs listed are continuing items and will fund this work through the next year or more.

Please note that this does not include the cost to Neuse Basin farmers. We do not have the ability to calculate the out-of-pocket expense to farmers for their portion of cost-share projects or for the practices that they pay for entirely. However, we know that this amount is very substantial and should be acknowledged.

1. Federal Cost Share Funding through the Natural Resource Conservation from the Environmental Quality Incentives Program (EQIP) -$ 2,690,134

2. The NC Agriculture Cost Share Program – including federal funds sent to the state with state match for the Conservation Reserve Enhancement Program $ 2,782,915

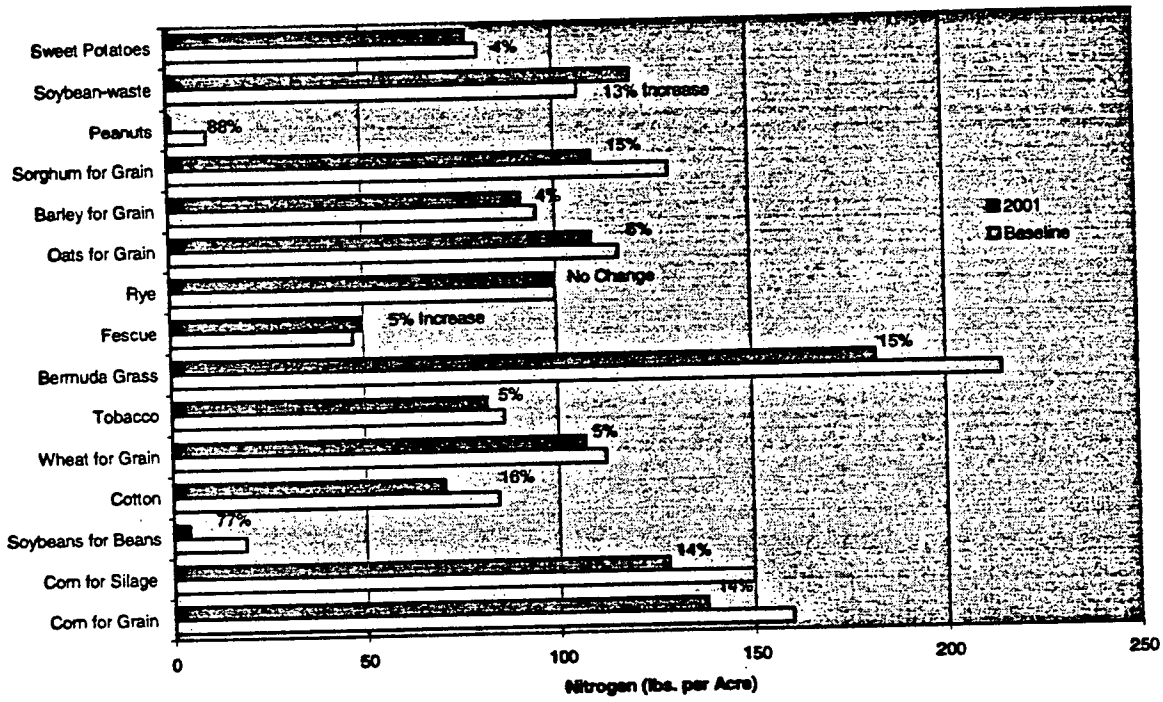
3. Clean Water Management Trust Fund $1,160,000. This amount is not grant totals, but actual amounts spent thus far for practices installed on farms.

4. The "Neuse Crop Management Project" conducted by NCSU received primary funding from the Pew Charitable Trust and the US Environmental Protection Agency. That funding paid for nutrient management demonstrations, over 113,000 acres of nutrient management, produced a variety of educational fact sheets for Neuse Basin farmers, and covered the $50,000 computer programming cost for NLEW (the nutrient accountability program approved by the EMC for the Neuse Agricultural Rule), and $30,000 for nutrient management training (mandated in Neuse Rule .0239) which is also required for most farmers. The total funding for this project including the portion that came from the Clean Water Management Trust Fund was $967,000.

Fertilizer Management

With greater nutrient management and increased costs of fertilizer, farmers in the Neuse River Basin have reduced their fertilizer application since 1996. Figure 2 indicates that fertilization rates for most major crops in the basin have been reduced.

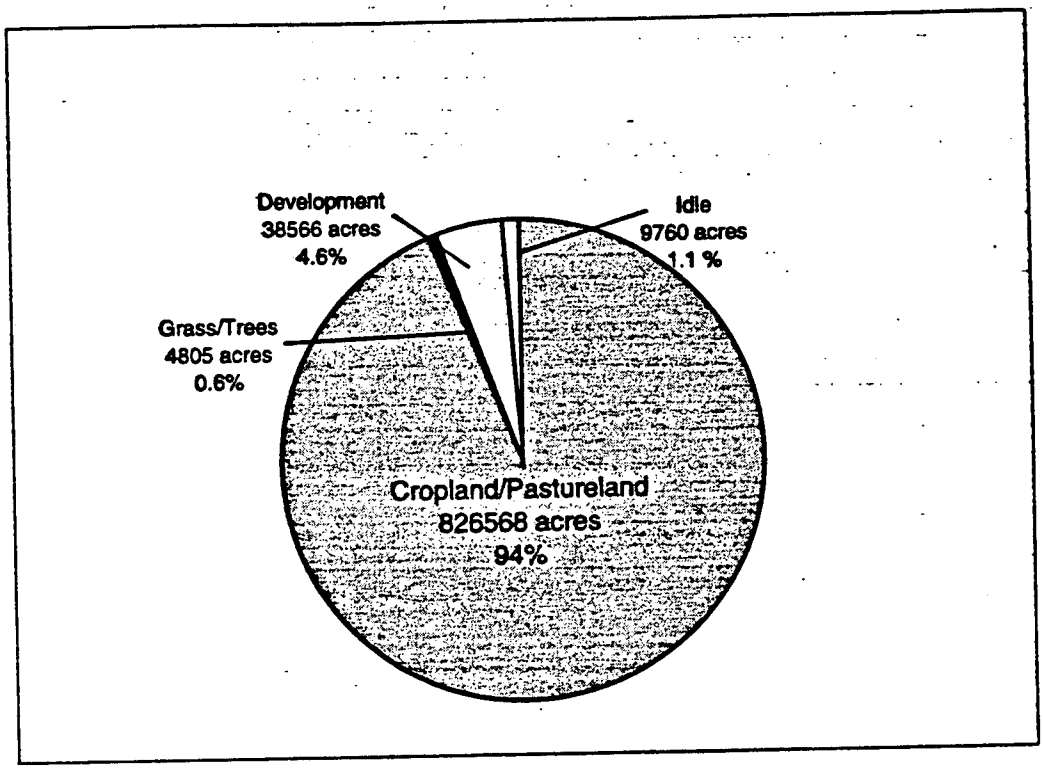
Figure 2. Average Fertilization Rate for Major Crops in the Neuse River Basin in 2001 Compared to the Baseline Period (1991-1995)



Cropland Loss

The Neuse River Basin has experienced significant growth since the 1980s. Durham, Johnston and Wake Counties are growing the fastest in the upper basin, with Pitt County growing fastest in the lower basin. Approximately 5 percent of the cropland in the basin has been lost to development since 1996 (Figure 3). Cropland loss has contributed significant N reductions for Johnston, Wake and Wayne Counties.

Figure 3. Current (2001) Uses of Land in the Neuse River Basin that was all Agriculture during Baseline Period (1991-1995)



The Basin Oversight Committee recognizes that the business of agriculture and the science of agriculture are under perpetual change as a result of a great number of forces. These forces may include:

- Changes in world economies or trade policies
- Government program changes such as commodity support or environmental regulations
- Weather, i.e., long periods of drought or rain
- New crops brought into production or changes in how crops are grown as a result of research and development
- Plant disease or pest problems such as foreign pest or virus
- Farm location, i.e., large grain grower renting local farms moves to cash crop as rental lands sold to development
- Age of farmer, i.e., as retirement approaches farmer may move from row crops to cattle

The strategies of several LACs were influenced by significant acreage shifts from corn to cotton production. Figure 4 shows changes of crop pattern in the Neuse River Basin between the baseline period (1991-1995) and 2001. This change is significant because corn has a considerably higher nitrogen requirement than does cotton. This change in

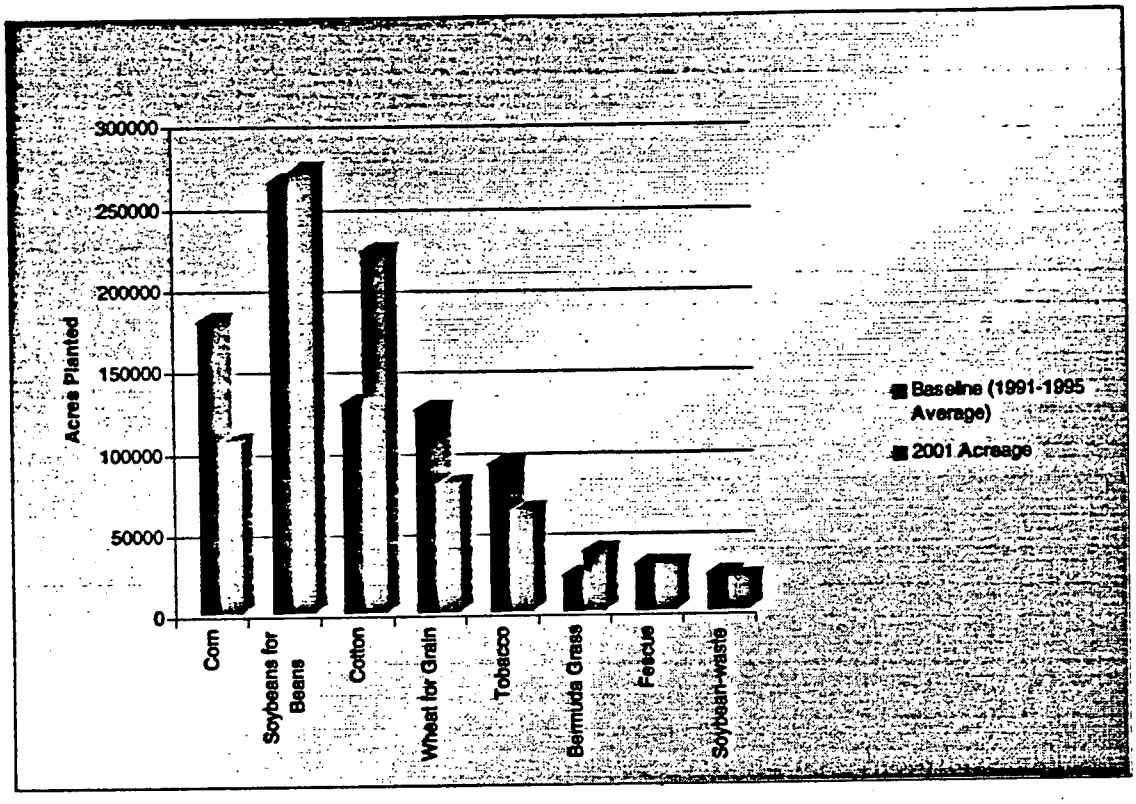
crop production brought about a significant reduction in nitrogen use on agricultural lands since the baseline was established.

It is important to note, however, that nitrogen application rates for corn have dropped significantly relative to the baseline due to intensive nutrient management education efforts and to the increasing cost of nitrogen. This reduction in corn fertilization rates should significantly mitigate the effect of a potential shift back to corn.

Historical farming practices in North Carolina cannot be used as a reliable predictor for the future agricultural picture in the state. Tobacco and peanut program changes have occurred recently that will likely result in major changes for many farms in the Neuse River Basin. Conversion of cropped lands to other agricultural and non agricultural uses also remains a likely scenario in many Neuse River Basin counties. New crops are likely to be grown in the basin as a result of bioenergy and biopharmaceutical production. Agriculture in the Neuse River Basin will continue to change over the next decade.

The Local Advisory Committees have been advised of the need to monitor changes in agriculture for the county and to update strategies to accommodate these changes. These changes could result in the need to implement additional best management practices or to redesign or reimplement existing practices based on changes in the practice itself over time, or based on the changes in crops grown, crop management, BMP management or other factors. Individual farm plans must be updated as any changes occur that will result in changes in nitrogen uses on farmlands

Figure 4. Changes in Crop Pattern in the Neuse River Basin between Baseline Period (1991-1995) and 2001



Future Steps

The Neuse Agricultural Basin Oversight Committee will continue to work with Local Advisory Committees and farmers to reduce N loss from agricultural lands in the Neuse River Basin. The BOC continues to encourage counties that have already achieved their N reduction goal to implement additional BMPs to reduce N loss. The BOC will focus additional efforts to assist counties that currently have not met their reduction goals to implement additional BMPs and to seek alternative BMPs to achieve the N reduction goals.

Lower Neuse Basin Association, Inc.

Raleigh, North Carolina

March 29, 2001

APR - 2 2001
DENR - WATER QUALITY
POINT SOURCE BRANCH

VIA U.S. MAIL

Mr. Michael Templeton
NCDENR-Division of Water Quality
512 N. Salisbury Street
Mail Service Center 1617
Raleigh, NC 27699-1617

Re: Success of the Lower Neuse Basin Association in Nitrogen Reduction

Dear Mr. Templeton:

Enclosed is a description of the success achieved by members of the Lower Neuse Basin Association ("LNBA") as a group in reducing their discharge of total nitrogen into the Neuse River and its tributaries. It is remarkable that this group has already reduced its total nitrogen discharge by 40% from the 1995 level. This reduction substantially exceeds the 2003 reduction goal of 30% established under the Neuse River Rules and does so two years ahead of schedule. We thought you would want to see the enclosed summary since success stories sometimes don't get the attention they deserve. We hope that you will help the LNBA find ways to spread the news about this success story.

Should you have any questions or comments about the enclosed materials, please feel free to call me at (252) 753-5774. With kind regards, I am

Very truly yours,

Richard N. Hicks

Richard N. Hicks

Enclosure

P. O. Box 590 Raleigh, North Carolina 27602
(919) 890-3400

RECEIVED
APR - 2 2001
DENR - WATER QUALITY
POINT SOURCE BRANCH

NITROGEN REDUCTION IN WASTEWATER DISCHARGE

A SUCCESSFUL PROGRAM BY

THE LOWER NEUSE BASIN ASSOCIATION

JANUARY 2001

The Lower Neuse Basin Association (LNBA) is an association of municipalities and industries with wastewater treatment facilities permitted to discharge treated wastewater into the Neuse River below Falls of the Neuse Dam. The association was formed for information exchange and to undertake activities best accomplished by group effort. For example, the LNBA monitors river quality under an agreement with the N.C. Division of Water Quality. Sampling and laboratory testing is done by a commercial laboratory with results provided to DWQ. LNBA members benefit because the requirement for monitoring upstream and downstream from discharge locations is waived. DWQ benefits because sampling can be done at DWQ preferred locations. Also, by having one responsible laboratory, consistency of procedures and results is assured.

The LNBA has been attracted to the concept of a group approach to point source nitrogen control in the Neuse River Basin since the concept was included in House Bill 515 in 1996 and in the Nutrient Sensitive Waters Management Strategy adopted by the Environmental Management Commission in December, 1997.

The Management Strategy mandates a 30% reduction by 2003 from 1995 levels of total nitrogen delivered to the estuary. The LNBA has been supportive of the reduction goal of 30% – pending development of scientific based requirements necessary to maintain water quality – and members have been actively working to reduce nitrogen discharge from their facilities.

The goal for nitrogen reduction has been achieved and substantially exceeded well ahead of the required schedule. Between 1995 and 2000, LNBA members' total pounds of nitrogen discharged into the Neuse River was reduced by 46% at the point of discharge and 40% at the estuary. During the same period, member plants experienced an increase in wastewater flow of 11%.

These results were not achieved without significant effort and expense. The LNBA has completed several studies and seminars to improve members' understanding of nitrogen control methods. Over $16 million was spent on projects for nitrogen control between July 1995 and October 1998 according to a member survey. That survey indicated that members expected to spend an additional $31 million on capital projects for nitrogen reduction prior to 2003. Most nitrogen reduction projects have been completed and are operating successfully as shown in the following detailed performance data.

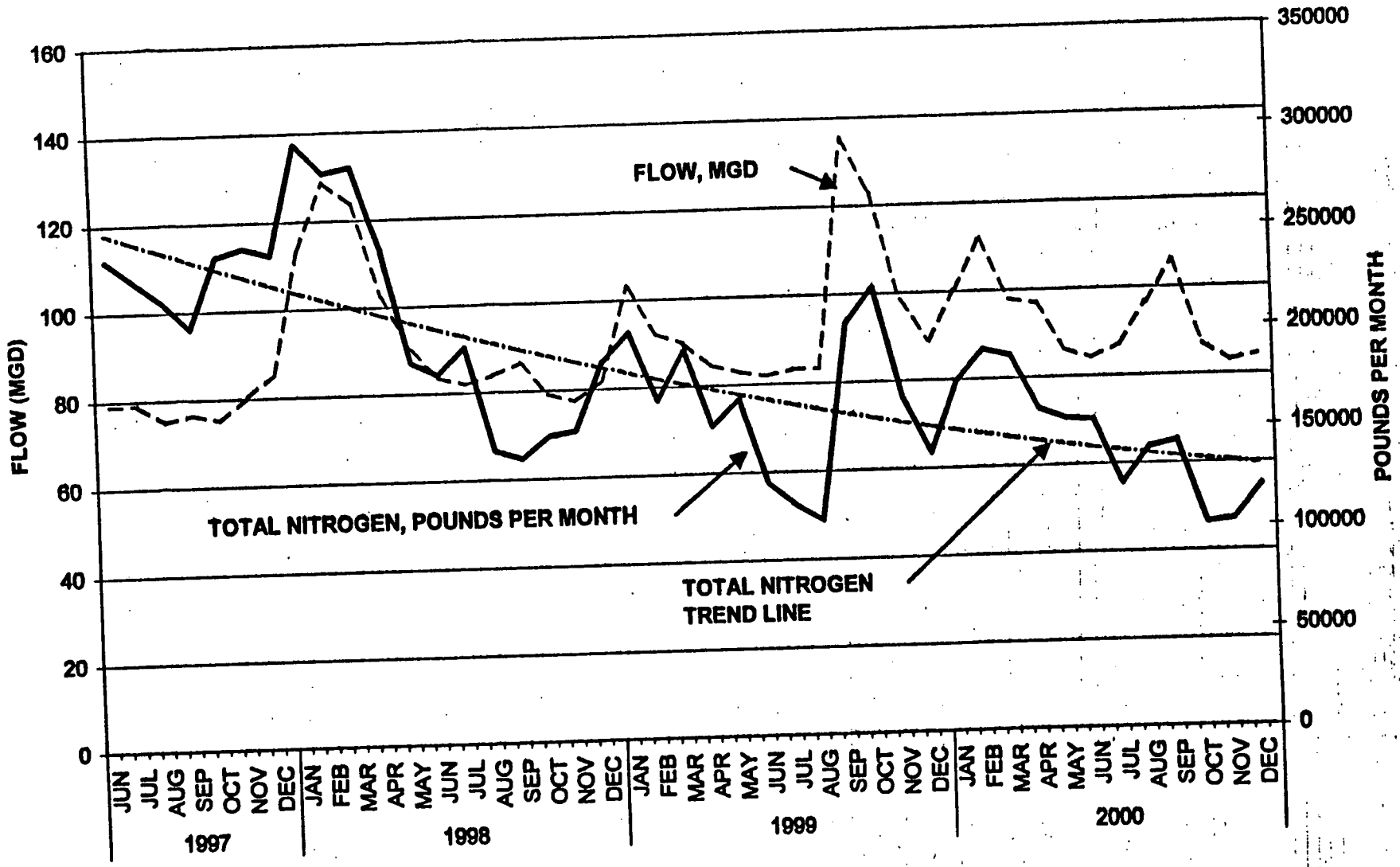
The LNBA has been tracking nitrogen reduction performance of member facilities since 1995 when water quality problems in the Neuse estuary were determined to be the result of nitrogen enrichment. Nitrogen reduction performance data are periodically documented and presented at membership meetings. Year 2000 results (from Daily Monitoring Reports submitted monthly to the Division of Water Quality) are shown on the following Table. Charts showing monthly TN concentrations and monthly pounds of nitrogen discharged since July 1997 are also included.

Additional reductions will be produced in the near future by facilities with recently completed upgrades and completion of new projects. However, many of the plants are now meeting or exceeding accepted limits of technology and future growth presents a challenge to maintain current discharge levels. According to State Division of Water Quality estimates, point source dischargers were responsible for about 24% of the total nitrogen arriving at the estuary in 1995. LNBA member facilities represent about 80% of all permitted wastewater discharges in the lower Neuse basin. Although reductions in nitrogen discharge by the LNBA members have been dramatic, it is noted that they only represent a small share of the nitrogen enrichment problem in the estuary.

LNBA Member Facilities	Permitted Flow, MGD*
Central Johnston County WWTP	4.990
Raleigh -Neuse River WWTP	60.000
Clayton WWTP	1.900
Cary-North WWTP	12.000
Wake Forest -Smith Creek WWTP	6.000
Cary-South WWTP	16.000
Apex - Middle Creek WWTP	3.600
Fuquay-Varina – Troublesome Creek WWTP	6.000
Benson WWTP	3.000
Goldsboro WWTP	16.800
Kinston -Peachtree Plant	6.750
La Grange WWTP	0.750
Kinston-Northside WWTP	4.500
Dupont -Kinston	3.600
Kenly New WWTP	0.630
Wilson WWTP	14.000
Contentnea Metro Sewerage District	2.850
Farmville WWTP	3.500
Zebulon -Little Creek WWTP	1.850
New Bern WWTP	4.700
Havelock WWTP	1.900

* *As adjusted in the Nutrient Sensitive Waters Management Strategy*

LOWER NEUSE BASIN ASSOCIATION
TOTAL NITROGEN DISCHARGE 1997 - 2000



LOWER NEUSE BASIN ASSOCIATION
TOTAL NITROGEN DISCHARGE 1995 AND 2000

COMPILED FROM MEMBER SURVEY & DMRS - MVB - JANUARY 24, 2001; REVISED JAN 31,2001

FACILITY	Permit Flow* (MGD)	1995 Flow (MGD)	1995 TN Discharge (Pounds)	1995 TN CONC (MG/L)	2000 FLOW (MGD)	2000 CONC (MG/L)	2000 TN Discharge lb	2000 End of Pipe TN Change (lb/yr)	2000 End of Pipe TN Change %	Trans Factor	AT ESTUARY 95 TN Estuary	AT ESTUARY 00 TN Estuary	AT ESTUARY TN Change (lb TN)
Cary North	12.00	3.214	265,839	27.18	5.816	2.19	38,959	-226,880	-85%	50%	132,919	19,480	-113,440
Burlington Industries/ Wake	5.00	2.195	109,767	16.43	0.066	3.49	698	-109,068	-99%	50%	54,883	349	-54,534
Wake Forest	6.00	0.695	11,838	5.60	1.329	4.79	19,444	7,606	64%	50%	5,919	9,722	3,803
Town of Apex	3.60	1.046	32,531	10.21	1.654	3.97	20,034	-12,496	-38%	50%	16,265	10,017	-6,248
Cary South	16.00	4.839	262,279	17.81	5.374	3.64	59,709	-202,570	-77%	50%	131,139	29,854	-101,285
Fuquay-Varina	6.00	0.000	0	0.00	0.189	15.38	8,853	8,853	100%	50%	0	4,426	4,426
City of Raleigh	60.00	32.954	1,316,940	13.13	36.140	4.90	540,725	-776,215	-59%	50%	658,470	270,363	-388,107
Town of Clayton	1.90	0.892	20,583	7.58	1.253	8.20	31,351	10,769	52%	50%	10,291	15,676	5,384
Town of Benson	3.00	1.245	55,194	14.57	1.215	5.22	19,368	-35,826	-65%	50%	27,597	9,684	-17,913
County of Johnston.	4.99	3.277	89,363	8.96	4.246	8.85	114,751	25,389	28%	50%	44,681	57,376	12,694
Town of Kenly	0.63	0.338	12,978	12.63	0.425	6.48	8,406	-4,572	-35%	50%	6,489	4,203	-2,286
Town of Zebulon	1.85	0.855	17,495	6.72	0.852	5.89	15,326	-2,169	-12%	50%	8,748	7,663	-1,085
City of Goldsboro	16.80	8.445	358,872	13.96	8.341	3.31	84,308	-274,564	-77%	70%	251,211	59,016	-192,195
City of Wilson	14.00	8.725	269,849	10.16	9.221	8.88	249,837	-20,012	-7%	50%	134,925	124,919	-10,006
Town of LaGrange	0.75	0.466	12,950	9.12	0.546	9.82	16,362	3,412	26%	70%	9,065	11,453	2,388
Town of Farmville	3.50	1.643	36,892	7.38	2.028	2.35	14,522	-22,370	-61%	50%	18,446	7,261	-11,185
City of Kinston (Peachtree)	6.75	4.729	97,167	6.75	4.311	4.58	60,297	-36,870	-38%	70%	68,017	42,208	-25,809
City of Kinston (North)	4.50	1.601	47,086	9.66	1.462	6.78	30,258	-16,828	-36%	70%	32,960	21,180	-11,780
Dupont- Kinston	3.60	1.197	27,687	7.60	1.452	5.77	25,561	-2,126	-8%	70%	19,381	17,893	-1,488
Contentnea MSD	2.85	1.506	61,774	13.48	1.895	13.44	77,739	15,965	26%	70%	43,242	54,417	11,175
City of New Bern	4.70	2.962	121,995	13.53	4.226	22.83	294,494	172,500	141%	100%	121,995	294,494	172,500
Havelock	1.90	1.182	18,385	5.11	1.312	3.95	15,810	-2,575	-14%	100%	18,385	15,810	-2,575
TOTALS / AVERAGES	180.32	84.005	3,247,463	12.70	93.353	6.13	1,746,813	-1,500,650	-46.21%		1,815,028	1,087,463	-727,565

* Adjusted Flow from Nutrient Management Strategy.

END OF PIPE

CHANGE IN TOTAL NITROGEN - 1995 to 2000: (LB -TN) -1,500,650 -46.21%

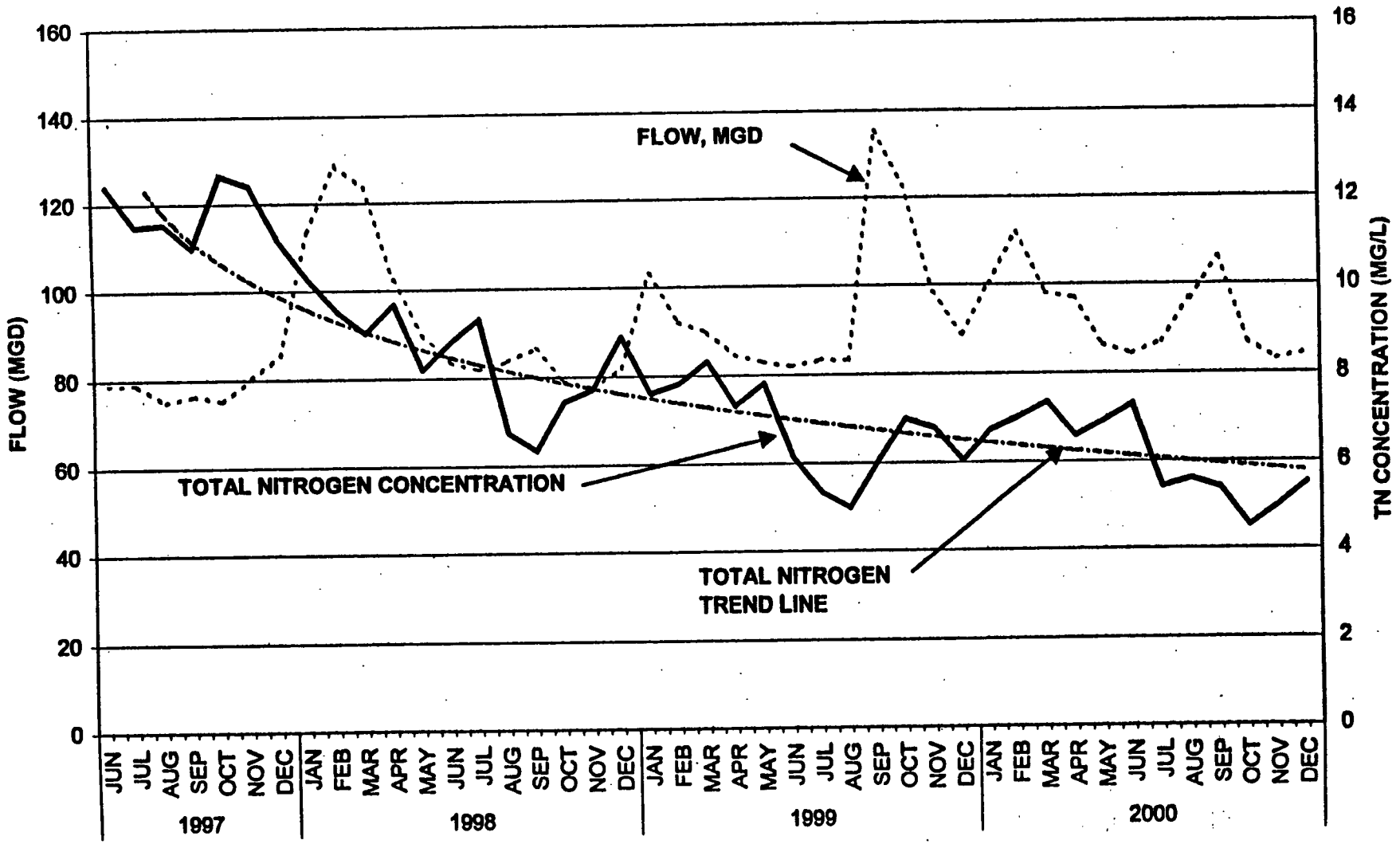
CHANGE IN TOTAL FLOW 1995 - 2000 (MGD) 9.348 11.13%

CHANGE IN TN CONCENTRATION 1995 -2000 : -51.73%

AT ESTUARY

CHANGE IN TOTAL NITROGEN - 1995 to 2000 AT ESTUARY: -40.09%

LOWER NEUSE BASIN ASSOCIATION
TOTAL NITROGEN DISCHARGE 1997 - 2000



Annual Report from the Basinwide Planning Program

For the Period of October 1, 2001 through September 30, 2002

I. Progress in Developing and Implementing Basinwide Water Quality Plans

A. Public Outreach/Involvement

The Basinwide Planning Program finalized the first cycle of basin plans in May 1998. The second cycle of plans is nearly completed and the third cycle of basinwide water quality plans has begun. Activities related to gathering public input on the basinwide plans during October 2001 through September 2002 are listed below.

River Basin	Plan Approved by EMC	Public Workshops	Public Meetings
Broad		October 2001(3)	
Yadkin-Pee Dee		April 2002 (5)	
Savannah	March 2002		December 2001 (1)
Watauga	February 2002		December 2001 (1)
Little Tennessee	April 2002		December 2001 (2)
Hiwassee	March 2002		December 2001 (1)
Chowan	July 2002		May 2002 (1)
Pasquotank	July 2002		May 2002 (1)
Neuse	July 2002		May 2002 (3)
TOTAL	**7**	**8**	**10**

B. Basinwide Activities

The following bullets, by basin, present some of the more significant activities and accomplishments over the past year to achieve the goals of the Basinwide Planning Program.

Broad River –

- Held three public workshops in October 2001 with approximately 103 people attending.
- Cooperate with the US Army Corps of Engineers' whole basin (NC & SC) water resources study.
- Work with the NC Division of Water Resources regarding minimum flows from the Lake Lure dam.
- Prepared a draft Broad River Basinwide Water Quality Plan, presented the plan to the Water Quality Committee of the EMC, requested and received approval to take the plan to public review and meetings in November 2002.

Cape Fear River –

- Continued participation in interbasin transfer and dam management issues in the Jordan Lake watershed.
- Participation in the Black River Conservation Corridor planning group.
- Remain involved in modeling and TMDL projects in the Jordan watershed, middle Cape Fear River and the Cape Fear River estuary.

Catawba River –

- Participate in quarterly meetings of the Catawba River Bi-State Task Force, often providing a presentation on status of Catawba River Basinwide issues.
- Provide input to the Catawba River Bi-State Task Force by serving on the Executive Committee.
- Conducted basinwide biological sampling in addition to ambient monitoring.
- Participated in a series of meetings with other DENR agency staff and Duke Power representatives to explore the potential for, and develop a concept document for, a FERC relicensing settlement agreement.

Chowan and Pasquotank Rivers –

- Held two public meetings in May 2002 with approximately 65 people attending.
- Received EMC final approval in July 2002 after public input.
- Provided presentations to, and sought input from, the Albemarle-Pamlico National Estuary Program Chowan and Pasquotank Regional Councils.
- Participated in the NC Division of Coastal Management Land Use Plan review process and submitted comments for Dare County, per DWQ/DCM agreement.

French Broad –

- Conducted basinwide biological sampling in addition to ambient monitoring.
- Coordinate with the new River Keeper for the French Broad River, providing information on the basinwide planning program and contacts for other areas within DWQ (i.e. classifications & standards, monitoring, etc.).
- Coordinate with regional office staff on the many local initiatives underway in the basin.

Hiwassee River –

- Held a public meeting in December 2001 with approximately 28 people attending.
- Received EMC final approval in March 2002 after public input.
- Participate in the Hiwassee Interagency Team of state and federal agencies from NC, GA and TN. Team collaborates on water quality restoration and stream habitat enhancement.
- Coordinated biological data collection with the Tennessee Valley Authority and opened communication between several offices within TVA and DWQ for better sharing of data.
- Established partnerships with the Hiawassee River Watershed Coalition and TVA for a special study of biological data in the Valley River watershed.

Little Tennessee River –

- Held two public meetings in December 2002 with approximately 54 people attending.
- Received EMC final approval in April 2002 after public input.
- Provide assistance to the Nonpoint Source Team of local, state and federal agencies and local watershed organizations to conduct education and demonstration projects in the basin.
- Worked with several professors at Western Carolina University to disseminate information and give two presentations to students about water quality and state government jobs.
- Continue to strengthen DWQ's relationship with the Eastern Band of Cherokee Indians through coordination on monitoring locations and nonpoint source pollution education.
- Gave presentation to and supported formation of the Watershed Association for the Tuckasegee River, a citizen-based watershed organization.
- Serve on the technical advisory board for the Little Tennessee Watershed Association.

- Working with the Wildlife Resources Commission and US Fish & Wildlife Service on strategies to improve and sustain water quality to protect federally-listed mussel and fish species in the basin.

Neuse River –

- Held three public meetings in May 2002 with approximately 75 people attending.
- Received EMC final approval in July 2002 after public input.
- Met with Army Corps of Engineers to discuss funding of restoration projects.
- Continued involvement in the Upper Neuse River Basin Association planning process.
- Provided presentations to, and sought input from, the Albemarle-Pamlico National Estuary Program Neuse Regional Council.

Roanoke River –

- Participate on a technical workgroup for FERC relicensing, helping to draft the water quality article of the settlement agreement. The workgroup includes representatives of federal and state agencies from both NC and VA, as well as other organizations such as The Nature Conservancy.
- Participated in meetings in support of the formation of a bi-state commission between VA and NC. As a first step toward coordination, worked with staff of VA Dept. of Environmental Quality to construct a GIS map of the entire basin that includes discharge points, water intakes and monitoring locations in both states.
- Worked on an agreement with the Division of Land Resources to require additional monitoring for instream mining permits in the Dan River watershed due to water quality standards violations and presence of endangered species.
- Provided presentations to, and sought input from, the Albemarle-Pamlico National Estuary Program Roanoke Regional Council.

Savannah River–

- Held a public meeting in December 2001 with approximately 26 people attending.
- Received EMC final approval in March 2002 after public input.
- Provided assistance between concerned public and NPDES Unit on specific discharge of interest.
- Coordinated implementation of the Outstanding Resource Waters management strategy between concerned public, Asheville Regional Office and NPDES Unit.
- Worked with homeowners in Sapphire Valley on projects to improve water quality and raise awareness about water quality issues.
- Coordinated with basinwide planning staff in South Carolina, sharing new data and information.

Tar-Pamlico River–

- Conducted basinwide biological sampling in addition to ambient monitoring.
- Provided presentations to, and sought input from, the Albemarle-Pamlico National Estuary Program Tar-Pamlico Regional Council.

Watauga River –

- Held a public meeting in December 2001 with approximately 22 people attending.
- Received EMC final approval in February 2002 after public input.

White Oak River –

- Continued discussions with Camp Lejeune on environmental initiatives and on reclassifying portions of the New River to Class SA waters.
- Continued discussions on potential modeling and shoreline survey studies in the Newport and North Rivers in support of TMDLs and restoration of shellfish harvesting potential.

Yadkin-Pee Dee River –

- Held five public workshops in April 2001 with approximately 156 people attending.
- Collaborating with several agencies and organizations to draft the basin plan, including the Surry County Soil & Water Conservation District, Mitchell River Watershed Coalition, NC Wetlands Restoration Program, the LandTrust for Central NC, Keep Iredell Clean, and the Mecklenburg County Dept. of Environmental Protection. This collaboration involves exchange of data and information, attending meetings and giving presentations.
- Attend meetings of and provide guidance to the Yadkin-Pee Dee River Basin Association of NPDES permit holders.
- Provided assistance between concerned public and NPDES Unit on proposed discharge of interest. Also provided assistance between concerned public and the Classifications & Standards Unit on reclassification of waters to more protective classification.
- Attend meetings of and provide guidance to the Goose Creek Watershed Advisory Committee of local governments and community representatives.
- Working with the Wildlife Resources Commission and US Fish & Wildlife Service on a strategy to improve and sustain water quality to protect federally-listed mussel species in the Goose Creek watershed.

C. Miscellaneous Activities Related to Basinwide Planning

Many additional activities have occurred over the past year that are not tied to a specific basin, but rather can be applied to the program as a whole. Some of the more significant activities are as follows.

- At least one meeting has been held with each regional office staff to discuss the Implementation Packet for each river basin covered by the regional office. These meetings to discuss implementation needs are held every six months with regional staff. Further coordination is conducted with central office staff as follow-up.
- Basinwide staff coordinate constantly with Wetlands Restoration Program staff on prioritization of targeted watersheds and getting input from local resource professionals.
- Staff coordinated with other state, federal and local agencies to obtain information pertinent to the basinwide plans, increasing the level of coordination and communication with these agencies and their participation in the development of basinwide plans. Discussions between the Basinwide Planning Program and the NC Divisions of Soil and Water Conservation, Environmental Health, Coastal Management, and Marine Fisheries, as well as the Wildlife Resources Commission and US Fish and Wildlife have occurred as a means of improving communication, sharing information and assuring appropriate information is presented in the basin plans.
- Over the past year, many new avenues of coordinating the Basinwide Program and the Albemarle-Pamlico National Estuary Program have occurred. Some of these activities include participation in regional council meetings, coordinating council meetings, obtaining sponsorship and presentations from regional council members at public workshops, and working closely with the APNEP Virginia liaison position to get information for the Chowan and Pasquotank River basin plans.

- Basinwide information was provided to applicants for CWMTF and Section 319 grants. Basin planners also provide initial technical reviews of applications.
- Staff collaborated with Office of Environmental Education on development of river basin education document and brochures on each river basin.
- Basinwide plans, basin statistics, a river quiz and other relevant information to the basinwide planning program have been put on the web site to provide interested parties with more access to information (see http://h2o.enr.state.nc.us/basinwide/).
- 1,076 copies of basin plans were printed and distributed during 2002 in response to public request for copies of the plans. Since the basin plans can be downloaded from the web page, we believe that several hundred more have been downloaded in this format.
- Over 1,757 people attended the public workshops for the second cycle (includes the third cycle of workshops for the Neuse River basin) and over 1,068 people attended the second cycle of public meetings (does not include the planned meetings for the Yadkin-Pee Dee).
- Basinwide staff continues to coordinate with the Classifications & Standards Unit and other federal and state agencies to develop management strategies for threatened and endangered species per DWQ rule.
- Basinwide staff provided presentations on use support and basinwide planning to the Coastal Resources Commision -Planning and Special Issues Committee. The Committee is especially interested in the development of improved use support methods for assessing shellfish harvesting in Class SA waters.
- Basinwide staff continues to work with USGS, NCDOT and the Center for Geographic Information and Analysis in development of 1:24,000 National Hydrography Data for North Carolina. Methods continue to be developed and tested to incorporate water quality and NCDOT data onto the NHD. The NHD will be a necessary data layer for submittal of future 303(d) impaired waters lists to EPA.
- Basinwide staff heavily participated monthly on the Drought Management Task Force as well other meetings related to the 2002 drought and water quality management.
- Basinwide staff continues to develop information and improve skills related to GIS procedures. The result of these efforts will increase proficiency in use support mapping and analysis.

II. Activities Related to Use Support Methods

A. Changes in Methodologies to Assess Water Quality Conditions

- Key to making determinations of the quality of the waters is a tool to assess the "use support" of a particular water body. Use support is directly related to the classification of the water body. For example, a water body may need to support a quality sufficient to enable the water to be used as a water supply. Staff have revised use support methodologies that assesses up to six categories (Aquatic Life/Secondary Recreation, Primary Recreation, Shellfish Harvesting, Fish Consumption, Water Supply, Other Uses). These methods continue to be revised and improved upon.

  Significant progress has made towards developing methods to better assess shellfish harvest area closures by using a frequency-based closures method to determine impairment, rather than simply using the Division of Environmental Health growing area classifications. A database and GIS related system is currently being developed to facilitate the use of these new methods. Presentations on these new methods have been given to the various commissions (CRC, EMC and MFC) and other interested groups.

B. 305(b) Report

- Submitted electronic update of the *Water Quality Progress in North Carolina Year 2001 305(b) Update* and associated data to EPA by April 2002.
- Incorporated this data into the submittal of the 305(b)/303(d) integrated report to EPA by October 2002. Awaiting EPA approval of the integrated report.

III. Development of Water Quality Educational Materials

- The program has been working with the Office of Environmental Education to produce the *Discover North Carolina's River Basins* document. An insert to this document for each river basin has been developed. The Section 319 funds this project.
- Three water quality education brochures were produced using Section 319 funds for educating the public on a variety of water quality issues and how to reduce water quality impacts.

Riparian Buffer Rules - 2002 Summary
Compiled by NC Division of Water Quality
January 13, 2003

During 2002, the Riparian Buffer Protection Program continued its efforts to protect riparian buffers along water bodies in the Neuse River basin, Tar-Pamlico River basin, Randleman Dam and Catawba River basin (along the lakes and mainstem of the river only). Two major changes occurred in these rules in 2002 -1) training and subsequent delegation of stream origin determinations for forestry operations to staff of the NC Division of Forest Resources (DFR), and 2) delegation of administration of the Neuse River buffer rules to Orange County. We anticipate that these actions by DFR and Orange County will increase in 2003 since the delegations will have been in effect for a longer time. In addition, DWQ staff have continued various measures to streamline and improve the riparian buffer rules including an extensive training and certification effort for DWQ staff and new General Variances.

A total of 1195 stream origin determinations were made in 2002 with 56 of these by DFR or Orange County staff. A majority of these determinations were in the Neuse River basin (864 out of 1195). A total of 638 written approvals for buffer impact were made with approximately equal portions in the Neuse and Catawba River basins. DWQ approved 60 projects under General or Minor Variances from the rules while the Environmental Management Commission approved five major variances

Riparian Buffer Actions during 2002

Division of Water Quality, Division of Forest Resources and Orange County

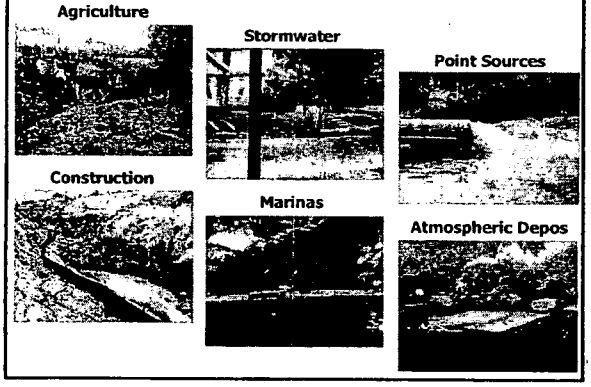
Complied by Division of Water Quality staff - January 10, 2002

	Neuse River Basin	Tar-Pamlico River Basin	Randleman Lake watershed	Catawba River Basin	Totals
Stream Origin determinations					
DWQ	826	296	17	n/a	1139
DFR	30	18	0	n/a	48
Orange County	8	n/a	n/a	n/a	8
Subtotal	864	314	17		1195
Stream Origin appeals					
DWQ	3	0	0	n/a	3
Authorization Certificates					
DWQ	273	121	3	238	635
Orange County	3	n/a	n/a	n/a	3
Subtotal	276	121	3	238	638
Minor Variances issued					
DWQ	10	2	0	0	12
Orange County	1	n/a	n/a	n/a	1
Subtotal	11	2	0	0	13
Major Variances issued					
EMC	3	1	0	1	5
Major Variances denied					
EMC	0	1	0	0	1
General Variance approvals					
DWQ	24	22	1	n/a	47

NC Phase II Stormwater Regulations

- Why be concerned about stormwater?
- What is the NPDES Phase II Program?
- Who is covered by these rules?
- What is required by these rules?
- Where can you find more information?

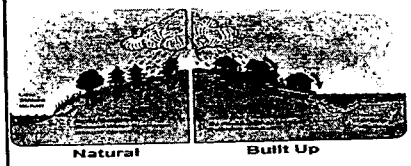
Sources of Pollution



Why be Concerned about Stormwater?

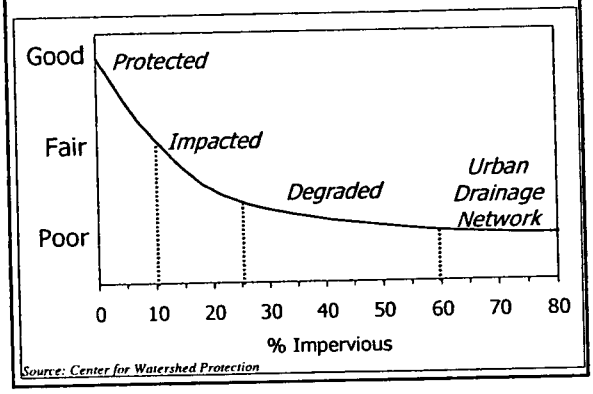
- Declining water quality
- Increasing demand for clean water
- *Urbanization*.
  - Population doubling every 50 years
  - 88% increase in urban area from 1982-1997 (USDA-NRCS)

Land Development Impacts



- Increased Imperviousness
- Increased Runoff
- Increased Pollutants
- Impacts to Streambanks
- Erosion/Sedimentation

Stream Condition Related to Impervious Surface



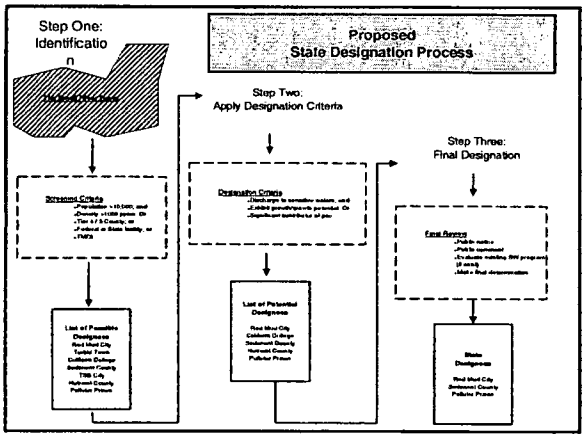
Source: Center for Watershed Protection

What is NPDES Phase II?

- Phase II of the NPDES Stormwater Program was signed into law in December, 1999
- Requires smaller communities to apply for a permit by March 2003
- Permitted communities must implement a comprehensive program including 6 minimum measures

Who is Covered by Phase II?

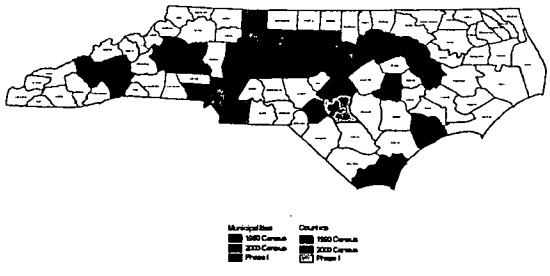
- Automatically Designated - *Urbanized Areas*
- State Designated Public Entities
- Petitioned Entities



North Carolina NPDES Stormwater Program

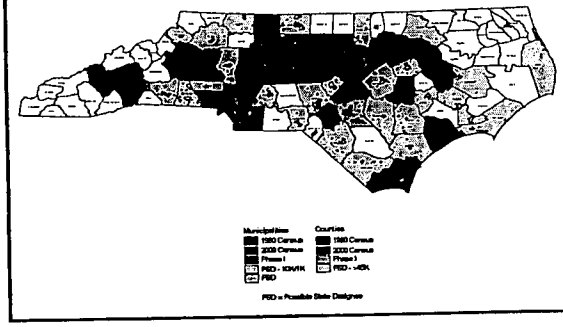
North Carolina - NPDES Stormwater Program

Automatic Coverage



North Carolina NPDES Stormwater Program

Automatic & Possible State Designation



What is Required by Phase II?

- Public education & outreach
- Public involvement & participation
- Illicit discharge detection & elimination
- Construction site stormwater runoff control
- Post-construction stormwater management for new development & redevelopment
- Pollution prevention/good housekeeping for municipal operations

Post Construction Runoff Control

- New development and redevelopment
- 1-year / 24-hour storm control
- 85% average annual TSS removal
- Operation & maintenance of BMPs
- Specific requirements for Class SA, Tr, NSW

NC Rulemaking Process

- Temporary Rules Approved By EMC - Oct 2002
- Temporary Rules Effective Nov. 1, 2002
- Permanent Rulemaking Process Underway
- Notice & Public Hearings - Early 2003

Information Sources

Division of Water Quality
Stormwater and General Permits Unit
http://h2o.enr.state.nc.us/su/stormwater.html

Environmental Protection Agency
http://cfpub.epa.gov/npdes/

NPDES Phase II Stormwater

January 16, 2003

1. Federal program overview
2. North Carolina temporary rule overview
3. List of N.C. municipalities and counties possibly affected by Phase II program
4. Excerpt from *Rapid Watershed Planning Handbook* (Concepts of watershed protection)
5. Key findings from urban stream studies (Effects of imperviousness)

NPDES Phase II Overview

- The NPDES Phase II Final Rule, published in the Federal Register on December 8, 1999, requires NPDES permit coverage for storm water discharges from:
  - Certain regulated small municipal separate storm sewer systems (MS4s); and
  - Construction activity disturbing between 1 and 5 acres of land (i.e., small construction activities).
- In addition to expanding the NPDES Storm Water Program, the Phase II Final Rule revises the "no exposure" exclusion and the temporary exemption for certain industrial facilities under Phase I of the NPDES Storm Water Program.

Small MS4

What constitutes an MS4 is often misinterpreted and misunderstood. The term MS4 does not solely refer to municipally-owned storm sewer systems, but rather is a term of art with a much broader application that can include, in addition to local jurisdictions, State departments of transportation, universities, local sewer districts, hospitals, military bases, and prisons. An MS4 also is not always just a system of underground pipes – it can include roads with drainage systems, gutters, and ditches. According to 40 CFR 122.26(b)(8), the regulatory definition of an MS4 is:

"***Municipal separate storm sewer*** means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law)...including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States.

(ii) Designed or used for collecting or conveying storm water;

(iii) Which is not a combined sewer; and

(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2."

MS4s in Urbanized Areas

Storm water discharges from MS4s in urbanized areas are a concern because of the high concentration of pollutants found in these discharges. Concentrated development in urbanized areas substantially increases impervious surfaces, such as city streets, driveways, parking lots, and sidewalks, on which pollutants from concentrated human activities settle and remain until a storm event washes them into nearby storm drains. Common pollutants include pesticides, fertilizers, oils, salt, litter and other debris, and sediment. Another concern is the possible illicit connections of sanitary sewers, which can result in fecal coliform bacteria entering the storm sewer system. Storm water runoff picks up and transports these and other harmful pollutants then discharges them – untreated – to waterways via storm sewer systems. When left uncontrolled, these discharges can result in fish kills, the destruction of spawning and wildlife habitats, a loss in aesthetic value, and contamination of drinking water supplies and recreational waterways that can threaten public health.

Construction Activity

Uncontrolled runoff from construction sites is a water quality concern because of the devastating effects that sedimentation can have on local water bodies, particularly small streams. Numerous studies have shown that the amount of sediment transported by storm water runoff from construction sites with no controls is significantly greater than from sites with controls. In addition to sediment, construction activities yield pollutants such as pesticides, petroleum products, construction chemicals, solvents, asphalts, and acids that can contaminate storm water runoff. During storms, construction sites may be the source of sediment-laden runoff, which can overwhelm a small stream channel's capacity, resulting in streambed scour, stream bank erosion, and destruction of near stream vegetative cover. Where left uncontrolled,

Source: US EPA

sediment laden runoff has been shown to result in the loss of in-stream habitats for fish and other aquatic species, an increased difficulty in filtering drinking water, the loss of drinking water reservoir storage capacity, and negative impacts on the navigational capacity of waterways.

Municipally Operated Sources Exempted by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 Provisions within ISTEA temporarily delayed the deadline for Phase I industrial activities (with the exception of power plants, airports, and uncontrolled sanitary landfills) operated by municipalities with populations of less than 100,000 people to obtain an NPDES storm water discharge permit. Congress delayed the permitting deadline for these facilities to allow small municipalities additional time to comply with NPDES requirements. The Phase II Final Rule ended this temporary exemption from permitting and set a deadline of no later than March 10, 2003 for all ISTEA exempted municipally operated industrial activities to obtain permit coverage.

Phase II Coverage

The final rule "automatically" covers two classes of storm water dischargers on a nationwide basis:

(1) Owners/Operators of small MS4s located in "urbanized areas" as delineated by the Bureau of the Census. A "small" MS4 is any MS4 not already covered by Phase I of the NPDES storm water program.

(2) Operators of small construction activities that disturb equal to or greater than 1 (one) and less than 5 (five) acres of land.

In addition, the federal Rule requires delegated states to develop state designation criteria for bringing entities outside the "urbanized area" into the program. Small MS4s located outside of urbanized areas, construction activity disturbing less than 1 acre, and any other storm water discharges can be designated for coverage if the NPDES permitting authority or EPA determines that storm water controls are necessary.

Petitioning

The federal Rule specifies a petitioning mechanism for inclusion of small MS4s and individual point source discharges into the Phase II program. Under this option, any person may petition the permitting authority to require an NPDES permit for a discharge composed entirely of storm water that contributes to a violation of a water quality standard or is a significant contributor of pollutants to the waters of the United States. Affected parties/communities are notified when a petition is received. The implementing authority has 180 days from receipt of the petition to determine whether a permit is required.

Phase II Final Rule Requirements

Operators of Phase II-designated small MS4s and small construction activity are required to apply for NPDES permit coverage and to implement storm water discharge management controls (known as "best management practices" (BMPs)). Specific requirements for each type of discharge are listed below.

Small MS4

- A regulated small MS4 operator must develop, implement, and enforce a storm water management program designed to reduce the discharge of pollutants from their MS4 to the "maximum extent practicable," to protect water quality, and to satisfy the appropriate water quality requirements of the CWA. The rule assumes the use of narrative, rather than numeric, effluent limitations requiring implementation of BMPs.
- The small MS4 storm water management program must include the following six minimum control measures: public education and outreach; public participation/involvement; illicit discharge detection and elimination; construction site runoff control; post-construction runoff control; and pollution prevention/good housekeeping.

Source: US EPA

NPDES Phase II Overview

- A regulated small MS4 operator must identify its selection of BMPs and measurable goals for each minimum measure in the permit application. The evaluation and assessment of those chosen BMPs and measurable goals must be included in periodic reports to the NPDES permitting authority.

Construction Activities

- The specific requirements for storm water controls on small construction activity will be defined by the NPDES permitting authority on a State-by-State basis.
- EPA expects that the NPDES permitting authorities will use their existing Phase I general permits for large construction activity as a guide for their Phase II permits for small construction activity.

Source: US EPA

NC NPDES Phase II Implementation Temporary Rule Overview

Why temporary Rules? The federal regulations establish the minimum standards for the Phase II program. A number of items, including designation criteria, needed to be confirmed in state rules so that everyone would know what standard will be applied. Rulemaking also ensures that there was an opportunity for public input on the rule language. This is an important component of the process because DWQ has a limited number of staff to dedicate to Phase II. Public forums such as workshops, stakeholder meetings and comment periods increase the number of people working on the project. This brought a wealth of experience and different points of view to the table and results in a better program for everyone.

The North Carolina NPDES Phase II implementation Rule (15A NCAC 2H .0126) covers 5 basic areas:

Program Applicability

- Federal Design
  - The Federal intent is for a seamless program of coverage for urbanized areas
  - Federal specificity - Applies to small MS4's, owners and operators who would have control over the small MS4's
- State Design
  - Addresses NC's uniqueness while capturing the intent/specificity of the federal program and ease implementation. State program designed for differences in counties and municipalities, different approaches developed to account for these differences
  - Municipalities - straight forward permitting approach, where the permitted entity can take credit for existing programs to meet permit requirements in whole or in part.
  - Counties - Various voluntary options developed to address the unique situation in NC. Options developed through negotiations with affected parties.

Designation

- Auto Designation - Based on decennial census
- State Designation – Defined process is required by Federal rules.
  - Administered on Basinwide Schedule starting in 2004
  - Rule Sets Up A Two Step Process
    - Identification of entities for <u>potential</u> coverage
      - Municipalities
      - Counties
      - Other small MS4's
    - Evaluation against designation criteria
      - Discharge to sensitive waters
      - High growth / growth potential
      - Significant contributor of pollutants
      - Effectiveness of applicable existing programs

Petitioning

- Rule defines submittal requirements
- Specifies review and public involvement in process

Post-Construction Program

- Applies to new development and redevelopment
- Requires ordinance(s)
- Rule establishes program elements
  - 1 Year 24 Hour Storm Control
  - 85% Average Annual TSS Removal

- Operation & Maintenance of BMPs
- Control / Oversight Programs
- Specific Requirements - SA, Tr and NSW

Program Administration

- Public Input / Notice
- Application / Implementation Schedules
- State Implementation Procedures Schedules

Municipalities
(Auto Designated and Possible State Designees)

Phase I Municipalities	Phase II Municipalities	Phase II Municipalities	Municipalities with >10K Total Perm & Season Population/ >1K density
(1990 US Census)	(1990 US Census)	(2000 US Census)	(Not 1990 or 2000 Census listed)
Auto Designee	**Auto Designee**	**Auto Designee**	**Possible Designee**
Charlotte	Apex	Alamance	Albemarle
Durham	Archdale	Ayden	Asheboro
Fayetteville	Asheville	Bermuda Run	Boone
Greensboro	Belmont	Bethania	Eden
Raleigh	Belville	Cajah's Mountain	Elizabeth City
Winston-Salem	Bessemer City	Canton	Emerald Esle
	Biltmore Forest	Carolina Beach	Havelock
	Black Mountain	Claremont	Henderson
	Brookford	Clyde	Kill Devil Hills
	Burlington	Connelly Springs	Kinston
	Carrboro	Cornelius	Laurinburg
	Cary	Davidson	Lexington
	Chapel Hill	Dortches	Lumberton
	China Grove	Drexel	Mooresville
	Clemmons	Flat Rock	Oak Island
	Concord	Fuquay-Varina	Reidsville
	Conover	Gamewell	Roanoke Rapids
	Cramerton	Glen Alpine	Shelby
	Dallas	Granite Falls	Smithfield
	Elon College	Green Level	Statesville
	Fletcher	Harrisburg	Tarboro
	Garner	Hemby Bridge	Wilson
	Gastonia	Hendersonville	
	Gibsonville	Hillsborough	
	Goldsboro	Holly Springs	
	Graham	Hudson	
	Greenville	Huntersville	
	Haw River	Kernersville	
	Hickory	King	
	High Point	Knightdale	
	Hildebran	Kure Beach	
	Hope Mills	Lake Park	
	Indian Trail	Laurel Park	
	Jacksonville	Lenoir	
	Jamestown	Lewisville	

Date: 01/07/2003

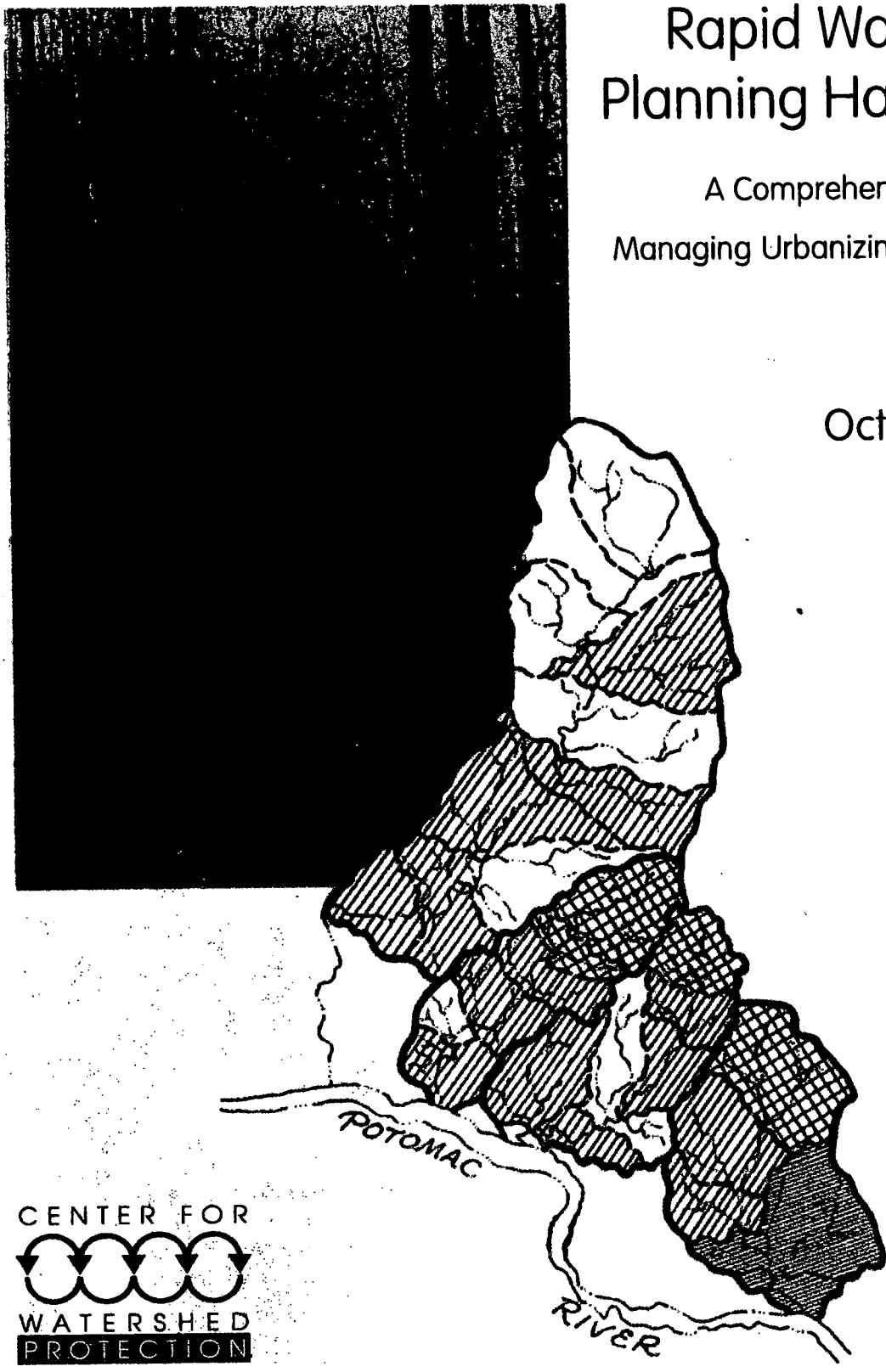
Data Source: U.S. Census Bureau Web Site
http://www.census.gov/geo/www/cob/ua2000.html

Rapid Watershed Planning Handbook

A Comprehensive Guide for Managing Urbanizing Watersheds

October 1998

(Reprinted 1999)



CENTER FOR WATERSHED PROTECTION

Ellicott City, Maryland

CHAPTER 1
BASIC CONCEPTS OF WATERSHED PROTECTION

1.1 Introduction

This chapter introduces some of the basic watershed concepts that are at the heart of the rapid watershed planning approach. It is helpful to fully understand these concepts before embarking on a local watershed plan.

> ***Concept No. 1.*** **There are many different watershed management units.** Watershed and subwatershed units are most practical for local plans. Each watershed is composed of many individual subwatersheds that can have their own unique water resource objectives. A watershed plan is a comprehensive framework for applying management tools within each subwatershed in a manner that also achieves the water resources goals for the watershed as a whole.

In developing a watershed plan, it is useful to consider how watersheds are configured. The term **management unit** is used to describe watersheds and their smaller segments. The two management units that will be focused upon in this handbook are the **watershed** and the **subwatershed**. A **watershed** can be defined as the land area that contributes runoff to a particular point along a waterway. A typical watershed can cover tens to hundreds of square miles and several jurisdictions.

Watersheds are broken down into smaller geographic units called **subwatersheds**. Subwatersheds typically have a drainage area of 2 to 15 square miles with boundaries that include the land area draining to a point at or below the confluence of two second order streams and almost always within the limits of a third order stream. While management unit size will vary among geographic regions and also as a function of slope, soils and degree of urbanization, this general definition provides a consistent and uniform basis for defining individual subwatershed boundaries within a larger watershed.

The terms "watershed" and "subwatershed" are *not* inter-changeable. Readers will observe that throughout this handbook, the term **watershed** is used when referring to broader management issues across an entire watershed, while the term **subwatershed** is used to refer assessment level studies and specific projects within the smaller subwatershed units.

There are other important management units to consider when developing a watershed plan. The largest watershed management unit is the basin. A **basin** drains to a major receiving water such as a large river, estuary or lake. Basin drainage areas typically exceed several thousand square miles and often include major portions of a single state or even a group of states. Within each basin are a group of **subbasins** that extend over several hundred square miles. Subbasins are a mosaic of many diverse land uses, including forest, agriculture, range, and urban areas. Subbasins are composed of a group of watersheds, which, in turn, are composed of a group of subwatersheds. Within subwatersheds are **catchments**, which are the smallest units in a watershed. A **catchment** is defined as the area that drains an individual development site to its first intersection with a stream. Table 1.1 describes the various management units and provides a comparison of impervious cover influences and possible management measures. Figure 1.1 illustrates how watershed management units nest together within the drainage system.

Table 1.1 Description of the Various Watershed Management Units

Watershed Management Unit	*Typical Area (square miles)*	*Influence of Impervious Cover*	*Sample Management Measures*
Catchment	0.05 to 0.50	very strong	BMP and site design
Subwatershed	1 to 10	strong	stream classification and management
Watershed	10 to 100	moderate	watershed-based zoning
Subbasin	100 to 1,000	weak	basin planning
Basin	1,000 to 10,000	very weak	basin planning

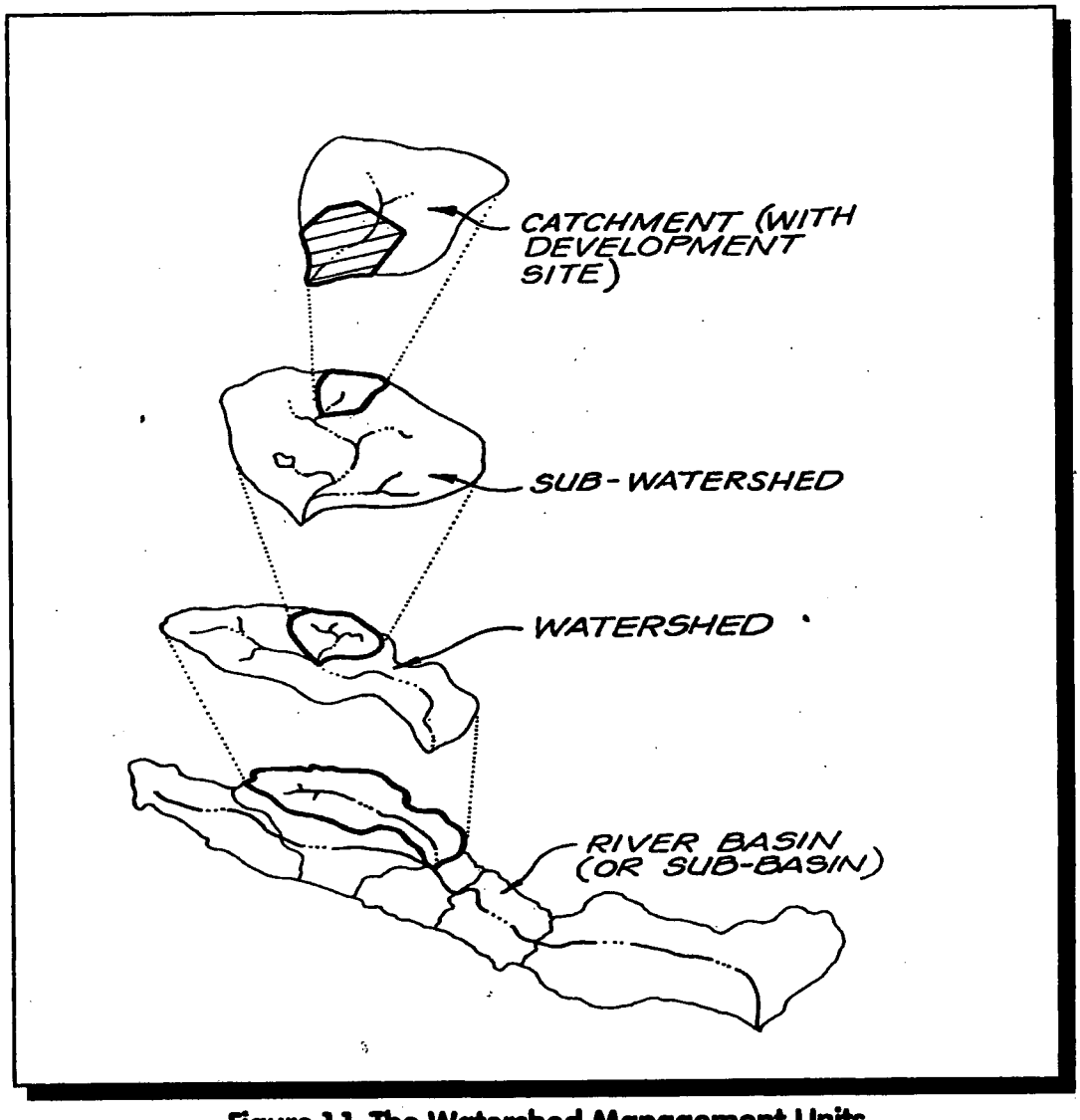


Figure 1.1 The Watershed Management Units
(Adapted from Clements, et al., 1996)

A local watershed may have dozens of individual subwatersheds within its boundaries. A watershed plan tracks the planning and management within individual subwatersheds. Figure 1.2 illustrates this concept of multiple subwatersheds within a larger watershed.

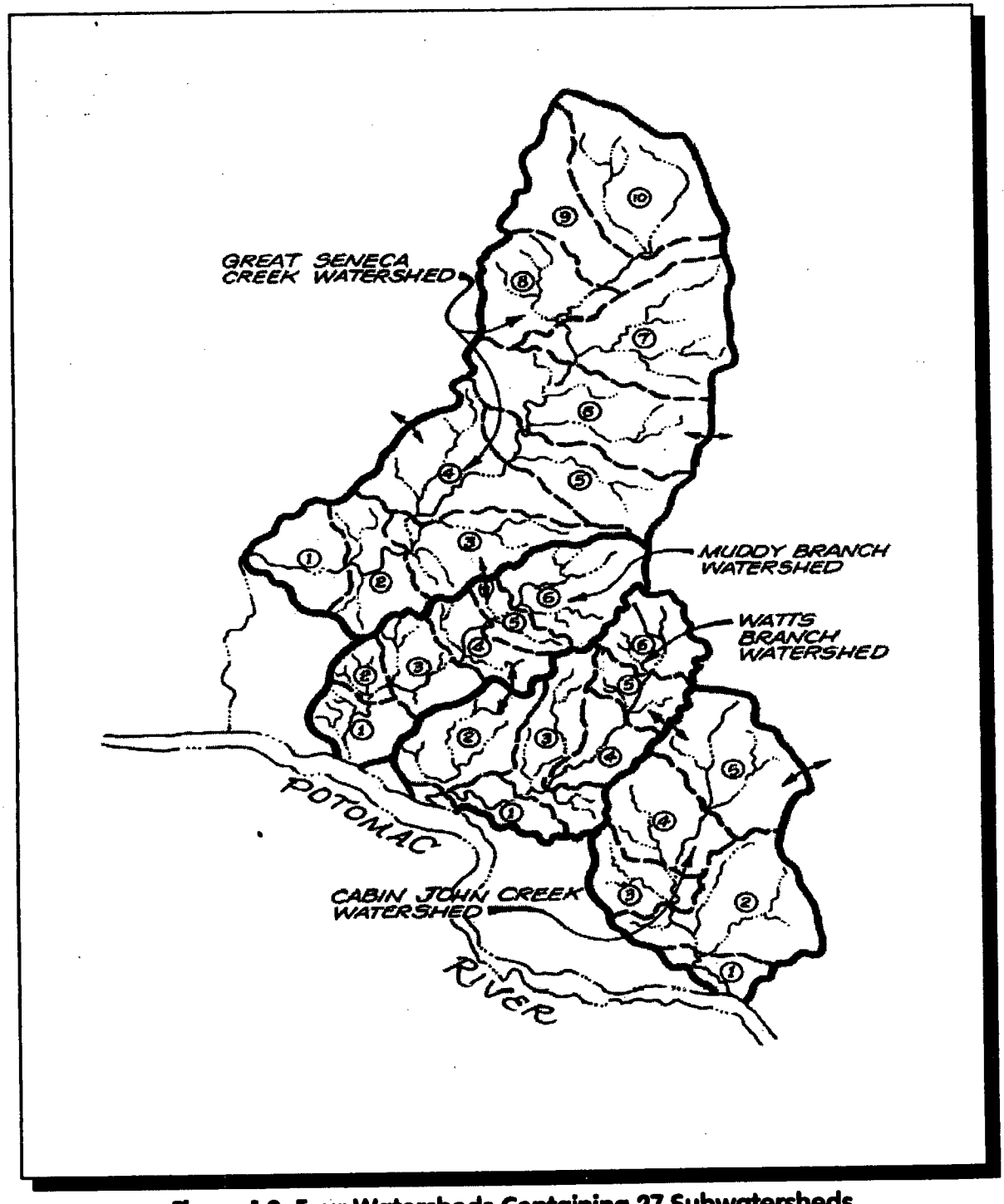


Figure 1.2 Four Watersheds Containing 27 Subwatersheds
(Modified from MCDEP Countywide Stream Protection Strategy, 1998)

This handbook focuses on the subwatershed as the primary planning unit for several reasons:

- The influence of impervious cover on hydrology, water quality, and biodiversity is most evident at the subwatershed level where the influences of individual development projects are easily recognizable.
- Subwatersheds are small enough to be within just a few political jurisdictions where it is easier to establish a clear regulatory authority and incorporate the smaller number of stakeholders into the management process.
- Subwatersheds are limited so that few confounding pollutant sources (e.g., agricultural runoff, point sources, etc.) are present that confuse management decisions.
- A map of a subwatershed can usually fit on a standard 24" by 36" sheet with sufficient detail to provide useful management information.
- Locally, managers may prefer the subwatershed as a planning unit because it is small enough to perform monitoring, mapping, and other watershed assessment tasks in a rapid time frame. A subwatershed plan can generally be completed within a year's time and still allow ample time for goal development, agency coordination, and stakeholder involvement. This shorter time span enables planners to generate many subwatershed plans in a consistent and coordinated cycle.

***Concept No. 2.* Each subwatershed contains a network of small streams channels that are known as headwater streams.** While each headwater stream is short and narrow, they collectively represent a majority of the drainage network of any watershed management unit. In addition, headwater streams are exceptionally vulnerable to watershed development. Consequently, it makes sense to focus on headwater streams in any watershed plan.

Stream classification is important in watershed management. It is also important to understand the spatial connections between the stream and its watershed. A network of streams drain each watershed. Streams can be classified according to their order in that network. A stream that has no tributaries or branches is defined as a first-order stream. When two first-order streams combine, a second-order stream is created, and so on. **Headwater streams** are defined as first- and second-order streams. Figure 1.3 illustrates the stream order concept.

Headwater streams are the smallest streams but they are crucial in watershed management because they dominate the landscape through their shear number and cumulative length. Figure 1.4 illustrates the significance of a headwater stream network in a local landscape.

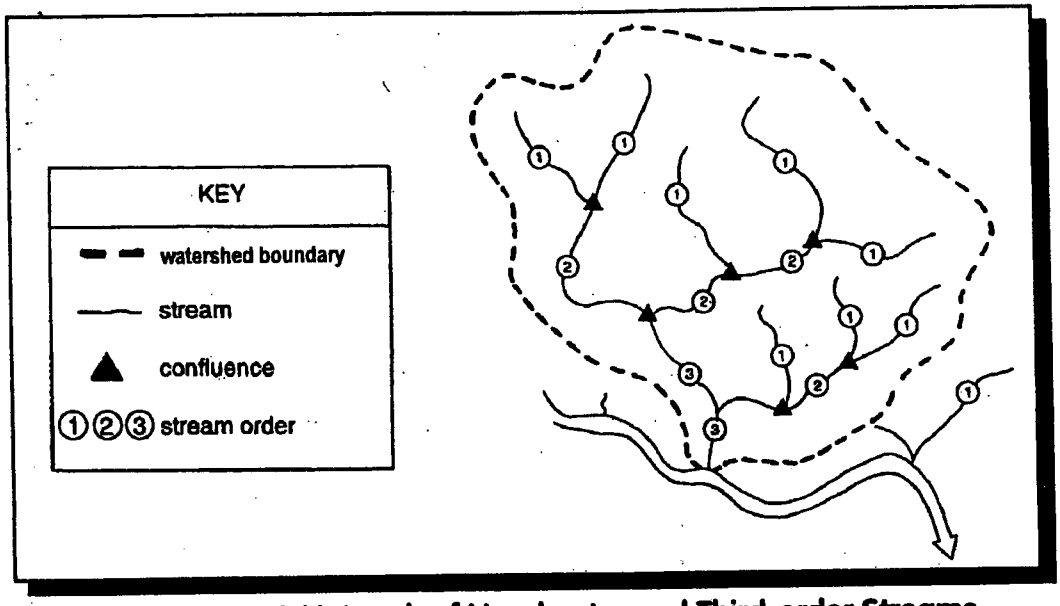


Figure 1.3 A Network of Headwater and Third-order Streams
(Source: Schueler, 1995b)

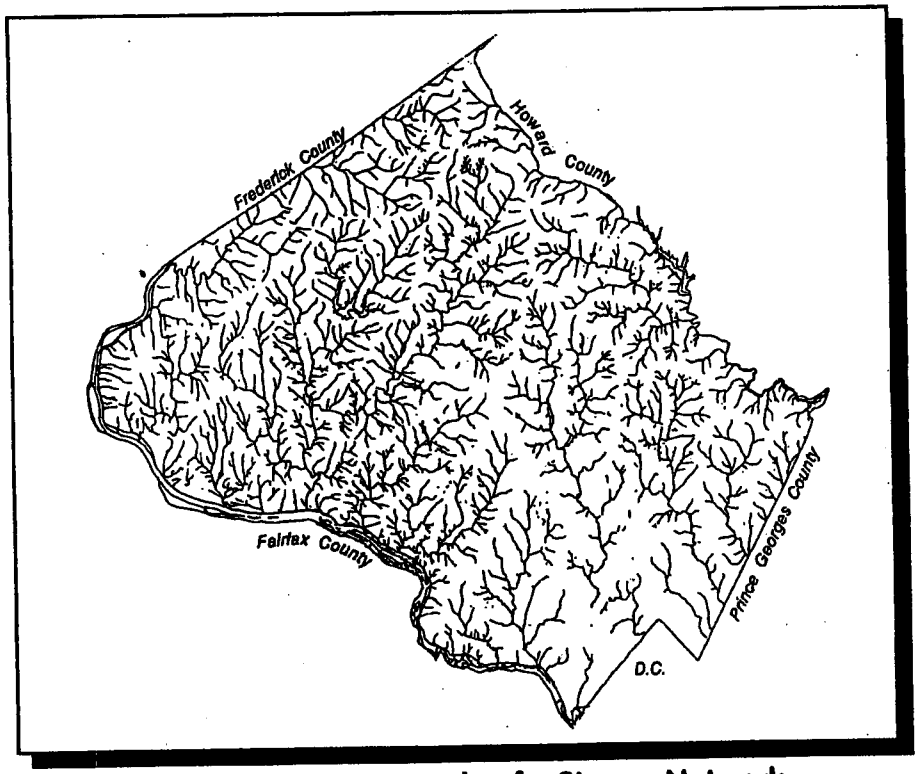


Figure 1.4 An Example of a Stream Network
(Source: Montgomery County DEP)

Headwater streams are typically short in length and drain relatively small areas, but are important because they comprise roughly 75% of the total stream and river mileage in the United States. Table 1.2 illustrates the proportion of smaller streams to larger streams in the United States.

What happens in the local landscape is directly translated to headwater streams and major receiving waters are affected in turn. As urbanization increases, streams handle increasing amounts of runoff which degrades headwater streams as well as major tributaries.

Focusing on the headwater stream level is important in watershed management for several reasons:

- streams are exceptionally vulnerable to watershed changes
- streams are on the same scale as development
- the public intuitively understands streams and strongly supports their protection
- streams are the "narrowest door" for water resource protection
- streams are good indicators of watershed quality

Table 1.2 Proportion of National Stream and River Mileage in Headwater Streams
(Leopold, Wolman, Miller, 1964)

Stream Order*	Number of Streams	Total Length of Stream (miles)	Mean Drainage Area (square miles)**
1	1,570,000	1,570,000	1.0
2	350,000	810,000	4.7
3	80,000	420,000	23
4	18,000	220,000	109
5	4,200	116,000	518
6	950	61,000	2,460
7	200	30,000	11,700
8	41	14,000	55,600
9	8	6,200	264,000
10	1	1,800	1,250,000
Total	2,023,400	3,250,000	N/A

* stream order based on Strahler (1957) method, analyzing maps at a scale of 1:24,000
** cumulative drainage area, including tributaries

The watersheds and subwatersheds that drain to these streams are "readily identifiable landscape units that integrate terrestrial, aquatic, geologic, and atmospheric processes" (Clements et al., 1996). They are the most appropriate geographic unit to protect water resources.

Concept No. 3. Recent research has shown that the amount of **impervious cover in a subwatershed can be used to project the current and future quality of many headwater streams.** There are also strong lines of evidence that suggest that impervious cover is linked to the quality of other subwatershed resources such as lakes, reservoirs, estuaries and aquifers.

The influence of impervious cover on stream quality

The conversion of farmland, forests, wetlands, and meadows to rooftops, roads, and lawns creates a layer of impervious surface in the urban landscape. Impervious cover is a very useful indicator with which to measure the impacts of land development on aquatic systems. The process of urbanization has a profound influence on the hydrology, morphology, water quality, and ecology of surface waters (Horner, et al, 1996). Recent research has shown that streams in urban watersheds possess a fundamentally different character than streams in forested, rural, or even agricultural watersheds. The amount of impervious cover in the watershed can be used as an indicator to predict how severe these differences can be. In many regions of the country, as little as ten percent watershed impervious cover has been linked to stream degradation, with the degradation becoming more severe as impervious cover increases (Schueler, 1994).

Impervious cover directly influences urban streams by dramatically increasing surface runoff during storm events. Depending on the degree of impervious cover, the annual volume of stormwater runoff can increase by two to 16 times its predevelopment rate, with proportional reductions in groundwater recharge (Schueler, 1994). Figure 1.5 illustrates the influence of impervious cover on the hydrologic cycle and the amount of infiltration which occurs. In natural settings, very little annual rainfall is converted to runoff and about half is infiltrated into the underlying soils and the water table. This water is filtered by the soils, supplies deep water aquifers, and helps support adjacent surface waters with clean water during dry periods. In urbanized areas, less and less annual rainfall is infiltrated and more and more volume is converted to runoff. Not only is this runoff volume greater, it also occurs more frequently and at higher magnitudes. As a result, less water is available to streams and waterways during dry periods and more flow occurs during storms.

Other key changes in urban streams due to increases in impervious cover levels are detailed below:

Bankfull and sub-bankfull floods increase in magnitude and frequency. The peak discharge associated with the bankfull flow (i.e., the 1.5 to 2 year return storm) increases sharply in magnitude in urban streams. In addition, channels experience more bankfull and sub-bankfull flood events each year, and are exposed to critical erosive velocities for longer intervals (Hollis, 1975; Booth, et al, 1996; and MacRae, 1996).

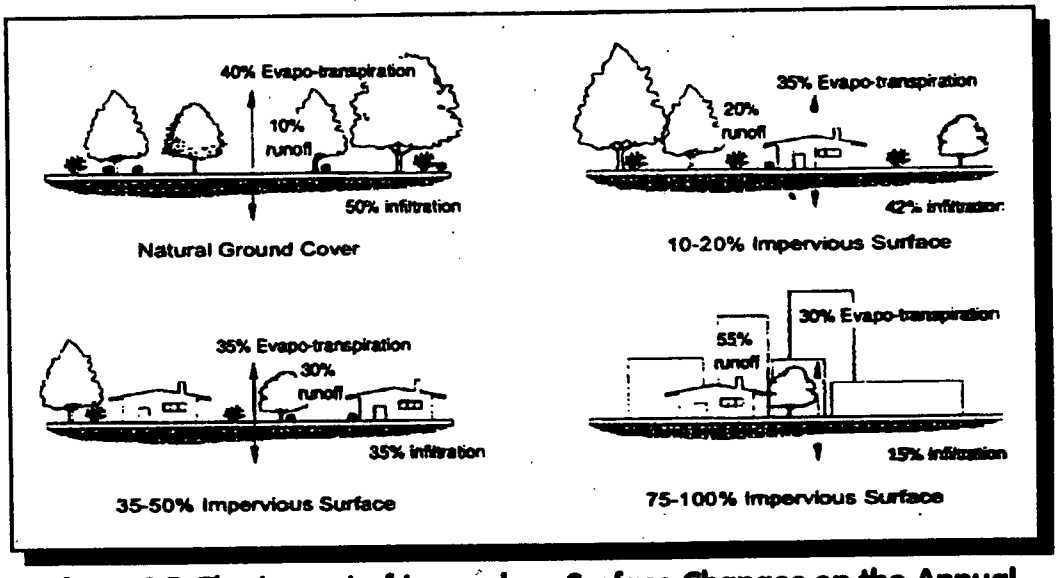


Figure 1.5 The Impact of Impervious Surface Changes on the Annual Water Balance (Source: PGDER, No Date)

Dimensions of the stream channel are no longer in equilibrium with its hydrologic regime. The hydrologic regime that had defined the geometry of the pre-development stream channel irreversibly changes and the channel faces higher flow rates on a more frequent basis. The higher flow events of the urban stream are capable of performing more "effective work" in moving sediment than they had done before (Wolman, 1954).

Channels enlarge. The customary response by an urban stream is to increase its cross-sectional area to accommodate the higher flows. This is done by stream bed down-cutting, stream bank widening, or a combination of both. Urban stream channels often enlarge their cross-sectional area by a factor of 2 to 5, depending on the degree of impervious cover and the age of

development in the upland watershed (Arnold, et al, 1982; Gregory ,et al, 1992;and MacRae, 1996).

Stream channels are highly modified by human activity. Urban stream channels are extensively modified in an effort to protect adjacent property from streambank erosion or flooding. Headwater streams are frequently enclosed within storm drains, while others are channelized, lined, and or "armored" by heavy stone. Another modification that is unique to urban streams is the installation of sanitary sewers underneath or parallel to the stream channel. According to May, et al (1997), 20 to 30% of natural stream channels are modified in typical urban watersheds.

Upstream channel erosion contributes greater sediment load to the stream. The prodigious rate of channel erosion in urban streams, coupled with sediment erosion from active construction sites, increases sediment discharge to urban streams. Researchers have documented that channel erosion constitutes as much as 75% of the total sediment budget of urban streams (Crawford and Lenat, 1989 and Trimble, 1997). Urban streams also tend to have a higher sediment discharge than non-urban streams during the active channel enlargement stage.

Dry weather flow in the stream declines. Since impervious cover prevents rainfall from infiltrating into the soil, less flow is available to recharge groundwater. Consequently, during extended periods without rainfall, baseflow levels are often reduced in urban streams (Simmons and Reynolds, 1982).

Wetted perimeter of the stream during low flow declines. The wetted perimeter of a stream is the fraction of the total cross-sectional area of the channel that is covered by flowing water during dry-weather periods, and is an important indicator of habitat degradation in urban streams. Given that urban streams develop a larger channel cross-section while their baseflow rates decline, it follows that the wetted perimeter becomes smaller. Thus, for many urban streams, this results in a very shallow low flow channel that "wanders" across a very wide stream bed, often changing its lateral position in response to storms.

Instream habitat structure degrades. Urban streams are routinely scored as having poor instream habitat quality, regardless of the specific metric or method employed. Habitat degradation is often exemplified by a loss of pool and riffle structure, embedding of stream bed sediments, shallow depths of flow, eroding and unstable banks, and frequent stream bed turnover.

Large woody debris is reduced (LWD). Large woody debris is an important structural component of many low order streams systems, creating complex habitat structure and generally making

the stream more retentive. In urban streams, the quantity of LWD found in stream channel declines sharply, due to the loss of riparian forest cover, storm washout, and channel maintenance practices (Booth, et al, 1996; May, et al, 1997).

Stream crossings and potential fish barriers increase. Many forms of urban development are linear in nature (e.g., roads, sewers, and pipelines) and cross stream channels. The number of stream crossings increases directly in proportion to impervious cover (May, et al 1997), and many crossings can become partial or total barriers to upstream fish migration, particularly if the stream bed erodes below the fixed elevation of a culvert or a pipeline.

Riparian forests become fragmented, narrower and less diverse. The important role that riparian forests play in stream ecology is often diminished in urban watersheds, as tree cover is often partially or totally removed along the stream as a consequence of development (May, et al 1997). Even when stream buffers are reserved, encroachment often reduces their effective width, and native species are supplanted by exotic trees, vines and ground covers.

Water quality declines. The water quality of urban streams during storm events is consistently poor. Urban stormwater runoff contains moderate to high concentrations of sediment, carbon, nutrients, trace metals, hydrocarbons, chlorides and bacteria (Schueler, 1987). While considerable debate exists as to whether stormwater pollutant concentrations are actually toxic to aquatic organisms, researchers agree that pollutants deposited in the stream bed exert an undesirable impact on the stream community.

Summer stream temperatures increase. The impervious surfaces, ponds, and poor riparian cover found in urban watersheds can increase mean summer stream temperatures by 2 to 10 degrees Fahrenheit (Galli, 1991). Since temperature plays a central role in the rate and timing of biotic and abiotic reactions in streams, even moderate increases can have an adverse impact on streams. In some regions, summer stream warming can irreversibly shift a cold-water stream to a cool-water or even warm-water stream, with deleterious effects on salmonoids and other temperature sensitive organisms.

Reduced aquatic diversity. Urban streams are typified by fair to poor fish and macro invertebrate diversity, even at relatively low levels of watershed impervious cover or population density (see Table 1.3). The ability to restore pre-development fish assemblages or aquatic diversity is constrained by a host of factors: irreversible changes in carbon supply, temperature, hydrology, lack of instream habitat structure, and barriers that limit natural recolonization.

A typical relationship between impervious cover and the presence of sensitive aquatic insects from the Delaware Piedmont region is illustrated in Figure 1.6. As the level of impervious cover in the watershed increases, the amount of sensitive species declines. Beyond watershed imperviousness levels of 10 to 15%, about 90% of the sensitive organisms are lost from the stream (Maxted and Shaver, 1996).

In recent years, many studies have begun to quantify the relationship between development and the health of the receiving waters. Some key findings of this research are summarized in Table 1.3. In general, the studies point to a decrease in stream quality with increasing urbanization. Other measures may also have predictable relationships to stream quality, such as the quantity and quality of riparian cover, or the amount of compacted urban turf (Schueler, 1995a).

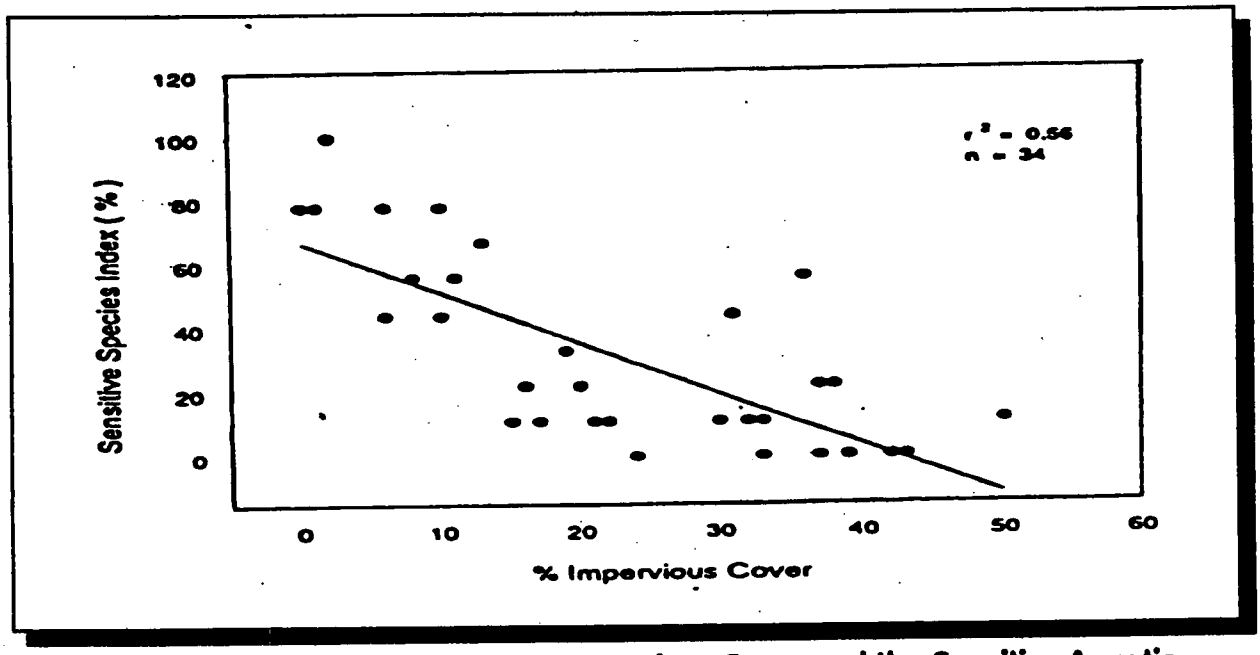


Figure 1.6 Relationship Between Impervious Cover and the Sensitive Aquatic Insect Index in Delaware's Northern Piedmont Streams.
(Source: Adapted from Maxted and Shaver, 1996)

Table 1.3 Review of Key Findings of Recent Research Examining the Relationship of Urbanization on Aquatic Systems

Watershed Indicator	*Key Finding*	*Reference*	*Year*	*Location*
Aquatic insects	Negative relationship between number of insect species and urbanization in 21 streams.	Benke, et al.	1981	Atlanta
Aquatic habitat	There is a decrease in the quantity of large woody debris (LWD) found in urban streams at around 10% impervious cover.	Booth, et al.	1996	Washington
Fish, habitat & channel stability	Channel stability and fish habitat quality declined rapidly after 10% impervious area.	Booth	1991	Seattle
Fish, habitat	As watershed population density increased, there was a negative impact on urban fish and habitat	Couch, et al.	1997	Atlanta
Aquatic insects and fish	A comparison of three stream types found urban streams had lowest diversity and richness	Crawford & Lenat	1989	North Carolina
Stream temperature	Stream temperature increased directly with subwatershed impervious cover.	Galli	1991	Maryland
Aquatic insects	A significant decline in various indicators of wetland aquatic macroinvertebrate community health was observed as impervious cover increased to levels of 8-9%.	Hicks & Larson	1997	Connecticut
Insects, fish, habitat water quality, riparian zone	Steepest decline of biological functioning after 6% imperviousness. There was a steady decline, with approx 50% of initial biotic integrity at 45% impervious area.	Horner, et al.	1996	Puget Sound Washington
Aquatic insects and fish	Unable to show improvements at 8 sites downstream of BMPs as compared to reference conditions.	Jones, et al.	1996	Northern Virginia
Aquatic insects	Urban streams had sharply lower insect diversity with human population above 4/acre. (About 10%)	Jones & Clark	1987	Northern Virginia
Aquatic insects & fish	Macroinvertebrate and fish diversity decline significantly beyond 10-12% impervious area.	Klein	1979	Maryland
Aquatic insects	Drop in insect taxa from 13 to 4 noted in urban streams.	Garie and McIntosh	1986	New Jersey

Table 1.3 Review of Key Findings of Recent Research Examining the Relationship of Urbanization on Aquatic Systems

Watershed Indicator	*Key Finding*	*Reference*	*Year*	*Location*
Fish spawning	Resident and anadromous fish eggs & larvae declined in 16 streams with > 10% impervious area.	Limburg & Schmidt	1990	New York
Fish	Shift from less tolerant coho salmon to more tolerant cutthroat trout pop.-between 10-15% impervious area at 9 sites.	Luchetti & Fuersteburg	1993	Seattle
Stream channel stability	Urban stream channels often enlarge their cross-sectional area by a factor of 2 to 5. Enlargement begins at relatively low levels of impervious cover.	MacRae	1996	British Columbia
Aquatic insects & stream habitat	No significant difference in biological and physical metrics for 8 BMP sites versus 31 sites without BMPs (with varying impervious area).	Maxted and Shaver	1996	Delaware
Insects, fish, habitat, water quality, riparian zone	Physical and biological stream indicators declined most rapidly during the initial phase of the urbanization process as the percentage of total impervious area exceeded the 5-10% range.	May, et al.	1997	Washington
Aquatic insects and fish	There was significant decline in the diversity of aquatic insects and fish at 10% impervious cover.	MWCOG	1992	Washington, DC
Aquatic insects	As watershed development levels increased, the macroinvertebrate community diversity decreased.	Richards, et al.	1993	Minnesota
Aquatic insects	Biotic integrity decreases with increasing urbanization in study involving 209 sites, with a sharp decline at 10% I. Riparian condition helps mitigate effects.	Steedmen	1988	Ontario
Wetland plants, amphibians	Mean annual water fluctuation inversely correlated to plant & amphibian density in urban wetlands. Declines noted beyond 10% impervious area.	Taylor	1993	Seattle
Wetland water quality	There is a significant increase in water level fluctuation, conductivity, fecal coliform bacteria, and total phosphorus in urban wetlands as impervious cover exceeds 3.5%.	Taylor, et al.	1995	Washington
Sediment loads	About 2/3 of sediment delivered into urban streams comes from channel erosion.	Trimble	1997	California

Table 1.3 Review of Key Findings of Recent Research Examining the Relationship of Urbanization on Aquatic Systems

Watershed Indicator	*Key Finding*	*Reference*	*Year*	*Location*
Water quality-pollutant conc.	Annual P, N, COD, & metal loads increased in direct proportion with increasing impervious area.	US EPA	1983	National
Fish	As watershed development increased to about 10%, fish communities simplified to more habitat and trophic generalists.	Weaver	1991	Virginia
Aquatic insects & fish	All 40 urban sites sampled had fair to very poor index of biotic integrity (IBI) scores, compared to undeveloped reference sites.	Yoder	1991	Ohio

The influence of impervious cover on other aquatic systems

The impact of impervious cover on the quality of lakes, water supply reservoirs, aquifers, or coastal areas has not been as well investigated as it has for urban streams. Although research is scarce, there is some evidence that impervious cover does have a similar impact on these aquatic systems. The impacts to these systems are manifested in different ways and may occur at different levels of impervious cover than are often seen for urban streams.

Even small increases in impervious cover change stream morphology and degradation of aquatic habitat. By contrast, aquatic systems such as lakes, water supply reservoirs, aquifers, and coastal areas tend to be impacted more by a decline in water quality due to non-point source pollutants. Research has shown that stormwater pollutant loads increase when the percentage of impervious cover in a watershed increases.

Urban Lakes

For urban lakes, the major water quality impacts are caused by higher stormwater pollutant loads. Elevations in total phosphorus and chlorophyll *a* are often associated with the impervious cover generated in developing areas. These factors can negatively affect the quality of the lake for activities such as fishing, swimming, or other water contact recreation. Sediment inputs may also be heightened with additional development in the watershed, which can often affect water clarity. In addition, the natural level of the lake may also be affected by the increased stormwater runoff which occurs with changes in impervious cover levels in the watershed.

Table 2: Review of Key Findings of Urban Stream Studies Examining the Relationship of Urbanization to Stream Quality

Ref.	Year	Location	Biological Parameter	Key Finding
Booth	1991	Seattle	Fish habitat/ channel stability	Channel stability and fish habitat quality declined rapidly after 10% imperv.
Galli	1994	Maryland	Brown trout	Abundance and recruitment of brown trout declines sharply at 10-15% imperv.
Benke *et al.*	1981	Atlanta	Aquatic insects	Negative relationship between number of insect species and urbanization in 21 streams
Jones and Clark	1987	Northern Virginia	Aquatic insects	Urban streams had sharply lower diversity of aquatic insects when human population density exceeded 4 persons/acre. (estimated 15-25% imperv. cover)
Limburg and Schimdt	1990	New York	Fish spawning	Resident and anadromous fish eggs and larvae declined sharply in 16 tributary streams greater than 10% imperv.
Shaver *et al.*	1994	Delaware	Aquatic insects	Insect diversity at 19 stream sites dropped sharply at 8 to 15% imperv.
Shaver *et al.*	1994	Delaware	Habitat quality	Strong relationship between insect diversity and habitat quality; majority of 53 urban streams had poor habitat
Schueler and Galli	1992	Maryland	Fish	Fish diversity declined sharply with increasing imperv., loss in diversity began at 10-12% imperv.
Schueler and Galli	1992	Maryland	Aquatic insects	Insect diversity metrics in 24 subwatersheds shifted from good to poor over 15% imperv.
Black and Veatch	1994	Maryland	Fish/insects	Fish, insect and habitat scores were all ranked as poor in 5 subwatersheds that were greater than 30% imperv.
Klein	1979	Maryland	Aquatic insects/fish	Macroinvertebrate and fish diversity declines rapidly after 10% imperv.
Luchetti and Fuersteburg	1993	Seattle	Fish	Marked shift from less tolerant coho salmon to more tolerant cutthroat trout populations noted at 10-15% imperv. at 9 sites
Steedman	1988	Ontario	Aquatic insects	Strong negative relationship between biotic integrity and increasing urban land use/ riparian condition at 209 stream sites. Degradation begins at about 10% imperv.
Pedersen and Perkins	1986	Seattle	Aquatic insects	Macroinvertebrate community shifted to chironomid, oligochaetes and amphipod species tolerant of unstable conditions.
Steward	1983	Seattle	Salmon	Marked reduction in coho salmon populations noted at 10-15% imperv. at 9 sites
Taylor	1993	Seattle	Wetland plants/ amphibians	Mean annual water fluctuation was inversely correlated to plant and amphibian density in urban wetlands. Sharp declines noted over 10% imperv.
Garie and McIntosh	1986	NewJersey	Aquatic insects	Drop in insect taxa from 13 to 4 noted in urban streams
Yoder	1991	Ohio	Aquatic insects/ fish	100% of 40 urban sites sampled had fair to very poor index of biotic integrity scores

Source: *The Practice of Watershed Protection,* Schueler and Holland, 2000

Department of Environment and Natural Resources
Division of Water Resources
STATUS REPORT TO THE GENERAL ASSEMBLY
ON
WATER SUPPLY PLANNING
JANUARY 1, 2002 THROUGH SEPTEMBER 30, 2002

Drought

Water supply planning efforts over the months covered by this report have been dominated by the ongoing drought. Portions of the Piedmont and Mountains have experienced drought conditions for the fourth consecutive year. Streamflows and ground water levels in these areas have been setting new low flow records this year. As of September 30, 2002, 230 water systems were under some level of water use restrictions. Seven of these systems were under emergency restrictions. An extended period of normal precipitation will be needed to return ground water levels to pre-drought conditions. Until then, we will continue experiencing low streamflows during periods without rain.

The Division of Water Resources chairs the North Carolina Drought Monitoring Council. The Drought Monitoring Council has been meeting regularly since November 2001. At its December 6, 2001 meeting, the Drought Monitoring Council activated its Water Source Task Force to closely monitor water supply conditions. Since then the Water Source Task Force has met monthly and has consistently recommended that all water systems in the state closely monitor their water supplies, develop water shortage response plans and act early to minimize the impacts of the current drought.

The Piedmont region has been the most severely impacted by the drought. This region contains the Broad, Catawba and Yadkin river basins, as well as the headwaters of the Roanoke, Neuse and Cape Fear river basins. Most of these rivers are regulated by dams that provide water storage and varying degrees of ability to manage river flows. The Division of Water Resources initiated steps to modify normal operating procedures on several of the regulated rivers to minimize impacts of the drought. Drought response efforts have been underway in the Roanoke River Basin since last year. Releases from the hydropower projects on this river are being managed to protect water quality and control the migration of the salt water upstream from the estuary. Water systems in North Carolina and Virginia have instituted varying levels of water conservation measures.

By mid-summer, forecasts indicated that if water quality releases from Jordan Lake and Falls Lake were continued at normal levels, the water allocated for these releases would be exhausted, severely affecting water quality and downstream users. After consultation with the Division of Water Quality, the Wildlife Resources Commission, and water users, the Division of Water Resources and the U.S Army Corps of Engineers began reducing water releases from Jordan Lake (in the Cape Fear River Basin) in July and from Falls Lake (in the Neuse River Basin) in August. Water quality monitoring was increased and regular meetings with affected parties have been held to closely monitor for potential impacts. The reduced releases have not caused significant water quality problems and downstream water users have been able to get adequate amounts of water to meet their current needs. This effort has extended the usefully life of the storage dedicated to downstream releases without significantly affecting water quality and water availability downstream.

Dams on the Catawba and Yadkin rivers are operated for electric power generation under licenses issued by the Federal Energy Regulatory Commission (FERC). Duke Power manages a series of lakes on the Catawba River. Duke Power's staff has been managing these lakes for the last several years to make the most of the limited water available during the drought. Water systems using the Duke Power lakes have been buffered from the effects of the drought by the adaptations made to lake operations. However, declining lake levels have increased the need for everyone that depends on these lakes to reduce their withdrawals to protect water supplies.

In the Yadkin River Basin there are four lakes managed by Alcoa Power Generating Inc. and two lakes managed by Carolina Power & Light. The licenses for these facilities lacked the flexibility needed to alter releases in response to the worsening drought conditions. In early July, the Division of Water Resources initiated efforts to allow reductions in releases from the regulated lakes to protect lake levels, public water supplies and water quality. DWR is working closely with the power companies, other North Carolina and South Carolina resource management agencies, and the Federal Energy Regulatory Commission to manage the lakes during the current drought. Releases from the dams in this basin are now being managed to provide enough water to protect water quality downstream in South Carolina as well as to improve lake levels, to protect lake water quality and aquatic habitat and to protect public water supply intakes.

On July 12, 2002, Governor Easley requested that the federal government designate 54 counties as disaster areas due to the effects of the drought on agricultural operations. He also asked all North Carolinians to begin or increase water conservation measures and called for communities in the most severely impacted areas of the state to impose mandatory water restrictions. Affected water users were requested to reduce usage by 20 percent. The Division of Water Resources established a web site where communities could voluntarily report their water usage and reductions and continues to provide assistance with water conservation programs to local water systems.

On August 15, 2002, Governor Easley's Executive Order No. 26 ordered that "all state government agencies discontinue non-essential water use until further notice". The order also established a Water System Protection Team to provide assistance to state agencies and drought-stricken communities. The Division of Pollution Prevention and Environmental Assistance is providing assistance to local governments and industrial water users to comply with the governor's requests. The Division of Water Resources and the Division of Environmental Health's Public Water Supply Section have been working closely with drought-stricken communities and the Water System Protection Team. A weekly assessment of drought affected water systems is provided to the co-chairs of the Water System Protection Team. Water systems considered to be in the worst condition were invited to meet with agency representatives to explore options and identify difficulties the systems face in their efforts to address water shortages. The most often received request has been for financial assistance.

The Division of Water Resources is working closely with the Water System Protection Team, local water systems and other water users in the ongoing struggle to manage water resources during what appears likely to be our most severe drought of record. Efforts are underway to help water system administrators identify alternative sources of water and support applications for funding to have solutions in place to minimize anticipated drought impacts next summer.

On September 30th Governor Easley announced that more than $20 million will be made available through the departments of Commerce and Environment and Natural Resources and the North Carolina Rural Center to help communities ensure safe adequate water supplies. Communities with the most critical needs will be targeted and priority will be given to

communities that are developing interconnections with other systems or supplemental water sources to improve system reliability.

Water Supply Planning Program

Water supply planning in North Carolina is generally undertaken at the local level, with local communities having the primary responsibility for maintaining adequate water supplies. However, to help assure and assess the availability of water and to protect the state's water resources, the General Assembly has established several planning and regulatory programs administered by the Division of Water Resources (DWR). These programs require a variety of activities including: assessments of the availability of water through a network of monitoring wells and stream gages, preparation of Local Water Supply Plans by local government water systems, development of a statewide North Carolina Water Supply Plan, registration of large water withdrawals, certification of interbasin transfers of surface water, and permitting of water withdrawals in designated capacity use areas. This status report provides an update on these water supply programs, along with other DWR water supply planning activities.

Local Water Supply Plans

The General Assembly established a water supply planning program under General Statute 143-355(l) and (m) in order "to assure the availability of adequate supplies of good quality water to protect the public health and to support desirable economic growth". The statute requires units of local government that provide or plan to provide public water service to prepare a Local Water Supply Plan (LWSP). LWSPs describe current and future water needs and provide an assessment of the system's ability to meet those supply needs. LWSPs have to be adopted by the water system's local governing board and have to be updated at least every five years. The Division of Water Resources (DWR) is responsible for reviewing the local plans for consistency with the law and using the information in the plans to develop the North Carolina Water Supply Plan (NCWSP) mandated in G.S. 143-355(m). The NCWSP presents a summary of water use statewide and identifies areas of concern where water availability or conflicts between uses may limit the ability to meet water demand.

The first set of LWSPs were developed by over 500 local governments based on their 1992 water supplies and demands, with projections through 2020. Beginning in 1998 these plans were updated based on 1997 supply and demand conditions. Data from Local Water Supply Plans, available on the Division's web site, provide a valuable source of information for all local and regional water supply planning. Local Water Supply Plans have provided essential information as communities and state agencies have struggled to deal with the drought induced water shortages this year.

As of August 31, 2002, The following water systems have not submitted a 1997 LWSP: Green Level, Speed, Bunn, Gibsonville, Raeford, Mooresville, Taylortown, Saratoga, Ossipee Sanitary District, Chowan County, Lincoln County, Perquimans County, Whitley Heights Sanitary District, and North Brunswick Water & Sewer.

Local government water systems are currently compiling information on 2002 water supply and demand in preparation for updating their local plans in 2003. The Division of Water Resources has developed a web-based data submission program that will allow online submission of 2003 Local Water Supply Plans. Online submission will reduce printing and postage costs for local governments and speed the review process. Division of Water Resources' staff, with the help of the North Carolina Rural Water Association, will be conducting a series of workshops in early 2003 to assist water system administrators with their local plan updates.

North Carolina Water Supply Plan (NCWSP)

The 2001 NCWSP is available on the Division of Water Resources web site at www.ncwater.org. It is based on information from the 1997 LWSPs and 1999 water withdrawal registrations submitted pursuant to General Statute 143-215.22H.

In 1997, Local Water Supply Plan systems provided 867 million gallons of water per day to 68 percent (5,067,094) of North Carolinians, with the remainder of the state's population served by non-local government water systems and domestic wells. By 2020, these LWSP systems expect to need 1,415 million gallons per day to meet the water demands of 8 million people, a 63 percent increase in water to meet a 58 percent increase in population.

To help avoid water shortages and supply problems DWR recommends that water systems establish plans for managing water demand and developing additional water supplies by the time their average daily demand equals 80 percent of their estimated available supply. The 1997 LWSPs showed that 106 water systems were over this planning threshold with 80 systems regularly using over 90 percent of their estimated available supply. Implementing water conservation programs that reduce water losses and improve water use efficiency can help minimize operating costs and extend the useful life of existing water supplies and treatment facilities. Many of these water systems will face major investments to develop new supplies and expand their treatment facilities to meet future water demands, in addition to the costs of operating and maintaining existing operations.

The NCWSP presents several recommendations that are important to maintaining adequate water supplies for the citizens of North Carolina. In the 15 counties identified as the Central Coastal Plain water users should reduce the over-pumping of the Black Creek and Upper Cape Fear aquifers and develop sustainable water sources. The Division of Water Resources and other appropriate agencies should identify and provide assistance to water systems that are at greater risk of water supply shortages (those with demands greater than 80 percent of their supply). All public water systems should develop Water Shortage Response Plans to minimize impacts of droughts and other water shortage emergencies. State and local governments should work together to seek regional solutions to water supply problem. All interested parties should work together to encourage coordination of state programs and policies to encourage innovative solutions to water supply problems while protecting the environment and public health.

Central Coastal Plain Capacity Use Area

Establishment of the Central Coastal Plain Capacity Use Area directly addresses one of the recommendations of the NCWSP. The Black Creek and Upper Cape Fear aquifers have provided high-quality, low-cost water to residents of eastern North Carolina's Central Coastal Plain for generations. Declines in water levels and water pressure in the aquifers are causing migration of saltwater inland and threaten the long-term viability of these aquifers. To protect these aquifers for current and future residents of the area, withdrawals from these aquifers have to be reduced.

In November 1998, after years of study, the Division of Water Resources recommended that the Environmental Management Commission (EMC) designate 15 counties in eastern North Carolina as the Central Coastal Plain Capacity Use Area (CCPCUA) under authority granted to it by the Water Use Act of 1967. Over the next several years the Division of Water Resources worked closely with local governments and other large water users in the region to develop a set

of rules that provide a schedule for reductions of withdrawals from the aquifers of concern. The Central Coastal Plain Capacity Use Area rules became effective on August 1, 2002. The rules and supporting documentation are available on the Division of Water Resources web site at www.ncwater.org.

Under these rules, anyone withdrawing more than 100,000 gallons of ground water per day in the designated counties must apply for a water use permit from the Division of Water Resources. To provide a better picture of overall water use in the region, the rules also require that anyone withdrawing more than 10,000 gallons per day of surface water or ground water must register their water use on an annual basis. Water withdrawals from the Black Creek and Upper Cape Fear aquifers will be reduced in three stages over a 16-year period. In defined critical areas reductions will be as much as 75 percent below current withdrawals. In addition, applicants for a water use permit must adopt a set of minimum water conservation measures to improve water use efficiency.

The North Carolina Rural Economic Development Center provided funds for a private consulting firm to identify and evaluate alternative water supplies for systems in the 15 Central Coastal Plain Capacity Use Area counties. The results of this study were presented to local officials and concerned citizens in the spring of 2002. Many local governments in the 15-county region are already actively planning to manage water demands and develop new, sustainable water sources to meet their future needs.

The Division of Water Resources is partnering with the Department of Agriculture and Consumer Services for registration and reporting of agricultural water use.

The successful implementation of these rules will significantly reduce withdrawals from the affected aquifers and insure that they will remain reliable sources of water for residents of eastern North Carolina for generations to come.

Allocation of Water Supply Storage in B. Everett Jordan Lake

The third round of allocations of water supply storage in B. Everett Jordan Lake was approved by the EMC on July 11, 2002. Water supply storage in Jordan Lake is allocated by the EMC to units of local government based on rules outlined in NCAC T15A:02G.0500. Applications were received from 11 local governments in May 2001.

To evaluate the long-term effects of allocations of water supply storage in Jordan Lake, DWR staff developed the Cape Fear River Basin Water Supply Plan. A draft of the plan was reviewed by water users in the basin in December 2001. After further public review, the plan was completed in March 2002.The plan provides an assessment of water supply needs and availability through 2050 for water systems using water from the Cape Fear River Basin above Lock and Dam # 1 in Bladen County. The plan uses data from Local Water Supply Plans and applications for allocations from Jordan Lake combined with the newly developed Cape Fear River Hydrologic Model. This computer model is designed to characterize water quantity effects of major withdrawals and discharges on the Cape Fear River and its major tributaries. The plan considers the water supply and wastewater discharge needs of 94 systems that withdraw water from or discharge water to the Haw, Deep or Cape Fear river basins. The effects of these demands are compared to the conditions in the basins in 1998, the base year for the model. The model uses a 69-year (1930-1998) record of precipitation, streamflow and water usage. Using the information contained in the allocation applications and projections based on Local Water Supply Plan data the model indicates that the current level of water supply allocations from Jordan Lake will not hinder any community's ability to meet its 2050 water needs. Allocations were based on applicants needs in 2030 and their existing water supply sources. The current

allocations leave 37 percent of the water supply storage available to meet future needs and do not require any additional interbasin transfer certificates.

Interbasin Transfer Certifications

General Statute 145-215.22I regulates large transfers (over 2 mgd) of surface water between designated river basins. In March 2002, the Environmental Management Commission approved, with conditions, an increase in the allowable interbasin transfer for Charlotte Mecklenburg Utilities from 16.1 to 33 million gallons per day. Water is withdrawn from the Catawba River Basin and transferred to the Rocky River Basin.

The conditions require: continued work on watershed management to protect water quality and control runoff during construction; prohibit increased distribution lines to move water into the Goose Creek watershed until impacts on the endangered Carolina Heelsplitter are evaluated; require periodic reporting on compliance with conditions; and drought management planning. In addition there is a provision to re-open the process if environmental impacts turn out to be significantly different from the projected impacts that form the basis of the Finding of Facts.

Requests for additional interbasin transfer certifications associated with the Catawba River and neighboring basins are expected from Gastonia, Kannapolis, Mooresville, Concord and Union County.

The environmental studies are underway to support an application by the City of Roxboro for approval to transfer 8.5 million gallons per day of water from the Roanoke River Basin to the Neuse River and Tar River basins. If approved this transfer will supplement the City's water supply and will provide cooling water to an 1100 MW electric generation facility proposed by Dominion Power.

In addition, environmental evaluations are underway by the Kerr Lake Regional Water Authority to support an application to increase their grandfathered interbasin transfer capacity of 10 million gallons per day to 18. Water is withdrawn from the Roanoke River Basin and transferred to the Tar River and Fishing Creek basins.

As the population and water systems in North Carolina continue to grow, more systems will exceed their grandfathered interbasin transfer amounts (their transfer capacity as of July 1, 1993), and will face the lengthy process required to obtain an IBT certificate. The 1997 LWSPs document system reliance on interbasin transfers to aid water system managers in understanding the extent to which this law may affect them.

Hydropower Facility Relicensing

As noted in previous status reports, the licenses issued by the Federal Energy Regulatory Commission (FERC) for all of the non-federal major hydroelectric projects in the state will expire between 2001 and 2008. Nearly a dozen projects involving over 30 impoundments along the Yadkin-PeeDee, Catawba, Roanoke, Little Tennessee, and other mountain rivers will need to be relicensed. The relicensing process is an intensive, multi-year process that attempts to balance the many benefits of these projects such as power generation, water supply, recreation, water quality, aquatic habitat, and others. Relicensing provides a process that can address concerns of state agencies and local communities about how the lakes are managed. Licenses are typically issued for 30 to 50 years.

Relicensing is nearing completion for Dominion Generation's Lake Gaston and Roanoke Rapids projects on the Roanoke River. Relicensing is also underway for the numerous Duke Power - Nantahala Area and Alcoa Power Generating Inc.'s Tapoco Division's projects in western North Carolina. Work is beginning on relicensing of Duke Power's facilities in the

Catawba River Basin. Duke Power's lakes on the Catawba River are used by many water systems as sources for their public water supplies. Also work is beginning on facilities in the Yadkin-Pee Dee River Basin operated by Alcoa Power Generating, Inc. and Carolina Power and Light. Several water systems depend on these lakes for public water supplies.

Growth, Development and water supply

Severe drought conditions this year have provided a preview of conditions that may be faced in the future as our growing population increases demand on limited water resources. The significant reductions in available supply provided a short duration simulation of how conditions could be when a larger customer base requires a higher percent of available water to cover water system withdrawals.

Much of the growth over the last few decades occurred along the Piedmont Urban Crescent, the Interstate 40 and Interstate 85 corridors between Raleigh and Charlotte. A recent tread is for new growth to spread out from these urban centers into the surrounding countryside and neighboring small towns. The metropolitan centers have developed extensive and reliable water supplies and distribution systems to meet community needs. The movement of people out from the urban centers is putting increased stress on the water systems in these smaller communities. With the prime reservoir sites having been developed in previous decades, many supporting our urban centers, there are few easily developed water supply sources available for these smaller dispersed community water systems to expand their supplies. As our population continues to grow many communities will face significant challenges, especially with finances and limited local resources, as they struggle to meet growing demands for water.

The Division of Water Resources is working toward developing long-range water demand projections and availability analysis for the river basins in the state. Community water systems could do much to minimize the impacts of water shortages on their systems by improving the efficiency with which water is used and developing water shortage response plans. Local Water Supply Plan data show that unaccounted-for water is a serious problem for many systems, some being unable to account for almost half of the finished water they produce.

Local water policies that allow unrestricted use of drinking water for irrigation commonly face their highest demands when their available supplies are the lowest and experience inflated demands for drinking water that speed the obsolescence of existing treatment facilities and supplies. By adopting policies that encourage efficient use of water local governments could extend the useful life of their existing infrastructure and accommodate more growth with existing supplies.

The impacts of water shortages can be mitigated by preparing ahead for when and how to respond. A Water Shortage Response Plan establishes a priority ranking of types of water use and a protocol for when to begin and end reductions in water use. Developing a plan outside of an emergency situation and with customer input gives customers and local officials guidance to recognize when a shortage is developing and a community-developed plan for how to respond, making it more difficult to be caught unaware of a developing crisis. The Division will be placing increased emphasis on unaccounted-for water and water shortage response planning when reviewing 2002 Local Water Supply Plans.

REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION ON THE NORTH CAROLINA UNDERGROUND STORAGE TANK PROGRAM INCLUDING THE PAY-FOR-PERFORMANCE INITIATIVE

A: The Universe of Underground Storage Tanks

1. In North Carolina, there are 12,147 UST facilities which have 34,030 tanks.

2. These facilities are owned by 5,406 owners.

3. Of these 34,030 tanks, 31,309 are regulated and 2,721 are commercial heating oil tanks.

4. There are also an estimated 250,000 home heating oil tanks in the state. These are unregulated tanks.

B: The UST Program's Corrective Action Progress

1. Since the programs inception, we have recorded 17,335 incidents of leaking tank systems.

2. We have closed 8,412 of these incidents.

3. Presently, we are dealing with 8,923 active incidents: 2,595 are High-Risk; 1,219 are Intermediate-Risk; 2,066 are Low-Risk; 2,416 are Unconfirmed-Risk; and 627 are Default Low-Risk.

4. Each month, we add about 78 new releases. Right now, the majority of these new releases (about 65%) are home heating oil tanks.

5. Default Low-Risk sites are a special category of Unconfirmed-Risk sites. We began evaluating these sites in June 2000. At that time, there were 2,840 such sites. Now, there are only 637 left to evaluate, which should be completed within the next 12 months.

6. In addition, there have been 5,705 "clean closures" of tank systems. These were closures where there was no release of petroleum.

7. We have 38 incident managers in the seven regional offices. Together with the seven regional supervisors, we have 43.5 FTE working on UST release incidents. Since the bulk of the work is being done on High-Risk, Intermediate-Risk and Unconfirmed-Risk sites, each incident manager works on about 158 sites.

C: The UST Program's Compliance Progress

1. We have 13 inspectors to assure compliance of the 12,147 UST facilities, or an average of 934 facilities per inspector.

2. Typically, each inspector can inspect one facility per day, including the inspection, follow-up meetings with the facility, data entry, reports, and enforcement. That means, at present, we can inspect each facility once every four years. Right now, our compliance rate is 68%. Our goals are to increase our inspections to at least once every two years and to increase the compliance rate to 90%.

3. We are taking several steps to increase both the inspection rate and the compliance rate. We have adjusted the 13 regional areas to even out the inspector workload, and we have home-based the inspectors to reduce their travel time to facilities. We are focusing on faster up-front training for new inspectors and follow-up training to ensure consistency. We are working with facility owners, equipment contractors, and consultants to educate them about the requirements to prevent tank system releases. We are assisting some tank owners in the organization of their certifications and records so that inspection time is shortened.

D: The Commercial Fund

1. Since the inception of the Commercial Trust Fund in 1988, we have received about $335 million and disbursed about $332 million. 93% of that money has gone toward cleanup of releases from USTs. 7% of the money has been used for administrative expenses.

2. As of 3 January 2003, the balance of the Commercial Fund is $2,292,972. Claims pending against the Commercial Fund total $17,536,192.

3. In June 2002, in order to stabilize the Commercial Fund, we instituted a procedure to pay out of the Fund each month only an amount equal to the Fund receipts for the month. Claims against the Fund are paid in the order in which they are received. Right now, the time between a claim being approved and being paid is approximately 4 ½ months.

4. On average, 154 claims are made against the Commercial Fund each month. The amount of claims vary widely, but usually fall between $500,000 and $3,000,000.

E: The Non-Commercial Fund

1. Since the inception of the Non-Commercial Trust Fund in 1988, we have received about $69 million and disbursed about $66 million. Again, 93% of that money has gone toward cleanup of releases from USTs. 7% of the money has been used for administrative expenses.

2. As of 3 January 2003, the balance of the Non-Commercial Fund is $2,966,433. Claims pending against the Non-Commercial Fund total $4,849,326.

3. On average, 79 claims are made against the Non-Commercial Fund each month. The amount of the claims is usually in the $100,000 to $500,000 range.

4. If the present trend of claims continues against the Non-Commercial Fund, we expect to institute the same stabilizing procedure this spring. Right now, the time between claim approval and claim payment in the Non-Commercial Fund is short, but it is widening rapidly.

F: Program Improvements to Increase Fund Viability

1. Where possible, adjust remediation policies to lower remediation costs. We have already done this by limiting some analytical procedures and limiting some Low-Risk site excavations. We are considering modifying the over-excavation policy and eliminating some site assessment steps.

2. Introduce legislation to add a co-pay requirement and eliminate the deductible requirement for tank owners. This will keep tank owners fiscally involved in the entire remediation process, not just up to a deductible amount, and lower costs by having tank owners watch costs carefully.

3. Introduce legislation to phase in secondary containment for all regulated tank systems. If we can catch releases before they reach the soil or ground water, we can eliminate a large portion of the remediation costs.

4. Continue trying to institute Pay-For-Performance.

   On October 15, 2001, House Bill 1063 was enacted, which gave the UST Program the authority to allow performanced-based cleanups of UST sites. Sites selected for the pilot program will be posted for competitive bidding in the North Carolina Interactive Purchasing System. A performance-based contract will be awarded to the qualified environmental services firm that submits the lowest, technically qualified bid for an acceptable remedial proposal for the advertised site. A series of milestones (generally percentage reductions in contaminant levels in the soil and the ground water) must be achieved before payments are made from the Commercial or the Non-Commercial Funds.

On November 2, 2001, the Division of Waste Management met with representative of the Professional Engineers of North Carolina, the Consulting Engineers Council of North Carolina, the North Carolina Board for the Licensing of Geologists, and the North Carolina Petroleum Marketer's Association to develop a temporary rule. A follow-up meeting on November 9, 2001 resulted in further refinement of the rule and the discussions of the contract and bidding procedures proposed for use with the rule.

The temporary rule was presented to the Groundwater Committee of the Environmental Management Commission (EMC) on December 12, 2001, who voted for a full EMC review in February 2002. On February 14, 2002, the EMC approved the publication of the temporary rule in the North Carolina Register. The temporary rule was published for public comment between March 15 and April 15, 2002 in Volume 16, Issue 18, page 2,019 of the NC Register. No comments were received. The EMC adopted the temporary rule on May 14, 2002.

The permanent rule was published for public notice in August 2002 and went to public hearing on 18 November 2002. No comments were received. On December 12, 2002, the EMC approved the permanent rule, and on December 20, 2002, the rule package was presented to the Rules Review Commission (RRC). Comments were received from the RRC during the week of January 6. One minor change was made and the package was resubmitted to the RRC this week. If approved by the RRC, the permanent rule will be effective when approved by the General Assembly, probably in August 2003.

We have been unable to implement any PFP remediations of regulated USTs since the law only allows us to use 50% of any funds from the Commercial Fund that are unobligated at the beginning of a quarter. Since we have $17.5 million in claims and $2.3 million in the Commercial Fund, we do not have unobligated money at the beginning of any quarter.

We are continuing to pursue implementation of PFP using the Non-Commercial Fund. The use of PFP is voluntary on the part of the tank owner. We have sent out approximately 100 letters to unregulated tank (home heating oil) owners who were planning remediations explaining the benefits of this program (having the Division do all the contracting, saving money in the Fund). So far, we have had no responses.

Semi-Annual Report to the
North Carolina General Assembly

The Status of Leaking Petroleum Underground Storage Tanks, the State Cleanup Funds, and the Groundwater Protection Loan Fund

SEPTEMBER 1, 2002

NCDENR

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ENVIRONMENT AND NATURAL RESOURCES

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EXECUTIVE SUMMARY

The Department of Environment and Natural Resources is required to prepare a semi-annual report on the status of leaking petroleum underground storage tanks.

From July 1 2001 through June 30, 2002, the Underground Storage Tank Program received reports of 1,045 releases or discharges to the environment. During the same time period, 732 sites were closed. A total of 8,585 sites currently exist in North Carolina. Of that number, approximately 84 percent are commercial and 16 percent are non-commercial.

Expedited claim reviews began in July 1, 2001. The increase in claims processed nearly doubled the amount expended from the Commercial Trust Fund in the first six months. This increase continued through June 30, 2002 although revenues remained steady. The precipitous drop in funds available for reimbursement caused the section to begin reimbursing only when funds are available for that purpose. Please see the Recommendations section for suggestions to stabilize the revenue stream.

Pay-for-performance cleanups were adopted by temporary rule on May 14, 2002. This process differs from the standard in that site contracts are awarded by competitive bid and payments are made only when milestones specific, measurable reductions in contaminant levels are met. PFP programs in Florida have reduced costs 66 percent and lowered them by 50 percent in South Carolina. The section looks forward to implementing this new process.

Program Summary

The Division of Waste Management's UST Section in DENR administers North Carolina's underground storage tank program. The UST Section enforces UST regulations and manages funds used to perform cleanups of petroleum UST discharges or releases. The program was initiated in 1988 in response to growing reports of USTs leaking petroleum into soil and drinking water supplies. Funding for the program has been provided by the Commercial and Noncommercial Trust Funds, the Groundwater Protection Loan Fund, the Federal UST Regulatory Grant and the Federal Leaking UST Fund.

This is the summary of the statistics described in this report for the period July 1, 2001 through June 30, 2002.

Commercial Fund Revenues	$27,124,210
Commercial Fund Total Expenditures	$39,269,690
Noncommercial Fund Revenues	$ 6,620,808
Noncommercial Fund Total Expenditures	$10,096,076
Petroleum UST Incidents - Reported	1,045
Petroleum UST Incidents - Closed Out	732

This is the summary of the statistics for the entire history of the UST program (7/1/88 -6/30/02).

Commercial Fund Revenues	$319,795,285
Commercial Fund Total Expenditures	$315,915,347
Noncommercial Fund Revenues	$ 65,685,246
Noncommercial Fund Total Expenditures	$ 59,709,964
Petroleum UST Incidents - Reported	16,550
Petroleum UST Incidents - Closed Out	7,965

As of June 30, 2002, the status of the Commercial and Noncommercial Funds was:

Commercial Fund Balance	$3,958,556
Commercial Fund Claims Pending	$6,606,996
Noncommercial Fund Balance	$5,977,277
Noncommercial Fund Claims Pending	$2,004,723

The initiation of expedited claim reviews beginning May 24, 2001 has contributed to an increase in payments from the Commercial Fund. A significant backlog of pending claims was processed and, as a result, reimbursement costs nearly doubled during the six month period between July 1, 2001 and December 31, 2001. Payment increases continued during the following six-month period from January 1, 2002 through June 30, 2002, while revenues remained steady. An evaluation of the claims paid during the twelve month period from July 1, 2001 through June 30, 2002 indicate a significant increase in payments for costs associated with comprehensive site assessments and corrective action plans. This is partly due to re-examining low or undetermined risk sites and an increase of enforcement efforts. Beginning on June 17, 2002, reimbursements from the Commercial Fund have only been made as funds are available. The ability to cover all obligations by the Commercial Fund will continue to be closely monitored during FY 2002 - 2003 and recommendations will be made to address the shortfall.

The Noncommercial Fund still appears to be able to meet all obligations based on the current rate of claims submitted. However, the Noncommercial Fund balance is decreasing. North Carolina General Statute 119-18(b) states that if the amount of revenue in the Noncommercial Fund at the end of the month is at least $5 million, one half of the motor fuel inspection tax must be credited to the Commercial Fund and one half must be credited to the Noncommercial Fund. If the amount of revenue in the Noncommercial Fund at the end of the month is less than this threshold amount, all of the inspection tax will be credited to the Noncommercial Fund. The ability to cover all obligations by the Noncommercial Fund will be closely monitored during the financial year of 2002 - 2003.

FUNDING FOR THE UNDERGROUND STORAGE TANK PROGRAM

Program funding is provided by revenues from the Commercial and Noncommercial Trust Funds and the Groundwater Protection Loan Fund. The Federal UST Regulatory Grant and the Federal Leaking UST Fund are provided by the Environmental Protection Agency. Of the 99 staff positions assigned to the UST program, state revenue funds 68 positions and 31 are supported by federal grants.

Commercial and Noncommercial Trust Funds

The Leaking Petroleum Underground Storage Tank Cleanup Act of 1988* established two separate funds: the Commercial Trust Fund and the Noncommercial Trust Fund. Both may be used to reimburse eligible UST owners, operators and landowners for reasonable and necessary costs incurred as a result of environmental cleanup and third party liability claims. Additionally, both funds enable UST Section staff to:

- record and track UST release incidents;
- register and permit commercial USTs, manage a database and receive annual UST operating fee payments;
- identify responsible parties;
- provide technical assistance to tank owners and operators;
- inspect USTs to ensure compliance with UST regulations;
- monitor site cleanups;
- review site assessments and corrective action plans;
- evaluate innovative assessment and cleanup technologies;
- review reimbursement claim procedures;
- manage contracts for cleanups designated as "State Lead";
- inspect and monitor land applications of contaminated soil; and
- identify and evaluate abandoned petroleum USTs.

The UST Section has the authority to contract for the cleanup of petroleum UST incidents if the owner or operator cannot be identified or located, if the owner or operator is financially unable to perform cleanup, or if the owner or operator refuses to perform the required cleanup. In the latter case, the section is authorized by general statute to recover costs incurred during assessment and cleanup activities.

Sources of funding for the Commercial Trust Fund include:

- a motor fuel and kerosene inspection tax,
- an excise tax (0.297 cents per gallon) on motor fuel and kerosene sales,
- annual payment of UST operating fees,
- costs recovered from UST owners and operators for State Lead sites,
- loan collection and interest for the Groundwater Protection Loan Fund, and
- interest earned on the account.

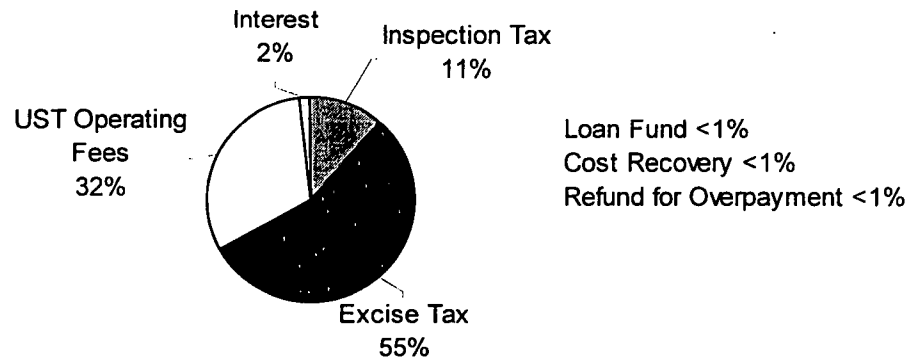
* General Statute 143-215.94A et.seq.

Owners and operators are required to pay annual operating fees to receive operating permits and to be eligible for the Commercial Fund. Annual fees for commercial USTs began at a rate of $30 for tanks with a capacity equal to or less than 3,500 gallons (small tanks) and $60 for tanks with a capacity in excess of 3,500 gallons (large tanks). Tank fees increased annually from 1989 to 1993. From 1993 to 1997, fees were $150 for small tanks and $225 for large tanks. Beginning January 1, 1997, annual fees were increased to $200 for commercial USTs with a capacity equal to or less than 3,500 gallons and $300 for commercial USTs with capacity in excess of 3,500 gallons. Revenues received for the Commercial Fund for the twelve-month period from July 1, 2001 to June 30, 2002 were approximately $21.1 million (Table 1). The relative contributions to the Commercial Fund from each of the funding sources are illustrated in Figure 1.

Table 1 - Commercial Trust Fund Revenues
7/1/01 - 6/30/02

Motor Fuel & Kerosene Inspection Tax	$ 3,082,427
Motor Fuel & Kerosene Excise Tax	$ 14,850,470
UST Operating Fees	$ 8,525,252
State Lead Cost Recovery	$ 38,189
Interest	$ 529,022
Loan Fund Collection and Interest	$ 98,847
Total Commercial Revenues	**$ 27,124,207**

Figure 1 - Commercial Fund Revenue Sources



Funding for the Noncommercial Trust Fund is provided by a motor fuel and kerosene inspection tax and excise taxes (0.047 cents per gallon) on kerosene and motor fuel sales.* Owners and operators of noncommercial USTs are not required to pay annual operating fees. Revenues received for the Noncommercial Fund for FY 2001-02 were approximately $6.6 million (see Table 2, page 3).

* House Bill # 681 of 1993

Table 2 - Noncommercial Trust Fund Revenues
7/1/01 - 6/30/02

Motor Fuel & Kerosene Inspection Tax	$ 3,082,427
Motor Fuel & Kerosene Excise Tax	$ 2,346,259
Interest	$ 407,739
Inter-Agency Transfer (Circle K)	$ 784,382
Total Noncommercial Revenues	**$ 6,620,808**

North Carolina General Statute 119-18(b) states that if the amount of revenue in the Noncommercial Fund at the end of the month is at least $5 million, one half of the motor fuel inspection tax must be credited to the Commercial Fund and one half must be credited to the Noncommercial Fund. If the amount of revenue in the Noncommercial Fund at the end of the month is less than this threshold amount, all of the inspection tax will be credited to the Noncommercial Fund.

Groundwater Protection Loan Fund

The Groundwater Protection Loan Fund Program was created in 1991.** It provided financial assistance to owners of commercial USTs for replacing or upgrading their tanks to meet the performance standards required for all USTs by December 22, 1998. Administrative rules implementing the program were adopted by DENR and became effective December 1, 1992. Revenues for the fund were generated through a 0.0025 cent (one quarter of one cent) per gallon motor fuel excise tax received from January 1, 1992 through December 31, 1994.

Federal UST Regulatory Grant Program

This program promotes compliance with UST regulations. It provides the state's UST Section with $186,675 per year to fund three positions in the DWM central office. The positions provide technical assistance to the owners and operators of USTs, develop materials, conduct educational activities, train regional staff and conduct UST inspections.

Federal Leaking UST Fund

The Federal Leaking UST Trust Fund is used to clean up petroleum contamination from leaking USTs, provide potable water to affected third-parties, perform emergency activities, relocate residents affected by leaking USTs and conduct enforcement activities. This fund is limited to USTs regulated by federal agencies, primarily commercial tanks used for storing motor fuels. Tanks used for heating oil and those used for farm or residential uses (1,100 gallons capacity or less) are not covered by this fund.

Individuals (i.e., owners/operators) do not have access to the fund. Only the federal government and states with cooperative agreements with the EPA can draw on the fund. It may be used in situations when: (1) the responsible party cannot be identified; (2) the responsible party is financially unable to pay for the cleanup; or (3) the responsible party is unwilling and refuses to undertake assessment and/or cleanup actions.

**Session Laws 1991, c. 538, s. 25 - G.S. 143-215.94P

Since the state's UST program began in 1988, the Federal Leaking UST Fund has made 17 awards totaling $34,699,569 to the state's UST Section. As of June 30, 2002, the state spent $33,368,411 from these awards. Of this amount, $15,574,330 was spent for cleanup-related activities and $3,202,354 for enforcement actions. Administrative, operating, travel and equipment costs totaled $14,502,540.

The program is obligated to seek recovery of all costs incurred during state lead cleanups. As of June 30, 2002, the UST Section had recovered $1,518,496 in federal cleanup money through cost recovery actions. Of this amount, $729,532 came from the North Carolina Commercial Fund for sites determined eligible for Commercial Fund coverage after cleanup activities had begun. Cost recovery funds in the amount of $1,382,228 were returned to the Federal Trust Fund to be used for additional corrective action expenditures.

The EPA approved $2,033,793 for North Carolina from the Leaking UST Fund for FY 2001-2002.

PETROLEUM UST INCIDENTS

Discharges or releases from petroleum USTs are reported to DENR regional offices where they are added to an incident management database. Table 3 (see page 5) lists the number of incidents reported and closed out in each region during the twelve-month period from July 1, 2001 through June 30, 2002. It also shows the number of incidents reported and closed out since the UST program began in 1988.

Beginning January 2, 1998, the UST Section implemented risk-based corrective action rules for petroleum UST incidents. Discharges or releases under these rules receive a risk classification of "high," "intermediate," or "low" based on the potential threat to human health and the environment. Of the total number of UST incidents closed since 1988, 56 percent were closed following implementation of Risk-Based Corrective Action. The total number of open incidents has generally increased since 1988; however, recent data indicates the trend may be leveling off (see Figure 2, page 5).

Table 3 - Petroleum UST Incidents by Region

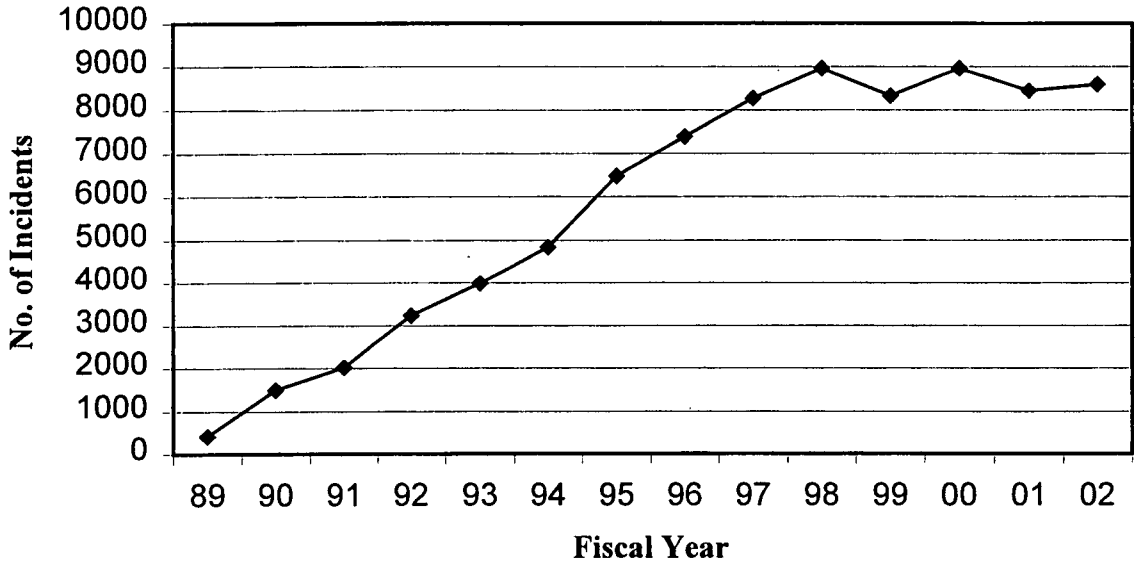
REGION	7/1/01 - 6/30/02		7/1/88 - 6/30/02	
	Reported	Closed	Reported	Closed
Asheville	82	27	1570	998
Fayetteville	43	37	978	472
Mooresville	163	155	3,357	1,641
Raleigh	249	165	3,467	1,472
Washington	174	133	2,113	986
Wilmington	101	65	1,278	463
Winston-Salem	233	150	3,787	1,933
TOTAL	**1,045**	**732**	**16,550**	**7,965**

Total reported releases affecting groundwater that have been closed out	1,431
Total reported releases closed out since implementation of RBCA*	4,466
Total remaining open sites	8,585
Estimated open commercial sites**	7,211
Estimated open noncommercial sites**	1,374

* Risk-based corrective action implemented 1/2/98.

** Based on an average of past data (85%) and the current twelve month period (76%), approximately 84 percent of the reported releases are from commercial sites, while the other 16 percent are from noncommercial sites.

Figure 2 - Open UST Incidents



RECEIPTS AND DISBURSEMENTS: COMMERCIAL AND NONCOMMERCIAL TRUST FUNDS AND GROUNDWATER PROTECTION LOAN FUND

Commercial and Noncommercial Funds

UST owners, operators and landowners may submit reimbursement claims for reasonable and necessary costs incurred during environmental assessment and cleanup activities. Claims may be submitted if the eligibility requirements for the trust funds are met. Deductibles that must be met before receiving reimbursement from the Commercial Fund range from $20,000 to $75,000. Noncommercial Fund deductibles are $0 for UST owners and operators, and $5,000 for landowners. Table 4 lists the receipts and disbursements by fiscal year for both funds for the period July 1, 1988 to June 30, 2002.

Table 4 - Receipts & Disbursements for Cleanups
7/1/88 - 6/30/02

FISCAL YEAR	RECEIPTS		DISBURSEMENTS[1]	
	Commercial	Noncommercial	Commercial	Noncommercial
FY 88-89	$ 2,337,685	$ 0	$ 14,768	$ 0
FY 89-90	5,773,632	2,905,035	79,080	0
FY 90-91	7,330,573	2,934,347	1,616,760	564,206
FY 91-92	13,484,008	3,018,344	4,409,229	2,143,155
FY 92-93	18,032,784	7,693,288	9,651,948	4,069,497
FY 93-94	24,438,966	3,404,086	22,904,802	2,012,312
FY 94-95	56,037,135[2]	5,194,725	37,405,510	2,900,368
FY 95-96	28,178,768	5,215,550	44,060,639	5,029,109
FY 96-97	28,564,034	5,587,781	44,163,273	5,924,799
FY 97-98	27,291,220	5,717,592	30,267,392	3,869,091
FY 98-99	26,783,344	5,945,461	16,104,152	2,776,105
FY 99-00	27,178,623	5,636,563	22,820,069[3]	5,028,505
FY 00-01	27,240,303	5,811,666	24,566,132[4]	7,890,618[5]
FY 01-02	27,124,210	6,620,808[6]	36,872,426	9,182,320
TOTAL	**$319,795,285**	**$ 65,685,246**	**$294,936,180**	**$ 51,390,085**

[1] Does not include administrative costs.
[2] Commercial receipts for FY 94-95 included $31,288,889 that was transferred from the Groundwater Protection Loan Fund.
[3] Adjustment due to a transfer from the Commercial Fund to the Federal Trust Fund of $288,117 as a cleanup expenditure rather than as an administrative cost.
[4] $33,866 transferred to Federal Trust Fund as a cleanup expenditure.
[5] $2 million transferred out of Noncommercial Fund to the state's General Fund.
[6] Includes transfer of $784,382 from Circle K Settlement Fund.

The administrative budget for the state-funded portion of the UST program is derived from the Commercial and Noncommercial Funds. Table 5 lists past administrative expenditures since the beginning of the UST program.

Table 5 - Administrative Expenditures

Fiscal Year	Commercial	Noncommercial
FY 89-90	$ 201,255	$ 201,254
FY 90-91	547,595	547,595
FY 91-92	517,221	517,221
FY 92-93	601,687	601,686
FY 93-94	694,424	694,423
FY 94-95	666,270	666,270
FY 95-96	2,322,632	783,684
FY 96-97	2,623,339	801,143
FY 97-98	2,530,036	667,724
FY 98-99	2,567,668	620,574
FY 99-00	2,579,540*	570,738
FY 00-01	2,730,236	733,811
FY 01-02	2,397,264	913,755
TOTAL	**$ 20,979,167**	**$8,319,878**

Incorporating the administrative costs into receipts and cleanup disbursements yields these Commercial and Noncommercial Fund balances:

Commercial Fund Balance (as of June 30, 2002)	**$ 3,958,556**
Noncommercial Fund Balance (as of June 30, 2002)	**$ 5,977,277**

Groundwater Protection Loan Fund

After the Groundwater Protection Loan Fund was created, 11 North Carolina banks agreed to administer the loan program. As of June 30, 1995, four loans totaling $1,228,350 had been closed. After this date, remaining funds of $31,288,889 were deposited into the Commercial Trust Fund. Loan repayments are also deposited into the Commercial Fund. During the twelve-month period ending June 30, 2002, $67,903 was repaid. Total receipts for the Loan Fund since its inception in January 1992 are $32,994,840.

* Adjustment due to a transfer from the Commercial Fund to the Federal Trust Fund of $288,117 as a cleanup expenditure rather than as an administrative cost.

CLAIMS AGAINST THE CLEANUP FUNDS

Claims against both the Commercial and Noncommercial Funds are processed on a "first-come, first-served" basis. The status of all claims requesting reimbursement from both funds that were received as of June 30, 2002 is presented in Table 6. These claims only include costs claimed to date, and do not represent the total costs for cleanups.

UST Section staff have supervised contract cleanups at 277 commercial and noncommercial sites (Table 6, 213 commercial and 64 noncommercial). Currently, DENR has four contracts with environmental engineering/geology firms that perform a range of assessment and cleanup actions. The term of these contracts is 18 months with an option to renew for an additional 18 months. Two contracts expire in August 2002 and two contracts expire in November 2002.

Table 6 - Claims Against the Cleanup Funds
7/1/88 - 6/30/02

	Commercial Fund		Noncommercial Fund	
	Number	Cost	Number	Cost
Claims Paid	18,265	$288,334,564	5,617	$ 47,927,270
Incidents Denied Totally [1]	33	$ 4,573,040	4	$ 59,845
Claims Denied Partially [2]	11,134	$ 57,301,779	2,860	$ 7,273,497
Total Deductibles Paid	-------	$ 58,585,814	-------	$ 255,515
Claims Pending	571	$ 6,606,996	205	$ 2,004,723
Contracted Cleanups [3]	213	$ 8,019,963	64	$ 1,736,882

[1] Ineligible
[2] Excessive or undocumented costs
[3] State Lead actions undertaken or completed

COMMERCIAL AND NONCOMMERCIAL FUND BALANCES AND PROJECTED NEEDS

Commercial Fund

As of June 30, 2002, the Commercial Fund balance was $3,958,556 with pending claims of $6,606,996 (see Figure 3, Page 9). Since January 1, 2001, the difference between the fund balance and the pending amount has decreased (see Figure 4, Page 9). During the six-month period from July 1, 2001 to December 2001 expedited reviews were initiated in an effort to reduce claim review time. While the claim review time has been reduced, the result has been an increase of nearly double the claim reimbursement payments during the six-month period of July 1, 2001 to December 31, 2001. Expedited reviews have continued during the period January 1, 2002 through June 30, 2002. Review of the claims paid beginning on July 1, 2001 indicate that a significant increase of payments are being made for comprehensive site assessments and corrective action plans. The increase in CSAs and CAPs appears to be related to required work

for sites that were formerly under suspension and have been re-evaluated (low and undetermined risk sites). Claim amounts continue to increase while revenues remain steady.

Figure 3 - Commercial Fund Balance and Claims Pending

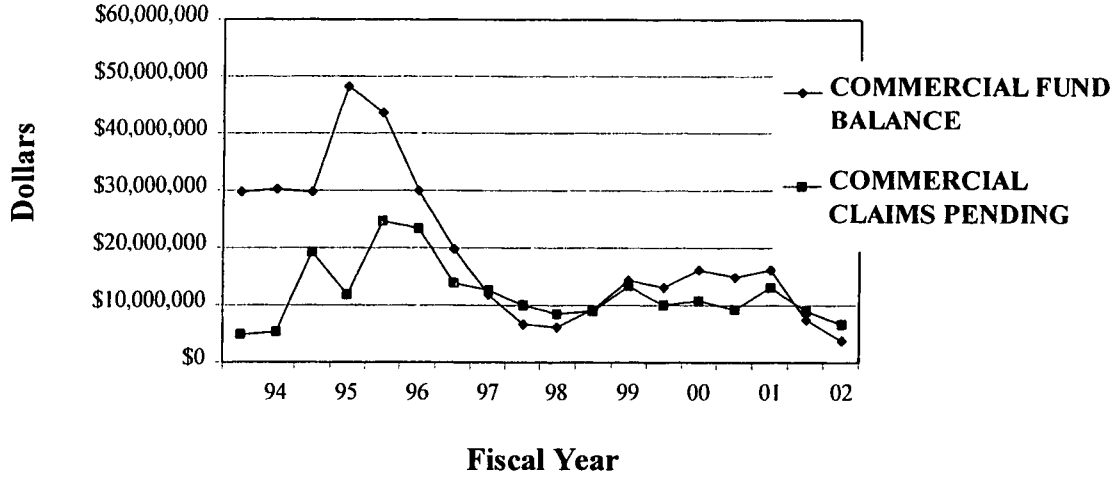
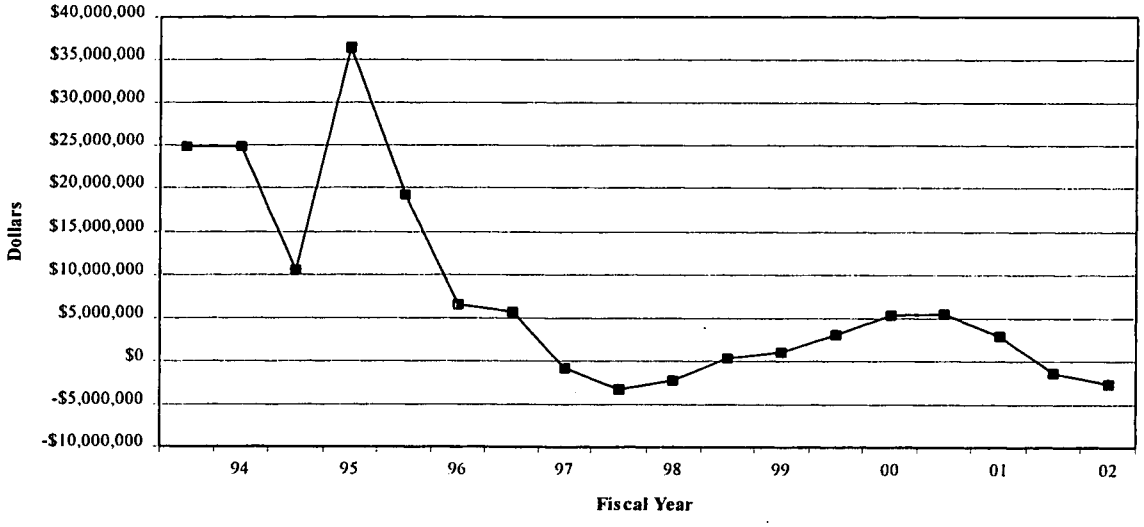


Figure 4 - Commercial Fund Balance Minus Claims Pending



Commercial Fund revenues should remain relatively steady while claim costs and contracted cleanups will likely increase due to the continuation of expedited reviews.

Table 7 - Total Commercial Fund Revenues and Expenditures
7/1/01 – 6/30/02

Total Commercial Revenues (see Table 1, page 2)	**$27,124,207**
Total Claims and Contracted Cleanups	$36,872,426
Administrative Costs	$ 2,397,264
Total Commercial Expenditures	**$39,269,690**

Another factor, which may effect an increase of demands to the Commercial Fund in the future, is pay-for-performance based cleanups. On October 1, 2001, the General Assembly ratified House Bill 1063, which allows responsible parties to participate in the pay-for-performance program on a voluntary basis. Pay-for-performance is a reimbursement method that requires cleanup goals to be met before payments can be made to environmental consultants. This reimbursement method requires the Trust Fund to obligate the contracted cleanup costs. Pay-for-performance obligations may initially place a higher demand on the Trust Fund, but should greatly decrease the costs of cleanups and thus result in a lesser burden to the Trust Fund.

Another factor that may effect future demands on the Commercial Fund is third-party claims. There is currently one pending third-party claim under review which has the potential to place a burden of many hundred thousands of dollars on the Commercial Fund. Other third party claims may be planned that have not been submitted for review.

After UST operating fees were raised on January 1, 1997, revenue from this funding source declined through the end of FY 1998-99 (see Table 8). This decrease was likely due to the reduction in the number of registered USTs that occurred as a result of the federal 1998 upgrade regulations. The number of registered USTs continued to decrease during the period from July 1, 2001 to June 30, 2002. However, UST operating fees have remained stable.

Table 8 - Commercial UST Population and Operating Fee Revenue

Fiscal Year	No. of Commercial USTs Billed	Operating Fee Revenue
FY 1996-97	37,776	$ 10,839,975
FY 1997-98	36,563	$ 10,008,917
FY 1998-99	34,428	$ 8,697,468
FY 1999-00	33,558	$ 8,844,093
FY 2000-01	33,776	$ 8,464,019
FY 2001-02	32,839	$ 8,553,715

At present, approximately 7,200 commercial incidents have yet to be closed out. With minor work performed in accordance with the RBCA rules, many of these sites may receive "no further action" letters. However, some will require additional assessment and corrective action that will subsequently result in additional demands on the Commercial Fund.

Data tracking improvements are being made to the UST incident management database. These changes will enable the UST Section to better predict the number of incident closures and project Commercial Fund expenditures.

UST systems pose a substantial threat to human health and the environment. Over 1,200 leaks are reported each year. Maintaining the quality of North Carolina's drinking water depends on preventing releases to the environment. Direct education and technical assistance for tank owners and operators is critical. Only education and assistance ensure responsible handling of petroleum products, including methyl tertiary-butyl ether, and early detection in the event of a leak.

North Carolina currently has about 31,620 active regulated USTs at 9,900 facilities. Of that number, we estimate 40 to 50 percent are located within 500 feet of both domestic and public drinking water supplies. Our inspection data show that over 30 percent of tank owners and operators do not comply with UST regulations. These regulations cover proper operation and maintenance, with an emphasis on leak detection. If we are to preserve the quality of North Carolina's drinking water, improving compliance must be a future priority.

Noncommercial Fund

As of June 30, 2002, the Noncommercial Fund balance was $5,977,277. The total for pending claims stood at $2,004,723. Based on past data, the present financial condition of this fund appears sound (see Figure 5), but will be carefully monitored for anticipated increased demands.

Figure 5 - Noncommercial Fund Balance and Claims Pending

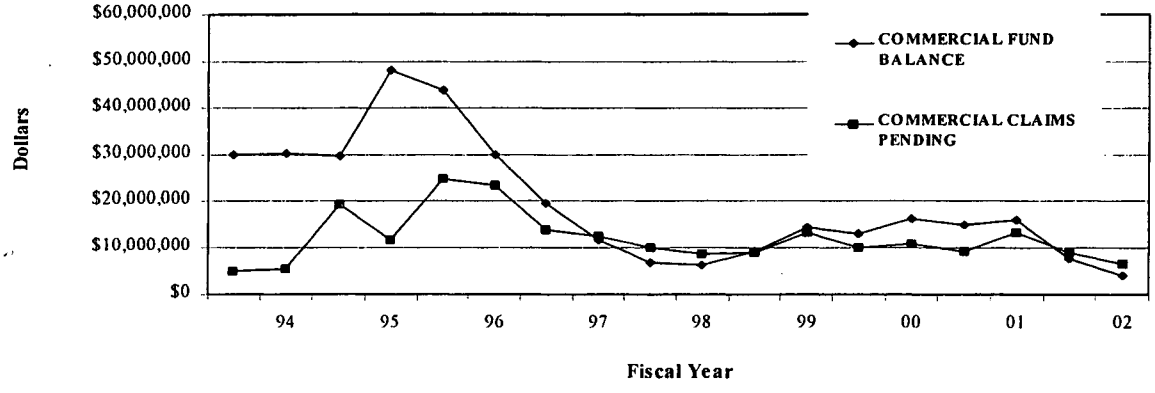


Figure 6 - Noncommercial Fund Balance Minus Claims Pending

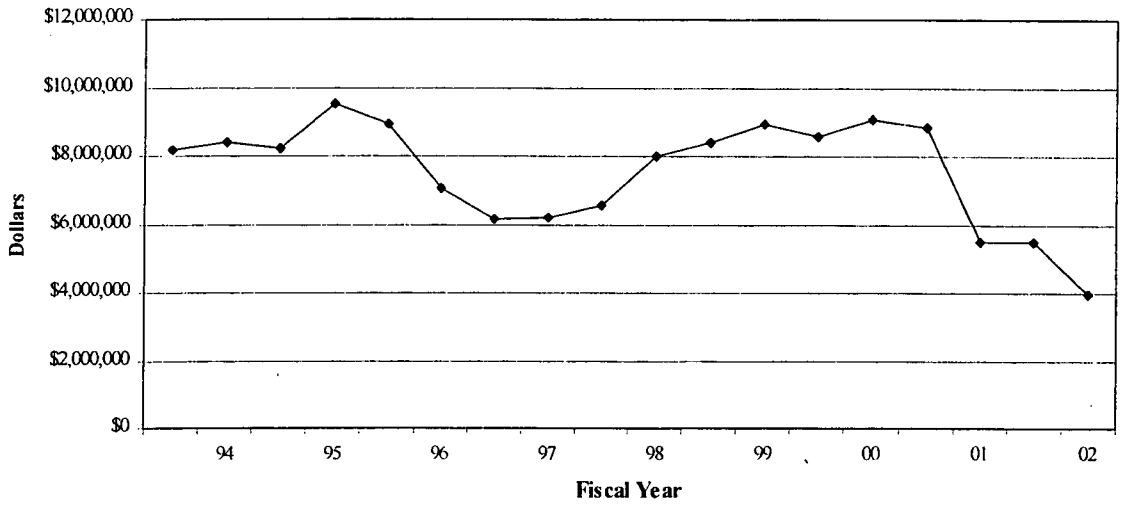


Table 9 - Total Noncommercial Fund Revenues and Expenditures
7/1/01-6/30/02

Total Noncommercial Revenues (see Table 2, page 3)	**$6,620,808**
Total Claims and Contracted Cleanups	$ 9,182,321
Administrative Costs	$ 913,755
Total Noncommercial Expenditures	**$10,096,076**

Table 10 shows the estimated cost to complete cleanups for noncommercial incidents reported from July 1, 2001 to June 30, 2002. It should be noted, however, that cleanups can easily extend over several years and costs may vary greatly.

Table 10 - Estimate of Cleanup Costs for Noncommercial Incidents
Reported 7/1/01 - 6/30/02

Region	Incidents*	Total Estimated Cleanup Cost**
Asheville	30	$ 1,875,000
Fayetteville	16	$ 1,000,000
Mooresville	60	$ 3,750,000
Raleigh	92	$ 5,750,000
Washington	64	$ 4,000,000
Wilmington	37	$ 2,312,500
Winston-Salem	86	$ 5,375,000
Total	**385**	**$24,062,500**

* Calculations of the last 12-month period indicate that approximately 37 percent of reported releases are from noncommercial sites.

** An average cost of $62,500 is used as an estimate of total cleanup costs for noncommercial sites.

PAY-FOR-PERFORMANCE

On October 15, 2001, House Bill 1063 was enacted by the North Carolina General Assembly. This bill gives the Division of Waste Management's Underground Storage Tank program the authority to allow performance-based cleanups of sites where petroleum has been discharged or released from underground storage tanks. Sites selected for the pilot program will be posted for competitive bidding in the North Carolina Interactive Purchasing System. A performance-based contract will be awarded to the qualified environmental services firm that submits the lowest, technically qualified bid for an acceptable remedial proposal for the advertised site. A series of milestones (generally percentage reductions in contaminant levels in the soil and groundwater) must be achieved before payments are made to the cleanup firm from the Commercial or Non-Commercial Fund.

On November 2, 2001, the Division of Waste Management convened a stakeholders workgroup consisting of representatives of the Professional Engineers of North Carolina, the Consulting Engineers Council of North Carolina, the North Carolina Board for the Licensing of Geologists and the North Carolina Petroleum Marketer's Association to develop a temporary rule. A follow-up meeting on November 9, 2001 resulted in the further refinement of the rule and the discussions of the contract and bidding procedures proposed for use with the rule.

The proposed temporary rule was presented to the Groundwater Committee of the Environmental Management Commission on December 12, 2001. It received a favorable vote to proceed to full commission review in February 2002. On February 14, 2002, the EMC voted to approve the publication of the temporary rule in the North Carolina Register. The temporary rule was published for public comment between March 15 and April 15, 2002 in Volume 16, Issue 18, page 2,019 of the NC Register. No comments were received. The Commission adopted the temporary rule on May 14, 2002.

RECOMMENDATIONS

Based on the results of this report, the UST Section makes the following recommendations for the Commercial and Noncommercial Trust Funds:

- Responsible parties of UST releases should continue to be encouraged to consider pay-for-performance cleanups at their sites. Pay-for-performance is a reimbursement method that requires cleanup goals to be met before payments can be made to environmental consultants. PFP programs in other states have dramatically reduced the costs for cleanups. Costs are down 66 percent in Florida and 50 percent in South Carolina. PFP also accelerates the rate of cleanups. The Department of Environment and Natural Resources will monitor the obligated costs for pay-for-performance contracts and the potential cleanup cost savings of the PFP program.

- Additional revenue should be made available for continued expedited payment of Commercial Fund claims.

- Establish a statute of limitations for filing claims. Because fund deductible amounts vary, we propose grouping all years with like deductibles (Example: releases detected 6/88-12/91 and 1/92-12/93) and assigning a common claim submittal deadline. The UST Section can inform its customers of the new deadline, and then provide one year for all claims to be prepared and filed. By learning more about outstanding claims, the UST Section can increase its ability to predict fund expenditures.

- The $5 million Noncommercial Fund floor which triggers revenue diversion from the Commercial Fund should be reduced to $2.5 million to more accurately reflect a typical month's demand. The remaining amount above the floor should be transferred to the Commercial Fund to assist with meeting this Fund's outstanding obligations.

January 16, 2003 ERC Meeting
EXHIBIT I

North Carolina
Parks and Recreation Trust Fund

2001– 2002
ANNUAL REPORT

Division of Parks and Recreation
Department of Environment and Natural Resources
1615 MSC
Raleigh, NC 27699-1615

Michael F. Easley
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Department of
Environment and Natural
Resources

Parks and Recreation Trust Fund
Annual Report 2001–2002

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1.0 Introduction

The North Carolina Parks and Recreation Trust Fund (PARTF) was established by the North Carolina General Assembly on July 16, 1994. The General Assembly gave an initial appropriation of $1 million to PARTF to fund improvements in state parks, to fund grants for local governments and to increase public access to the state's beaches. In 1995, the General Assembly dedicated funds from the excise stamp tax to the trust fund starting in FY 1996-97. The Parks and Recreation Authority, an eleven-member board, was also created to allocate funds from PARTF to projects in state parks and to grants for local governments.

The excise tax is the primary funding source for PARTF. The tax is levied on each "deed, instrument, or writing by which interest in real property is conveyed to another person." The tax is levied at the rate of one dollar on each $500 of the interest or property conveyed. Each county remits one-half of the proceeds, less the county's allowance for administrative expenses, to the state. Effective July 1996, the General Assembly (G.S. 105-228.30) stipulated that part of the state's share would be allocated to PARTF. Of the funds remitted, the Department of Revenue credits 75% to the Parks and Recreation Trust Fund and 25% to the Natural Heritage Trust Fund.

Pursuant to G.S. 113-44.15, the money from the Parks and Recreation Trust Fund are to be allocated as follows:

(1) Sixty-five percent (65%) for the State Parks System for capital projects, repairs and renovations of parks facilities, and land acquisition.

(2) Thirty percent (30%) to provide grants to local governments on a dollar-for-dollar basis to create or improve parks and recreational projects.

(3) Five percent (5%) for the Coastal and Estuarine Water Beach Access Program.

(4) No more than three percent (3%) may be used by the Department of Environment and Natural Resources (DENR) for the operating expenses associated with managing capital improvements projects, acquiring land, and administering the local grants program.

2.0 North Carolina Parks and Recreation Authority

The North Carolina Parks and Recreation Authority, an 11-member board that oversees the Parks and Recreation Trust Fund, was created by the General Assembly with the Authority's powers and duties becoming effective July 1, 1996. The Governor appoints three members, including the chairperson. The General Assembly appoints four members upon the recommendation of the President Pro Tempore of the Senate. The General Assembly appoints four members upon the recommendation of the Speaker of the House.

The Authority is charged with six powers and duties: to receive public and private donations and funds for deposit into the trust fund; to allocate funds for land acquisition; to allocate funds for capital projects; to solicit financial and material support; to develop effective support for parks and recreation; and to advise the Secretary of DENR on any matter he may refer to the body.

Members are appointed for three-year terms and may serve no more than two consecutive three-year terms. After serving two consecutive three-year terms, a member is not eligible for appointment to the Authority for at least one year after the expiration of the member's last term.

The 2001-2002 Parks and Recreation Authority members were:

Jonathan B. Howes, Chairman
Chapel Hill

Roy Alexander
Charlotte

Leslie Anderson
Asheville

Wendell Begley
Black Mountain

Harriet Farrior
Wallace

Eddie Holbrook
Cherryville

Walt Israel
Belmont

Ron Kincaid
Mount Gilead

Russell Robinson III
Greensboro

Kenneth Sadler
Lewisville

Todd Tilley
Hertford

The Parks and Recreation Authority held four meetings during fiscal year 2001-2002.

3.0 Parks and Recreation Trust Fund Revenue Summary

Table 3-1 shows the revenues received into the Parks and Recreation Trust Fund and the allocation of revenues by program for fiscal year 2001-2002.

Table 3-1
Parks and Recreation Trust Fund (PARTF)
Distribution of Revenues for Fiscal Year 2001-2002

Item	Subtotal	Amount	Percent
Public Beach and Coastal Waterfront Access Program		$1,073,746	5.00%
Local Governments Matching Grants Program		$6,312,011	29.39%
State Parks System		$13,676,026	63.68%
Capital Improvement & Renovation Projects	$9,573,218		
Land Acquisition	$4,102,808		
Administrative Expenses		$413,135	1.92%
Contract with N.C.S.U. Recreation Resources Service	$144,955		
Division of Parks & Recreation staff and Authority members	$268,180		
2001-2002 PARTF Revenues		**$21,474,918**	**100.00%**

Note: In fiscal year 2001-2002, $5 million was transferred from the Parks and Recreation Trust Fund to the General Fund to address the shortfall in the state's budget.

4.0 Local Government Matching Grants Program

4.1 Program Description

The Parks and Recreation Trust Fund (PARTF) program provides dollar-for-dollar grants to local governments. All counties, incorporated municipalities and public authorities (as defined in N.C.G.S. 159-7) are eligible for funding. Two or more local governments may apply jointly. Recipients can acquire land to use for public recreation or to protect the natural or scenic resources of the property. Recipients can also use a grant to build or renovate recreational and support facilities. All facilities must serve the general public.

In September, the Division of Parks and Recreation (DPR) mails a description of the PARTF program and a schedule to local governmental officials and parks and recreation directors. A local government can request a maximum grant amount of $250,000 in PARTF assistance with its grant application. The approved value of land that is donated to a local governmental unit or public authority may be applied to the 50% matching requirement.

The DPR provides assistance to local governments in several ways. In October, the PARTF staff conducts a workshop where local governments can learn about the program and how to complete an application. The workshop is presented simultaneously at University of North Carolina video conference sites. The DPR has a contract with Recreation Resources Service (RRS) at North Carolina State University. The staff of RRS can provide technical assistance to local governments who request help in planning projects and preparing grant applications. RRS has six consultants in regional offices across the state.

The Parks and Recreation Authority selects which applicants will receive a grant. The factors considered by the Authority as it selects recipients include, but are not limited to, the criteria contained in the PARTF scoring system, the population of the applicant, the geographic distribution of projects across the state, the presence or absence of other funding sources and compliance with prior grant agreements.

Applications are due January 31. The Parks and Recreation Authority meets in May to select recipients from PARTF revenues received for the first three-quarters of the fiscal year. The Authority meets in early July to select grant recipients from PARTF revenues received during the fourth quarter of the fiscal year.

4.2 Description of Applications and Grants

Sixty-one local governments submitted applications for consideration in fiscal year 2001-2002. The Parks and Recreation Authority reviewed all of the applications and awarded 37 grants for a total of $6,566,777. This amount is greater than the $6,312,011 in PARTF revenues that was available to award for fiscal year 2001-2002. The difference includes $317,634 returned by previous grantees who were unable to compete all or a portion of their projects.

Pursuant to G.S. 113-44.15, up to three percent in PARTF funds may be used by the Department of Environment and Natural Resources (DENR) for the operating expenses associated with managing capital improvements projects, acquiring land, and administering the local grants program. The current balance in the PART grants program for local governments is $62,810. This amount includes the unspent administrative funds.

Table 4-1 on the following page is a list of the projects approved for fiscal year 2001-2002. The table is organized alphabetically by county.

4.3 Geographic Distribution of Grants

The Parks and Recreation Authority considers the geographic distribution of funds across the state as one of the factors used in selecting grant recipients. After seven funding cycles, the Authority has awarded $40 million in PARTF grants to 263 projects in 93 counties across North Carolina.

Figure 4-1 (page 7) is a map showing the distribution of PARTF grants by county across North Carolina from 1995-2002.

Table 4-1 North Carolina Parks and Recreation Trust Fund Grant Recipients for Fiscal Year 2001-2002			
Sponsor	**County**	**Project**	**Amount**
Alexander	Alexander	Dusty Ridge Park	$50,000
Anson	Anson	Little Park Renovation and Development	$200,000
Archdale	Randolph	Creekside Park Expansion	$143,193
Asheville	Buncombe	Azalea Road Park Phase I	$249,165
Banner Elk	Avery	Charles B. VonCanon Fort Play Structure	$32,227
Bertie	Bertie	Bertie County Park	$250,000
Buncombe	Buncombe	Buncombe County Recreation Park	$250,000
Carolina Beach	New Hanover	Lake Park	$152,114
Cherokee	Cherokee	Cherokee County Pool and Wellness Center	$250,000
Concord	Cabarrus	Three Mile Branch Park	$230,856
Currituck	Currituck	Point Harbor Park	$250,000
Dare	Dare	Soccer / Football Complex	$80,885
Durham	Durham	Downtown Trail/Central Park	$200,695
Elon	Alamance	Elon Park	$250,000
Greenville	Pitt	River Park Nature Center	$250,000
Grifton	Pitt	Creekside Trail Park	$37,731
Guilford	Guilford	Northeast Park	$250,000
Laurel Park	Henderson	Little Laurel Green	$33,788
Liberty	Randolph	Freedom Park Improvements	$10,800
Lincolnton	Lincoln	Highland Drive Park	$250,000
Marion	McDowell	Cross Mill Community Park	$50,542
Mecklenburg	Mecklenburg	Rockwell Neighborhood Park	$170,331
Mount Gilead	Montgomery	Property Acquisition	$39,383
Nashville	Nash	J.W. Glover Park	$242,130
Oakboro	Stanly	Oakboro District Park	$250,000
Princeville	Edgecombe	Riverside Heritage Park	$165,750
Rocky Mount	Edgecombe	Stith Talbert Park Renovation	$250,000
Rolesville	Wake	Rolesville Town Park	$231,369
Rowan	Rowan	Nature Center Renovation	$250,000
Smithfield	Johnston	Smithfield Community Park -Phase IV	$250,000
Surf City	Pender	Surf City Community Park	$250,000
Surry	Surry	Fisher River Park Phase III	$83,160
Wade	Cumberland	Wade Park	$89,562
Watauga	Watauga	Watauga County Park	$250,000
Whitakers	Nash	Whitakers Town Park	$73,096
Wilmington	New Hanover	17th Street Park	$250,000
Wilson	Wilson	Toisnot Park Soccer Complex	$250,000
		Total	$6,566,777

5.0 State Parks Program

5.1 Land Acquisition

For fiscal year 2001-2002, the Parks and Recreation Authority approved land acquisition projects for the state parks system for a total of $4,102,808 (Table 5-1).

Table 5-1
North Carolina Parks and Recreation Trust Fund
Land Acquisition Projects Approved in Fiscal Year 2001-2002

Park	Acres	Description	Amount
Dismal Swamp State Natural Area	15	Funds to buy an easement to build a road that will give the Division an access to this state natural area and will allow for park management and the construction of facilities.	$25,000
Eno River State Park	825	PARTF money used to match a grant from the federal Land and Water Conservation Fund for the Eno Wilderness project. Project has extensive river frontage, significant natural communities and intact upland hardwood forests. This will be the largest single acquisition at the park.	$1,207,808
Eno River State Park	161	River corridor protection upstream of the Cabelands section of the park. Additional funds from the Natural Heritage Trust Fund and LWCF. Project contains extensive river frontage and significant natural communities.	$500,000
Lake Norman State Park	75	Land to improve boundary management on the north side of the park and to protect water quality of Norwood Creek, the main stream into the park's lake.	$450,000
Lumber River State Park	80	River corridor tracts across from the Pea Ridge Access of the park. Landowners wanted to sell to the state for the park.	$200,000
Merchants Millpond State Park	200	Entrance protection across from the picnic area and property on the north side of the park.	$300,000
Mountains to Sea Trail	1,117	First tract in the Neuse River bottomland section of the river for Mountains to Sea State Park. This area contains significant natural communities and extensive bottomland hardwood forests.	$500,000
South Mountains State Park	150	Funds for tracts in the Henry Fork and Jacob Fork watersheds. These acquisitions will protect the water quality in both rivers.	$300,000
South Mountains State Park	310	Additional funds for tracts in the Jacobs Fork water shed to protect water quality and provide critical trail connections on the east side of the park.	$620,000
Total	**2,933**		$4,102,808

5.2 Construction and Renovation

During fiscal year 2001-2002, the Parks and Recreation Authority approved state park construction and renovation projects totaling $10,854,201 (Table 5-2). The PARTF receipts in fiscal year 2001-2002 were $9,573,218. The Authority was able to allocate an additional $1,280,983. This amount was available from projects that were completed under budget during fiscal years 1996-1999.

Table 5-2
North Carolina Parks and Recreation Trust Fund
State Parks Capital Improvement Projects Approved in Fiscal Year 2001-2002

Park	Project	Amount
Cliffs of the Neuse	Lake Area Safety and Improvements	$186,974
Cliffs of the Neuse	Picnic Area Toilet Building	$336,099
Dismal Swamp	Design fees for swing barge across the canal	$75,000
Falls Lake	Telephone/Utilities Improvements	$501,670
Hammocks Beach	Replace Bathhouse	$1,539,320
Jockey's Ridge	Sand Removal	$573,763
Jordan/Falls Lake	Replace Playground Equipment Replacement	$900,605
Jordan Lake	Crosswinds Group Area	$1,511,235
Lake James	Hidden Cove Development	$541,489
Medoc Mountain	Footbridge Across Fishing Creek	$334,236
Morrow Mountain	Renovation of Lodge for Community	$354,580
Mount Mitchell	Tower and Access Trail	$623,967
Pilot Mountain	Grassy Creek Section-Design Only	$800,000
South Mountain	Visitor Center - Design Only	$243,000
Weymouth Woods	Renovate Visitor Center Building Renovations	$664,002
William B. Umstead	Replace Toilet Facilities	$287,712
Park System	Major Maintenance Fund	$800,000
Park System	Small Trails Funds	$200,000
Park System	Emergency Funds	$150,000
Park System	Statewide Exhibits Repair Funds	$50,000
Park System	Construction Reserve	$180,549
	Total	$10,854,201

6.0 Public Beach and Coastal Waterfront Access Program

The Public Beach and Coastal Waterfront Access Program was established by the General Assembly in 1981. Beginning in fiscal year 1996-97, the program began receiving 5% of the revenues from the Parks and Recreation Trust Fund. The public beach and coastal waterfront access program's enabling legislation (GS 113A-134.1) states that "Public purposes would be served by providing increased access to ocean beaches, public parking facilities, or other related public uses." The program provides matching grants to local governments for low-cost capital projects designed to improve pedestrian access to the state's beaches and waterways.

The program, administered by the Division of Coastal Management (DCM), offers matching grant funds to local governments throughout the 20 coastal counties. Since 1981, over 280 public access sites have been constructed at a cost of $11.6 million ($11.2 million state/federal and $5.2 million local funds). Local governments are responsible for construction, operation and long-term maintenance of the facilities. While most of the early projects were located along the oceanfront, more and more projects are now designed to improve access to estuarine shorelines, coastal rivers, and urban waterfronts.

The Division of Coastal Management sends requests for proposals to local governments in the 20 coastal counties in March of each year. The division uses criteria developed by the Coastal Resources Commission to select grant recipients. Local governments are required to match at least 25% of the project costs. Recipients are selected in July and contracts are awarded in August or October. Grant recipients have one year to complete their projects.

Communities can apply for five different types of water access sites: local, neighborhood, regional, multi-regional and urban waterfront redevelopment projects.

"Local access sites" include public access points which offer minimal or no facilities. They are primarily used by pedestrians who reside within a few hundred yards of the site. Generally, these accessways are a minimum of ten feet in width and provide only a dune crossover or pier, if needed, litter receptacles and public access signs. Vehicle parking is generally not available at these access sites. However, bicycle racks may be provided.

"Neighborhood access sites" are public access areas offering parking, usually for five to twenty-five vehicles, a dune crossover or pier, litter receptacles and public access signs. Such accessways are typically 40 to 60 feet in width and are primarily used by individuals within the immediate subdivision or vicinity of the site. Restroom facilities may be installed.

"Regional access sites" serve the public from throughout an island or community including day visitors. These sites normally provide parking for 25 to 80 vehicles, restrooms, a dune crossover, pier, foot showers, litter receptacles and public access signs. Where possible one-half acre of open space in addition to all required setback areas should be provided for buffering, day use, nature study or similar purposes.

"Multi-regional access sites" are generally larger than regional accessways but smaller than state parks. Multi-regional accessways provide parking for a minimum of 80 and a maximum of 200 cars, restrooms with indoor showers and changing rooms, and concession stands. Where possible two acres of open space in addition to all required setback areas should be provided for buffering, day use, nature study or similar purposes.

"Urban waterfront redevelopment projects" improve public access to utilized urban waterfronts. Such projects include the establishment or rehabilitation of boardwalk areas, shoreline stabilization measures such as the installation or rehabilitation of bulkheads, and the placement or removal of pilings for the purpose of public safety and/or increased access and use of the urban waterfront.

The Division of Coastal Management received $1,080,375 in PARTF revenues from the last quarter of 1999-00, the first three quarters of 2001-02 and reserve ($327,715) from canceled projects. The Division distributed $1,285,481 to local governments (Table 7-1). The remaining $122,609 will be reserved for grant awards in 2002-2003.

The Division of Coastal Management (DCM) received 27 pre-applications from 23 local governments requesting $2,636,310. DCM received 18 final applications from 15 local governments requesting $1,285,481. These eighteen local governments received public beach and coastal water front access grants funded by PARTF in 2001-2002 (Table 7-2).

6.0 Public Beach and Coastal Waterfront Access Program

Table 6-1 Division of Coastal Management's Distribution of PARTF Revenues For Fiscal Year 2001-2002	
Item	Amount
PARTF revenues received in first three quarters of fiscal year 2001-2002	$798,611
Reserve from fiscal year 1999-2001 (4th quarter revenues)	$609,479
Total available for fiscal year 2001-2002 grants	$1,408,090
Grants awarded for fiscal year 2001-2002	$1,285,481
Reserve for grants to be awarded in fiscal year 2002-03*	$122,609

*DCM's annual funding cycle is based on PARTF revenues for the first three quarters of fiscal year 2001-2002 and any reserve from the previous fiscal year including the fourth quarter revenues. The balance of $122,609 will be added to upcoming PARTF revenues and used to fund projects in the fiscal year 2002-03 grants cycle.

Table 6-2 Public Beach and Coastal Waterfront Access Grant Program
PARTF Grants Awarded for Fiscal Year 2001-2002

Local Government	Project Description	Grant Request	Cash Match	In-Kind Match	Total Cost
Kill Devil Hills	Construction of a new estuarine access site at West Arch Street including a 20'x20' observation platform.	$48,750	$15,440	$810	$65,500
Elizabeth City	Construction of a bulkhead for a new waterfront park on the Pasquotank River.	$225,000	$75,000	$0	$300,000
Washington County	Acquisition of a 61-acre parcel on Albemarle Sound near the mouth of the Roanoke River for future construction of a waterfront park.	$150,000	$25,000	$25,000	$200,000
Windsor	Construction of restroom facilities at the existing Roanoke/Cashie River Center.	$45,000	$7,500	$7,500	$60,000
Plymouth	Construction of a new bulkhead and boardwalk access along the Roanoke River between Washington and Adams Streets.	$90,000	$15,000	$15,000	$120,000
Swansboro	Construction of an elevated walkway to connect to an existing public pier on the White Oak River along NC Hwy 24..	$59,175	$14,500	$5,000	$78,900
Pine Knoll Shores	Phase II improvements to an existing access facility at the Iron Steamer including restroom and stormwater control.	$29,175	$9,725	$0	$38,900
Pine Knoll Shores	Purchase of an existing improved beach access site at the AmeriSuites/Royal Pavillion.	$26,250	$8,750	$0	$35,000
Morehead City	Construction of a launch area, limited docking facilities and composting restroom on Sugarloaf Island.	$115,000	$38,334	$0	$153,334
Jacksonville	Construction of a new boardwalk, dock and parking lot for an estuarine access on Wilson Bay.	$200,000	$118,765	$11,4150	

Table 6-2 Public Beach and Coastal Waterfront Access Grant Program
PARTF Grants Awarded for Fiscal Year 2001-2002

Local Government	Project Description	Grant Request	Cash Match	In-Kind Match	Total Cost
Emerald Isle	Construction of a new ocean access at Seagull Road with an ADA compliant walkway.	$14,325	$4,775	$0	$19,100
Emerald Isle	Construction of a new ocean access at Less Street with an ADA compliant walkway.	$10,987	$3,663	$0	$14,650
Surf City	Phase II construction of a parking lot, restrooms, concessions and shelters, boardwalks, shoreline stabilization and fishing piers at the Surf City Soundside Park.	$90,000	$135,000	$10,000	$235,600
Kure Beach	Upgrade three existing accessways by increasing parking and improving stormwater drainage at Avenues E, F, H and Hwy 421.	$39,967	$10,922	$2,400	$53,289
Ocean Isle	Improvements to an existing ocean access site at Charlotte St..	$13,612	$4,538	$0	$18,150
Southport	Construction of a new estuarine access on Kingsley St with a walkway, boardwalk and fishing pier.	$100,000	$16,500	$16,500	$133,000
Wrightsville Beach	Improvements to two existing ocean accessways at 2498 & 2698 N. Lumina Avenue.	$28,240	$8,760	$0	$37,000
	FY 2001-2002 Total				

DRAFT

NORTH CAROLINA

NATURAL HERITAGE TRUST FUND

AWARD REPORT

Calendar Year 2002

A Report to the Governor and General Assembly

William G. Ross, Secretary
Department of Environment
and Natural Resources

Dewey W. Wells, Chairman
Board of Trustees
NC Natural Heritage Trust Fund

DRAFT

NORTH CAROLINA
NATURAL HERITAGE TRUST FUND
AWARD REPORT
Calendar Year 2002

Origins and Mission

The North Carolina Natural Heritage Trust Fund was established by the 1987 General Assembly (G.S. 113-77, effective July 1, 1987) as a supplemental funding source for state agencies to acquire lands and to pay for the inventory of natural areas by the North Carolina Natural Heritage Program. A twelve-member board of trustees administers the Trust Fund.

Funding Sources

Since 1987, and as of December 31, 2002, the Natural Heritage Trust Fund has received $98 million including an initial appropriation of $275,000. The Trust Fund acquired a continuing source of funding in 1989 when a part of the receipts from the sale of personalized license plates was designated as income. The General Assembly in 1991 increased the state's deed stamp tax to $2 per $1000 value and set aside 15% of the state's share of this additional money as income for the Trust Fund. The 1995 General Assembly increased the Trust Fund's portion of the deed stamp tax from 15% to 25% effective July, 1996. Moneys not expended remain in the interest-accumulating Natural Heritage Trust Fund account and do not revert to the General Fund. In the calendar year January 1,2002 - December 31,2002, a total of $12,689,018 was received from all funding sources.

Board of Trustees

The North Carolina Natural Heritage Trust Fund is delegated the authority to grant funds to eligible state agencies pursuant to applications which meet statutory criteria and board guidelines. The governing authority for the Trust Fund is a 12 member Board of Trustees. This number was increased from nine members during the 2001 legislative session. Four members are appointed by the Governor who also designates the chairman. Eight members are appointed by the General Assembly with four recommended by the President Pro-Tempore of the Senate and four recommended by the Speaker of the House. Appointments are made effective January 1 and are for staggered six year terms. Persons appointed are to be knowledgeable in the acquisition and management of natural areas. The 2002 trustees are as follows:

Governor Appointees	Senate Appointees	House Appointees
Charles E. Clement Watauga County	J. Robert Gordon Scotland County	Alan D. Briggs Wake County
Lawrence G. Diedrick Nash County	George Richards Wake County	William Joslin Wake County
Thomas D. "Bud" Hunter Henderson County	Jim Sponenburg Caldwell County	Henry L. Kitchen Richmond County
R. Michael Leonard Forsyth County	Dewey W. Wells, Chairman Avery County	Thomas W. Reese Catawba County

Projects and Agencies

Grants are awarded for the purposes of acquiring lands that represent the state's ecological diversity to ensure their preservation and conservation for recreational, scientific, educational, cultural, and aesthetic purposes; for additions to the system of parks, state trails, aesthetic forests, wild and scenic rivers, fish and wildlife management areas; to develop a balanced State program of historic properties; and for other beneficial use and enjoyment of the public. Funds are also allocated to the Natural Heritage Program for natural area inventories and conservation and protection planning of natural areas. State agencies authorized to apply for grant awards are the Department of Environment and Natural Resources, the Wildlife Resources Commission, the Department of Cultural Resources, and the Department of Agriculture and Consumer Services. Priority consideration is given to protection of land having outstanding natural or cultural heritage values. Land with outstanding natural heritage values is land that is identified by the N.C. Natural Heritage Program as having state or national significance. Land with outstanding cultural heritage values is land that is identified, inventoried or evaluated by the Department of Cultural Resources.

During calendar year 2002, the Natural Heritage Trust Fund awarded 20 grants totaling $9,688,240 which contributed to the protection of 23,266 acres. An additional $3 million was reverted to the general fund due to the State Budget Emergency. The amount requested was $24,520,903, showing that the need far exceeds the received amount of $12,689,018.

Calendar Year 2002
NHTF Awarded Grant Totals by Agency

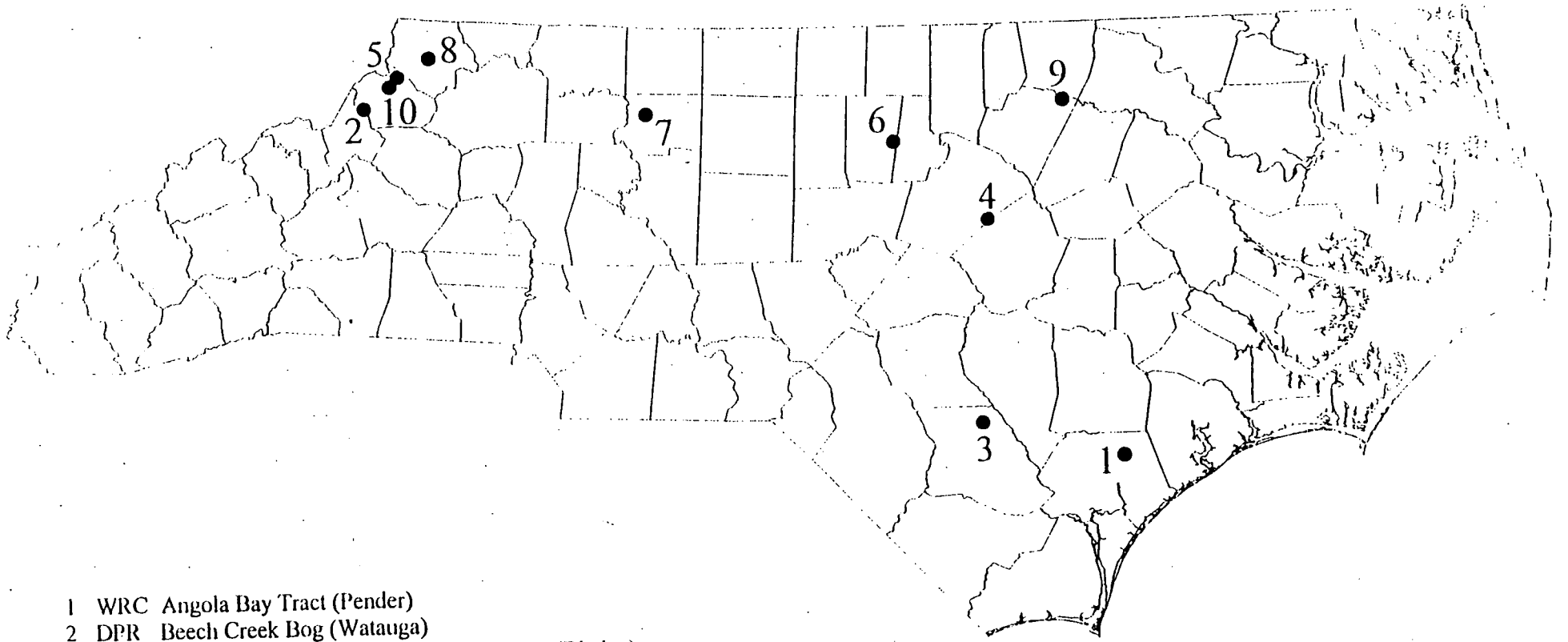
Agency	Acres	Grant Total
Department of Environment and Natural Resources - *Division of Forest Resources*	876	$529,460
Department of Environment and Natural Resources - Division of Parks and Recreation - *Natural Heritage Program*	N/A	$118,000
Department of Environment and Natural Resources - *Division of Parks and Recreation*	2,634	$3,185,000
Wildlife Resources Commission	19,035	$4,026,000
Department of Agriculture and Consumer Services	702	$1,557,780
Department of Cultural Resources	19	$272,000
Total	23,266	$9,688,240

Natural Heritage Trust Fund
Spring 2002 Grant Awards

DCR- Department of Cultural Resources
DENR- Department of Environment and Natural Resources
DFR- Division of Forest Resources
DPR- Division of Parks and Recreation
DPR-NHP- Division of Parks and Recreation, Natural Heritage Program
DOA- Department of Agriculture and Consumer Services
WRC- Wildlife Resources Commission

AGENCY	PROJECT NAME	COUNTY	ACRES	AWARD	DESCRIPTION
DOA	Paddy Mountain	Ashe	228	$175,780	Excellent quality high elevation rocky summit communities, rare plants, unfragmented hardwood forest.
DOA	Tater Hill, Phase 3	Watauga	316	$667,000	Protect Tater Hill Bog and federally Endangered spreading avens.
DCR	Historic Bethania # 3	Forsyth	19	$272,000	Gateway and greenway to Bethania National Historic Landmark Area.
DPR	Beech Creek Bog	Watauga	120	$585,000	High quality rare natural community and rare plant population.
DPR	Elk Knob	Watauga	1,000	$1,000,000	Significant for its size, elevation and exemplary natural communities.
DPR-NHP	Natural Area Inventories	N/A	N/A	$70,000	Continue protection-focused and county by county natural area inventories.
DPR	Eno River State Park - Upper Cabelands Tracts	Orange	180	$100,000	Contribute to the protection of water quality, a vital wildlife corridor, and identified Significant Natural Heritage Area.
DFR	Clemmons Educational State Forest	Johnston	12	$72,000	Expand Clemmons State Forest.
DFR	Bladen Lakes State Forest - Boyette Tract	Bladen	684	$257,460	Protect water quality and wildlife habitat connections.
WRC	Angola Bay Tract	Pender	14,825	$1,250,000	Connects Angola Bay Game Land and Holly Shelter, contains extensive pocosin and pond pine woodland and longleaf communities.
WRC	Shocco Creek Tracts	Franklin, Warren	577	$1,100,000	Habitat for game and non-game bird species. Protection will provide recreation opportunities and will benefit mussels in Shocco Creek
		TOTAL	17,961	$5,549,240	

NC Natural Heritage Trust Fund
Grant Awards, Spring 2002
Project Locations



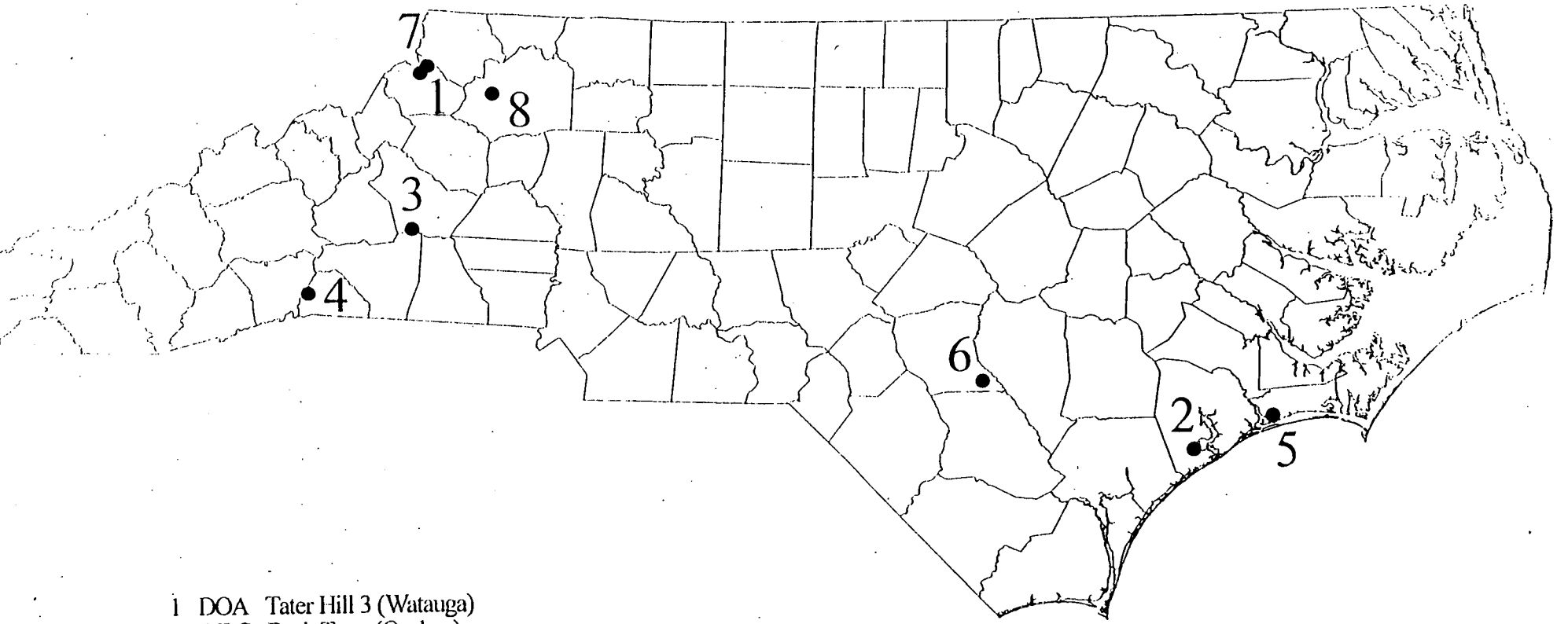
1 WRC Angola Bay Tract (Pender)
2 DPR Beech Creek Bog (Watauga)
3 DFR Bladen Lakes State Forest - Boyette Tract (Bladen)
4 DFR Clemmons Educational State Forest (Johnston)
5 DPR Elk Knob (Watauga)
6 DPR Eno River State Park - Upper Cabelands Tracts (Orange)
7 DCR Historic Bethania Phase 3 (Forsyth)
8 DOA Paddy Mountain (Ashe)
9 WRC Shocco Creek Tracts (Franklin & Warren)
10 DOA Tater Hill, Phase 3 (Watauga)

Natural Heritage Trust Fund
Fall 2002 Grant Awards

DENR- Department of Environment and Natural Resources
DFR- Division of Forest Resources
DPR- Division of Parks and Recreation
DPR-NHP- Division of Parks and Recreation, Natural Heritage Program
DOA- Department of Agriculture and Consumer Services
WRC- Wildlife Resources Commission

AGENCY	PROJECT NAME	COUNTY	ACRES	AWARD	DESCRIPTION
WRC	Beck Tract	Onslow	2,500	$1,250,000	Contributes towards linking red-cockaded woodpecker populations, longleaf habitats, and providing a high quality game land adjacent to Camp Lejeune.
WRC	Norman Tract	Rutherford	71	$140,000	Addition to South Mountains Game Land which is contiguous on three sides of this tract.
WRC	Posey Henderson Estate Tract	Polk	146	$236,000	Addition to Green River Game Land.
WRC	RPM Partnership tract	Carteret	916	$50,000	Protection of longleaf pine, streamhead pocosins, and freshwater marsh habitats as part of Game Land program.
DPR	Bushy Lake State Natural Area-Big White Bay Project I	Cumberland	234	$250,000	Addition to Bushy Lake State Natural Area. Protects 200 yr. old longleaf and populations of rare species.
DPR-NHP	Natural Area Inventories	N/A	N/A	$48,000	Identification and documentation of the significant aquatic natural areas of NC.
DPR	Elk Knob State Natural Area Land Acquisition	Watauga	1,100	$1,250,000	Significant for its size, rare plants and exemplary natural communities.
DFR	Whittington Acquisition	Wilkes	180	$200,000	Addition to Renedezvous Educational State Forest.
DOA	Tater Hill 3	Watauga	158	$715,000	Extends the Tater Hill preserve to upper slopes which contain undisturbed hardwood forests.
		TOTAL	5,305	$4,139,000	

NC Natural Heritage Trust Fund
Grant Awards, Fall 2002
Project Locations



1 DOA Tater Hill 3 (Watauga)
2 WRC Beck Tract (Onslow)
3 WRC Norman Tract (Rutherford)
4 WRC Posey Henderson Estate Tract (Polk)
5 WRC RPM Partnership Tract (Carteret)
6 DPR Big White Bay 1 (Cumberland)
7 DPR Elk Knob (Watauga)
8 DFR Whittington Tracts (Wilkes)
9 DPR Inventory of Significant Aquatic Habitats (not mapped)

Report prepared by: Jennifer Dennis
NC Natural Heritage Trust Fund
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Fewer than fifty copies of this annual report were printed at $0.04 per page.

2002 Annual Report
NC Million Acre Initiative

Presented to the Environmental Review Commission
North Carolina General Assembly

January 16, 2003

By the North Carolina Department of Natural Resources
Office of Conservation and Community Affair

The Latest Numbers

At the end of the third full year of the NC Million Acre Initiative (January 1, 1999 - December 31, 2001), private and public land protection partners across the state have permanently protected an additional **175,515** "Million Acre" acres. Adding **63,444** of those acres during the 2001 calendar year. This past year's activities represent a substantial increase in the rate of land protection in NC, and a clear sign of the effectiveness of the Million Acre Initiative.

However, while our rate of land protection is increasing each year, we have not yet reached an annual rate that will allow us to meet the goal of permanently protecting an additional million acres by December 31, 2009 (G.S. 113A-240 and 241). The primary barrier is the availability of public and private funding for new protection projects. If we intend to meet the Million Acre Goal by the end of 2009, more money for land protection must be found.

The table at the end of this report, describes in detail the number of acres protected by sector (State government, Local Government, etc), by program, and by time period. Footnotes at the bottom of the page note special circumstances in some of the calculations. The end result is a conservative presentation of the totals. It is likely that the numbers presented here could be adjusted upward between 10,000 to 30,000 acres. To avoid frustration and embarrassment in the future, only official reports of new acquisitions (from our surveys, interviews, and questionnaires) make it into the final total. Estimations for non-respondents are not included.

The Program

In addition to successfully increasing the rate at which we are protecting land in North Carolina, the Million Acre Initiative continues to work towards making information about land protection tools and techniques more broadly available. The Million Acre website was completely updated in the Spring of 2002, with many new and updated links to land protection information from across North Carolina and across the nation. This web site, in conjunction with regular public presentations at local, regional, and statewide conferences, annual meetings, and workshops is slowly, but steadily increasing awareness among North Carolinians about the desperate condition

of our land resources. As tens of thousands of acres a year are permanently altered from their existing natural condition for new development, increased awareness about the importance of setting aside our critical and unique lands is essential.

Work also continued with several public and private partners to further develop a centralized, up-to-date, accessible clearinghouse for Geographic Information System data on protected lands. Towards the end of the year, the NC Clean Water Management Trust Fund approved a grant to the Center for Geographic Information and Analysis to continue their work of cataloging all protected properties, developing a system to continuously update those lists, and make the data layers available via the internet.

Looking Ahead

Calendar year 2002 looks to be another great year for new land protection projects. Final reports regarding how many acres were protected from January 2002 – December 2002 will not be available until the Spring of 2003, but estimates suggest that approximately 80,000 acres have been protected – due in large part to one extraordinarily large protection project completed by The Nature Conservancy. In addition, hundreds of surveys, filled out across the State during a series of meetings in the Fall of 2002, make it clear that more technical assistance to local governments, non-profits, and community groups is still needed. This includes education and awareness building for local elected officials and the general population.

The upcoming year offers us an opportunity to initiate new regional-scale projects for identifying networks of important resources, and an opportunity to finalize similar projects that are already underway. By fostering the completion of regional open space plans for every part of the State, it will be possible to see how individual greenspaces and working landscapes across North Carolina fit together into a network of essential green infrastructure. Understanding the interrelationships among those areas will help us target our protection efforts so that we maximize the cost effectiveness and the natural protection value of our investment.

Acres Under Permanent Protection

(note: a blank cell means no data was collected. 0 means no land was protected)

State Agency	category	Previous Total 1/99 - 12/00	New Sub-Total 1/01 - 12/01	"Million Acre" Total
DENR - FOREST RESOURCES (*)	state forest	1,746	2,535	4,281
DENR - SOIL AND WATER	conservation reserve enhancement program	349	526	875
	hog farm buyout	0	886	886
WILDLIFE RESOURCES	game lands	28,010	15,485	43,495
DENR - WATER QUALITY	wetlands restoration program	139	75	214
DENR - PARKS AND REC.	state park	13,897	3,729	17,626
	state natural area	315	42	357
	state rec area	0	0	0
	state lakes	0	0	0
DENR - COASTAL MNGMT.	coastal reserves	18,790	378	19,168
	public beach/access	0	0	0
	submerged lands	0	0	0
DoA&CS - PLANT INDUSTRY	state nature preserve	3,898		3,898
	other lands			
DCR - HISTORIC SITES	state historic sites	0	0	0
STATE UNIVERSITY SYSTEM (**)	university property			
SUBTOTALS		67,144	23,656	90,800
Local Governments				
ALL CITY AND COUNTY GOVERNMENTS (***)	parks, greenways, watersheds, etc.	9,994	5,413	15,407
SUBTOTALS		9,994	5,413	15,407
Federal Agency				
FISH AND WILDLIFE SERVICE	national wildlife refuge	1,142	4,256	5,398
US FOREST SERVICE	national forests	2,512	1,557	4,069
USDA-NRCS WETLAND RESERVE PROGRAM	wetlands reserve	3,149	1,894	5,043
NATIONAL PARK SERVICE	national park	209	6,265	6,474
SUBTOTALS		7,012	13,972	20,984
Local Land Trusts				
NC LAND TRUSTS (****)	protected lands	22,738	10,500	33,238
SUBTOTALS		22,738	10,500	33,238
Other Conservation Groups				
THE NATURE CONSERVANCY	nature preserves	4,606	9,883	14,489
AUDUBON SOCIETY	nature preserves	0	0	0
AMERICAN FARMLAND TRUST	farmland	0	0	0
PRESERVATION NC	historic preservation	577	20	597
SUBTOTALS		5,183	9,903	15,086
TOTALS		112,071	63,444	175,515

* Does not include Dupont State Forest

** Universities: Have not been surveyed again

*** All data updated following new, 18 month survey (304 city responses from two surveys and 67 County responses).

**** 25 local land trusts that regularly partner with the Conservation Trust for North Carolina

Clean Water
MANAGEMENT TRUST FUND

Bill Holman
EXECUTIVE DIRECTOR

CWMTF TRUSTEES

Chair, Robert D. Howard
WHITEVILLE

Caroline Ansbacher
BURLINGTON

Bill Brooks
WAYNESVILLE

Dr. John Costlow
BEAUFORT

Karen Cragnolin
ASHEVILLE

Allen Holt Gwyn
GREENSBORO

John C. Hagan
GREENSBORO

Allen M. Hardison
NEW BERN

Joseph M. Hester, Jr.
ROCKY MOUNT

William Hollan
WINSTON-SALEM

Margaret Markey
CORNELIUS

Dickson McLean, Jr.
LUMBERTON

William McPhatter, Sr.
CARRBORO

Mickey Simmons
NEWPORT

C. Leroy Smith
WINTERVILLE

Chuck Wakild
WILMINGTON

Claudette Weston
WINSTON-SALEM

Jerry Wright
JARVISBURG

January 16,2003

MEMORANDUM

To: The Honorable Fountain Odom, Co-Chairmen
The Honorable Pryor Gibson, Co-Chairmen
Members of the Environmental Review Commission

From: Bill Holman, Executive Director

Re: Clean Water Management Trust Fund's Annual Report

Introduction

I am writing on behalf of the Board of Trustees and staff of the Clean Water Management Trust Fund to thank the members of the General Assembly of North Carolina for your strong support for investments in clean water and to make our annual report to the General Assembly and the public.

Thanks to the General Assembly North Carolina continued to make substantial progress in protecting and restoring water quality in 2002, despite one of the worst fiscal crises in years. As we face another challenging budget year ahead, the future of our state's environmental and economic health depends on your continued support and interest.

Background

The General Assembly for many years has advocated non-regulatory, incentive-based programs to complement North Carolina's environmental regulatory and educational programs and to ensure both a strong economy and healthy environment.

The 1996 General Assembly created the Clean Water Management Trust Fund (CWMTF) (GS 113-145) "to clean up pollution in the state's surface waters and to protect and conserve those waters that are not yet polluted." The CWMTF "shall be used to help finance projects that specifically address water pollution problems and focus on upgrading surface waters, eliminating pollution, and protecting and conserving unpolluted surface waters, including urban drinking water supplies" and "to build a network of riparian buffers and greenways for environmental, educational, and recreational benefit."

TEL (919) 733.6375 | FAX (919) 733.6374 | wwwcwmtf.net
530 NORTH WILMINGTON STREET, RALEIGH, NC 27604
1651 MAIL SERVICE CENTER, RALEIGH, NC 27699-1651

The CWMTF is an independent agency housed for administrative purposes in the Department of Environment and Natural Resources (DENR.) An eighteen-member board of trustees establishes criteria, allocates funds and approves grants, makes rules, and hires the executive director. Six members are appointed by the Governor; six, by the General Assembly upon the recommendation of the President Pro Tempore of the Senate; and six, by the General Assembly upon the recommendation of the Speaker of the House. An advisory council composed of the Commissioner of Agriculture, Chair of the Wildlife Resources Commission, Secretary of DENR, and Secretary of Commerce or their designees advises the board of trustees.

Local governments or other political subdivision of the state, state agencies, and nonprofit conservation organizations, such as land trusts, may apply for grants. Deadlines for applications are June 1 and December 1 of each year.

The board of trustees typically meets ten times per year - six times across the state and four times in Raleigh. In 2002, the board met in Blowing Rock, Lumberton, Charlotte, Elkin, Tyrrell County, Ashe County, Troy, and Raleigh. In 2003, the board plans to meet in Greenville, Gastonia, Fayetteville, Cullowhee, Rockingham County, Jacksonville, and Raleigh.

Moneys from CWMTF may be used to acquire land or easements for riparian buffers and watersheds; to restore wetlands, buffers and watershed lands; to repair failing wastewater treatment systems; to improve stormwater controls and management practices; for planning, and for administration and staff. The board works through three principal committees: acquisitions; infrastructure/wastewater, and restoration/stormwater/planning.

CWMTF applications forms for grants, grant evaluation guidelines, enabling legislation, lists of the board of trustees, staff directory, and news releases and other reports and documents are available at www.cwmtf.net.

The executive director, deputy director, senior scientist, administrative officer, public information officer, and administrative assistant are based in the central office in Raleigh. Currently, four field representatives cover the coast, piedmont and mountain regions of the state. A part-time water quality advisor is home based.

Progress

Last year, much attention was focused on North Carolina's water resources because of the extreme drought, which caused widespread agricultural damage and forced communities all across the state to take mandatory conservation measures. During this time, the importance of maintaining **quantity** of our water resources took center stage.

The drought may have focused attention on the amount of our water resources, but it also served as a reminder that North Carolina's water **quality** is still one of the state's top environmental issues.

In its North Carolina 20/20 report, the state's Progress Board laid out a series of performance targets to improve environmental quality by the year 2020. Those targets included increasing the percentage of water bodies fully supporting their uses, ensuring that 100 percent of all North Carolinians have access to clean and safe drinking water, protecting and permanently preserving one million acres by 2010, and improving water quality to ensure the continued viability of the state's fisheries.

In almost all the areas cited by the North Carolina 20/20 report, CWMTF grants are playing a role in reaching those performance targets. Here are some examples:

- The CWMTF and its partners have helped protect 2,422 miles of riparian buffers and preserve 203,966 acres of land, thereby ensuring streams, rivers and lakes can continue or will be able to support their uses. In total, CWMTF has funded 61 stream and riparian buffer restoration projects totaling over $158.8 million.
- The CWMTF has funded 61 wetlands restoration projects totaling over $42 million to help maintain and preserve these important ecosystems.
- The CWMTF has assisted 74 local governments with wastewater improvements, investing over $65 million to reduce discharges and more effectively treat wastewater so that fewer nutrients and other pollutants enter our rivers.
- CWMTF grants have funded 24 stormwater management projects totaling $25.3 million to reduce pollution from urban runoff and decrease flooding. .
- CWMTF grants have been used for watershed planning projects, and to purchase land surrounding water supply watershed lakes to make sure some of the state's largest population centers are guaranteed clean drinking water.
- CWMTF acquisition grants have been used to protect waters in areas closed to shellfishing, or to protect important nurseries for key fisheries.

All of these efforts and the target measures to which they correlate are just as important to North Carolina's economic well-being as they are to the health and safety of her citizens and the environment. They enhance both the recreational and commercial fishing industries, reinforce North Carolina's travel and tourism industry, and help maintain North Carolina's high quality of life.

As the Progress Board states in its report, "...states can and do have strong economies and simultaneously protect the environment. In fact, the states with the strongest environmental records also claim the distinction of having the best job opportunities and climate for long term economic development."

Thanks to appropriations from the General Assembly CWMTF approved 89 water quality grants totaling over $64.9 million in calendar year 2002.

As of December 1, 2002, 840 applicants had requested over $933 million for water quality projects. Since 1997 the board of trustees has approved 372 grants for a total of $300.4 million. CWMTF grants have leveraged at least $499 million in private and other public funds.

The CWMTF continues to be an important tool in helping local governments protect their water resources. Since 1996, $142.9 million - nearly half of the $300.4 million in

CWMTF grants issued – have been awarded to local governments. These grants have funded:

- Improvements to Wastewater Treatment Facilities
- Stormwater management
- Removal of septic tanks/straightpiping
- Wetlands and Stream Restoration
- Greenway and open space acquisition

These projects are increasingly important to cities and counties as they experience increased growth and development, and as they face severe water usage issues in light of the 2002 drought.

2002 Examples

In May, the state completed the second and final phase of the $4.2 million purchase of **Bird Island** in Brunswick County. With the help of a $2.75 million CWMTF grant the Division of Coastal Management has added Bird Island to its Coastal Reserve system. The acquisition protects 1.2 miles of ocean beach and 1.5 miles of shoreline and extensive marshes for a total of nearly 1,300 acres.

The CWMTF awarded a $444,000 grant to the Southern Appalachian Highlands Conservancy to help purchase an important conservation easement at the **headwaters of the Catawba River** in McDowell County. The easement on 180.5 acres will extend the protection already provided by the U.S. Forest Service to the source of the river by an additional mile. As part of the project, a conservation easement will be donated on the 137-acre uplands portion of the property for a total of 317.5 protected acres.

Last year, the City of **Goldsboro's innovative constructed wetlands** project to reduce pollution in the Neuse River was completed. The $3.2 million venture was funded in part with a $1.6 million grant from CWMTF. This project is only one of several being taken by the city to curb pollution in the Neuse. Goldsboro has reduced discharges of nitrogen.

Two early CWMTF grants are coming to fruition in the Little Tennessee watershed. The **Macon County Greenway Project** received a $3.8 million CWMTF grant for restoration of wetlands and buffers along the river in Franklin in 1997.

Macon County government partnered with the Macon County Soil and Water Conservation District to restore riparian and wetland habitat in the six-mile portion of the river that flows through the town of Franklin.

In conjunction with the restoration, the county has developed a greenway along this section of the Little Tennessee, enhancing its environmental, recreational and economic value to the community.

Last year, the CWMTF helped fund the purchase of the 2,168-acre **North River Farms in Carteret County for wetlands restoration**. The property is adjacent to the North River, Core Sound, and the upper reaches of Jarretts Bay, and was drained and converted to cropland over the last several decades. Three creeks originate on the land. Many of these surrounding wasters are now too polluted for shellfish harvest because of high bacteria counts contained in runoff from drained land.

Conservation Reserve Enhancement Program (CREP)

CWMTF's $40 million investment in the Conservation Reserve Enhancement Program (CREP) will leverage $221 million in US Department of Agriculture and $10 million in other funds over the next six years. The Division of Soil and Water Conservation requested $4.5 million in June 2002 from CWMTF to continue CREP. CWMTF approved expansion of CREP into the Pasquotank, Roanoke, White Oak, and lower Cape Fear Rivers last year. The Chowan, Tar-Pamlico, Neuse, and upper Cape Fear Rivers were already covered.

CWMTF is working with DENR's Division of Soil and Water Conservation, local soil and water conservation districts, the US Natural Resources Conservation Service, and others to leverage federal Farm Bill conservation programs.

Recent Legislative Action

The 2002 General Assembly demonstrated that protecting and restoring water quality remains a high priority of the State and appropriated $66.5 million ($70 million minus a 5% budget cut) to CWMTF in fiscal year 2002-2003. The Office of State Budget and Management is withholding about 4% of that appropriation to CWMTF. The 2002 appropriation enabled the board of CWMTF to provide funds for all the projects that CWMTF approved in 2001 but were delayed by 2002 budget cuts and to fund about one-third of the applications that CWMTF received and reviewed in 2002.

The 2002 General Assembly also continued its strong support for CWMTF partners, the Parks and Recreation Trust and Natural Heritage Trust Fund.

CWMTF appreciates the efforts of the 2002 General Assembly to simplify and clarify CWMTF's reporting requirements and to clarify and strengthen the law regarding conservation easements.

The CWMTF board of trustees supported legislation in the 2002 session of the General Assembly to restructure the terms of board members in an effort to promote continuity in the decision-making process. Under the existing law the terms of two-thirds of the board expired on December 31, 2002. The proposed change was among provisions in the appointments bill passed by the General Assembly but ultimately vetoed by the Governor. The board will continue to push for the change in the 2003 legislative session.

Finally, on October 31, Governor Easley signed SB 1161, Amend Present Use Value, by Senator Fletcher Hartsell and others. SB 1161 clarified that rollback taxes are not owed when a conservation easement is either donated or purchased on farm or forestland and clarified that property encumbered by a conservation easement remains eligible for present use taxation. CWMTF supported SB 1161 and commends the General Assembly for its passage. SB 1161 is another incentive for conservation on private lands.

The Year Ahead

The CWMTF board and staff are reviewing 70 projects requesting $105.2 million this spring. Specific grant requests submitted in the December 2002 cycle include:

- $2.3 million from the North Carolina Division of Parks and Recreation for purchase of 815 acres along the Eno River near Durham.
- $13.3 million from the North Carolina Wildlife Resources Commission for purchase of the 4,458-acre Needmore tract on the Little Tennessee River in Swain and Macon counties.
- $2.4 million from the City of Fayetteville for stormwater management on Little Cross Creek.
- $450,000 from the Buncombe County Soil and Water Conservation District for stream restoration along Newfound Creek in the French Broad River Basin.
- Two separate requests from Mecklenburg County for continued stormwater improvements and stream restoration along Little Sugar Creek totaling $1.8 million.
- $400,000 from the town of La Grange for improvement to the town's wastewater treatment plant which will reduce discharges into the Neuse River.
- $500,000 to the city of Charlotte for additional land acquisition to protect Mountain Island Lake. Mountain Island Lake provides drinking water for Charlotte, Gastonia, and many other towns.

2003 Legislation

State law requires an appropriation of $100 million to CWMTF in 2003-2004 and future years. CWMTF will work with the General Assembly this year to secure appropriations to continue North Carolina's progress in protecting and restoring water quality.

CWMTF supports the work of the Conservation Income Tax Program, Natural Heritage Trust Fund, Parks and Recreation Trust Fund, and Farmland Preservation Trust Fund.

The 2002 General Assembly considered HB 1761 and SB 1464, Certificates of Participation for Natural Heritage and Parks, sponsored by Representative Pryor Gibson, Senator Fountain Odom, and others. CWMTF is interested in certificates of participation financing for natural heritage, parks, and other purposes.

CWMTF is available to assist the Governor and General Assembly in their efforts to mitigate hazards in floodplains to help reduce rising property insurance costs and to prevent encroachment on Fort Bragg, Camp Lejuene, and other military bases. Governor Mike Easley is hosting a National Governors Association conference on encroachment on military bases on January 21, 2003 in Kinston.

CWMTF recommends that the General Assembly reenact legislation to improve the staggering of terms of CWMTF trustees.

CWMTF is available to assist the General Assembly in the development of an incentive-based air quality program such as the proposed Clean Air Trust Fund.

Please contact me if you need more information.

DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
January 28, 2003

The Environmental Review Commission (ERC) met on Tuesday, 28 January 2003 at 9:30 a.m. in Room 643 of the Legislative Office Building.

Representative Pryor Gibson presided over the 28 January 2003 meeting. The following members were present: Senators Albertson, Clodfelter, Forrester, Horton, Kinnaird and Odom and Representatives Gibson, Hackney, Hill, McComas and Weiss. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Tim Dodge, Research Assistant, Kevin Howell, Research Intern, and Mary Watson, Commission Clerk were also present.

On 24 January 2003, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice was included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Representative Gibson called the meeting to order.

George Givens, Commission Counsel, was asked to explain the agenda.

Mr. Givens asked visitors to sign the visitor registration sign-in sheet and asked members to sign and send forward their reimbursement forms.

Mr. Givens announced that a several documents provided by DENR had been placed on each member's desk for read only. First, a Truth in Penalties Framework, the 2002 Annual Fish Kill Report, Funds Transfers Authorized for State Fiscal Years 2001-2002 and 2002-2003, and a report on Environmental Regulatory Compliance Activity in Calendar Year 2000. Copies of these read-only reports are listed as **Exhibit D**.

Mr. Givens announced that next meeting of the ERC will occur after the 2003 long session although it is possible we could meet during the session.

Mr. Givens said that the meeting of the Underground Storage Tank Working Group would resume at 10:00 a.m. on Monday, 3 February 2003 in Room 605.

Mr. Gene Upchurch, Director of Public Affairs, Progress Energy gave an update on Progress Energy's plan to comply with the requirements of the Clean Smokestacks legislation. A copy of Mr. Upchurch's comments is listed as **Exhibit E**.

Senator Kinnaird asked Mr. Upchurch if there was ongoing research as to the best way to clean up the pollution and to deal with the waste.

Mr. Upchurch said that the engineering had already been done for the first five units using the best available technology. He added that there was a by-product called gypsum that comes from the dry-scrubbers. This is try to be marketed and sold to companies who can use it in wallboard and what cannot be sold will be stored on-site.

Senator Kinnaird asked where the research would come from and was there any incentive for research.

Mr. Upchurch said that he was not aware of any research but that they were using the best engineering firms in the state that used the latest technology.

Next, Mr. George T. Everett, Vice President for Environmental Affairs, Duke Power, gave an update on NC Clean Air Initiative. A handout summarizing what Duke Power has done to implement the Clean Air bill from last session is included as **Exhibit F**.

Mr. Everett covered the information in Exhibit F and then called for questions.

Senator Albertson asked Mr. Everett how many hydros and how many CT's there were.

Mr. Everett said that the hydros were divided into several groups. There are several units in the western part of North Carolina on the Nanthala system and they have CT's located in Lincoln County and some located at coal-fired plants.

Representative Gibson asked Mr. Everett to define CT.

Mr. Everett said that CT stands for Combustion Turbine that runs off of natural gas or oil.

Mr. Everett added that in addition to the hydros in the western part of the state, there are a group of them along the Catawba-Wateree river system that they will begin relicensing this year.

Senator Albertson asked Mr. Everett how many total hydros there are.

Mr. Everett said that on the Catawba Wateree, there are 13 and a total of 30 in their system.

Representative Hackney asked Mr. Everett if any effort was being made to geographically arrange the phase-in so that the benefits come into all regions or is it done on some other basis.

Mr. Everett said there are a couple of considerations. They have talked to the agency about the ozone issue and where they would best help them in meeting the ambient ozone standard and their best estimate was that the system would benefit most if they could put NOx controls all along the I-85 corridor.

Mr. Everett said that in order to meet the NOx target, the SCR's would have to go lower. These were done at the biggest, newest units because of the cost. The combination of this technology, along with the SNCR's would answer the eight-hour ozone issue.

Mr. Everett said that their strategy was to lower initially the NOx emissions at all of the units.

Representative Gibson asked Mr. Everett if they have the flexibility and the model to do the construction schedule so that if there is someway to lower the removal of a ton of pollutant that they will have the flexibility to address that.

Mr. Everett said that the schedule, as it is laid out in Exhibit F is the best information at this point. They may move a unit, change a schedule or use a different technology; however, in order to meet the target date, they cannot delay in searching for new technology.

Representative Gibson asked if there would be a measurement by which the energy groups would be involved in developing so that they could get the most for their dollar.

Mr. Everett said there are many people interested in how the money is being spent. The technology they are currently using is the best in the marketplace now.

Representative Hackney said that he believed the EPA Office of Air is taking the position that the new source review rules do not preempt state initiatives and asked if that was Duke Energy's position as well.

Mr. Everett said that it appears that whatever happens with the new source review requirements, this would install a lot of progress at these new units.

Representative Hackney asked Mr. Everett which units it would impact.

Mr. Everett said it would not affect the newest units.

Senator Forrester asked Mr. Everett if there was a cleaner coal that would cause less pollution even though it may be more expensive.

Mr. Everett said that the sulfur content of the coal is a big issue. North Carolina has very stringent requirements of sulfur content in the coal and has been paying a premium for coal for a long time.

Mr. Everett said that nitrogen is also a contaminant in the coal and cannot be changed by buying cleaner coal. So, the best thing to do is burn the coal efficiently.

Senator Kinnaird asked if Duke Energy was taking into consideration any of the measures of alternative energy that will overall reduce pollutants.

Mr. Everett said there were many considerations around this issue. As the units get older, they have put scrubber on 12 of their units. There are 27 coal units at seven coal plants. Over a period of time, these units will be phased out and new technology will have to be found to replace these units.

Mr. Keith Overcash, Director, Division of Air Quality, DENR, gave a progress report of the Clean Smokestacks Act. A copy of his comments is listed as **Exhibit G**.

Senator Kinnaird asked Mr. Overcash if utility companies have to submit permit request as well as compliance plans.

Mr. Overcash said that the bill does not provide information on when permit applications have to be submitted, but they are aware that they must have a permit before they begin construction.

Representative Gibson asked Mr. Overcash if any other states were doing as much as North Carolina on compliance.

Mr. Overcash said that they had not seen any other states working at the level that North Carolina is.

Senator Forrester asked Mr. Overcash how mercury emissions affected people.

Mr. Overcash said that they mercury emissions were a byproduct of coal-burning. The legislation states that technologies have to be explored on mercury removal and how much concurrent removal they could get from equipment that is already in place.

Mr. Carl G. Pigford, Administrator, Motor Vehicle Emission Inspection and Maintenance Program, Division of Motor Vehicles, Department of Transportation, gave a report on the progress in implementing the motor vehicle inspection and maintenance program. A copy of this report is listed as **Exhibit H**.

Mr. Donnie Redmond, Division of Air Quality, added some examples of why these readiness rejections are occurring. There are a few makes and model years that are having a problem with it. For examples 1996 and 1998 Volvos, 1996 and 1997 Mitsubishis have been troublesome. On many of these models there were outstanding recalls on them.

Representative Gibson asked Mr. Redmond what percentage overall are being rejected.

Mr. Redmond said about three percent are being rejected.

Representative Gibson asked what percentage of that three percent is targeted to a manufacturer glitch and was not foreseen.

Mr. Redmond said that they did not foresee the amount of recalls that were not done and the amount of retraining that would need to be done for the service technicians to know how to handle these situations.

Representative Gibson asked Mr. Redmond what timeframe he was predicting that the three percent would go to one percent.

Mr. Redmond said that the number could be reduced within a year.

Senator Forrester asked Mr. Redmond what the rationale was on requiring new cars to be inspected. What percentage of the three percent are brand new cars that are found not in compliance with the emissions standards.

Mr. Redmond said that brand new cars are exempt from the OBD test but have to have the safety inspection.

Senator Forrester asked why new car owners had to pay for safety inspection.

Representative Gibson said that they had the debate last year and no one could not come up with a explanation.

Senator Albertson added that he had research done on the necessity of the safety inspection on any car, and it was found to be of little or no value.

Mr. Givens asked Mr. Redmond what percentage of vehicles had failed because they are violating air quality standards.

Mr. Redmond said the failure rate was four percent for 1996 and new cars.

Mr. Givens asked Mr. Redmond what percentage of vehicles had failed because they are violating air quality standards.

Mr. Redmond said that four percent are failing because they are dirty and the other three percent are readiness issues.

Mr. Pigford added that DMV and Air Quality are in the process of putting together a widespread public outreach campaign to reach the inspection industry and the general public about the OBD testing and the issues that are occurring.

Senator Forrester asked who is monitoring trucks and buses to make sure they are not over polluting the air and asked what could be done about that.

Mr. Redmond said that ozone has been a concern and EPA has established standards for particulates. There are also requirements on rebuilt engines in these trucks and buses that will prevent emissions of particulates.

Representative Hackney said that the EPA regulations would be in place soon.

Senator Kinnaird asked if trucks are required to have state inspections.

Mr. Redmond said that all gasoline vehicles, trucks and autos require inspection.

Mr. Givens pointed out that our law was amended to allow the EMC to adopt rules on diesel and are awaiting the federal litigation outcome.

Mr. Brock M. Nicholson, Chief, Planning Section, Division of Air Quality, DENR gave a report on the Process of Designations of Non-Attainment for Ozone and Fine Particle Air Quality Standards. A copy of this report is listed as **Exhibit H**.

Representative Gibson asked Mr. Nicholson if the report on attainment will be ready by April.

Mr. Nicholson said that the Association of the State Environmental Officials requested an October 15 date and hopefully will be allowed more time for the attainment.

Mr. Givens asked if there was monitoring done in every county.

Mr. Nicholson said that they do not monitor in every county because of the expense. However, they follow the federal guidelines on citing and covering monitors based on population, area and wind direction. Ozone is monitored in 33 counties.

Mr. Givens asked if Davidson County was monitored and surrounding counties were not.

Mr. Nicholson said this was correct. He emphasized that the map showing the counties and monitoring data status does not reflect what the state's recommendations would be on areas to be designated. A good example of this is Gaston County because it has never been monitored.

Mr. Paul S. Crissman, Environmental Programs Manager, Solid Waste Section, Division of Waste Management, DENR, gave a report on the White Goods Management Account Balance. A copy of his report is listed as **Exhibit I.**

Mr. Crissman said that there has been an increased demand for white goods, which accounts for the low balance in the fund.

Mr. Crissman said that with regard to the scrap tire program, scrap tire costs are going down in terms of management cost and the number of tires being managed is increasing slightly.

Mr. Crissman said that there are tons of solid wastes being produced by our state. In the past year, the solid waste being produced is higher than previous years. In times of economic recession, waste usually decreases; however, this year it did not.

Mr. Crissman added that the top 25 waste producing counties all have a population of over 100,000 people. Fourteen of those counties increased in waste and 11 of them decreased. Statewide, 58 counties increased and 42 decreased. Orange County reached the 40 percent goal of waste reduction.

Representative Hackney asked Mr. Crissman if Orange County was the only county that had achieved the 40 percent waste reduction goal.

Mr. Crissman said that it was the only large county that had.

Mr. Crissman thanked Senator Odom for his interest in solid waste over the past years and said that he would be missed.

Senator Kinnaird added that it would be interested to see if the pay as you throw program in Carrboro would have an effect on the waste reduction.

Mr. Crissman said that the City of Wilmington has a pay as you throw program.

Representative Weiss asked Mr. Crissman if there are plans to urge other large counties to do what Orange County is doing.

Mr. Scott B. Mouw, Chief, Community and Business Assistance Section, Division of Pollution, Prevention and Environmental Assistance, DENR, answered Representative Weiss' question.

Mr. Mouw said that Orange County had put in place a number of aggressive policies on cardboard and construction and demolition disposal.

Representative Gibson asked Mr. Mouw if Orange County has a lumber and gypsum wallboard recycling facility.

Mr. Mouw answered in the affirmative.

Mr. Givens asked Mr. Crissman to give an explanation of the distribution formula for the proceeds from taxes.

Mr. Crissman said that he distribution of the scrap tire tax proceeds is 67 percent to county governments and the balance to the State. Other portions are used to clean up nuisance tire sites and to support tire recycling.

Mr. Givens added that when North Carolina entered the modern era of solid waste management, with the passage of SB 115 in 1989, almost all landfills were publicly owned and operated. With the requirement of liners, everyone thought that landfilling would go down and we would go to other methods of managing solid waste. What has happened is that we have private companies in the landfill business that can dispose of waste cheaply so that other methods of waste management are not economically viable.

Mr. Crissman said that this was a correct observation. Solid waste never got as expensive as it was first predicted.

Senator Horton asked Mr. Crissman if plastic cups used by the General Assembly are biodegradable.

Mr. Givens said that they are not accepted by any landfills in our area.

Senator Horton said that we should be setting a better example.

Senator Odom added that we do a lot of things that are not good examples of public policy. He also said that he does not think we will make real progress in the solid waste stream until the cost becomes so exorbitant that people will have to pay per pound for what they throw away.

Senator Kinnaird said that we should look at a bottle bill. She also said we over package.

Senator Clodfelter asked Mr. Mouw how much of the recycling is packaging materials.

Mr. Mouw said that it is probably around 15 to 20 percent.

Mr. Mouw gave a slide presentation on the State's progress in supporting recycling markets. A copy of his slide presentation is presented as **Exhibit J**.

Mr. Mouw said there is still a need to improve access to recycling markets in the western part of the state.

Senator Odom asked Mr. Mouw what a new market is for food waste.

Mr. Mouw said there are two commercial composters in the triangle area who are now going out and collecting food waste from restaurants and cafeterias and putting it into their compost mix.

Senator Odom asked if they are mixing the food with yard waste.

Mr. Mouw said they are using wood waste, yard waste and other organic materials, which they are able to sell.

Mr. Mouw said the General Assembly put on some very strict mandates on state agencies to help the recycling markets by buying recycled products. This has been a success.

Mr. Mouw discussed electronic recycling. This is a complex waste stream that produces a number of concerns. He said there are approximately around 1.4 million units of televisions discarded each year. There is a CRT that contains lead that may contaminate the soil.

Mr. Mouw said that electronics have good usable materials in them but they are difficult to process. All communities that have collected electronics have not found any market restrictions as yet.

Mr. Mouw said that Mecklenburg County, Wake and Lee counties have a permanent collection program for electronic materials.

Mr. Mouw said that any electronic waste generated by a household in North Carolina can be legally disposed of in a landfill.

Mr. Mouw said that the state of California and Massachusetts have banned CRT's from disposal and Virginia has introduced a bill to ban them.

Mr. Mouw said that there is dialog going between the states and industry called the National Electronic Stewardship Initiative that produce a national, voluntary program.

Mr. Mouw added that a bill was introduced last year to put an advanced recycling fee on CRT's in North Carolina. These fees would go to set up local recycling programs. As a result of the complexity of this issue, the bill went to a study committee.

Senator Odom added that he hoped the ERC would in the future pass legislation that would ban electronic goods going in the landfills.

Mr. Givens added that with regard to the development of legislation on this topic, he said that the meetings on this topic were stopped because of the length of the session and hopes to bring it back up in the next interim.

Representative Weiss added that she and Representative Hackney had made previous recommendations on this legislation and asked if they could introduce it again this session.

Mr. Givens said that his recommendation would be for the ERC to introduce this legislation in the short session.

Lisa D. Martin, Director of Regulatory Affairs, North Carolina Home Builders Association, Edmund P. Regan, Deputy Director, North Carolina Association of County Commissioners, Kimberly S. Hibbard, Associate

General Counsel, North Carolina League of Municipalities and Trip Van Noppen, Carolinas Office Director, Southern Environmental Law center gave their comments on the development and implementation of rules and programs to control storm water runoff.

Ms. Martin said they were responding to the report presented at the last ERC meeting regarding the implementation of the federal Phase II and PDES programs.

Ms. Martin said that since 1999, neither the deadlines nor the requirements in the federal rule have changed substantially. The federal rule was adopted in North Carolina in February 2000 and the temporary rule went into effect in February 2002.

Ms. Martin said that most of the environmental groups, municipalities, the counties and other interest groups decided that a temporary rule was not necessary.

Ms. Martin said that one rule added after the public comment period that the Home Builders Association has a problem with is the expedited post construction implementation. These are the requirements that most affect the development and homebuilding industry. They are also the requirements that will cost the cities and counties the most to implement. They are the most complicated and the most onerous of the post construction measures.

Ms. Martin said that the federal rule requires that the implementation of all six minimum measures under the NPDES program be completed within five years. For most of the cities and counties in North Carolina, that will be in 2008.

Ms. Martin said that after the close of the public hearing period, the EMC decided to expedite the post construction requirements to 2005.

Ms. Martin said that the second disagreement the HBA has with the state is that the federal rule does not prescribe set built upon area requirements or density requirements. What the federal rule does do is acknowledges land use decisions must be made locally depending on the circumstances that are in that jurisdiction.

Ms. Martin said that the EMC does not have the authority to prescribe density built upon area requirements outside of water supply watersheds. DENR testified that the only reason that they had to add this measure was because the municipalities and counties would have no idea what was required of them if they did not.

Ms. Martin said that if the state had completed the model ordinance, the cities and counties would have had an idea of what the state expected in terms of their permit without picking a one-size fits all rule.

Ms. Martin said there were concerns regarding the cost of this program. No federal money and limited state money is available to help local

governments. DENR offered to assist with the education minimum measure but would charge the local governments for that assistance.

Ms. Martin said that the application process itself is also cumbersome. Local governments would have to hire additional staff to complete the applications.

Ms. Martin said that housing costs would increase for first time homebuyers.

Mr. Regan handed out copies of letters written to DENR, and the United States Environmental Protection Agency, regarding the position of the North Carolina Association of County Commissioners on the Phase II storm water rules. A copy of these letters is listed as **Exhibit K**.

Mr. Regan said that county governments have had questions regarding the applicability of the federal Phase II stormwater requirements to North Carolina counties since the EPA issued final rules in December 1999.

Mr. Regan said that some of the problems they have encountered are with how the rules will apply in North Carolina.

Mr. Regan said that the federal requirements apply to the owners and operators of Municipal Separate Storm Sewer Systems (MS4s). Generally, North Carolina counties do not own and operate MS4s, which are generally around operating road systems.

Mr. Regan also said that the federal rules included a listing of all local government units in each state that would be automatically subject to the requirements if these jurisdictions owned and operated MS4s. The listing included 25 urban counties in North Carolina and has been expanded to include eight additional counties.

Mr. Regan said that it was apparent that two of our counties, Cumberland and Mecklenburg were in the storm sewer business.

Mr. Regan said that at the request of their member counties, following some hearings in the summer of 2000, they wrote to DENR (see Exhibit L) asking how the federal rules would be applied to the urban counties on the EPA list. In the conclusion of that letter, they asked DENR to take two actions. First, to seek a definitive ruling from EPA as to how these rules would apply in a situation where the county governments listed did not operate MS4s. The second thing they asked was for the Department to convene representatives of the 25 metropolitan counties to determine what role these jurisdictions might play in stormwater management.

Mr. Regan said that under state law, the Department could develop rules that address the county role in stormwater management.

Mr. Regan pointed out that this was not the first inquiry that had been made to the Department. Forsyth County wrote a letter shortly after the federal rules were issued and raised the same questions.

Mr. Regan said that a formal response was never received; however, the Department began the process of developing rules.

Mr. Regan said it would be much more efficient if the Department had approached stormwater management issues on two separate tracks. Clearly the federal rules had to be implemented in North Carolina and a system had to be in place by March 2003, applying to those units that owned municipal storm sewer systems.

Mr. Regan said it also would have been more efficient for the counties if the Department had begun development of a stormwater program based on state law to address an appropriate role for county governments and land use management subdivision regulation.

Mr. Regan pointed out that the other two letters in Exhibit L come from the Attorney General's office, issued at the request of DENR, as to how the counties might be required to participate if they were deemed a MS4. Tanglewood Park in Forsyth County might fall into this category.

Mr. Regan said that DENR did attempt, in the temporary rules, to identify several ways in which counties could voluntarily participate in certain aspects of the program most notably in pre-construction regulation and in post-construction monitoring of stormwater issues.

Mr. Regan said that since the summer hearings, the Department has recognized the need to address an appropriate county role through separate rulemaking. In February, it is expected that the Department may take a two-track approach sending the rules that implement the federal requirements for the federal rulemaking and a separate set of rules applying to county governments to permanent rulemaking.

Mr. Regan concluded by saying that they needed more time and more input from the county governments affected to develop a meaningful set of regulations.

Ms. Kimberly S. Hibbard, Associate General Counsel, North Carolina League of Municipalities, presented her comments on the draft stormwater rules on behalf of the League of Municipalities. A copy of Ms. Hibbard's comments is listed as **Exhibit L**.

Senator Kinnaird asked Ms. Hibbard if there were incorporated towns with only 51 people in them.

Ms. Hibbard said there was one, Spencer Mountain.

Senator Kinnaird asked Ms. Hibbard if there was an exemption for a town as small as Spencer Mountain.

Ms. Hibbard said that her reading of the draft permanent rules indicates that essentially there is no exemption based on the size of a town.

Mr. Trip Van Noppen, Carolinas Office Director, Southern Environmental Law Center, offered his comments on the Phase II stormwater rules. A copy of Mr. Van Noppen's comments is listed as **Exhibit M**.

Mr. Van Noppen addressed the importance of managing stormwater, the reason we are doing Phase II, and commented on the specific rules and issues that are pending in the EMC.

Senator Odom asked Mr. Van Noppen if he had a problem with the adopted rules and asked he thought they should be more expansive.

Mr. Van Noppen said that this was correct.

Representative Gibson asked Mr. Givens to explain the difference between the temporary rule and the permanent rule.

Mr. Givens said that in 1996, the General Assembly amended the administrative procedure act to revise the process by which temporary and permanent rules are adopted. At that time, the concept of legislative disapproval of administrative rules was added to the statutes. The statues now provide for legislative disapproval of permanent rules but do not provide for legislative review of temporary rules.

Mr. Givens added that since 1996, the staff and the General Assembly have been grappling with this concept of legislative review of rules and with the constitutional issues related to separation of powers. While the statues does not provide for a formal mechanism for legislative disapproval of a temporary rule, most of the APA is statutory in nature and any member could introduce a bill that had the potential to affect a temporary rule, even though the APA does not provide for that.

Mr. Givens gave an example of the 1998 legislation on buffers where the status of the rule at that time was a temporary rule and a bill was introduced to address the temporary rule to provide further instructions and guides to the EMC on the adoption of the permanent rule.

Mr. Givens said that as things now stand, we have a temporary stormwater rule in effect and potential legislative review of the permanent rule in the 2004 Session.

Senator Clodfelter corrected Mr. Regan regarding his comment that Mecklenburg County operates a MS4 as defined in the regulations. They do, however, operate a stormwater management system, but not an MS4.

Senator Clodfelter added that Mecklenburg maintains all of the stream, creek and ditches in the county, but this is not a structured system and viewed it as a countywide stormwater system. So, when the compliance issue came

up, the question was how to integrate it with the MS4 that the cities in the county did operate.

Senator Clodfelter said if we look back at the legislation that resulted from this, we might come up with some good suggestions that could provide some good models to show how an integrated, countywide operation in which the roles of the particular parties are all well defined.

Senator Odom added that it appears there are legitimate concerns with regard to the process and the goal that the Department has set is commendable.

Senator Odom further added that this sounds like a good subject for a working group to see what can be done to work out some of the problems.

Dr. Charles M. "Mike" Williams, Director, Animal and Poultry Waste Management Center, North Carolina State University, gave a report on issues related to the evaluation of alternative animal waste management technologies to determine whether those technologies are environmentally superior and economically feasible. A copy of Dr. Williams' report and slide presentation is listed as **Exhibit N**.

Senator Albertson asked Dr. Williams to explain why two of the systems located outside of the United States.

Dr. Williams said that the technology providers are located in those locations. The system in Germany has been delayed because of cash flow problems.

Senator Albertson asked if the two operating technologies units are gasification units.

Dr. Williams said the two that have completed data are actually the inground ambient digester system on the Barem Farm with the greenhouse and the constructed wetlands system in Onslow County.

Senator Albertson asked if we are going to find a better system than the one we already have.

Dr. Williams said he is optimistic that of these eighteen, there will be some systems that will meet the environmental performance standards. However, he is concerned about the cost.

Representative Hill asked Dr. Williams if there a problem finding a market for the solids and how are they trying to solve this problem.

Dr. Williams said they are looking at technologies that have options other than just compost or fertilizer. That is why there are technologies that can take the solids and gasify those to an end product such as ethanol or methanol.

Dr. Williams said that another end product that is receiving a lot of attention nationally is bio diesel. Any of these systems that generate methane or solids would be a candidate for bio diesel.

Senator Clodfelter asked Dr. Williams if the schedule is an aggressive one or is it subject to slippage.

Dr. Williams said the schedule is subject to slippage and he continues to have surprises in this initiative. However, he has taken the information from the people involved in the process after a two-year learning curve and he feels they are realistic projections.

Mr. Givens asked Dr. Williams if he would be able to make a valid economic feasibility determination based on the 2004 group.

Dr. Williams answered in the affirmative.

Mr. Givens reminded members that the moratorium that has been in effect since March 1997 is scheduled to expire on September 1, 2003.

Representative Hill asked Dr. Williams if anything had been done to help the odor problem in the lagoon system, as it now exists.

Dr. Williams said that there has been improved management that is impacting the odor on farms.

Senator Albertson asked if this same technology be used for municipal waste and poultry waste.

Dr. Williams said there is no question that it could be. In fact, any of these technologies that are targeting a solid waste stream could be used for municipalities. The gasification approach, the larvae, the anaerobic digestion would all be candidates.

Senator Albertson commented that the benefits from these technologies could be very beneficial to us.

Dr. Williams concluded by saying that one of the technology suppliers of the anaerobic digester are also looking to process municipal type waste and have an arrangement with Ft. Bragg.

Senator Albertson asked Dr. Williams if possible a source of use with energy is feasible.

Dr. Williams said that this type of incentive would be necessary for broad-scale implementation.

Ms. Robin W. Smith, Assistant Secretary for Policy and Planning, DENR, gave a report on implementation of the two-year action plan for livestock operations. A copy of this plan is listed as **Exhibit O**.

Senator Albertson asked if they are making changes to some of the permits and when the NPDES comes in they will make changes again.

Ms. Smith said they are both going along on the same track. The NPDES general permit is final and now people are being asked to apply under that general permit. The general permit for the non-discharge expired this year and was due to be renewed.

Senator Albertson asked Ms. Smith if there are scientists involved in helping develop protocol for producers for groundwater testing.

Ms. Smith said they largely worked with DENR staff, the Pork Council and representatives from Frontline. The protocol was not a monitoring protocol but one for screening down to identify the farms that were to be evaluated.

Senator Albertson commented that he feels like there should be some scientific expertise in this evaluation.

Senator Albertson asked if the protocol is based on whether someone is not following rules and regulations.

Ms. Smith said they are basing it on the expertise of DENR staff and the other consultants in terms of types of violations that are likely to impact groundwater.

Senator Odom asked Dr. Williams to come forward to answer a question.

Senator Odom asked Dr. Williams what happens if his work is not completed by the time the Smithfield Agreement is terminated by time limitation.

Dr. Williams said there is a five-year research agreement between the University, Smithfield and the Attorney General's Office. The actual Smithfield Agreement is a twenty-five year agreement.

Senator Odom asked where this information comes from and suggested that we get something from the Attorney General's office to indicate where we will be if the research is not concluded by the date that agreement ends.

Senator Odom then asked how long the agreement with Frontline Farmers runs.

Dr. Williams said he did not know the time limitations on that agreement. The Frontline Farmers did not bring cash into the process; however, they are providing farms for making baseline measurements. This scope of work will be completed within the next couple of years.

Mr. Givens said that we have copies of all three agreements on file and will inquire about the terms of the agreement with the Attorney General's office.

Mr. Givens called attention to three items that were distributed to members during the lunch break. The first item is Response to Phase II Stormwater questions. The second item is Basinwide Water Quality Public Workshop Schedule and the third item is the Annual Report of the Conservation Easement Program. These three items are listed as **Exhibit P**.

Ms. Charlotte V. Jesneck, Head, Inactive Hazardous Sites Program, Superfund Section, Division of Waste Management, DENR, gave an annual report on the Inactive Hazardous Waste Sites Program. A copy of this report is listed as **Exhibit Q**.

Ms. Jesneck said there have been some local governments interested in converting some of these old landfills to greenspace. They would like to encourage this but do it in a way where exposure concerns are addressed. She said that building on landfills creates some expensive construction and problems with landfill gases entering into buildings that would be constructed on those properties.

Ms. Jesneck said that the most practical remedy for large, unlined landfills is for a local government or nonprofit group to purchase the property, placing land use restrictions on the property that would limit its use to greenspace or park space and ensuring that a cover is maintained over the waste.

Ms. Jesneck said that it is cost prohibitive in most cases to remove the waste. However, if the waste is not removed the groundwater will not be safe and the property would be unsuitable for restoring to unrestricted use levels.

Ms. Jesneck said that local governments that operated these did so to control indiscriminate dumping. The private individuals do not have funds for remediation.

Ms. Jesneck said that local governments and citizens would benefit from increased greenspace. Since the majority of these are located next to streams and rivers, redeveloping them as greenspace is even more critical. Property damage that occurs from more expensive development in flood prone areas would not be an issue, there would be little or no impervious surfaces installed with parklands that would aggravate flooding problems and the contamination exposure that currently exists would be addressed.

Ms. Jesneck said they are seeking funding from the federal government to continue to locate and determine the use of these old landfills in the remaining counties.

Ms. Jesneck said that there are many sites that are higher priority because of exposure concerns. At may of these sites, there are cases where

there is no financially viable responsible party. They are presently using the remainder of their clean-up funds to address these sites.

Mr. Bruce I. Nicholson, Head, Special Remediation Branch, Superfund Section, Division of Waste Management, DENR gave a report on the effectiveness of the Brownfield's Property Reuse Act in facilitating the remediation and reuse of existing industrial and commercial properties and receipts by expenditures from the Brownfield's Property Reuse Act Implementation Account. A copy of Mr. Nicholson's report is listed as **Exhibit R**.

Senator Clodfelter asked Mr. Nicholson asked what is needed to continue the progress we are making on this program.

Mr. Nicholson said that pursuing the federal funds under the Brownfields Act would allow for more staff.

Senator Clodfelter asked if the State has to match funds.

Mr. Nicholson said there is no state matching funds associated with this Act. What the federal government is looking at is that these funds be supplementary fund and not replacement funds.

Senator Odom asked Mr. Nicholson if there was any information available on the tax value of this program.

Mr. Nicholson said there are no statistics on this but numbers from developers themselves regarding individual projects and how much capital they are receiving or putting into those projects.

Senator Odom suggested that in his next report, he should include the increased property tax values for the local communities.

Mr. Nicholson added that there is also the Brownfield's Property Tax Incentive that could be used to help track this information.

Senator Kinnaird asked if the Penco Project was a contaminated site.

Mr. Nicholson said it was a contaminated site and the previous owner is still conducting a remedial operation on this site.

Senator Kinnaird asked if there are some sites that are too polluted to clean up. Could a parking deck be built on these types of sites.

Mr. Nicholson said this is a typical project they would undertake.

Mr. Nicholson said that under the statute, the one prohibition they have is that the site cannot be on a national priorities list, worst of the worst superfund sites. Other than that, a site would be eligible.

Senator Horton asked Mr. Nicholson if the time between application and completion would be about four months plus two months for public comment.

Mr. Nicholson answered in the affirmative.

Senator Horton asked what has changed between last year and this year with regard to the number of projects being completed.

Mr. Nicholson said the last two years have seen quite a number of Brownfield Agreements coming through. Prior to that, they did not have staffing or funding.

Senator Horton said that he had constituents who have faced discourtesy from personnel in the Brownfield's office and asked Mr. Nicholson to convey this message to proper people.

Mr. Ronald E. Ferrell, Program Manager, North Carolina Wetlands Restoration Program, Division of Water Quality, DENR, gave a report on implementation of the Wetlands Restoration Program and use of the Wetlands Restoration Fund. A copy of this report is listed as **Exhibit S**.

Mr. Ferrell said that all of the reports for the Wetlands Restoration Program can be found on their website.

Mr. Ferrell said that the Wetlands Restoration Program has made significant progress in meeting the statutory mandates established by the General Assembly. The foundation has been laid through careful watershed planning and project selection is yielding desired results for replacing lost wetland and repairing area functions throughout North Carolina.

Senator Odom asked Mr. Ferrell if part of Mecklenburg was in the Yadkin River Basin.

Mr. Ferrell said that Rocky River, in Mecklenburg County, is a tributary of the Yadkin River Basin.

Senator Odom asked Mr. Ferrell about the cost per acre dealing with riparian wetlands. He asked Mr. Ferrell if the cost had come down.

Mr. Ferrell said the reason for the cost coming down is due to non-riparian wetlands. The fee schedule is $12,000 for non-riparian and $24,000 for riparian wetlands.

Senator Odom asked Mr. Ferrell how many times the private mitigation bank companies were asked to respond to the survey.

Mr. Ferrell said they had sent the same survey out every year since 1998 and the response rate from the private banking community had gone down each year. There were only two respondents in 2002.

Representative Gibson announced that the ERC may meet during the 2003 Session.

Mr. Givens said that as of 29 January 2003, the ERC would consist of those members of the Commission who continued to be members of the General Assembly. He said that we would continue to have 11 members until the leadership of each House made changes and appointments.

Mr. Givens said that further notification of ERC meetings would be announced on the floor of the House and Senate.

Members bid farewell to Senator Odom who has served as Co-Chair of the ERC since 1995.

The meeting was adjourned at 3:00 p.m.

Representative Pryor Gibson	Mary R. Watson
Presiding Co-Chair	Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Read only reports: Truth in Penalties Framework, the 2002 Annual Fish Kill Report, Funds Transfers Authorized for State Fiscal Years 2001-2002 and 2002-2003, and a report on Environmental Regulatory Compliance Activity in Calendar Year 2000
EXHIBIT E:	Handout: Report given by Mr. Gene Upchurch, Director of Public Affairs, Progress Energy on Progress Energy's plan to comply with the requirements of the Clean Smokestacks legislation
EXHIBIT F:	Handout: Report given by George T. Everett summarizing what Duke Power has done to implement the Clean Air Bill
EXHIBIT G:	Handout: Progress report given by Mr. Keith Overcash, Division of Air Quality, DENR, on the Clean Smokestacks Act
EXHIBIT H:	Report given by Carl G. Pigford, Administrator, Motor Vehicle Emission Inspection and Maintenance Program, Division of Motor Vehicles, Department of Transportation, on the progress in implementing the motor vehicle inspection and maintenance program
EXHIBIT I:	Report given by Brock M. Nicholson, Chief, Planning Section, Division of Air Quality, DENR on the Process of Designations of Non-Attainment for Ozone and Fine Particle Air Quality Standards
EXHIBIT J:	Report given by Paul S. Crissman, Environmental Programs Manager, Solid Waste Section, Division of Waste Management, DENR, on the White Goods Management Account Balance
EXHIBIT K:	Slide presentation given by Scott Mouw on the State's progress in supporting recycling markets
EXHIBIT L:	Handouts: Presented by Ed Regan. Copies of letters written to DENR, and the United States Environmental Protection Agency, regarding the position of the North Carolina Association of County Commissioners on the Phase II storm water rules

EXHIBIT M: Report given by Kim Hibbard presenting her comments on the draft stormwater rules on behalf of the League of Municipalities

EXHIBIT N: Handout: Comments made by Trip Van Noppen, Carolinas Office Director, Southern Environmental Law Center, on the Phase II stormwater rules

EXHIBIT O: Report given by Dr. Charles M. "Mike" Williams, Director, Animal and Poultry Waste Management Center, North Carolina State University, on issues related to the evaluation of alternative animal waste management technologies to determine whether those technologies are environmentally superior and economically feasible

EXHIBIT P: Report given by Robin W. Smith, Assistant Secretary for Policy and Planning, DENR, on implementation of the two-year action plan for livestock operations

EXHIBIT Q: Three handouts: Response to Phase II Stormwater Questions, Basinwide Water Quality Public Workshop Schedule, and the Annual Report of the Conservation Easement Program

EXHIBIT R: Report given by Charlotte V. Jesneck, Head, Inactive Hazardous Sites Program, Superfund Section, Division of Waste Management, DENR, on the Inactive Hazardous Waste Sites Program

EXHIBIT S: Report given by Bruce I. Nicholson, Head, Special Remediation Branch, Superfund Section, Division of Waste Management, DENR on the effectiveness of the Brownfield's Property Reuse Act in facilitating the remediation and reuse of existing industrial and commercial properties and receipts by expenditures from the Brownfield's Property Reuse Act Implementation Account

EXHIBIT T: Handouts: Reports presented by Ronald E. Ferrell, Program Manager, North Carolina Wetlands Restoration Program, Division of Water Quality, DENR, on implementation of the Wetlands Restoration Program and use of the Wetlands Restoration Fund

January 28, 2003 ERC Meeting
EXHIBIT A

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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24 January 2003

TO: Members and Interested Parties – Environmental Review Commission

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meeting**

COMMISSION MEETING:

The Environmental Review Commission will meet at 9:30 a.m. Tuesday 28 January 2003 in Room 643 of the Legislative Office Building in Raleigh.

At this meeting, the Commission will hear reports from State agencies, consider studies for which the Commission is responsible, and attend to other matters.

The agenda for the 28 January meeting of the Commission may include:

1. Report on progress in implementing the "clean smokestacks" legislation (Senate Bill 1078, S.L. 2002-4)
2. Report on progress in implementing the motor vehicle inspection and maintenance program
3. Report on the process by which areas of the State are designated as non-attainment areas with respect to air quality standards for specific pollutants
4. Annual report on the status of solid waste management efforts (G.S. 130A-309.06(c))
5. Comment on the development and implementation of rules and programs to control stormwater runoff
6. Discussion of issues related to the evaluation of alternative animal waste management technologies to determine whether those technologies are environmentally superior and economically feasible
7. Report on implementation of the two-year action plan for livestock operations (S.L. 2002-148, Sec. 2)
8. Annual report on the Inactive Hazardous Waste Sites Program (G.S. 130A-310.10(a))

9. Annual report on the effectiveness of the Brownfields Property Reuse Act in facilitating the remediation and reuse of existing industrial and commercial properties and receipts by and expenditures from the Brownfields Property Reuse Act Implementation Account (G.S. 130A-310.40)

10. Annual report on implementation of the Wetlands Restoration Program and use of the Wetlands Restoration Fund (G.S. 143-214.13)

11. Other matters related to the Commission's powers and duties under G.S. 120-70.43

FUTURE MEETINGS:

The General Assembly will convene for the 2003 Session of the General Assembly at 12:00 noon on Wednesday 29 January 2003.

The Commission may meet at other times while the General Assembly is in session (G.S. 120-70.44). If the Commission meets while the General Assembly is in session, written notice will not be mailed to persons on the mailing list. Rather, notice will be given at a session of the Senate and House of Representatives as provided by G.S. 143-318.12(b). The Commission will resume a schedule of regular monthly meetings following adjournment of the 2003 Session of the General Assembly. Mailed notices of Commission meetings will resume at that time.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties in specific topics as indicated below:

Leaking Underground Storage Tank Working Group
10:00 a.m. Monday 3 February 2003 – 605 Legislative Office

ADDITIONAL INFORMATION:

Persons who have questions about the Commission meeting or other matters related to the Commission may contact the Commission Counsel at (919) 733-2578.

Posted: 24 January 2003
Press ____
Committee Record ____
Interested Parties ____

January 28, 2003 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

DATE 1-28-03

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Tom BEAN	NC ENVIRO DEPT	441-7601
Laura DeHaio	NCDENR	
Tommy Stevens	NCPC	781-0361
Chris Nichols	Hunton + Williams-intern	
David Jerose	ENRISCO	590-0186
Theresa Kostrzewa	CAA	781.8030
Katherine Joyce	Electric Co-ops	645-2431
Beth Warren	AGO	716-6600
Kim Hibbard	NCLM	715-3936
Maria Souther	Weyerhaeuser	786-2415
Jimmy Carter	DENR	733-4908
Kari Barsness	DENR	715-4193
Jim Simons	DENR	733-4574
ROGER SHEATS	DOT	733-2520
SHARON LIPSCOMB	DOT	733-2039
John Preyer	NCERA	755-9490

VISITOR REGISTRATION SHEET

DATE_____

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Brock Nicholson	NC DAQ/DENR	715-0587
Keith Overcash	NC DAQ	715-6290
PAUL CRISSMAN	NC DWM	733 0692
David Knight	NC Sierra, NCWF	832-0670
Trip Van Noppen	Southern Env. Law Center	967-1450
Carol Howard	DOT / DMV	816-3015
Carl Pifford	DOT / DMV	861-3114
DONNIE REDMOND	NC DAQ	733 1481
Mike GAITHER	DOT/DMV	861-3139
PAUL GORDEY	NC DAQ	715-7220
DAVID MICKEY	BREAL	336-769-0955
Pricey Harrison	Beaufort NC	2527281287
Steve Wall	Conservation Council	839-0020
Shelley Welton	Cons. Council	9600359
Gordon Zeigler	DOT/DMV	861-3185

VISITOR REGISTRATION SHEET

DATE _____

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Susan Conard	NCDOT	733-2520
Hawley Truax	Office of the Governor	715-1455
Sharon Miller	CUCA	782-2843
Jack Cozart	Parker Poe	890-4153
Charles Archer	NCLM	715-3918
John McAlister	Duke Energy	
Eddie Caldwell	Hafer+Caldwell	831-1801 x 220
Elizabeth Oates	NCPIRG	9335681
Molly Diggins	Sierra Club	833-8467
Derb Matthews	ENR Wash. Mgr.	7834996
Fran Pierce	Duke Energy	789-8769
Jim Upchurch	Progress Energy	
Bill Flournoy	DENR	715-4191
Doug Hoey	NC Power	7824411
Mary Shumaker	UNC-IC	834 9459

VISITOR REGISTRATION SHEET

DATE_____

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Robin Smith	DENR	715-4141
Lisa Martin	NCHBA	676-9090
Fred Allen	NC Agg. Assn.	782-7055
C O Reagan	N.C.A.C.C.	715-4361
Anita Watkins	DENR	715 2613
Tom Gwen	BPMHL	839-0300
[illegible]	NC ICU	832-5817
Coleen Sullins	DWQ	733-5083
Alan Klimek	DWQ	733-5083
[illegible]	CWMTF	733-6375
CHRIS RUSSO	DENR SEC'Y OFF.	715-4168
R. Paul Wilms	NCHBA	676-9090
Shannon Langley	DENR - DWQ	733-5083
Donna M[illegible]	DENR - DWQ	733-5083
Bradley Bennett	DENR - DWQ	733-5083

VISITOR REGISTRATION SHEET

DATE 1-28-03

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Bob Phillips	Common Cause NC	836-0027
Ann McCracken	Common Cause NC	774-4797
Kim Harrell	CC/NC	274-4475
Rick Zechini	NC Assoc. of REALTORS	856-9155
Mike Williams	NCSU	515 5386
Jim Lowry	NC Utility Contractors Assn.	383-0044
Charlotte Jessen	NCDENR	733-0801
Jack Butler	NCDENR	733-2801
Tony Duque	NCDENR	733-2801
Bruce Nicholson	NCDENR/DWM	733-2801
Paul Sherman	NCDENR	486-1541
Sue Homewood	NCDENR	733-5083
Dennis Ramsey	"	"
Courtney Washburn	NC Sierra Club	833-8467
Kirsten Collings	CCNC	839-0020

VISITOR REGISTRATION SHEET

DATE 1-28-03

ENVIRONMENTAL REVIEW COMMISSION

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
[signature]	Mining Geologist	349-2901
[signature]	DENR	715-6509

January 28, 2003 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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AGENDA
9:30 a.m. Tuesday 28 January 2003
Room 643 – Legislative Office Building

1. Call to order
   Representative Pryor Gibson, Presiding

2. Introductory remarks by Cochairs
   Representative Pryor Gibson
   Senator Fountain Odom

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Report on progress in implementing the "clean smokestacks" legislation (Senate Bill 1078, S.L. 2002-4)
   P. Eugene Upchurch, Director of Public Affairs
   Progress Energy

   George T. Everett, Vice President for Environmental Affairs
   Duke Power

   Keith Overcash, Director
   Division of Air Quality, DENR

5. Report on progress in implementing the motor vehicle inspection and maintenance program
   Carl G. Pigford, Administrator
   Motor Vehicle Emissions Inspection and Maintenance Program
   Division of Motor Vehicles, Department of Transportation

6. Explanation of the process by which areas of the State are designated as non-attainment areas with respect to air quality standards for specific pollutants
   Brock M. Nicholson, Chief
   Planning Section, Division of Air Quality, DENR

7. Annual report on the status of solid waste management efforts (G.S. 130A-309.06(c))
   Paul S. Crissman, Environmental Programs Manager
   Solid Waste Section, Division of Waste Management, DENR

   Scott B. Mouw, Chief
   Community and Business Assistance Section, Division of Pollution Prevention and Environmental Assistance, DENR

8. Comment on the development and implementation of rules and programs to control stormwater runoff (Response to report presented by Coleen Sullins at the 16 January 2003 meeting of the Commission)
   Lisa D. Martin, Director of Regulatory Affairs
   North Carolina Home Builders Association

   Edmund P. Regan, Deputy Director
   North Carolina Association of County Commissioners

   Kimberly S. Hibbard, Associate General Counsel
   North Carolina League of Municipalities

   Trip Van Noppen, Carolinas Office Director
   Southern Environmental Law Center

LUNCH BREAK – Estimated for 12:15 p.m. to 1:00 p.m.

9. Discussion of issues related to the evaluation of alternative animal waste management technologies to determine whether those technologies are environmentally superior and economically feasible
   Charles M. "Mike" Williams, Director
   Animal and Poultry Waste Management Center
   North Carolina State University

10. Report on implementation of the two-year action plan for livestock operations (S.L. 2002-148, Sec. 2)
    Robin W. Smith, Assistant Secretary for Policy and Planning
    DENR

11. Annual report on the Inactive Hazardous Waste Sites Program (G.S. 130A-310.10(a))
    Charlotte V. Jesneck, Head
    Inactive Hazardous Sites Program, Superfund Section
    Division of Waste Management, DENR

12. Annual report on the effectiveness of the Brownfields Property Reuse Act in facilitating the remediation and reuse of existing industrial and commercial properties and receipts by and expenditures from the Brownfields Property Reuse Act Implementation Account (G.S. 130A-310.40)
    Bruce I. Nicholson, Head
    Special Remediation Branch, Superfund Section
    Division of Waste Management, DENR

13. Annual report on implementation of the Wetlands Restoration Program and use of the Wetlands Restoration Fund (G.S. 143-214.13)
    Ronald E. Ferrell, Program Manager
    North Carolina Wetlands Restoration Program
    Division of Water Quality, DENR

14. Commission discussion and announcements

15. Adjourn

FUTURE MEETINGS:

The Commission may meet while the General Assembly is in session (G.S. 120-70.44). If the Commission meets while the General Assembly is in session, written notice will not be mailed to persons on the mailing list. Rather, notice will be given at a session of the Senate and House of Representatives as provided by G.S. 143-318.12 (b). The Commission will resume a schedule of regular monthly meetings following adjournment of the 2003 Regular Session of the 2003 General Assembly. Mailed notices of Commission meetings will resume at that time.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. Monday 3 February 2003 – 605 Legislative Office Building

NC Department of Environment and Natural Resources
Truth In Penalties Framework

What is the goal of Truth in Penalties?

The goal of Truth in Penalties is to encourage responsible environmental behavior through enforcement programs that are strong, effective and fair – so that

- serious violations of environmental laws are met with serious consequences;
- penalties are consistently and vigorously assessed and collected; and
- the public has full confidence in environmental enforcement.

Truth in Penalties Strategy

Target serious violations in all programs

- Assess stiff and deterring penalties for willful violations.
- Assess stiff and deterring penalties for violations posing a serious threat to the environment.
- Increase the severity of enforcement for repeat violations.
- Seek increased penalty authority where necessary.
- Close the gap between the amount of the penalties assessed and the amount collected.

Ensure public access to the enforcement decision-making process in all programs

- Clarify and disclose to the public the criteria used by each program in the Department to establish and modify penalties.
- Provide to the public a complete description of the appeal process.

Make penalty information available to the public in a clear, usable form

- Using year 2000 as a baseline, regularly report to the public on penalties assessed, penalties collected, compliance rates by program and trends in enforcement.
- Develop an integrated computer system to share information between programs and to make penalty information across program lines more readily available to the public.

North Carolina Division of Water Quality
Annual Report of Fish Kill Events
2002

Water Quality Section
Environmental Science Branch
Raleigh, NC
December 2002

Introduction

The investigation of fish kill activity across the state currently involves protocols established by the North Carolina Division of Water Quality (DWQ) in 1996. The protocols were developed with assistance from Regional Office staff, North Carolina Wildlife Resources Commission biologists, and Division of Marine Fisheries personnel as a means to improve the tracking and reporting of fish kill events in North Carolina. Fish kill and fish health investigations are recorded on a standardized form and sent to the Division's Environmental Sciences Branch (ESB) where the data are reviewed and compiled. Data from fish kill investigation forms and supplemental information sent to the ESB are entered into a central database where the data can be managed and retrieved for use in reports to concerned parties. The procedure also requires the notification of appropriate state officials and scientists associated with the investigation of such events. In addition, reported kill information is updated weekly on the ESB website at: www.esb.enr.state.nc.us/Fishkill/fishkillmain.htm.

This document is a summary of fish kill events reported to the DWQ from January to mid December, 2002. The report is mandated under Section 4 of Chapter 633 of the 1995 North Carolina General Assembly Session Laws.

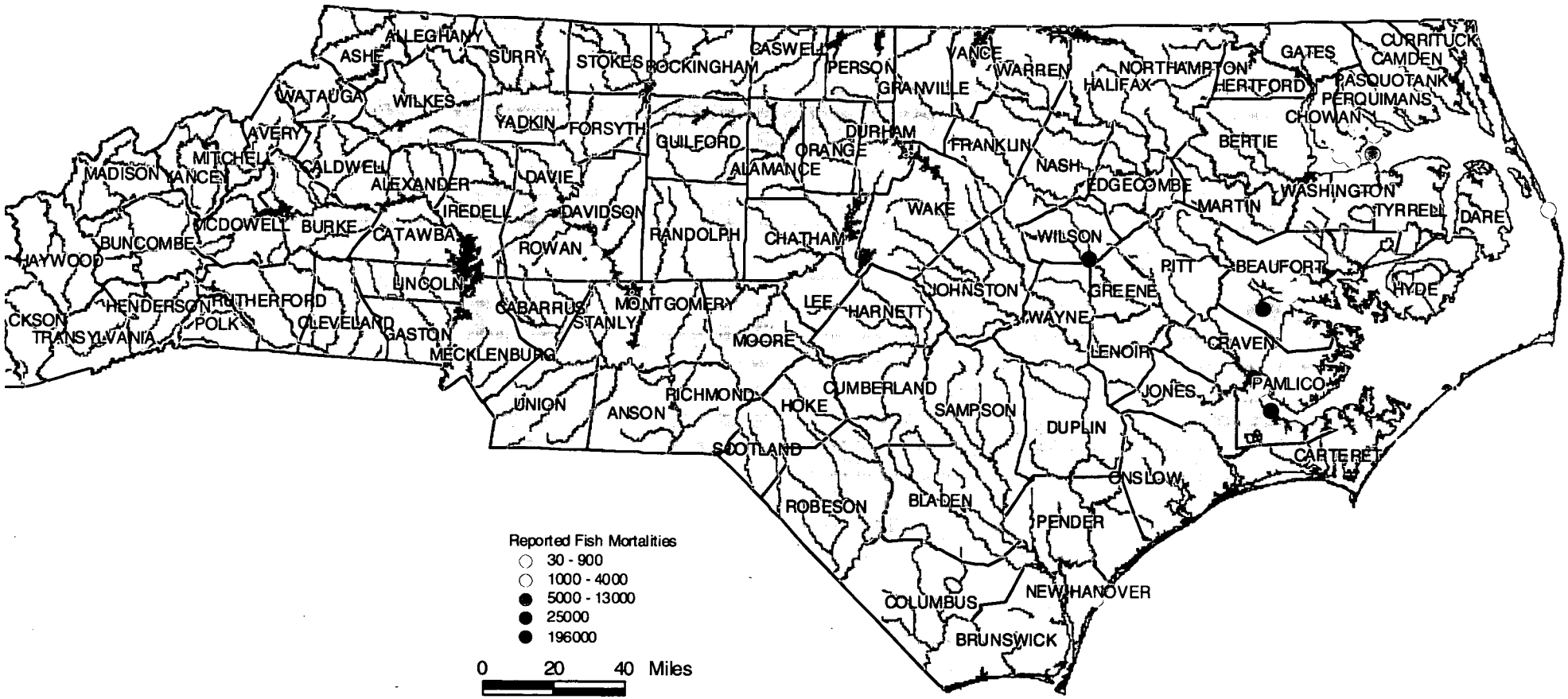
2002 Fish Kill Summary

Field investigators reported 46 fish kill events from January to December, 2002. Kill events were reported from the coast to as far west as Mitchell County in 9 of the state's 17 major river basins. The ESB tracks fish kill events when at least 25 fish are affected and when the event is confirmed by investigators.

The total fish mortality for all 2002 reports was 269,635. This figure represents a sharp drop from the 2001 figure and is the lowest total since systematic fish kill reporting began in 1996. Mortality totals for individual events ranged from 30 to 196,000 with a median mortality of 350. Two-thirds of the fish kill activity for 2002 was reported from freshwater locations leaving about one-third of reports from estuarine waters. No reports were received from the Atlantic Ocean.

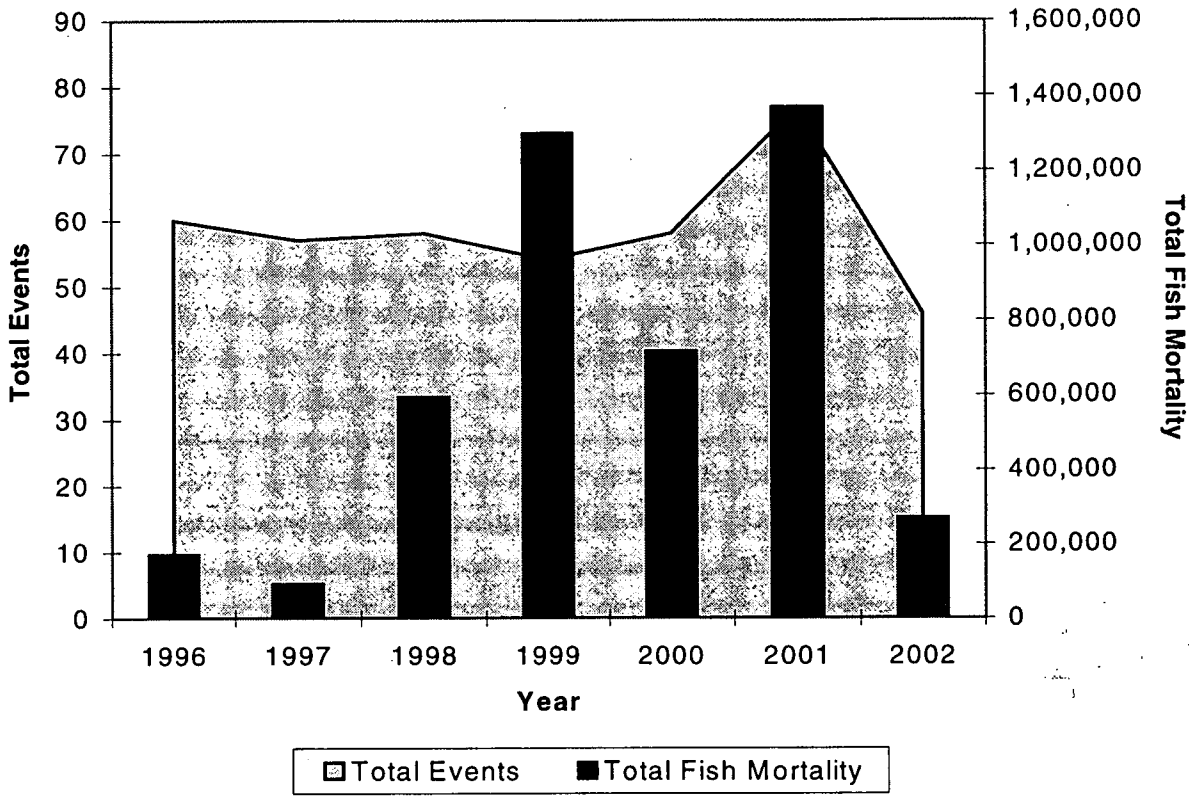
Total Kill Events for 2001	46
Total Mortality for 2001	269,635 (229,796 Freshwater, 39839 Estuarine)
Report Mortality Range	30 to 196,000
Report Median Mortality	350
Basins with Activity	9 (of 17)
Freshwater Kills	30
Estuarine Kills	16

Figure 1 : Fish Kill Events Reported to NCDWQ - 2002



million (2001). The total for 2002 represents a sharp drop from yearly totals reported for the previous four years (Figure 2).

Figure 2: Reported annual fish kill events and mortality, 1996 to 2002



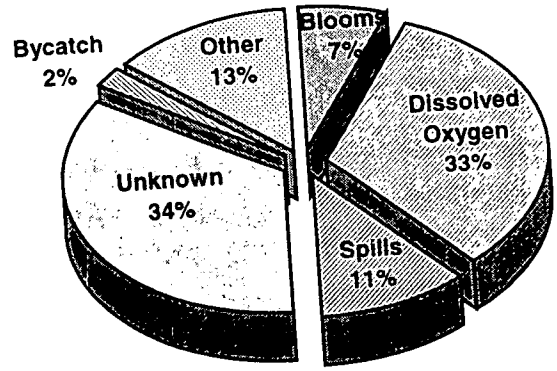
Suspected Causes of 2002 Events

Specific causes of fish kill events may or may not be obvious to investigators depending on a host of factors. Many causes may quickly be defined, but others remain unconfirmed or unclear due to an investigation occurring after the fact. Kill events often result from many environmental conditions, and sorting out the major reason(s) why fish are dieing is frequently a difficult and often subjective task. The NCDWQ reviews and tracks suspected causes of fish kills reported by field investigators. Suspected cause reports aid in evaluating potential water quality trends and problems, and assist scientists and decision-makers with formulating future courses of action. Suspected cause reports should not be viewed as a definitive label for a particular event.

Reported causes of 2002 kill events are summarized into six categories –dissolve oxygen (DO) induced events, algal bloom related events, spills, bycatch, and other (miscellaneous) causes. Those events where no specific causes could be determined were assigned as "unknown" (Figure 3).

Dissolved Oxygen Depletion: Poor dissolved oxygen (DO) was cited as a factor in 33 percent of the kill events during 2002. Unlike the trend in previous years, the majority of DO related kills were reported in fresh waters. Freshwater DO events were reported in conjuction with low flows and high water temperatures brought about by the state's ongoing drought conditions, most notably in July and August. Although several DO related events occurred in estuarine waters, the intense kill activity historically associated with DO problems in the lower Neuse and Pamlico Rivers was reduced in 2002.

Figure 3: Suspected causes for fish kills - 2002



Harmful Algal Blooms: Nutrient enrichment of waterbodies throughout North Carolina has resulted in eutrophication and algal blooms, common factors in fish kill events. Algal blooms cause dissolved oxygen (DO) and pH fluctuations as well as DO depletion through diurnal cycles and algal decomposition. These elements often precede fish kills events. Certain types of algae also release toxins during the course of a bloom that are detrimental to aquatic life. Blooms were suspected in 7 percent of the fish kill events for the year. A dense bloom of the blue-green alga *Oscillatoria geminata* occurred in High Rock Lake near Buddle Creek in October. The bloom depleted DO levels and was a factor in the death of 1,000 common carp and striped bass. Water samples from two estuarine fish kills contained dense blooms of dinoflagellates, ciliates, some euglenoids and cryptomonads (see Appendix B).

During 2002, the ESB staff routinely examined water samples associated with estuarine fish kills for the presence of *Pfiesteria* and *Pfiesteria*-like organisms. ESB examinations were performed using light and epifluorescent microscopy. Suspect samples warranting further confirmation for toxic *Pfiesteria* species were also forwarded to UNC-Greensboro and the NCSU Center for Applied Aquatic Ecology for further tests. These tests included fish bioassays, scanning electron microscopy, and an RNA probe that can discern the presence of actual *Pfiesteria* cells.

Pfiesteria-like cells examined by ESB staff during 2002 appeared as nontoxic obligate autotrophs and not forms historically associated with fish health events. At the time of this report, all confirmatory tests results have been reported as negative and all involved laboratories have reported that toxic *Pfiesteria* was not a causal factor in any of the 2002 events.

Spills: Toxic spills either deplete DO levels in receiving streams or induce kills outright through physical or chemical toxicity. Spills were reported as a cause in 11 percent of the kill events during 2002 (Table 2).

Table 2: Spill-induced fish kills during 2002.

Date	Waterbody	County	Mortality	Comments
1/10	Hitchcock Creek	Richmond	70	Kill caused by uncured concrete coming in contact with water below Lake McKinney spillway.
4/18	Cane Creek	Mitchell	1062	Kill event was caused by a petroleum spill into Cane Creek on 4/16/02.
4/19	Pete Dye Lake	New Hanover	200	Investigators suspected prior application of copper based algacide as cause for kill.
5/12	Village Creek	Chowan	500	Kill caused by discharge water from a fire at the Chowan Veneer facility.
7/30	Peter's Creek	Forsyth	1000	Kill caused by a fire at P&B distributors on Chatham Street in Winston Salem on 7/30/02. Chemicals from the fire migrated to Peter's Creek.

Bycatch: Discarded fish from nearby fishing operations was reported as a cause in only one kill event during 2002. A kill of 1,000 menhaden was reported on Albemarle Sound by Division of Marine Fisheries investigators in late October. Investigators suspected the fish were discarded eel pot bait.

Other: Miscellaneous causes were reported for 13 percent of the fish kills during 2002. Fish were reported killed by extremes in temperature in several reports both during the winter and summer. A bacterial infection of catfish in Catawba County and trauma in associated with a dam spillway affecting threadfin shad on the Pee Dee River were among other miscellaneous events.

Unknown Causes: Causes for kill events are listed as unknown when investigators fail to report specific reasons for an event. Investigations may not provide definitive causes when they are conducted too long after an event and no clear factors are determined, or when causes are suspected but not confirmed. Investigators failed to cite specific causes for an event in 34 percent of the year's reports. Reports with unknown causes were received from both estuarine and fresh waters. Investigators reported dead or decomposed fish even though water quality measurements and water samples failed to suggest a problem.

Drought Effects: North Carolina entered a fourth consecutive year of drought conditions in 2002. The entire state was affected with the center of the state experiencing the most severe conditions, and the far western and eastern sections generally experiencing moderate drought. During June and July, 80 percent of the monitored streams across the state were at less than 10 percent of normal flow for that time of year (www.ncwater.org). Some areas across the state reported rainfall levels from 40 to 60 inches below normal since the drought began.

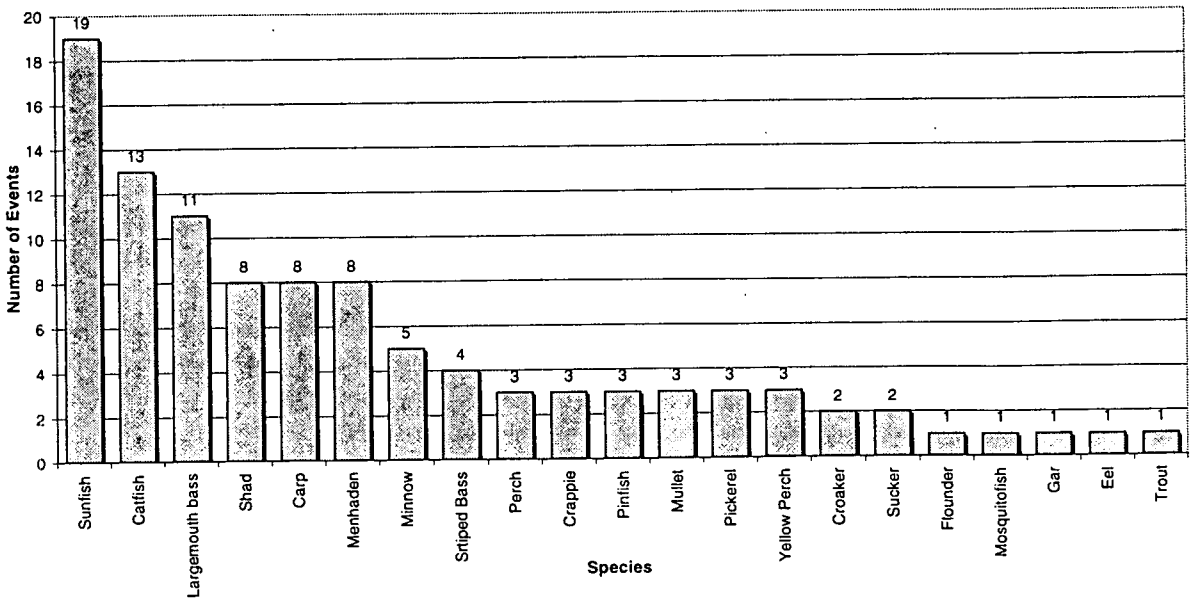
Drought conditions were evident in many fish kill reports submitted by investigators during 2002. Reports from the eastern sections of the state often mentioned low dissolved oxygen levels associated with low river flows and subsequent stagnation. Eastern investigations also revealed areas with extremely high salinities due to the lack of freshwater inflow. High salinities were blamed for the stress and mortality of freshwater fishes in a number of waterways around the Neuse and Pamlico estuaries. Investigators from the Piedmont often reported fish kills occurring simply from a lack of water. Numerous investigations as well as a number of anecdotal reports from citizens described extremely low river flows and lake levels that trapped fish in small pockets without adequate oxygen to sustain the schools.

The year's most high profile events occurred on High Rock Lake (Davidson and Rowan Counties) during a period from July to October. Record low stream-flows into High Rock Lake reduced water levels over 20 feet below full pool by September. The low water levels were a factor in the death of at least 5,000 fish most of which were common carp (see Appendix B). Reports from citizens during this time period suggested that many more fish may have perished on High Rock Lake, but were not observed by investigators due to access difficulties, scavenging, and limited manpower.

Fish Species

Fish kill reports in 2002 involved 21 different species of fish across the state (Figure 4). Freshwater species most commonly identified during investigations included sunfishes, catfishes, and largemouth bass. Estuarine species most commonly reported included menhaden. Menhaden, which have historically been involved in a majority of yearly kill events, were cited in only eight kills during 2002. Menhaden reports decreased as a result of reduced kill activity in the state's estuaries.

Figure 4: Fish species observed during 2002 fish kill events



Other animals were observed at about 15 percent of the year's kill events. These included blue crab, Rangia clams, scallops, Asian clams, crayfish, turtles, and ducks. A large kill of rangia clams was reported on the Yeopim River (Perquimans County) from unknown causes in August. Investigators also reported a significant kill of asian clams as a result of drought effects on the South Yadkin River (Davie County).

NCSU College of Veterinary Medicine Pathology Results

During 2002, Dr. Mac Law along with NCSU College of Veterinary Medicine staff and veterinary students, assisted DWQ investigators by performing gross and microscopic evaluations of fish found dead and fish found stressed and/or diseased in association with fish kill events. Dr. Mac Law is an American College of Veterinary Pathology (ACVP) board-certified veterinary pathologist at the North Carolina State University College of Veterinary Medicine.

The year was relatively quiet for fish kill activity in the state's estuaries, so Dr. Law's staff was asked to evaluate only a small number (less than 20) of Atlantic menhaden from only three kill events. Most of these fish had no remarkable gross or microscopic lesions, and the cause of the kills was not associated with a particular disease syndrome (i.e., some kills were attributed to low dissolved oxygen, which leaves no observable lesions behind). The few lesioned fish associated with fish kills had chronic symptoms and fungal infections consistent with ulcerative mycosis described by Noga, et al (1993). At present Dr. Law's staff has been unable to establish a solid link between the presence of lesioned menhaden or the presence of potentially harmful algal species (such as toxic *Pfiesteria*) with fish kill events that they have helped investigate.

The NCSU laboratory also helped DWQ investigate a large kill of common carp in High Rock Lake, NC. Since carp were the only species affected, a viral agent was suspected and fish samples were submitted for virus isolation. No viruses were found in any of the samples. Lesions were, however, consistent with a bacterial infection that caused severe gill pathology.

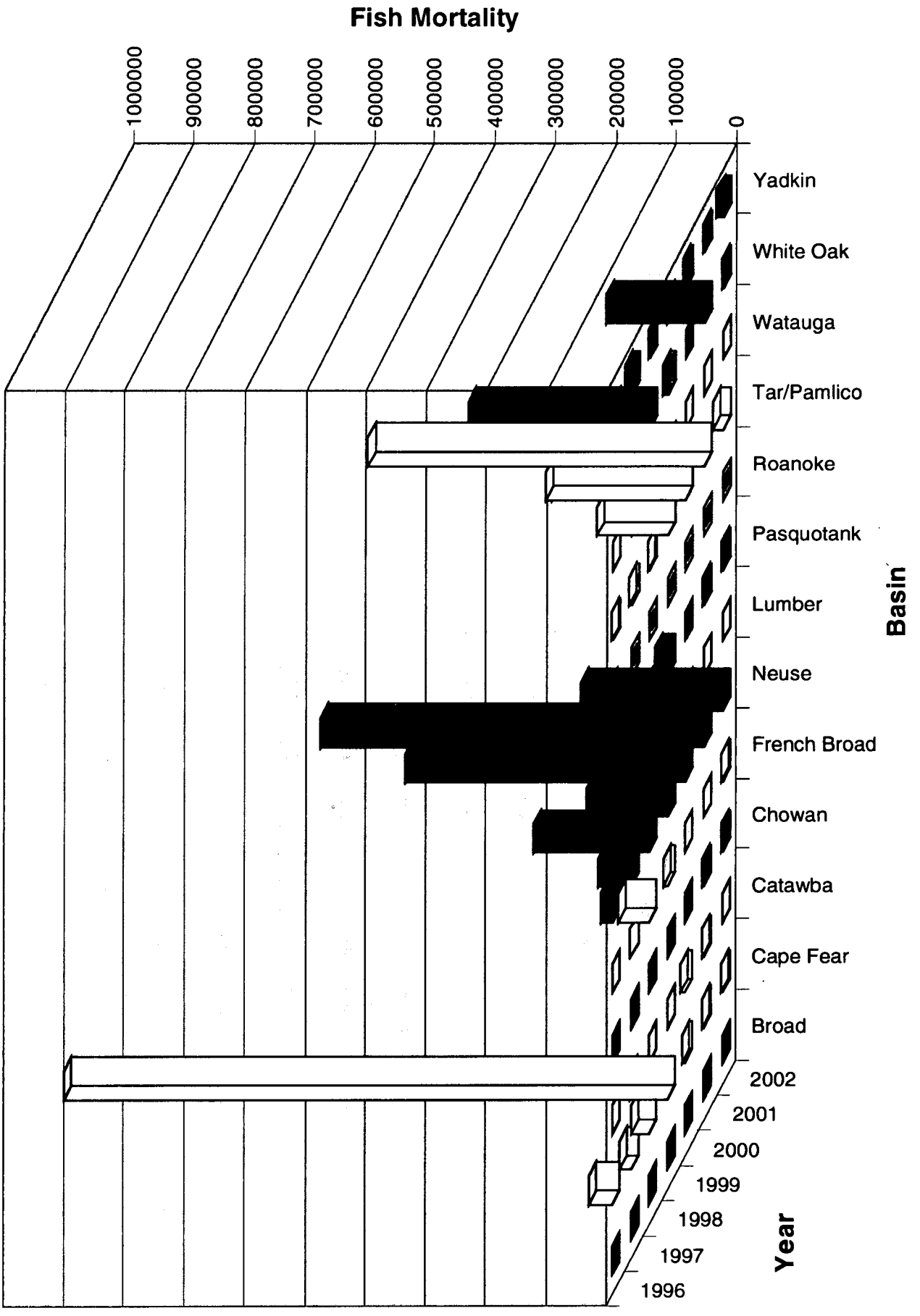
2002 Summary

The number of fish kills reported across North Carolina during 2002 declined from previous yearly figures to 46. This is the lowest number of reports since the DWQ began systematically tracking fish kill activity in 1996. Reported fish mortalities were also low, totaling about 270,000 fish.

As North Carolina entered a fourth year of drought conditions in 2002, environmental conditions conducive to fish kills appeared to worsen. Severe conditions were experienced throughout the midsection of the state where most flows in monitored streams dropped below 10 percent of normal. These conditions further resulted in stream stagnation, depleted dissolved oxygen levels, and high salinities (coastal areas). The effects of the drought were common in reports from investigators throughout the season. Reports to ESB showed the worse kill activity shifted away from coastal estuaries where the most activity was reported in prior years, to inland streams and reservoirs where water levels were critically low. About 85 percent of the 2002 fish mortality was reported from freshwaters.

Although the drought played a role in many kill events during 2002, the drought effects surprisingly did not increase the total number of events or total fish mortality for 2002 over prior yearly figures. Investigators pointed to several conditions brought on by the drought that may have acted to suppress fish kills in 2002. Drought conditions drastically reduced freshwater flows into estuaries and coastal systems. Areas that typically experience water column stratification at the saltwater and freshwater interface were more saline in 2002 and thus less stratified. Water quality problems associated with stratification, such as hypoxia, were reported on a much smaller scale in coastal areas. Less freshwater input into reservoirs and estuaries also meant less input of the nutrients responsible for algal blooms often associated with fish kills. ESB staff received 31% fewer reports of algal blooms statewide when compared to 2001. It was anticipated that freshwater fish species in coastal areas would suffer from saltwater intrusion into creeks and rivers as a result of the drought. Investigators reported eight kill events where saltwater stress may have played a role, far fewer than the number expected. Some investigators concluded that freshwater species were able to move far enough upstream to avoid salty conditions, or they were more tolerant of those conditions than expected.

Appendix A : Fish mortality by basin, 1996 - 2002



Appendix B: Fish kills reported to DWQ

Date	Subbasin	Kill Number	Waterbody	Location	County	Fish Species	Mortality	Comments
1/3/2002	030501	WL02002	Pasture Branch	near Molly's Landing	Onslow	Mullet	540	Water quality measurements were normal at time of investigation. Investigators suspected extreme cold mayy have induced kill.
1/3/2002	030502	WL02001	New River	US 17 in Jacksonville	Onslow	White perch	30	Water quality readings were normal at time of investigation. Marine patrol indicated fish looked fine with no sores or injuries. Investigators suspected cold temperatures induced kill.
1/10/2002	030716	FA02001	Hitchcock Creek	Lake McKinney	Richmond	Bluegill, Largemouth bass, Chain pickerel, Pirate perch, Catfish	70	Kill caused by uncured concrete coming in contact with water below Lake McKinney spillway. No fines or penalties assessed by NCWRC.
1/24/2002	030307	WA02001	Bay Lake		Beaufort	shad, sunfish, perch, catfish, gar	500	Cause of fish kill is unknown, fish found at event were severely decomposed and water conditions were within resonable expectations. The weather on the day the kill was reported was 70+ F and winds 20+ WSW, and there were multiple rainfall events within the last two weeks. Past several days were rainy with aprox. 1.5" rain. Fish had been reported dead one or two here and there within the last week or so, wind had pushed all of dead fish together in corner of canal and drawn the attention of residents. Salt was high and DO was low in some canals. Canals closest to outlet were fresher with normal DO those farthest from canal outlet were salter and had lower DO near the bottom.
1/25/2002	030407	WA02002	Private Pond	near Farmville	Pitt	shad, sunfish, perch	3800	Community fishing pond next to Farmville Waste Water Treatment Plant. Past several days were rainy with aprox. 1.5" rain. Most of fish were several days dead with a few that had died with in a day (still had color to scales). Area around pond was mostly swamp, readings at the time of investigation were with in normal range. Overflow from swamp could have caused pond to turn over.
4/4/2002	030623	WL02003	Floyd Lake		Onslow	sunfish	200	Lake level extremly low - pond had become 2 water bodies. Kill occurred in the larger, deeper pond. Two stations were sampled in the larger pond, one station in the smaller pond. A cold front came in overnight (after the kill) and it was overcast.

Date	Subbasin	Kill Number	Waterbody	Location	County	Fish Species	Mortality	Comments
4/12/2002	030307	WA02003	Canal	Middle Street Aurora	Beaufort	sunfish, largemouth bass, mosquito fish	50	Fish seen floating along the surface being pushed out toward main body of Pamlico river. Neighbor along the canal reported seeing dead fish on 4/11/02. Parameters were within normal ranges for south side of Middle St. with the exception of high DO % Sat., bloom suspected. Parameters on the north side of Middle St. had a low DO. Other canals were obseved in the area and a few dead fish were also found in them, again parameters for these canals were with in normal ranges. Water samples contained a dense algal bloom of dinoflagellates, ciliates, and some euglenoids and cryptomonads.
4/14/2002	030413	WA02004	Alligator Creek	NC 55 near Stonewall	Pamlico	Menhaden	3060	Fish kill took place in Pamlico Co. on Alligator Cr. The kill spanned for a quarter mile downstream from HWY55 bridge south of the town of Stonewall. Only menhaden were observed in the kill, none with lesions. The fish appeared to be around 24hrs old. The creek is very shallow and narrow and there were thunderstorms moving through the area for a couple of days. There was an algal bloom present and samples were taken.
4/18/2002	040306	AS02001	Cane Creek	at Bakersville	Mitchell	Trout, Northern hogsucker, sunfish, stoneroller, bluehead chub,	1062	Kill event was caused by a petroleum spill into Cane Creek on 4/16/02. Most fish appeared to have died quickly from an acute event and did not show signs of disease. Many carcasses contained residues of petroleum. NCWRC requested a reimbursment from the responsible party of $1825.
4/19/2002	030617	WL02004	Pete Dye Lake		New Hanover	Carp, Bass, Sunfish, Eel	200	Investigators suspected prior application of copper based algaecide as cause for kill. 5 gallons of Cutrine Plus applied 3 days prior to event. Lake is also shallow and in the vicinity of golf course with no buffers. The lake has experienced fish kill events at numerous times in the past.
4/24/2002	030622	WL02005	Nash Johnson Lake		Duplin	Sunfish, Bass	1000	Water at time of investigation described as green with floating filamentous mats. Water samples analyzed by ESB didi not show evidence of bloom event.
5/9/2002	030307	WA02005	Pamlico River	Hawkins Beach	Beaufort	Menhaden	250	95 percent of affected fish had lesions. Increasing water temperatures and sudden changes in water conditions due to wind shifts may have caused a marked change in DO or salinity. Lesioned fish may not have been able to adjust to these changes, having difficulty in osmoregulating and moving to areas where oxygen, salinity, and temperatures would not have been at such stressful levels.

Date	Subbasin	Kill Number	Waterbody	Location	County	Fish Species	Mortality	Comments
5/12/2002	030104	WA02006	Village Creek	Edenton	Chowan	Shad, bluegill, Largemouth bass, White Catfish	500	Discharge water from a fire at the Chowan Veneer facility on Thursday, May 9, was observed running into the headwaters of Village Creek. Firefighters placed hay at the entry and exit outlets on a small impoundment on Village Creek to contain the runoff. No chemicals were known to be in the plant during the time of the fire, with the exception of wood dye (makeup unknown). The cause of the fire was traced to a faulty conveyor belt; the origin of the fire was not under suspicion.
5/22/2002	030710	FA02002	Pee Dee River	Below Tillery Dam	Montgomery	Treadfin Shad	3000	CP&L biologists investigated the kill. They suspect that shad were schooling near the dam and high wind and wave action forced them over the dam and into the tailrace. Mortalities appeared to be a result of falling over the dam and hitting the dam apron. Dam operators had noticed large schools of shad in the forebay area preceeding kill.
6/1/2002	030618	FA02003	Black Lake	behind Clubhouse	Bladen	Yellow perch	300	Hot weather days prior. No causes suggested by investigators.
6/5/2002	030409	WA02007	Weyerhaeuser Pond		Pitt	Sunfish, Carp, Largemouth bass	200	A fire occurred at the Weyerhaeuser saw mill on Saturday, June 1, 2002 around 5:00. After the fire, many aeriation pumps were turned off. The pond where the fish were dead is the last in a series before it discharges into Little Swift Creek. This pond is the last to receive flow and aeriation. The intense heat combined with shallow water is believed to be the reason for the low dissolved oxygen.
6/17/2002	030410	WA02008	Slocum Creek	Near Cherry Point	Craven	Channel catfish	62	Approximately 62 Channel catfish were found severely decomposed in the upper reaches of navigable waters of Slocum Cr. Dissolved oxygen levels were found to be less than 1 mg/L from 1 meter down to the bottom in the area of the fishkill. Heavy rains two days prior most likely caused a flushing type event, which pushed stagnant water from upstream areas containing very little if any dissolved oxygen into the area of the fishkill. Persistant drought conditions have caused many creeks along the neuse River estuary to become highly saline which could also stress freshwater fish species. Salinity levels at the site of the fishkill were higher than expected, and were found throughout most of the water column. In the area of the fishkill thousands of healthy Atlantic Menhaden were observed swimming in the uppermost layer of the water column. No other species were found dead in this fishkill, although several other were observed in the area after the event.

Date	Subbasin	Kill Number	Waterbody	Location	County	Fish Species	Mortality	Comments
7/2/2002	030153	WA02023	Albemarle Sound	Hwy 32, Mackeys side	Tyrrell	Menhaden	1000	Mr. Winslow called PRRT and reported that DMF had responded to a fish kill. Approximately 1000 menhaden 8-9" in length washed along shore. The fish had no signs of lesions and were decaying. DO levels 8 mg/L, salinity 4.1 ppt and water temp. 28.5-30.3°C. DMF officials believe the kill to be a release of eel pot bait.
7/3/2002	030410	WA02009	Neuse River	near Fairfield Harbor	Craven	Atlantic menhaden	400	A small kill comprised of Atlantic Menhaden with all fish showing lesions. This kill is most likely a result of high temperatures stressing lesioned fish. Many healthy schools were sampled in the area of the kill and those fish that were sampled showed less than 1% lesions. No algae bloom activity was found at the kill area and most fish were found in a small very shallow bay.
7/4/2002	030410	WA02010	Neuse River	Bridgeton	Craven	Atlantic menhaden, Striped Bass	6500	Approximately 6500 dead Atlantic Menhaden were found along a stretch of the Neuse River at Bridgeton. Fish appeared to be around 12 hours old, and had died in the area offshore of Bridgeton and were blown onto the shoreline, and into grass beds along the eastern shoreline of the Neuse River. Conditions in the area of the fishkill were stratified for several days prior to this event and, several smaller similar kills had also occured just downstream along the same shoreline. Hot conditions and a persistant salt wedge caused severe stratification in the Neuse River from Johnson Pt. to upstream of New Bern. These conditions most likely caused the death of lesioned fish swimming in that area due to added stress of high water temperatures, and low oxygen conditions.
7/7/2002	030502	WL02006	Little Northeast Creek	Jacksonville	Onslow	Largemouth bass, Pickerel, Sunfish, Atlantic menhaden	150	A fish kill was investigated by NRRT on 7/7/02 at 14:30. Upon investigation approximately 150 mixed species of fish were found in Little Northeast Creek , a trib. of the New River. The fish apeared to be about 48hrs old with no obvious signs of sores or lesions. There had been severe thunder storms in the area two days before the kill was reported. The salinity in the creek was high and the DO was very low.
7/8/2002	030407	RA02001	Private Pond	near Stantonsburg	Wilson	Largemouth Bass, Sunfish, Minnows	196000	Ben Smith, Stantonsburg Wastewater Plant ORC, reported seeing fish mortality at about 8 PM July 6, and by 10 AM July 7, all activity had ceased. He measured DO on Sunday AM at about 0.5 mg/l. Strongly suspect hot pond water had relatively low DO, then rainstorm went to the bottom and caused the pond to "turn over". Investigator certain fish died from lack of oxygen. Impacted all sizes and all species over a short period of time.

Date	Subbasin	Kill Number	Waterbody	Location	County	Fish Species	Mortality	Comments
7/9/2002	030155	WA02011	Pamlico Sound	near Oregon Inlet	Dare	Flounder, Houndfish, Pinfish, Mullet, Toadfish	54	Commercial gill netting for flounder and mullet occuring in area prior to kill. Fish looked dead for quite some time. Investigators unable to definitely conclude that fish were net discards.
7/11/2002	030307	WA02012	Back Creek	near Hwy 92 Bridge	Beaufort	Croaker, Pinfish	33	Juvenile croakers 3- 5 in. in length were found over a 200m stretch of Back Creek, a tributary of Bath Creek. The fish appeared to have been dead for 12 - 24 hrs. Low DO levels and recent heavy storms may have contributed to the kill.
7/19/2002	030704	MO02001	High Rock Lake	Second Creek arm near Bringle Ferry	Rowan	Shad, Crappie, Catfish	2000	Water had receeded due to drought trapping fish in a shallow, isolated pool near the Bringle Ferry Rd. bridge. Fish most likely succumbed due to low dissolved oxygen levels.
7/29/2002	030704	MO02002	High Rock Lake	Crane Creek Arm	Rowan	Carp, Crappie, Catfish	1000	Water had receeded trapping fish in a shallow, isolated pool near the Goodman Lake Rd Bridge. Fish most likely succumbed due to low dissolved oxygen levels.
7/30/2002	030410	WA02013	Neuse River	between Stately and Carolina Pines	Craven	Croaker, Silver perch, Pinfish, Menhaden	25330	It is likely that these fish did not die in the area where they were counted. Northwest winds were blowing them into the Stately Pines/Carolina Pines area. Just upriver at CM# 11 and Flanner's Beach the water column was very stratified with very little if any DO in the lower layers. Water temperatures were over 32° C (90° F) throughout the area where dead fish were found. Nearly all of the fish found were juvenile, and were most likely killed by stress related to extremely high water temperatures/low DO.
7/30/2002	030704	WS02001	Peters Creek	Winston Salem	Forsyth	Sunfish, Suckers, Minnow Sp.	1000	Kill caused by a fire at P&B distributors on Chatham Street in Winston Salem on 7-30-02. Chemicals from the fire migrated to Peter's Creek
8/1/2002	030104	WA02014	Albemarle Sound	near Sandy Point	Beaufort	striped bass	150	NC DMF personnel discovered 150 dead striped bass in the Albemarle Sound from the Hwy 32 bridge west to the Chowan River bridge, a distance of approximately 7.6 mi. Although gill nets were present in the area, no apparent net marks were found on the fish. Dissolved Oxygen levels were within normal ranges, however high water temperatures throughout the kill zone may have been a contributing factor in the kill.

Date	Subbasin	Kill Number	Waterbody	Location	County	Fish Species	Mortality	Comments
8/3/2002	030152	WA02019	Yeopim River	near Bethel	Perquimans	none	2000	Approximately 1,000 dead clams in vicinity of boat ramp at Bethal Fishing Center on the Yeopim River. Most clams on shore were without shell. Several more clams floating in shell in water around boat ramp.
8/7/2002	030307	WA02015	Blounts Creek	below Hwy 33 Bridge	Beaufort	Catfish	50	Water was green in color . Several phyto samples were sent to ESB for analysis. Stress from high salinity and low Do were suspected as factors in the death of the fish. The phyto samples were dominated by a benign Peridinium dinoflagellate, and euglenoids were common.
8/8/2002	030152	WA02016	Canal off Albemarle Sound	near Holiday Island	Perquimans	Menhaden	300	300 menhaden observed floating on surface of water. Grayish film on water with thick mats of green algae and spots of duckweed. Homeowner reported that there has been no water movement since December. Fish are believed to have swam into area where the number of fish quickly reduced the amount of oxygen in the water to anoxic levels, thus killing the menhaden. No other fish species were present. There were also reports of approximately 75 canadian geese utilizing the area frequently, but no signs of fecal matter that could have affected the water.
8/9/2002	030401	RA02002	Private pond	Creedmore	Granville	Sunfish, Catfish, Carp, Largemouth bass	300	Rain and low pond levels prior to kill. Fish samples showed no signs of disease or lesions.
8/14/2002	030619	FA02004	Rice's Run	near Beaman Crossroads	Sampson	Warmouth	100	Fish apparently died from the lack of dissolved oxygen. The kill is a pool located beside SR 1335 on Rice's run which is a small trib. to Great Coharrie. DO was 0.33 mg/L. The pool had no flow associated with it. Weather conditions were hot, humid and dry.
8/21/2002	030706	WS02002	South Yadkin River	near Cooleemee	Davie	Clam Kill	1000	Investigators believe kill was caused by manipulation of pool area behind the run of the river water supply dam at Cooleemee. Two weeks prior to the event the dam gates were closed to raise pool levels above the dam . Except for seepage, no water was allowed to flow downstream from the dam during this time. Clams were reported killed from a lack of water flow.
8/22/2002	030153	WA02020	Albemarle Sound	Hwy 32 Bridge	Washington	Striped bass, White catfish	120	Most striped bass showed no signs of disease or lesions. Most fish seen on shore and decomposed. Water temperature was high and was suspected as a cause.

Date	Subbasin	Kill Number	Waterbody	Location	County	Fish Species	Mortality	Comments
8/23/2002	030307	WA02017	Blounts Creek	near Cotton Patch Landing	Beaufort	Catfish	13024	Extremely elevated salinity levels and low dissolved oxygen levels were the cause of the kill. Salinity readings of 12 ppt in a creek with an average reading of 3 ppt or below created stressful conditions too difficult for the fish to overcome. Some fish are still in distress, prolonging the kill.
8/23/2002	030307	WA02018	Chocowinity Creek	Hwy 33 Bridge	Beaufort	Catfish	500	Combination of high salinities and low DO stressed fish. At time of investigation there were approx. 3000 fish gasping for air upstream of bridge. Expected these fish to perish in next few days. Fish very visible from Hwy 33 bridge.
8/26/2002	030307	WA02021	South Creek	near Idalia	Beaufort	Carp, Catfish, Sunfish, Largemouth bass	850	Investigators responded to a call from a concerned citizen regarding dead carp in South Creek. The kill was several days old and the majority of fish were in advanced stages of decay. Low DO's and high salinity levels appeared to be the cause of the kill.
9/12/2002	030616	FA02005	White Lake		Bladen	Yellow perch	300	Water quality parameters within normal range at time of investigation.
9/16/2002	030616	FA02006	White Lake		Bladen	Largemouth bass, Yellow perch	200	Fish reported dead near marina on the downwind side of the lake.
9/27/2002	030704	WS02003	High Rock Lake	Abbotts Creek arm	Davidson	Carp, Sunfish, Crappie, Shad	1000	Investigators reported strong wastewater and sulfur smell in area. Water color reported as very dark.
10/2/2002	030617	WI02007	Rice Creek, Town Creek	At confluence	Brunswick	Striped mullet, Largemouth bass, Pickerel, Sunfish, Shad	50	Low dissolved oxygen levels reported throughout the sample area. Aquatic weed (Elodea?) very prevalent throughout the creeks.

Date	Subbasin	Kill Number	Waterbody	Location	County	Fish Species	Mortality	Comments
10/3/2002	030704	WS02004	High Rock Lake	Abbotts Creek Arm	Davidson	Carp, Striped bass	1000	Investigators reported ph and DO levels indicative of an algal bloom. Fish kill attributed to low DO levels. Water reported dark and turbid in some areas. Green surface film also observed in Abbotts Creek. Results of ESB analysis indicated that High Rock Lake (near Buddle Creek) experienced a extremely dense algal bloom (> 140,000 units/ml). The bloom was dominated by filamentous blue greens, primarily (36%) Oscillatoria geminata. O. geminata is a common bloom former and found in many waters throughout the state. The alga is known to discolor water and cause taste and odor problems.
10/15/2002	030153	WA02022	Thirty Foot Canal	between Phelps Lake and	Washington	Sunfish, Shad, Carp, Largemouth bass	200	none
10/31/2002	030835	MO02003	Ut to Clark Creek	near Newton	Catawba	Catfish	200	Most fish removed and buried before investigators arrived. Carp and sunfish were abundant in the pond and not affected. the Surface water samples contained filamentous bluegreen microalga Anabaena, a common species in North Carolina. Investigators suspected a bacterial infection of the catfish caused by environmental stress.

DENR Funds Transfers Authorized for State Fiscal Years 2001-2002 and 2002-2003

Budget Code	Fund Code	DENR Division	Transfer Amount
Funds transfers authorized by S.L. 2001-424 (SFY 2001-2002)			
24300	2106	DEH – Sleep Products	$46,437
24300	2331	DAQ – Air Permits	$77,889
24300	2735	DLR – Sedimentation Fees	$148,562
24300	2620	DLR – Land Env. Controls	$111,261
24300	2740	DLR – Dam Safety Account	$18,522
64305	6372	DWM – Inactive Haz. Sites Cleanup	$499,263
64305	6373	DWM – Emergency Response Fund	$49,771
24300	2341	DWQ – Water Permits	$371,682
64306	6341	DWQ – WW Treatment	$43,256
24300	2335	DWQ – Lab Certification Fees	$16,371
24300	2130	DWQ – Well Construction Fund	$18,134
24300	2310	DWQ – Oil Pollution Control	$8,170
24303	2980	DWQ – Wetlands Restoration	$3,400,000
		Total	**$4,809,318**
Funds transfers authorized by OSBM (SFY 2001-2002)			
24300	2333	DAQ – Clean Air Act	$100,000
24304	2980	DWQ – Wetlands Restoration	$1,000,000
64302	6715	DPR – Parks and Recreation Trust Fund	$5,000,000
64302	6710	DPR – Natural Heritage Trust Fund	$3,000,000
		Total	**$9,100,000**
Total funds authorized for SFY 2001-2002			
		Combined Total for SFY 2001-2002	**$13,909,318**
Funds transfers authorized by S.L. 2002-126 (SFY 2002-2003)			
24300	2104	ADM – Mooresville Regional Office Vending	$472
24308	2105	DEE – Environmental Education Certification	$10,000
24300	2331	DAQ – Air Permits	$250,000
24300	2106	DEH – Sleep Products	$300,000
24300	2754	DEH – On-site Wastewater Account	$10,900
24310	2711	DFR – Forestry Fire Suppression	$78,225
24310	2712	DFR – Forestry Restoration	$771,333
24308	2255	DFR – Special Air Operations	$6,759
24300	2610	DLR – Mineral Interest	$20,000
24300	2740	DLR – Dam Safety Account	$100,000
24300	2745	DLR – Mining Fees	$25,000
24300	2393	DWM – Septage Fees	$100,000
24308	2387	DWM – Hazardous Waste Fees	$68,189

24300	2341	DWQ – Water Permits	$1,000,000
24308	2465	MNS – Museum Nat. Sci./Scientific Publications	$3,177
24308	2515	DSWC – Agricultural Waste Small Farms	$20,000
24308	2520	DSWC – Animal Waste Cost Share	$500,000
64302	6710	DPR – Natural Heritage Trust Fund	$3,287,582
24308	2525	DSWC – Neuse Animal Waste Cost Share	$366,335
24300	2221	DFR – Bladen Lakes State Forest Fund	$440,000
		Total for SFY 2002-2003	**$7,357,972**

North Carolina Department of Environment and Natural Resources

Environmental Regulatory Compliance Activity in Calendar Year 2000

Readers are invited to send comments, questions and improvements.

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November 14, 2001

North Carolina Department of Environment and Natural Resources
Environmental Regulatory Compliance Activity in Calendar Year 2000

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INTRODUCTION

After taking office in January, Governor Mike Easley directed the Department of Environment and Natural Resource to strengthen North Carolina's environmental enforcement programs. As a first step in that process, Secretary Bill Ross initiated a department-wide review of the complex array of regulatory programs within DENR that promote compliance with environmental laws.

This report of environmental regulatory activities provides a basis from which to analyze DENR's enforcement activities across 14 regulatory programs during the last calendar year, from January through December 2000. With this information, the department will implement strategies to accomplish the Governor's goal of assuring that enforcement is strong, effective and fair.

The 15 programs reviewed in this report are:

- Air Quality
- Coastal Management
- Dam Safety
- Erosion & Sedimentation Control
- Groundwater (including Well Certification and Oil Pollution & Hazardous Substance Control)
- Hazardous Waste
- Mining
- National Pollutant Discharge Elimination System (NPDES)
- Non-Point Source Discharge
- On-Site Wastewater
- Public Water Supply
- Radiation Protection (including x-ray machines and tanning booths)
- Solid Waste
- Shellfish Sanitation
- Underground Storage Tanks

It is generally believed that an active inspection and enforcement presence ensures compliant behavior among those regulated by correcting current violations and by deterring future violations. This report is DENR's first attempt to evaluate departmental measures and provide analysis of compliance tools, most notably enforcement. Future reports will assess compliance assistance, education, and performance incentives. Limited experience indicates that these are valuable tools and deserve broader use.

Environmental regulatory agencies, including DENR, primarily focus on compliance with environmental laws. This focus creates an indirect relationship with the desired outcome of environmental protection and makes measuring results a challenge. Environmental protection is more accurately a measure of acceptable environmental impact determined through the process of making laws. DENR can easily compute activity measures that show adherence to the law, but less readily interpret environmental outcomes that occur either because of or in spite of environmental laws. Still, it is our responsibility to quantify the relationship between effectiveness of laws and the realized environmental benefits. This report begins the effort to link the two.

Why is compliance with laws and environmental protection not the same thing? Laws are subject to a process of negotiation to meet the needs of diverse interests in a society that measures progress in terms of economic development. While the environment can thrive without us, we cannot thrive without the environment. Sometimes we balance the benefits of economic development with the need for environmental protection as a means of compromise. More and more, we are finding ways that economic development and environmental protection can achieve mutually compatible outcomes.

Currently, there is limited dialogue among DENR enforcement practitioners about the job we do in maintaining compliance with environmental standards. This report aims to begin a continuing conversation in DENR's divisions about the value of our work and the results of our efforts. Although this report does not answer all the questions, it begins an internal process of asking quite a few of those questions.

Differences between the regulatory programs make comparative analysis complicated and can lead to faulty conclusions. Some programs regulate transient and temporary operations that need significant near-term oversite while other programs regulate stationary facilities that remain in place for years. Some programs regulate activities that occur at a limited number of industrial sites while other programs regulate activities occurring at any given homeowner's site. There are few similarities in the way these programs are managed or in their expected results.

BACKGROUND

Nearly four years ago, the Department of Environment and Natural Resources (DENR) began looking at how we ensure compliance with North Carolina environmental regulations. In the Division of Water Quality (DWQ), a new enforcement policy took effect July 1, 1998, resulting in a measurable improvement in compliance rates. As fines increased in the NPDES program, the compliance rate rose from a threshold barrier of 80% in 1998 to 88.4% in 2000 [*see Figure 4, page 12*].

Early in 1999, DENR decided to build on the success in DWQ to strengthen enforcement in DENR's other regulatory agencies. Senior management initiated a department-wide enforcement assessment designed to better understand DENR's strengths and weaknesses and identify opportunities for improvement.

The enforcement assessment was completed and released to the public on February 22, 2000 and called for DENR to create a set of departmental enforcement principles, develop meaningful performance measures, and improve public access to enforcement information.

On February 23, 2000, DENR chartered a team to develop a framework from which enforcement programs could implement the major recommendations. The team brought together DENR staff from various program perspectives within the department, all experienced practitioners in enforcement and compliance assistance. The team became known as the STEP Team, an acronym for Stewardship Through Enforcement Principles.

The STEP Team produced an implementation plan that provides a schedule to act on the major recommendations of the February 2000 assessment. The implementation plan also develops several stewardship strategies that will be implemented over the next several years.

Since the beginning of 2001, departmental enforcement received continuing support from the new administration. Bill Ross was named as secretary of DENR, and enforcement is strong among his priorities. In April of 2001, Secretary Ross directed staff to prepare this compliance report and establish calendar year 2000 as a baseline year to begin annual reporting.

HOW THIS REPORT IS ORGANIZED

This report presents key DENR activities for a strong enforcement program based on four departmental goals: fairness, focus, visibility, and timeliness. These goals are discussed in the following pages and expanded upon in the form of guiding principles. Goals and principles are denoted by headings followed by numerical measures and discussion text.

Certain discussion points are supplemented with background explanations found in text boxes. These supplemental boxes are provided to give readers a common orientation to the information presented in this report.

ENFORCEMENT GOALS: A STRONG ENFORCEMENT PROGRAM THAT IS FAIR, FOCUSED, VISIBLE, AND TIMELY

On March 31, 2000, DENR released a set of twelve guiding principles developed to ensure a strong enforcement program. These principles form the basis for performance measurement in this report and are based on the premise that when enforcement is necessary, it should be fair, focused, visible, and timely [*see Appendix F*]. These four goals are the cornerstones of DENR's enforcement program.

Fairness is the application of consistent decision-making criteria in determining appropriate penalties for all violations. Focus means to plan our enforcement activities for effectiveness and spend our resources where problems are likely to be found. Visibility ensures community awareness and maintains accountability of those responsible. Timeliness is a necessary goal to ensure that enforcement actions are meaningful and occur in close proximity to the violation.

Enforcement has traditionally been the most widely used and trusted tool to promote compliance. Enforcement is a process designed to deal selectively with sectors operating outside of the law and return them to compliance. Because non-compliant sectors represent the most obvious environmental threat, enforcement has been the tool of choice receiving priority in the allocation of limited resources.

Still, enforcement operates at the exact opposite end of the compliance spectrum from where communities want to be. The desired state is a conscientious community where everyone considers first his or her own accountability. Consider the prospect of a self-regulating community where citizens, business and government work together to take responsibility for environmental outcomes. DENR leadership recognizes the value of other compliance tools, in addition to enforcement, and is using them as appropriate to create desired results.

DENR's twelve principles establish a baseline of expected behavior and consequences of deviation from that behavior.

What are Compliance Tools?

DENR uses various methods to ensure adherence to environmental laws and regulations. Depending on the awareness and willingness of the regulated entity, one tool may prove more effective than another.

Enforcement is a critical tool applied to those who violate environmental standards. Enforcement can escalate from a simple warning to a civil penalty or a court injunction and even to criminal prosecution. If a simple warning will correct the situation, compliance is achieved with minimal resources spent. If stronger legal remedy is required, the process becomes long and costly for all involved.

Education is offered in most programs to provide those regulated with a clear understanding of the requirements they face. DENR divisions offer workshops and training conferences to help everyone achieve a threshold understanding of conditions for compliance. Some programs advertise in the media and launch awareness campaigns to help increase understanding. Other types of education include videos, brochures, and videoconferences.

Technical Assistance is a tool available to those who would seek and benefit from guidance. Technical staffs are made available to answer questions, interpret regulations and give advice. Other types of technical assistance include fact sheets, manuals, videos, and checklists.

Performance Incentives can be positive, such as awards and recognition, or negative, such as publicly noticing violators. Both types of incentives can achieve the desired result of compliance.

GOAL: Enforcement should be fair.

Each of the fourteen environmental regulatory enforcement programs included in this report uses standardized penalty assessment criteria based on degree of harm and deviation from regulatory requirements. The programs use matrix analyses, penalty trees, or some combination of the two to guide decision-making. Penalty assessment criteria for programs are found in either general statute or administrative code [*see side bar – What factors are considered in determining the penalty amount? on page 18*].

Some DENR enforcement programs consider the *actual* degree of harm, and others have the latitude by statute or regulation to consider the *potential* degree of harm. Fair processes should result in consistent decision making, yet provide flexibility to address issues that may be unique in certain programs. An important attribute of being fair is to keep faith with those who have demonstrated compliance by firmly dealing with those who are non-compliant.

In one program, On-Site Wastewater, the maximum allowable penalties are so limited by regulation that the program categorically uses the maximum allowable penalty for all assessments. For example, large system violators can not be assessed more than $300 even if they have multiple violations.

Programs that use a matrix analysis:
- Hazardous Waste
- NPDES
- Public Water Supply
- Solid Waste
- Underground Storage Tank

Programs that use a penalty tree:
- Air Quality
- Non-Point Source Discharge

Programs that use a matrix/tree in combination:
- Coastal Management.
- Groundwater Protection
- Radiation Protection

Programs that use a hybrid matrix:
- Erosion & Sedimentation Control
- Dam Safety
- Mining

Programs that apply maximum penalties in all cases:
- On-Site Wastewater

What is a penalty matrix?

Some programs calculate a penalty based on the relationship between the degree of harm caused or threatened by a violator and the extent that a violation deviates from the rules. The relationship is characterized as major, moderate or minor cells. At the intersection of the selected cell, a penalty range is isolated to guide the agency.

For example, a violation determined to be major for degree of harm and moderate in their deviation from the rules would be assessed from 60 – 80 percent of the maximum penalty. Factors that contribute to the gravity of the violation are offset by considerations for remission (e.g. good faith efforts to correct the violation).

Degree of Harm ☐ Potential ☐ Actual	Degree of Deviation from Requirement		
	MAJOR	MODERATE	MINOR
MAJOR	80 – 100%	60 – 80%	44 – 60%
MODERATE	32 – 44%	20 – 32%	12 – 20%
MINOR	6 – 12%	2 – 6%	1 – 2%
Degree of Harm Factors:		Degree of Deviation Factors:	
☐ Duration of Violation ☐ Area of Impact (size) ☐ Proximity to receptors ☐ Sector impacts (air, land, water) ☐ Health Impacts		☐ Administrative / Record Keeping ☐ Indirect sector impact ☐ Direct sector impact ☐ Undermines statute / regulation	

FIGURE 1. Generic Penalty Matrix Worksheet

What is a penalty tree?

Some programs use a penalty tree to guide their decision-making. When the violation is identified, a table indicates the base penalty amount which can then be increased or decreased based on aggravating or mitigating factors [*see side bar – What factors are considered in determining the penalty amount? on page 18*].

2.0 NON-PERMITTED ACTIVITY		
Class	Violation	Amount
2.1	operating without a permit	$4,000
2.2	failure to submit reports	$500

FIGURE 2. Generic Penalty Tree

GOAL: Enforcement should be focused.

DENR compliance programs plan their inspection activities annually, ideally focusing on sectors that are likely to have compliance difficulty. DENR's awareness of these sectors may come from community complaints, from data that reveal a pattern of repeat violations, or from other sources. In all cases, DENR inspectors are assigned to monitor compliance, but inspection rates are not the same from one program to the next. Some programs need higher frequency of inspection because of the amount of damage that can be done in a very limited amount of time. Other programs can supplement physical inspections with automated monitoring data. Because different inspection strategies are used depending on program needs and resource availability, it is not helpful to compare inspection rates across different programs.

The Erosion and Sedimentation Control Program regulates over 7000 active land disturbing activities at any given time. Temporary control structures, used to prevent offsite sedimentation at construction sites, require proper installation and regular maintenance to remain effective. Changing weather conditions and human error can virtually eliminate their usefulness in a very short period of time.

Three studies[1] during the past eleven years have concluded that land disturbing activities need more frequent inspections than current levels to determine compliance with the Sedimentation Pollution Control Act of 1973. The most recent study, by Dr. Seth R. Reice and Richard N. Andrews, found a direct correlation between downstream water quality and frequency of sedimentation compliance inspection. A Sedimentation Control Commission study in 1997 recommended to the Governor that land disturbing activities be inspected at least once a month. This increased level of oversite would require a total of 133 technical positions. The Land Quality Section currently has 34 positions. At the current staffing level, Land Quality staff inspect sites on the average about once every 4 to 4.5 months.

Many programs with lower inspection frequencies rely on monitoring data that are routinely submitted without an inspection. It is not the goal of these programs to inspect every site every year. For example, the Division of Air Quality inspection rate (61 percent) exceeds EPA's most recent guidance on compliance monitoring, which recommends one inspection every five years at smaller sources and one inspection every two or three years at major sources. Unlike the Erosion and Sedimentation Control Program, Air Quality sites are usually fixed long-term facilities.

[1] Evaluation of the North Carolina Erosion and Sedimentation Control Program prepared by the Department of Civil Engineering, NCSU and the Department of City and Regional Planning, UNC Chapel Hill July 2. 1990.

Sedimentation Control Commission's Plan of Action prepared by the Sedimentation Control Commission and its Technical Advisory Committee adopted November 19, 1997.

Effectiveness of Regulatory Incentives for Sediment Pollution Prevention: Evaluation Through Policy Analysis and Biomonitoring prepared by Seth R. Reice and Richard N. Andrews, UNC-Chapel Hill, December 15, 2000.

What do we mean by "Sectors"?

Sectors are identifiable groups with common business practices who are likely to be subject to the same environmental requirements. Some readily distinguished sectors include universities, electroplating operations, dairy farms, textile industry and dry cleaners.

Sectors may be targeted for compliance purposes, including site visits, inspections, training and technical assistance that is tailored to meet their specific needs.

GOAL: Enforcement should be visible.

Regulated entities are accountable to their communities, especially when they have violated environmental requirements. Community awareness ensures that violators can demonstrate their future intent to be good stewards of the environment. Additionally, negative publicity is a potent deterrent. Any enforcement action carries the potential to reach other regulated entities and impress upon them the value of maintaining compliance.

Future activities in DENR will build on our current philosophy of access to information. More enforcement information will be made available on the Internet. DENR's information systems will be enhanced and integrated to allow easier access to our programs.

DENR makes enforcement activity public at www.enr.state.nc.us/novs/index.htm. Information is updated monthly.

Who does enforcement in DENR?

Division of Air Quality – Regulates air pollution including open burning, Title V permitting and state .0300 permits
Division of Coastal Management – Regulates development within areas of environmental concern within the 20 coastal counties
Division of Environmental Health – Regulates public water supplies, On-Site wastewater systems, shellfish sanitation and restaurant sanitation grades
Division of Land Resources – Regulates mining, erosion and sedimentation control, and dam safety
Division of Radiation Protection – Monitors radiation sources from power plants and medical facilities
Division of Waste Management – Regulates solid waste disposal, hazardous waste management, underground storage tanks and superfund cleanups
Division of Water Quality – Regulates water pollution including surface water quality, ground water quality, well-driller certifications, wetlands, storm water and municipal water treatment

See Appendix C for detailed descriptions.

GOAL: Enforcement should be timely.

Currently, DENR divisions are assessing – and in some cases have changed – their enforcement processes to remove steps in the process that can cause delay. Historically, compliance actions generated in the field have gone through the organizational hierarchy, ultimately to the division director, prior to being decided.

Some programs have delegated the authority to levels in the organization closer to the point of origination. This saves time and allows for decision-makers in closer proximity to the situation to determine the compliance remedy.

The DENR administration is addressing issues of timeliness and has developed, with the STEP Team, a strategy to implement delegated decision making. The strategy would include:

- Targeted training for regional decision-makers;
- Standard decision matrices;
- A departmental tracking system;
- Conditional delegation.

PRINCIPLE: Compliance is the first step toward the ultimate goal of stewardship.

Measure:	Division Compliance Rates
Result:	Values vary. See text below.

Until more sophisticated data gathering is institutionalized, this measure has limited reliability. Compliance rate is based on inspections and only provides information about a percentage of those regulated. Inspections may have occurred randomly or they may have been targeted. Multiple inspections may have occurred at one site or several. In other words, any two inspections may represent single visits to two sites, or duplicate visits to one site. Still the information has value in revealing the level of compliance that can be expected at sites that we select for inspection, even though inference cannot be made regarding those facilities that were not inspected. Despite our concern about reliability, we decided to present the data that is available until a better measure is developed.

Lower compliance rates are not necessarily a concern. For example, the compliance rate in the Division of Air Quality (DAQ) is 64 percent. This relatively lower rate is an expected outcome because DAQ inspections are targeted instead of random. Regional air personnel use inspection-targeting software that helps them locate places where they can expect to find violations.

Another reason for lower compliance rates in the Division of Air Quality is that the Title V program is newly established and the experience level of the regulated community is low. Air program inspectors are conducting thorough inspections and finding a high rate of violations at the facilities that have recently received their Title V permits.

In some cases, higher compliance rates are expected. For example, the Shellfish Sanitation Section reports a compliance rate of 100 percent. Since they inspect seafood dealers, the consequences of low compliance rates are a more immediate threat to public health. The section does not issue notices of violation (NOV's) but rather denies certification for violators. In other words, violators are shut down. The certification process is similar to the restaurant inspection and certification program. Only certified facilities are allowed to open.

In Public Water Supply, the compliance rate is reported two ways, both different from our departmental definition (see Appendix B). When based on exceedences of maximum contaminant levels, the compliance rate is 99 percent. When based on failure to perform all required tests, the compliance rate is 82 percent.

Measure:	Return to Compliance Rate
Result:	92 percent
[based on select measure – Hazardous Waste Section]	

In the hazardous waste regulatory system, 92 percent of the regulated facilities returned to compliance within time frames specified by the regulatory division. Only 1 of 13 facilities that were given deadlines to remedy compliance problems was not able to achieve compliance. In the absence of data from other programs in this baseline year, it is difficult to make inferences. In future reports, this information will be requested from all programs.

PRINCIPLE: Enforcement will be an effective deterrent against future violations.

Measure:	Civil Penalty Timelines
Result:	See Figure 3 below.

The average time across all programs from awareness of a violation to issuance of an NOV was 16 days. The average time from NOV issuance to penalty assessment ranges from 35 days in some programs to 423 days in others – the department mean is 144 days. In many instances, before a penalty is assessed, a follow-up inspection takes place. Each program gives the facility a certain amount of time (usually 30 – 60 days) to return to compliance. If the facility is not in compliance at the follow-up inspection, then a penalty may be assessed.

Resolution of contested civil penalty assessments is time consuming. The department mean from penalty assessment to penalty resolved through settlement or final action is 111 days, excluding facilities that choose not to contest their cases. Facilities that would have resolved the enforcement action beyond the calendar year cut off date are excluded as well.

The average time for facilities to pay their penalties in full once their cases were resolved was 20 days, ranging from 10 to 56 days. Cases that did not pay their penalty by December 31, 2000 are excluded from the data below.

How much does it cost to develop an enforcement case?

A true figure for this cost is not readily known. By law, civil penalty collections are distributed to public schools through the State School Technology Fund [NCGS Chapter 115C – 457.3]. DENR may keep the "cost of collection," up to 10 percent of the amount collected [NCGS Chapter 115C-457.2]. DENR cannot categorically attach a 10 percent cost recovery fee to the penalty, but must show cost accounting. At a 10 percent recovery rate, tracking costs can exceed the potential collection.

Timeliness of Penalty Collections in Calendar Year 2000
(of penalties assessed in calendar year 2000)

PROGRAMS	Average Number of Days from Violation Awareness to when NOV is Issued (for Cases where further Department Action was later taken)	Average Number of Days from when NOV is Issued until Penalty is Assessed Excluding Facilities that chose not to Contest their Cases	Average Number of Days from when Penalty is Assessed to when Penalty is Resolved through Settlement or Final Action as of 12/31/2000	Average Number of Days from when Penalty is Resolved through Settlement or Final Action to When Penalty is Paid in Full as of 12/31/2000
Sediment	not available	not available	not available	not available
Mining	not available	115	not available	10
Dams	n/a	n/a	n/a	n/a
Coastal Management	5	35	not available	not available
Groundwater	15	88	177	n/a
NPDES	not available	not available	not available	not available
Non Discharge	not available	not available	not available	not available
Solid Waste	6	196	n/a	n/a
Hazardous Waste	0	328 [2]	137	56
UST	not available	not available	not available	not available
Public Water Supply	5	151	not available	0
On-Site Wastewater	not available	78	n/a	30
X-Ray	n/a	n/a	n/a	n/a
Tanning	11	423	179	30
Radioactive Materials	n/a	n/a	n/a	n/a
Shellfish Sanitation	n/a	n/a	n/a	n/a
Air Quality	39	125	104	32
Department	16	144	111	20

FIGURE 3. n/a – not applicable, which is different than "not available". In cases where data is not available, either the data is not collected or programs are delegated to local government and records are not easily compiled. Programs that were unable to supply this data are currently reformatting their databases so this information will be available in future years.

[2] In the Hazardous Waste Program, it took 2,212 days to negotiate a consent agreement for one particular case. If this case were excluded, the average time to assess a penalty in that program would be 156 days.

PRINCIPLE: Enforcement will be an effective deterrent against future violations.

Measure:	Compliance Rate Related to Enforcement
Result:	See Figure 4.
[based on select measure – NPDES Program]	

In July of 1998, DWQ implemented an enforcement initiative. The goal of the initiative was to increase compliance by increasing enforcement activities. The initiative appears successful at achieving higher compliance rates over time.

It is unclear why the compliance rate actually began rising before enforcement cases were increased. To determine a causal relationship between the enforcement initiative and increased compliance rates over time, statistical analysis should be completed in future years.

NPDES Program: Number of Enforcement Cases vs. Compliance Rate of NPDES Dischargers

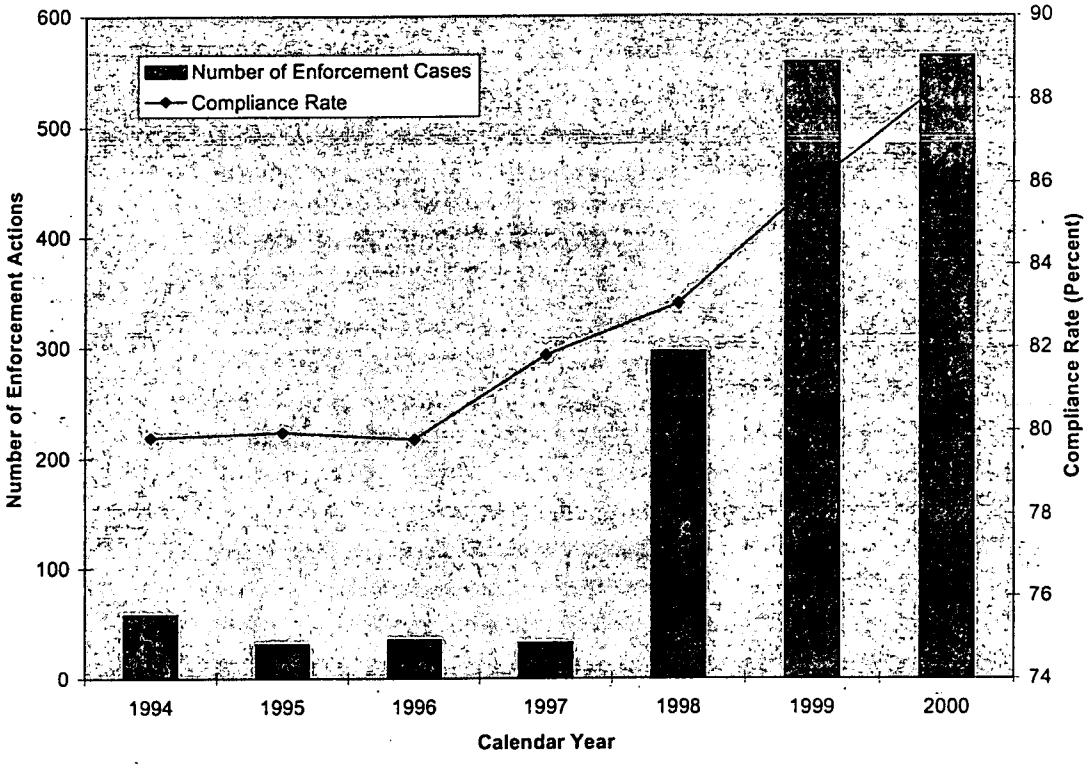

FIGURE 4. NOTE: This compliance rate calculation only includes discharge monitoring reports (DMRs). Other compliance rate calculations in this report include both DMRs and site visits.

PRINCIPLE: Enforcement will be an effective deterrent against future violations.

Measure:	Compliance Rate Related to Enforcement and Inspections
Result:	See Figures 5 & 6.
[based on select measure – Non-Point Source Discharge]	

This measure reflects DWQ's enforcement initiative. A combination of events may have led to decreases in surface water discharges. In 1999, inspection resources were increased to provide a dedicated inspector for each region. Enforcement activities increased as well. Mass mailings took place in May 1998, June 1999, and October 1999 to owners and operators notifying them of the new enforcement policy (made effective July 1, 1998) and new legislation regarding their systems.

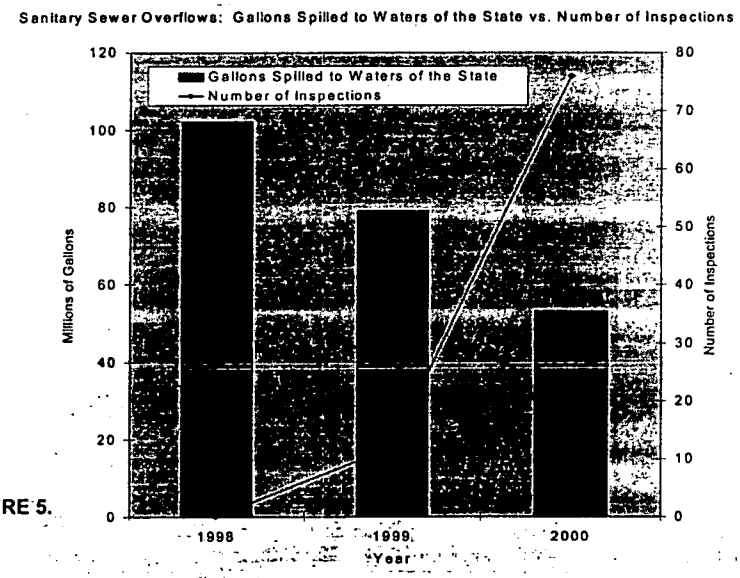

FIGURE 5.

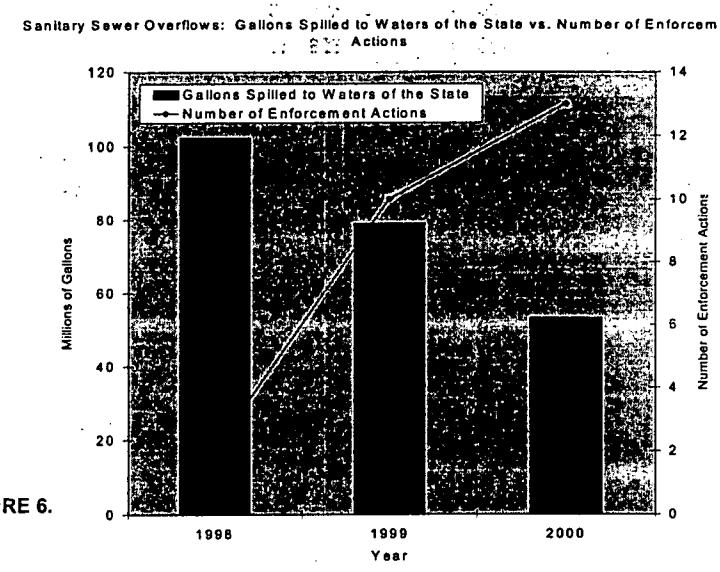

FIGURE 6.

PRINCIPLE: Enforcement will be an effective deterrent against future violations.

Measure:	Civil Penalty Dollar Amounts	
Result:	Total amount	$6,138,837
	Highest amount	$198,194
	Average amount	$3,054

Sediment, NPDES, and Air Quality programs assessed the highest penalty amounts in the department - each from about 1 – 1.5 million dollars for calendar year 2000. The department total is $6,138,837. Average individual penalty assessments vary from around $350 for Coastal Management to $58,153 in the Hazardous Waste Program. The department average is $3,054.

The highest penalty assessed in 2000 was in the Air Quality Program – $198,194. This occurred at a site with over 200 violations and a poor compliance history. Air Quality's average penalty assessment was $2,784. [*see side bar – What are the maximum daily civil penalties in DENR? on page 17*]

As a matter of principle and as a matter of fact, DENR's interest in penalties is not to generate revenue, but rather to change the behavior of regulated persons who violate environmental laws. The proceeds from penalties do not benefit DENR, but are distributed to public schools through the State School Technology Fund. [*see sidebar – How much does it cost to develop an enforcement case? on page 11*]

CIVIL PENALTY ASSESSMENTS IN CALENDAR YEAR 2000				
PROGRAMS	Number of Penalties	Total Dollar Amount	Average Dollar Amount	Highest Dollar Amount
Sedimentation	94	$1,002,955	$10,670	$121,440
Mining	8	$83,940	$10,493	$55,800
Dams	0	n/a	n/a	n/a
Coastal Management	83	$29,550	$356	$1,000
Groundwater	65	$135,125	$2,079	$21,200
NPDES	660	$1,526,740	$2,313	$78,167
Non-Discharge	106	$628,450	$5,929	$55,750
Solid Waste	5	$41,995	$8,399	$13,625
Hazardous Waste	13	$755,983	$58,153	$147,998
UST	90	$561,184	$6,235	$28,278
Public Water Supply	435	$201,380	$463	$5,040
On-site Wastewater	16	$8,800	$550	$7,200
X-Ray	1	$750	$750	$750
Tanning	35	$51,050	$1,459	$3,050
Radioactive Materials	0	n/a	n/a	n/a
Shellfish Sanitation	0	n/a	n/a	n/a
Air Quality	399	$1,110,935	$2,784	$198,194
DEPARTMENT	2010	$6,138,837	$3,054	$198,194

FIGURE 7.

PRINCIPLE: Enforcement will be an effective deterrent against future violations.

Measure:	Penalty Collection Information
Result:	See Figure 8.

The penalty amount established through settlement, agreement or final action is $1,766,990. Differences between penalty assessments and resolved penalty amounts vary between programs. Some programs assess penalties frequently using lower dollar amounts while other programs use penalties sparingly but assess high penalties when needed. More cases are contested when penalty assessments are high, resulting is lower resolved penalty amounts.

The penalty assessment and resolved penalty dollar figures do not include investigative costs or costs incurred by facilities for fixing their environmental harm. This increases the facilities' cost of noncompliance when all dollar amounts are included.

How are penalties reduced from originally assessed amounts?

State law provides for review and possible reduction of civil penalty assessments through administrative processes including requests for penalty remission and formal appeals. Processes may vary from program to program, but a right to appeal exists under every program.

When an agency assesses a penalty and the violator chooses to appeal instead of pay the fine, the penalty will go through several different steps to reach a final resolution. Independent commissions, DENR's secretary, the Office of Administrative Hearings (OAH) and the courts can all play a role in determining the final amount of a penalty that is contested.

OAH conducts a hearing and issues a recommended decision. Depending on the program, the case then goes to the DENR secretary, the state health director or an independent citizen commission for final decision. If none of these avenues produce a result accepted by the violator, the case can then go to the courts for resolution.

Sometimes violators choose not to contest the factual circumstances that led to the penalty, but will pursue settlement of the case — either directly with the state agency or through the Attorney General's Office — to avoid lengthy administrative hearings or court action. Reductions in penalties may be established through penalty remission procedures established by independent commissions or through an even less formal negotiation process.

Penalty Collection Information for Calendar Year 2000

PROGRAMS	Total Number of Penalties Assessed	Total Dollar Amount of Penalties Originally Assessed	Total Dollar Amount of Penalties Established through Settlement or Final Action as of 12/31/2000	Percent of Cases Where Penalty Amount has not yet been Established Through Settlement or Final Action as of 12/31/2000	Total Dollar Amount of Penalties Collected as of 12/31/2000
Sedimentation	94	$1,002,955	$261,495	7%	$205,976
Mining	8	$83,940	$13,100	38%	$13,100
Dams	0	$0	n/a	n/a	$0
Coastal Management	83	$29,550	$26,950	8%	$26,950
Groundwater	65	$135,125	$125,725	not available	$28,461
NPDES	660	$1,526,740	not available	not available	$667,106
Non-Discharge	106	$628,450	not available	not available	$195,560
Solid Waste	5	$41,995	$25,220	20%	$3,500
Hazardous Waste	13	$755,983	$158,244	23%	$138,787
UST	90	$561,184	$502,292	11%	$136,002
Public Water Supply	435	$201,380	$135,860	0%	$15,130
On-Site Wastewater	16	$8,800	$8,800	0%	$7,650
X-Ray	1	$750	$0	0%	$0
Tanning	35	$51,050	$42,650	3%	$2,788
Radioactive Materials	0	$0	n/a	n/a	$0
Shellfish Sanitation	n/a	$0	n/a	n/a	$0
Air Quality	399	$1,110,935	$425,942	20%	$308,216
Department	2,010	$6,138,837	$1,726,278	10%	$1,749,225

FIGURE 8.

PRINCIPLE: Enforcement will be an effective deterrent against future violations.

Measure:	Uncollected Penalty Totals from 1996 – 1999
Result:	$3,368,277

It is not possible to accurately determine penalty collections in the year the penalty is assessed. In contested cases, the legal process extends the time it takes to arrive at a penalty amount. Collection may occur weeks or months later. Many programs use payment plans for facilities that cannot afford to pay their penalty in full at once and collection occurs over several years.

It is possible, however, to review uncollected penalties over time and develop an understanding of trends in penalty collections. The data in figure 9 suggest that most penalties are paid within five years of the time they were first assessed. Almost all of the uncollected penalties are from 1998 and 1999 ($1,398,019 and $1,547,963 respectively).

In some cases, these penalties may no longer be collectable. For example, a violator may have filed bankruptcy. The department makes effort to collect on delinquent cases. Efforts include using liens or seizing property. Future reports will delineate the percentage of collectable penalties and separate non-collection based on business default.

These numbers represent a "snapshot" in year 2000 of penalties assessed in the previous four years. The amounts in each column are representative of that year alone as of December 31, 2000. The amounts are not accumulated from one year to the next. For example, in year 2000, there were no uncollected penalties in the Erosion and Sedimentation program from the year 1996.

The data does not always show a gradient trend of successively reduced amounts in earlier years. For example, the Public Water Supply Section has a large uncollected amount in 1998 but a significantly lower amount in 1999.

Uncollected Penalty Totals From Years 1996 – 1999 as of December 31, 2000

PROGRAMS	1996	1997	1998	1999	TOTAL
Sedimentation	$0	$58,800	$185,365	$583,225	$827,390
Mining	$0	$0	$63,250	$20,460	$83,710
Dams	$0	$0	$0	$0	$0
Coastal Management	$3,300	$5,800	$8,300	$2,475	$19,875
Groundwater	$3,863	$20,148	$166,861	$77,740	$268,612
NPDES	$23,909	$21,915	$148,967	$179,933	$374,723
Non Discharge	$0	$0	$32,605	$134,283	$166,889
Solid Waste	$15,600	$129,250	$22,125	$0	$166,975
Hazardous Waste	$0	$0	$1,235	$201,245	$202,480
UST	$0	$0	$19,603	$116,070	$135,674
Public Water Supply	$0	$71,800	$733,580	$187,945	$993,325
On-site Wastewater	$0	$0	$0	$0	$0
X-Ray	$0	$0	$0	$0	$0
Tanning	$1,250	$0	$0	$1,500	$2,750
Radioactive Materials	$0	$0	$0	$0	$0
Shellfish Sanitation	n/a	n/a	n/a	n/a	n/a
Air Quality	$59,794	$12,767	$28,753	$43,086	$144,400
Department	$107,115	$315,180	$1,398,019	$1,547,963	$3,368,277

FIGURE 9.

PRINCIPLE: Enforcement actions will increase in severity for regulated entities with poor compliance histories.

Measure:	Percent Repeat Violations
Result:	0.4 percent

Across all programs, less than one percent of sites – 1,397 – were found to have been in violation more than once during a five-year period from 1996-2000. This measure is based on those violations requiring more significant enforcement actions (e.g. penalty assessments, administrative orders, injunctions etc.) and excludes NOVs.

This measure is reliable to the extent enforcement programs focus inspections to re-inspect violators within a five year period. The department will test the validity of this measure in future years by ensuring follow-up inspections at sites that have violations.

In practice, compliance history is routinely considered as part of penalty assessment. Typically, the enforcement officer will bring the information to the division director or delegated authority and discuss previous violations when determining the amount of penalty [*see sidebar – What factors are considered in determining the penalty amount? on page 18*].

Compliance history is not currently tracked in a database for easy retrieval, but rather is found through file review. DENR does not yet have an integrated information management system to allow one program to investigate violations that may have occurred in other programs. Even to do so manually can be problematic since programs do not use identical facility identifications.

Developing common facility identification is the first step to realizing an integrated information system. This is being addressed now in the department through the work of the FITS (Facility Identification Template for States) Team.

What are the maximum daily civil penalties in DENR?

- **Air Quality** – $10,000 per day per violation [NCGS 143-215.114A (a)]
- **Coastal Management** – $250 per day (minor development), $2500 per day (major development) [NCGS 113A-126(d)]
- **Erosion and Sediment Control** – $5,000 per day [NCGS 113A-64(a)(1)]
- **Dam Safety** – $500 per day for each day of willful violation [NCGS 143-215.36.(b)(1) and(2)]
- **Hazardous Waste** – $25,000 per day 15A NCAC 13B Section .0702
- **Mining** – $500 per day; Mining without a permit $5,000 per day [NCGS 74-64(a)(1)a and b]
- **Non-Point Discharge** – $25,000 per day [NCGS 143-215.6A and 143B-282.1(b)]
- **NPDES** – $10,000 per violation per day; $25,000 if assessed in the past three years [NCGS 143-215.6A(a) and (b1)] NOTE: Repeat offenses will be considered for violations occurring within 5 years beginning October 1, 2002.
- **Solid Waste** – $5,000 per day; $25,000 per day for medical waste disposed on water first violation, $50,000 per day for subsequent violations [NCGS 130A-22(a)]; $50 per violation per tire improperly disposed [NC GS 130A-309.62]; $50 per violation for improper disposal of lead-acid batteries [NC GS 130A-309.70(c)]; $100 for improper disposal of white goods or failure to remove refrigerants [NC GS 130A-309.84]
- **Oil Pollution/Hazardous Substance Control** – $5,000 per day
- **On-Site Wastewater** – $50 per day (</= 480 gallon systems); $300 per day (>480 gallon systems) [NCGS 130A-22(c)]
- **Public Water Supply** – $25,000 per day [NCGS 130A-22(b)]
- **Radiation Protection** – $10,000 per day; Each day of continuing violation is a separate violation. [NCGS 104E-24(b)]
- **Underground Storage Tanks** – $10,000 per day per violation [NCGS 143-215.6A]
- **Well Construction** – $100 per day per violation [NCGS 87-94]

PRINCIPLE: Enforcement decisions will be defensible, documented, and proportional to the degree of potential harm.

Measure:	Percent of Civil Penalty Cases Contested
Result:	32 percent

Of the 2,010 civil penalty assessments in the department in year 2000, 32 percent were contested. Nearly all of the programs fall between 5 percent and 40 percent. A higher percentage of penalties are appealed in programs where higher penalties are assessed (e.g. Hazardous Waste). This number does not include instances where violators ignore compliance orders.

Percent of Penalty Assessment Cases Contested In Calendar Year 2000

PROGRAMS	Total Number of Penalties Assessed	Percent of Penalty Assessment Cases Contested
Sedimentation	94	76%
Mining	8	13%
Dams	0	n/a
Coastal Management	83	8%
Groundwater	65	2%
NPDES	660	39%
Non-Discharge	106	
Solid Waste	5	40%
Hazardous Waste	13	69%
UST	90	22%
Public Water Supply	435	34%
On-Site Wastewater	16	0%
X-Ray	1	100%
Tanning	35	6%
Radioactive Materials	0	n/a
Shellfish Sanitation	n/a	n/a
Air Quality	399	20%
Department	2,010	32%

FIGURE 10. n/a – not applicable which is different from "not available". In the case of Shellfish Sanitation, the data is not applicable because the program does not issue NOVs or penalty assessments for violations, but rather withholds certification effectively causing the violator to close.

What factors are considered in determining the penalty amount?

Most programs are bound by statute or regulation to consider the following factors in determining the amount of a penalty:

- Degree and extent of harm;
- Duration and gravity of the violation;
- Effect on media (air, water, land);
- Effect on public health;
- Cost of rectifying the damage;
- Any money saved by noncompliance;
- Cause (i.e. whether the violation resulted from negligent, reckless, willful, or intentional act or omission);
- Compliance history (prior record) of the violator.

Where is the Penalty Assessment Computation Criteria found?

- **Air Quality** – NCGS 143-215.114A(c), 143B-282.1(b) and 15A NCAC 02J .06
- **Dams** – NCGS 143-215.36(b)(3) and 15A NCAC 02K .0102
- **Coastal Management** – NCGS 113A-126(d)(4) and 15A NCAC 07J .0409(f)(3)
- **Erosion and Sediment Control** – NCGS 113A-64(a)(3) and 15A NCAC 04C. 0105
- **Hazardous Waste** – NCGS 130A-22(f) and 15A NCAC 13B Section .0702
- **Mining** – NCGS 74-64(a)(1)(c) and 15A NCAC 05D .0102
- **Non-Point Discharge** – NCGS 143-215.6A and 143B-282.1(b)
- **NPDES** – NCGS 143-215.6A and 143B-282.1(b)
- **Solid Waste** – NCGS 130A-22(f) and 15A NCAC 13B Section .0702
- **Oil Pollution/Hazardous Substance Control** – NCGS 143-215.91, recodified as NCGS 143-215.88A and B which references 143-215.6 recodified as 143-215.6A through 143-215.6C and 143B-282.1
- **On-site Wastewater** – NCGS 130A-22(b1), 15A NCAC 18A
- **Public Water Supply** – NCGS 130A-22(f) and 15A NCAC 18C .1906
- **Radiation Protection** – NCGS 104E-24(b)
- **Underground Storage Tanks** – NCGS 143-215.6A(c), which references 143B – 282.1(b)
- **Well Construction** – NCGS 87-94 references NCGS 143B-282.1(b) and NCGS 143-215.6A

NCGS – North Carolina General Statute
NCAC – North Carolina Administrative Code
Both can be found on the Internet at
http://www.ncgov.com/asp/subpages/intention.asp?P=2&I=82

Observations and Next Steps

This report is intended to establish a baseline of information that can be used to evaluate and improve DENR's performance in maintaining compliance with environmental laws and regulations. In issuing this report, the Department takes an important first step in developing a more comprehensive analysis of program activity and effectiveness.

Initial conclusions are difficult to reach because data systems within DENR do not support the collection of information that answers key questions. For example, it is important to understand the rate at which regulated parties are complying with environmental laws enforced by DENR programs. But determining compliance rates accurately requires a certain method of data collection that is not currently used in the Department. To answer questions surrounding compliance rates with greater certainty, DENR needs to gather data differently. Compliance contacts from the enforcement programs will meet with the department's STEP Team to develop an improved compliance rate measure and initiate better data collection practices.

Data were also not readily available to determine the timeliness of penalty collections in year 2000. Compliance programs will begin tracking cases through decision points in the enforcement process more closely to gain a better understanding of the steps involved in moving from the identification of a violation to ultimate penalty resolution.

As this report notes, the amount of penalties originally assessed is higher than the amount that Department actually ends up collecting from the violator. Several factors contribute to that outcome. One factor is fairness: those found in violation of environmental requirements are afforded a system of appeals and second review that can bring to light circumstances that merit a reduction in the penalty amount. Additionally, statutes provide for a process of penalty mitigation even where the violation is admitted and the penalty is not subject to judicial review. While DENR has some delegated authority in this area, ultimate decisions on mitigation lie with commissions.

Another factor in collections is allocation of resources. DENR staff – or Department of Justice attorneys – sometimes conclude that the resources required to litigate a case are too high to merit pursuing, so they settle for a smaller penalty in order to commit enforcement resources elsewhere. At other times, penalties prove to be uncollectible because violators have left the state's jurisdiction or gone bankrupt.

Risks associated with litigation can increase as facts and arguments come to light. Depending on the certainty of the case, sometimes settlement is a wise choice.

DENR is now analyzing the effect that each of these factors plays. The Department is also committed to helping the public and the regulated community gain a better understanding of the penalties process by making the enforcement process more transparent.

Following the Governor's direction, DENR is developing a "truth in penalties" program. Taking the data presented in this report, Department management will review the penalty processes program by program, and identify areas where action is needed to strengthen each program.

The Department will do all in its power to ensure that its enforcement actions lead to a final penalty that is proportional to the violation. Willful and egregious misconduct will be dealt with in a tough, coordinated fashion that takes full advantage of civil penalties and other authority available. The Department will also identify programs in which its regulatory authority is not sufficient to enforce the law adequately and to protect public health and the environment, so that a plan for enhancing this authority – whether through rulemaking or legislative change – can be developed and implemented.

Conclusion

This report is the department's first attempt to put in place a large-scale system of measurement for activities and outcomes related to our compliance programs. Many of the measures in this report are being generated for the first time and reveal gaps in our data systems that yield incomplete answers. Some measures are currently limited in scope and will be improved in future reports.

The department recognizes the need to continue developing measures that allow any interested person to evaluate the effectiveness of our enforcement programs. Not only do we need to assess the quality of our enforcement programs, but we should be able to link enforcement activities to trends in environmental quality. Ultimately, what matters is that healthy citizens live in a healthy environment.

The department has begun strengthening environmental information systems to facilitate better internal decision-making and to inform our constituents of enforcement and compliance related activities. Existing data systems are not yet integrated and only minimally support DENR's information needs for program planning, decision-making and communication. An integrated information management system will allow DENR to answer questions that are important to manage our enforcement programs.

The STEP Team's implementation plan is due to be released later in 2001 and will act on specific strategies designed to foster a stewardship culture within all North Carolina communities. These "stewardship strategies" will balance enforcement with other compliance tools and engage the community to take responsibility for environmental outcomes. Our intent is to share the responsibility of environmental protection rightfully with those in the communities who ultimately live with the consequences of environmental impact.

Currently, enforcement is a necessary tool to achieve the desired outcome of regulatory compliance. Moving into the 21st century, environmental stewardship will receive more attention as the department focuses on other compliance assistance tools for enhanced environmental protection. Business, government and community leaders need to share accountability as all parties value the health of citizens and their environment, and understand that a healthy economy cannot exist without a healthy environment.

Readers are invited to send suggestions, comments and questions that will help improve this report in future years. You may direct your comments to:

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Appendix A – Enforcement Profiles by Program

Air Quality	
Number of Regulated Sites	3,622
Number of Inspectors [Full-Time Equivalents (FTEs)]	12
Number of Inspections per year	2,206
Compliance Rate Among Inspected Sites [1]	64 %
Percent Repeat Violators [2]	–

[1] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[2] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Coastal Management	
Number of Regulated Sites [3]	4,206
Number of Inspectors (FTEs)	6
Number of Inspections per year	8,412
Compliance Rate Among Inspected Sites [4]	96 %
Percent Repeat Violators [5]	0.25%

[3] At any one time during the year

[4] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[5] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Dam Safety	
Number of Regulated Sites	4,305
Number of Inspectors (FTEs)	11
Number of Inspections per year	1,764
Compliance Rate Among Inspected Sites [6]	96 %
Percent Repeat Violators [7]	–

[6] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[7] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Erosion & Sedimentation Control	
Number of Regulated Sites [8]	7000
Number of Inspectors (FTEs)	34
Number of Inspections per year	15,445
Compliance Rate Among Inspected Sites [9]	95 %
Percent Repeat Violators [10]	0.1%

[8] At any one time during the year

[9] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[10] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Groundwater	
Number of Regulated Sites	19,100
Number of Inspectors (FTEs)	24
Number of Inspections per year	2,947
Compliance Rate Among Inspected Sites [11]	98 %
Percent Repeat Violators [12]	0.1%

[11] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[12] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Hazardous Waste	
Number of Regulated Sites	6,605
Number of Inspectors (FTEs)	10
Number of Inspections per year	997
Compliance Rate Among Inspected Sites [13]	83%
Percent Repeat Violators [14]	0.02%

[13] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[14] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Mining	
Number of Regulated Sites	898
Number of Inspectors (FTEs)	3
Number of Inspections per year	779
Compliance Rate Among Inspected Sites [15]	91%
Percent Repeat Violators [16]	0.1%

[15] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[16] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

NPDES	
Number of Regulated Sites	18,000
Number of Inspectors (FTEs)	28
Number of Inspections per year	1,203
Compliance Rate Among Inspected Sites [17]	93%
Percent Repeat Violators [18]	0.4%

[17] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[18] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Non-Point Source Discharge	
Number of Regulated Sites	3,473
Number of Inspectors (FTEs)	22
Number of Inspections per year	3,409
Compliance Rate Among Inspected Sites [19]	85%
Percent Repeat Violators [20]	0.4%

[19] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[20] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

On-Site Wastewater	
Number of Regulated Sites [21]	1,502,970
Number of Inspectors (FTEs)	632
Number of Inspections per year	not available
Compliance Rate Among Inspected Sites [22]	not available
Percent Repeat Violators [23]	not available

[21] On-Site Wastewater program is delegated to local government agencies. Number of regulated sites and number of inspectors reflects local government resources. All other data is based on state program activities alone.

[22] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[23] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Public Water Supply	
Number of Regulated Sites	7,695
Number of Inspectors (FTEs)	35
Number of Inspections per year	10,054
Compliance Rate Among Inspected Sites [24]	82%
Percent Repeat Violators [25]	1.5%

[24] Compliance rate based on population served with water improperly tested rather than violations based on inspections.

[25] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Radioactive Materials	
Number of Regulated Sites	679
Number of Inspectors (FTEs)	1.8
Number of Inspections per year	395
Compliance Rate Among Inspected Sites [26]	not available
Percent Repeat Violators [27]	0%

[28] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[27] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Shellfish Sanitation	
Number of Regulated Sites	149
Number of Inspectors (FTEs)	2
Number of Inspections per year	1,023
Compliance Rate Among Inspected Sites [28]	100%
Percent Repeat Violators [29]	0%

[28] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[29] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Solid Waste	
Number of Regulated Sites	685
Number of Inspectors (FTEs)	6.6
Number of Inspections per year	790
Compliance Rate Among Inspected Sites [30]	98%
Percent Repeat Violators [31]	0.1%

[30] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[31] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Tanning Booths	
Number of Regulated Sites	2,871
Number of Inspectors (FTEs)	3
Number of Inspections per year	1,142
Compliance Rate Among Inspected Sites [32]	68.4%
Percent Repeat Violators [33]	0%

[32] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[33] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Underground Storage Tanks	
Number of Regulated Sites	10,797
Number of Inspectors (FTEs)	13
Number of Inspections per year	2,122
Compliance Rate Among Inspected Sites [34]	76.1%
Percent Repeat Violators [35]	0.6%

[34] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[35] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

X-Ray Machines	
Number of Regulated Sites	6,017
Number of Inspectors (FTEs)	7
Number of Inspections per year	1,544
Compliance Rate Among Inspected Sites [36]	78.8%
Percent Repeat Violators [37]	0%

[38] Pending sophisticated data collection, this measure is unreliable to infer compliance rates at uninspected sites.

[37] NOVs are excluded from this measure to isolate more serious violations (e.g. penalty orders and injunctions).

Appendix B – Definitions of the Measures for this Report

Page 10. Compliance Rate

1. Percent – *[(1 - (in calendar year 2000, total number of enforcement actions ÷ total number of inspections)) × 100]. Enforcement actions include notices of violations (NOVs), civil penalties, injunctions, or special orders of consent (SOCs).*

Page 10. Return to Compliance Rate

1. Percent – *what percent of facilities were found to be in compliance at their follow-up compliance inspection (i.e. returned to compliance by their specified deadline)*

Page 11 – Figure 3. Timeliness of Penalty Collections in Calendar Year 2000 (of penalties assessed in calendar year 2000)

1. Time from Inspection to Issuance of NOV - *average number of days from when a violation was detected to when an NOV was issued*
2. Time from NOV Issuance to Penalty Assessment - *average number of days from when an NOV was issued to when a penalty was assessed (or in instances where the issuance of the NOV was skipped, the average number of days from when violation was detected to when penalty was issued).*
3. Time from Penalty Assessment to Penalty Established through settlement or final action - *average number of days from when a penalty was assessed to when the penalty was established (for penalties established as of 12/31/00). This number only includes facilities that chose to contest their case.*
4. Time from Penalty being established through settlement or final action to Penalty Paid in Full - *average number of days from when a penalty was established to when the penalty was paid in full (for penalties paid in full as of 12/31/00)*

Page 14 – Figure 7. Penalties Assessments in Calendar Year 2000

1. Number – *number of penalties assessed*
2. Total – *total dollar amount assessed*
3. Average – *average dollar amount assessed (Total/Number)*
4. Highest – *highest dollar amount assessed*

Page 15 – Figure 8. Penalty Collection Information for Calendar Year 2000

1. Total Established Through Settlement, Agreement or Final Action – *total dollar amount established as of 12/31/00 (i.e. the total dollar amount you expect to receive in penalty collections). This includes the total dollar amount that is finally agreed upon through negotiations (i.e. settlement amount) or through the appeals process (of all the facilities that decide to appeal) plus the total dollar amount assessed (of the facilities that choose not to appeal and time has expired for them to contest their penalty). This excludes cases that were appealed in calendar year 2000, but a settlement amount was not decided as of 12/31/00. This excludes cases where the facility still had time to contest their case as of 12/31/00 and has not yet appealed or paid their penalty in full as of 12/31/00.*
2. Percent of Cases Where the Penalty Amount has not yet been Established– *Cases still outstanding as of 12/31/00 [cases that were appealed in calendar year 2000, but a settlement amount was not decided as of 12/31/00 and cases where the facility still had time to contest their case as of 12/31/00 and has not yet appealed or paid their penalty in full as of 12/31/00].*
3. Total Collected – *the total dollar amount collected (through 12/31/00) for penalties assessed in 2000*

Page 16 – Figure 9. Penalty Collections Pending in Years 1996-1999 (as of 12/31/00)

1. Collections Pending (1996) – *penalties assessed in 1996 that have not been collected as of 12/31/00*
2. Collections Pending (1997) – *penalties assessed in 1997 that have not been collected as of 12/31/00*
3. Collections Pending (1998) – *penalties assessed in 1998 that have not been collected as of 12/31/00*
4. Collections Pending (1999) – *penalties assessed in 1999 that have not been collected as of 12/31/00*

Page 17. Repeat Violations

1. Number – *number of regulated entities with two or more enforcement actions over the last five calendar years (2000, 1999, 1998, 1997, and 1996). Enforcement actions include civil penalties, injunctions, or SOCs. NOVs are excluded from this measure.*
2. Percent – *[(number of regulated entities with two or more enforcement actions over the last five calendar years + 5) + total number of inspections in calendar year 2000]. Enforcement Actions include civil penalties, injunctions, or SOCs. NOVs are excluded from this measure.*

Page 18 – Figure 10. Percent of Civil Penalty Cases Contested in Calendar Year 2000

1. Percent – *of all civil penalties assessed in calendar year 2000, what percent were contested (as of 12/31/00)*

Appendix C – Program Descriptions

PROGRAM (DIVISION)	PROGRAM DESCRIPTION	EXAMPLES OF REGULATED ENTITIES
Division of Air Quality	The Division of Air Quality regulates the quality of air in North Carolina through technical assistance and enforcement of state and federal air pollution standards. The division issues permits, establishes ambient air quality standards, monitors the air quality of the state and implements a vehicle inspection/maintenance program in conjunction with the Division of Motor Vehicles (DOT).	• Industries with air emissions • Animal operations with liquid waste management systems
Division of Coastal Management	The Division of Coastal Management carries out the state's Coastal Area Management Act, the Dredge and Fill Law, and the federal Coastal Zone Management Act of 1972 (CZMA) in the 20 coastal counties, using rules and policies of the NC Coastal Resources Commission (CRC). Areas of environmental concern (AECs) are the foundation of the CRC's permitting program for coastal development. An AEC is an area of natural importance: it may be easily destroyed by erosion or flooding; or it may have environmental, social, economic, or aesthetic values that make it valuable to our state.	• Those proposing any development (construction, excavation, filling) in the coastal area and within an AEC
Non-point Source Discharge Unit (Division of Water Quality)	The Nonpoint Source Discharge Branch regulates a wide range of facilities that handle wastewater or biosolids but are not designed to discharge pollutants directly into a waterbody. The solids generated by any wastewater treatment facilities are regulated. The branch also oversees the Neuse and Tar Pamlico river basin buffer rules, wetlands development, and stream course modification. Oil and hazardous substances control, as they cannot be discharged, are regulated by the unit under the provisions of Article 21A.	• Animal farms • Municipal wastewater treatment plants that apply waste to land • Sewers • Industrial wastewater spray facilities • Developers that modify a stream course or move a wetland • Facilities that spill oil or hazardous materials in or near water
Groundwater Section (Division of Water Quality)	The Groundwater Section is the lead state agency for groundwater protection. Responsibilities include ground water pollution prevention, ground water quality classification and standards, review of permits for wastes that may enter the ground water, developing and implementing ground water clean-up requirements, promoting resource restoration, well construction rules, underground injection control, and ground water quality monitoring.	• Well contractors • Industrial and municipal wastewater treatment plants producing residuals needing disposal on land • Wastewater spray irrigation systems • Above-ground petroleum storage tank systems. • Parties causing groundwater pollution
NPDES Unit (Division of Water Quality)	The National Pollutant Discharge Elimination System (NPDES) is the federally-established program for controlling point-source discharges of pollution. The Clean Water Act of 1972 initiated strict control of wastewater discharges giving enforcement responsibility to the Environmental Protection Agency (EPA). The EPA delegated permitting authority to the State of North Carolina in 1975. The NPDES Unit is responsible for administering the program for the state.	• Municipal wastewater treatment plants • Industrial wastewater treatment plants • Subdivision wastewater treatment plants • Mobile home park wastewater treatment plants. • Animal farms

PROGRAM (DIVISION)	PROGRAM DESCRIPTION	EXAMPLES OF REGULATED ENTITIES
On-Site Wastewater Section (Division of Environmental Health)	The On-Site Wastewater Section regulates all wastewater collection, treatment, and disposal systems that do not discharge to surface waters. The department has delegated the permitting (>50k permits/year) and enforcement of the laws and rules to authorized environmental health specialists in local health departments	• Privies • Incinerating and composting toilets • Septic tank systems • Wastewater treatment plants and industrial process wastewater systems discharging to the subsurface • Modified, alternative, and innovative wastewater collection, treatment and disposal systems designed for subsurface disposal
Solid Waste Section (Division of Waste Management)	The Solid Waste Section regulates safe management of solid waste in North Carolina through guidance, technical assistance, regulations, permitting, environmental monitoring, compliance evaluation, and enforcement. Waste types handled at these facilities include municipal solid waste, industrial waste, construction and demolition waste, land-clearing waste, scrap tires, and medical waste.	• Landfills • Transfer stations • Incinerators • Treatment and processing facilities • Compost facilities • Land application sites for a variety of non-hazardous solid waste types
Underground Storage Tank Section (Division of Waste Management)	The Underground Storage Tank (UST) Section issues permits, collects annual fees and handles requests for information for regulated and/or commercial Underground Storage Tanks. The UST Section ensures compliance with all relevant state and federal laws, policies, rules and regulations by assisting owners and operators in complying with the operation standards (standards for leak detection, spill and overfill detection, etc.) and inventory record-keeping. In addition, the UST Section is charged with overseeing the permanent closure activities of UST systems.	• Gas stations • Any facility that uses USTs
X-Ray (Division of Radiation Protection)	The X-Ray Inspection Program inspects X-Ray machines and facilities to meet the regulations adopted by the Radiation Protection Commission to protect the public and workers against over-exposure to radiation. The program provides technical assistance to encourage x-ray exposure as low as reasonably achievable.	• Dental x-ray machines • Hospital x-ray machines • Industrial x-ray machines
Tanning (Division of Radiation Protection)	The Tanning Inspection Program inspects tanning machines and facilities to ensure compliance with the regulations adopted by the Radiation Protection Commission to protect the public. The program provides technical assistance to registrants and operators to encourage responsible operation of tanning facilities.	• Beauty shops • Spas • Video stores • Home-based commercial tanning facilities.
Radioactive Materials (Division of Radiation Protection)	The Radioactive Materials Program regulates the receipt, possession, use, transfer, and disposal of radioactive material and particle accelerators. The program inspects specific licensees periodically and general licensees as required. The program reviews and certifies new sealed radioactive sources manufactured in North Carolina.	• Nuclear medicine facilities • Civil engineering firms • Industrial radiographers • Research facilities
Dam Safety (Division of Land Resources)	The Dam Safety Program ensures the safety of the public from dam failures, the maintenance of water reservoirs and the maintenance of downstream minimum stream flows from dams. The Dam Safety Program performs inspections, reviews permit applications, and	• Owners of dams

PROGRAM (DIVISION)	PROGRAM DESCRIPTION	EXAMPLES OF REGULATED ENTITIES
	enforces the Dam Safety Law of 1967 to bring dams that pose a threat to human life or property into compliance with the requirements of the law. There are more than 5,000 dams on the state's inventory of dams, approximately 1,000 of which would cause probable loss of human life and/or extensive property damage in the event of dam failure. The program processes approximately 200 applications each year for the construction, repair modification, and removal of dams. The regional offices are responsible for inspection of dams and the initiation of enforcement for violations of the law.	
Erosion and Sedimentation Control (Division of Land Resources	The Erosion and Sedimentation Control Program prevents offsite sedimentation pollution from land disturbance activities. The program began in 1974 following the 1973 passage of the Sedimentation Pollution Control Act by the North Carolina General Assembly. The act is a performance-oriented legislation that establishes four mandatory standards. The regional offices are responsible for the review and approval of erosion control plans, inspection of land-disturbing activities and the initiation of enforcement for violations of the Act. The Land Quality Section received approximately 3,600 new erosion and sediment control plans in FY 2000, and has approximately 7,000 active projects.	• Builders of homes, subdivisions, commercial property, etc.
Public Water Supply Section (Division of Environmental Health)	The Public Water Supply Section promotes public health by ensuring that safe, potable water is available in adequate quantities to the residents and visitors of North Carolina served by public water systems by ensuring that such systems are properly located, constructed, and maintained. The section implements and enforces the provisions of the federal Safe Drinking Water Act in the state through a primacy agreement with the US Environmental Protection Agency.	• Public water systems with at least 15 service connections or that serve 25 or more individuals for 60 or more days per year
Hazardous Waste Section (Division of Waste Management)	The Hazardous Waste Section ensures the safe management of hazardous waste in North Carolina. The section applies the adopted federal rules that incorporate the Resource Conservation and Recovery Act (RCRA) requirements and additional state rules. In addition, the section oversees the RCRA Used Oil regulations.	• Small and large quantity generators • Hazardous waste transporters • Treatment / storage / disposal facilities • Facilities that are in various states of closure and post-closure • Used oil facilities
Shellfish Sanitation Section (Division of Environmental Health)	The Shellfish Sanitation Section protects the consuming public from shellfish and crustacea that could cause illness. Rules and regulations following national guidelines have been implemented to ensure the safety of harvesting waters and the proper sanitation of establishments that process shellfish and crustacea for sale to the general public.	• Shellfish and crustacea harvesters that sell to the public
Mining Program (Division of Land Resources)	The purpose of the Mining Program, as authorized by The Mining Act of 1971, is to ensure that mining operations protect the environment and public safety during mining and reclaim the mined land after mining. The Mining Program regulates approximately 900 mines. The Land Quality Central Office processes approximately 325 applications for new mines, renewals, and transfers and releases each year, and initiates and coordinates enforcement. The regional offices are responsible for inspection of the mine sites.	• Mining operations

Appendix D – Compliance Contacts

Compliance Contacts				
CONTACT	ORGANIZATION	VOICE NO.	FAX NO.	EMAIL ADDRESS
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Mell Nevils	Mining, Sedimentation, Dams	919-733-4574	919-733-2876	Mell.Nevils@ncmail.net
Jeff Poupart	Non-Point Source Discharge	733-5083 x527	919-733-0059	Jeff.Poupart@ncmail.net
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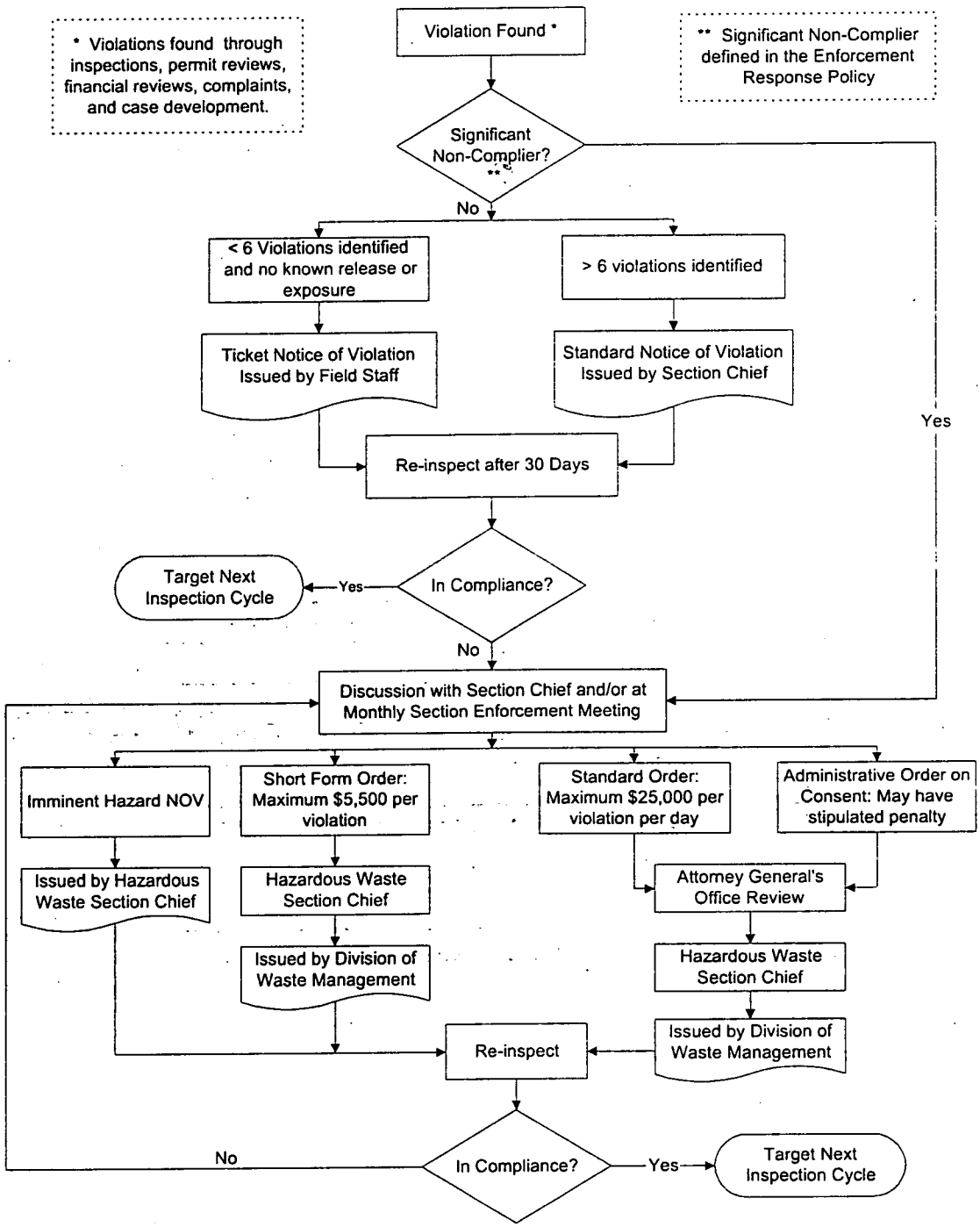
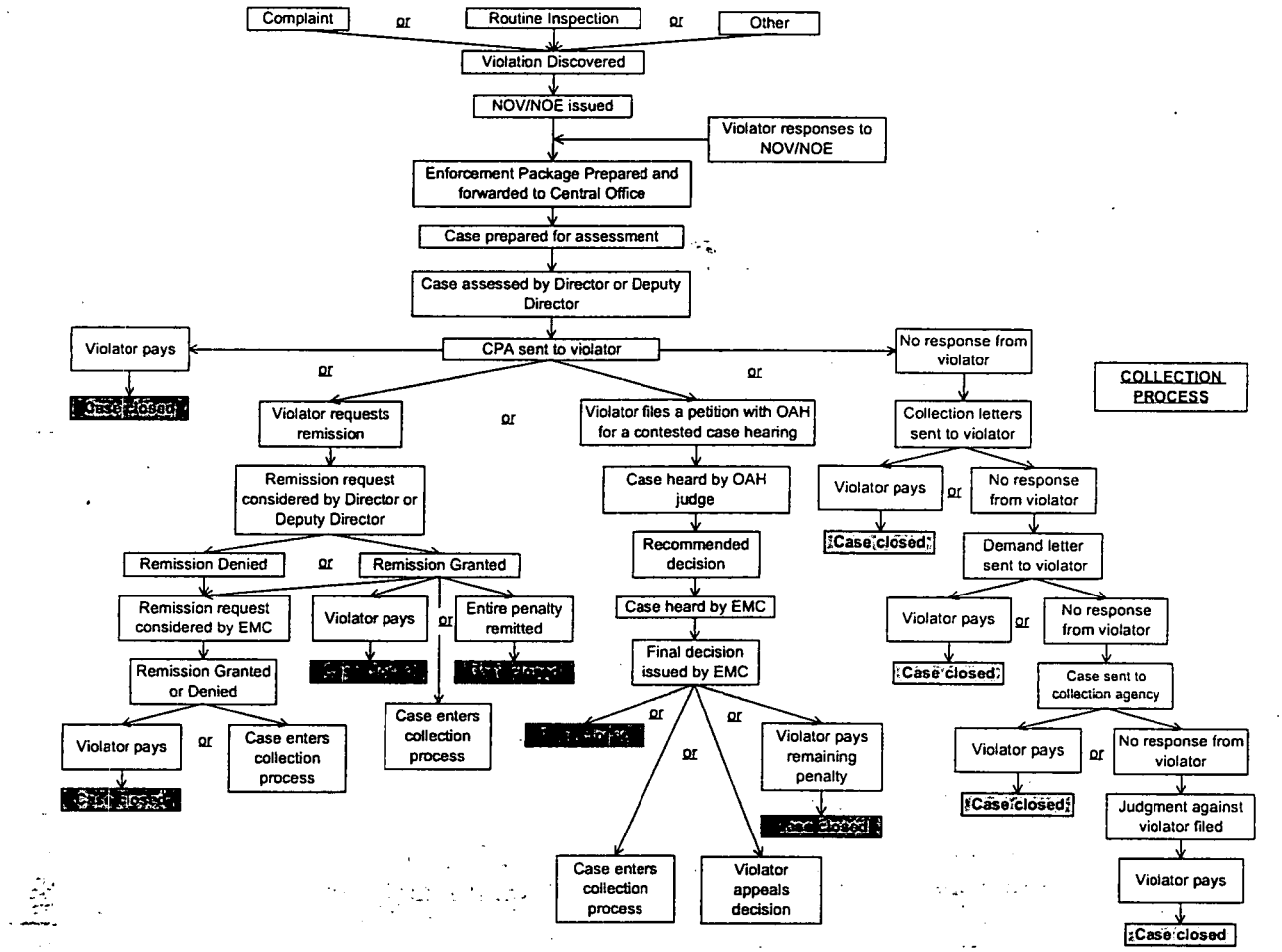
Jimmy Carter	Secretary's Office	919-733-4908	919-715-3060	Jimmy.Carter@ncmail.net

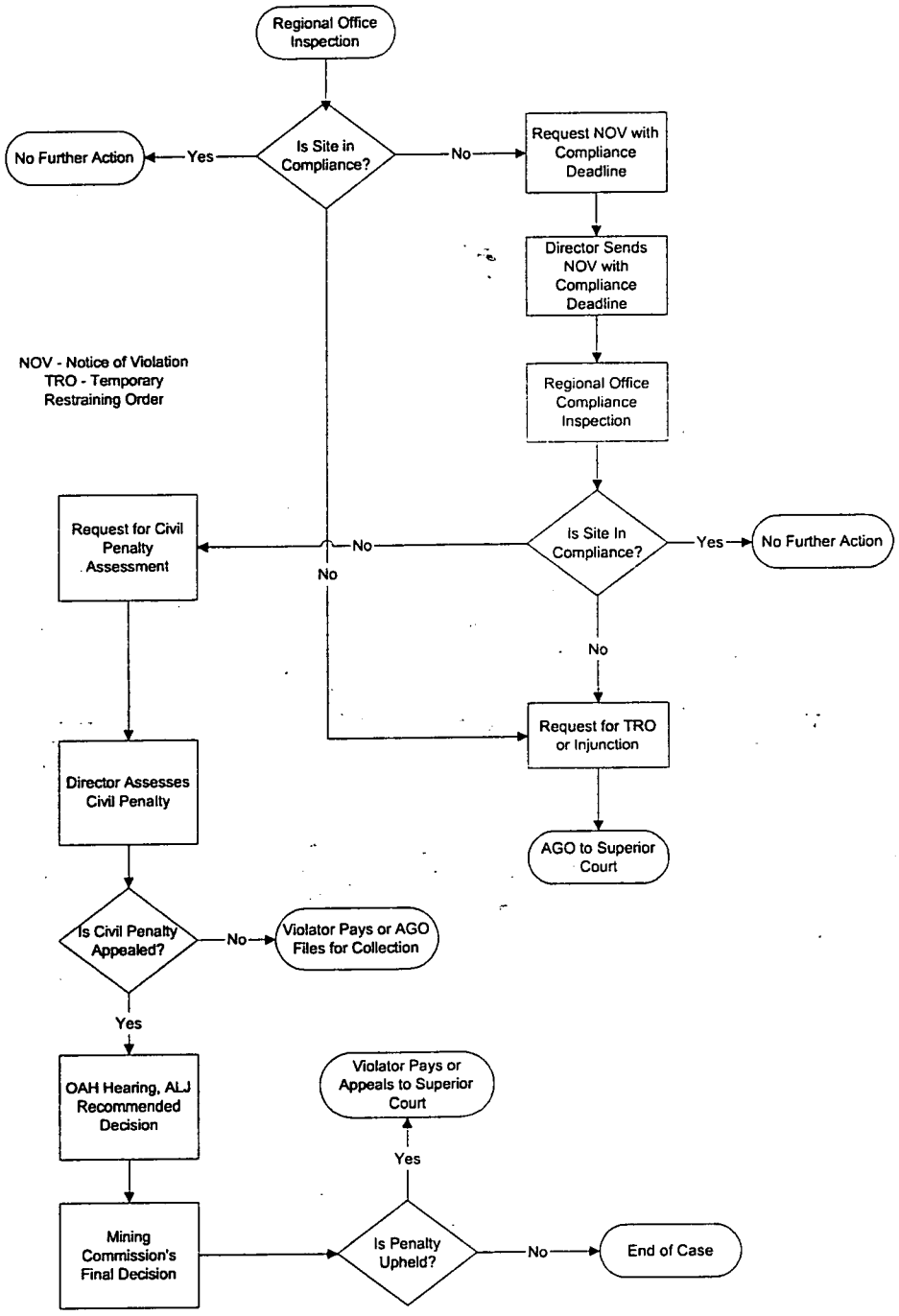
HAZARDOUS WASTE SECTION ENFORCEMENT PROCESS



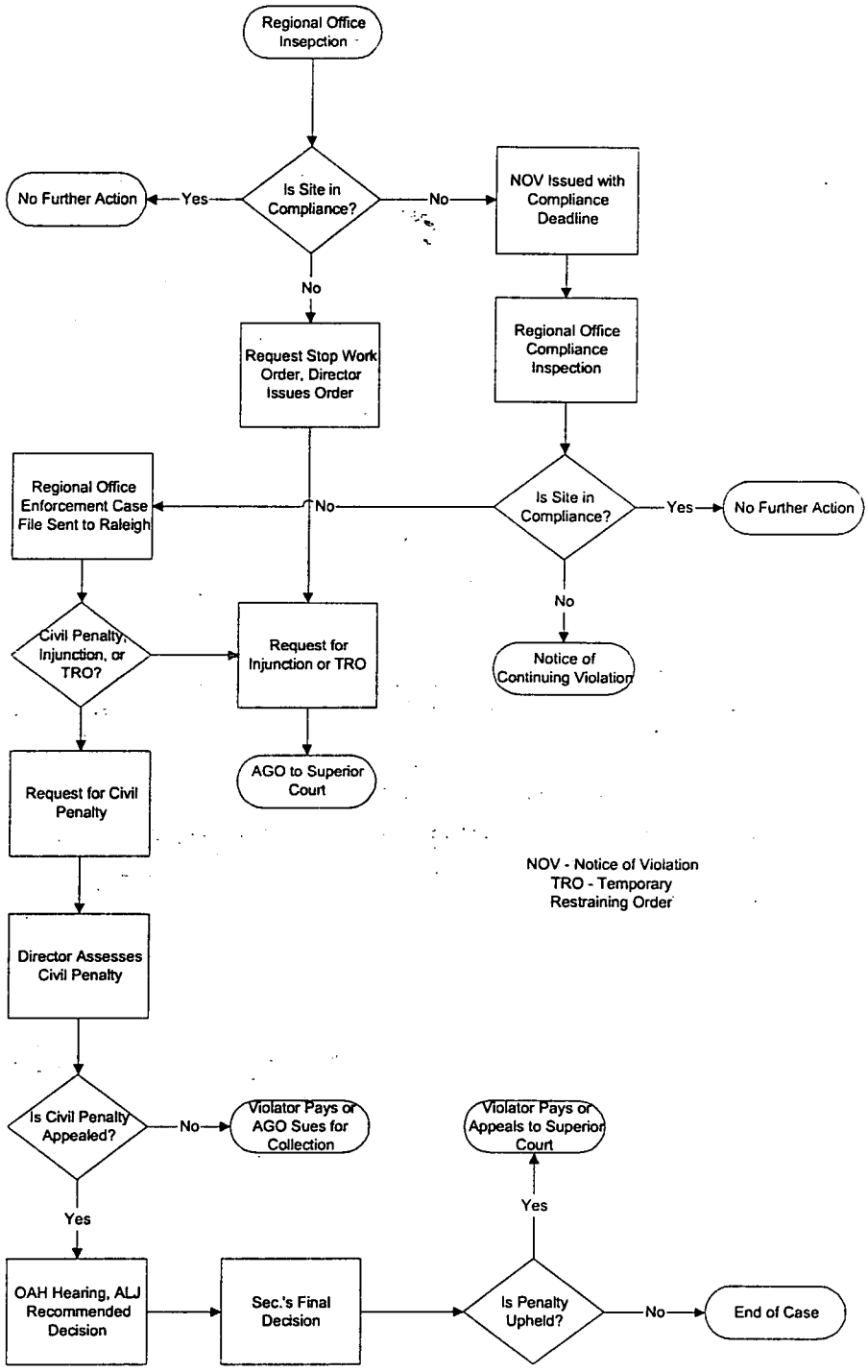
Division of Air Quality Enforcement Process



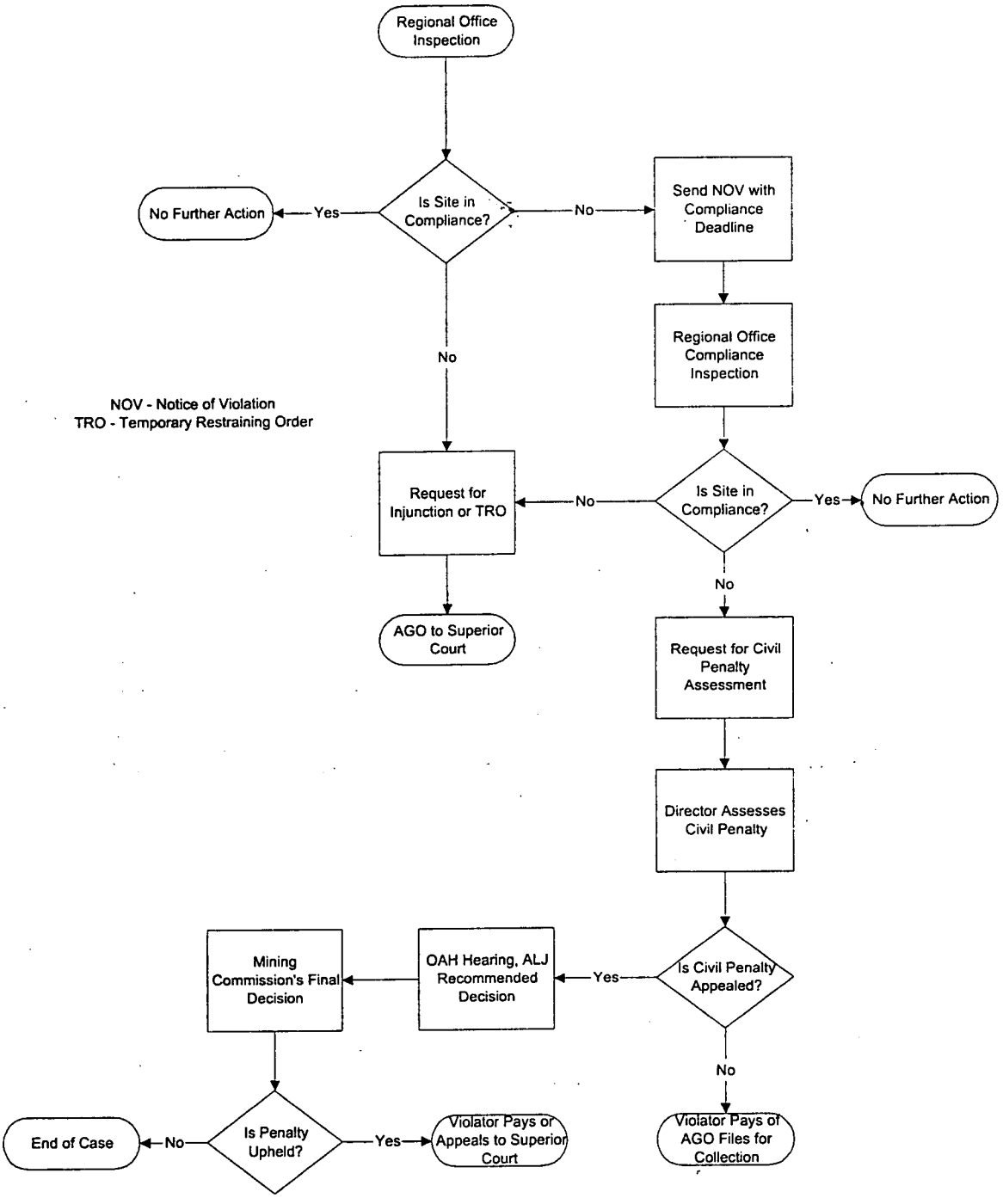
Mining Enforcement Process – Permit Violations



Sedimentation and Pollution Control Act Enforcement



Mining Enforcement – Mining Without a Permit



PRINCIPLES OF ENFORCEMENT
March 31, 2000

In an ideal world, regulation is replaced by stewardship; an inherent respect for the environment. In this concept of stewardship, everyone takes responsibility for their actions and the use of resources for the benefit of the community. In the real world, stewardship is sometimes compromised by conflicting capabilities, priorities, values, and perspectives. This creates the need for regulation and enforcement.

The challenge for regulators is to balance the use of compliance tools with the recognition of stewardship efforts. Regulated entities must be made aware of the conditions for compliance, made to feel the consequences of non-compliance, and provided an opportunity to demonstrate behavior beyond compliance. When enforcement is necessary, it should be fair, focused, visible, and timely.

The following principles are embraced to meet this challenge:

1. Compliance is the first step toward the ultimate goal of stewardship.
2. Enforcement will be balanced with education, technical assistance, and incentives to achieve compliance and encourage stewardship.
3. Enforcement will be an effective deterrent against future violations.
4. Enforcement actions will increase in severity for regulated entities with poor compliance histories.
5. The cost of non-compliance should be greater than the cost of compliance.
6. Resources will be used proportional to the potential impact on human health and the environment and in keeping with statutory responsibilities.
7. DENR will support the development and use of alternative tools to traditional enforcement that achieve compliance and encourage going beyond compliance.
8. DENR will trust, empower, and support its employees to make enforcement decisions and use enforcement discretion where appropriate.
9. DENR will ensure that its employees are well trained and informed to make enforcement decisions which are measurably consistent.
10. Enforcement policies, procedures, pertinent data, and other critical information will be accessible to any interested party.
11. Enforcement decisions will be defensible, documented, and proportional to the degree of potential harm.
12. DENR will foster partnerships internally and externally to realize shared responsibilities in environmental stewardship.

Good morning, Mr. Chairman and members of the committee.

I'm Gene Upchurch with Progress Energy, and I'm pleased to give you this update on our plan to comply with the requirements of the Clean Smokestacks legislation passed last year.

Right now, we're on schedule and on budget to comply with the General Assembly's requirement that we reduce by 70 percent the emissions of NOx and S02 from our 18 coal-fired units at seven power plants in North Carolina in the next 10 years.

Most of our work will focus on S02 reductions since we have been installing NOx reduction equipment at our plants since 1995 to comply with the Clean Air Act and the NOx SIP call rule adopted by the EMC.

To comply with Senate Bill 1078, our two units in Asheville will be among the first to be scrubbed, with construction beginning later this year and scrubber technology in operation in 2005 for unit 1 and 2006 for unit 2. One of our four Roxboro units will be scrubbed by 2005 and we will have a total of five units scrubbed by the end of 2007.

By the time we are in full compliance with SB 1078 at the end of 2013, will plan to scrub 11 of our units. However, our plan may be adjusted over the years as we work to meet the targets established in the legislation.

We will use flue-gas desulfurization technology and will use both wet scrubbers and dry scrubbers depending on the plant location. As you know, these scrubbers produce unique waste and by-product streams, and we'll need to address issues relating to wastewater permitting and disposal for each site.

We've been very pleased so far with the cooperation of regulators, who understand that this is an aggressive compliance schedule and are working with us to ensure we have the necessary permits in a timely manner.

Thank you, Mr. Chairman. I'll be glad to answer questions.

Duke Power
A Duke Energy Company

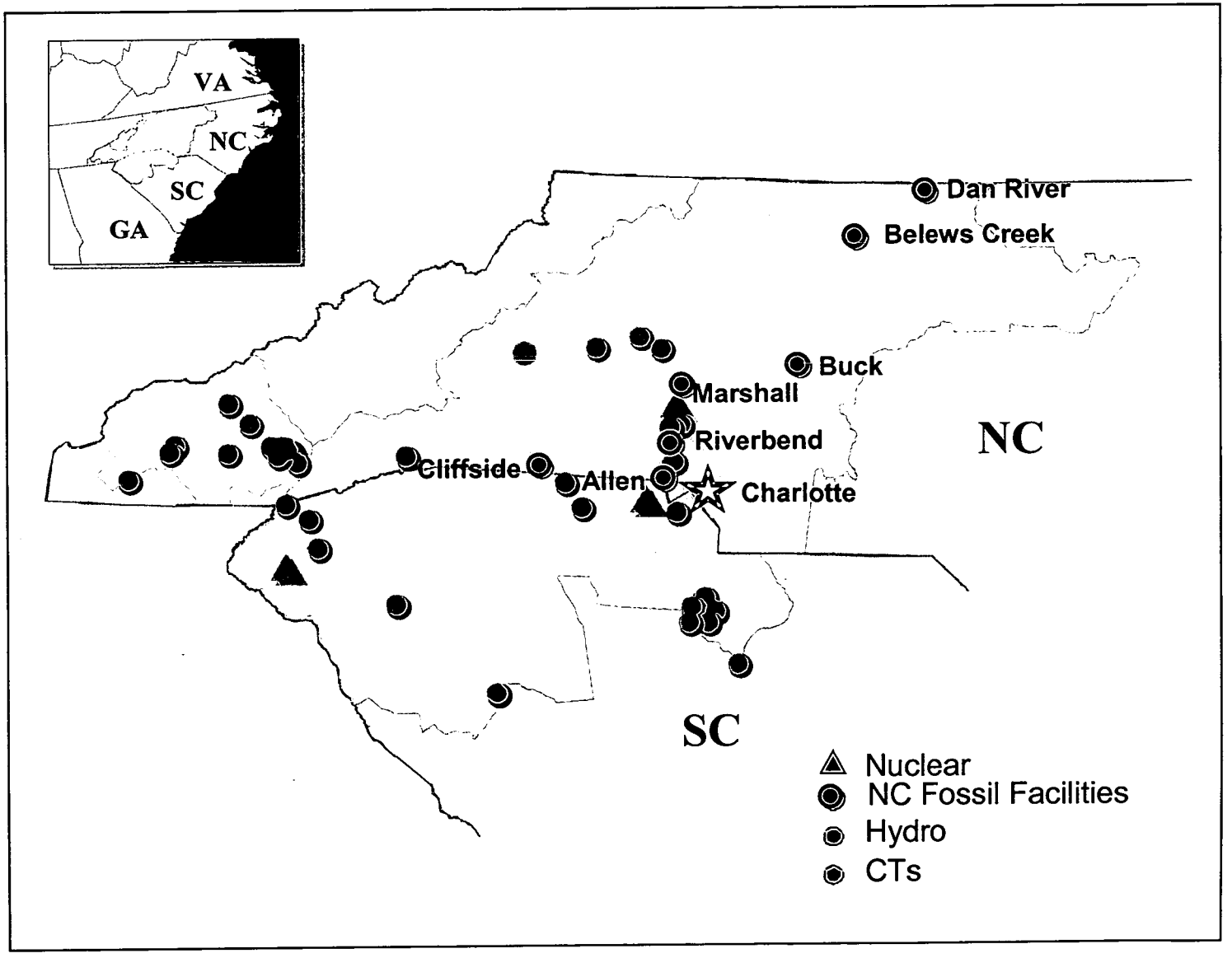
Legislative Update on NC Clean Air Initiative

January 2003

January 28, 2003 ERC Meeting
EXHIBIT F

Duke Power
A Duke Energy Company

Duke Power Service Area



NC CAI Requirements Impact to Duke Power

- NOx
  - 2001 NC NOx Emissions – 82,000 Tons
    - 35,000 Tons by 2007
    - 31,000 Tons by 2009
- SO_2
  - 2001 NC SO2 Emissions – 258,000 Tons
    - 150,000 Tons by 2009
    - 80,000 Tons by 2013

NC CAI Proposed NOx Compliance Strategy

Duke Power
A Duke Energy Company

				NOx		
				2001	2007	2009
	Unit	Technology	Operational Date	Tons	Tons	Tons
Allen	1	SNCR	2003	760	680	780
Allen	2	SNCR	2007	1,860	840	870
Allen	3	SNCR	2006	2,670	1,230	950
Allen	4	SNCR	2005	2,120	990	1,400
Allen	5	SNCR	2006	3,070	1,060	1,510
Belews Creek	1	SCR	2004	14,800	3,000	2,960
Belews Creek	2	SCR&Burners	2004	18,100	2,960	3,000
Buck	3	SNCR	2009	480	500	390
Buck	4	SNCR	2008	265	290	230
Buck	5	SNCR	2007	1,500	680	500
Buck	6	SNCR	2007	1,370	650	580
Cliffside	1	SNCR	2008	200	260	200
Cliffside	2	SNCR	2008	200	260	200
Cliffside	3	SNCR	2009	400	480	380
Cliffside	4	SNCR	2009	300	490	370
Cliffside	5	SCR	2002	7,380	1,250	1,300
Dan River	1	SNCR	2009	395	500	380
Dan River	2	SNCR	2009	460	540	410
Dan River	3	SNCR&Burners	2007	1,060	740	590
Marshall	1	SNCR	2007	5,200	2,160	1,960
Marshall	2	SNCR	2008	3,845	2,350	1,920
Marshall	3	SNCR	2008	6,255	5,120	3,380
Marshall	4	SNCR	2008	4,460	4,850	4,080
Riverbend	4	SNCR	2007	900	470	460
Riverbend	5	SNCR&Burners	2008	790	970	450
Riverbend	6	SNCR&Burners	2008	1,590	820	550
Riverbend	7	SNCR	2007	1,570	640	630
Total				**82,000**	**34,780**	**30,430**
Requirement					**35,000**	**31,000**

NC CAI Proposed SO2 Compliance Strategy

Duke Power
A Duke Energy Company

				2001	2009	2013
	Unit	Technology	Operational Date	Tons	Tons	Tons
Allen	1	Scrubber	2013	3,400	7,340	690
Allen	2	Scrubber	2013	5,700	8,210	770
Allen	3	Scrubber	2009	8,660	3,910	840
Allen	4	Scrubber	2010	9,500	13,170	1,230
Allen	5	Scrubber	2011	9,700	14,200	1,330
Belews Creek	1	Scrubber	2008	42,100	4,930	4,930
Belews Creek	2	Scrubber	2008	41,000	5,000	5,000
Buck	3			1,300	2,560	2,560
Buck	4			650	1,530	1,530
Buck	5			3,840	4,710	4,710
Buck	6			3,370	5,490	5,490
Cliffside	1			730	1,340	1,340
Cliffside	2			720	1,340	1,340
Cliffside	3			1,390	2,490	2,490
Cliffside	4			1,160	2,440	2,440
Cliffside	5	Scrubber	2009	25,550	2,780	2,780
Dan River	1			960	2,500	2,500
Dan River	2			1,150	2,700	2,700
Dan River	3			2,400	5,560	5,560
Marshall	1	Scrubber	2007	15,865	1,730	1,730
Marshall	2	Scrubber	2007	12,085	1,700	1,700
Marshall	3	Scrubber	2006	27,730	2,640	2,640
Marshall	4	Scrubber	2006	21,610	3,190	3,190
Riverbend	4			3,220	4,370	4,370
Riverbend	5			2,900	4,230	4,230
Riverbend	6			5,595	5,180	5,180
Riverbend	7			5,715	5,930	5,930
Total				**258,000**	**121,170**	**79,200**
Requirement					**150,000**	**80,000**

NC CAI Duke Power Projected Cost

- NOx $81 Million
  - Year around operation of Low NOx Burners & Selective Catalytic Reduction (SCR)
  - 24 additional Selective Noncatalytic Reduction (SNCR) systems
  - Additional Low NOx Burners
- SO2 $1.4 Billion
  - Wet Scrubber at 12 Units
- Total $1.5 Billion

NC CAI Technologies (NOx)

Technology	Cost $/kw	Reduction
LNBs	10 $/kw	25 %
Advanced LNBs	25 $/kw	60 %
SNCRw/ AdvLNBs	40 $/kw	72 %
SCRw/ AdvLNBs	250 $/kw	83 %

Current Activities & Upcoming Milestones

- NC CAI
  - NOx efforts
    - Spring 2002 - Cliffside Unit 5 SCR operational
    - November 2002 - Competitively bid and awarded the first permanent SNCR system at Allen
    - June 2003 – Belews Creek Unit 1 SCR operational
    - July 2003 – Allen Unit 1 SNCR operational date for long term trial
    - March 2004 – Belews Creek Unit 2 SCR completion date

Current Activities & Upcoming Milestones

- NC CAI
  - SO2 efforts
    - November 2002 - Competitively bid and awarded Alstom/Shaw-Stone/ Webster the Duke system scrubber optimization study. Will provide engineering, procurement and construction for scrubber additions.
    - Early 2003 – Begin permit preparation for air water and by-product disposal
    - June 2003 – Compete system optimization study
    - December 2003 – Award EPC contract for first scrubber unit(s)
    - 2006 – First scrubber unit operational

January 28, 2003 ERC Meeting
EXHIBIT G

PROGRESS REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION OF THE CLEAN SMOKESTACKS ACT

January 28, 2003

B. Keith Overcash, P.E.
Director, Division of Air Quality

IMPLEMENTATION OF CLEAN SMOKESTACKS ACT

Efforts to Date:

- Governor Easley signed legislation into law on June 20, 2002.
- Utility companies submitted compliance plans and initial cost estimates in June '02.
- Governor Easley sent letters to all other governors in July '02 advising of clean smokestacks law.
- Attorney General Roy Cooper sent letters to the Attorneys General of upwind states in August '02 in reference to the clean smokestacks law.
- Secretary Bill Ross sent a letter to TVA in Sept. '02 requesting information about that utility's efforts to reduce NO_x and SO_2 emissions from its plants.
- DAQ Director Keith Overcash sent letters in Oct. '02 to air directors in 28 states and 18 local air programs requesting information about efforts underway in those jurisdictions to reduce NO_x and SO_2 emissions.
- Presentations were made about the legislation at two national state environmental organizations meeting in Fall of '02.

What's Up Next:

- Permits must be issued for the new control equipment to be installed by utilities. No permit applications have been received by DAQ to date.
- Utility companies must submit a progress report to the Environmental Management Commission and DENR by April 1 '03.
- DENR and State Utilities Commission must make a report on the implementation of the act to the ERC and Joint Legislative Utility Review Commission by June 1 '03.
- DAQ will make the first annual report to the EMC and the ERC in Sept. '03 on its interim findings relative to future requirements to control mercury and carbon dioxide emissions from coal-fired generating units. The final report with recommendations is due in September '05.

January 28, 2003 ERC Meeting
EXHIBIT H

Department of Transportation

LYNDO TIPPETT
Secretary

CAROL HOWARD
Commissioner

Status Report on On-Board Diagnostic Implementation and Inspection Maintenance Expansion

Environmental Review Commission
January 23, 2003

Presenter: Carl G. Pigford
Emissions & I/M Program Administrator
Division of Motor Vehicles

Summary of Phase 1 Implementation

- **Notifications to Stations** - Information regarding penalty and fee changes were mailed to over 7,000 safety and emissions stations in all 100 counties in December 2001.

- **Contract Negotiations** - The contract with MCI was amended in May 2002, which included development of a new vehicle information database and the testing for collection and storing of on-board diagnostic data. Specifications were developed for a new telecommunications system.

- **Software Development & Enhancements**
  - **MCI WorldCom** - New software enhancements were made to enable the network to perform all the essential functions required to accommodate the on-board diagnostic testing procedures, program administration and enforcement.
  - **DOT/Information Technology** - A gateway interface was developed to transmit and share data from the state database to the vehicle information database for on-board diagnostic testing.
  - **Analyzer Vendors** - Development of new specifications for on-board diagnostic testing equipment for North Carolina Analyzer Systems began in August 2001 and was finalized in late February 2002. The testing and certification process by our partners at the Division of Air Quality began in April 2002.

- **North Carolina Analyzer System Testing & Certification** - This was a team effort between the Division of Motor Vehicles, Division of Air Quality and the various vendors. Six (6) different vendors submitted equipment for testing and certification. This resulted in eight (8) different types of equipment that was certified and tested by the Division of Air Quality for purchase by the stations.

- **DMV Inspection Maintenance Training** - In May 2002, the Center for Automotive Science and Technology at Weber State University in Utah provided training locally for all Division of Motor Vehicles' Inspection Maintenance personnel.

- **Mechanic & Technician Training** - The first phase of training involved "train the trainer," in which State Instructors trained the Community College Instructors. In a partnership with the Community Colleges and Continuing Education Departments, over 4,000 on-board diagnostic technicians were trained at Community Colleges in the nine (9) existing emissions counties and certified in the operation of on-board diagnostic training by DMV Inspectors.

- **Public Awareness Outreach**
  - **Station Education Campaign** - Town meetings were conducted in Raleigh, Greensboro, and Charlotte to educate stations owners and operators about on-board diagnostic implementation, requirements, and equipment.
  - **Registration Renewal Inserts** - Inserts concerning the new on-board diagnostic testing were placed on the license plate renewal notices sent to our customers in the existing nine (9) emissions counties.

- **Public Service Announcements** - Announcements about the new on-board diagnostic testing were made in English and Spanish on radio stations in the nine (9) existing emissions counties.
- **Website Enhancements** - On-board diagnostic system information has been added to the DMV Website providing the locations of stations and the type of inspections a station is licensed to perform.

➢ **Current Status of Phase 1 Implementation** - The on-board diagnostic implementation in the nine (9) existing emissions counties is 100% complete.
- **1,212 licensed safety/exhaust/on-board diagnostic stations**
- **Over 4,000 licensed and certified technicians**
- **257 additional licensed safety/exhaust stations**

Preparations for Phase 2 Implementation

➢ **Overview** - Effective July 1, 2003, the expansion of the inspection maintenance program will involve the phase-in of six (6) additional counties (Catawba, Cumberland, Davidson, Iredell, Johnston and Rowan)

➢ **Notifications to Stations** - Information will be sent to approximately 780 safety inspection stations notifying them of the upcoming on-board diagnostic implementation.

➢ **Personnel for Expansion** - Personnel will be hired, trained and placed in the new counties to facilitate a successful transition into the emissions program.

➢ **Mechanic & Technician Training** - Approximately 2,300 technicians will go through the on-board diagnostic training and certification process at the Community Colleges offering the training.

➢ **North Carolina Analyzer System Testing & Certification** - Continuous testing of software and hardware will be made as it is submitted for approval.

➢ **Public Awareness Outreach** - An on-going public outreach program is planned to include all of the instruments used in Phase 1 and any other resources available.

Emissions and Maintenance Inspection Program Expansion Schedule for OBD Technology						
Original Counties	Expansion Counties		Expansion Counties		Expansion Counties	
July 1, 2002	**July 1, 2003**	**Jan. 1, 2004**	**July 1, 2004**	**Jan. 1, 2005**	**July 1, 2005**	**Jan. 1, 2006**
Cabarrus	Catawba	Alamance	Buncombe	Edgecombe	Burke	Brunswick
Durham	Cumberland	Chatham	Cleveland	Lenoir	Caldwell	Carteret
Forsyth	Davidson	Franklin	Granville	Nash	Haywood	Craven
Gaston	Iredell	Lee	Harnett	Pitt	Henderson	New Hanover
Guilford	Johnston	Lincoln	Rockingham	Robeson	Rutherford	Onslow
Mecklenburg	Rowan	Moore		Wayne	Stokes	
Orange		Randolph		Wilson	Surry	
Union		Stanley			Wilkes	
Wake						
(Phase 1)	***(Phase 2)***	***(Phase 3)***	***(Phase 4)***	***(Phase 5)***	***(Phase 6)***	***(Phase 7)***

Designations of Non-Attainment for Ozone and Fine Particle Air Quality Standards

Report on the Process of Designations to the Environmental Review Commission

January 23, 2003

Brock M. Nicholson, P.E.
Chief, Air Quality Planning
NC DENR

January 28, 2003 ERC Meeting
EXHIBIT I

Designations of Non-Attainment for Ozone and Fine Particle Air Quality Standards

Report on the Process of Designations to the Environmental Review Commission

January 23, 2003

Brock M. Nicholson, P.E.
Chief, Air Quality Planning
NC DENR

What are Designations?

- *Federal Action under the Clean Air Act*
- *In Code of Federal Regulations, CFR*
- *Based on Measured Air Quality Levels; Non-Attainment - Areas Exceeding Federal Ambient Air Quality Standards*

What Air Pollutants are Involved?

- *Ground Level Ozone, 8 - Hour Average*
- *Fine Particle, $PM_{2.5}$*

What is the Process?

- New Air Quality Standard "Triggers" Requirement
  - July 1997
  - Legal Challenges
  - Consent Agreement
- State Analysis
- Public Input
- Governor's Recommendation
- EPA Administrator's Action by Rule Making

What is the Timing for Designation?

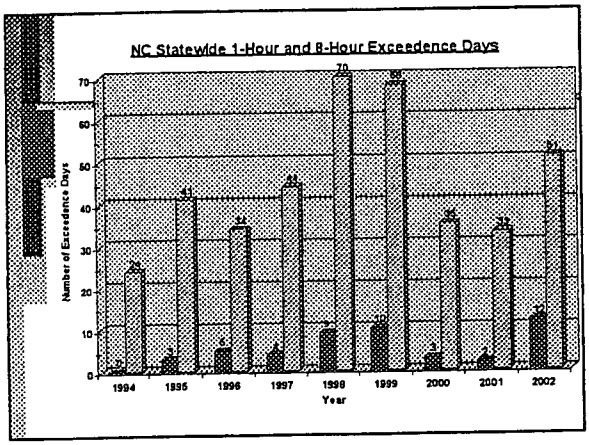
- Ozone
  - Final action by Administrator - April 15, 2004
  - Recommendation by Governor - April 15, 2003
- Fine Particles
  - Final Action by Administrator - December 31, 2004
  - Recommendation by Governor - September 30, 2003

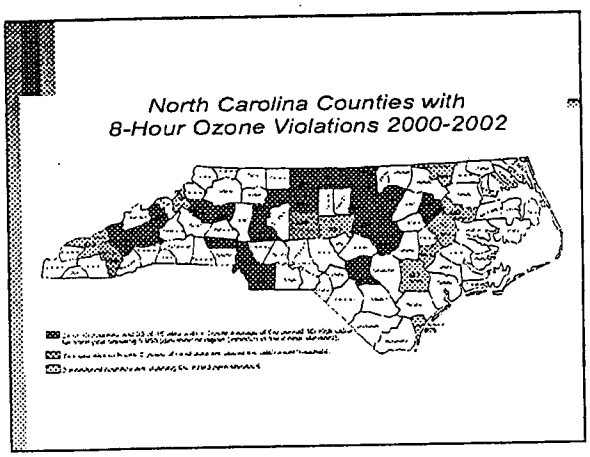
What are the Consequences of Designation of Non-Attainment?

- Starts "Clock" when State Implementation Plan (SIP) Revision is Due - Three years from Designation
  - Early Action Compact (EAC) Areas for Ozone are Due Earlier - December 31, 3004
- Transportation Conformity Starts One Year After Designation - April 2005 for Ozone; December 2005 for PM
- General Conformity Effective Upon Designation
- Non-Attainment New Source Review (NSR) Effective Upon Designation
  - Lowest Achievable Emission Rate (LAER) Controls Required
  - Offsets of New Emissions

What Areas of North Carolina will be Affected?

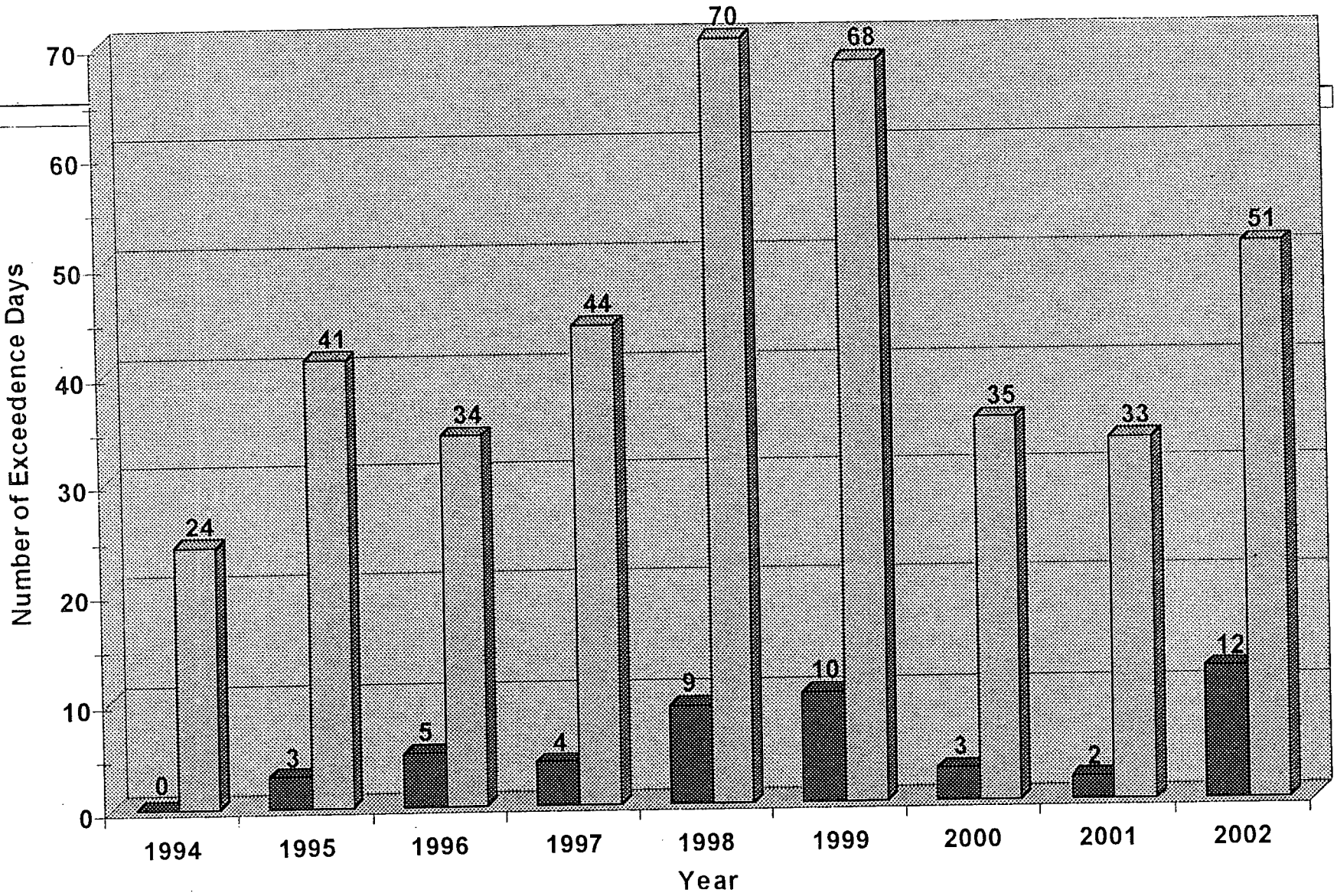
- **Ozone - See Following Graphics and Attached Map**
- **Fine Particles - See Attached Map**





Page 3a

NC Statewide 1-Hour and 8-Hour Exceedence Days



Issues

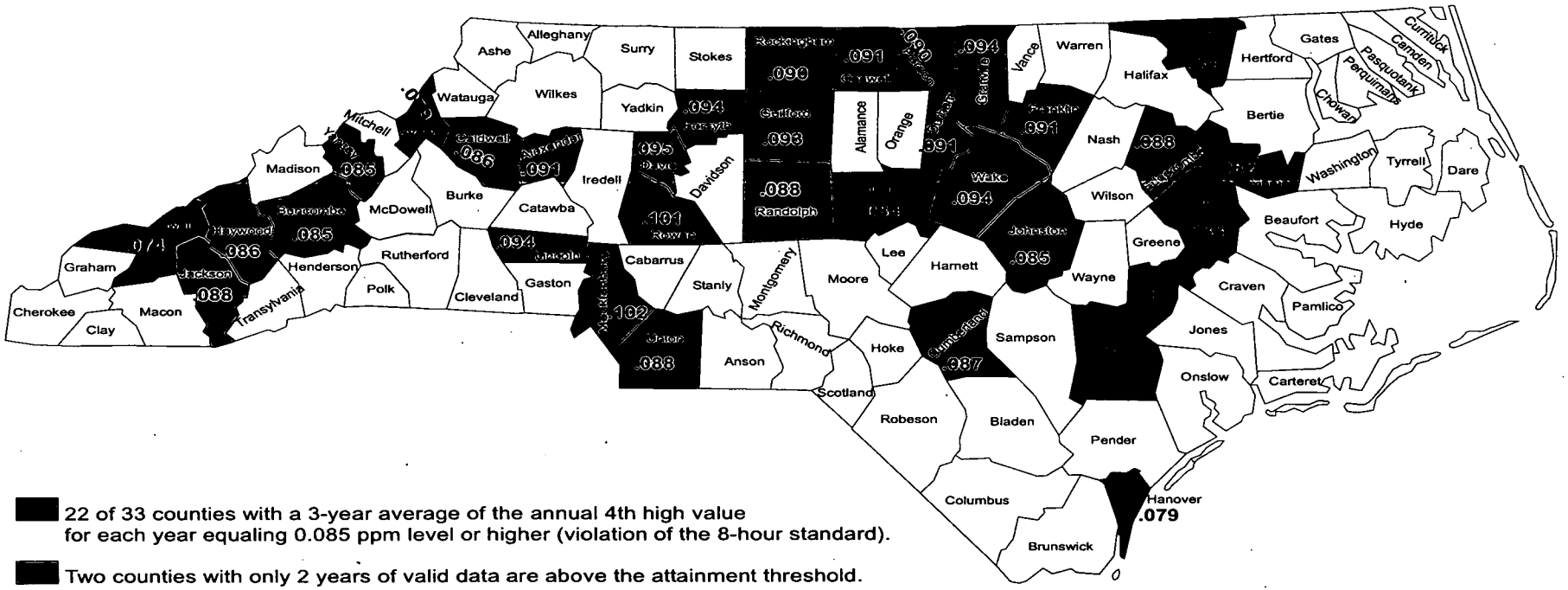
- *Timing for Governors Recommendations*
- *Implementation Requirements from EPA are Late*
- *Metropolitan Statistical Area (MSA) Adjustments from Last Census Not Determined Yet*
- *EPA Presumption for Boundaries*

For More Information:

- ***Visit our website:***
  - *Division of Air Quality - http://daq.state.nc.us*
- ***e-mail:***
  - *brock.nicholson@ncmail.net*

DRAFT

North Carolina Counties with 8-Hour Ozone Violations 2000-2002



- 22 of 33 counties with a 3-year average of the annual 4th high value for each year equaling 0.085 ppm level or higher (violation of the 8-hour standard).
- Two counties with only 2 years of valid data are above the attainment threshold.
- 9 monitored counties are attaining the 0.085 ppm standard.

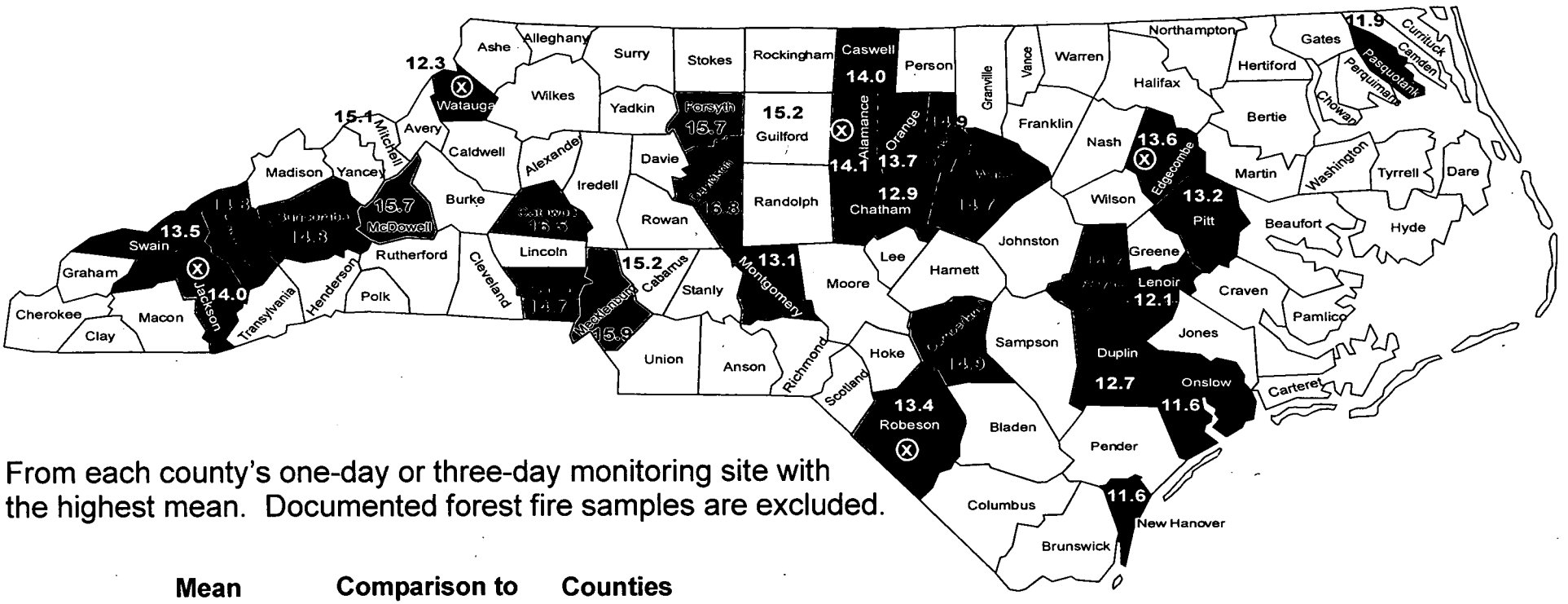
NOTE:

- Additional counties may be involved in emission reduction strategies.
- Nonattainment designations may not follow county boundaries.
- Final data validation is not yet complete.

N.C. DENR
Division of Air Quality
Not To Scale
W. Cornelius
2003-01-13
(Rev. 12-14-02)

DRAFT

Estimated Annual Mean PM 2.5 - 24 Hour Concentrations for October 1999 through September 2002



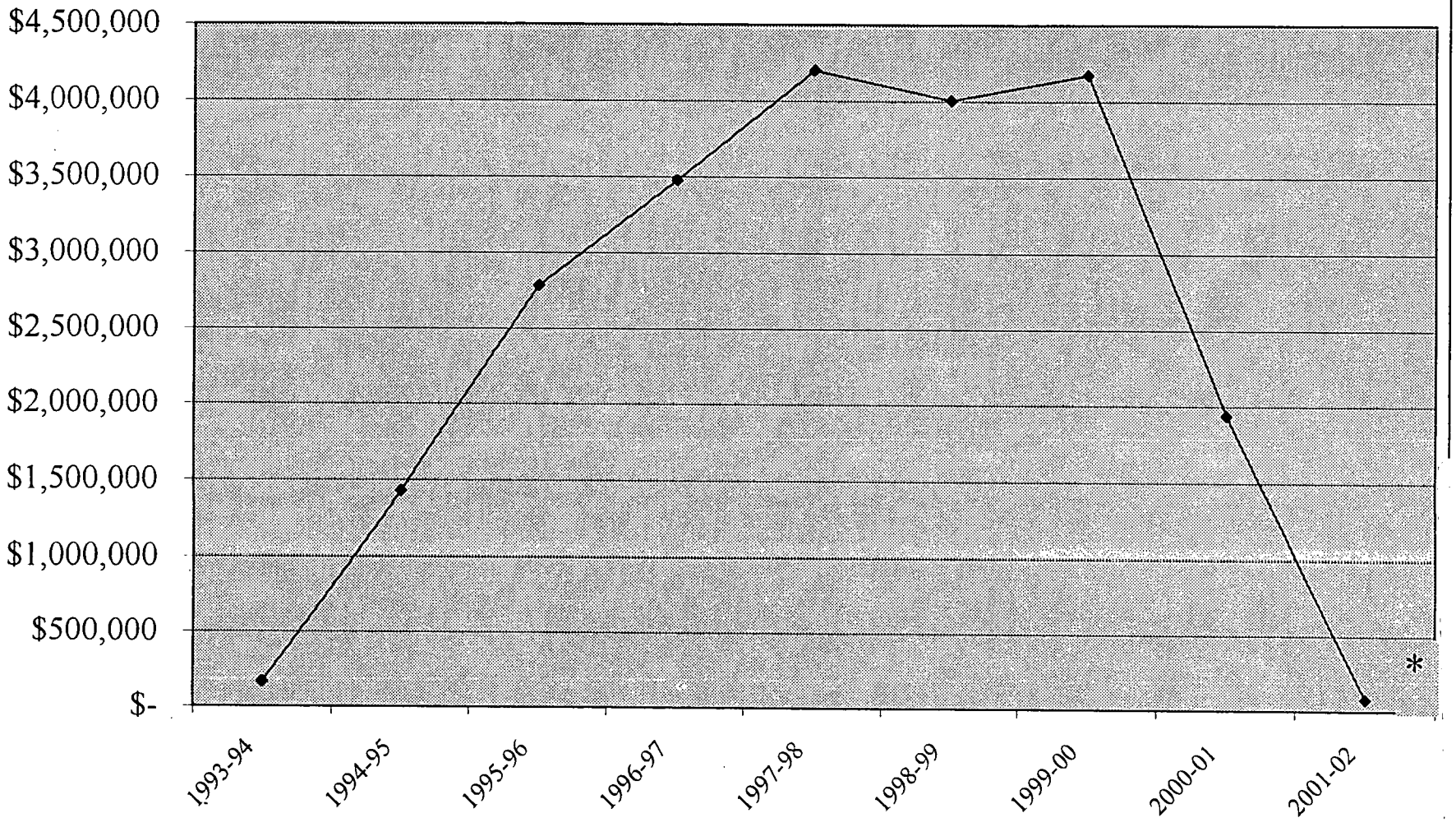
From each county's one-day or three-day monitoring site with the highest mean. Documented forest fire samples are excluded.

Color	Mean Concentration	Comparison to Annual Standard	Counties Counted
	11.6 - 12.6	Well Below	5
	12.7 - 14.5	Moderately Below	11
	14.6 - 15.0	Below	7
	15.1 - 15.6	Above	3
	15.7 - 16.4	Moderately Above	3
	16.5 - 16.8	Well Above	2

⊗ In one or more of 12 calendar quarters, 0% valid sampling occurred.

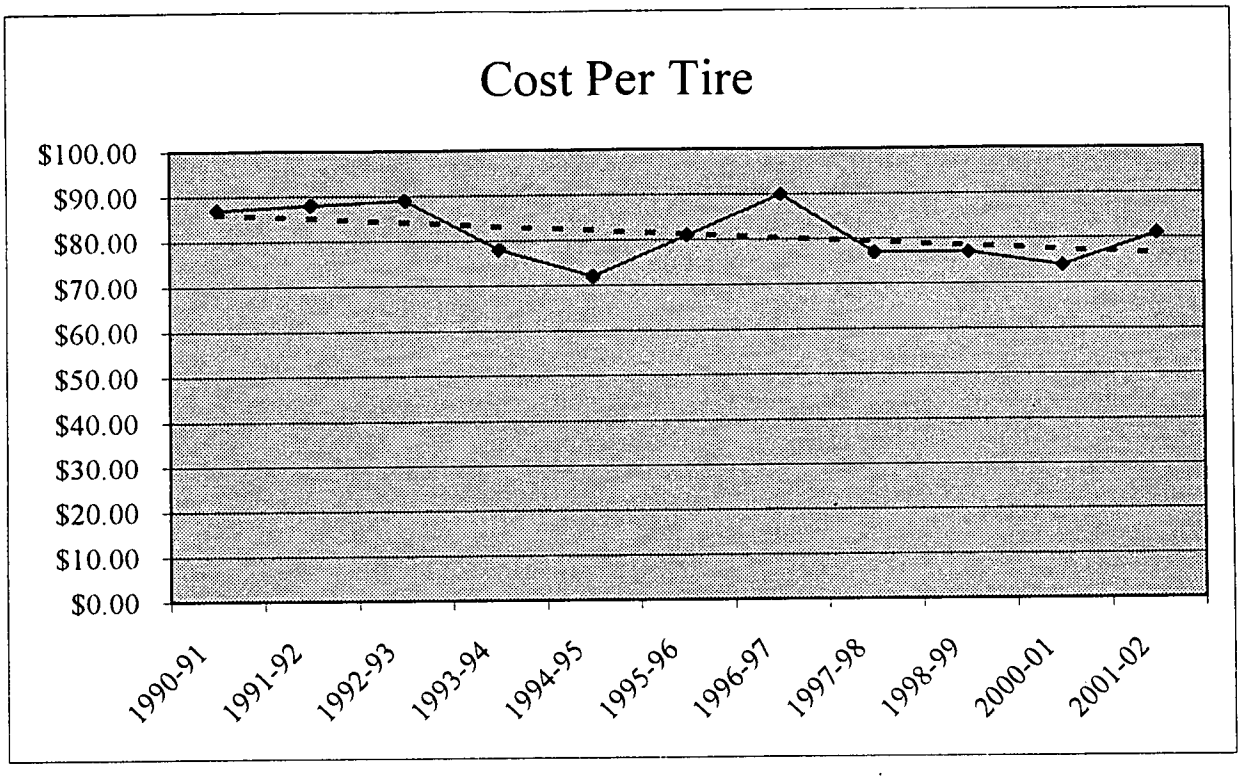
NOTE: Not To Scale
01-27-03

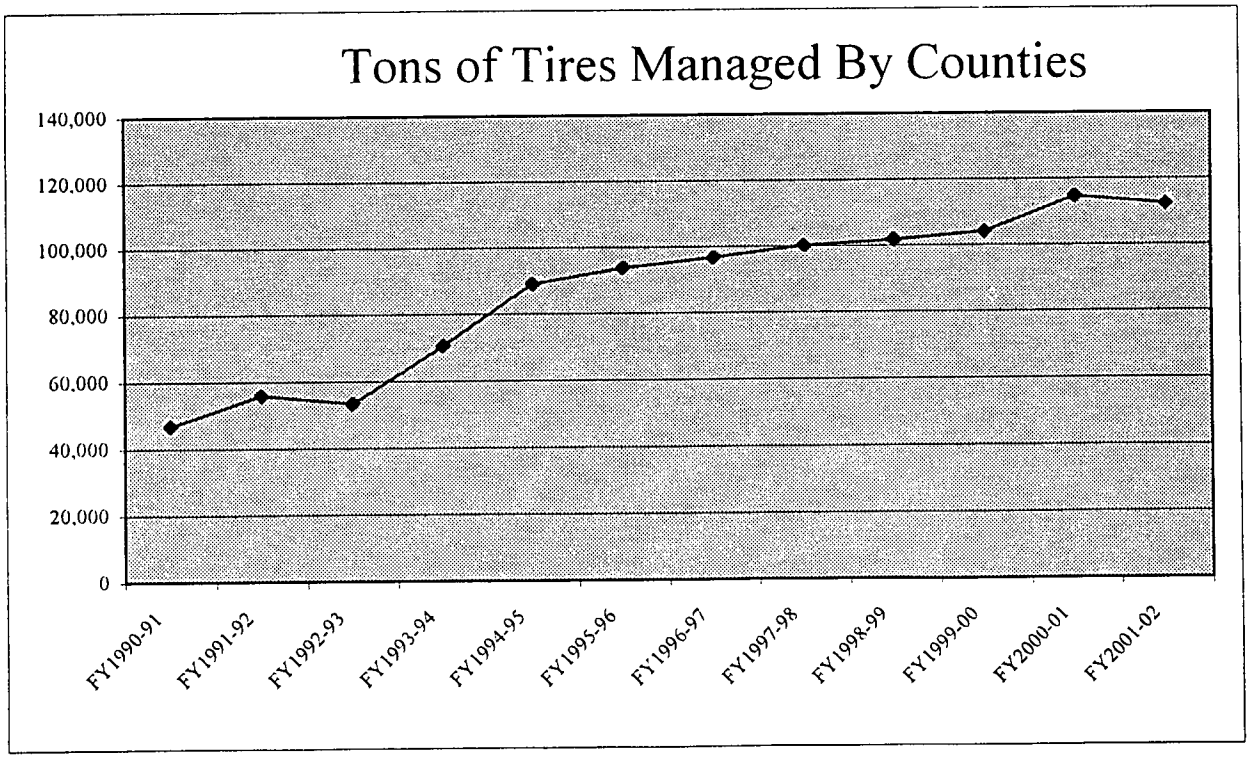
White Goods Management Account Balance



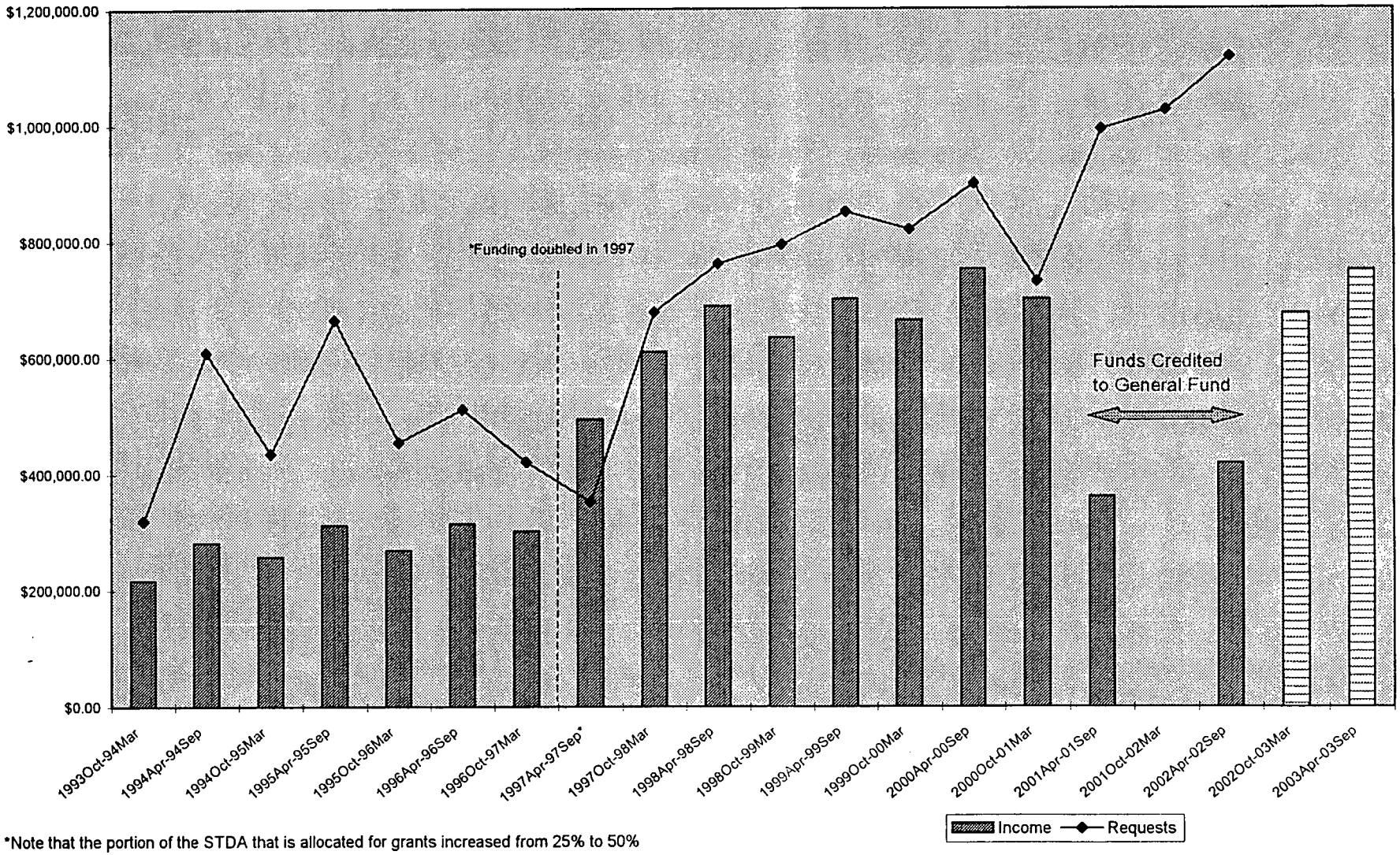
*Balance in 2001-02 was $906,073 minus $825,562 committed

January 28, 2003 ERC Meeting
EXHIBIT J


Cost Per Tire
$100.00
$90.00
$80.00
$70.00
$60.00
$50.00
$40.00
$30.00
$20.00
$10.00
$0.00
1990-91
1991-92
1992-93
1993-94
1994-95
1995-96
1996-97
1997-98
1998-99
2000-01
2001-02


Tons of Tires Managed By Counties
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
FY1990-91
FY1991-92
FY1992-93
FY1993-94
FY1994-95
FY1995-96
FY1996-97
FY1997-98
FY1998-99
FY1999-00
FY2000-01
FY2001-02

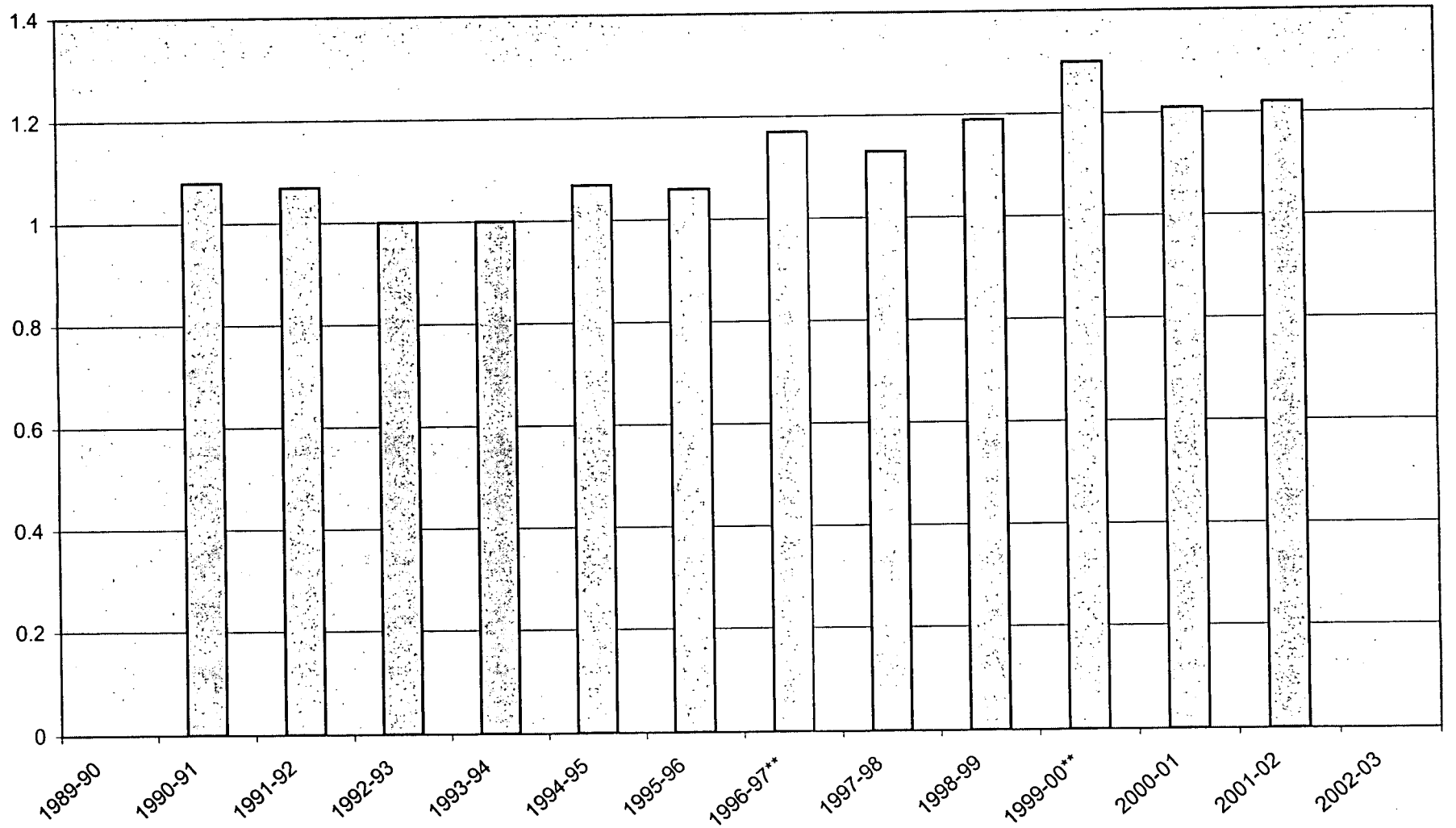
Comparison of Grant Income and Requests



*Note that the portion of the STDA that is allocated for grants increased from 25% to 50%

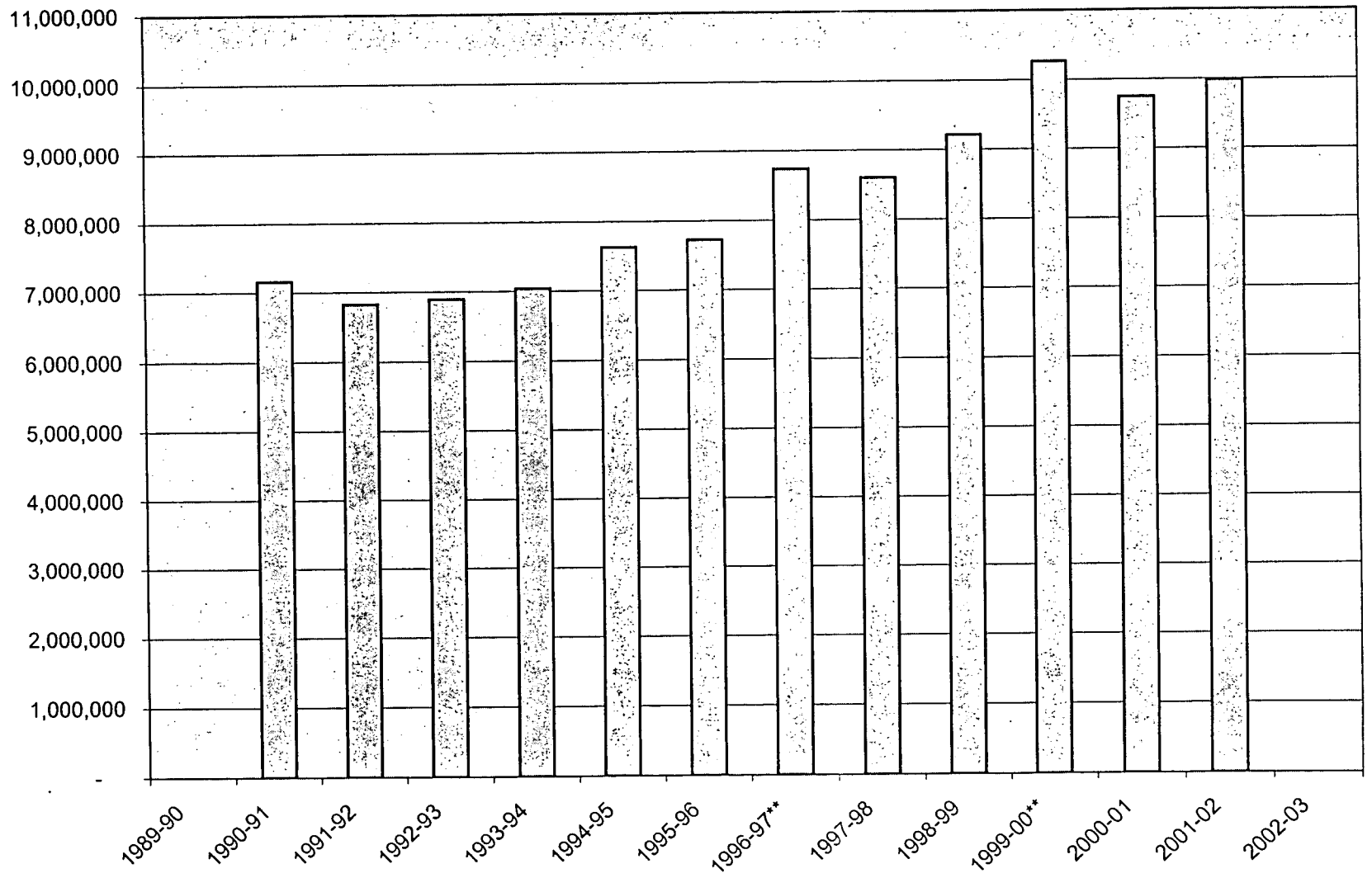
Tons of solid waste disposed per person in North Carolina

**years of hurricanes Fran and Floyd



Tons of North Carolina solid waste incinerated and/or landfilled

* *years of hurricanes Fran and Floyd



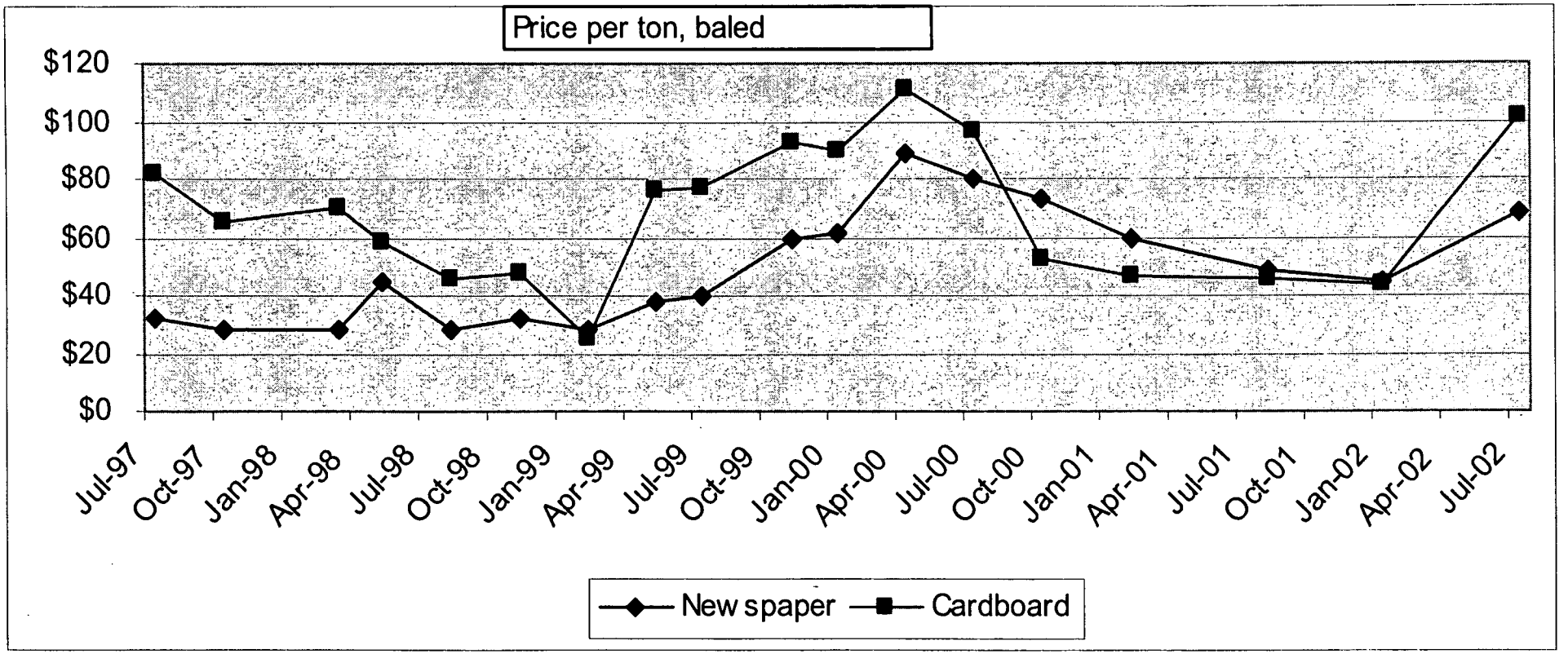
State Progress in Supporting Recycling Markets

- DOT a major user of recycled materials, including over 1 million tires, 70,000 recycled plastic offset blocks, and 67,000 cubic meters of fly ash in 2003.
- DOA continues to add many environmental products to state term contracts, including items like biodesiel fuel and recycled carpet.
- Recycled paper constitutes over 70 percent of all paper purchases by state agencies; 21 agencies bought only recycled paper.
- State agencies also bought over $6 million worth of non-paper recycled products in FY 02.

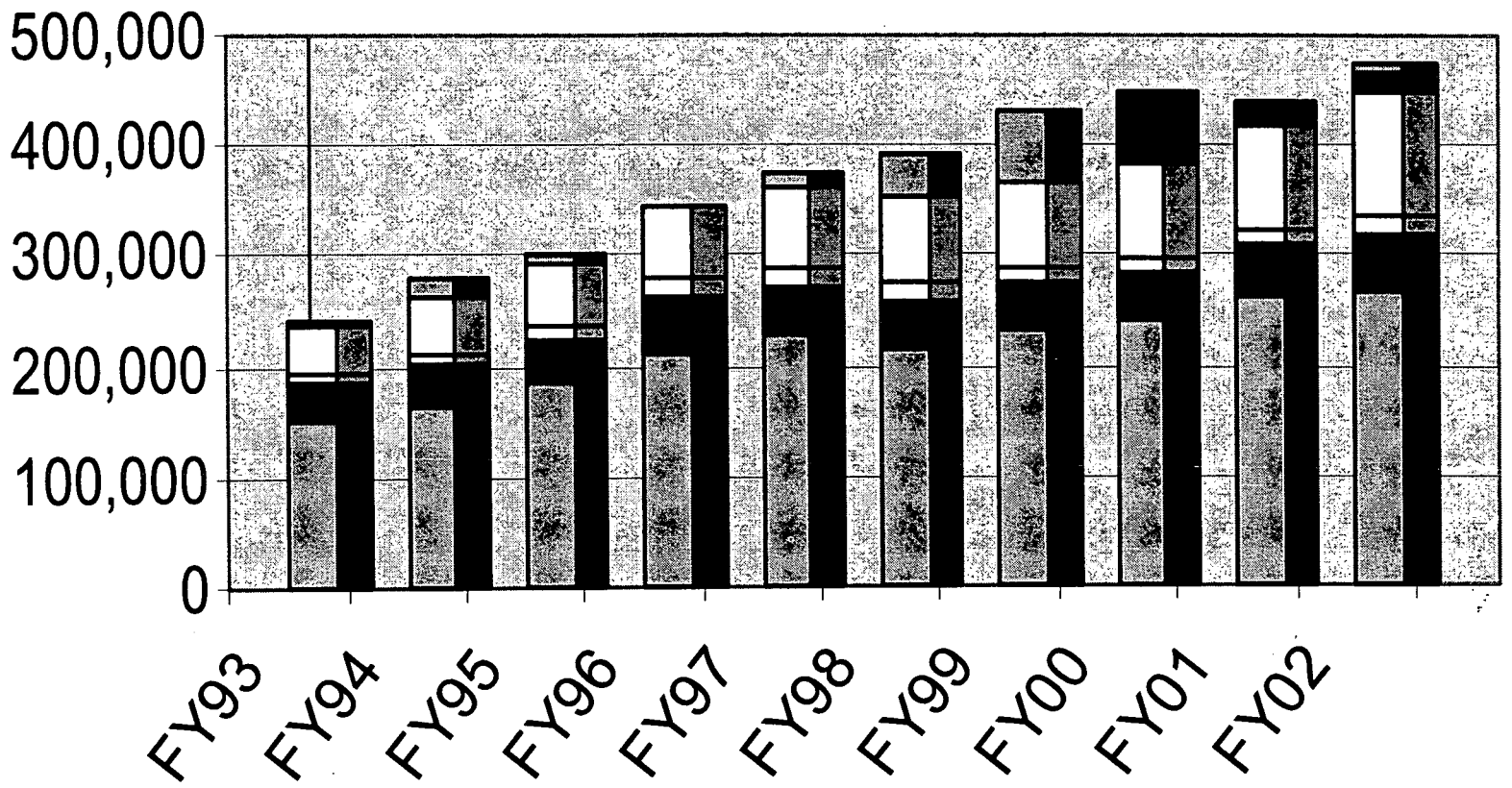
January 28, 2003 ERC Meeting
EXHIBIT K

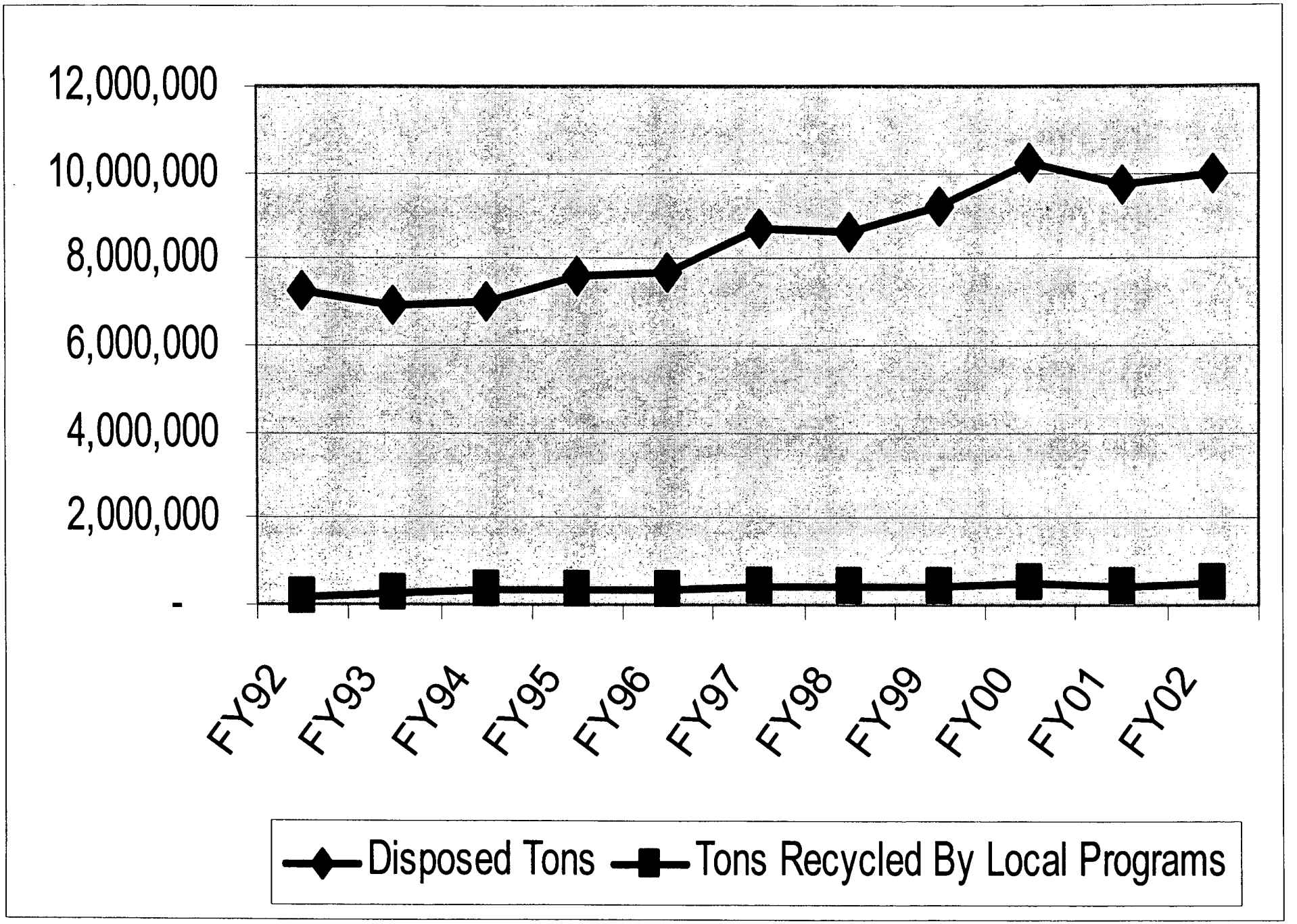
Recycling Markets

- Markets stable, with price fluctuations over time.
- Big factors: health of economy and virgin material prices.
- Many end markets express need for more materials.
- Markets emerging for "new" materials – e.g. food waste.
- Need more processing capacity in some areas of the state.



Local Government Recycling Efforts




12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
-
FY92
FY93
FY94
FY95
FY96
FY97
FY98
FY99
FY00
FY01
FY02
Disposed Tons
Tons Recycled By Local Programs

North Carolina Association of County Commissioners
Mailing Address: P. O. Box 1488, Raleigh, NC 27602-1488
Street Address: Albert Coates Local Government Center, 215 N. Dawson Street, Raleigh, NC 27603
Telephone: 919-715-2893 • *Fax:* 919-733-1065 • *Email:* ncacc@ncacc.org
Home Page Address: http://www.ncacc.org

September 27, 2000

Mr. Bradley Bennett
Department of Environment and Natural Resources
Division of Water Quality
512 N. Salisbury St.
Raleigh, NC 27604-1148

Dear Bradley:

A number of counties have raised an issue regarding the responsibilities of the counties that were listed by EPA in the Phase II Stormwater rules. It appears that EPA listed twenty-four North Carolina counties because these units contain urbanized areas that potentially would be subject to the requirements of the Phase II regulations. The assumption is that these counties would be automatically subject to all of the Phase II requirements and would be required to implement the six stormwater program components. The EPA regulations are intended to apply automatically in local government jurisdictions that include defined urbanized areas and where the local government units own or operate municipal storm sewer systems (MS4s).

The issue raised by our member counties is this: county government in North Carolina should not be automatically required to implement all components of the Phase II program since our county governments do not own or operate storm sewer systems. Furthermore, North Carolina counties do not own or operate road or street systems with their extensive stormwater drainage systems.

This issue was raised earlier by Forsyth County. We have attached a copy of a letter dated December 16, 1999 written by Mr. Ragland, Forsyth County Water Quality Program Manager to you. Mr. Ragland made the point that the EPA regulations contemplated that units of local governments which own or operate MS4s in designated urbanized areas would be automatically required to implement the full-fledged stormwater management program. However, Forsyth County did not own or operate such systems nor did the county have any control or jurisdiction over the most extensive stormwater control systems within the county, namely, the drainage systems owned and operated by the State Department of Transportation.

Again, we contend that the EPA regulations do not automatically require any county in North Carolina to implement the Phase II program. We fully understand that the EPA regulations

authorize the states to designate additional units of local governments to be covered by the Phase II requirements. There may be a number of situations where requiring some level of participation by county governments in urbanizing areas would be both beneficial in carrying out state and Federal policy on stormwater management and appropriate in terms of county local authority and responsibility.

Let us suggest that your division pursue the following course of action.

1.) Seek a definitive ruling from the U.S. Environmental Protection Agency regarding the automatic applicability of the Phase II requirements to North Carolina counties containing urbanized areas.
2.) Initiate a dialogue with representatives of our metropolitan counties to determine what roles can reasonably be assumed by county governments to implement the Phase II requirements.

We would be happy to assist in setting up a meeting with the appropriate counties. We look forward to your response.

Sincerely,

Ed Regan, Deputy Director

enclosures

cc: Bill Holman, Secretary, DENR
Richard Rogers, Legislative Liaison, DENR
John Thuss, Caldwell County Commissioner
Delilah Blanks, NCACC President
Graham Pervier, Forsyth County Manager
Bob Ragland, Forsyth County Environmental Affairs Department
Mike Ruffin, Durham County Manager
Chuck Armbrust, Durham County Planning Department
David Cooke, Wake County Manager
Rick Rowe, Wake County Director of Environmental Services
Harry Jones, Mecklenburg County Manager
Jeanette Powell, Division of Water Quality, DENR
Jerry Meyers, Rockingham County Manager
Joe Lesch, Union County Planning Director
David Cheek, Alamance County Manager
Jimmy Varner, Brunswick County Manager
Wanda Greene, Buncombe County Manager
Ron George, Burke County Manager
Frank Clifton, Cabarrus County Manager
J. Thomas Lundy, Catawba County Manager
Gerald Hege, Davidson County Manager
Joseph Durham, Edgecombe County Manager
Philip Hinely, Gaston County Manager
Roger Cotten, Guilford County Manager
Neil Emory, Harnett County Manager
David Nicholson, Henderson County Manager
Jimmy Grimes, Nash County Manager
Allen O'Neal, New Hanover County Manager
Ronald Lewis, Onslow County Manager
John Link, Orange County Manager
Tom Robinson, Pitt County Manager
Frank Willis, Randolph County Manager

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

APR 9 2002

Honorable David Price
House of Representatives
Washington, DC 20515

Dear Congressman Price:

Thank you for your inquiry of March 15, 2002, on behalf of the North Carolina Association of County Commissioners, regarding its request for clarification of the applicability of the Phase II storm water regulations to county governments within the State of North Carolina. On December 9, 1999, the United States Environmental Protection Agency (EPA) promulgated the National Pollutant Discharge Elimination System (NPDES) Phase II Storm Water regulations. In short, the regulations set out to address operators of small municipal separate storm sewer systems (MS4s), industrial facilities that discharge storm water associated with industrial activity, and construction activity disturbing one to five acres.

The Association has expressed three major concerns with regard to the potential impact of the Phase II rule on the counties in North Carolina. In the first issue of concern, the Association asks, "What is the responsibility of the counties containing urbanized areas that were named on the initial list if the county governments do not own or operate the separate storm sewer systems or road/street systems?" The intent of the rule is to clearly address the owner/operator of the MS4 system, and hold that party responsible for applying for the permit. However, the State of North Carolina presents a unique situation where unincorporated counties neither own nor operate the road systems in their jurisdictional area. These systems represent a large portion of the MS4s that have direct discharges to waters of the U.S. in unincorporated county areas. Therefore, even though a county may be listed in Appendix 6, if that county does not own or operate the MS4, it does not have to submit an application or develop a storm water management plan, in accordance with NPDES regulations. If another entity does own or operate an MS4 within the county (e.g., town, department of transportation, regional utility district), that other entity will need to submit an application and develop the program. Please note that the federal NPDES regulations require delegated states to establish authorities for administering the federal requirements, including the development and implementation of their own designation and petition criteria which may expand storm water permit coverage by state law rather than by federal law.

The second concern expressed by the Association concerns the responsibilities of the counties with regard to the rule if they own public facilities such as parks, office parks, courthouses, landfills, and water supply systems. In 40 Code of Federal Regulations (C.F.R.) §122.26(a)(16)(iii) of the Phase II rule, EPA clarifies that the definition of a small MS4 does not include individual buildings, such as post offices, courthouses or urban buildings. These buildings may have a municipal separate storm sewer, but not have a "system" of conveyances. The State

will have to employ some discretion in deciding as to the nature of the building (or complex of buildings) and its storm water conveyance system.

Finally, the Association wants clarification regarding facilities requiring discharge permits. Specifically, would the six minimum measures apply only to the specific facilities or across the entire jurisdiction of the local governments that own/operate these facilities? As noted above, these facilities may not be required to obtain NPDES permit coverage according to the federal Phase I or Phase II storm water regulations. However, the State may use the authority under the Clean Water Act, Section 402(p)(2)(E), to designate an individual storm water discharge as a source of significant pollutants or one that contributes to a violation of a water quality standard within waters of the U.S. Under State designation authority, the State would determine the extent of the six minimum measures application.

The specific situations in North Carolina are unique and complex. The EPA Region 4 staff will continue to work with the North Carolina permitting staff in addressing these issues in the most effective manner possible. If EPA Region 4 can be of further assistance, please contact me or the Office of Congressional and Intergovernmental Relations at (404)562-8327.

Sincerely,

for J. I. Palmer, Jr.
Regional Administrator

cc: Greg Thorpe, NCDENR

ROY COOPER
ATTORNEY GENERAL

State of North Carolina
Department of Justice
P. O. Box 629
RALEIGH
27602-0629

Reply to:
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Environmental Division
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January 11, 2002

Coleen Sullins, Water Quality Section Chief
Bradley Bennett, Stormwater and General Permits Unit Supervisor
Division of Water Quality
1617 Mail Service Center
Raleigh, NC 27699-1617

Re: **Advisory Opinion:** Application of the NPDES Storm Water Phase II Program to Local Governments; N.C. Gen. Stat. § 214.7; N.C. Admin. Code tit. 15A, r. 2H.0126; 33 U.S.C. § 1342(p); 40 C.F.R. §§ 122.26, 122.32, 123.35

Dear Coleen and Bradley:

You requested written advice on two questions concerning the State implementation of the federal National Pollutant Discharge Elimination System ("NPDES") Storm Water Phase II Program as it relates to local governments. The questions arose from a request by the North Carolina Association of County Commissioners to review the federal rule and determine whether State implementation would require a county to obtain a permit, notwithstanding the county does not own or directly operate the largest storm water conveyance system in its jurisdiction, i.e., the State road system and its associated drainageways.[1] In particular, you asked (1) whether a county may be required to obtain a NPDES Storm Water Phase II permit for the storm water conveyances within its jurisdiction notwithstanding that it does not own or operate roads and associated drainageways; and (2) if a county is required to obtain a permit, what permitting avenues would be available.

In regard to the first Issue our answer is "yes;" we conclude that there are four scenarios under which a county may be required by DENR to obtain a Phase II permit, notwithstanding that it does not own or operate roads and associated drainageways. The four scenarios arise when: (a) the county owns or operates a municipal separate storm sewer system ("MS4")[2] in an urbanized

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[1] Letter from Ed Regan, Deputy Director of the North Carolina Association of County Commissioners to Bradley Bennett of the North Carolina Department of Environment and Natural Resources' Division of Water Quality dated September 27, 2000.

[2] Under either phase, "municipal separate storm sewer" means a conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains owned by a public body designed or used for collecting or conveying storm water which is not a

area which discharges directly to receiving waters; (b) the county owns or operates a storm water conveyance in an urbanized area which is interconnected with a permitted MS4, but retains the authority to implement a measure of the program; (c) the State designates a county's MS4 as needing a permit, regardless of location; or (d) a third party successfully petitions the State to require county permitting. In response to the second Issue, if required to obtain a Phase II permit, a county may obtain a general permit, an individual permit or arrange to be co-permittees with existing or new permittees.

Issue 1. The NPDES storm water permitting program has two phases, Phase I for large and medium MS4s[3] and Phase II for smaller MS4s[4]. Phase II permits require implementation of a storm water management program which is composed of six minimum measures. The minimum measures consist of (1) public education; (2) public notice; (3) illicit discharge detection and elimination; (4) construction controls; (5) post-construction controls; and (6) pollution prevention. In certain instances, only the county may be able to implement one or more of these six minimum measures. One such example of municipal control over a minimum measure is the requirement of post-construction controls, i.e., requiring maintenance of installed best management practices after construction is complete. To this end, a county may exercise control over its jurisdiction through the land use authorities granted to it by statute. Counties have broad authority to regulate and restrict the size of buildings; the percentage of lots occupied, the size of open spaces; the density of population; the location and use of buildings, structures, and land for trade, industry, residence or other purposes; and provide density credits or severable development rights for dedicated rights-of-way. N.C. Gen. Stat. § 153A-340. Counties may adopt zoning regulations designed to facilitate the adequate provision of water, sewerage and other public requirements. N.C. Gen. Stat. § 153A-341. Counties also regulate subdivisions by ordinance. N.C. Gen. Stat. § 153A-330 *et seq.*

North Carolina is one of the few states in which roads and adjoining drainageways are owned and operated by the state's department of transportation[5] rather than by counties. Apparently for this reason, the Association of County Commissioners has questioned whether a county may be required to obtain a Phase II permit when a county does not own or operate the majority of storm water conveyances, namely road drainageways, in its municipal jurisdiction, despite their ability to implement the minimum measures contemplated under Phase II.

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combined sewer or publicly owned treatment works. 40 C.F.R. § 122.26(b)(8).

[3] Phase I covered discharges from MS4s serving populations of 100,000 or more. 33 U.S.C. § 1342(p)(2).

[4] Phase II covers discharges from MS4s serving populations of less than 100,000.

[5] North Carolina currently regulates NC DOT storm water under a statewide NPDES Stormwater Phase I permit (NPDES Permit No. NCS000250).

However, it is our opinion that North Carolina counties may be required by DENR to obtain a permit under at least four scenarios, notwithstanding that they do not own or operate the majority of MS4s in their jurisdiction.

First, a county may be required by DENR to obtain a permit for any discrete system which it owns or operates in an urbanized area.[6] Road drainageways are not the only MS4s in a county. Counties own or operate jail facilities, hospital complexes, municipal buildings, maintenance facilities and parks which contain catch basins, ditches, storm drains and other features of storm drainage which discharge directly to waters of the State without passing through another storm system such as NC DOT's road system. These MS4 point sources must obtain Phase II permits to discharge storm water directly to waters of the State.

Second, a county may be required by DENR to obtain a permit when its storm water devices are interconnected in an urbanized area with a permitted MS4 and the county retains authority to implement one or more of Phase II's six minimum measures. Under Phase I, the permitting agency could include storm water conveyances that did not themselves constitute a large or medium MS4 under the permit for a large or medium MS4 due to the interrelationship between the discharges of the smaller system and the MS4, including the physical interconnections between the storm sewers and other factors. 40 C.F.R. §§ 122.26(b)(4) and (7). DENR issued a statewide NPDES Phase I permit to the NC DOT for its roadways, but did not require counties to be permitted at that time. Without the county as a co-permittee, NC DOT's Phase I permit fails to provide program coverage outside of the right-of-way although those areas contain storm water conveyances that drain to the right-of-way.

Third, a county may be required by DENR to obtain a permit when the State permitting authority designates it for coverage, even if it falls outside of an urbanized area. 40 C.F.R. §§ 122.32(a)(2) and 123.35(b). The rule's preamble discusses this extended coverage by indicating that "Permitting authorities may also decide to designate all MS4s within a county or township, if they believe it necessary to protect water quality." 64 Fed. Reg. 68751. As the NPDES permitting authority, DENR is required to develop a process, as well as criteria, to designate small MS4s outside of the urbanized area which have the potential to result in exceedances of water quality standards or other significant water quality impacts. 40 C.F.R. § 123.35(b). Other significant water quality impact criteria may consist of discharge to sensitive waters, high growth or growth potential, high population density, contiguity to an urbanized area, significant contributor of pollutants to waters, and ineffective protection of water quality by other programs. 40 C.F.R. § 123.35(b)(1)(ii). DENR may also designate any small MS4 that contributes substantially to the pollutant loadings of a physically interconnected MS4 that is regulated by the NPDES storm water program. 40 C.F.R. § 123.35(b)(4). Therefore, even if a county lies outside

[6] The Bureau of Census determines urbanized areas based upon the latest decennial census data. Appendix 6 of the Phase II rule lists 25 counties which are partially or fully located within an urbanized area.

an urbanized area or is only physically interconnected with another regulated MS4, it may be required to obtain a Phase II permit through the State's own designation process.

Fourth, a county may be required by DENR to obtain a permit when it is subject to a successful third party petition. Even if DENR itself does not designate a county as needing a Phase II permit, third parties may petition the permitting agency to do so. 40 C.F.R. §§ 122.26(f)(4) and 122.32(b). Under the petition process, ***any operator*** of a permitted MS4 may petition DENR to require a separate NPDES permit for a discharge entering the operator's MS4. 40 C.F.R. § 122.26(f)(1)(emphasis added). Moreover, ***any person*** may petition DENR to require a county to obtain an NPDES permit for a storm water discharge which contributes to a violation of a water quality standard or is a significant contributor of pollutants to receiving waters. 40 C.F.R. §§ 122.26(f)(2) (emphasis added).

The Phase II rule generally focuses on discharges from MS4s which, by definition, requires the county to own or operate the MS4.[7] However, the language of the rule addressing the Phase II petition process addresses "any discharge into [an MS4]."[8] This change in language creates some ambiguity as to the scope of coverage. In particular, it might be argued by the petitioning operator of a permitted MS4 that he must only show that the discharge reaches its system, not that the discharge comes from another MS4. The petition process also addresses "[any] discharge which is composed entirely of storm water which contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States."[9] In this instance, it might be contended that the third party must show that the discharge negatively affects water quality, without a requirement that the third party must show that the discharge emanates from an MS4.

It may be contended that the general intent of the statute would support such a construction. The structure of the CWA and its history indicate that all point sources should be permitted. *See Natural Resources Defense Council (NRDC) v. Train, 396 F. Supp. 1393 (D.D.C. 1975), affirmed, NRDC v. Costle*, 568 F.2d 1369 (D.C. Cir. 1977). With the adoption of the Water Quality Act of 1987, Congress amended the CWA and added section 402(p), which established the priorities, deadlines and permit requirements for storm water point sources, including MS4s. 33 U.S.C. § 1342(p).

The Phase II rule implements the Clean Water Act goal by seeking to provide comprehensive coverage of storm water control and to eliminate gaps in storm water coverage.

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[7] *See* 40 C.F.R. §§ 122.26(b)(4), (7), (8), and (16).

[8] *See* 40 C.F.R. §§ 122.26(f)(1).

[9] *See* 40 C.F.R. § 122.26(f)(2). *Also see* 33 U.S.C. § 1342(p)(2)(E).

As the rule's preamble states, "'Donut holes' are gaps in program coverage where a small unregulated MS4 is located next to or within a regulated larger MS4 that is subject to an NPDES permit under the Phase I NPDES storm water program. The existence of such 'donut holes' creates an equity problem because similar discharges may remain unregulated even though they cause or contribute to the same adverse water quality impacts. Using NPDES permits to regulate the unregulated discharges in these areas is intended to facilitate the development of a seamless regulatory program for the mitigation and control of contaminated storm water discharges in an urbanized area." 64 Fed. Reg. 68739. The rule's preamble dedicates an entire subsection, Section II.H., to describing the municipal role in Phase II. 64 Fed. Reg. 68748 through 68771. The rule's appendix goes on to identify twenty-five North Carolina counties as being fully or partially located within an urbanized area. 64 Fed. Reg. 68822. It appears that EPA anticipated that North Carolina counties would be covered by the Phase II program and did not anticipate that whole areas would be left out simply because NC DOT rather than local government maintained the road system. Thus, the petition process may extend county coverage to county storm water discharges regardless of whether the discharge emanates from a conveyance that is owned and operated by the county and otherwise meets the definition of a small MS4.

Issue 2. If a county is required to obtain a NPDES permit under Phase II, it has several permitting options. It may request a general permit for all systems and components within the county boundaries. The Phase II program encourages the use of general permits on a system-wide or jurisdiction-wide basis. Under Phase I, NC DOT received a system-wide permit for its road system. Under Phase II, a county could receive a jurisdiction-wide permit for the systems within the county. In this regards, an NPDES general permit can cover a category of dischargers within a defined geographic area which may be defined broadly to include political boundaries, e.g., an entire county. 64 Fed. Reg. 68739. For the storm water systems which interconnect with NC DOT road systems, a county could join NC DOT as a co-permittee in its Phase I permit which would have to be modified to include the Phase II minimum measures. The Phase II rule allows a newly regulated MS4 to join as a "limited" co-permittee with a regulated MS4 by referencing a common storm water management program. 64 Fed. Reg. 68739. A "limited" co-permittee is only responsible for the measures not covered by the already-existing permit. Alternatively, a county could obtain its own Phase II permit for the systems that interconnect with NC DOT. Finally, a county may obtain or require individual permits for each system within its geographical area.

We trust this analysis proves helpful. If you have any questions or wish to discuss this matter further, please do not hesitate to contact us. With best wishes, we are

Very truly yours,

James C. Gulick
Senior Deputy Attorney General

Mary Penny Thompson
Assistant Attorney General

EP/51803-3/wp6.1

January 28, 2003 ERC Meeting
EXHIBIT M

Comments to Environmental Review Commission
on Stormwater Rules
January 28, 2003

Thank you Mr. Chairman and members of the Commission. My name is Kim Hibbard and I'm here to comment on the draft stormwater rules on behalf of the League of Municipalities.

Timing. We agree with many of the points made by previous speakers today. From the beginning, League policy has supported focusing the state's resources on implementation of the federal Phase II criteria before attempting to develop a more expansive program. We asked that priority be placed on complying with Phase II because the federal deadline for municipal applications is March of 2003. We had hoped that permanent rules would be in place well in advance, but here on the eve of that deadline there are still no permanent rules. As you can imagine, municipalities are frustrated by the process and the continued lack of certainty as to what will be expected of them.

Cost. A major issue for municipalities will be the fiscal impact of these regulations. You will note on the list of Phase II municipalities that there are 123 towns automatically designated and 22 more listed as "possible designees." In addition, the draft permanent rules specify that any municipality located in a regulated county may be designated, so many more towns are likely to join this list. If you've had a chance to review the list of designees, you've probably noticed that most of these are not big cities. Many of them are 2,000 or 3,000 or 4,000 in population; fourteen of them are under 1,000. Consider how Belville, population 287, or Spencer Mountain, population 51, will have the financial resources to implement a stormwater program. These are not towns that own or operate MS4's, nor do they have the staff or the expertise to administer a new program.

References were made at your last meeting to federal analysis of the potential costs of Phase II compliance. Those federal figures give a broad range as to the possible per capita costs, but they are not specific to the requirements contemplated under North Carolina's draft permanent rules. At best they are a starting point for discussion. Needless to say, it is imperative that fiscal information addressing the impact of the specific state regulations be forthcoming. We have seen no sign of a fiscal note.

As was pointed out at your last meeting, the General Assembly assisted municipalities in the 2000 Session by amending the stormwater statutes to clarify that local governments can charge a fee for stormwater programs. We believe that Phase II municipalities will have to rely heavily on that fee option.

Coverage & Authority. The draft permanent rules require municipalities to implement all six of the minimum measures within their city limits but also in the extraterritorial jurisdiction. The League generally supports addressing stormwater in unincorporated areas, since that is where much of the growth is occurring. However, we have several concerns regarding the ETJ coverage, as there may be some gaps in municipal statutory authority to implement all of the measures contemplated by the rules. ETJ authority

currently exists only with respect to certain land-use activities—planning, zoning, subdivision control, and building permits. Municipalities do not have broad police powers outside of city limits.

This does not pose a problem as to those aspects of a stormwater program that are closely tied to land use. But questions have been raised, for example, as to what authority a town official has to enter private property in the ETJ for the purpose of detecting illicit stormwater discharges. (Attorneys for Phase II municipalities have contacted us with this concern.) It is also not abundantly clear that municipalities can charge a stormwater fee in the ETJ to finance the program. We know they can't charge a property tax in the ETJ, so fee-based financing will be necessary. The statutes have some ambiguous language that may need tweaking on this point.

Also, the draft permanent rules require the stormwater program to regulate on-site wastewater systems (septic tanks). Authority for that is vested in county health services, and we question what authority municipalities would have. The draft permanent rules further specify that in nutrient sensitive waters, the stormwater program must include a nutrient application management program. Again, we are unsure where the statutory authority lies for municipalities to regulate the use of fertilizer. I bring these to your attention simply to give you an idea of some of the items that might require legislation to clarify.

Post-Construction. Briefly, we have concerns about the details of several items under the post-construction component of the proposed rules. In the low-density option, the draft permanent rules have been left blank with regard to the limitation on Built-Upon Area. This should be a local land-use decision, and we would not support a one-size-fits-all approach. Under the high-density option, the rules would require removal of 85% of Total Suspended Solids. Our discussions with biological and agricultural engineers at NCSU indicate that this is not a realistic target and that 85% removal can only be achieved under optimum circumstances. Finally, the draft permanent rules would shorten the deadline for compliance with post-construction measures to one year, while retaining the federal five-year compliance time for the other measures. We believe one year is inadequate and question the wisdom of seeking to implement the most costly and complex aspect of the program before implementing the public education and participation components.

Thank you for allowing us this time to respond. I will be happy to answer any questions.

January 28, 2003 ERC Meeting
EXHIBIT N

Comments of Southern Environmental Law Center (SELC)

Trip Van Noppen, SELC
January 28, 2003

I. North Carolina will benefit as a result of implementation of Phase II stormwater rules

- Contaminated surface runoff is the number one cause of impaired surface water quality in North Carolina according to the US Environmental Protection Agency.

- The North Carolina Division of Water Quality has determined that more than 2,000 stream miles have impaired water quality and that surface runoff from cities, construction sites, and other land uses accounts for nearly two-thirds of that pollution.

- About 80 percent of the water pollution in estuaries comes from polluted runoff.

- DENR Secretary Bill Ross has determined that nonpoint source runoff is a major concern and has directed most agencies within DENR to conduct efforts to educate the public about the connection between polluted runoff and impaired streams.

- Another devastating impact of poor storm water controls is that some neighborhoods flood during heavy rains because existing stormwater controls are not effective.

- Prevention is the least cost method to handle stormwater. Builders throughout the country are designing developments that make a strong profit and prevent the degradation of streams. The Phase II rules are designed to lead North Carolina is this direction.

- The cost of retrofits to remediate flooding and to restore impaired waters is extremely high. A study conducted for the City of Wilmington determined the cost of remediating flooding after developments had been built on Page's Creek watershed was $7,500 per acre.

- The Town of Washington spent over $4 million to redirect stormwater from the downtown area away from the Pamilco River and onto a stormwater wetland. The Town of Emerald Isle is also spending about $5 million to pump out Coast Guard Road on to wetland, which floods due to overdevelopment during heavy rains.

- Protected uses of waters, such as shellfishing and recreational swimming, are being lost in violation of the federal Clean Water Act. Due to stormwater runoff, most shellfish beds from Cedar Island to the South Carolina line are closed regularly as a result of fecal coliform bacteria contamination after 1.5 or 2 inches of rain. Recreational swimming is also curtailed whenever stormwater is pumped into the ocean.

II. The Phase II program is both federally required and consistent with state law.

- Federal law requires implementation, in two phases, of a comprehensive program for addressing stormwater discharges through mandatory National Pollution Elimination Discharge System (NPDES) permits.

- Phase II of that program addresses, among other things, stormwater pollution from smaller municipal separate storm sewer systems (MS4s). Federal rules require states choosing to implement the program to develop a permitting program that meets federal criteria. If the states do not implement the program, the federal government does.

- A variety of groups (including the National Association of Home Builders) challenged these "Phase II" rules. On January 14, 2003, a federal appellate court upheld the rules in almost all respects. The court did agree with conservation groups that certain aspects of the rule were not protective enough.

- In addition to the federal stormwater requirements, in the late 1980s, the General Assembly directed the EMC to "develop and adopt a statewide plan with regard to establishing and enforcing stormwater rules for the purpose of protecting the surface waters of the State. . . . [and to] implement stormwater runoff rules and programs for point and nonpoint sources on a phased-in statewide basis." N.C. Gen. Stat. § 143-214.7(a)-(b).

- The General Assembly directed the EMC first to consider standards for classified shellfish waters, water supply watersheds, outstanding resource waters ("ORWs"), and high quality waters ("HQWs"). After developing standards for those specific waters, the EMC was to consider standards and best management practices to control runoff to "[a]ll other waters of the State to the extent that the [EMC] finds control of stormwater is needed to meet the purposes of Article 21 [the State law providing for the protection of air and water resources]." N.C. Gen. Stat. § 143-214.7(b).

III. We recommend strengthening North Carolina's Phase II rules to protect state waters.

- The rules should include science-based best management practices that will protect water quality. For example, especially where urban runoff is draining to shellfishing waters, science does not support the conclusion that development with less than 24 percent built upon area addresses water quality problems related to urban runoff. Scientific studies suggest that the allowable amount of built upon area (impervious surface) should be 10 percent or lower.

- The rules should ensure seemless coverage so that potential gaps in coverage are eliminated. Moreover, counties and municipalities should have similar criteria for stormwater management programs.

- The final rules should be written so that they can be carried out effectively taking into account staff constraints within the Division of Water Quality.

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grant u
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DEVELOPMENT OF ENVIRONMENTALLY SUPERIOR TECHNOLOGIES: NC Agreements project – *a progress report*

Report prepared by: C.M. (Mike) Williams January 2003

Background: The Attorney General of North Carolina entered into Agreements in July and September, 2000 with Smithfield Foods and its subsidiaries (Smithfield Foods), and Premium Standard Farms (PSF), respectively, to develop "Environmentally Superior Technologies" (EST) for implementation onto farms located in North Carolina that are owned by these companies.[1] In March 2002, the Attorney General also entered into an Agreement with Frontline Farmers in which its membership agreed to work cooperatively with the Attorney General and North Carolina State University (NCSU) to develop and implement EST.[2] The Smithfield Foods Agreement provides $15 million and the NC Attorney General allocated $2.3 million from the PSF Agreement for a total of $17.3 million for the EST identification and development initiative.

Environmentally Superior Technologies: The Agreements define EST as "any technology, or combination of technologies that (1) is permittable by the appropriate governmental authority; (2) is determined to be technically, operationally, and economically feasible for an identified category or categories of farms as described in the Agreements and (3) meets the following performance standards: 1. Eliminate the discharge of animal waste to surface waters and groundwater through direct discharge, seepage, or runoff; 2. Substantially eliminate atmospheric emissions of ammonia; 3. Substantially eliminate the emission of odor that is detectable beyond the boundaries of the parcel or tract of land on which the swine farm is located; 4. Substantially eliminate the release of disease-transmitting vectors and airborne pathogens; and 5. Substantially eliminate nutrient and heavy metal contamination of soil and groundwater."

Candidate EST: Selection of EST candidates to undergo performance verification and economic analysis involved a request for proposals that was issued nationwide to research institutions and industry. Selections were based on terms and conditions of the Agreements and competitive review (outside *ad hoc* review) as well as review by an Advisory Panel appointed per the Agreements and comprised of individuals that represent government, environmental and community interests, the companies (Smithfield, PSF and Frontline Farmers) and individuals with expertise in animal waste management, environmental science and public health, economics and business management. Collectively, this process yielded the following EST candidates:

1. In-ground ambient temperature anaerobic digester / energy recovery / greenhouse vegetable production system,
2. High temperature thermophilic anaerobic digester (TAnD) energy recovery system,
3. Solids separation / constructed wetlands system,
4. Sequencing batch reactor (SBR) system,
5. Upflow biofiltration system,
6. Solids separation / nitrification-denitrification / soluble phosphorus removal /solids processing system,
7. Belt manure removal and gasification system to thermally convert dry manure to a combustible gas stream for liquid fuel recovery,
8. Ultrasonic plasma resonator system,

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[1] See Agreements between Attorney General of North Carolina and Smithfield Foods and Premium Standard Farms (North Carolina Department of Justice, on file with Ryke Longest, 2000).

[2] See Agreement between Attorney General of North Carolina and Frontline Farmers (North Carolina Department of Justice, on file with Ryke Longest, 2002).

9. Manure solids conversion to insect biomass (black soldier fly larvae) for value-added processing into animal feed protein meal and oil system,
10. Solids separation / reciprocating water technology system,
11. Micro-turbine co-generation system for energy recovery,
12. Belt system for manure removal,
13. High-rate second generation totally enclosed Bion system for manure slurry treatment and biosolids recovery,
14. Combined in-ground ambient digester with permeable cover / aerobic blanket - BioKinetic aeration process for nitrification-denitrification / in-ground mesophilic anaerobic digester system (this project represents 3 farm sites),
15. Dewatering / drying / desalinization system,
16. Solids separation / gasification for energy and ash recovery centralized system (this project represents 3 farm sites),
17. High solids high temperature anaerobic digester system, and
18. Solids separation / mesophilic anaerobic digestion / membrane filtration – reverse osmosis system.

EST determination: Performance verification and economic feasibility analysis for candidate EST located on commercial farm sites involves a 15-step systematic process: 1) EST candidate selection through a pre-proposal and subsequent full proposal competitive review process, 2) selection of appropriate commercial farm or university research site for the technology study, 3) execution of farm owner agreement, 4) execution of technology design agreement, 5) development of technology design documents, 6) submittal, review and approval of design documents by NC Department of Environment and Natural Resources (NCDENR) for permitting purposes, 7) execution of technology construction agreement, 8) on-site construction, 9) execution of agreements for technology operation and post-evaluation decommission (if necessary), 10) construction closure approval, 11) establishment of functional operation of technology (e.g. steady state waste treatment conditions), 12) procurement of environmental performance data and economic feasibility data by third party research teams, 13) analysis of data and results reporting to the Advisory Panel, Designee, and public, 14) input and review process by the advisory panels, and 15) EST technology determinations per terms and conditions of Agreements.

Progress to date: Currently candidate EST nos. (as referenced above) 1, 3, 5, 6, 7, 9, 10, 12, and 17 are in various stages of operation and performance verification. Nos. 2, 4, 11, 13, 14, 16, and 18 are in various stages of design and/or permitting and/or construction. Candidate EST no. 8 (a portable unit process technology) is under fabrication in Germany and will be shipped to North Carolina as soon as possible; EST no. 15 (also a portable unit process) is under development out-of-state and a decision is pending regarding the location of the performance evaluation.

The 15-step process described above is grouped into 3 categories – 1) "on site" construction, 2) "on campus" technology development and objective environmental/economic performance verification, and 3) Advisory Panel review and technology determination reporting by the Designee named in the Agreements. A full service civil, agricultural, and environmental consulting engineering firm was retained in Year 1 of this initiative to provide project technical management assistance for the construction and permitting processes associated with all "on site" activities (items 2-10 in the 15-step process). Also during Year 1, request for proposals were issued for the "on campus" activities. Responses were subjected to outside *ad hoc* review and Advisory Panel review. Subsequently, successful project teams were identified and awarded grants/contracts for this scope of work. These teams are comprised of faculty and staff from NCSU and also include faculty from the University of North Carolina – Chapel Hill (UNC-CH), Duke University, University of Georgia (UGA), and professionals from Research Triangle Institute (RTI), United States Department of Agriculture (USDA), United States Environmental Protection Agency (USEPA), United States Air Force Combat Climatology Center, MCNC, and NCDENR.

Work in progress detail is provided on the college's waste management program web site.[3]

[3] See www.cals.ncsu.edu/waste_mgt/ *Development of Environmentally Superior Technologies: Two-Year Progress Report* and subsequent Quarterly Progress Reports.

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Development of Environmentally Superior Technologies

Progress Report – NC Attorney General

Agreements with Smithfield Foods, Premium Standard Farms, and Frontline Farmers

C.M. (Mike) Williams
Animal and Poultry Waste Management Center
North Carolina State University

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Environmentally Superior Technologies

- "permittable by the appropriate governmental authority
- determined to be technically, operationally, and economically feasible for identified categories of farms
- meets the following performance standards..."

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Performance Standards

- "Eliminate the discharge of animal waste to surface waters and groundwater through direct discharge, seepage, or runoff;
- Substantially eliminate atmospheric emissions of ammonia;
- Substantially eliminate the emission of odor that is detectable beyond the boundaries of the parcel of land on which the swine farm is located;
- Substantially eliminate the release of disease-transmitting vectors and airborne pathogens;
- Substantially eliminate nutrient and heavy metal contamination of soil and groundwater"

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Economic Feasibility Determination

- Projected 10 year annualized cost of the technology (including capital, operation and maintenance) per 1000 # steady state live weight for each category of farm system
- Compared to lagoon and spray-field system
- Projected revenues, including income from byproducts
- Available cost-share monies or other financial assistance from federal, state or other public sources
- Impact that the adoption of the technology may have on the competitiveness of the NC pork industry
- ID/quantification (if possible) of emissions to environmental media from each category of farm system implementing the technology as compared to lagoon and spray-field system
- Estimate of the economic benefits to NC households arising from the changes in emissions to environmental media resulting from implementation of the technology

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Concise Overview of Activities / Progress to Date

- Advisory panels appointed (meet app quarterly)
- 18 candidate technologies identified
- Performance verification teams identified for environmental variables (nitrogen and odor emissions & pathogen) analysis and economic analysis - work in progress
- 9 candidate EST in various stages of construction / operation / performance verification
- 7 candidate EST in various stages of design / permitting
- 2 candidate EST under development out of state

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Advisory Panel Membership

- Delilah B. Blanks; North Carolina Association. of County Commissioners
- Alan Briggs; Save Our State
- Don Butler; Murphy-Brown, LLC
- Kim Colson; NCDENR
- Bob Epting; EPTING & HACKNEY
- Bundy Lane; Frontline Farmers, Inc.
- George Lucier; National Institute of Environmental Health Sciences
- Randy Mapes; AgProVision, LLC
- Fred Pfaender; UNC-CH, Dept. of Environmental Science and Engineering
- Karen Priest; Alliance for a Responsible Swine Industry
- Dennis Rondinelli; UNC-CH, Kenan-Flagler Business School
- Joe Rudek; NC Environmental Defense
- Paul Sherman; NCDENR
- Shihwu Sung; ISU, Dept. of Civil and Construction Engineering
- John Sweeten; Texas A&M Univ.,Texas Agri. Experiment Station
- Dave Townsend; Premium Standard Farms, Inc.
- Phil Westerman; NCSU, Dept. of Biol. and Agri. Engineering
- Johnny Wynne; NCSU, NC Agricultural Research Service
- Chantal Line Carpentier; Commission for Envir. Cooperation
- Richard Eason; Cape Fear Farm Credit
- Bart Ellis; Smithfield Foods, Inc.
- Bryan Hubbell; US EPA
- Kerry Smith; NCSU, Dept. of Agri. and Resources Economics

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1. In-ground ambient temperature anaerobic digester / energy recovery / greenhouse vegetable production system.
2. High temperature thermophilic anaerobic digester (TAnD) energy recovery system.
3. Solids separation / constructed wetlands system.
4. Sequencing batch reactor (SBR) system.
5. Upflow biofiltration system.
6. Solids separation / nitrification-denitrification / soluble phosphorus removal solids processing system.
7. Belt manure removal and gasification system to thermally convert dry manure to a combustible gas stream for liquid fuel recovery.
8. Ultrasonic plasma resonator system.
9. Manure solids conversion to insect biomass (black soldier fly larvae) for value-added processing into animal feed protein meal and oil system.
10. Solids separation / reciprocating water technology system.
11. Micro-turbine co-generation system for energy recovery.
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15. Dewatering / drying / desalinization system.
16. Solids separation / gasification for energy and ash recovery centralized system (this project represents 3 farm sites).
17. High solids high temperature anaerobic digester system, and
18. Solids separation / mesophilic anaerobic digestion / membrane filtration – reverse osmosis system.

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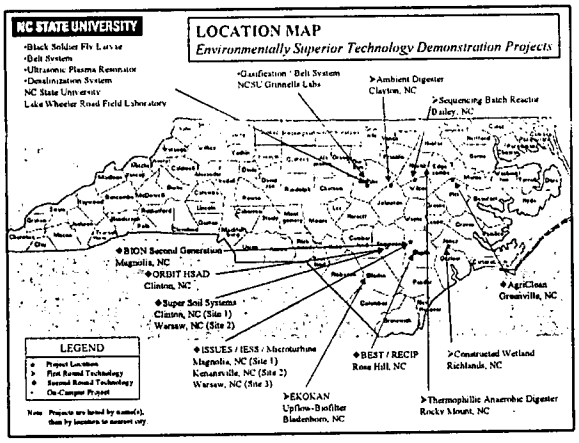
LOCATION MAP

Environmentally Superior Technology Demonstration Projects



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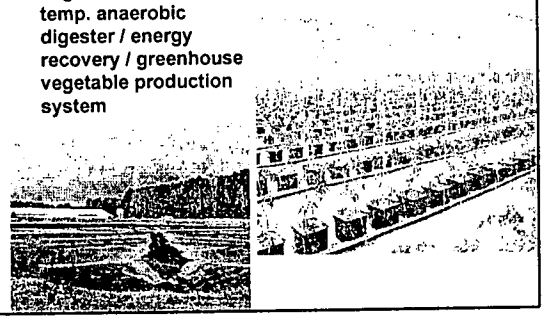
Candidate Technologies:

- In ground ambient temp. anaerobic digester / energy recovery / greenhouse vegetable production system



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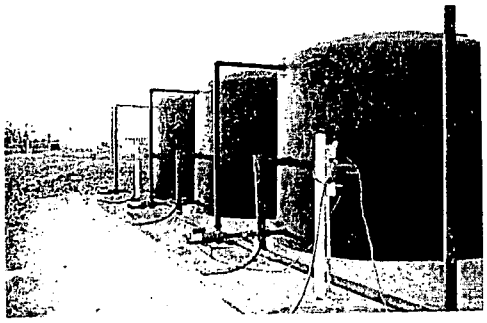
Nitrification Tanks – Barham Farm Project



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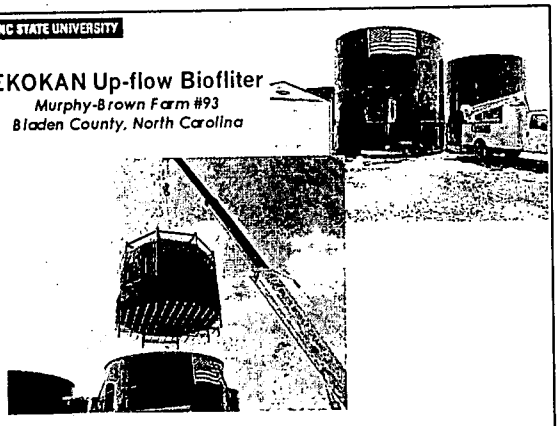
EKOKAN Up-flow Biofliter

Murphy-Brown Farm #93
Bladen County, North Carolina



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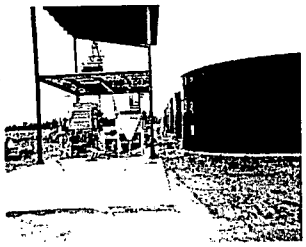
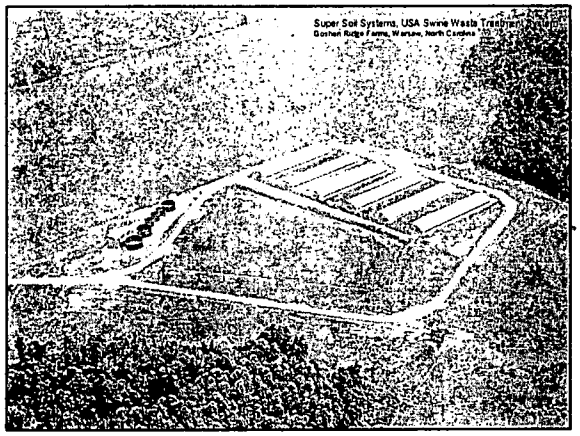
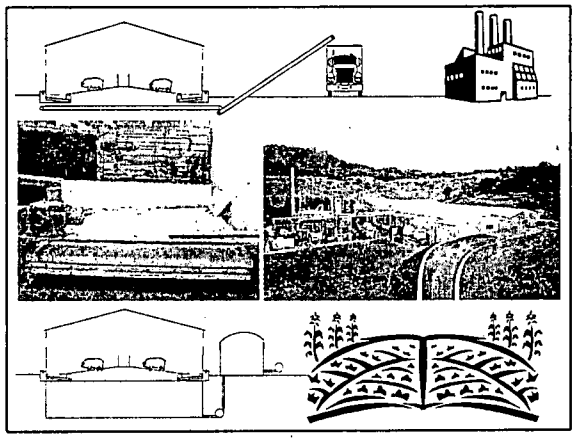
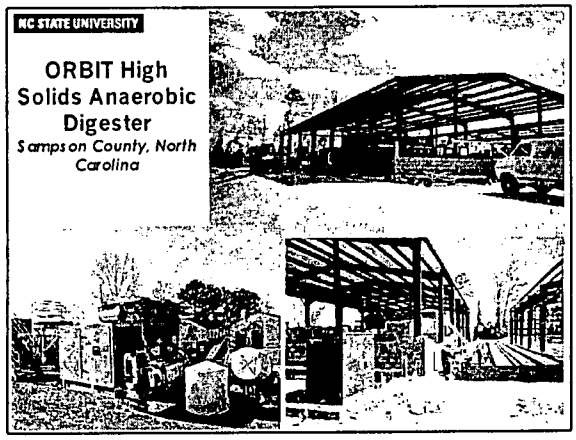
Candidate Technologies:

- Solids separation / nitrification-denitrification / soluble P removal / solids processing system




Super Soil Systems, USA Swine Waste Treatment System
Goshen Ridge Farms, Warsaw, North Carolina

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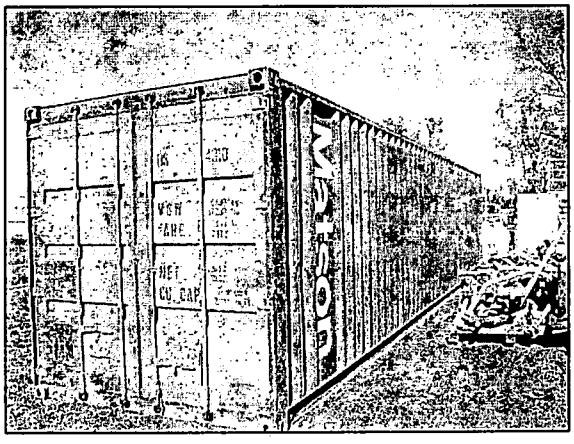
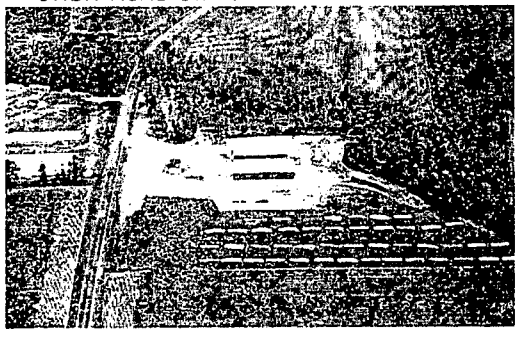
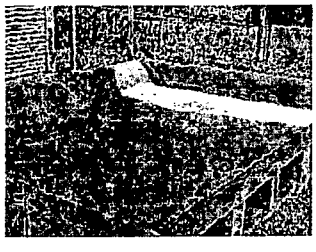
ORBIT High Solids Anaerobic Digester
Samps on County, North Carolina

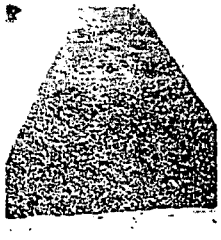


ORBIT HSAD On-site Pictures



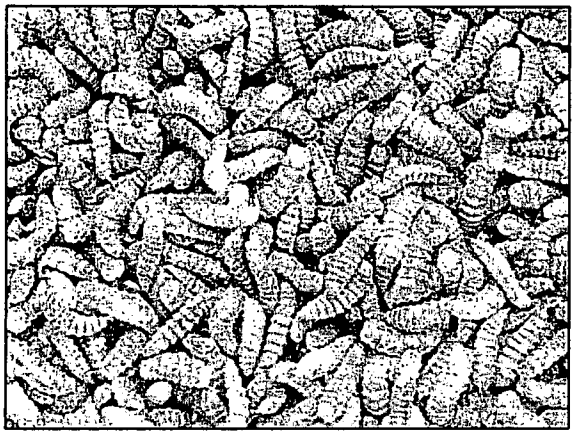
Larval Basin





120 lbs of fresh manure

10,000 larvae/sq ft.



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15-STEP SYSTEMATIC PROCESS

- EST candidate selection process
- Project site selection for technology study
- Execution of farm owner agreement
- Execution of technology design agreement
- Development of technology design documents
- Submittal, review and approval of design documents by NCDENR
- Execution of technology construction agreement
- On-site construction
- Execution of technology operation and decommission agreements
- Construction closure approval
- Establishment of functional operation of technology (steady-state)
- Environmental performance and economic feasibility data procurement
- Data analysis and results reporting
- Input and review process by the advisory panels
- EST technology determinations per terms and conditions of Agreements

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Procurement of Environmental Performance Verification Data

- **Nitrogen**
- **Phosphorus**
- **Ammonia (aerial)**
- **Odor**
- **Pathogens**
- **Metals**

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Results – emissions (one site, one sampling event)

Downwind of spray fields 65 yds (VOCs)	163 ppb
Downwind of spray fields 65 yds (H_2S)	170 - 330 ppb
Downwind of spray fields 65 yds (Ammonia)	1 ppm
Human odor thresholds at fans	350 D/T

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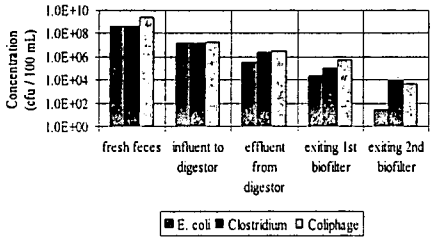

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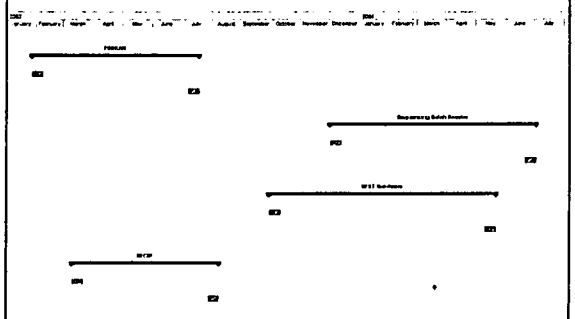

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Economic Feasibility Determination

- Projected 10 year annualized cost of the technology (including capital, operation and maintenance) per 1000 # steady state live weight for each category of farm system
- Compared to lagoon and spray-field system
- Projected revenues, including income from byproducts
- Available cost-share monies or other financial assistance from federal, state or other public sources
- Impact that the adoption of the technology may have on the competitiveness of the NC pork industry
- ID/quantification (if possible) of emissions to environmental media from each category of farm system implementing the technology as compared to lagoon and spray-field system
- Estimate of the economic benefits to NC households arising from the changes in emissions to environmental media resulting from implementation of the technology

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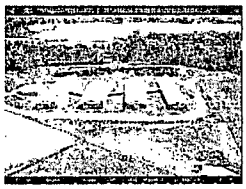
Projected Technology Determination Timelines



- July-Oct 2003 (2)
- March-July 2004 (9)
- March-Sept 2005 (7)

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APWMC Web Address

- **www.cals.ncsu.edu/waste_mgt/**

- (see Development of Environmentally Superior Technologies Two-Year Progress Report and subsequent quarterly reports)

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: The Honorable Fountain Odom
The Honorable Pryor Gibson

FROM: Robin W. Smith
Assistant Secretary for Policy and Planning

RE: Update on Two-Year Livestock Plan

DATE: January 22, 2003

Set out below is a brief status report on the action items in the Two-Year Livestock Plan developed by the Department of Environment and Natural Resources in 2001. The plan is built on the Attorney General's agreements with Smithfield Foods, Premium Standards Farms and the Frontline Farmers organization to fund and test innovative animal waste management technologies.

I. **Attorney General / Producer Agreements**:

The Smithfield Agreement and similar agreements with Premium Standard Farms and the Frontline Farmers organization (representing independent and contract growers) created a process for identifying new animal waste management technology that would be environmentally superior to the lagoon and sprayfield system now in common use.

The Smithfield Technology Panel has chosen eighteen technologies for review. DENR has permitted eight of these alternative animal waste treatment systems and four others are currently in the permitting process.

II. Economic Initiatives:

- Legislative Study – In the last legislative session, DENR proposed a legislative study of potential funding sources to assist contract and independent farmers in adopting new and innovative technologies. The study, discussed as part of a broader legislative proposal on regulation of animal operations, did not move forward. DENR continues to see a need for development of economic incentives and potential funding sources for implementation of new technology. Some of these same issues are addressed in the Soil

and Water Conservation Commission's State Nutrient Plan which was submitted to the General Assembly last session.

- State Nutrient Plan – The State Plan for Managing Animal Manures and Animal-Derived Nutrient Produced in North Carolina, prepared by the North Carolina Soil and Water Commission, was released in September 2001. The plan considers value-added alternatives for using animal waste.

III. Federal Initiatives

- **NPDES Permits** –In response to an EPA mandate to issue NPDES permits (discharge permits required under the federal Clean Water Act) to swine, poultry and cattle facilities exceeding certain thresholds in of numbers of animals, DENR worked closely with stakeholders to develop a proposed general NPDES permit for animal operations. The NPDES general permit was finalized on July 19, 2002. The State will now issue two types of water quality permits for animal operations. Facilities with 2500 or more swine weighing 55 pounds or more each, 700 or more mature dairy cows, 1000 or more confined beef cattle or 30,000 or more chickens served by a liquid waste management system must have an NPDES permit. Facilities that fall below those thresholds will receive a State non-discharge permit. By April 30, 2003 (when coverage under the current non-discharge permit expires) all animal operations must be covered under either an NPDES permit or a state non-discharge permit (according to the size of the facility). DENR staff held thirteen (13) information sessions across the state to acquaint producers with the new NPDES permit. In December, DENR sent a notice for NPDES permit applications to 1000 producers; producers have 60 days to submit applications for coverage under the NPDES permit.

  DENR is in the process of reissuing the non-discharge general permit for animal operations. Public meetings on the proposed non-discharge general permit will be held in Kenansville on February 3, in Williamston on February 4, and in Statesville on February 6, 2003.

- **Federal NPDES Rules.** The Environmental Protection Agency (EPA) released new federal rules for large animal operations (referred to in the federal rules as "concentrated animal feeding operations" or "CAFOs") in December. Major changes include an expansion of the rules to apply to dry-litter poultry operations of specific sizes (55,000 or more turkeys; 82,000 or more laying hens; and 125,000 or more hens that are not layers) and a requirement that animal operations assess and manage phosphorus loss.

- **Phosphorus** – The federal Natural Resource Conservation Service (NRCS) has developed a phosphorus standard, but the recommended approach for evaluating phosphorus loss is still under discussion. Once the Phosphorus Loss Assessment Tool (PLAT) has been completed and approved by the Soil and Water Commission, DENR will need to begin incorporating use of the phosphorus assessment into the permitting of animal operations. Legislation may be needed to make current state statutes governing preparation of animal waste management plans consistent with the new federal requirement that animal operations address phosphorus.

- **Dry-Litter Poultry Operations** – The Division of Soil and Water is working with the poultry industry to determine compliance with the requirements of SB 1217 and planning for regulatory changes required under the new EPA rules applicable to poultry operations.

IV. State Initiatives

- **Groundwater / Drinking water protection** – DENR is addressing groundwater issues in two ways:

  1. The Department is developing a groundwater database to consolidate all information on groundwater contamination so that the Department can better identify sources of groundwater contamination. The Department still expects that effort to be completed by late summer 2003.

  2. Using a protocol developed with input from producers, the Division of Water Quality has reviewed enforcement records to identify farms with a high potential for groundwater contamination and evaluated those farms to determine whether groundwater monitoring should be required. To date, DENR has required eighteen farms to institute groundwater monitoring.

- **Management of Existing Facilities**

  Environmental Management Systems. The Division of Pollution Prevention and Environmental Assistance (DPPEA), with the assistance of the N.C. Cooperative Extension Service and the Division of Soil and Water Conservation, has worked with seven independent and contract farms to design and implement an EMS for swine operations. The project will be competed this spring. All seven farms are actively implementing an EMS; two farms plan to pursue ISO 14001 certification. Out of this experience, DPPEA will develop guides to assist other producers in implementing an EMS, including a web-based tool that will enable farmers to identify farm activities that have a significant impact on the environment. A workshop will be held in late summer 2003 to train other producers on the use of the tools to develop an effective EMS.

  Recently, DPPEA has obtained a $150,000 grant to test the effectiveness of an EMS in achieving, maintaining and exceeding compliance on hog farms. Information gained from this project will lead to development of additional compliance assistance tools.

  As required by the new NPDES permit for Smithfield's Tar Heel Plant, DPPEA is working with Smithfield to develop a model EMS program that can be adopted by contract growers. Drawing on the expertise of Smithfield, DPPEA, hog farmers and other experts, the target date for completion of the model program implementation is the fall of 2003.

January 28, 2003 ERC Meeting
EXHIBIT Q

Response to Phase II Stormwater Questions

- How can a Phase II City Be Removed?
  - The NPDES rules do include waiver options for systems served by less than 10,000 people. The requirements for waiver differ somewhat depending on size (less than 1,000 and less than 10,000. In general, the waivers require that the systems can show that they are not contributing substantially to pollutant loading. The system may have to show that other approved programs are in place to address pollutants of concern.

- What Are The Minimum Federal Mandates?
  - NPDES permits and comprehensive stormwater programs are required for all owners and operators of storm sewer systems in census designated urbanized areas.
  - The federal regulations also require that entities outside of the urbanized areas be reviewed for potential designation into the program. At a minimum, these reviews must take place for entities with a population over 10,000.
  - The federal regulations also establish minimum control measures for stormwater management programs, including: public education and outreach, public participation/involvement, illicit discharge detection and elimination, construction site runoff control, post-construction stormwater control and pollution prevention/ good housekeeping.

- What are the Post-Construction Stormwater Control Requirements?
  - Apply to all new development and redevelopment disturbing one acre or more of land.
  - Stormwater controls must be designed to have an 85% annual average removal of Total Suspended Solids (TSS)
  - Measures must be designed to control and treat the difference in stormwater runoff volume (pre verses post construction) for the 1 year 24 hour storm.
  - Owners of structural stormwater measures must provide adequate long-term operation and maintenance of the measures.
  - Built-upon area must be 30 foot landward of surface waters
  - For projects draining to sensitive waters, measures selected must be those appropriate for the pollutant of concern - fecal coliform for shellfishing waters, temperature for trout waters and nitrogen and phosphorous for nutrient sensitive waters.

Basinwide Water Quality Public Workshop Schedule

River Basin	Designation Year
Cape Fear	2004
French Broad	2004
New	2004
Catawba	2004
Roanoke	2005
White Oak	2005
Hiwassee	2005
Savannah	2005
Watauga	2005
Chowan	2006
Neuse	2006
Pasquotank	2006
Broad	2006
Little Tennessee	2006
Yadkin-Pee Dee	2007
Lumber	2007
Tar-Pamlico	2008

CONSERVATION EASEMENT PROGRAM
ANNUAL REPORT
January 23, 2003

Pursuant to NC G.S. 113A-235(c), the Department of Environment and Natural Resources reports to the Environmental Review Commission each year on the implementation of Article 16, the Conservation Easement Program. This Article, 113A-230 through 113A-235, also includes enabling legislation for a program for conservation tax credit promotion/education, and enabling legislation for a conservation grant fund. The following reports on these programs.

Conservation Easement Program 113A-230. Having been established in 1997, this program is administered as part of the NC Conservation Tax Credit Program (NCCTC). The Conservation Easement (CE) program is intended to use promotion and education to increase the use of conservation easements as a tool to accomplish conservation goals, such as the Million Acre Initiative. A graph (Attachment A) of NCCTC Program Statistics shows the increasing use of conservation easements through this program, due primarily to the growing acceptance of CEs within the farming and forestry communities. Also an inventory (Attachment B) of the conservation easements held by the Department shows use of this conservation tool by programs such as State Parks, Wetlands Restoration, Conservation Reserve Enhancement, Coastal Reserves, Forest Legacy, and Clean Water.

To accomplish optimum use of conservation easements and their related economic advantages, the program needs to provide more than superficial information and guidance. While a more substantial and in-depth outreach program could greatly increase the use of conservation easements, it will also require more attention to the complexities of conservation easement drafting and stewardship. By combining the CE Program with the NCCTC Program, the Department has maintained a limited CE Program in the absence of staff or line item operating budget.

Conservation Tax Credit Program 113A-231. The State's Conservation Tax Credit was established in 1983 and this Department's role was passive, to respond to donor's applications for certification of their gifts of interests in real property for conservation purposes. In 1997 the Department received the authorization to begin a non-regulatory program of education/promotion to increase the use of conservation tax credits. Last year NCCTC/CE presentations were made at three workshops organized by other groups for landowners and land related professionals, and the NCCTC display and brochures were sent to three other workshops or conferences.

Graphs (Attachments C,D,E,F) of the NCCTC Program Statistics show the acreage and value of donations over the duration of the program. Cumulatively, more than 98,800 acres valued in excess of $252 million has been donated.

Over the duration of Conservation Tax Credit use, it has leveraged the donation of $72.8 million of excess value that was above the amount that could be used to create the maximum credit allowed (Attachments G, H, I, J).

Further, when used in conjunction with bargain sales, the conservation Tax Credit (Attachments K, L) can yield substantial savings for conservation trust funds, local governments, and nonprofit organizations purchasing land. For example, in 1998 & 1999 alone, the gift portion of bargain sales to the State that qualified for the Conservation Tax Credit allowed the acquisition of conservation lands by the state at a price $23 million below appraised market value. Over the duration of the program, all recipients have saved more than 44.2 million through bargain sales including the tax credit.

The increasing benefits from the Conservation Tax Credit Program have been derived mostly from increases in the maximum tax credit allowed. A more substantial and in depth outreach program could greatly increase donations of real property for conservation purpose from the use of conservation tax credits. To date the Department has provided minimum support for this function, but the Conservation Tax Credit Program has operated in a limited fashion in the absence of permanent, full time staff or line item operating budget.

Conservation Grant Fund 113A-232. Established in 1997, it was intended to stimulate the use of conservation easements, to improve the capacity of private nonprofit land trusts and agencies to successfully accomplish conservation projects, to better equip real estate related professionals to pursue opportunities for conservation, to increase private landowner participation in land and water conservation, and to provide an opportunity to leverage private or other public monies for the stewardship of conservation easements. To date the Department has not received an appropriation to actualize the Conservation Grant Fund.

Results from 2002 Legislative Session.

(1) **Awkward Text**. Article 16 was amended in 1999 to include the Conservation Reserve Enhancement Program (CREP). The result was somewhat awkward and was clarified through a technical amendment in 2002.
(2) **Clarify Donation in Perpetuity**. Donations of interests in real property for conservation purposes that qualify for the N.C. Conservation Tax Credit must be made in perpetuity. Nevertheless, the enabling legislation at G.S. 105-130.34 and 105-151.12 was not explicit on that point. Having the perpetuity expectation prominently within the text of these statutes assures the understanding of potential donors and their professional representatives, as well as benefits administration of the program. This clarification was made through a technical amendment in 2002.

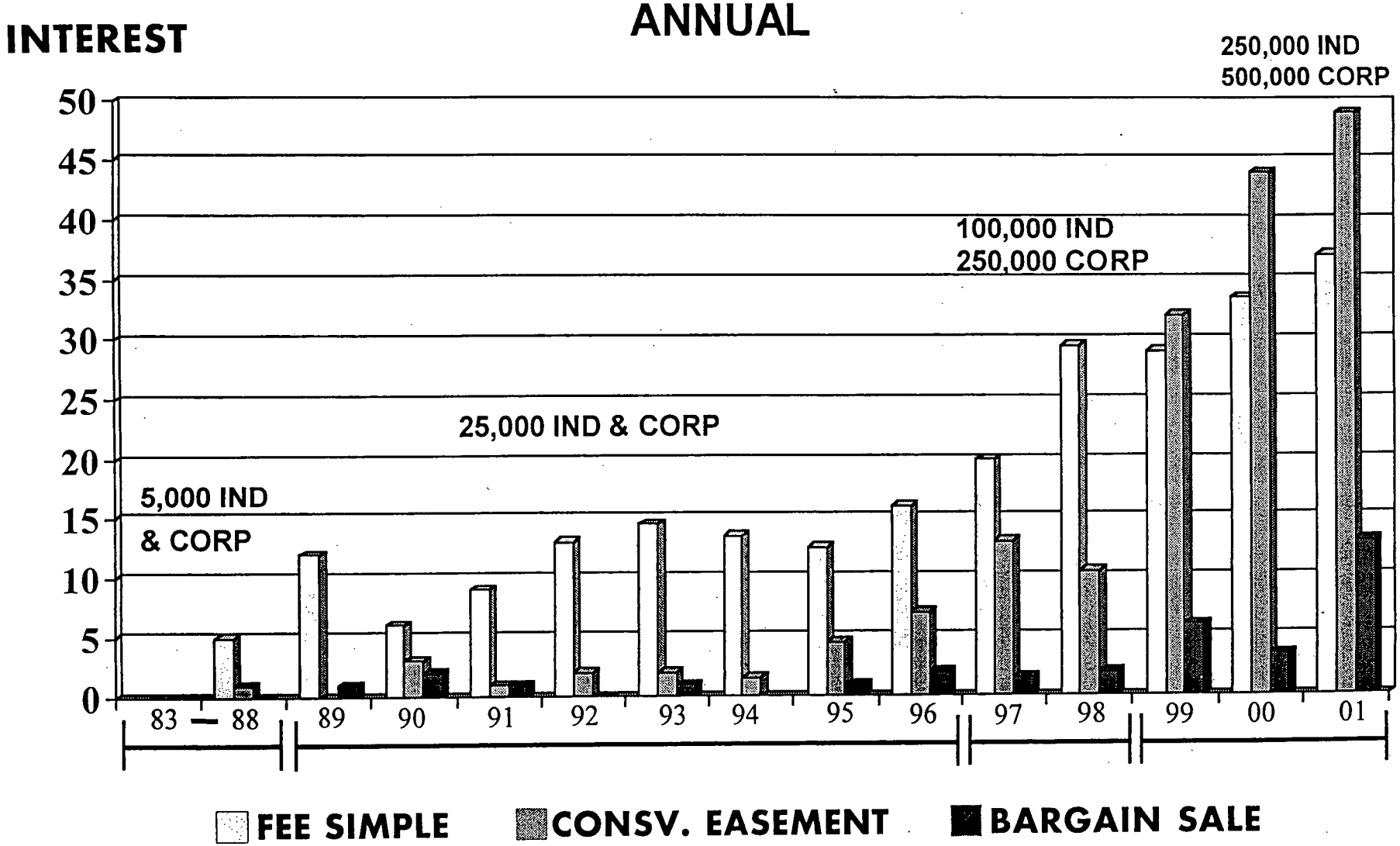
Recommendations for Substantive Legislation. Generally speaking, activities under Article 16 are being carried out as well as can be expected, given the limited resource commitment to these programs. The principal constraint on the promotional and educational opportunities envisioned by Article 16 is the absence of staff and operating budgets. Nevertheless, there are items that may be considered for substantive legislation to improve existing programs.

(1) Index Credit Cap. Since its establishment in 1983, the maximum credit allowed (credit cap) for the NCCTC has been raised three times (1989, 1997, and 1999). Further requests for increases are inevitable as increasing property values decrease the incentive provided by the NCCTC. These dynamics can be addressed by indexing the credit cap. The incentive to donate would then be stabilized relative to land value, and repetitive legislated increases would be avoided. For discussion purposes, an increase equal to 75% of the CPI (Consumer Price Index) can be calculated from the last year of credit cap increase, with the cap increasing incrementally in the year following a cumulative increase of $25,000 for individuals and $50,000 for corporations. If enacted, it would be several years before an indexed increase would occur.

(2) **NCCTC Refundability**. The NCCTC was created as an incentive for landowners to donate interests in real property for conservation purposes. While the concept has been very successful and has been emulated in other states, there is still a category of landowner that finds little incentive in the program. "Land-rich and cash-poor" landowners receive disproportionately low response from their conservation donation for a tax credit. Several states with more recent conservation tax credit programs have addressed this issue by authorizing "transferability" for their tax credits, but this involves a considerable administrative workload. The issue could be addressed more simply through "refundability". For discussion purposes, a 50% refund of any remaining credit amount might be considered after the second year of carry forward (third year including the year of donation). In this way, land-rich and cash-poor landowners would have more incentive to donate interests in real property for conservation purposes. If enacted, it would be four years before any refunds were paid.

(3) **Charitable Purpose Flexibility.** To be eligible for a NCCTC, the donated land must yield one or more of the required public conservation purpose. Nevertheless, minor parts of donated tracts may not contribute to the conservation purpose and may not be allowed to be converted to another purpose without conflict with the tax credit statutes. While it would be inappropriate to allow wholesale or unsupervised conversion of conservation properties to other uses, there may be justification to consider allowing small parts that do not contribution to conservation purposes to be converted to another charitable purposes under a specific process of checks and balances administered by the NCCTC Program.

NCCTC PROGRAM STATISTICS



Effective Date 8/15/02

ATTACHMENT A

ATTACHMENT B

Conservation Easements Held By DENR

Division of Coastal Management

- **Prior to 2002: One easement of 462 acres in Dare County.**
- **New in 2002: One easement of 8270 of acres in Hyde County.**

Division of Forest Resources, Forest Legacy Program

- **Prior to 2002: Two easements of 2,357 acres in Brunswick County.**
- **New in 2002: None**

Division of Parks and Recreation

- **Prior to 2002: Fifteen easements of 42,728 acres in Ashe, Alleghany , Durham, Orange and Wake Counties.**
- **New in 2002: One easement of 1560 acres in Orange County**

Division of Soil & Water Conservation, Conservation Resource Enhancement Prog.

- **Prior to 2002: Seventeen easements on 1449 acres in Beaufort, Craven, Halifax, Hyde, Washington, and Wayne Counties**
- **New in 2002: Eight easements on 673 acres in Hertford, Johnston, Hyde, Warren, and Wayne Counties.**

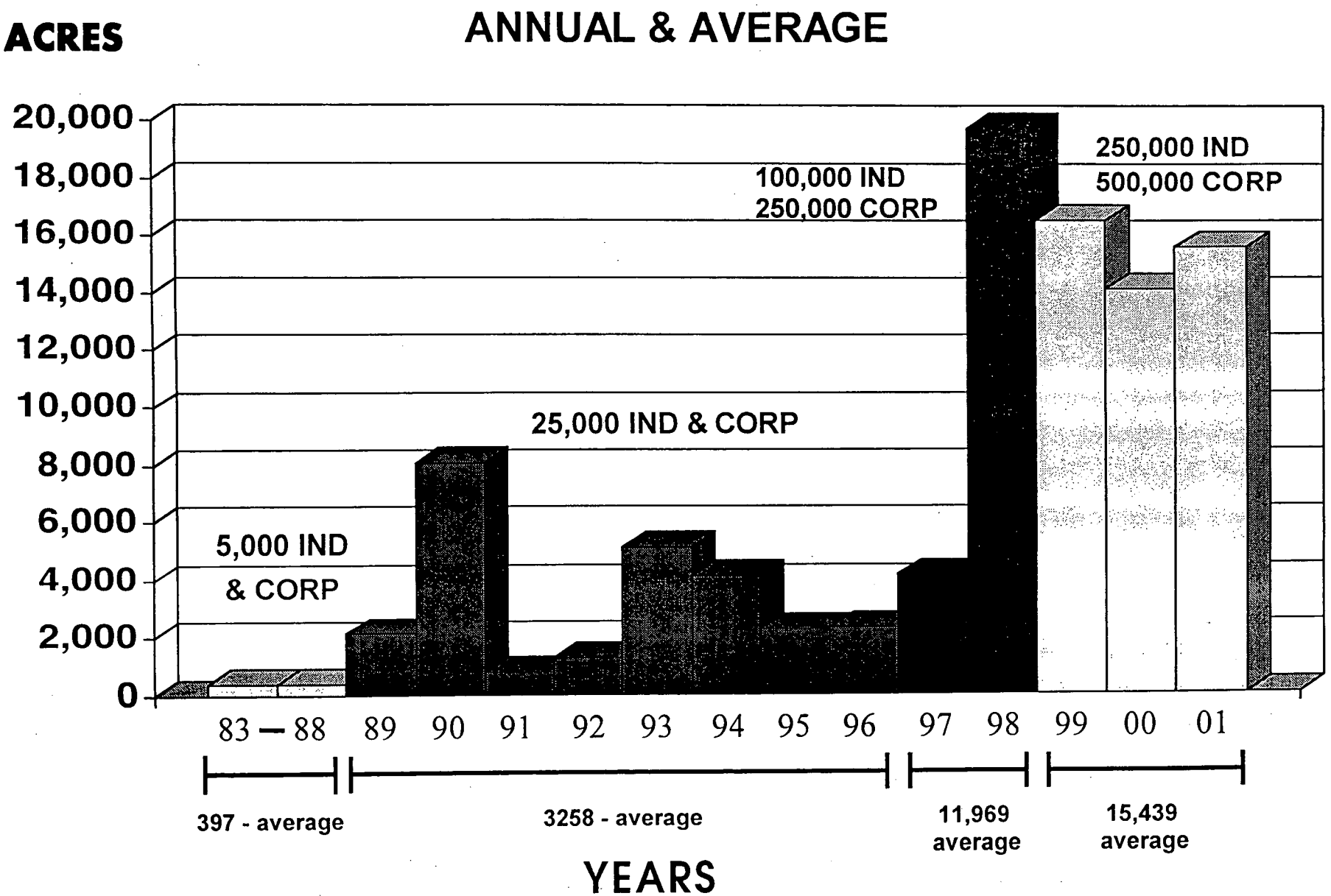
Division of Soil & Water Conservation, Hog Buyout Program

- **Prior to 2002: None**
- **New in 2002: Three easements on 57 acres in Beaufort, Edgecombe and Halifax Counties**

Division of Water Quality, Wetland Restoration Program

- **Prior to 2002: Twenty-six easements on 1228 acres in Alexander, Alleghany, Buncombe, Caldwell, Carteret, Catawba, Cumberland, Greene, Guilford, Henderson, Hertford, Johnston, Nash, Onslow, Wake, Wilkes and Wilson Counties.**
- **New in 2002:**

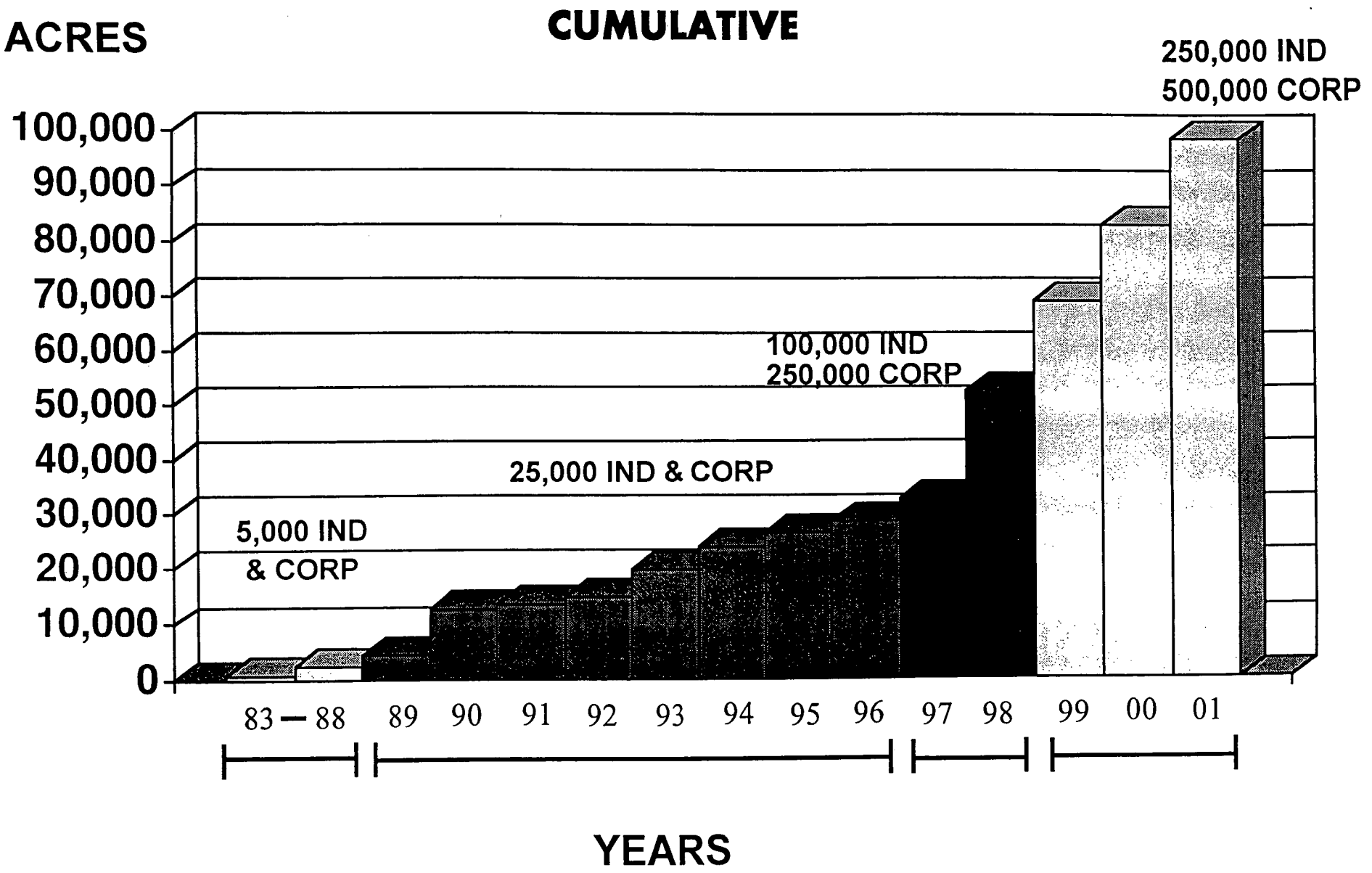
NCCTC PROGRAM STATISTICS



Effective Date 8/15/02

ATTACHMENT C

NCCTC PROGRAM STATISTICS

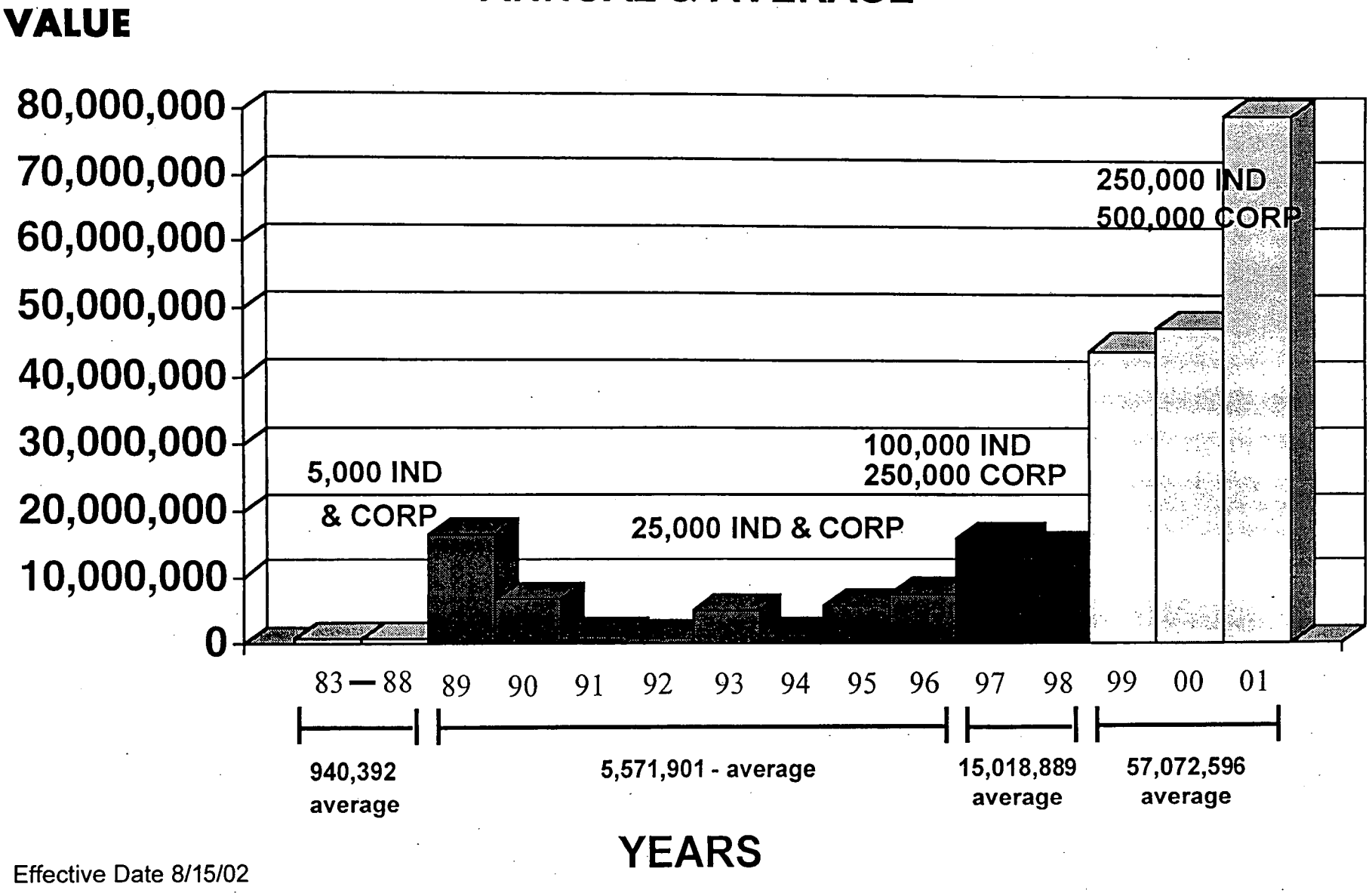


ATTACHMENT D

Effective Date 8/15/02

NCCTC PROGRAM STATISTICS

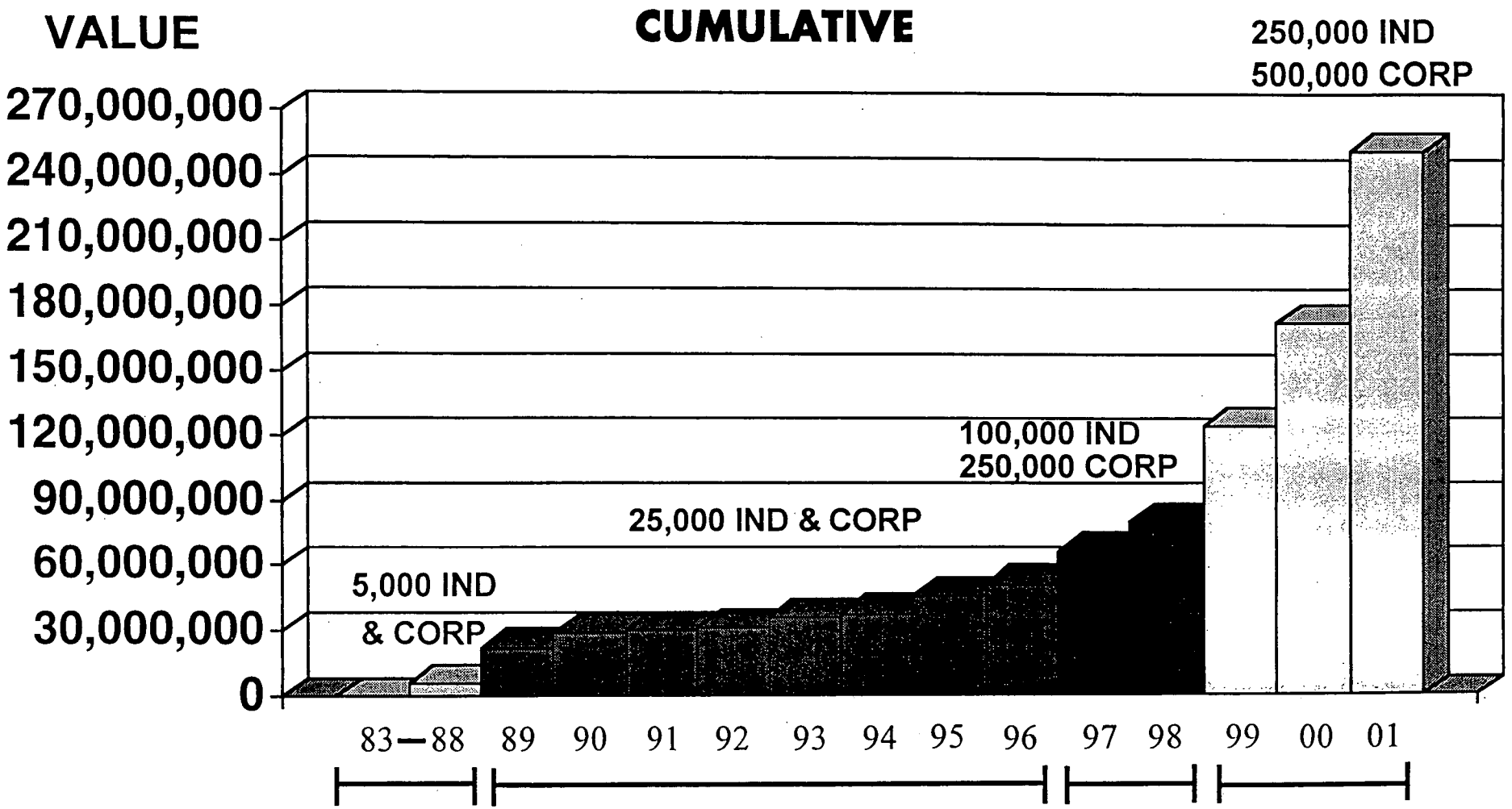
ANNUAL & AVERAGE



Effective Date 8/15/02

ATTACHMENT E

NCCTC PROGRAM STATISTICS



ATTACHMENT F

Effective Date 8/15/02

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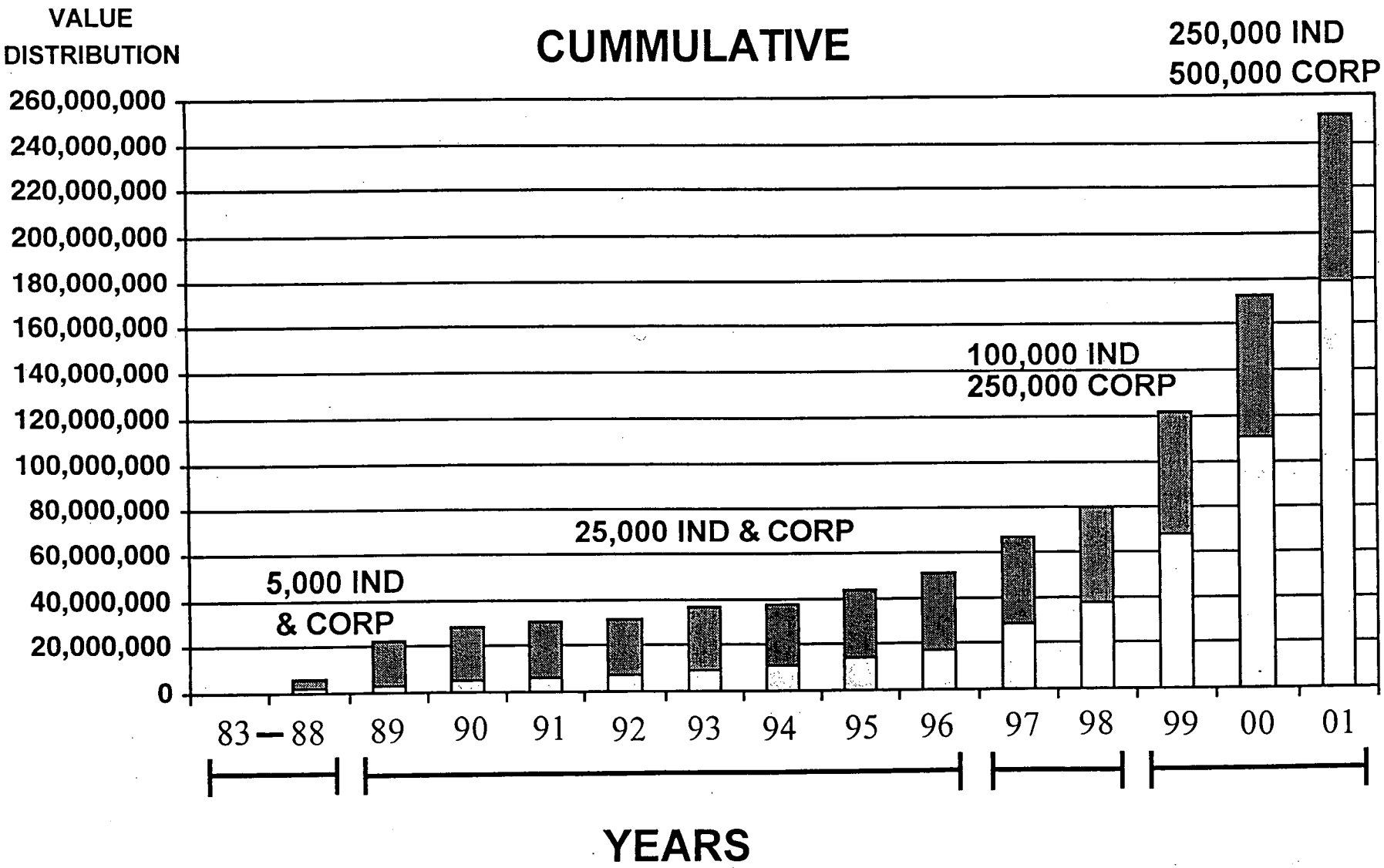
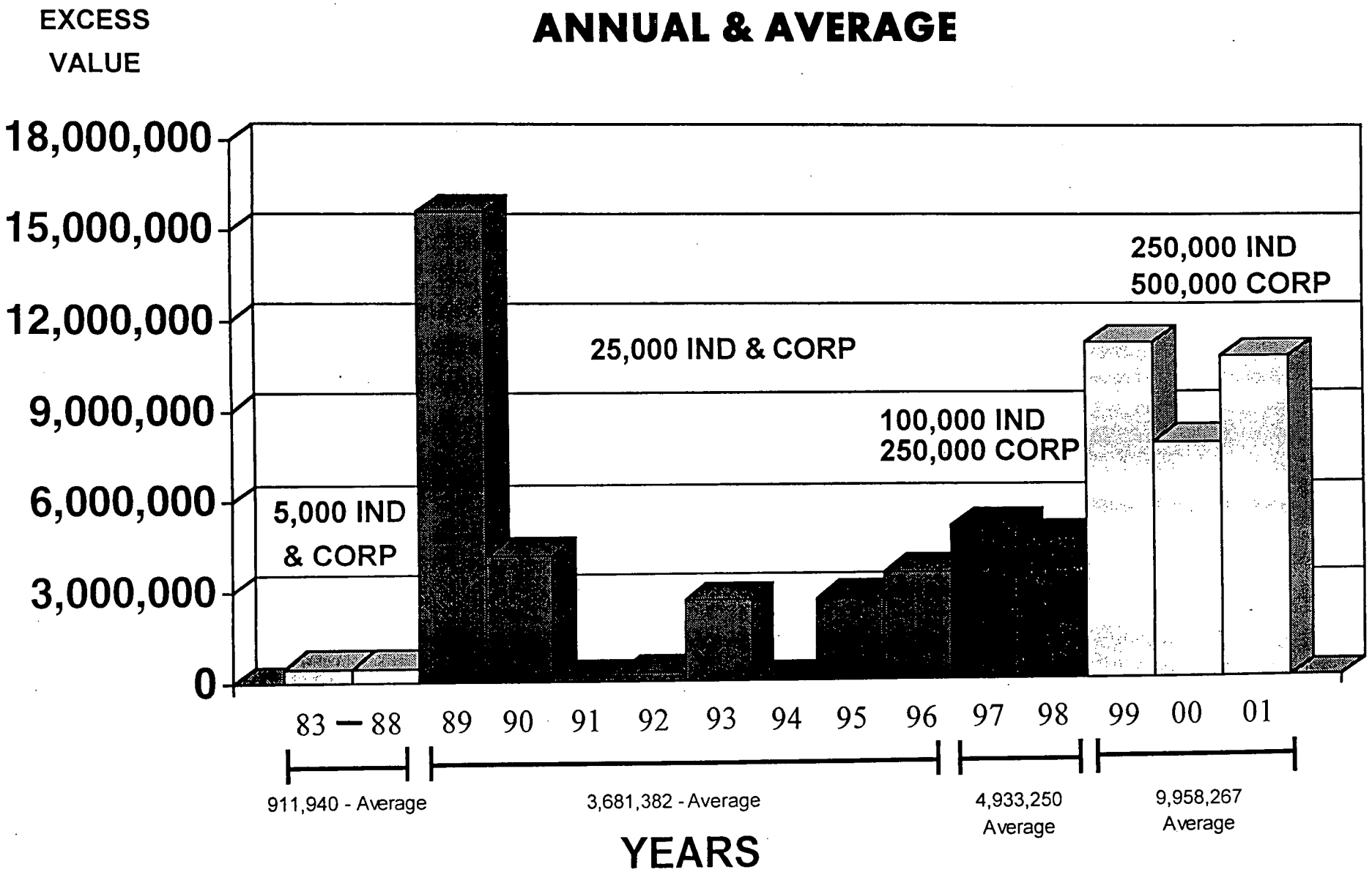


Effective Date 8/15/02

ATTACHMENT G

NCCTC PROGRAM STATISTICS

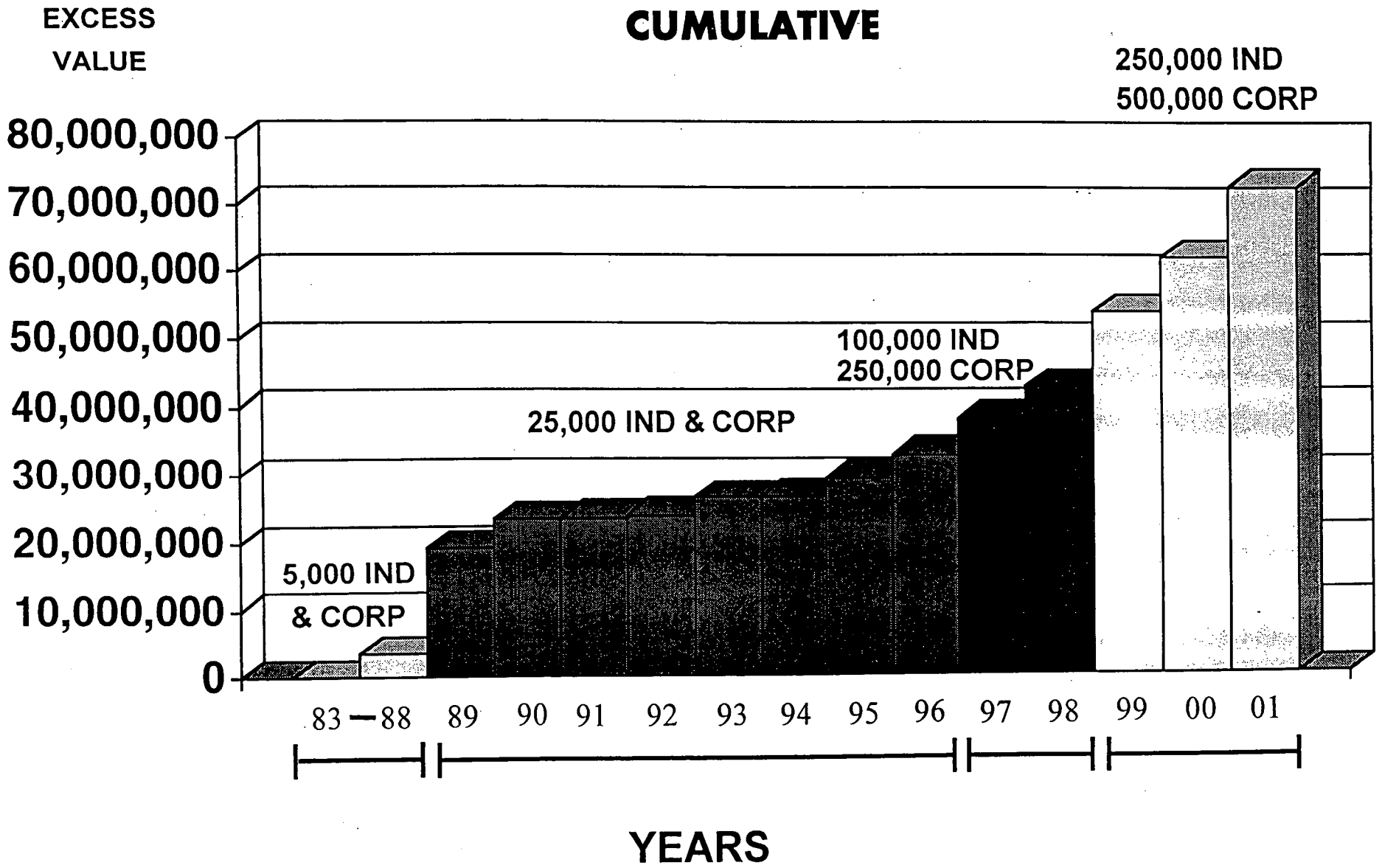
ANNUAL & AVERAGE



Effective Date 8/15/02

ATTACHMENT H

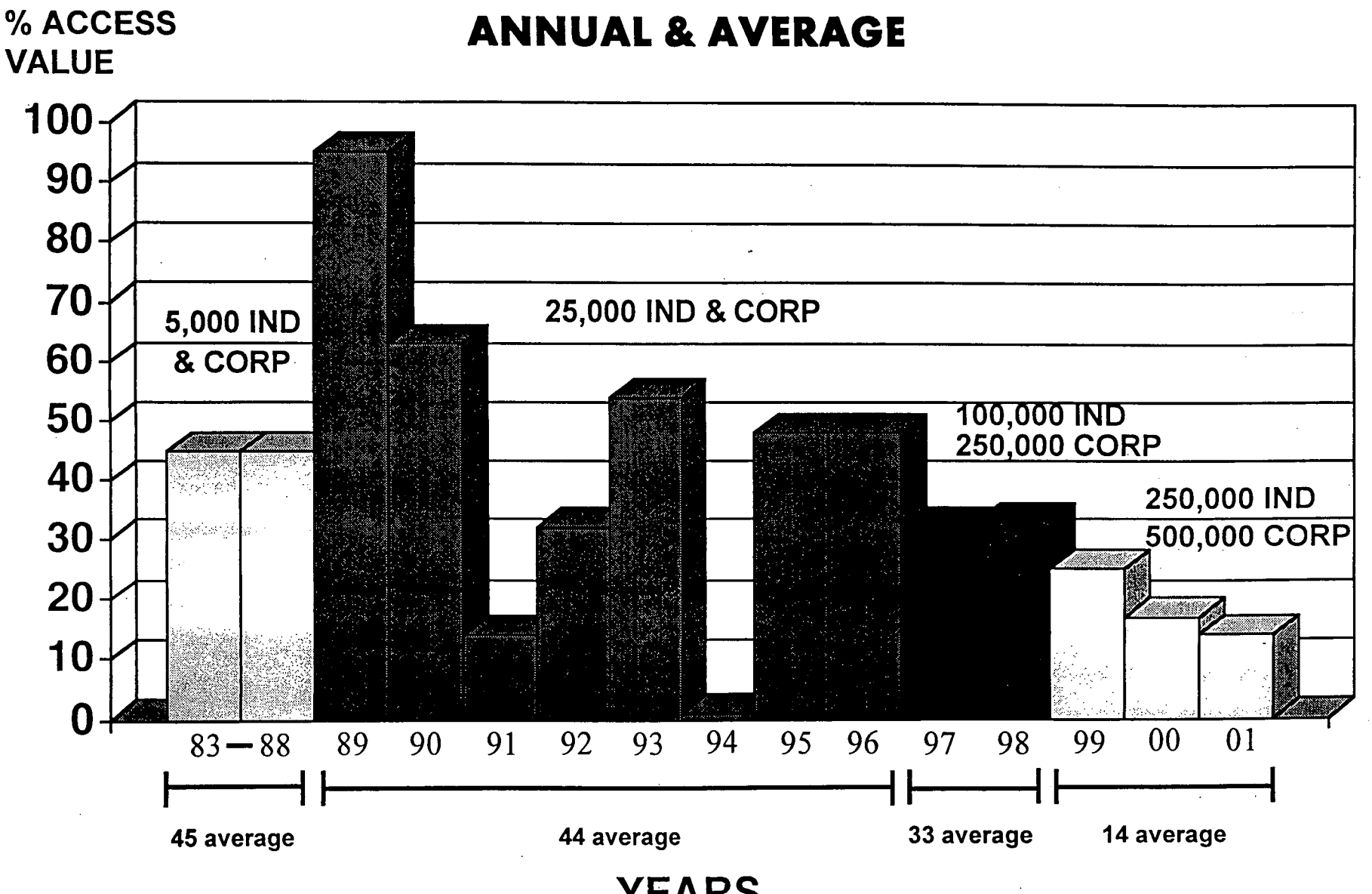
NCCTC PROGRAM STATISTICS



Effective Date 8/15/02

ATTACHMENT 1

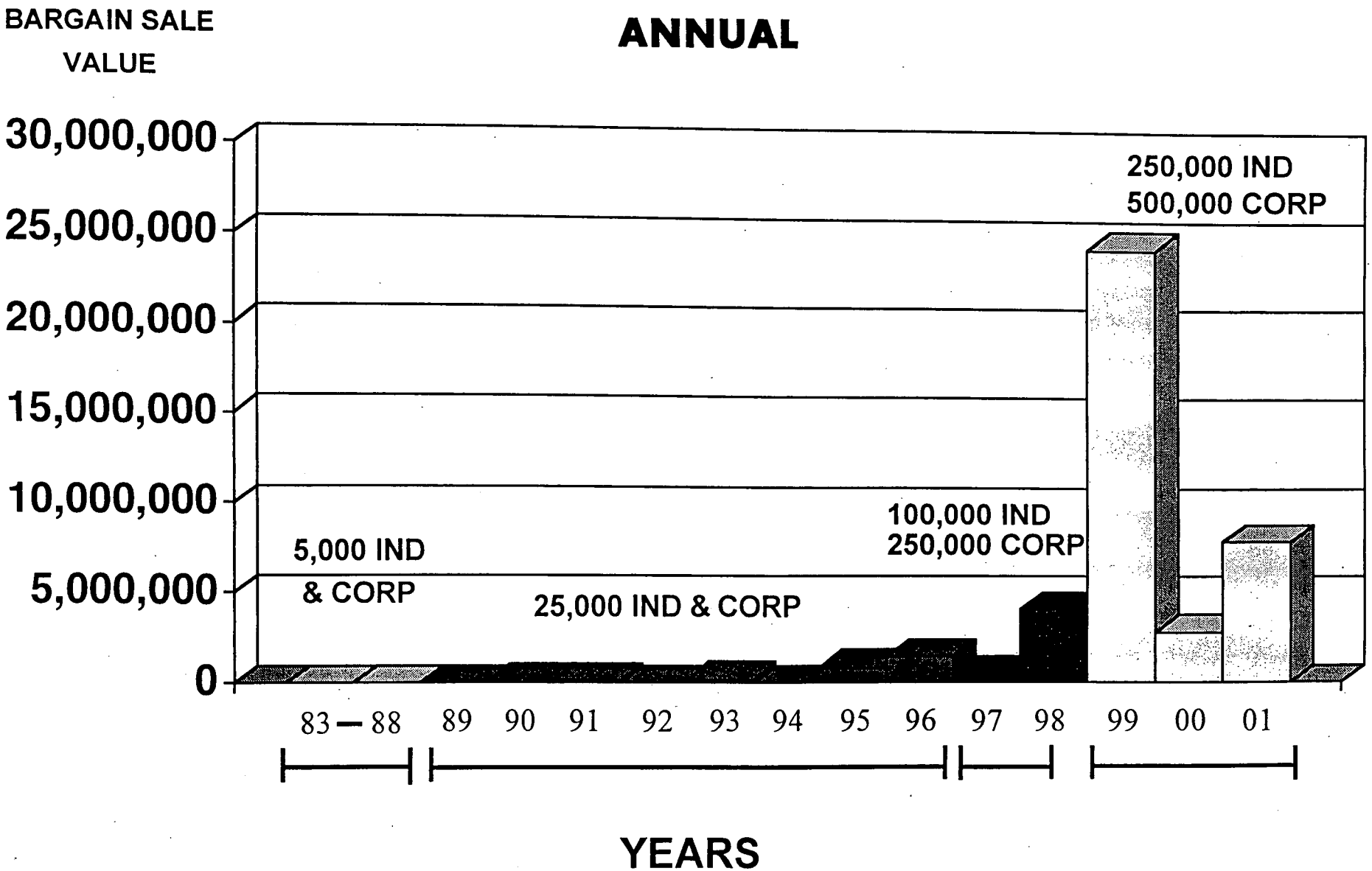
NCCTC PROGRAM STATISTICS



Effective Date 8/15/02

ATTACHMENT J

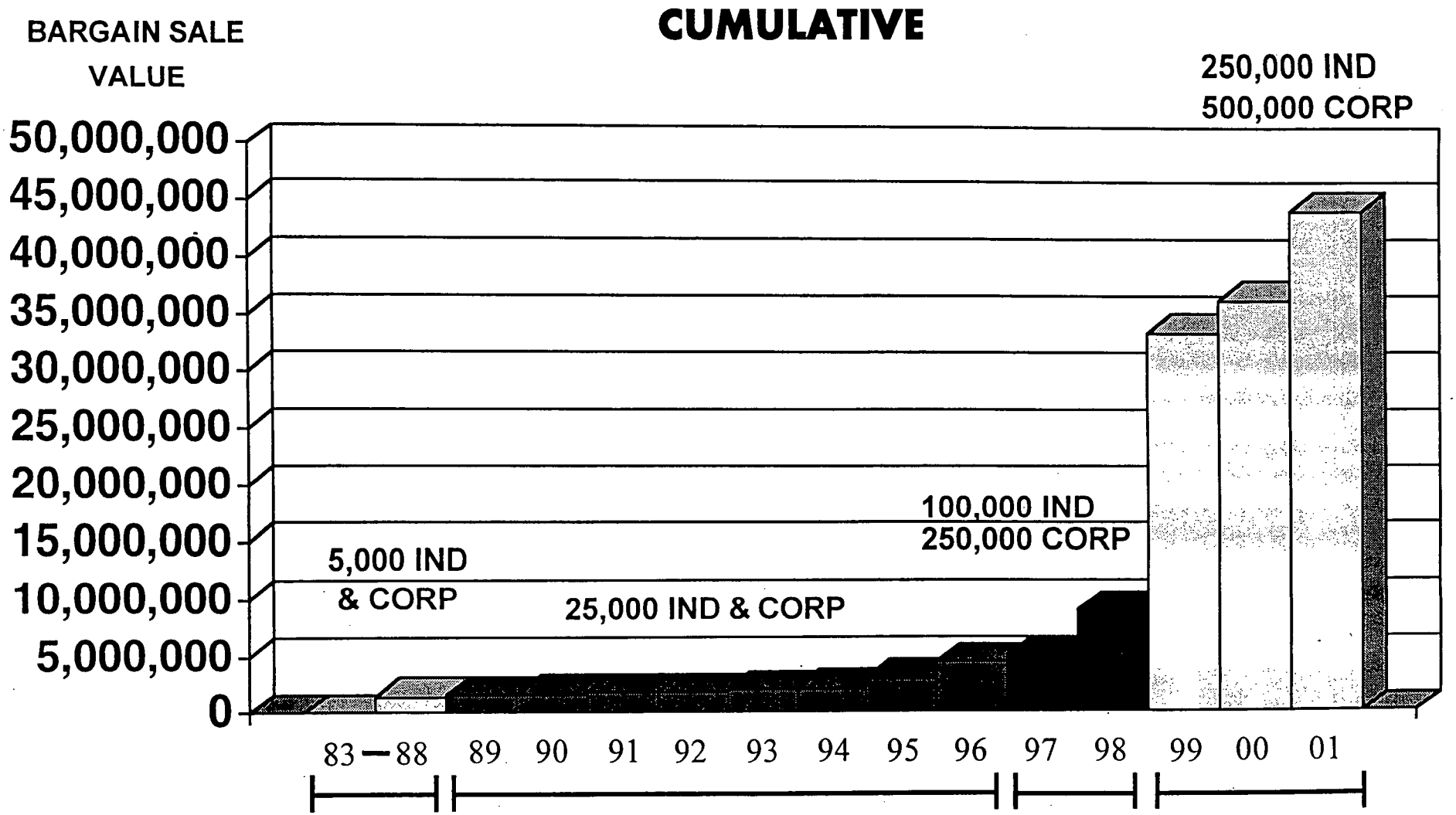
NCCTC PROGRAM STATISTICS



Effective Date 8/15/02

ATTACHMENT K

NCCTC PROGRAM STATISTICS



ATTACHMENT L

Effective Date 8/15/02

January 28, 2003 ERC Meeting
EXHIBIT R

Report to the North Carolina General Assembly on the Inactive Hazardous Sites Program

October 2002

Superfund Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources

http://wastenot.enr.state.nc.us/

EXECUTIVE SUMMARY

The Inactive Hazardous Sites Program was created by the North Carolina General Assembly to identify, control and correct properties contaminated with hazardous substances.

To date, 1,081 chemical spill and disposal sites and 755 old, unlined dumps or landfills have been catalogued. In most cases, the locations of the landfills are still being determined. The Inactive Hazardous Sites Branch is currently supervising a contract to locate these landfills, collect information on property use, and determine the potential for exposure. Of the 148 landfills inspected under this contract thus far, 109 (or 74 percent) have either a residence, school, church, day care or drinking water source on or within 1,000 feet of the landfill. Based on observations at sites investigated by the US EPA and the North Carolina Division of Waste Management, most of North Carolina's unlined landfills can be expected to have groundwater contamination.

The branch has a five person staff. To increase efficiency without additional appropriations, the General Assembly authorized the use of branch-approved private environmental consulting firms to certify lower priority voluntary party cleanup actions. Called Registered Environmental Consultant's or RECs, these private overseers are working on 31 sites. At present, 59 firms have received REC status.

Figure ES-1, on page iii, shows both the number of sites catalogued by the program and the number where all work is now complete. Figure ES-2, on page iv, shows how the number of sites that can be addressed at one time by the program has grown.

Sites Identified	
Chemical spills and disposal	1,081
Old unlined dumps and landfills	755
Total	**1,836**
Sites With All Work Complete	
Since last status report in 10/01	8
Previous site completions (three sites reactivated due to newly reported releases; one site determined to be a duplicate.)	400
Total	**404**
Ongoing Cleanup Actions	
Ongoing REC-Supervised Site Cleanup Actions	31
Ongoing Priority Cleanup Actions Supervised by State Staff	64
Total	**95**

The Inactive Hazardous Sites Response Act requires annual reporting to the General Assembly. All of the reporting requirements specified under N.C.G.S. 130A-310.10 are met in this report. The status report on the Brownfields program, as required by N.C.G.S. 130A-310.40, will be provided separately.

Figure ES-1 Inactive Hazardous Sites Inventory

Number of Catalogued Sites and Sites With All Work Complete

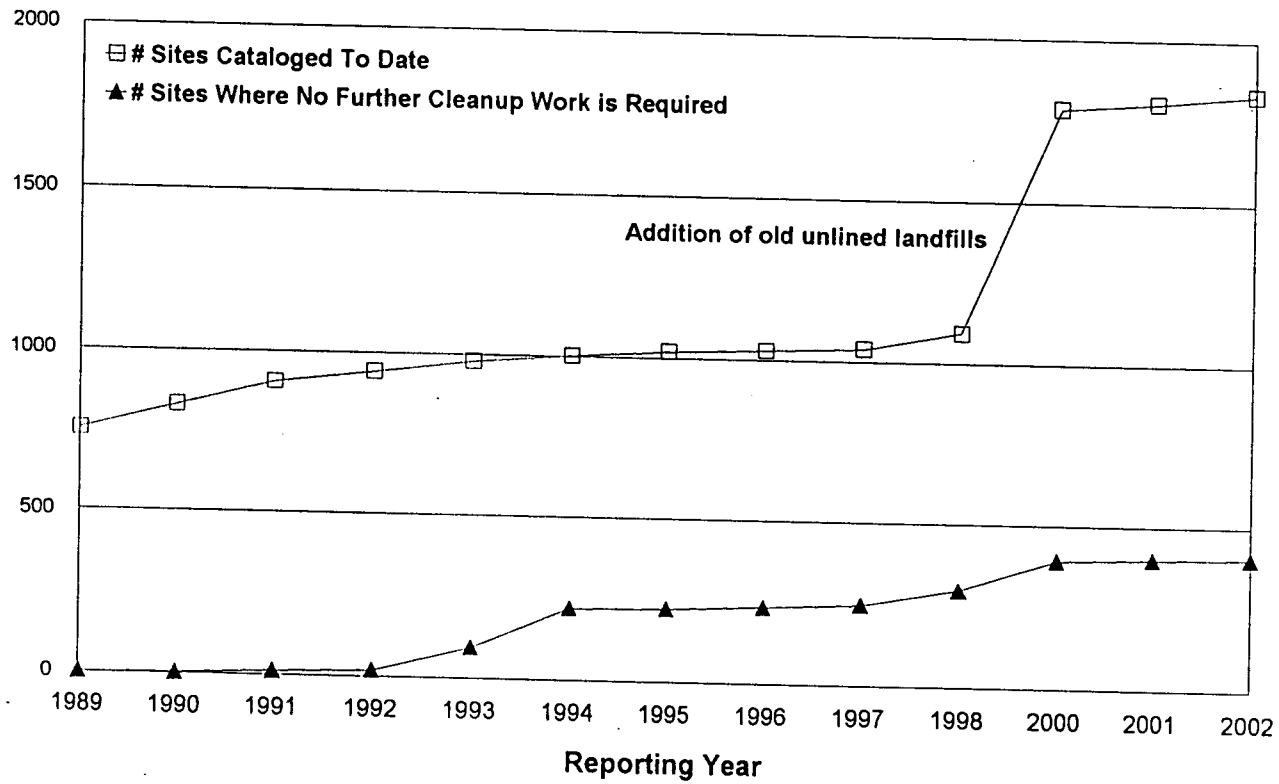
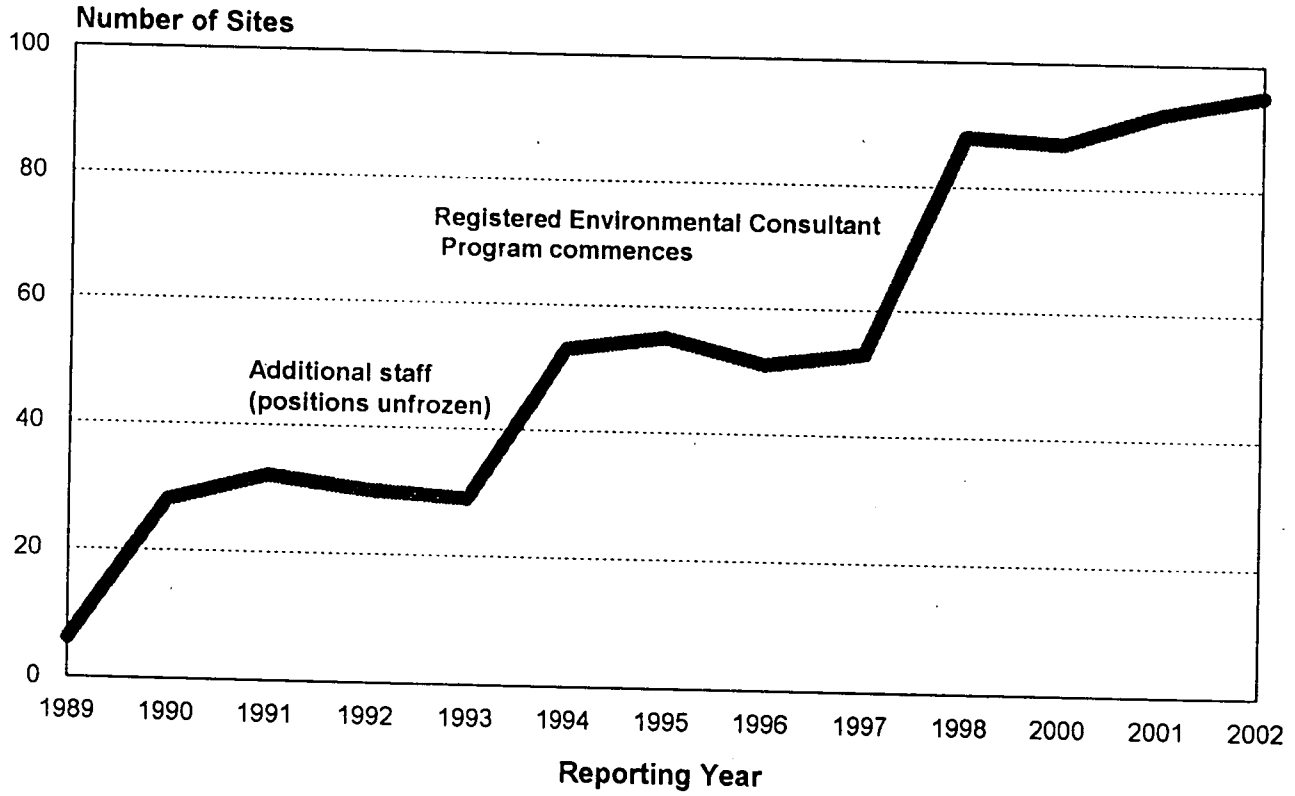


Figure ES-2 Inactive Hazardous Sites Program

Ongoing Assesment/Cleanup Actions Supervised



Program has five state positions and one privately funded REC position.

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I. THE INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST

The Inactive Hazardous Sites Branch is within the North Carolina's Department of Environment and Natural Resources' Division of Waste Management. It implements the Inactive Hazardous Sites Response Act of 1987. This act requires the branch to maintain a catalog of inactive hazardous substance or waste disposal sites. Table 1, on the following page, provides a list of sites added to that inventory since the last program report in October 2001. Table 2, also on the following page, provides a list of sites assigned "No Further Action" status. The entire inventory can be found in Appendix II. Figure 1, on Page 3, shows how the inventory is distributed by category. Appendix I provides a description of each inventory category.

N.C.G.S. 130A-310.2 requires that sites catalogued in the Inactive Hazardous Sites Inventory be prioritized based on their threat to public health and the environment. After discovery, sites are first cataloged in the "Evaluations Pending" category of the Inactive Hazardous Sites Inventory until their rank is determined. Site rankings are determined using the rules found in 15A NCAC 13C .0200. Once ranked, sites are transferred to the Inactive Hazardous Waste Sites Priority List. This list is provided in Table 3, found on Page 4.

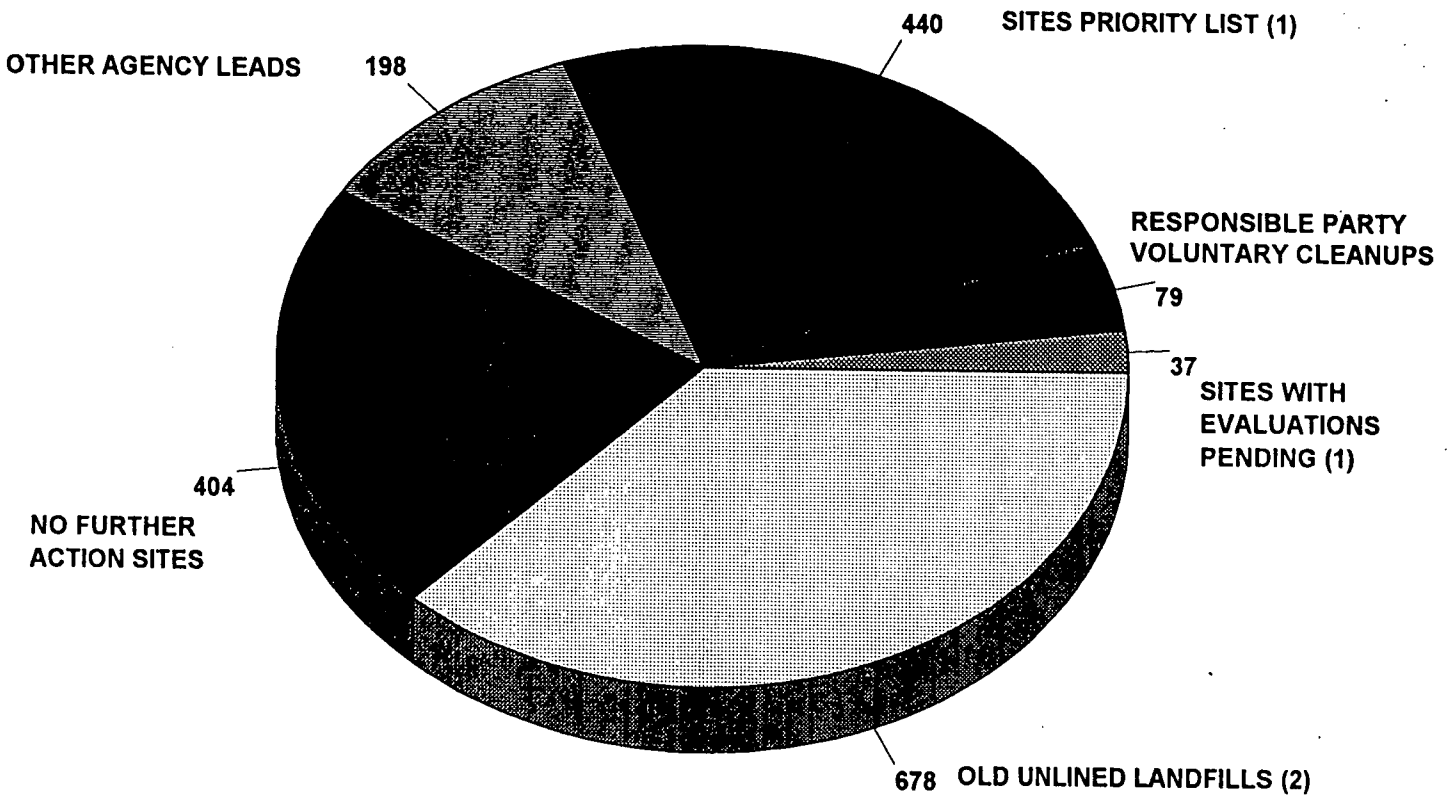
TABLE 1. INACTIVE HAZARDOUS SITES INVENTORY
LIST OF NEW SITES ADDED
OCTOBER 2001 -OCTOBER 2002

ID Number	Site Name	City	County
NCN000407447	ABERDEEN CONTAMINATED GROUNDWATER	ABERDEEN	MOORE
NONCD0001081	ALCOA-NARROWS POWERHOUSE	BADIN	MONTGOMERY
NONCD0001094	ALLISON MANUFACTURING CO	ALBEMARLE	STANLY
NONCD0001082	CMI FLYASH DISPOSAL (PARCEL 2)	ELKIN	SURRY
NONCD0001092	CMI WWTP (PARCEL1)	ELKIN	SURRY
NONCD0001083	GOLDSBORO COAL GAS PLANT #2	GOLDSBORO	WAYNE
NONCD0001089	GREENSBORO COAL GAS PLANT #1	GREENSBORO	GUILFORD
NONCD0001084	HENDERSON COAL GAS PLANT	HENDERSON	VANCE
NONCD0001085	HICKORY COAL GAS PLANT	HICKORY	CATAWBA
NONCD0001079	LES MYERS PARK	CONCORD	CABARRUS
NONCD0001086	MT AIRY COAL GAS PLANT	MT AIRY	SURRY
NONCD0001093	NCDOT-CORBETT PACKAGING	WILMINGTON	NEW HANOVER
NONCD0001090	OLD MILL BLDG	HENDERSONVILLE	HENDERSON
NCD003149663	RADIATOR SPECIALTY COMPANY	CHARLOTTE	MECKLENBURG
NONCD0001087	REIDSVILLE COAL GAS PLANT	REIDSVILLE	ROCKINGHAM
NCN000407196	ROWAN ROAD LANDFILL	CLINTON	SAMPSON
NONCD0001088	SALISBURY COAL GAS PLANT #2	SALISBURY	ROWAN
NONCD0001080	SOUTHERN METALS RECYCLING, INC	WILMINGTON	NEW HANOVER
NCN000407333	TRIAD USED AUTO SALES	GREENSBORO	GUILFORD
NCN000407188	US 1-15/501 ABERDEEN	ABERDEEN	MOORE
NONCD0001091	WEST MOREHEAD ST PESTICIDE	CHARLOTTE	MECKLENBURG

TABLE 2. INACTIVE HAZARDOUS SITES INVENTORY
SITES RECEIVING NO FURTHER ACTION STATUS
OCTOBER 2001 - OCTOBER 2002

ID Number	Site Name	City	County
NONCD0000036	BALFOUR ROAD BATTERY	GRANITE QUARRY	ROWAN
NCD991278466	BROYHILL FURNITURE MILLER HILL	LENOIR	CALDWELL
NCD006991210	DEPOORTERE CORPORATION	WILMINGTON	NEW HANOVER
NONCD0000018	ICI AMERICAS (FORMER)	PIKEVILLE	WAYNE
NCD981021546	KOPPERS BORROW PIT	ASHLEY HEIGHTS	HOKE
NCD065300113	ROWLAND LANDFILL	RALEIGH	WAKE
NCD003185311	STARLING DAVID PROPERTY	FARMVILLE	PITT
NCD980842413	WILKINSON PROPERTY BATTERY SITE	ROCKY MOUNT	EDGECOMBE

FIGURE 1. INACTIVE HAZARDOUS SITES
OCTOBER 2002 INVENTORY CATEGORICAL DISTRIBUTION
(1,836 Sites)



(1) Sixteen sites in either the "evaluations pending" or "sites priority list" categories are also undergoing assessment and/or cleanup with program supervision (but not under an agreement).

(2) Inventory has 755 landfills. Of tht number, 77 were already included in the Inventory before the addition of the larger catalog of old unlined landfills. As a result they fall into other categories.

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score)

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NONCD0000022	WATTS REGULATOR-DAVIS PROPERTY	OLD BALL PARK ROAD	SPINDALE	RUTHERFORD	59.73	soil	metals
						soil	organics
NCD062552153	SAYLES-BILTMORE BLEACHERIES	SWANNANOA RD	ASHEVILLE	BUNCOMBE	57.04	groundwater	metals
NCD981864614	ULAH BATTERY/BATTERY PILES	SR 1219	ASHEBORO	RANDOLPH	55.64	groundwater	organics
NCD003157377	AMERICAN THREAD/SEVIER PLANT	US 221 NORTH	MARION	MCDOWELL	54.37	soil	metals
						soil	acids
NONCD0000056	JAMES LANDFILL	HWY 74 & SR 1369	LAURINBURG	SCOTLAND	54.25	groundwater	metals
						groundwater	organics
NONCD0001056	LITTLE MOUNTAIN LANDFILL	(SR 1522) LITTLE MNT RD	TRYON	POLK	53.17	groundwater	metals
						soil	metals
						surface water	organics
						soil	organics
NCD003229358	SCM PROCTOR-SILEX/WEAREVER	HAY ST	MOUNT AIRY	SURRY	53.02	groundwater	organics
						groundwater	metals
NONCD0001080	SOUTHERN METALS RECYCLING, INC	1002 SOUTH FRONT STREET	WILMINGTON	NEW HANOVER	52.56	sediment	organics
						surface water	metals
						soil	metals
						sediment	metals
						groundwater	metals
NCD980729677	KNOB CREEK FLYASH DISPOSAL	SR 1540	BREVARD	TRANSYLVANIA	52.53	soil	metals
						groundwater	metals
NCD986166692	HARWELL ROAD SEPTIC PIT	HARWELL ROAD	GASTONIA	GASTON	52.37	soil	metals
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD003167780	SPRAGUE ELECTRIC COMPANY	HWY 194	LANSING	ASHE	52.33	groundwater	metals
						soil	metals
NONCD0001025	TOOMEY PROPERTY	1020 HICKORY GROVE ROAD	SPRINGWOOD	GASTON	51.23	groundwater	organics
NCD982117590	CUSTOM PROCESSING AND MANUF.	1110 SURRETT DRIVE	HIGH POINT	GUILFORD	51.04	groundwater	organics
						soil	organics
NONCD0000016	CMC LANDFILL	EAST MAIN STREET	ELKIN	SURRY	51.02	soil	organics
						groundwater	metals
						groundwater	organics
NONCD0001075	TEXFI INDUSTRIES, INC	601 HOFFER DRIVE	FAYETTEVILLE	CUMBERLAND	50.55	groundwater	organics
						soil	organics
NCD093338119	SCM CORP. GLIDDEN COATINGS & RESINS	3926 GLENWOOD DRIVE	CHARLOTTE	MECKLENBURG	50.29	groundwater	organics
						soil	organics
NCD986172518	OLD MOUNT HOLLY ROAD PCE SITE	OLD MT HOLLY RD & FREEDOM	CHARLOTTE	MECKLENBURG	50.26	groundwater	organics
NCD980839716	RIVERDALE HOMES/EARL GETTS	404 RIVERDALE DRIVE	DURHAM	DURHAM	50.10	groundwater	organics
NCD981750425	BUXTON DUMP	.5 MILES WEST OF BACK RD	BUXTON	DARE	49.81	groundwater	pesticides
NCD003220969	WHITE FURNITURE CO.	201 EAST CORNER ST	MEBANE	ALAMANCE	49.76	soil	organics
						groundwater	organics
NONCD0000679	STURGEON CITY PROPERTY	4 COURT STREET	JACKSONVILLE	ONSLOW	49.67	soil	organics
						soil	metals
						groundwater	metals
						groundwater	organics
						sediment	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD980558761	GS LABORATORY EQUIPMENT	275 AIKEN RD	ASHEVILLE	BUNCOMBE	49.57	sediment groundwater sediment surface water soil	organics organics metals organics metals
NCD980502991	JACKSONVILLE LANDFILLS	(SEVERAL LOCATIONS)	JACKSONVILLE	ONSLOW	49.36	groundwater groundwater	organics metals
NC0001279710	WOODY WILSON BATTERY/ASHLEY	HWY 211	ASHLEY HEIGHTS	HOKE	49.02	soil soil	metals organics
NCD986171379	NEW HAVEN DRIVE TCE	NEW HAVEN DRIVE	GASTONIA	GASTON	48.98	groundwater	organics
NCSFN0407074	NC MARITIME MUSEUM	310 FRONT ST	BEAUFORT	CARTERET	48.84	sediment sediment sediment	metals organics pesticides
NCD980729412	CAROLINA TANK CLEANING COMPANY	HWY 68-4 MI N OF I-40	GREENSBORO	GUILFORD	48.53	soil soil	metals organics
NONCD0000085	JONES & PRESNELL STUDIO	433 LAWTON ROAD	CHARLOTTE	MECKLENBURG	48.48	groundwater	organics
NCD986175628	LEE'S MOTOR WORKS	BEATY ROAD	GASTONIA	GASTON	48.48	groundwater surface water soil	organics organics organics
NCD986186518	OLD ATC REFINERY	801 SURRY STREET	WILMINGTON	NEW HANOVER	48.40	soil sediment groundwater soil	organics metals metals metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD042269134	SOUTHERN SCREW/FARLEY METALS	1211 BARKLEY RD	STATESVILLE	IREDELL	48.40	soil	bases
						soil	metals
						groundwater	cyanide
						groundwater	metals
NCD981474158	SWEETEN CREEK DRUM SITE	115 SWEETEN CREEK ROAD	ASHEVILLE	BUNCOMBE	48.40	groundwater	organics
NCD041230418	AMP INCORPORATED	3900 REIDSVILLE ROAD	WINSTON-SALEM	FORSYTH	48.35	soil	metals
						soil	metals
						soil	cyanide
						surface water	metals
						sediment	metals
						sediment	cyanide
NCD003216959	UNION CAMP CORPORATION	RAGSDALE RD	JAMESTOWN	GUILFORD	48.27	soil	organics
						groundwater	organics
						sediment	metals
NCD986185411	OLD WESTERN NC FAIRGROUNDS	BTWN US 176 & SOUTHER RR	EAST FLAT ROCK	HENDERSON	48.18	surface water	organics
						groundwater	metals
						soil	pesticides
						soil	organics
NCD980558019	ELK MOUNTAIN LANDFILL	ELK MOUNTAIN ROAD	ASHEVILLE	BUNCOMBE	47.96	groundwater	organics
						soil	organics
						soil	pesticides
NCD024477556	WINSTON CONTAINER COMPANY	4732 MORRIS FIELD RD	CHARLOTTE	MECKLENBURG	47.89	soil	metals
NONCD0000023	CAROLINA P&L CO. FAYETTEVILLE	CUMBERLAND RD & OWEN DR	FAYETTEVILLE	CUMBERLAND	47.78	soil	organics
						groundwater	organics
						surface water	organics
NCD980848840	SCOTT'S CREEK BATTERY SITE	402 HOWELL ROAD	NEW BERN	CRAVEN	47.75	soil	organics
						soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD980557870	CALDWELL COUNTY ABANDONED	NC HWY 90	LENOIR	CALDWELL	47.69	groundwater groundwater	metals organics
NCD990883001	MONARCH FURNITURE CORPORATION	300 SCIENTIFIC ST	JAMESTOWN	GUILFORD	47.40	soil groundwater	metals metals
NONCD0001029	R & D LAMINATORS INC	HOLLOMAN ROAD (SR 1187)	AHOSKIE	HERTFORD	47.21	groundwater	organics
NCD980557557	ASHEBORO LANDFILL	OFF OF OLD US 64	ASHEBORO	RANDOLPH	47.10	soil	metals
NCD986176030	RHODERA DRIVE WELLS	LAKEWOOD & RHODERA DRIVE	STALLINGS	UNION	46.98	soil groundwater	metals organics
NONCD0000081	TRITON, INC	1610 SOUTH WARD BLVD	WILSON	WILSON	46.84	groundwater groundwater	metals organics
NONCD0001001	CLOSED CITY OF HENDERSON LDFL	NC 39 & ST. ANDREWS CHURCH	HENDERSON	VANCE	46.74	groundwater groundwater	metals organics
NCD980518211	IRT/IBM CORPORATION	4101 S I-85	CHARLOTTE	MECKLENBURG	46.67	groundwater	metals
NCD093137636	GENERAL WOOD PRESERVING CO., INC.	HWY 74/76	LELAND	BRUNSWICK	46.56	groundwater soil	organics organics
NONCD0001049	LEXINGTON FURNITURE IND. PLNT #7	178 LFI COMPLEX LANE	LEXINGTON	DAVIDSON	46.43	groundwater groundwater	metals organics
NCD980844336	UNION CARBIDE BATTERY	5400 HOVIS ROAD	CHARLOTTE	MECKLENBURG	46.30	surface water soil	organics metals
NCSFN0406906	OLD STAKE ROAD	OLD STAKE ROAD	CHADBOURNE	COLUMBUS	46.17	groundwater soil	metals metals
NCD003216462	UNION CARBIDE CORP/EVEREADY	800 ALBEMARLE RD	ASHEBORO	RANDOLPH	45.97	groundwater soil	organics organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD003213030	DOUGLAS BATTERY MANUFACTURING	500 BATTERY DR	WINSTON-SALEM	FORSYTH	45.69		
NCD144192606	PARKER-ZENITH	TAYLOR STREET	ABERDEEN	MOORE	45.67	groundwater	metals
NONCD0001074	OLD FORD BLDG	FIFTH ST	TABOR CITY	COLUMBUS	45.62	groundwater	organics
						soil	metals
						soil	organics
NCD981015746	CAROLINA ALUMINUM/HERBERT TAYLOR	SR 1125	ROPER	WASHINGTON	45.33	groundwater	metals
NCD003167988	MARANTZ PIANO CO INC/ANEVKA, INC	HWY 64/70 E	MORGANTON	BURKE	45.30	soil	organics
						groundwater	metals
						soil	organics
						soil	metals
NCD981473150	CHERRY MT STREET DRUM	602 CHERRY MOUNTAIN	FOREST CITY	RUTHERFORD	45.07	groundwater	organics
NONCD0001022	GIBBS ELECTROPLATING - OLD	2229 N DAVIDSON	CHARLOTTE	MECKLENBURG	45.07	soil	metals
						groundwater	organics
						groundwater	metals
						soil	organics
NCD062555792	SIGMON'S SEPTIC TANK	EUFOLA RD	STATESVILLE	IREDELL	44.96	soil	metals
NONCD0000050	HWY 268 MIRROR WASTE DUMP	HWY 268	NORTH	WILKES	44.95	groundwater	metals
NONCD0001092	CMI WWTP (PARCEL1)	HWY 268	ELKIN	SURRY	44.85	soil	metals
						soil	organics
						sediment	organics
						groundwater	organics
NONCD0001011	JUNG CORPORATION	718 INDUSTRIAL PARK AVE	ASHEBORO	RANDOLPH	44.77	groundwater	metals
NCD986228054	KANNAPOLIS PCE SPILL	ENOCHVILLE ROAD	KANNAPOLIS	CABARRUS	44.71	groundwater	organics
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD980502983	HOPE MILLS LANDFILL	SR 1003/WIRE ROAD	HOPE MILLS	CUMBERLAND	44.50	groundwater	metals
NCD981468622	FORK SWAMP/GRADY WHITE BOAT	SR 1725	AYDEN	PITT	44.49	soil	organics
NCD093334969	S & S METALS RECYCLING COMPANY	SHORTCUT ROAD/SR 2455	GOLD HILL	CABARRUS	44.49	soil surface water	metals metals
NONCD0000060	WATTS REGULATOR-GENERAL AIDES	WITHROW ROAD	FOREST CITY	RUTHERFORD	44.49	soil	metals
NCD981928088	TEXFI INDUSTRIES, INC/NEW BERN	SR 1317/BOSCH STREET	NEW BERN	CRAVEN	44.30	groundwater	organics
NC0000195743	JIMMY GREEN METALS	BARN HILL CHURCH ROAD	NASHVILLE	NASH	44.29	soil	metals
NCD042891663	MITCHELL ENGR CO/CECO BLDG. DIV.	BYPASS 301	ROCKY MOUNT	NASH	44.27	soil groundwater	metals organics
NCD084167444	STANADYNE, INC/DIESEL SYSTEMS	405 WHITE ST	JACKSONVILLE	ONSLOW	44.22	soil soil	organics metals
NONCD0001034	GEORGE STREET PESTICIDE	SOUTH GEORGE STREET	GOLDSBORO	WAYNE	44.16	soil groundwater	pesticides pesticides
NONCD0000038	AYCOCK PROPERTY	SR 1162 & 1103	WILSON	WILSON	43.92	groundwater	organics
NCN000407206	SHULIMSON BROTHERS SCRAP YARD	MEADOW ROAD	ASHEVILLE	BUNCOMBE	43.79	soil groundwater groundwater	metals organics metals
NCD003149556	CTS OF ASHEVILLE, INC.	MILLS GAP RD	SKYLAND	BUNCOMBE	43.44	surface water soil surface water soil	metals organics organics metals
NCD048467427	MINERAL RESEARCH & DEV. CORP.	NC HIGHWAY 49	ROCKY RIVER	CABARRUS	43.43	groundwater soil	metals metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NONCD0000043	GREAT LAKES CARBON CORPORATION	307 JAMESTOWN ROAD	MORGANTON	BURKE	43.36	groundwater groundwater	organics metals
NCD082363102	HELENA CHEMICAL COMPANY	HARRY MALLEY RD	LAURINBURG	SCOTLAND	43.32	soil groundwater	metals pesticides
NCD060306727	RICHARDS WC COMPANY, INC.	101 EAST MAPLE STREET	ABERDEEN	MOORE	43.31	soil soil	metals organics
NCD980557805	KERR MCGEE CORPORATION	NAVASSA RD	NAVASSA	BRUNSWICK	43.11	soil	organics
NCD986197374	OLD RANDLEMAN TOWN DUMP	WALKER MILL ROAD /SR 1961	RANDLEMAN	RANDOLPH	43.05	groundwater soil	metals organics
NCSFN0406953	G&B/FARMER PROPERTY	DOUG HILL FARM RD (SR 1100)	SCOTLAND NECK	HALIFAX	43.04	soil soil	metals organics
NCD986172617	FORBES ROAD WELLS	501 FORBES ROAD	GASTONIA	GASTON	43.02	groundwater surface water	organics organics
NCD048401087	HOOKER FURNITURE	1212 THROWER ROAD	PLEASANT	GUILFORD	43.00	groundwater groundwater soil	organics metals organics
NONCD0000025	RANGE ROAD BURN SITE	RANGE ROAD	BUTNER	GRANVILLE	42.80	soil soil	metals organics
NONCD0001090	OLD MILL BLDG	301 FOURTH AVE EAST	HENDERSONVILLE	HENDERSON	42.75	groundwater	organics
NCN000407197	LEARY BROTHERS STORAGE (FORMER)	VIRGINIA & BROAD STREET	EDENTON	CHOWAN	42.74	groundwater groundwater soil soil	organics metals organics metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NONCD0001016	ROYSTER-CLARK FERTILIZER PLANT	SR 1321	OAK CITY	MARTIN	42.74	groundwater	pesticides
						soil	organics
NCD000615872	AMP INCORPORATED	1260 SHANNON-BRADLEY RD	GASTONIA	GASTON	42.72	groundwater	inorganics
NCD130708126	CONSOLIDATED WAREHOUSE	8300 MOORES CHAPEL RD	CHARLOTTE	MECKLENBURG	42.58		
						surface water	organics
						soil	organics
NCSFN0407140	CARDINAL CONTAINER SERVICES	138 WALSER ROAD	LEXINGTON	DAVIDSON	42.30	groundwater	organics
						groundwater	metals
NCD000830612	CAROLINA P&L CO. MAYO STEAM	HWY 501	ROXBORO	PERSON	42.13	groundwater	organics
NC0002374445	GASTONIA INDUSTRIAL TRUCK	HEMPHILL ROAD	GASTONIA	GASTON	42.08	soil	metals
NCD043711977	CHEMICAL LEAMAN TANK LINES, INC.	6600 WEST MARKET STREET	GREENSBORO	GUILFORD	42.05	groundwater	organics
NONCD0001072	J & C DYEING	1000 WEST GROVER STREET	SHELBY	CLEVELAND	41.98	groundwater	organics
						groundwater	organics
						groundwater	metals
NCD002571438	ABC ENGRAVERS	724 NORTH I-85	CHARLOTTE	MECKLENBURG	41.91	soil	metals
						groundwater	metals
						groundwater	organics
NCD003155587	SCOTT AVIATION OF MONROE/TOOL	309 W. CROWELL ST	MONROE	UNION	41.73	soil	metals
						groundwater	organics
NCD986175651	GLEN RAVEN MILLS	114 RAVEN CIRCLE	KINGS MOUNTAIN	CLEVELAND	41.72	soil	metals
						groundwater	organics
NCD981031578	RAINBOW DRIVE BATTERY	SR 1646	KANNAPOLIS	CABARRUS	41.66	soil	organics
						soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD991278730	SQUIBB E R & SONS	FLOWERS RD	KENLY	JOHNSTON	41.61	groundwater	organics
NCD986166734	OLD BEAUFORT CO. LANDFILL	FLANDERS FILTERS ROAD	WASHINGTON	BEAUFORT	41.57	groundwater	metals
NONCD0000073	H. M. WADE FURNITURE	SOUTH GRAHAM STREET	CHARLOTTE	MECKLENBURG	41.50	groundwater	organics
NCD002972966	REA MAGNET WIRE COMPANY	OLD LAUREL HILL CHURCH RD	LAURINBURG	SCOTLAND	41.49	surface water	organics
						soil	organics
NC0002178580	VC CHEMICAL-ALMONT WORKS	US 421 NORTH	WILMINGTON	NEW HANOVER	41.47	soil	metals
NCD980557854	FMC/NIAGARA PESTICIDES	OLD ST HWY 11 NORTH	AYDEN	PITT	41.44	soil	organics
						soil	pesticides
NCD980557771	CHARLOTTE CITY DUMP	HWY 49 - YORK ROAD	CHARLOTTE	MECKLENBURG	41.34	groundwater	metals
NCD991278755	MARTIN'S BATTERY SALVAGE, INC.	ASHLAND RD	KANNAPOLIS	CABARRUS	41.22	soil	metals
NONCD0000047	MEADS AIRFIELD PESTICIDES	SR 1100	WEEKSVILLE	PASQUOTANK	41.22	soil	pesticides
NCD986171445	BENFIELD CHEMICALS	OLD CANTON CLYDE HWY	CANTON	HAYWOOD	41.20	soil	pesticides
						soil	metals
NCD062664883	REINCO CHEMICAL COMPANY	EAST 11 ST	ROANOKE RAPIDS	HALIFAX	41.20	soil	organics
						groundwater	organics
NCD024817827	HENREDON FURNITURE	ALTAPASS ROAD	SPRUCE PINE	MITCHELL	41.19	soil	organics
						soil	metals
NCD981016280	DURHAM ANIMAL CLINIC	4306 ROXBORO ROAD	DURHAM	DURHAM	41.13	soil	organics
NCD054283189	HOOVER MACHINE SHOP	RATCHFORD ROAD	GASTONIA	GASTON	41.09	groundwater	organics
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD062566047	FASCO CONTROLS CORPORATION	SR 1926	SHELBY	CLEVELAND	40.78	soil	metals
						soil	organics
NONCD0001077	CATAWISSA LUMBER CO	301 LOCUST ST	WEST JEFFERSON	ASHE	40.72		
NONCD0001040	DOMESTIC LAUNDRY/WASHBURN	801 S MCDOWELL STREET	CHARLOTTE	MECKLENBURG	40.71	groundwater	organics
NCD982119463	DAYCO LANDFILL CRYME COVE ROAD	SR 1134	WAYNESVILLE	HAYWOOD	40.52	groundwater	organics
NCD981927908	KIDD LANE BATTERY DISPOSAL	3607 KIDD LANE	CHARLOTTE	MECKLENBURG	40.49	soil	organics
NCD024462327	ACADEMY STEEL DRUM	3213 RIDGE RD	MATTHEWS	MECKLENBURG	40.48	soil	metals
						surface water	organics
						surface water	metals
						soil	metals
NC0000998344	HICKORY GROVE ROAD TCE	HICKORY GROVE ROAD	MCADENVILLE	GASTON	40.46	soil	organics
NCD082362989	TUNGSTEN QUEEN MINE/ATLAS MINE	SR 1348	TOWNSVILLE	VANCE	40.34	groundwater	organics
NONCD0000031	INDEPENDENCE MALL OUTPARCEL	OLEANDER & FORDHAM RDS	WILMINGTON	NEW HANOVER	40.19	soil	metals
NONCD0001068	GENCORP PRINTWORLD INC	2011 ROCKY RIVER ROAD	MONROE	UNION	40.18	groundwater	organics
						groundwater	metals
						soil	metals
NCD980838379	ROWE CORP PROPERTY/BOULIGNY	433 W MOREHEAD ST	CHARLOTTE	MECKLENBURG	40.18	groundwater	organics
						groundwater	metals
NCD986172492	CRESTLINE CONTAMINATED WELLS	ROUTE 211	ABERDEEN	MOORE	40.12	soil	metals
						groundwater	metals
NCD093334894	BURLINGTON INDUSTRIES, INC.	PHOENIX STREET	STATESVILLE	IREDELL	40.03	groundwater	organics
						groundwater	organics
						soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD003158094	GLEN RAVEN MILLS	EAST MAIN STREET	BURNSVILLE	YANCEY	40.02	soil	metals
NCD986223170	MCBESS INDUSTRIES	OLD HWY 321	HIGH SHOALS	GASTON	39.75	sediment	metals
						soil	organics
NCD980839757	INDIAN GRAVE GAP DRUM DISPOSAL	APPROX 2 MLS N OF SR 1513	LENOIR	CALDWELL	39.69	surface water	metals
NCD986172500	MCLEAN BROTHERS FARM	SR 1415	WAGRAM	SCOTLAND	39.67	soil	pesticides
						soil	organics
NCD048958615	KELLY-SPRINGFIELD TIRE	NAVASSA RD	FAYETTEVILLE	CUMBERLAND	39.64	soil	organics
NCD986170694	POULOS GROUNDWATER	SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	39.63	groundwater	organics
NCD986188498	DURA-BUILT ENGINES CO	OFF HWY 55	COATS	HARNETT	39.57	sediment	metals
NONCD0001041	MITCHELL & BECKER	1928 SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	39.56	sediment	organics
						soil	metals
NC0001402213	ELLIS JUNK YARD	NEEDMORE DRIVE	HAYESVILLE	CLAY	39.52	groundwater	organics
						groundwater	metals
NCD980502827	BROWN #1	SR 1504 VANDERBILT RD	PISGAH FOREST	TRANSYLVANIA	39.30	soil	metals
						soil	organics
NCD003216397	HIGHLAND INDUSTRIES/BURLINGTON	215 DRUMMOND ST/SR 2089	KERNERSVILLE	FORSYTH	39.25	soil	metals
NCD003154960	FLEMING LABORATORIES	2205 THRIFT ROAD	CHARLOTTE	MECKLENBURG	39.24	groundwater	organics
						soil	organics
NCD119168813	ANILOX ROLL COMPANY	4840 WALLACE NEAL RD	CHARLOTTE	MECKLENBURG	39.13	groundwater	organics
						soil	organics
						soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD033978396	ATEC INDUSTRIES	PERKINS DRIVE	ROXBORO	PERSON	38.92	soil	metals
						soil	organics
						groundwater	metals
NCD986215499	PARKER INDUSTRIES	4867 RHONEY ROAD	CONNELLY	BURKE	38.88	groundwater	organics
NONCD0000079	OLD PINEHURST HOTEL CLEANERS	MCCASKILL ROAD	PINEHURST	MOORE	38.79	groundwater	organics
NONCD0000001	STANLY NEWS & PRESS	237 W NORTH STREET	ALBEMARLE	STANLY	38.78	groundwater	organics
NCD980502959	HARRISBURG PARK LANDFILL	PENCE & HARRISBURG ROAD	CHARLOTTE	MECKLENBURG	38.75	soil	metals
NCD105797922	TECHNIBILT/DIV OF WHITTAKER	EAST PEACE ST	NEWTON	CATAWBA	38.61	groundwater	organics
NONCD0001073	BONE FARM PESTICIDE AREA	HWY 58/SR 1717	NASHVILLE	NASH	38.54	soil	metals
						soil	organics
NONCD0001018	HWY 49 BATTERY DUMP	NC HIGHWAY 49	CHARLOTTE	MECKLENBURG	38.47	soil	pesticides
NCD980557623	UNIVERSITY OF NC/ARPT WASTE DISP	AIRPORT RD	CHAPEL HILL	ORANGE	38.47	soil	metals
						groundwater	metals
NONCD0000044	CHEMICAL AND SOLVENTS, INC.	2804 PATTERSON STREET	GREENSBORO	GUILFORD	38.45	soil	organics
						groundwater	organics
NCD986190239	CHEROKEE OIL	925 SOUTH SUMMIT AVE	CHARLOTTE	MECKLENBURG	38.45	soil	organics
NCD081428104	SUN CHEM CORPORATION/GPI DIV	2400 0LD LEXINGTON ROAD	WINSTON-SALEM	FORSYTH	38.41	soil	metals
						soil	organics
NCD052553641	WEYERHAEUSER CO/LEWISTON	HWY 308 W	LEWISTON	BERTIE	38.38	soil	metals
NCD004520136	EATON CORPORATION	ROUTE 501 SOUTH	ROXBORO	PERSON	38.14	soil	metals
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD001871854	FRUEHAUF TRAILER CORPORATION	310 DALTON	CHARLOTTE	MECKLENBURG	38.12		
NONCD0001076	SOUTHSIDE INVESTMENTS LLC	2222 SOUTH BLVD	CHARLOTTE	MECKLENBURG	38.05	groundwater	organics
						groundwater	metals
						soil	metals
						soil	organics
NONCD0000003	VAN WATERS & ROGERS	ATANDO INDUSTRIAL PARK	CHARLOTTE	MECKLENBURG	38.05	groundwater	organics
						groundwater	organics
NONCD0000030	COLLINS AND AIKMAN	327 EAST ELM ST.	GRAHAM	ALAMANCE	38.04	soil	organics
NCD085083004	MOORE CO., INC/EASCO HAND TOOLS	ISLEY RD	GASTONIA	GASTON	38.01	groundwater	organics
						groundwater	organics
NCD980844732	CLAYTON BALL FIELD	SR 1709	CLAYTON	JOHNSTON	37.98	soil	organics
NCD980557953	FISHBURNE LANDFILL	AIRPORT ROAD	FLETCHER	BUNCOMBE	37.98	soil	pesticides
NCD980503148	SOUTHCHEM LANDFILL	750 EAST MARKHAM AVE	DURHAM	DURHAM	37.98	groundwater	organics
						surface water	organics
						soil	pesticides
						surface water	pesticides
NCD003148889	CHAMPION INTERNATIONAL/CANTON	NEWFOUND STREET	CANTON	HAYWOOD	37.79	sediment	pesticides
NCD052813250	AMERICAN ENKA COMPANY/BASF	US 19 & 23 WEST	ENKA	BUNCOMBE	37.65	groundwater	organics
						soil	organics
NONCD0001091	WEST MOREHEAD ST PESTICIDE	147 W MOREHEAD ST	CHARLOTTE	MECKLENBURG	37.62	soil	metals
NCD986171270	HESTA CARILLON PROJECT	WEST TRADE STREET	CHARLOTTE	MECKLENBURG	37.61	groundwater	pesticides
NONCD0000074	TEXTILE CHEMICAL FACILITY	GRAHAM STREET	CHARLOTTE	MECKLENBURG	37.60	groundwater	organics
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NONCD0000024	GAITHER TRANSOU PROPERTY	1202 GUILFORD COLLEGE RD	GREENSBORO	GUILFORD	37.52	soil	metals
NCD062548995	QUORUM KNITTING	REEMS CREEK RD	WEAVERVILLE	BUNCOMBE	37.35	soil	organics
NCD981928021	HOLLINGSWORTH PROPERTY	BROADFOOT AVE & CLARK ST	FAYETTEVILLE	CUMBERLAND	37.34	soil	organics
NCD986171338	PEELE CO. PESTICIDE DISPOSAL	NC 42 EAST	CLAYTON	JOHNSTON	37.13	soil	pesticides
NCD075563932	ESB INC/EXIDE CORPORATION	2510 NORTH BOULEVARD	RALEIGH	WAKE	37.09	soil soil	pesticides metals
NCD986166759	WILSON SEPTIC PITS	SR 1131	HICKORY	CATAWBA	36.90	soil	metals
NCD067428821	SIEMENS-ALLIS, INC/SWITCHGEAR DIV	5000 WOMACK ROAD	SANFORD	LEE	36.86	soil soil	metals organics
NCD003196847	NATIONAL SPINNING COMPANY	WEST 3RD STREET	WASHINGTON	BEAUFORT	36.61	sediment groundwater	organics metals
NCD981929813	CARBONTON ROAD DRUM SITE	2816 CARBONTON ROAD	SANFORD	LEE	36.60	groundwater	organics
NCD980712038	SED, INC. SWING COURT	SWING COURT	GREENSBORO	GUILFORD	36.30	soil	metals
NCD991279118	MEREDITH/BURDA, INC.	ST JAMES CHURCH RD	NEWTON	CATAWBA	36.12	soil	organics
NONCD0001009	SINGER PLANT #2	VIRGINIA STREET	LENOIR	CALDWELL	36.09	soil	metals
NCD981015886	CAROLINA PRODUCTION FINISHING	105 FAIRVIEW RD	ASHEVILLE	BUNCOMBE	35.86	soil	organics
NCD067437400	GULF OIL CORPORATION	SR 2813	MCLEANSVILLE	GUILFORD	35.22	groundwater	organics
NONCD0001035	DUKE ENERGY-WINSTON-SALEM POWER	1198 SOUTH BROAD STREET	WINSTON-SALEM	FORSYTH	35.21	surface water	metals
NCD072028251	TORPEDO WIRE & STRIP, INC.	INSTRUMENT DR	ROCKY MOUNT	NASH	35.10	soil soil	organics metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD108702606	HARTSOE BATTERY	2513 LINA AVE	KANNAPOLIS	ROWAN	35.01	soil	metals
NONCD0001082	CMI FLYASH DISPOSAL (PARCEL 2)	HWY 268	ELKIN	SURRY	34.97	soil	metals
NCD024459471	GUYTON BATTERY SERVICE	HWY 401 S	CHADBOURN	COLUMBUS	34.92	soil	metals
NCN000407205	TRI-COUNTY AIRPORT	NC 561	AULANDER	HERTFORD	34.92	soil	pesticides
NONCD0001048	LEXINGTON FURNITURE IND. PLNT #2	3979 OLD LINWOOD ROAD	LEXINGTON	DAVIDSON	34.53	soil groundwater	organics organics
NONCD0000075	FOAMEX/REEVES BROTHERS	HWY 115	CORNELIUS	MECKLENBURG	34.50	soil	organics
NC0001206473	GLEN RAVEN MILLS	TUCKER STREET C	BURLINGTON	ALAMANCE	34.27	groundwater	organics
NCD040042426	AEROQUIP/FAWN PLASTICS	HIGHWAY 264 ALT.	MIDDLESEX	NASH	34.22	groundwater	organics
NCD098765506	SINGER CO/FURNITURE DIV BRYSON	GIBBONS AVE	BRYSON CITY	SWAIN	34.16	groundwater	organics
NCD083673616	REEVES BROTHERS	RAILROAD AVE	RUTHERFORDTON	RUTHERFORD	34.10	soil	organics
NONCD0000041	CIBA-GEIGY	WESTINGHOUSE BLVD	CHARLOTTE	MECKLENBURG	34.01	groundwater soil	organics organics
NCD986209575	CARDINAL CHEMICAL WAREHOUSE	NC 211 & NC 72	LUMBERTON	ROBESON	33.96	soil	pesticides
NCD990715658	SOUTHERN MANUFACTURING, INC.	1000 SEABOARD ST	CHARLOTTE	MECKLENBURG	33.72	soil	inorganics
NONCD0001071	DOE-SPUN	ROUTE 1002	HOLLISTER	HALIFAX	33.63	groundwater	metals
NONCD0000054	MOORES COMPANY	US 1 BUSINESS & SR 1001	HENDERSON	VANCE	33.35	soil	organics
NCD055550560	GULF ADHESIVES & RESINS/PERKINS	1717 WARD STREET	HIGH POINT	GUILFORD	33.33	groundwater soil	organics organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD054417308	COASTAL CHEMICAL CORP.	NC 42	CLAYTON	JOHNSTON	33.11	soil	pesticides
NCD072018252	GENERAL ELECTRIC CO/MED STEAM	OLD RALEIGH RD	DURHAM	DURHAM	32.88	groundwater	organics
NCD093783876	VANIER GRAPHICS CORPORATION	655 MEADOW RD	EDEN	ROCKINGHAM	32.86	soil	organics
NCD980729479	CAROLAWN COMPANY	1426 W MOUNTAIN ST	KERNERSVILLE	FORSYTH	32.81	groundwater	organics
NCD981472624	US 70 DRUM DUMP	US 70	MORGANTON	BURKE	32.41	soil	organics
NONCD0001036	JOYCETON WATER WORKS WELL #2	300 FT N OF SWANSON RD	LENOIR	CALDWELL	32.38	soil	organics
NONCD0001037	JOYCETON WATER WORKS WELL #9	600 FT N OF SWANSON RD	LENOIR	CALDWELL	32.38	groundwater	organics
NCD095470332	THONIT A SIMMONS COMPANY	11900 STEELE CREEK ROAD	CHARLOTTE	MECKLENBURG	32.33	groundwater	organics
NCD986172526	GURLEY PESTICIDE BURIAL	PRESTON STREET	SELMA	JOHNSTON	32.28	soil soil	metals organics
NCD080885551	DAUGHERTY CHEMICAL COMPANY	307 WALKER STREET	DURHAM	DURHAM	32.27	soil soil	pesticides organics
NCD980847123	HURT RESIDENCE	HWY 64	MORGANTON	BURKE	32.27	soil	metals
NCD003221868	CENTURY FURNITURE COMPANY	401 11TH ST NW	HICKORY	CATAWBA	31.90	soil	organics
NONCD0000084	THERMO PRODUCTS, INC.	800 JONES STREET	DENTON	DAVIDSON	31.77	soil	metals
NCD980799019	CHEROKEE OIL	1201 BERRYHILL ROAD	CHARLOTTE	MECKLENBURG	31.76	soil soil	organics metals
						soil soil surface water	organics metals metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD980845119	BUCKHORN PESTICIDES	NC 581 & NC 42	WILSON	WILSON	31.36	soil	pesticides
NCD003229762	STRUCTURAL WOODS PRESERVING CO.	HWY 22	COLERIDGE	RANDOLPH	31.34	soil	organics
NCSFN0406924	VC CHEMICAL	STAMBACK FERRY RD	WADESBORO	ANSON	31.34	soil groundwater	metals metals
NCD981863814	LANCASTER PLATING	802 EDWARDS ROAD	LILLINGTON	HARNETT	31.32	soil	metals
NONCD0001015	MARY CIRCLE BATTERY	ZION CHURCH & MARY CRL	CONCORD	CABARRUS	31.18	soil	metals
NCD045451473	ACE CHEMICAL CORPORATION	9801 YORK ROAD	CHARLOTTE	MECKLENBURG	31.05	soil	metals
NONCD0000019	SIR WALTER GUN CLUB	US 64	RALEIGH	WAKE	30.96	soil groundwater	organics organics
NCD024740433	EC MANUFACTURING	413 N. POLK STREET	PINEVILLE	MECKLENBURG	30.45	soil	metals
NONCD0001067	CC DICKSON	1524 SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	30.43	soil	metals
NCD981031693	KEENER LANDFILL	SR 1820	CLINTON	SAMPSON	30.30	groundwater soil	organics organics
NONCD0001065	OLD CHARLOTTE LDFL/VANGUARD	SEVENTY SEVEN CENTER DRIVE	CHARLOTTE	MECKLENBURG	30.26	soil	organics
NC0000998336	CP PROPERTIES	2350 BROWN ROAD	SANFORD	LEE	30.23	groundwater	organics
NCD000616516	SCOVILL INC/SECURITY PRODUCTS	HWY 74 E	MONROE	UNION	30.21	soil soil sediment	organics metals metals
NCD003186004	INTERNATIONAL PAPER RICHMOND	2215 S. WILMINGTON STREET	RALEIGH	WAKE	30.10	soil soil	metals organics
						soil groundwater	organics organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD980557722	HARRISBURG BATTERY	HIGHWAY 49	HARRISBURG	CABARRUS	30.00	soil	metals
NCD067392175	TRAMCO, INC.	SR 1611	CONNELLY	BURKE	29.87	soil	organics
NCD991277724	MITCHELL SYSTEMS, INC.	ALTAPASS RD	SPRUCE PINE	MITCHELL	29.82	soil	metals
NCD057248759	PATCH RUBBER POND	GRACE BOULEVARD	ROANOKE RAPIDS	HALIFAX	29.82	soil	organics
NCD003213568	LIBERTY FURNITURE	HWY 421	LIBERTY	RANDOLPH	29.60	soil	organics
NCD003218161	CORNELL-DUBILIER ELECTRONICS	2652 DALYRUMPLE STREET	SANFORD	LEE	29.02	soil groundwater	organics organics
NCD991278714	CAROCHEM, INC.	540 GULF ST	DURHAM	DURHAM	28.72	soil	organics
NONCD0001050	LEXINGTON FURNITURE IND. PLNT #12	3301 COTTON GROVE LANE	LEXINGTON	DAVIDSON	28.59	soil	organics
NCD003186178	COASTAL CHEMICAL CORP.	EVANS ST EXT	GREENVILLE	PITT	28.33	soil	pesticides
NCD991278839	NORTH STATE CHEMICALS	3301 SPRING GARDEN ST	GREENSBORO	GUILFORD	27.60	soil soil	metals organics
NONCD0001030	BLR	2911 LEE AVENUE	SANFORD	LEE	27.50	groundwater soil	organics organics
NONCD0000013	CAROLINA HARDWOODS	158 FACTORY STREET	WILLIAMSTON	MARTIN	27.49	surface water	metals
NCD003213881	BENDIX CORPORATION	I-85 INNES ST EXIT	SALISBURY	ROWAN	26.36	soil	metals
NCD990868168	INMONT CORP/BASF CORPORATION	1701 W WESTINGHOUSE BLVD	CHARLOTTE	MECKLENBURG	26.22	soil groundwater	organics organics
NCD003218492	CAROLINA RUBBER HOSE COMPANY	1801 SOUTH RAILROAD	SALISBURY	ROWAN	26.04	soil soil	metals organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In order by Score) cont.

ID Number	Site Name	Address	City	County	Score	Media Contaminated	Contaminant Type
NCD003464765	VAUGHAN-BASSETT FURNITURE CO.	ROUTE 268 EAST	ELKIN	SURRY	25.93	soil	organics
NCD981003957	HENSON LANDFILL	US HIGHWAY 221 SOUTH	FOREST CITY	RUTHERFORD	24.35	soil	organics
NONCD0000048	WALKER DRUM DISPOSAL	WYATTS CHURCH GROVE ROAD	GOLD HILL	ROWAN	23.80	soil soil	organics metals
NCD003189024	BORDEN CHEMICAL FAYETTEVILLE	1411 INDUSTRIAL DR	FAYETTEVILLE	CUMBERLAND	23.51	groundwater groundwater	organics metals
NCD077838589	THOMASVILLE FOREST PRODUCTS	CLARKSBURY CHRUCH ROAD	THOMASVILLE	DAVIDSON	23.10	soil	metals
NCD071579528	FORBUSH METAL	SPEER BRIDGE ROAD	YADKINVILLE	YADKIN	21.90	soil soil soil	organics metals cyanide
NCD986232213	SUMMIT RESOURCE MANAGEMENT	3501 GRIBBLE ROAD	STALLINGS	UNION	21.45	soil soil surface water	organics inorganics organics
NCD003223799	CLAYTON-MARCUS CO., INC.	HWY 127 N	BETHLEHEM	ALEXANDER	21.11	soil soil soil	cyanide organics metals
NONCD0001062	SWAIM'S TRUCK PARTS & SERVICE	WELCOME AVENUE	HENDERSON	VANCE	20.15	soil soil	metals organics
NCD003225620	HIGH POINT FURNITURE INDUSTRIES	CORPORATION DRIVE	HIGH POINT	GUILFORD	19.14	soil	organics
NONCD0000034	ASHEVILLE INDUSTRIES	20 GLEN BRIDGE RD(SR3495)	ARDEN	BUNCOMBE	16.30	soil	organics
NCD081333858	HOLSTON ENERGY INC/HOLSTON FUEL	HWY 19A/235 BYPASS	WAYNESVILLE	HAYWOOD	7.70	soil	organics

II. SITES THAT MAY OR ARE KNOWN TO REQUIRE USE OF THE INACTIVE HAZARDOUS SITES CLEANUP FUND

Purpose of the Fund

The Inactive Hazardous Sites Cleanup Fund is used to: (1) address imminent hazard sites; (2) pay for assessment and cleanup when responsible parties do not comply with orders to clean up sites; (3) pay for assessment and cleanup of sites without financially-viable responsible parties (orphan sites); and (4) pay for state-contracted survey and legal assistance necessary to prepare notices of Inactive Hazardous Substance or Waste Disposal Sites where owners do not comply with orders to conduct such work. The state must attempt to recover its expenditures from responsible parties in the first, second and fourth cases.

The branch's Sites Priority List helps determine priorities for cleanup. Responsible parties for top priority sites are encouraged to voluntarily clean up their sites. When a responsible party does not comply with a request and subsequent order to clean up a site, the state must perform the cleanup using the Inactive Hazardous Sites Cleanup Fund. The demand for state funds to conduct site cleanups, also known as "remedial actions," depends on two factors. First, how often responsible parties refuse to comply with orders to conduct remedial action. Second, how often sites are without financially-viable responsible parties. To date, the program has been successful in encouraging voluntary actions by responsible parties. Funds are mainly needed for orphan cases.

The statute requires that the program report the list of sites known to require funds and the list of sites suspected to require funds for cleanup. Determining if responsible parties exist (and thus, if funds are needed) is often a complex and lengthy process. This information can become dated as owners and operators of the facilities change over time. Therefore, to operate as efficiently as possible with limited staff resources, responsible party research is not done until a site is next in priority for action. For this reason, the total number of orphan sites on the SPL requiring state funds is not presently known.

Orphan Chemical Sites

As of this writing, we have identified 37 orphaned chemical waste sites. Of these, 22 have attributes that make them a high priority. These attributes include current use as a residence or some other use with high exposure potential, and the existence of drinking water wells on or close to the disposal site. We are initiating a contract to sample and conduct some waste removal at these sites. Due to a transfer of $2.5 million (specified in the budget bill) from the Inactive Hazardous Sites Cleanup Fund to address the PCB landfill in Warren County, we do not have sufficient funds to complete sampling and waste removal work at all of these priority orphan sites. In addition, several of these sites will likely require additional funds to conduct a complete cleanup of contamination.

In addition to these orphan sites, the branch will require funds to control the large threat to public health and the environment posed by the Texfi, Inc. site in Fayetteville, Cumberland County. Groundwater contaminated with hazardous substances has migrated from Texfi to the adjoining City of Fayetteville's Hoffer Water Plant property. The contaminated groundwater is in contact with the City's primary finished drinking water holding tank. This tank sits, in part, below the groundwater table. The tank's construction and the nature of its water flow make it possible for contaminated groundwater to enter the tank. Thus far, the drinking water has not been affected. The branch used cleanup funds to construct a barrier wall to prevent additional flow of contaminated water toward the tank. Extraction wells have been installed to remove some of the contaminated water that had already passed on to the water plant property. The City's drinking water intakes on the Cape Fear River, 450 feet downstream from the Texfi property, and a city park adjoining the Texfi property, are also threatened. Texfi, Inc. is in the final stages of bankruptcy liquidation. None of the state's claims for funds expended thus far and for funds needed to clean up the site have been paid by the bankruptcy trustee.

There is a risk the barrier wall will fail overtime. Thus it is important to remove the source of the groundwater contamination on the Texfi property. The sources are solvents in the subsurface and contaminated soils. No monies are available to conduct this work.

Unlined Landfills

Due to the frequency of old unlined landfills having hazardous substance contamination, the branch has also begun the task of determining the location and current use of these sites. To date, we have completed field surveys of the old landfills in 22 counties. Of the 148 landfills inspected, 109 are considered priorities. This is due to either a drinking water source, a residence, a school, a church, or a daycare on the property or within 1,000 feet of the landfill.

We can estimate the number of old, unlined landfills that pose the greatest hazard by using the following equation:

$$\frac{\text{No. of landfills w/exposure concerns (109)}}{\text{Total no. of landfills surveyed thus far (148)}} \times \text{Total no. of landfills in inventory (755)} = \text{556 landfills w/exposure concerns}$$

Almost without exception, these landfills were operated either by private individuals with limited financial ability or by counties and municipalities which operated in the public interest and did not make a profit. Thus, these sites may be considered to have no responsible parties available to pay for any corrective measures required.

Cleanup Funds Needed

There are a total of 792 orphan chemical sites and orphan landfills identified to

date. Thus far, 131 of these are considered high priorities due to exposure concerns. An estimate of cleanup funds required to address these sites can be determined by multiplying the number of orphan sites and the average cost estimate for remedial action per site of $601,533 reported in a survey of state cleanup programs. (See "State and Territory Cleanup Accomplishments for the Period 1993-1997," prepared by the Association of State and Territorial Solid Waste Management Officials, December 1, 1998, pg. ES-9.) A total $65,567,097 would be required to address just the priority orphan landfills. A total of $1.5 million is needed to fullfill our pending contract to conduct the sampling and waste removal work at the orphan chemical sites. Additional monies will be needed to address the non-priority sites and to conduct complete cleanup of the orphan chemical sites.

Texfi, Inc., being the final stages of bankruptcy, and the Fayetteville facility having no other responsible parties, means that cleanup of this orphan site will become a responsibility for the state. The federal government has already indicated the site is not a candidate for a National Priorities List cleanup under Superfund. The drinking water for the entire population of the City of Fayetteville is threatened. Immediate attention is needed for this site. A cleanup cost for the Texfi site was determined by averaging cleanup costs at six similarly-contaminated sites. An estimated $4.6 million is needed.

As of August 31, 2002, the balance of the Inactive Hazardous Sites Cleanup Fund totaled $3,312,473. This total is presently being reduced by a transfer of $2.5 million from the cleanup fund to address the PCB landfill. Of the remainder, $244,163 is obligated in a contract to operate the extraction wells and monitor the City of Fayetteville's drinking water. This contract will end on June 11, 2003. This leaves only $568,310 of the $1.5 million needed to sample and conduct waste removal at the orphan chemical sites. The contract for this work is presently being finalized. No money remains to conduct the Texfi contaminant source cleanup or to address the orphan priority unlined landfills.

III. NATIONAL PRIORITIES LIST SITES REQUIRING A STATE COST SHARE

National Priorities List sites are those hazardous substance or waste disposal sites that are priorities for cleanup under the federal Comprehensive Environmental Response, Compensation and Liability Act, more commonly known as Superfund. North Carolina has 27 NPL sites. One additional site is currently proposed for the NPL.

The NPL includes sites with and without financially-viable responsible parties. Cleanup costs are financed either by responsible parties or by a federal trust fund with a state cost share. When the federal trust fund is used, CERCLA requires North Carolina to pay 10 percent of the cleanup cost plus 100 percent of the cost to operate and maintain the remediation system.

Table 4, found on Page 28, provides a list of the North Carolina NPL sites, their locations, investigation/cleanup status, estimated costs, and projected start dates for cleanup. Part I, found on Page 28, includes those sites where the Federal Trust Fund/North Carolina cost share is required. A summary of North Carolina's cost share obligations is provided at the end of this part. Part II, found on Page 30 includes the status of responsible party funded cleanups.

TABLE 4. NORTH CAROLINA NATIONAL PRIORITIES LIST SITES

PART I - SITES WHERE FEDERAL TRUST FUND/NORTH CAROLINA COST SHARE IS REQUIRED

NPL Site	*City/County*	*Operable Unit*	*Cleanup Status*	*Estimated Cost*	*Projected Cleanup Start Date*
ABC One Hour Cleaners	Jacksonville, Onslow	OU1-Groundwater	Remedial Action	$3,760,000	In Progress
		OU2-Soil	Remedial Action	$750,000	In Progress
Barber Orchard	Waynesville, Haywood	Entire Site			
		Soil	Remedial Investigation	Not Determined	2004
		Ground Water	Remedial Investigation	Not Determined	2004
Benfield Industries	Waynesville, Haywood	Entire Site		$6,729,200	
		Soil	Remedial Action		Complete
		Ground Water	Remedial Action		In Progress
Cape Fear Wood Preserving	Fayetteville, Cumberland	Entire Site		$21,315,300	
		Soil	Complete		Complete
		Ground Water	Remedial Action		In Progress
Carolina Transformer	Fayetteville, Cumberland	Entire Site		$16,486,550	
		Soil/Sediment	Remedial Action		In Progress
		Ground Water	Remedial Design		2003
Davis Park Road TCE Site	Gastonia, Gaston	Ground Water	Remedial Action	$3,873,299	In Progress
FCX, Inc. - Statesville	Statesville, Iredell	OU1-Groundwater	Remedial Action	$4,161,525	In Progress
		OU2-Soil	Complete	$6,000,000	Complete
FCX, Inc. - Washington	Washington, Beaufort	OU1-Groundwater	Remedial Design	$12,482,890	2005
		OU2-Soil, Surface Water, and Sediment	Complete	$1,500,000	Complete
North Belmont PCE	Belmont, Gaston	Ground Water	Remedial Design	$7,535,000	2002
Potter's Septic Tank Service	Maco, Brunswick	Entire Site			
		Soil	Complete	$8,350,000	Complete
		Ground Water	Remedial Action	$2,000,000	In Progress

NPL Sites	City/County	Operable Unit	Cleanup Status	Estimated Cost	Projected Cleanup Start Date
Reasor Chemical	Castle Hayne, New Hanover	Entire Site Soil Groundwater	RD/RA[1]	$2,000,000	2004
Ward Transformer[2]	Raleigh, Wake				

SUMMARY OF NORTH CAROLINA COST SHARE REQUIREMENTS
As of 31 May 2002

Estimated cost of pending Federal Trust Fund/NC Cost Share Cleanups:	**$94,943,764**
North Carolina's 10% cost share portion of pending Federal Trust Fund cleanups:	**$9,494,376**
Total NC Cost Share Fund income including appropriations, interest and other income:	**$11,435,480**
Disbursed amount of the Fund for cost share payments for NPL sites:	**$3,356,149**
Encumbered amount of the Fund for cost share payments for NPL sites:	**$4,539,939**
Other disbursed and encumbered amounts of the Fund:	**$1,496,966**
Current available Fund amount:	**$2,042,426**
State proceeds from bankruptcy settlement for FCX sites:	**$198,000[3]**

1 - Different portions of the site are in different work phases from Remedial Investigation/Feasibility Study to Remedial Design/Remedial Action
2 - Proposed for the NPL.
3 - A bankruptcy settlement contributed $2 million toward the total cost of the two FCX sites. North Carolina received $2,444.50 of this money for past state expenses. Approximately $198,000 remains in a separate trust fund that can be applied to the state's cost share for the FCX sites.

PART II - NORTH CAROLINA NATIONAL PRIORITIES LIST SITES - RESPONSIBLE PARTY FUNDED CLEANUPS

NPL Site	*City/County*	*Operable Unit*	*Cleanup Status*	*Estimated Cost*	*Projected Cleanup Start Date*
Aberdeen Pesticides	Aberdeen, Moore	OU1 & OU4 - Soils - All sites.	Complete	$30,000,000	Complete
		OU3 - Ground Water for FC, TS, F6.	Remedial Action	$5,520,464	In Progress
		OU5 - Ground Water for Rt 211 & McIver.	Remedial Action	$3,290,000	In Progress
Bypass 601/Martin Scrap	Concord, Cabarrus	OU1 - Soil and Sediment at the MSR	Const. Complete	$10,942,836	O & M[1]
		OU2 - Soil and Sediment Offsite	Complete	$1,319,887	Complete
		OU3 - Ground Water	Const. Complete		O & M[1]
Charlie Macon Lagoon and Drum	Cordova, Richmond	Entire Site			
		Soil	Complete	$1,254,000	Complete
		Ground Water	Const. Complete	$6,900,000	O & M[1]
Celanese Corporation	Shelby, Cleveland	OU1 - Ground Water	Const. Complete	$2,000,000	O & M[1]
		OU2 - Soil	Complete	$3,500,000	Complete
		Surface Water	Complete		Complete
Chemtronics, Inc.	Swannanoa, Buncombe	Entire Site			
		Soil	Const. Complete	$1,870,400	O & M[1]
		Ground Water	Const. Complete	$378,500	O & M[1]
FCX, Inc.	Statesville, Iredell	OU3-Burlington Industries Site	Remedial Action	$4,107,120	In Progress
Geigy Chemical	Aberdeen, Moore	Entire Site			
		Soil	Complete	$1,100,000	Complete
		Ground Water	Remedial Action	$1,157,500	In Progress
General Electric/Shepard Farm	East Flat Rock, Henderson	Entire Site			
		Soil	Const. Complete	$2,348,496	O & M[1]
		Ground Water	Const. Complete	$4,578,440	O & M[1]
		Surface Water and Sediment	Complete	$6,000,000	Complete
Jadco-Hughes	Belmont, Gaston	Entire Site		$5,000,000	
		Soil & Sediment	Remedial Acton		In Progress
		Ground Water	Remedial Action		In Progress
JFD Electronics/Channel Master	Oxford, Granville	Entire Site			
		Soil	Complete	$2,582,385	Complete
		Groundwater	Const. Complete	$5,181,000	O & M[1]
Koppers Company, Inc.	Morrisville, Wake	Entire Site			
		Soil	Complete	$4,750,000	Complete
		Ground Water	Const. Complete	$4,031,000	O & M[1]
		Surface Water	Complete	$1,995,500	Complete

PART II - NORTH CAROLINA NATIONAL PRIORITIES LIST SITES - RESPONSIBLE PARTY FUNDED CLEANUPS

NPL Site	*City/County*	*Operable Unit*	*Cleanup Status*	*Estimated Cost*	*Projected Cleanup Start Date*
Martin Marietta/Sodyeco	Charlotte, Mecklenburg	Entire Site			
		Soil	Remedial Action	$2,072,000	In Progress
		Ground Water	Remedial Action	$4,090,000	In Progress
National Starch and Chemical	Salisbury, Rowan	OU1-Groundwater in western part of site	Const. Complete	$3,036,000	O & M[1]
		OU2-Trench area soils & Surface Water	Const. Complete	$151,000	O & M[1]
		OU3-Groundwater in Area 2 & wastewater treatment area and surface water/sediments in Northeast tributary	Const. Complete	$8,159,000	O & M[1]
		OU4-Soils in Area 2 & wastewater treatment lagoon area	Const. Complete	$5,281,000	O & M[1]
New Hanover County Airport	Wilmington, New Hanover	Groundwater	Remedial Action	$350,000	In Progress
NCSU	Raleigh, Wake	Entire Site			
		Soil	Complete	$931,000	Complete
		Groundwater	Remedial Design	$2,100,000	2004
USMC Camp LeJeune	Jacksonville, Onslow	Multiple Units	RI/FS - RD/RA[2]	Not Determined	In Progress
USMC Cherry Point	Cherry Point, Craven	Multiple Units	RI/FS - RD/RA[2]	Not Determined	In Progress

1- O & M - Operation and Maintenance
2 - Different portions of the site are in different work phases from Remedial Investigation/Feasibility Study to Remedial Design/Remedial Action

IV. RESPONSIBLE PARTY VOLUNTARY SITE REMEDIAL ACTION

When the Inactive Hazardous Sites Branch solicits the cooperation of responsible parties in taking action at a priority site, most parties agree to voluntarily conduct a cleanup with branch approval. In addition to these voluntary actions, responsible parties and owners often come forward on their own to initiate an approved assessment and/or remedial action. Due to the number of volunteers and very limited staff resources, the branch was authorized by the General Assembly to privatize its oversight role at lower priority voluntary site remedial actions. Sites with more severe public health threats or concerns are still reviewed by state staff.

The privatized portion of the voluntary cleanup program is called the Registered Environmental Consultant, or REC Program. Under this program, a responsible party hires an REC to both conduct, and to certify the regulatory compliance of, the site assessment and clean up. In order for a firm to qualify as an REC, it must demonstrate it meets certain regulatory qualifications criteria. The REC certification replaces state oversight. The state audits a portion of the REC projects to ensure the integrity of the program. The state sanctions RECs where necessary. A state staff auditor is funded through fees collected from the voluntary participants.

A current list of sites which have parties conducting assessments and cleanups in accordance with consent agreements with the state is provided in Table 5, on the following page. Table 6, found on Page 35, is a list of additional ongoing Branch-directed priority actions not under consent agreements.

TABLE 5. SITES UNDERGOING VOLUNTARY REMEDIAL ACTION BY RESPONSIBLE PARTIES

ID Number	*Site Name*	*City*	*County*
NONCD0000040	ABBOTT LABORATORIES	LAURINBURG	SCOTLAND
NONCD0000039	ABITIBI-PRICE CORPORATION	ROARING RIVER	WILKES
NCD047257472	APPLIED RESEARCH GROUP, INC.	CHARLOTTE	MECKLENBURG
NCD074511361	AQUAIR CORPORATION	CHARLOTTE	MECKLENBURG
NCD986188787	ASHEVILLE COAL GAS PLANT #1	ASHEVILLE	BUNCOMBE
NONCD0000032	ASHEVILLE COAL GAS PLANT #2	ASHEVILLE	BUNCOMBE
NCD072003635	ATHOL MANUFACTURING COMPANY	BUTNER	GRANVILLE
NCD003193588	BARBOUR BOAT WORKS, INC.	NEW BERN	CRAVEN
NONCD0000002	BURLINGTON COAL GAS PLANT	BURLINGTON	ALAMANCE
NCD096158696	BURLINGTON INDUSTRIES, INC.	GREENSBORO	GUILFORD
NCD986171965	CARO-KNIT	WILMINGTON	NEW HANOVER
NCD000608117	CELANESE CORPORATION/FIBERS TECH	CHARLOTTE	MECKLENBURG
NCD986188803	CHARLOTTE COAL GAS PLANT NO. 2	CHARLOTTE	MECKLENBURG
NCD986197333	CONCORD COAL GAS PLANT	CONCORD	CABARRUS
NCD003162500	CONSOLIDATED ENGRAVERS CORP.	CHARLOTTE	MECKLENBURG
NONCD0001061	CP&L NORTHERN DIVISION COMPLEX	GARNER	WAKE
NC0001606250	CRISTEX DRUM	OXFORD	GRANVILLE
NCD062567623	DIAMOND SHAMROCK CORP/HENKEL	CHARLOTTE	MECKLENBURG
NCD981861743	DUKE POWER/GREENSBORO GAS PLANT	GREENSBORO	GUILFORD
NCD000813519	DUKE UNIVERSITY	DURHAM	DURHAM
NCD986173938	DURHAM GAS PLANT	DURHAM	DURHAM
NONCD0001058	ELECTRONICS COMPONENT CORPORATION	BURGAW	PENDER
NCD986197267	ELIZABETH CITY COAL GAS	ELIZABETH CITY	PASQUOTANK
NCD986197341	FAYETTEVILLE COAL GAS/RAY AVE	FAYETTEVILLE	CUMBERLAND
NCD041414780	FIELDCREST MILLS INC./NC FINISHING	SALISBURY	ROWAN
NONCD0000017	FLAKT PRODUCTS	WINSTON-SALEM	FORSYTH
NONCD0000029	FLEET AEROSPACE CORP./AERONCA	CHARLOTTE	MECKLENBURG
NCD093340487	FLORIDA STEEL CORPORATION	CHARLOTTE	MECKLENBURG
NCD000813600	GA-PACIFIC CORP CHIP-N-SAW	WHITEVILLE	COLUMBUS
NCD000773515	GA-PACIFIC CORP/HDWD SAW	BOWDENS	DUPLIN
NCD000773507	GA-PACIFIC CORP/HDWD SAW	ENFIELD	HALIFAX
NCD986188829	GASTONIA COAL GAS PLANT	GASTONIA	GASTON
NCD051322980	GENERAL ELECTRIC CO.	CHARLOTTE	MECKLENBURG
NCD003163730	GENERAL INSTRUMENT CORP.	FAIRVIEW	BUNCOMBE
NONCD0001069	GENERAL MARBLE COMPANY	LINCOLNTON	LINCOLN
NCD986197309	GOLDSBORO COAL GAS PLANT #1	GOLDSBORO	WAYNE
NONCD0001083	GOLDSBORO COAL GAS PLANT #2	GOLDSBORO	WAYNE
NONCD0001089	GREENSBORO COAL GAS PLANT #1	GREENSBORO	GUILFORD
NCD986188886	GREENVILLE COAL GAS PLANT	GREENVILLE	PITT
NCD986232379	GRESHAMS LAKE INDUSTRIAL PARK	RALEIGH	WAKE
NONCD0001084	HENDERSON COAL GAS PLANT	HENDERSON	VANCE
NCD990734055	HERCOFINA/CAPE INDUSTRIES	WILMINGTON	NEW HANOVER
NCD039102959	HEVI-DUTY ELECTRIC/GENERAL SIG	GOLDSBORO	WAYNE
NONCD0001085	HICKORY COAL GAS PLANT	HICKORY	CATAWBA
NCD986188837	HIGH POINT COAL GAS PLANT	HIGH POINT	GUILFORD
NCD051745685	HOLDING POND FOR WASTE/USS	GREENSBORO	GUILFORD

TABLE 5. SITES UNDERGOING VOLUNTARY REMEDIAL ACTION BY RESPONSIBLE PARTIES (Cont.)

ID Number	*Site Name*	*City*	*County*
NCD003215696	HUNT MANUFACTURING	STATESVILLE	IREDELL
NCD986197366	KINSTON COAL GAS PLANT	KINSTON	LENOIR
NCD981863327	KSP DRY CLEANERS	CHAPEL HILL	ORANGE
NCD986197358	LEXINGTON COAL GAS PLANT	LEXINGTON	DAVIDSON
NCD003183167	LONG MANUFACTURING	TARBORO	EDGECOMBE
NONCD0000027	MEADOWVIEW ROAD	GREENSBORO	GUILFORD
NONCD0001086	MT AIRY COAL GAS PLANT	MT AIRY	SURRY
NCD986197259	NEW BERN COAL GAS PLANT	NEW BERN	CRAVEN
NONCD0000077	OLD STATE LAB	CARY	WAKE
NCD055165609	PANTASOTE INC. FILM/COMPOUND DIV.	HICKORY	CATAWBA
NCD055162069	PELTON & CRANE PLANT (FORMER)	CHARLOTTE	MECKLENBURG
NONCD0001020	PRECISION FABRICS GROUP, INC	GREENSBORO	GUILFORD
NCD986188894	RALEIGH COAL GAS PLANT NO. 1	RALEIGH	WAKE
NCD986188902	RALEIGH COAL GAS PLANT NO. 2	RALEIGH	WAKE
NONCD0001087	REIDSVILLE COAL GAS PLANT	REIDSVILLE	ROCKINGHAM
NCD053009510	RELIANCE UNIVERSAL OF KENTUCKY	LENOIR	CALDWELL
NCD986197325	ROCKY MOUNT COAL GAS PLANT NO. 1	ROCKY MOUNT	NASH
NCD986197317	ROCKY MOUNT COAL GAS PLANT NO. 2	ROCKY MOUNT	NASH
NCD981933096	ROCKY MOUNT, OLD AIRPORT	ROCKY MOUNT	NASH
NCD986197283	SALISBURY COAL GAS PLANT #1	SALISBURY	ROWAN
NONCD0001088	SALISBURY COAL GAS PLANT #2	SALISBURY	ROWAN
NCD003234549	SCM PROCTOR SILEX/WEAREVER	SOUTHERN PINES	MOORE
NCD053488557	SOUTHERN WOOD PIEDMONT COMPANY	GULF	CHATHAM
NCD058517467	SOUTHERN WOOD PIEDMONT COMPANY	WILMINGTON	NEW HANOVER
NCD986197291	STATESVILLE COAL GAS PLANT	STATESVILLE	IREDELL
NCD986176444	STROH/CHITTY FARM	WINSTON-SALEM	FORSYTH
NCD986166700	TOISNOT SWAMP	WILSON	WILSON
NCD053485991	VARCO-PRUDEN BUILDINGS	KERNERSVILLE	FORSYTH
NCD986197275	WASHINGTON COAL GAS PLANT	WASHINGTON	BEAUFORT
NCD986188910	WILMINGTON COAL GAS PLANT	WILMINGTON	NEW HANOVER
NCN000407302	WILMINGTON GUN CLUB (FORMER)	WILMINGTON	NEW HANOVER
NCD986188845	WINSTON-SALEM COAL GAS PLANT NO. 1	WINSTON-SALEM	FORSYTH
NCD986188852	WINSTON-SALEM COAL GAS PLANT NO. 2	WINSTON-SALEM	FORSYTH

TABLE 6. ADDITIONAL ONGOING STATE-DIRECTED PRIORITY ACTIONS NOT UNDER VOLUNTARY CONSENT AGREEMENTS

ID Number	*Site Name*	*City*	*County*
NCD024462327	ACADEMY STEEL DRUM	MATTHEWS	MECKLENBURG
NCD003157377	AMERICAN THREAD	MARION	MCDOWELL
NONCD0001063	ARROWOOD, INC	NORWOOD	STANLY
NCD003193588	BARBOUR BOAT WORKS	NEW BERN	CRAVEN
NCD048181218	CAROLINA GALVANIZING	ABERDEEN	MOORE
NCD986175651	GLEN RAVEN MILLS	KINGS MOUNTAIN	CLEVELAND
NONCD0001064	GUILFORD MILLS	FUQUAY-VARINA	WAKE
NONCD0000050	HWY 268 MIRROR WASTE DUMP	WILKESBORO	WILKES
NONCD0000056	JAMES LANDFILL	LAURINBURG	SCOTLAND
NCD980729677	KNOB CREEK FLYASH	BREVARD	TRANSYLVANIA
NONCD0001056	LITTLE MOUNTAIN LANDFILL	TRYON	POLK
NCD986215499	PARKER INDUSTRIES	FAYETTEVILLE	CUMBERLAND
NCD062552153	SAYLES-BILTMORE BLEACHERIES	ASHEVILLE	BUNCOMBE
NCD990715658	SOUTHERN MANUFACTURING	CHARLOTTE	MECKLENBURG
NONCD0001075	TEXFI INDUSTRIES	FAYETTEVILLE	CUMBERLAND
NCD082362989	TUNGSTEN QUEEN MINE	TUNGSTEN	VANCE

V. IMMINENT HAZARD SITES

The NC Department of Environment and Natural Resources and the US EPA are committed to addressing imminent hazard sites when identified. Table 7 provides a list of sites where imminent hazards have been discovered, or where abatement activities have continued, since the last legislative report in October 2001. Their location, a site description, status and funding source are also provided.

TABLE 7. SUMMARY OF IMMINENT HAZARD SITES

Site	City/County	Site Description	Status	Funding Source
American Elements CON	Farmville/ Pitt	Numerous drums and a tank containing acids present at facility refusing to take action to stabilize the waste.	The USEPA stabilized and removed the acids. Removal complete. The USEPA plans to do further sampling.	USEPA
Balfour Road Battery NEW	Granite Quarry/ Rowan	Lead contaminated soils discovered on property 100 ft upslope from a private well.	State supervised cleanup by owner of contaminated property. All work complete in 9/02.	Owner
Holmes Scrap Yard CON	East Spencer/ Rowan	Abandoned source of radium 226 found at scrap yard.	USEPA is arranging for removal and proper disposal.	USEPA
Holtra Chem/ Honeywell NEW	Riegelwood, Columbus	Tanks, lagoons, ponds, soils, materials and a building contaminated with mercury.	USEPA is in the process of determining the extent of contamination prior to removal.	PRPs
Texfi Industries CON	Fayetteville/ Cumberland	Chlorinated solvent groundwater contaminant plume has migrated from a former textile mill to the City of Fayetteville's water plant property. The City's finished drinking water holding tank sits in contact with contaminated groundwater. Groundwater could permeate this tank. The City's drinking water intakes on the Cape Fear River are 450 feet downstream from the Texfi property line.	The State constructed a barrier wall to prevent further contaminant migration to the holding tank area and installed extraction wells to remove contamination presently near the tank. The State continues to monitor groundwater and the drinking water tank. USEPA is evaluating removing source material at plant. The State is attempting to get bankruptcy court to fund source removal.	State
VC Chemical CON	Wadesboro/ Anson	Former fertilizer manufacturing operation. Very high levels of metals in soils. Property is near a residential area.	USEPA is supervising a site cleanup being conducted by Exxon/Mobil. Work continues.	Exxon/ Mobil

CON - Continued action from previous reporting period
NEW - Initiated since last report
PRP - Potentially responsible party

TABLE 7. SUMMARY OF IMMINENT HAZARD SITES (CONT.)

Site	City/County	Site Description	Status	Funding Source
Woody's Salvage Yard CON	Vander/ Cumberland	Site used as a salvage yard. Tanks, gas cylinders, drums and other wastes from a salvage yard were found on site. Asbestos present in an on-site building.	USEPA has removed all hazardous waste sources.	USEPA

CON - Continued action from previous reporting period
NEW - Initiated since last report
PRP - Potentially responsible party

VI. SUMMARY OF THE INACTIVE HAZARDOUS SITES CLEANUP FUND AND NATIONAL PRIORITIES LIST COST SHARE FUND

Inactive Hazardous Sites Cleanup Fund
As of August 31, 2002

Deposits (8/01-8/02)	
Interest	$146,359
Cost recovery of previous expenditures	$37,564
Total Deposits	**$183,923**
Withdrawals (8/01-8/02)	
Emergency action (Texfi Industries-Fayetteville)	$145,392
Reversion to General Fund	$499,263
PCB Landfill Transfer (pending)	$2,500,000
Total Withdrawals	**$3,144,655**
Current Balance	**$812,474**
Obligations	
Remainder of Texfi emergency abatement contract	$244,163
Orphan priority site sampling/removal contract	$568,311
Total Current Obligations	**$812,474**
Effective Balance	**$0**
Orphan Cleanup Cost Requirements (*see Chapter II for more details*)	
Additional funds needed for orphan site sampling/removal contract	$931,689
Texfi contaminant source removal	$4,600,000
Priority unlined landfill remediation	$65,567,097
Total Priority Orphan Cleanup Cost Requirements	**$71,098,786**

National Priorities List Cost Share Fund
As of May 31, 2002

NC Cost Share Fund Income	
Appropriation, interest and other income	$11,435,480
Note: An additional $198,000 set aside for remediation of the two FCX sites in NC came from the final FCX bankruptcy settlement. These funds are not included in the fund income.	
Total Fund Income	**$11,435,480**
NC Cost Share Fund Expenditures	
Disbursed funds for NPL site cost share obligations	$3,356,149
Encumbered funds for NPL site cost share obligations	$4,539,939
Funds disbursed or encumbered for other than cost share obligations	$1,496,966
Total Fund Disbursements and Encumbrances	**$9,393,054**
NC Cost Share Fund Remaining Amount Available	**$2,042,426**
NC Cost Share Fund Estimated Obligations	
The estimated total cost of pending fund-lead NPL site cleanups in North Carolina is $94,943,764. Therefore, North Carolina's 10% share obligation of the total cost of fund-lead NPL cleanup is	$9,494,376
The estimated additional North Carolina obligation for a new fund-lead NPL site to be added within the next 12 months is	$1,000,000
The estimated North Carolina obligation for operation and maintenance expenses for existing fund-lead NPL sites is	$20,000,000
Total Estimated Current Obligations	**$30,494,376**

Note: There is currently enough money in the Fund to meet the State's present cost share obligation. However, virtually no funds remain to pay for the State's operation and maintenance obligations which will begin in the next few years. Aside from interest, the Fund has no continuing source of income.

APPENDIX I

INACTIVE HAZARDOUS SITES INVENTORY
Description of Categories

The Department of Environment and Natural Resources is required by North Carolina General Statute 130A-310.1(a) to maintain an inventory of inactive hazardous substance or waste disposal sites. The Inactive Hazardous Sites Inventory accounts for all of the sites in the EPA's Comprehensive Environmental Response, Compensation and Liability Act inventory of potential contaminated sites called CERCLIS. The intent is to address those sites determined not to be federal priorities. Many sites in the CERCLIS inventory, and therefore also the Inactive Hazardous Sites Inventory, are regulated by other state and federal laws. Thus, they are not priorities for the Inactive Hazardous Sites Branch. The Inactive Hazardous Sites Inventory is organized in the categories described below. To avoid duplication of work, sites being addressed by other agencies are tracked in separate categories. Ten of the inventory sites appear in multiple other agency lead categories (4 through 10).

1. **Sites Priority List**
   The SPL includes sites with confirmed contamination or known disposal of hazardous substances that have been ranked using the Prioritization System rules (15A NCAC Subchapter 13C .0200).

2. **Responsible Party Voluntary Remedial Action Sites**
   In accordance with North Carolina General Statute 130A-310.9(b), voluntary cleanups or "remedial actions" conducted by responsible parties under agreements with the state must be listed in a separate category.

3. **Sites with Evaluations Pending**
   This category includes those sites that require evaluation before site priority can be determined. Each site with evidence of contamination will be ranked and transferred to the SPL. Those sites where no further action is required will also be transferred to that category.

4. **National Priorities List**
   The NPL consists of sites the federal government has determined to be the most serious, uncontrolled hazardous waste disposal sites in the nation. Either federal and state dollars or responsible parties will fund these cleanups. This list only includes North Carolina NPL sites.

5. **Non-NPL Federal Superfund Cleanups**
NPL-caliber sites where the USEPA has entered into agreements with responsible parties to conduct remedial action are supervised by the USEPA. This list includes only the USEPA Non-NPL remedial action sites located in North Carolina.

6. **Inventory Sites Managed as TSD Facilities by the Hazardous Waste Section***
Facilities that have, or are in the process of applying for, a Resource Conservation and Recovery Act permit to treat, store or dispose of hazardous waste are tracked in this category. These sites are exempt pursuant to G.S. 130A-310(3).

7. **Non-TSD Inventory Sites Under the Jurisdiction of the Hazardous Waste Section ***
The inventory includes some sites that are currently undergoing Resource Conservation and Recovery Act corrective action under the direction of the North Carolina Hazardous Waste Section, but do not hold RCRA permits.

8. **Inventory Sites Under the Jurisdiction of the Solid Waste Section***
Permitted solid waste landfills being monitored and controlled by the North Carolina Solid Waste Section are tracked in this category.

9. **Inventory Sites Under the Jurisdiction of the Division of Water Quality ***
Sites in this category include those where the North Carolina Division of Water Quality has been specified as the lead agency to oversee assessment and/or cleanup.

10. **Inventory Sites Under the Jurisdiction of the Division of Radiation Protection ***
Sites conducting assessment and cleanup under the direction of the North Carolina Division of Radiation Protection are tracked in this category.

11. **Old Unlined Landfills**
This is a list of all the old unlined landfills catalogued by the branch. Seventy-seven of the 755 landfills are also listed in other categories.

* Note: Additional sites, not included in the Inactive Hazardous Sites Inventory, may be managed by these regulatory agencies.

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST

ID Number	*Site Name*	*City*	*County*
NCD002571438	ABC ENGRAVERS	CHARLOTTE	MECKLENBURG
NCD024462327	ACADEMY STEEL DRUM	MATTHEWS	MECKLENBURG
NCD045451473	ACE CHEMICAL CORPORATION	CHARLOTTE	MECKLENBURG
NCD045924339	ACME UNITED CORPORATION	FREMONT	WAYNE
NCD040042426	AEROQUIP/FAWN PLASTICS	MIDDLESEX	NASH
NCD024583288	AIR PRODUCTS AND CHEMICALS, INC.	GREENSBORO	GUILFORD
NCD085082311	AMERICAN COLORS INCORPORATED	CHARLOTTE	MECKLENBURG
NONCD0001033	AMERICAN CONTRACT COATINGS	APEX	WAKE
NCD052813250	AMERICAN ENKA COMPANY/BASF	ENKA	BUNCOMBE
NCD003157377	AMERICAN THREAD/SEVIER PLANT	MARION	MCDOWELL
NCD075582197	AMORE/WORTH CHEMICAL	DURHAM	DURHAM
NCD000615872	AMP INCORPORATED	GASTONIA	GASTON
NCD041230418	AMP INCORPORATED	WINSTON-SALEM	FORSYTH
NCD119168813	ANILOX ROLL COMPANY	CHARLOTTE	MECKLENBURG
NCD980502793	APEX SANITARY LANDFILL	APEX	WAKE
NCD048462881	ARMOLOY CO OF NC/HI-TECH	STATESVILLE	IREDELL
NCD986175636	ASHE PATTERN SHOP (FORMER)	GASTONIA	GASTON
NCD980557557	ASHEBORO LANDFILL	ASHEBORO	RANDOLPH
NONCD0000034	ASHEVILLE INDUSTRIES	ARDEN	BUNCOMBE
NCD033978396	ATEC INDUSTRIES	ROXBORO	PERSON
NONCD0000038	AYCOCK PROPERTY	WILSON	WILSON
NCD980559637	BEAUNIT CORP./DYING & FINISHING	LOWELL	GASTON
NCD003213881	BENDIX CORPORATION	SALISBURY	ROWAN
NCD986171445	BENFIELD CHEMICALS	CANTON	HAYWOOD
NONCD0000070	BENFIELD SANITATION SERVICE	STATESVILLE	IREDELL
NCD981022072	BETTIS PROPERTY	EARL	CLEVELAND
NONCD0001030	BLR	SANFORD	LEE
NONCD0000014	BOISE CASCADE	MONCURE	CHATHAM
NONCD0001073	BONE FARM PESTICIDE AREA	NASHVILLE	NASH
NCD003189024	BORDEN CHEMICAL FAYETTEVILLE PLANT	FAYETTEVILLE	CUMBERLAND
NCD980502827	BROWN #1	PISGAH FOREST	TRANSYLVANIA
NCD083682583	BROYHILL FURNITURE	NEWTON	CATAWBA
NONCD0001038	BRYANT FARM DRUM DUMP	GATEWOOD	CASWELL
NCD980845119	BUCKHORN PESTICIDES	WILSON	WILSON
NCD024770125	BURLINGTON FURNITURE	ROBBINSVILLE	GRAHAM
NCD991278581	BURLINGTON FURNITURE/LUMBER PL	LEXINGTON	DAVIDSON
NCD048184451	BURLINGTON HOME CHAIR	RONDA	WILKES
NCD980557664	BURLINGTON INDUSTRIES, INC.	RALEIGH	WAKE
NCD093334894	BURLINGTON INDUSTRIES, INC.	STATESVILLE	IREDELL
NCD024762668	BUSH BROTHERS PLATING INC/GREER	REIDSVILLE	ROCKINGHAM

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	Site Name	City	County
NCD981750425	BUXTON DUMP	BUXTON	DARE
NCD981022288	C&T REFINERY	CHARLOTTE	MECKLENBURG
NCD980502850	CABARRUS DISPOSAL COMPANY, INC.	CONCORD	CABARRUS
NCD980557870	CALDWELL COUNTY ABANDONED WASTE	LENOIR	CALDWELL
NCD981021702	CAMP, LEONARD PROPERTY	EARL	CLEVELAND
NCD003162666	CANNON MILLS COMPANY/FIELDCREST	KANNAPOLIS	CABARRUS
NONCD0000082	CAPE FEAR CHEMICALS/HL BRICE	ELIZABETHTOWN	BLADEN
NCD981929813	CARBONTON ROAD DRUM SITE	SANFORD	LEE
NCD986209575	CARDINAL CHEMICAL WAREHOUSE FIRE	LUMBERTON	ROBESON
NCSFN0407140	CARDINAL CONTAINER SERVICES	LEXINGTON	DAVIDSON
NCD991278714	CAROCHEM, INC.	DURHAM	DURHAM
NCD980729479	CAROLAWN COMPANY	KERNERSVILLE	FORSYTH
NCD981015746	CAROLINA ALUMINUM/HERBERT TAYLOR	ROPER	WASHINGTON
NCD048181218	CAROLINA GALVANIZING CORP.	ABERDEEN	MOORE
NONCD0000013	CAROLINA HARDWOODS	WILLIAMSTON	MARTIN
NONCD0000053	CAROLINA MARBLE CO.	ALBEMARLE	STANLY
NONCD0000078	CAROLINA METAL AND ALLOYS	HIGH POINT	GUILFORD
NCD000830919	CAROLINA P&L CO. CAPE FEAR STM	MONCURE	CHATHAM
NONCD0000023	CAROLINA P&L CO. FAYETTEVILLE	FAYETTEVILLE	CUMBERLAND
NCD000830612	CAROLINA P&L CO. MAYO STEAM	ROXBORO	PERSON
NCD000830653	CAROLINA P&L CO. ROXBORO STEAM	ROXBORO	PERSON
NONCD0000028	CAROLINA P&L CO. SPRUCE PINE	SPRUCE PINE	MITCHELL
NCD000830646	CAROLINA P&L CO. SUTTON STEAM	WILMINGTON	NEW HANOVER
NCD000830620	CAROLINA P&L CO. WEATHERSPOON STEAM	LUMBERTON	ROBESON
NCD981015886	CAROLINA PRODUCTION FINISHING	ASHEVILLE	BUNCOMBE
NCD003218492	CAROLINA RUBBER HOSE COMPANY	SALISBURY	ROWAN
NCD980729412	CAROLINA TANK CLEANING COMPANY	GREENSBORO	GUILFORD
NONCD0001077	CATAWISSA LUMBER CO	WEST JEFFERSON	ASHE
NONCD0001067	CC DICKSON	CHARLOTTE	MECKLENBURG
NCD986180883	CCFC PESTICIDE DISPOSAL	OXFORD	GRANVILLE
NONCD0000015	CENTRAL TRANSPORT COMPANY	WILMINGTON	NEW HANOVER
NCD003221868	CENTURY FURNITURE COMPANY	HICKORY	CATAWBA
NCD986188001	CHAMPION INTERNATIONAL LANDFILL #1	CANTON	HAYWOOD
NCD003148889	CHAMPION INTERNATIONAL/CANTON MILL	CANTON	HAYWOOD
NCD986188019	CHAMPION LANDFILL #2	CANTON	HAYWOOD
NONCD0000035	CHAPEL STREET BATTERY DUMP	KANNAPOLIS	ROWAN
NCD980557771	CHARLOTTE CITY DUMP	CHARLOTTE	MECKLENBURG
NCD024468597	CHARLOTTE STEEL DRUM	CHARLOTTE	MECKLENBURG
NONCD0000083	CHEESMAN PROPERTY	ROCKWELL	CABARRUS
NONCD0000044	CHEMICAL AND SOLVENTS, INC.	GREENSBORO	GUILFORD
NC0000183103	CHEMICAL CARTAGE COMPANY	LELAND	BRUNSWICK
NCD043711977	CHEMICAL LEAMAN TANK LINES, INC.	GREENSBORO	GUILFORD

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	Site Name	City	County
NCD986190239	CHEROKEE OIL	CHARLOTTE	MECKLENBURG
NCD980799019	CHEROKEE OIL	CHARLOTTE	MECKLENBURG
NCD981473150	CHERRY MT STREET DRUM	FOREST CITY	RUTHERFORD
NONCD0000041	CIBA-GEIGY	CHARLOTTE	MECKLENBURG
NCD980844732	CLAYTON BALL FIELD	CLAYTON	JOHNSTON
NCD003223799	CLAYTON-MARCUS CO., INC.	BETHLEHEM	ALEXANDER
NONCD0001001	CLOSED CITY OF HENDERSON LDFL	HENDERSON	VANCE
NONCD0000016	CMC LANDFILL	ELKIN	SURRY
NONCD0001082	CMI FLYASH DISPOSAL (PARCEL 2)	ELKIN	SURRY
NONCD0001092	CMI WWTP (PARCEL1)	ELKIN	SURRY
NCD054417308	COASTAL CHEMICAL CORP.	CLAYTON	JOHNSTON
NCD003186178	COASTAL CHEMICAL CORP.	GREENVILLE	PITT
NONCD0000030	COLLINS AND AIKMAN	GRAHAM	ALAMANCE
NCD003467099	CONE MILLS CORP/GRANITE FINISHING	HAW RIVER	ALAMANCE
NCD130708126	CONSOLIDATED WAREHOUSE	CHARLOTTE	MECKLENBURG
NCD003218161	CORNELL-DUBILIER ELECTRONICS	SANFORD	LEE
NCD003195161	CORNING GLASS WORKS	RALEIGH	WAKE
NCD003938586	CORNING GLASS WORKS	WILMINGTON	NEW HANOVER
NC0000998336	CP PROPERTIES	SANFORD	LEE
NCD980502892	CREEK BRIDGE/BORDEN CHEMICAL	FAYETTEVILLE	CUMBERLAND
NCD986172492	CRESTLINE CONTAMINATED WELLS	ABERDEEN	MOORE
NCD044444735	CROMPTON & KNOWLES CORP.	LOWELL	GASTON
NONCD0001027	CROWDERS MOUNTAIN STATE PARK	GASTONIA	GASTON
NCD044447639	CROWN CENTRAL PETROLEUM CORP.	PAW CREEK	MECKLENBURG
NCD003149556	CTS OF ASHEVILLE, INC.	SKYLAND	BUNCOMBE
NCD982117590	CUSTOM PROCESSING AND	HIGH POINT	GUILFORD
NCD080885551	DAUGHERTY CHEMICAL COMPANY	DURHAM	DURHAM
NONCD0000059	DAYCO COCHRAN LANDFILL	WAYNESVILLE	HAYWOOD
NCD982119463	DAYCO LANDFILL CRYME COVE ROAD	WAYNESVILLE	HAYWOOD
NONCD0001071	DOE-SPUN	HOLLISTER	HALIFAX
NONCD0001040	DOMESTIC LAUNDRY/WASHBURN GRAPHICS	CHARLOTTE	MECKLENBURG
NCD003213030	DOUGLAS BATTERY MANUFACTURING CO.	WINSTON-SALEM	FORSYTH
NONCD0001035	DUKE ENERGY-WINSTON-SALEM POWER	WINSTON-SALEM	FORSYTH
NONCD0000091	DUKE POWER/WALNUT COVE	WALNUT COVE	STOKES
NCD003230836	DUKE REFINING CORPORATION	HIGH POINT	GUILFORD
NCD986188498	DURA-BUILT ENGINES CO	COATS	HARNETT
NCD981016280	DURHAM ANIMAL CLINIC	DURHAM	DURHAM
NCD004520136	EATON CORPORATION	ROXBORO	PERSON
NCD024740433	EC MANUFACTURING	PINEVILLE	MECKLENBURG
NCD980558019	ELK MOUNTAIN LANDFILL	ASHEVILLE	BUNCOMBE
NC0001402213	ELLIS JUNK YARD	HAYESVILLE	CLAY
NCD075563932	ESB INC/EXIDE CORPORATION	RALEIGH	WAKE

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	Site Name	City	County
NCD986171171	ETHAN ALLEN-SPRUCE PINE	SPRUCE PINE	MITCHELL
NCD980557946	FAIRVIEW LANDFILL	FAIRVIEW	BUNCOMBE
NCD062566047	FASCO CONTROLS CORPORATION	SHELBY	CLEVELAND
NCD067178707	FAWN PLASTICS CO., INC.	MIDDLESEX	NASH
NCD990867855	FAWN PLASTICS CO., INC.	ROCKY MOUNT	NASH
NCD980502934	FAYETTEVILLE LANDFILL	FAYETTEVILLE	CUMBERLAND
NCD066327313	FINETEX, INC.	SPENCER	ROWAN
NCD980557953	FISHBURNE LANDFILL	FLETCHER	BUNCOMBE
NCD003154960	FLEMING LABORATORIES	CHARLOTTE	MECKLENBURG
NCD980557854	FMC/NIAGARA PESTICIDES	AYDEN	PITT
NONCD0000075	FOAMEX/REEVES BROTHERS	CORNELIUS	MECKLENBURG
NCD986172617	FORBES ROAD WELLS	GASTONIA	GASTON
NCD071579528	FORBUSH METAL	YADKINVILLE	YADKIN
NCD981468622	FORK SWAMP/GRADY WHITE BOAT	AYDEN	PITT
NCD001871854	FRUEHAUF TRAILER CORPORATION	CHARLOTTE	MECKLENBURG
NONCD0000092	FUNDER AMERICA	MOCKSVILLE	DAVIE
NCSFN0406953	G&B/FARMER PROPERTY	SCOTLAND NECK	HALIFAX
NCD000616219	GA-PACIFIC CORP	HAMLET	RICHMOND
NONCD0000024	GAITHER TRANSOU PROPERTY	GREENSBORO	GUILFORD
NCD003221462	GARDNER MIRROR CORPORATION	NORTH WILKESBORO	WILKES
NC0002374445	GASTONIA INDUSTRIAL TRUCK	GASTONIA	GASTON
NONCD0001068	GENCORP PRINTWORLD INC	MONROE	UNION
NCD003198967	GENERAL ELECTRIC CO/CAROLINA	GOLDSBORO	WAYNE
NCD072018252	GENERAL ELECTRIC CO/MED STEAM TURBIN	DURHAM	DURHAM
NCD093137636	GENERAL WOOD PRESERVING CO., INC.	LELAND	BRUNSWICK
NONCD0001034	GEORGE STREET PESTICIDE	GOLDSBORO	WAYNE
NCD980848766	GIBBS ELECTROPLATING	CHARLOTTE	MECKLENBURG
NONCD0001022	GIBBS ELECTROPLATING - OLD LOCATION	CHARLOTTE	MECKLENBURG
NCD980557607	GLASS, EH COUNTY LANDFILL	GREENSBORO	GUILFORD
NC0001206473	GLEN RAVEN MILLS	BURLINGTON	ALAMANCE
NCD003158094	GLEN RAVEN MILLS	BURNSVILLE	YANCEY
NCD986175651	GLEN RAVEN MILLS	KINGS MOUNTAIN	CLEVELAND
NONCD0000055	GLISSON ENTERPRISES	GREENVILLE	PITT
NCD980557649	GOLDSBORO MUNICIPAL LANDFILL	GOLDSBORO	WAYNE
NCD980843460	GRANT CREEK WWTP	SALISBURY	ROWAN
NONCD0000043	GREAT LAKES CARBON CORPORATION	MORGANTON	BURKE
NCD980557698	GREENVILLE CITY LANDFILL	GREENVILLE	PITT
NCD982124646	GREGSON FUNITURE INDUSTRIES	LIBERTY	RANDOLPH
NCD980557912	GROVE STONE LANDFILL	BLACK MOUNTAIN	BUNCOMBE
NCD980558761	GS LABORATORY EQUIPMENT	ASHEVILLE	BUNCOMBE
NONCD0001064	GUILFORD MILLS PLANT	FUQUAY-VARINA	WAKE
NCD055550560	GULF ADHESIVES & RESINS/PERKINS	HIGH POINT	GUILFORD

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	Site Name	City	County
NCD067437400	GULF OIL CORPORATION	MCLEANSVILLE	GUILFORD
NONCD0001028	GURLEY DRIVE LANDFILL	CONCORD	CABARRUS
NCD986172526	GURLEY PESTICIDE BURIAL	SELMA	JOHNSTON
NCD024459471	GUYTON BATTERY SERVICE	CHADBOURN	COLUMBUS
NCD049772023	H & S PROCESSORS, INC.	LINCOLNTON	LINCOLN
NONCD0000073	H. M. WADE FURNITURE	CHARLOTTE	MECKLENBURG
NCD084171545	HALIFAX COUNTY LANDFILL		HALIFAX
NONCD0000087	HARPER CRAWFORD BAG CO.	CHARLOTTE	MECKLENBURG
NCD051739209	HARRELSON RUBBER COMPANY	ASHEBORO	RANDOLPH
NCD000822130	HARRELSON RUBBER COMPANY	ASHEBORO	RANDOLPH
NCD980557722	HARRISBURG BATTERY	HARRISBURG	CABARRUS
NCD980502959	HARRISBURG PARK LANDFILL	CHARLOTTE	MECKLENBURG
NCD108702606	HARTSOE BATTERY	KANNAPOLIS	ROWAN
NCD986166692	HARWELL ROAD SEPTIC PIT	GASTONIA	GASTON
NCD044515211	HAYES-ALBION CORP/BRIGGS-SHAFFNER	WINSTON-SALEM	FORSYTH
NCD980483275	HELENA CHEMICAL COMPANY	ENFIELD	HALIFAX
NCD082363102	HELENA CHEMICAL COMPANY	LAURINBURG	SCOTLAND
NCD003163888	HENREDON FURNITURE	MORGANTON	BURKE
NCD024817827	HENREDON FURNITURE	SPRUCE PINE	MITCHELL
NCD981003957	HENSON LANDFILL	FOREST CITY	RUTHERFORD
NCD986171270	HESTA CARILLON PROJECT	CHARLOTTE	MECKLENBURG
NC0000998344	HICKORY GROVE ROAD TCE	MCADENVILLE	GASTON
NCD003225620	HIGH POINT FURNITURE INDUSTRIES	HIGH POINT	GUILFORD
NCD003216397	HIGHLAND INDUSTRIES/BURLINGTON IND.	KERNERSVILLE	FORSYTH
NCD046149019	HISTRAND CHEMICAL, INC.	LENOIR	CALDWELL
NCD981928021	HOLLINGSWORTH PROPERTY	FAYETTEVILLE	CUMBERLAND
NCD081333858	HOLSTON ENERGY INC/HOLSTON FUEL	WAYNESVILLE	HAYWOOD
NCD980558035	HOMINY CREEK LANDFILL	ASHEVILLE	BUNCOMBE
NCD048401087	HOOKER FURNITURE	PLEASANT GARDEN	GUILFORD
NCD054283189	HOOVER MACHINE SHOP	GASTONIA	GASTON
NCD003233673	HOOVER REPAIR SHOP	MT AIRY	SURRY
NCD980502983	HOPE MILLS LANDFILL	HOPE MILLS	CUMBERLAND
NCD060291051	HOW ENTERPRISES	ABERDEEN	MOORE
NCD980847123	HURT RESIDENCE	MORGANTON	BURKE
NONCD0000050	HWY 268 MIRROR WASTE DUMP	NORTH WILKESBORO	WILKES
NONCD0001018	HWY 49 BATTERY DUMP	CHARLOTTE	MECKLENBURG
NCD053010724	ICI - AMERICAS, INC.	CHARLOTTE	MECKLENBURG
NCD980557839	IDEAL BASIC INDS/PLANT MARL QUARRY	CASTLE HAYNE	NEW HANOVER
NONCD0000031	INDEPENDENCE MALL OUTPARCEL	WILMINGTON	NEW HANOVER
NCD980839757	INDIAN GRAVE GAP DRUM DISPOSAL	LENOIR	CALDWELL
NCD990868168	INMONT CORP/BASF CORPORATION	CHARLOTTE	MECKLENBURG
NCD003186004	INTERNATIONAL PAPER RICHMOND	RALEIGH	WAKE

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	Site Name	City	County
NCD980518211	IRT/IBM CORPORATION	CHARLOTTE	MECKLENBURG
NONCD0001072	J & C DYEING	SHELBY	CLEVELAND
NCD980502991	JACKSONVILLE LANDFILLS	JACKSONVILLE	ONSLOW
NONCD0000056	JAMES LANDFILL	LAURINBURG	SCOTLAND
NC0000195743	JIMMY GREEN METALS	NASHVILLE	NASH
NCD981928385	JOHN DEERE TRACTOR	MOCKSVILLE	DAVIE
NCD000770487	JOHNSON CONTROLS GLOBE BATTERY	WINSTON-SALEM	FORSYTH
NONCD0000085	JONES & PRESNELL STUDIO	CHARLOTTE	MECKLENBURG
NONCD0001036	JOYCETON WATER WORKS WELL #2	LENOIR	CALDWELL
NONCD0001037	JOYCETON WATER WORKS WELL #9	LENOIR	CALDWELL
NONCD0001011	JUNG CORPORATION	ASHEBORO	RANDOLPH
NCD980557847	KAISER ACME FARMARKET	RIEGELWOOD	COLUMBUS
NCD986228054	KANNAPOLIS PCE SPILL	KANNAPOLIS	CABARRUS
NCD981031693	KEENER LANDFILL	CLINTON	SAMPSON
NCD048958615	KELLY-SPRINGFIELD TIRE CO/GOODYEAR	FAYETTEVILLE	CUMBERLAND
NCD980557805	KERR MCGEE CORPORATION	NAVASSA	BRUNSWICK
NCD981927908	KIDD LANE BATTERY DISPOSAL	CHARLOTTE	MECKLENBURG
NCD980729677	KNOB CREEK FLYASH DISPOSAL	BREVARD	TRANSYLVANIA
NCD002388965	LACKAWANNA LEATHER CO., INC.	CONOVER	CATAWBA
NCD981863814	LANCASTER PLATING	LILLINGTON	HARNETT
NCD053528170	LAURENS GLASS/BALL-INCON GLASS PACK	HENDERSON	VANCE
NCN000407197	LEARY BROTHERS STORAGE (FORMER)	EDENTON	CHOWAN
NCD986175628	LEE'S MOTOR WORKS	GASTONIA	GASTON
NCD079066833	LENOIR REFINING COMPANY	LENOIR	CALDWELL
NONCD0001050	LEXINGTON FURNITURE IND. PLNT #12	LEXINGTON	DAVIDSON
NONCD0001048	LEXINGTON FURNITURE IND. PLNT #2	LEXINGTON	DAVIDSON
NONCD0001049	LEXINGTON FURNITURE IND. PLNT #7	LEXINGTON	DAVIDSON
NCD003213568	LIBERTY FURNITURE CORP/CHROMCRAFT	LIBERTY	RANDOLPH
NCD097724009	LIGGETT AND MYERS COMPANY	DURHAM	DURHAM
NONCD0001056	LITTLE MOUNTAIN LANDFILL	TRYON	POLK
NONCD0000006	LITTLEFIELD LANDFILL	AYDEN	PITT
NCD980848782	MADISON COUNTY CYANIDE SITE	LEICESTER	MADISON
NCD003167988	MARANTZ PIANO CO INC/ANEVKA, INC	MORGANTON	BURKE
NCD000623223	MARTIN MANUFACTURING PROPERTIES	WILLIAMSTON	MARTIN
NCD991278755	MARTIN'S BATTERY SALVAGE, INC.	KANNAPOLIS	CABARRUS
NONCD0001015	MARY CIRCLE BATTERY	CONCORD	CABARRUS
NONCD0000096	MASON DRUM STORAGE	CANTON	HAYWOOD
NCD055359079	MASONITE CORP. FIBERBOARD DIV.	SPRING HOPE	NASH
NCD986223170	MCBESS INDUSTRIES	HIGH SHOALS	GASTON
NCD980838551	MCDOWELL FIREMAN ASSOCIATION SITE	MARION	MCDOWELL
NCD986172500	MCLEAN BROTHERS FARM	WAGRAM	SCOTLAND
NONCD0000047	MEADS AIRFIELD PESTICIDES	WEEKSVILLE	PASQUOTANK

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	Site Name	City	County
NCD991279118	MEREDITH/BURDA, INC.	NEWTON	CATAWBA
NCD980503031	MILAN YARD LANDFILL	FAYETTEVILLE	CUMBERLAND
NCD089914311	MILLER BREWING CO/CONT DIV	REIDSVILLE	ROCKINGHAM
NCD048467427	MINERAL RESEARCH & DEV. CORP.	ROCKY RIVER	CABARRUS
NONCD0001041	MITCHELL & BECKER	CHARLOTTE	MECKLENBURG
NCD042891663	MITCHELL ENGR CO/CECO BLDG. DIV.	ROCKY MOUNT	NASH
NCD991277724	MITCHELL SYSTEMS, INC.	SPRUCE PINE	MITCHELL
NCD990883001	MONARCH FURNITURE CORPORATION	JAMESTOWN	GUILFORD
NCD008839276	MONEY-WORTH, INC	SWANNANOA	BUNCOMBE
NCD088563242	MONSANTO COMPANY/ROHM & HAAS	FAYETTEVILLE	CUMBERLAND
NCD085083004	MOORE CO., INC/EASCO HAND TOOLS	GASTONIA	GASTON
NONCD0000054	MOORES COMPANY	HENDERSON	VANCE
NONCD0000097	MORRIS, NORMAN	ELON COLLEGE	ALAMANCE
NCD980559355	NASH COUNTY LANDFILL/SR 1145	SPRING HOPE	NASH
NCD980559330	NASH COUNTY LANDFILL/SR 1524	RED OAK	NASH
NCD982174492	NATIONAL PIN	SARATOGA	WILSON
NCD003196847	NATIONAL SPINNING COMPANY	WASHINGTON	BEAUFORT
NCSFN0407074	NC MARITIME MUSEUM	BEAUFORT	CARTERET
NCD981023732	NEUVILLE SOCK PROPERTY	HILDEBRAN	BURKE
NCD003235066	NEW AGE FURNITURE CO/MILLER TOOL	LEXINGTON	DAVIDSON
NCD990715070	NEW HANOVER CY & CAROLINA LDFL	CAROLINA BEACH	NEW HANOVER
NCD986171379	NEW HAVEN DRIVE TCE	GASTONIA	GASTON
NCD991278839	NORTH STATE CHEMICALS	GREENSBORO	GUILFORD
NCD986186518	OLD ATC REFINERY	WILMINGTON	NEW HANOVER
NCD986166734	OLD BEAUFORT CO. LANDFILL	WASHINGTON	BEAUFORT
NONCD0001065	OLD CHARLOTTE LDFL/VANGUARD CENTRE	CHARLOTTE	MECKLENBURG
NONCD0001074	OLD FORD BLDG	TABOR CITY	COLUMBUS
NONCD0001090	OLD MILL BLDG	HENDERSONVILLE	HENDERSON
NCD986172518	OLD MOUNT HOLLY ROAD PCE SITE	CHARLOTTE	MECKLENBURG
NONCD0000079	OLD PINEHURST HOTEL CLEANERS	PINEHURST	MOORE
NCD986197374	OLD RANDLEMAN TOWN DUMP	RANDLEMAN	RANDOLPH
NCSFN0406906	OLD STAKE ROAD	CHADBOURNE	COLUMBUS
NCD986185411	OLD WESTERN NC FAIRGROUNDS	EAST FLAT ROCK	HENDERSON
NCD980728745	OSHIELDS FLY ASH	BREVARD	TRANSYLVANIA
NONCD0001039	OVERCASH GRAVEL & GRADING CO. INC.	CONCORD	CABARRUS
NCD003520301	OVERCASH MACHINE SHOP, INC.	STATESVILLE	IREDELL
NCD986215499	PARKER INDUSTRIES	CONNELLY SPRINGS	BURKE
NCD144192606	PARKER-ZENITH	ABERDEEN	MOORE
NONCD0000099	PARTON'S MOTOR COMPANY	GASTONIA	GASTON
NCD057248759	PATCH RUBBER POND	ROANOKE RAPIDS	HALIFAX
NCD986171338	PEELE CO. PESTICIDE DISPOSAL	CLAYTON	JOHNSTON
NCD980503098	PFIZER INC/SKATE STADIUM	GREENSBORO	GUILFORD

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	Site Name	City	County
NCD003196193	PIFER INDUSTRIES, INC.	DURHAM	DURHAM
NCD986166379	PILOT MOUNTAIN TIRE FIRE	PILOT MOUNTAIN	SURRY
NCD980557672	PITT COUNTY UTILITY LANDFILL	GREENVILLE	PITT
NCD075570820	PLYMOUTH WOOD TREATING COMPANY	PLYMOUTH	WASHINGTON
NCD980558027	POND ROAD LANDFILL 2	ASHEVILLE	BUNCOMBE
NCD986170694	POULOS GROUNDWATER CONTAMINATION	CHARLOTTE	MECKLENBURG
NCD980559983	PPG IND., INC./WKS 52	SHELBY	CLEVELAND
NCD062548995	QUORUM KNITTING	WEAVERVILLE	BUNCOMBE
NONCD0001029	R & D LAMINATORS INC	AHOSKIE	HERTFORD
NCD981031578	RAINBOW DRIVE BATTERY	KANNAPOLIS	CABARRUS
NCD003216413	RALEIGH ROAD FURNITURE CORP. STANLEY	LEXINGTON	DAVIDSON
NONCD0000025	RANGE ROAD BURN SITE	BUTNER	GRANVILLE
NCD002972966	REA MAGNET WIRE COMPANY	LAURINBURG	SCOTLAND
NCD083673616	REEVES BROTHERS	RUTHERFORDTON	RUTHERFORD
NCD003152659	REICHHOLD CHEMICAL, INC.	CONCORD	CABARRUS
NCD049845548	REICHHOLD CHEMICAL, INC.	MONCURE	CHATHAM
NCD062664883	REINCO CHEMICAL COMPANY	ROANOKE RAPIDS	HALIFAX
NCD986176030	RHODERA DRIVE WELLS	STALLINGS	UNION
NCD060306727	RICHARDS WC COMPANY, INC.	ABERDEEN	MOORE
NCD980557789	RICHMOND COUNTY LANDFILL	ROCKINGHAM	RICHMOND
NCD980839716	RIVERDALE HOMES/EARL GETTS	DURHAM	DURHAM
NCD980838379	ROWE CORP PROPERTY/BOULIGNY SITE	CHARLOTTE	MECKLENBURG
NONCD0001016	ROYSTER-CLARK FERTILIZER PLANT	OAK CITY	MARTIN
NCD093334969	S & S METALS RECYCLING COMPANY	GOLD HILL	CABARRUS
NCD003228087	S&W CHEMICALS, INC.	HICKORY	CATAWBA
NCD000776732	SAFETY-KLEEN CORP 3-031-02	WALLACE	DUPLIN
NCD980602791	SALVAGE OIL OF AMERICA	ROCKINGHAN	RICHMOND
NCD000281832	SANFORD PLATING COMPANY	SANFORD	LEE
NCD980503106	SANITATION SERV LAND	SAINT PAULS	ROBESON
NCD062552153	SAYLES-BILTMORE BLEACHERIES	ASHEVILLE	BUNCOMBE
NCD093338119	SCM CORP. GLIDDEN COATINGS & RESINS	CHARLOTTE	MECKLENBURG
NCD003229358	SCM PROCTOR-SILEX/WEAREVER	MOUNT AIRY	SURRY
NCD003155587	SCOTT AVIATION OF MONROE/TOOL SERV	MONROE	UNION
NCD980848840	SCOTT'S CREEK BATTERY SITE	NEW BERN	CRAVEN
NCD000616516	SCOVILL INC/SECURITY PRODUCTS	MONROE	UNION
NCD980600449	SED, INC. RADAR ROAD	GREENSBORO	GUILFORD
NCD980712038	SED, INC. SWING COURT	GREENSBORO	GUILFORD
NCD003231545	SHERWOOD TREATING CO., INC.	WINSTON-SALEM	FORSYTH
NCN000407206	SHULIMSON BROTHERS SCRAP YARD	ASHEVILLE	BUNCOMBE
NCD067428821	SIEMENS-ALLIS, INC/SWITCHGEAR DIV	SANFORD	LEE
NCD062555792	SIGMON'S SEPTIC TANK	STATESVILLE	IREDELL
NCD083678631	SINCLAIR AND VALENTINE CO.	CHARLOTTE	MECKLENBURG

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	Site Name	City	County
NCD098765506	SINGER CO/FURNITURE DIV BRYSON	BRYSON CITY	SWAIN
NCD072012354	SINGER CO/FURNITURE DIV WASHINGTON	CHOCOWINITY	BEAUFORT
NONCD0001009	SINGER PLANT #2	LENOIR	CALDWELL
NONCD0000019	SIR WALTER GUN CLUB	RALEIGH	WAKE
NCD981477318	SOMERS ROAD DUMP SITE	HAMPTONVILLE	WILKES
NCD980503148	SOUTHCHEM LANDFILL	DURHAM	DURHAM
NCD990715658	SOUTHERN MANUFACTURING, INC.	CHARLOTTE	MECKLENBURG
NONCD0001080	SOUTHERN METALS RECYCLING, INC	WILMINGTON	NEW HANOVER
NCD077821296	SOUTHERN RESIN/US INDUSTRIES INC	THOMASVILLE	DAVIDSON
NCD042269134	SOUTHERN SCREW/FARLEY METALS	STATESVILLE	IREDELL
NONCD0000042	SOUTHMET, INC.	GREENVILLE	PITT
NONCD0001076	SOUTHSIDE INVESTMENTS LLC	CHARLOTTE	MECKLENBURG
NCD986180917	SPANN PROPERTY	HENDERSONVILLE	HENDERSON
NCD003167780	SPRAGUE ELECTRIC COMPANY	LANSING	ASHE
NCD003214574	SPRUANCE SOUTHERN, INC.	WINSTON-SALEM	FORSYTH
NCD991278730	SQUIBB E R & SONS	KENLY	JOHNSTON
NCSFN0406894	STALLINGS SALVAGE	MONROE	UNION
NCD084167444	STANADYNE, INC/DIESEL SYSTEMS	JACKSONVILLE	ONSLOW
NCD054284518	STANDARD PACKAGING CORPORATION	MT GILEAD	MONTGOMERY
NCD049845266	STANLEY CASE GOODS (FORMER)	WEST END	MOORE
NONCD0000001	STANLY NEWS & PRESS	ALBEMARLE	STANLY
NCD000605097	STATESVILLE ROAD LANDFILL	CHARLOTTE	MECKLENBURG
NCD024895864	STEWART-WARNER CORP/BASSICK-SACK-	WINSTON-SALEM	FORSYTH
NCD986227965	STOLLER CHEMICAL - SEVERN	SEVERN	NORTHAMPTON
NCD986211274	STONEY FORK CREEK DRUM DUMP SITE	DEEP GAP	WILKES
NCD083669952	STORY BURIAL AREAS/UNION CHEMICAL	CHARLOTTE	MECKLENBURG
NCD053487765	STRATFORD METAL FINISHINGS, INC.	WINSTON-SALEM	FORSYTH
NCD003229762	STRUCTURAL WOODS PRESERVING CO.	COLERIDGE	RANDOLPH
NONCD0000679	STURGEON CITY PROPERTY	JACKSONVILLE	ONSLOW
NCD986232213	SUMMIT RESOURCE MANAGEMENT	STALLINGS	UNION
NCD081428104	SUN CHEM CORPORATION/GPI DIV	WINSTON-SALEM	FORSYTH
NCD000006361	SUPERIOR ELECTRO FINISHES	WINSTON SALEM	FORSYTH
NCD024600579	SUPERIOR PRODUCTS COMPANY	GREENSBORO	GUILFORD
NONCD0001062	SWAIM'S TRUCK PARTS & SERVICE	HENDERSON	VANCE
NC3120000002	SWAIN COUNTY LANDFILL	BRYSON CITY	SWAIN
NCD980557987	SWANNANOA LANDFILL	SWANNANOA	BUNCOMBE
NCD981474158	SWEETEN CREEK DRUM SITE	ASHEVILLE	BUNCOMBE
NCD981921083	SWIFT ADHESIVES	PINEVILLE	MECKLENBURG
NCD980559389	TARBORO LANDFILL	TARBORO	EDGECOMBE
NCD981932023	TARBORO-EDGECOMBE AIRPORT	TARBORO	EDGECOMBE
NCD000828566	TARTAN MARINE PROPERTY	HAMLET	RICHMOND
NCD105797922	TECHNIBILT/DIV OF WHITTAKER	NEWTON	CATAWBA

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	Site Name	City	County
NCD070619911	TELEDYNE ALLVAC MONROE PLANT	MONROE	UNION
NCD086326741	TEXACO INC/APEX	APEX	WAKE
NCD000623199	TEXACO INC/FAYETTEVILLE	FAYETTEVILLE	CUMBERLAND
NCD096165121	TEXACO INC/GREENSBORO	GREENSBORO	GUILFORD
NCD046148318	TEXACO INC/PAW CREEK	PAW CREEK	MECKLENBURG
NCD065295495	TEXFI IMPRESSIONS	GOLDSBORO	WAYNE
NONCD0001075	TEXFI INDUSTRIES, INC	FAYETTEVILLE	CUMBERLAND
NCD981928088	TEXFI INDUSTRIES, INC/NEW BERN	NEW BERN	CRAVEN
NONCD0000074	TEXTILE CHEMICAL FACILITY	CHARLOTTE	MECKLENBURG
NONCD0000084	THERMO PRODUCTS, INC.	DENTON	DAVIDSON
NCD077838589	THOMASVILLE FOREST PRODUCTS	THOMASVILLE	DAVIDSON
NCD095470332	THONIT A SIMMONS COMPANY	CHARLOTTE	MECKLENBURG
NCD986231967	TOM SADLER ROAD WELLS	CHARLOTTE	MECKLENBURG
NONCD0001025	TOOMEY PROPERTY	SPRINGWOOD	GASTON
NCD072028251	TORPEDO WIRE & STRIP, INC.	ROCKY MOUNT	NASH
NCD980843528	TOWN CREEK REGIONAL WWTP	SALISBURY	ROWAN
NCD067392175	TRAMCO, INC.	CONNELLY SPRINGS	BURKE
NONCD0001005	TRANSEASTERN CORP.	WILSON	WILSON
NCN000407205	TRI-COUNTY AIRPORT	AULANDER	HERTFORD
NCD087336335	TRIANGLE PACIFIC CORP/IXL DIV.	ELIZABETH CITY	PASQUOTANK
NONCD0000081	TRITON, INC	WILSON	WILSON
NCD082362989	TUNGSTEN QUEEN MINE/ATLAS MINE	TOWNSVILLE	VANCE
NCD981864614	ULAH BATTERY/BATTERY PILES	ASHEBORO	RANDOLPH
NCD045646924	UNICAN SECURITY SYSTEMS/ILCO UNI	ROCKY MOUNT	NASH
NCD003216959	UNION CAMP CORPORATION	JAMESTOWN	GUILFORD
NCD003183480	UNION CAMP CORPORATION	SMITHFIELD	JOHNSTON
NCD980844336	UNION CARBIDE BATTERY	CHARLOTTE	MECKLENBURG
NCD003216462	UNION CARBIDE CORP/EVEREADY BATTERY	ASHEBORO	RANDOLPH
NCD003184249	UNION CARBIDE CORP/EVEREADY BATTERY	GREENVILLE	PITT
NCD000609974	UNION OIL CO. SE TERM	GREENSBORO	GUILFORD
NCD003164464	UNIROYAL INC/UNIROYAL CHEMICAL	GASTONIA	GASTON
NCD061795696	UNITEX CHEMICALS	GREENSBORO	GUILFORD
NCD980557623	UNIVERSITY OF NC/ARPT WASTE DISP	CHAPEL HILL	ORANGE
NCD980557615	UNIVERSITY OF NC/OLD SANITARY LDFL	CHAPEL HILL	ORANGE
NCD981472624	US 70 DRUM DUMP	MORGANTON	BURKE
NC5210022906	USA RESERVE XVIII AIRBORNE CORPS	MOREHEAD CITY	CARTERET
NCD000828616	USS AGRI-CHEMICALS FARM SERVICE	WHITEVILLE	COLUMBUS
NONCD0000003	VAN WATERS & ROGERS	CHARLOTTE	MECKLENBURG
NCD093783876	VANIER GRAPHICS CORPORATION	EDEN	ROCKINGHAM
NCD003464765	VAUGHAN-BASSETT FURNITURE CO.	ELKIN	SURRY
NCSFN0406924	VC CHEMICAL	WADESBORO	ANSON
NC0002178580	VC CHEMICAL-ALMONT WORKS	WILMINGTON	NEW HANOVER

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES PRIORITY LIST (Cont.)

ID Number	*Site Name*	*City*	*County*
NCD093132207	VOICE OF AMERICA RELAY STATION	GREENVILLE	PITT
NONCD0000048	WALKER DRUM DISPOSAL	GOLD HILL	ROWAN
NCD003236841	WARLICK PAINT COMPANY	STATESVILLE	IREDELL
NONCD0000022	WATTS REGULATOR-DAVIS PROPERTY SITE	SPINDALE	RUTHERFORD
NONCD0000060	WATTS REGULATOR-GENERAL AIDES SITE	FOREST CITY	RUTHERFORD
NONCD0000057	WATTS, LEVI PROPERTY	TABOR CITY	COLUMBUS
NONCD0001091	WEST MOREHEAD ST PESTICIDE	CHARLOTTE	MECKLENBURG
NCD045924032	WEST POINT PEPPERELL LUMBERTON	LUMBERTON	ROBESON
NCD003195963	WESTINGHOUSE ELEC METER & LIGHT	RALEIGH	WAKE
NONCD0001006	WESTINGHOUSE TURBINE	CHARLOTTE	MECKLENBURG
NCD052553641	WEYERHAEUSER CO/LEWISTON	LEWISTON	BERTIE
NCD071567259	WEYERHAEUSER CO/MONCURE	MONCURE	CHATHAM
NCD003220969	WHITE FURNITURE CO.	MEBANE	ALAMANCE
NONCD0000012	WHITE'S GRAVEL PIT	CONCORD	CABARRUS
NCD003151651	WILLARD SMELTING CO.	CHARLOTTE	MECKLENBURG
NCD001704980	WILMINGTON BRANCH/BORDEN/SMITH	NAVASSA	BRUNSWICK
NCD986166759	WILSON SEPTIC PITS	HICKORY	CATAWBA
NCD024477556	WINSTON CONTAINER COMPANY	CHARLOTTE	MECKLENBURG
NCD003183571	WINTERVILLE MACHINE WORKS, INC.	WINTERVILLE	PITT
NCD986170678	WOOD ROAD DRUM BURIAL	GASTONIA	GASTON
NC0001279710	WOODY WILSON BATTERY/ASHLEY HEIGHTS	ASHLEY HEIGHTS	HOKE
NCD986166288	WOODY'S TIRE FIRE	GASTONIA	GASTON

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

RESPONSIBLE PARTY VOLUNTARY REMEDIAL ACTION SITES

ID Number	*Site Name*	*City*	*County*
NONCD0000040	ABBOTT LABORATORIES	LAURINBURG	SCOTLAND
NONCD0000039	ABITIBI-PRICE CORPORATION	ROARING RIVER	WILKES
NCD047257472	APPLIED RESEARCH GROUP, INC.	CHARLOTTE	MECKLENBURG
NCD074511361	AQUAIR CORPORATION	CHARLOTTE	MECKLENBURG
NCD986188787	ASHEVILLE COAL GAS PLANT #1	ASHEVILLE	BUNCOMBE
NONCD0000032	ASHEVILLE COAL GAS PLANT #2	ASHEVILLE	BUNCOMBE
NCD072003635	ATHOL MANUFACTURING COMPANY	BUTNER	GRANVILLE
NCD003193588	BARBOUR BOAT WORKS, INC.	NEW BERN	CRAVEN
NONCD0000002	BURLINGTON COAL GAS PLANT	BURLINGTON	ALAMANCE
NCD096158696	BURLINGTON INDUSTRIES, INC.	GREENSBORO	GUILFORD
NCD986171965	CARO-KNIT	WILMINGTON	NEW HANOVER
NCD000608117	CELANESE CORPORATION/FIBERS TECH	CHARLOTTE	MECKLENBURG
NCD986188803	CHARLOTTE COAL GAS PLANT NO. 2	CHARLOTTE	MECKLENBURG
NCD986197333	CONCORD COAL GAS PLANT	CONCORD	CABARRUS
NCD003162500	CONSOLIDATED ENGRAVERS CORP.	CHARLOTTE	MECKLENBURG
NONCD0001061	CP&L NORTHERN DIVISION COMPLEX	GARNER	WAKE
NC0001606250	CRISTEX DRUM	OXFORD	GRANVILLE
NCD062567623	DIAMOND SHAMROCK CORP/HENKEL	CHARLOTTE	MECKLENBURG
NCD981861743	DUKE POWER/GREENSBORO GAS PLANT	GREENSBORO	GUILFORD
NCD000813519	DUKE UNIVERSITY	DURHAM	DURHAM
NCD986173938	DURHAM GAS PLANT	DURHAM	DURHAM
NONCD0001058	ELECTRONICS COMPONENT CORPORATION	BURGAW	PENDER
NCD986197267	ELIZABETH CITY COAL GAS	ELIZABETH CITY	PASQUOTANK
NCD986197341	FAYETTEVILLE COAL GAS/RAY AVE	FAYETTEVILLE	CUMBERLAND
NCD041414780	FIELDCREST MILLS INC./NC FINISHING	SALISBURY	ROWAN
NONCD0000017	FLAKT PRODUCTS	WINSTON-SALEM	FORSYTH
NONCD0000029	FLEET AEROSPACE CORP./AERONCA	CHARLOTTE	MECKLENBURG
NCD093340487	FLORIDA STEEL CORPORATION	CHARLOTTE	MECKLENBURG
NCD000813600	GA-PACIFIC CORP CHIP-N-SAW	WHITEVILLE	COLUMBUS
NCD000773515	GA-PACIFIC CORP/HDWD SAW	BOWDENS	DUPLIN
NCD000773507	GA-PACIFIC CORP/HDWD SAW	ENFIELD	HALIFAX
NCD986188829	GASTONIA COAL GAS PLANT	GASTONIA	GASTON
NCD051322980	GENERAL ELECTRIC CO.	CHARLOTTE	MECKLENBURG
NCD003163730	GENERAL INSTRUMENT CORP.	FAIRVIEW	BUNCOMBE
NONCD0001069	GENERAL MARBLE COMPANY	LINCOLNTON	LINCOLN
NCD986197309	GOLDSBORO COAL GAS PLANT #1	GOLDSBORO	WAYNE
NONCD0001083	GOLDSBORO COAL GAS PLANT #2	GOLDSBORO	WAYNE
NONCD0001089	GREENSBORO COAL GAS PLANT #1	GREENSBORO	GUILFORD
NCD986188886	GREENVILLE COAL GAS PLANT	GREENVILLE	PITT
NCD986232379	GRESHAMS LAKE INDUSTRIAL PARK	RALEIGH	WAKE

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

RESPONSIBLE PARTY VOLUNTARY REMEDIAL ACTION SITES (Cont.)

ID Number	Site Name	City	County
NONCD0001084	HENDERSON COAL GAS PLANT	HENDERSON	VANCE
NCD990734055	HERCOFINA/CAPE INDUSTRIES	WILMINGTON	NEW HANOVER
NCD039102959	HEVI-DUTY ELECTRIC/GENERAL SIG	GOLDSBORO	WAYNE
NONCD0001085	HICKORY COAL GAS PLANT	HICKORY	CATAWBA
NCD986188837	HIGH POINT COAL GAS PLANT	HIGH POINT	GUILFORD
NCD051745685	HOLDING POND FOR WASTE/USS	GREENSBORO	GUILFORD
NCD003215696	HUNT MANUFACTURING	STATESVILLE	IREDELL
NCD986197366	KINSTON COAL GAS PLANT	KINSTON	LENOIR
NCD981863327	KSP DRY CLEANERS	CHAPEL HILL	ORANGE
NCD986197358	LEXINGTON COAL GAS PLANT	LEXINGTON	DAVIDSON
NCD003183167	LONG MANUFACTURING	TARBORO	EDGECOMBE
NONCD0000027	MEADOWVIEW ROAD	GREENSBORO	GUILFORD
NONCD0001086	MT AIRY COAL GAS PLANT	MT AIRY	SURRY
NCD986197259	NEW BERN COAL GAS PLANT	NEW BERN	CRAVEN
NONCD0000077	OLD STATE LAB	CARY	WAKE
NCD055165609	PANTASOTE INC. FILM/COMPOUND DIV.	HICKORY	CATAWBA
NCD055162069	PELTON & CRANE PLANT (FORMER)	CHARLOTTE	MECKLENBURG
NONCD0001020	PRECISION FABRICS GROUP, INC	GREENSBORO	GUILFORD
NCD986188894	RALEIGH COAL GAS PLANT NO. 1	RALEIGH	WAKE
NCD986188902	RALEIGH COAL GAS PLANT NO. 2	RALEIGH	WAKE
NONCD0001087	REIDSVILLE COAL GAS PLANT	REIDSVILLE	ROCKINGHAM
NCD053009510	RELIANCE UNIVERSAL OF KENTUCKY	LENOIR	CALDWELL
NCD986197325	ROCKY MOUNT COAL GAS PLANT NO. 1	ROCKY MOUNT	NASH
NCD986197317	ROCKY MOUNT COAL GAS PLANT NO. 2	ROCKY MOUNT	NASH
NCD981933096	ROCKY MOUNT, OLD AIRPORT	ROCKY MOUNT	NASH
NCD986197283	SALISBURY COAL GAS PLANT #1	SALISBURY	ROWAN
NONCD0001088	SALISBURY COAL GAS PLANT #2	SALISBURY	ROWAN
NCD003234549	SCM PROCTOR SILEX/WEAREVER	SOUTHERN PINES	MOORE
NCD053488557	SOUTHERN WOOD PIEDMONT COMPANY	GULF	CHATHAM
NCD058517467	SOUTHERN WOOD PIEDMONT COMPANY	WILMINGTON	NEW HANOVER
NCD986197291	STATESVILLE COAL GAS PLANT	STATESVILLE	IREDELL
NCD986176444	STROH/CHITTY FARM	WINSTON-SALEM	FORSYTH
NCD986166700	TOISNOT SWAMP	WILSON	WILSON
NCD053485991	VARCO-PRUDEN BUILDINGS	KERNERSVILLE	FORSYTH
NCD986197275	WASHINGTON COAL GAS PLANT	WASHINGTON	BEAUFORT
NCD986188910	WILMINGTON COAL GAS PLANT	WILMINGTON	NEW HANOVER
NCN000407302	WILMINGTON GUN CLUB (FORMER)	WILMINGTON	NEW HANOVER
NCD986188845	WINSTON-SALEM COAL GAS PLANT NO. 1	WINSTON-SALEM	FORSYTH
NCD986188852	WINSTON-SALEM COAL GAS PLANT NO. 2	WINSTON-SALEM	FORSYTH

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES WITH EVALUATIONS PENDING

ID Number	*Site Name*	*City*	*County*
NCN000407447	ABERDEEN CONTAMINATED GROUNDWATER	ABERDEEN	MOORE
NONCD0001081	ALCOA-NARROWS POWERHOUSE	BADIN	MONTGOMERY
NONCD0001094	ALLISON MANUFACTURING CO	ALBEMARLE	STANLY
NCSFN0407143	AMERICAN ELEMENTS	FARMVILLE	PITT
NONCD0001063	ARROWOOD, INC	NORWOOD	STANLY
NCSFN0406911	CAROLINA ASSOCIATED MILL	NEWTON	CATAWBA
NCSFN0407144	CARTRETTE FIELD	CHADBOURN	COLUMBUS
NCN000407241	CHADBOURN BATTERY	CHADBORN	COLUMBUS
NCD986188027	CHAMPION LANDFILL #3	CANTON	HAYWOOD
NCD981014517	DYNATECH	CHARLOTTE	MECKLENBURG
NONCD0001070	EMPORIUM CLEANERS	RALEIGH	WAKE
NCD051827905	ESTECH GENERAL CHEMICALS CORP.	NAVASSA	BRUNSWICK
NCD980503056	FLEMINGTON LANDFILL	WILMINGTON	NEW HANOVER
NCD980557888	LENOIR CITY LANDFILL	LENOIR	CALDWELL
NONCD0001079	LES MYERS PARK	CONCORD	CABARRUS
NCN000407301	LOFLIN GOLD MINE	TRINITY	RANDOLPH
NCSFN0406896	MULBERRY ROAD	SHALLOTTE	BRUNSWICK
NONCD0000076	NC SALVAGE CO.	GOLDSBORO	WAYNE
NONCD0001093	NCDOT-CORBETT PACKAGING	WILMINGTON	NEW HANOVER
NCD053530234	NORTHEAST CHEMICAL COMPANY	CAPE FEAR	NEW HANOVER
NCD980848667	ONE HOUR KORETIZING	DURHAM	DURHAM
NONCD0001024	PARK PLAZA	SPENCER	ROWAN
NCN000407204	PHOENIX MINE	CONCORD	CABARRUS
NCD091245969	RADIATOR SPECIALTY CO.	MATTHEWS	UNION
NCD003149663	RADIATOR SPECIALTY COMPANY	CHARLOTTE	MECKLENBURG
NCD982096653	RAM LEATHER CARE	CHARLOTTE	MECKLENBURG
NCN000407196	ROWAN ROAD LANDFILL	CLINTON	SAMPSON
NCD041519364	TEXASGULF CHEMICALS COMPANY	AURORA	BEAUFORT
NCN000407333	TRIAD USED AUTO SALES	GREENSBORO	GUILFORD
NCN000407188	US 1-15/501 ABERDEEN	ABERDEEN	MOORE
NC0210020541	US DOD MILITARY OCEAN TERMINAL	SOUTHPORT	BRUNSWICK
NC6680090002	US EPA TECH CENTER	RTP	DURHAM
NC7210020544	USA TARHEEL ARMY MISSILE PLANT	BURLINGTON	ALAMANCE
NC6570027460	USAF DARE COUNTY RANGE SEYMOUR	ENGLEHART	HYDE
NC7170090008	USMC/CRASH CREW BURN PIT	MOREHEAD CITY	CARTERET
NCSFN0406962	VINEGAR HILL LEAD SITE	TABOR CITY	COLUMBUS
NCN000407243	WOODY'S SALVAGE YARD	VANDER	CUMBERLAND

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

NATIONAL PRIORITIES LIST

ID Number	*Site Name*	*City*	*County*
NCD024644494	ABC ONE HOUR CLEANERS	JACKSONVILLE	ONSLOW
NCD980843346	ABERDEEN PESTICIDE DUMPS	ABERDEEN	MOORE
NCSFN0406989	BARBER ORCHARD	WAYNESVILLE	HAYWOOD
NCD981026479	BENFIELD INDUSTRIES, INC.	HAZELWOOD	HAYWOOD
NCD044440303	BYPASS 601	CONCORD	CABARRUS
NC6170022580	CAMP LEJEUNE MILITARY RESERVATION	CAMP LEJEUNE	ONSLOW
NCD003188828	CAPE FEAR WOOD PRESERVING	FAYETTEVILLE	CUMBERLAND
NCD003188844	CAROLINA TRANSFORMER	FAYETTEVILLE	CUMBERLAND
NCD003446721	CELANESE CORPORATION/SHELBY FIBER	SHELBY	CLEVELAND
NCD980840409	CHARLES MACON LAGOON & DRUM	CORDOVA	RICHMOND
NCD095459392	CHEMTRONICS, INC/JET RESEARCH	SWANNANOA	BUNCOMBE
NC1170027261	CHERRY POINT MARINE CORPS AIR STN	CHERRY POINT	CRAVEN
NCD986175644	DAVIS PARK ROAD TCE SITE	GASTONIA	GASTON
NCD095458527	FCX, INC. STATESVILLE	STATESVILLE	IREDELL
NCD981475932	FCX, INC. WASHINGTON PLANT	WASHINGTON	BEAUFORT
NCD981927502	GEIGY CHEMICAL CORPORATION	ABERDEEN	MOORE
NCD079044426	GENERAL ELECTRIC CO/SHEPHERD FARM	EAST FLAT ROCK	HENDERSON
NCD980729602	JADCO-HUGHES	BELMONT	GASTON
NCD122263825	JFD/CHANNEL MASTER	OXFORD	GRANVILLE
NCD003200383	KOPPERS COMPANY, INC.	MORRISVILLE	WAKE
NCD001810365	MARTIN MARIETTA-SODYECO DIV/SANDOZ	CHARLOTTE	MECKLENBURG
NCD991278953	NATIONAL STARCH CORPORATION	SALISBURY	ROWAN
NCD980557656	NC STATE UNIV. (LOT 86 FARM UNIT)	RALEIGH	WAKE
NCD981021157	NEW HANOVER COUNTY AIRPORT BURN	WILMINGTON	NEW HANOVER
NCD986187128	NORTH BELMONT PCE SITE	NORTH BELMONT	GASTON
NCD981023260	POTTER'S SEPTIC TANK SVS PITS	MACO	BRUNSWICK
NCD986187094	REASOR CHEMICAL	CASTLE HAYNE	NEW HANOVER
NCD003202603	WARD TRANSFORMER	RALEIGH	WAKE

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

NON-NPL REMEDIAL ACTIONS UNDER THE JURISDICTION OF THE US EPA SUPERFUND PROGRAM

ID Number	*Site Name*	*City*	*County*
NCD000648402	BATTERY TECH (DURACELL)	LEXINGTON	DAVIDSON
NCD045922986	FLANDERS FILTERS, INC.	WASHINGTON	BEAUFORT
NCD000813592	GA-PACIFIC CORP/HDWD SAW	PLYMOUTH	WASHINGTON
NCD981027915	J STREET FLYASH DISPOSAL SITE	ERWIN	HARNETT
NC6570024475	POPE AFB	POPE AIR FORCE BASE	CUMBERLAND
NC7570024474	USAF SEYMOUR JOHNSON AFB	GOLDSBORO	WAYNE
NCD991278540	WEYERHAEUSER COMPANY	PLYMOUTH	MARTIN

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

RCRA PERMITTED OR INTERIM STATUS FACILITIES

ID Number	*Site Name*	*City*	*County*
NCD986171320	ALCOA BADIN LANDFILL	BADIN	STANLY
NCD003162542	ALCOA BADIN WORKS	BADIN	STANLY
NCD053488409	ALLIED CHEMICAL CORPORATION	MONCURE	CHATHAM
NCD003168168	AMERICAN CYANAMID/FREEDOM TEXTILES	CHARLOTTE	MECKLENBURG
NCD085074821	AMERICAN HOECHST SOU-TEX /HOECHST	MT. HOLLY	GASTON
NCD070619663	ASHEVILLE DYEING AND FINISHING	SWANNANOA	BUNCOMBE
NCD024599011	ASHLAND CHEMICAL CO	GREENSBORO	GUILFORD
NCD061263315	ASHLAND CHEMICAL COMPANY	CHARLOTTE	MECKLENBURG
NCD088560032	ASHLAND CHEMICAL COMPANY	RALEIGH	WAKE
NCD003466919	AXTON-CROSS COMPANY/VAN WATER	GREENSBORO	GUILFORD
NCD044447589	BLUE RIDGE PLATING COMPANY	ARDEN	BUNCOMBE
NCD001725464	BORDEN CHEMICAL SMITH-DOUGLAS	KINSTON	LENOIR
NCD060295417	BURLINGTON FURNITURE/CENT MAIN	LEXINGTON	DAVIDSON
NCD047373766	BURROUGHS WELLCOME COMPANY	GREENVILLE	PITT
NCD052547635	BURROUGHS WELLCOME COMPANY	RTP	DURHAM
NCD086871282	CALDWELL SYSTEMS INCORPORATED	LENOIR	CALDWELL
NC6170022580	CAMP LEJEUNE MILITARY RESERVATION	CAMP LEJEUNE	ONSLOW
NCD003184710	CAROLINA CREOSOTING CORPORATION	LELAND	BRUNSWICK
NCD980557730	CAROLINA SOLITE CORPORATION	NORWOOD	STANLY
NCD003154010	CARTER, A B INCORPORATED	GASTONIA	GASTON
NCD991278623	CHARLOTTE FIRE DEPT TRNG/CITY OF	CHARLOTTE	MECKLENBURG
NCD095459392	CHEMTRONICS, INC/JET RESEARCH	SWANNANOA	BUNCOMBE
NC1170027261	CHERRY POINT MARINE CORPS AIR STN	CHERRY POINT	CRAVEN
NCD061801361	CIBA-GEIGY CORPORATION	GREENSBORO	GUILFORD
NCD107868812	CONBRACO INDUSTRIES, INC.	MATTHEWS	MECKLENBURG
NCD042892067	COOPER INDUSTRIES, INC. LUFKIN DIV	APEX	WAKE
NCD049773245	DETREX CHEMICAL INDUSTRIES, INC.	CHARLOTTE	MECKLENBURG
NCD047368642	DUPONT EI DE NEMOURS & CO.	FAYETTEVILLE	CUMBERLAND
NCD003190386	DUPONT EI DE NEMOURS & CO.	KINSTON	LENOIR
NCD047369046	DUPONT EI DE NEMOURS & CO.	LELAND	BRUNSWICK
NCD003173358	DURABLE WOOD PRESERVERS, INC.	CHARLOTTE	MECKLENBURG
NCD986194439	DYNATECH - HAWKINS ST	CHARLOTTE	MECKLENBURG
NCD980559967	GA-PACIFIC CORP/HDWD SAW	MURFREESBORO	HERTFORD
NCD003237948	GENERAL ELECTRIC CO/HICKORY	HICKORY	CATAWBA
NCD024900987	HOLCOMB CREOSOTE COMPANY	YADKINVILLE	YADKIN
NCD991278631	HOLTRA CHEM/HONEYWELL, INC.	REIGELWOOD	COLUMBUS
NCD041463761	IBM CORPORATION	RTP	DURHAM
NCD003185238	ITT TELECOMS CORP/ALCATEL	RALEIGH	WAKE
NCD981476955	JOHNSTON COUNTY SCHOOL BOARD	SMITHFIELD	JOHNSTON
NCD000771964	LITHIUM CORP. OF AMERICA /FMC	BESSEMER CITY	GASTON

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

RCRA PERMITTED OR INTERIM STATUS FACILITIES (Cont.)

ID Number	*Site Name*	*City*	*County*
NCD044438406	LITTON INDUSTRIES/CLIFTON PRECISION	CHEROKEE	CHEROKEE
NCD980729297	MALLINKRODT, INCORPORATED	RALEIGH	WAKE
NC1750890005	NATIONAL INST. ENVMTL. HLTH. SCI.	RTP	DURHAM
NCD053010732	PARKS-CRAMER COMPANY	CHARLOTTE	MECKLENBURG
NCD041466806	PHILLIPS PLATING	BRIDGETON	CRAVEN
NCD091245969	RADIATOR SPECIALTY CO.	MATTHEWS	UNION
NCD046362117	ROADWAY EXPRESS TERMINAL	KERNERSVILLE	FORSYTH
NCD079060059	SAFETY KLEEN CORP.	CHARLOTTE	MECKLENBURG
NCD077840148	SAFETY-KLEEN CORP 3-064-01	HIGH POINT	GUILFORD
NCD000776740	SAFETY-KLEEN CORP 3-171-01	RALEIGH	WAKE
NCD980846935	SAFETY-KLEEN CORP. 3-031	ST PAULS	ROBESON
NCD065300519	SCHLAGE LOCK COMPANY	ROCKY MOUNT	EDGECOMBE
NCD002591014	SCOVILL, SHRADER-BELLOWS DIVISION	WAKE FOREST	WAKE
NCD071574164	SEABOARD CHEMICAL CORPORATION	JAMESTOWN	GUILFORD
NCD057451270	SINGER CO/AAF-MCQUAY	WILMINGTON	NEW HANOVER
NCD000604322	SINGER CO/FURNITURE DIV PLTS 3	LENOIR	CALDWELL
NCD083673681	SINGER CO/KERAFOTT DIV	BLACK MOUNTAIN	BUNCOMBE
NCD067203752	SQUARE D COMPANY	KNIGHTDALE	WAKE
NCD091249417	TEXTRON INC/HOMELITE DIV.	GASTONIA	GASTON
NCD000648451	TRIANGLE RESOURCE IND/LAIDLAW	REIDSVILLE	ROCKINGHAM
NCD982093783	UNC-CHAPEL HILL	CHAPEL HILL	ORANGE
NC8210020121	USA FORT BRAGG	FORT BRAGG	CUMBERLAND
NC2690308232	USCG SUPPORT CENTER	ELIZABETH CITY	PASQUOTANK
NCD041466251	VEEDER-ROOT COMPANY	ELIZABETHTOWN	BLADEN
NCD060299880	WEBER USA SANFORD PLANT	SANFORD	LEE
NCD003213907	WESTERN ELECTRIC CO/AT&T	WINSTON-SALEM	FORSYTH
NCD003471158	WORTH CHEMICAL	GREENSBORO	GUILFORD

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

RCRA NON-PERMITTED CORRECTIVE ACTION SITES

ID Number	*Site Name*	*City*	*County*
NCD003200854	CAROLINA WOOD PRESERVING COMPANY	SCOTLAND NECK	HALIFAX
NCD003151990	KIMBERLY-CLARK CORP/LANDFILL	BALFOUR	HENDERSON

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES UNDER THE JURISDICTION OF THE SOLID WASTE SECTION

ID Number	*Site Name*	*City*	*County*
NCD980557714	BEAUFORT COUNTY LANDFILL	BATH	BEAUFORT
NCD980502801	BIGGERSTAFF LANDFILL	GASTONIA	GASTON
NCD980502819	BLADEN COUNTY LANDFILL	ELIZABETHTOWN	BLADEN
NCD980502835	BRUNSWICK COUNTY LANDFILL	LELAND	BRUNSWICK
NCD980558001	BUNCOMBE COUNTY LANDFILL	ASHEVILLE	BUNCOMBE
NCD980502843	CABARRUS COUNTY LANDFILL	CONCORD	CABARRUS
NCD982118960	CALDWELL LANDFILL	LENOIR	CALDWELL
NCD980502868	CHATHAM COUNTY LANDFILL	PITTSBORO	CHATHAM
NCD980502900	CUMBERLAND COUNTY LANDFILL	FAYETTEVILLE	CUMBERLAND
NCD003152329	DUPONT EI DE NEMOURS & CO.	CEDAR MOUNTAIN	TRANSYLVANIA
NCD047369046	DUPONT EI DE NEMOURS & CO.	LELAND	BRUNSWICK
NCD980502926	EDGECOMBE COUNTY LANDFILL	TARBORO	EDGECOMBE
NCD000605303	FEDERAL PAPER BOARD CO., INC.	RIEGELWOOD	COLUMBUS
NCD044388015	GA-PACIFIC CORP HDBD	CONWAY	NORTHAMPTON
NC4120000001	GRAHAM COUNTY MUNICIPAL LANDFILL	ROBBINSVILLE	GRAHAM
NCD991279027	GREENSBORO CITY LANDFILL	GREENSBORO	GUILFORD
NCD981474190	HAYWOOD COUNTY LANDFILL	WAYNESVILLE	HAYWOOD
NCD980557961	HENDERSON COUNTY SAN LANDFILL	HENDERSONVILLE	HENDERSON
NCD980557565	HIGH POINT CITY LANDFILL	HIGH POINT	GUILFORD
NCD003151990	KIMBERLY-CLARK CORP/LANDFILL	BALFOUR	HENDERSON
NCD075588913	KINSTON DEMOLITION LANDFILL	KINSTON	LENOIR
NCD980503015	LEE COUNTY LANDFILL	SANFORD	LEE
NCD980557581	LEXINGTON MUNICIPAL LANDFILL	LEXINGTON	DAVIDSON
NCD070626825	MACON COUNTY LANDFILL	FRANKLIN	MACON
NCD981928013	MOORE COUNTY LANDFILL	ABERDEEN	MOORE
NCD980559348	NASH COUNTY LANDFILL	NASHVILLE	NASH
NCD003166675	OLIN CORPORATION ECUSTA PAPER	PISGAH FOREST	TRANSYLVANIA
NCD986171106	ORANGE CO. REGIONAL LANDFILL	CHAPEL HILL	ORANGE
NCD980557680	PITT COUNTY LANDFILL	GREENVILLE	PITT
NCD043712298	PPG IND., INC.	LEXINGTON	DAVIDSON
NCD980557748	ROWAN COUNTY LANDFILL	SALISBURY	ROWAN
NCD980503122	SORRELL LANDFILL	APEX	WAKE
NCD980503163	UNION COUNTY LANDFILL	MONROE	UNION
NCD980503171	WAKE COUNTY/FELTONVILLE LANDFILL	APEX	WAKE
NCD980557896	WILKES COUNTY MUNICIPAL LANDFILL	RONDA	WILKES

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES UNDER THE JURISDICTION OF THE DIVISION OF WATER QUALITY

ID Number	*Site Name*	*City*	*County*
NCD002464691	ALLIANCE CAROLINA TOOL AND MOLD	ARDEN	BUNCOMBE
NCD040049173	AMOCO OIL COMPANY	WILMINGTON	NEW HANOVER
NCD980844518	AMP INCORPORATED	CLEMMONS	FORSYTH
NCD003467974	AMP INCORPORATED	GREENSBORO	GUILFORD
NCD051853547	AUSTIN FOODS	CARY	WAKE
NCD054412283	BLACK & DECKER PLANT (FORMER)	TARBORO	EDGECOMBE
NCD047373766	BURROUGHS WELLCOME COMPANY	GREENVILLE	PITT
NCD045456134	BUSS AUTOMATION INCORPORATED	LENOIR	CALDWELL
NCD046148540	CENTRAL TRANSPORT COMPANY	CHARLOTTE	MECKLENBURG
NCD065288847	CF NITROGEN, INCORPORATED	WINTON	HERTFORD
NCD991278623	CHARLOTTE FIRE DEPT TRNG/CITY OF	CHARLOTTE	MECKLENBURG
NCD986176451	CITY OF SHELBY LANDFILL	SHELBY	CLEVELAND
NONCD0000065	CMI INDUSTRIES	ELKIN	SURRY
NONCD0001032	COCA COLA BOTTLING WORKS INC	NEW BERN	CRAVEN
NCD107868812	CONBRACO INDUSTRIES, INC.	MATTHEWS	MECKLENBURG
NCD042890525	DIAMOND SHAMROCK CORP/MARIETTA	CASTLE HAYNE	NEW HANOVER
NCD057454670	DIAMOND SHAMROCK CORP/OCCIDENTAL	CASTLE HAYNE	NEW HANOVER
NONCD0001066	DIMETRICS INC	DAVIDSON	MECKLENBURG
NCD000827832	ELECTRICAL UTILITIES/CO BB&T	FARMVILLE	PITT
NCD089989917	EMERSON ELECTRIC COMPANY	MURPHY	CHEROKEE
NCD003201837	ENCEE CHEMICAL SALES, INC.	BRIDGETON	CRAVEN
NCD000605303	FEDERAL PAPER BOARD CO., INC.	RIEGELWOOD	COLUMBUS
NCD041043811	FIBER INDUSTRIES INC/HOECHST-CELANES	SALISBURY	ROWAN
NCD067191262	FIRESTONE TIRE AND RUBBER COMPANY	WILSON	WILSON
NCD062553490	FLEET TRANSPORT CO., INC.	CHARLOTTE	MECKLENBURG
NCD980559975	GA-PACIFIC CORP/RESIN DIV	CONWAY	NORTHAMPTON
NCD003448610	GALVAN INDUSTRIES, INC.	HARRISBURG	CABARRUS
NCD003149291	GASTON COUNTY DYEING MACHINE CO.	MOUNT HOLLY	GASTON
NCD991277922	GASTON COUNTY DYEING MACHINE CO.	STANLEY	GASTON
NCD050409150	GENERAL ELECTRIC CO/WILMINGTON	WILMINGTON	NEW HANOVER
NCD043679349	GENERAL TIRE & RUBBER CO	CHARLOTTE	MECKLENBURG
NONCD0001023	HEAVY EQUIPMENT SCHOOL	CHARLOTTE	MECKLENBURG
NONCD0001078	HIGHLAND MILLS	CHARLOTTE	MECKLENBURG
NCD062571658	HONEYWELL MICRO SWITCH DIV.	MARS HILL	MADISON
NCD003198520	HONEYWELL, INC	DURHAM	DURHAM
NCD083674713	HULL SERVICE STATION/PHILLIPS 66	VALE	LINCOLN
NONCD0000089	JOHN MORRELL & CO	WILSON	WILSON
NCD000653576	KERN RUBBER CO. URETHANE PLANT	SALISBURY	ROWAN
NCD062552989	MALLARD CREEK RD/UNION OIL CO OF CA	CHARLOTTE	MECKLENBURG

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITES UNDER THE JURISDICTION OF THE DIVISION OF WATER QUALITY (Cont.)

ID Number	*Site Name*	*City*	*County*
NCD000772046	MOBIL OIL CORP/KOCH REFINING	WILMINGTON	NEW HANOVER
NCD981030893	MUSIC CLUB PESTICIDE SITE	WILLIAMSTON	MARTIN
NCD091572073	NATIONAL STARCH & CHEMICAL COMPANY	LELAND	BRUNSWICK
NONCD0001053	PARAMOUNT CHEVROLET	GOLDSBORO	WAYNE
NCD057037178	PFIZER INC/COTY DIVISION	SANFORD	LEE
NCD040047425	PRILLAMAN CHEMICALS	FAYETTEVILLE	CUMBERLAND
NCD044514602	RJR ARCHER, INC.	WINSTON-SALEM	FORSYTH
NCD067441394	RJR ARCHER, INC.	WINSTON-SALEM	FORSYTH
NCD042091215	RJR TECH COMPANY	MERRY HILL	BERTIE
NCD041466525	ROCKY MOUNT FIBER DUMP	ROCKY MOUNT	EDGECOMBE
NCD003197704	SALT WOOD PRODUCTS, INC.	COVE CITY	CRAVEN
NCD981863228	SCHERER, R.P.	MONROE	UNION
NCD095458709	SCHRADER AUTOMOTIVE PRODUCTS DIV.	MONROE	UNION
NCD986180909	SHELBY DYEING & FINISHING	SHELBY	CLEVELAND
NONCD0000033	SPRINGS IND/UNIGLASS IND.	STATESVILLE	IREDELL
NCD003951878	SQUARE D COMPANY	ASHEVILLE	BUNCOMBE
NCD986191484	STOUT INTERNATIONAL OF NC, INC	MONROE	UNION
NONCD0000011	TERRELL MACHINE SHOP	CHARLOTTE	MECKLENBURG
NCD000770016	TEXAS CITY REFINING COMPANY	PAW CREEK	MECKLENBURG
NCD002560159	THIELE-ENGDAHL, INCORPORATED	WINSTON-SALEM	FORSYTH
NCD037160439	TOASTMASTER, INCORPORATED	LAURINBURG	SCOTLAND
NONCD0001017	TOWNE NORTH SHOPPING CENTER	RALEIGH	WAKE
NONCD0000088	TRANS TECHNOLOGY	CHARLOTTE	MECKLENBURG
NCD038551263	TRI-COUNTY COMMUNITY COLLEGE	MURPHY	CHEROKEE
NCD000609982	UNION OIL CO. SE TERM/PAW CREEK	PAW CREEK	MECKLENBURG
NONCD0000010	UNITED MERCHANTS/OLD FORT PLANT	OLD FORT	MCDOWELL
NCD980515308	UNIVERSITY OF NC AT CHAPEL HILL	CHAPEL HILL	ORANGE
NCD001493931	WECK, EDWARD INC.	RTP	DURHAM
NCD024766719	WRIGHT CHEMICAL CORP.	RIEGELWOOD	COLUMBUS

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

SITE REMEDIAL ACTIONS UNDER THE JURISDICTION OF THE DIVISION OF RADIATION PROTECTION

ID Number	*Site Name*	*City*	*County*
NCD980559397	RADIATION PHYSICS CONSULTANTS	PURLEAR	WILKES

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000401	ABATTOIR LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000443	ABERDEEN DUMP	ABERDEEN	MOORE	No
NONCD0000361	AHOSKIE DUMP	AHOSKIE	HERTFORD	No
NONCD0000307	AIRPORT LANDFILL		FORSYTH	No
NONCD0000728	ALAMANCE CO LDFL		ALAMANCE	No
NONCD0000102	ALAMANCE GARBAGE SERVICE	BURLINGTON	ALAMANCE	No
NONCD0000571	ALBEMARLE DUMP	ALBERMARLE	STANLY	No
NONCD0000551	ALEXANDER MILLS DUMP	ALEXANDER MILLS	RUTHERFORD	No
NONCD0000192	ANDERSON REFUSE DUMP		CALDWELL	No
NONCD0000231	ANDREWS DUMP	ANDREWS	CHEROKEE	No
NONCD0000349	ANGIER REFUSE DUMP	ANGIER	HARNETT	No
NONCD0000731	ANSON CO LDFL		ANSON	No
NONCD0000568	AQUADALE DUMP	AQUADALE	STANLY	No
NONCD0000717	ARAPAHOE LDFL	ARAPAHOE	PAMLICO	No
NONCD0000165	ARDEN DISPOSAL	ARDEN	BUNCOMBE	No
NONCD0000644	ARLINGTON DUMP	ARLINGTON	YADKIN	No
NONCD0000732	ASHE CO LDFL		ASHE	No
NONCD0000120	ASHE COUNTY LANDFILL	JEFFERSON	ASHE	No
NONCD0000509	ASHEBORO DUMP	ASHEBORO	RANDOLPH	No
NONCD0000167	ASHEVILLE LANDFILL	ASHEVILLE	BUNCOMBE	No
NONCD0000489	ATKINSON DUMP	ATKINSON	PENDER	No
NONCD0000199	ATLANTIC REFUSE DUMP	ATLANTIC	CARTERET	No
NONCD0000138	AULANDER REFUSE DISPOSAL	AULANDER	BERTIE	No
NONCD0000126	AURORA DUMP		BEAUFORT	No
NONCD0000659	AUTEN ROAD LANDFILL		GASTON	No
NONCD0000560	AUTRYVILLE LDFL	AUTRYVILLE	SAMPSON	No
NONCD0000502	AYDEN REFUSE DUMP	AYDEN	PITT	No
NONCD0000773	AZALEA ROAD LANDFILL	OTEEN	BUNCOMBE	No
NONCD0000556	B & G DUMP	CLIFFSIDE	RUTHERFORD	No
NONCD0000454	BAILEY DUMP	BAILEY	NASH	No
NONCD0000431	BAKERVILLE REFUSE DISPOSAL	BAKERVILLE	MITCHELL	No
NONCD0000768	BALFOUR ROAD LANDFILL	GRANITE QUARRY	ROWAN	No
NONCD0000594	BALSAM GROVE DUMP		TRANSYLVANIA	No
NONCD0000457	BARFIELD'S DUMP	WRIGHTSVILLE BEACH	NEW HANOVER	No
NONCD0000128	BATH DUMP	BATH	BEAUFORT	No
NONCD0000451	BATTLEBORO DUMP	BATTLEBORO	NASH	No
NONCD0000485	BAYBORO DUMP	BAYBORO	PAMLICO	No
NONCD0000200	BEAUFORT REFUSE DUMP	BEAUFORT	CARTERET	No
NONCD0000579	BEAULAH COMM. DUMP		SURRY	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000302	BECKEL ROAD DUMP	WINSTON-SALEM	FORSYTH	No
NONCD0000131	BELHAVEN DUMP	BELHAVEN	BEAUFORT	No
NONCD0000780	BELLTOWN ROAD DUMP	HAVELOCK	CRAVEN	No
NONCD0000384	BENSON REFUSE DUMP	BENSON	JOHNSTON	No
NONCD0000669	BENTLEY WOODS SITE	RALEIGH	WAKE	No
NONCD0000325	BESSEMER CITY DUMP	BESSEMER CITY	GASTON	No
NONCD0000501	BETHEL REFUSE DUMP	BETHEL	PITT	No
NONCD0000108	BETHLEHEM COMMUNITY DUMP	BETHLEHEM	ALEXANDER	No
NONCD0000283	BEULAVILLE DUMP	BEULAVILLE	DUPLIN	No
NONCD0000672	BISCOE OLD TOWN DUMP	BISCOE	MONTGOMERY	No
NONCD0000636	BLACK CREEK DUMP	BLACK CREEK	WILSON	No
NONCD0000166	BLACK MOUNTAIN	BLACK MOUNTAIN	BUNCOMBE	No
NONCD0000148	BLADENBORO REFUSE DISPOSAL	BLADENBORO	BLADEN	No
NONCD0000622	BLOWING ROCK LANDFILL	BLOWING ROCK	WATAUGA	No
NONCD0000194	BLOWING ROCK LF	BLOWING ROCK	CALDWELL	No
NONCD0000465	BLUE CLAY RD. LF		NEW HANOVER	No
NONCD0000241	BOILING SPRINGS DUMP	BOILING SPRINGS	CLEVELAND	No
NONCD0000160	BOILING SPRINGS LAKES DUMP	BOILING SPRINGS	BRUNSWICK	No
NONCD0000149	BOLIVIA REFUSE DISPOSAL	BOLIVIA	BRUNSWICK	No
NONCD0000252	BOLTON DUMP	BOLTON	COLUMBUS	No
NONCD0000226	BONLEE DUMP	BONELEE	CHATHAM	No
NONCD0000623	BOONE REFUSE DISPOSAL	BOONE	WATAUGA	No
NONCD0000645	BOONEVILLE DUMP	BOONEVILLE	YADKIN	No
NONCD0000546	BOSTIC REFUSE DISPOSAL	BOSTIC	RUTHERFORD	No
NONCD0000168	BRISTOL CREEK COMM. DUMP		BURKE	No
NONCD0000389	BROADWAY DUMP	BROADWAY	LEE	No
NONCD0000119	BRONSON SAND & GRAVEL	LILESVILLE	ANSON	No
NONCD0000320	BRUCES COUNTY LANDFILL		GASTON	No
NONCD0000673	BUD HOLDING COMPANY	GREENSBORO	GUILFORD	No
NONCD0000306	BUDDY ROBINS LANDFILL		FORSYTH	No
NONCD0000348	BUIES CREEK DUMP	BUIES CREEK	HARNETT	No
NONCD0000354	BUIES CREEK LANDFILL	BUIES CREEK	HARNETT	No
NONCD0000300	BUILDING RUBBLE LF		FORSYTH	No
NONCD0000682	BUNCOMBE CO LF/E CANTON		BUNCOMBE	No
NONCD0000312	BUNN DUMP	BUNN	FRANKLIN	No
NONCD0000490	BURGAW DUMP	BURGAW	PENDER	No
NONCD0000100	BURLINGTON DUMP	BURLINGTON	ALAMANCE	No
NONCD0000649	BURNSVILLE DUMP	BURNSVILLE	YANCEY	No
NONCD0000695	BURNT MILL CREEK LANDFILL	WILMINGTON	NEW HANOVER	No
NONCD0000765	BUXTON DUMP TWO	BUXTON	DARE	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000224	BYNUM DUMP	BYNUM	CHATHAM	No
NONCD0000510	C.A. BOWERS DUMP	TRINITY	RANDOLPH	No
NONCD0000284	CALYPSO DUMP	CALYPSO	DUPLIN	No
NONCD0000654	CAMDEN CO LF-CAMDEN	CAMDEN	CAMDEN	No
NONCD0000197	CAMDEN COUNTY LF-OLD TRAP	CAMDEN	CAMDEN	No
NONCD0000442	CAMERON DUMP	CAMERON	MOORE	No
NONCD0000683	CAMP DAVIS LANDFILL	HOLLY RIDGE	ONSLOW	No
NONCD0000162	CANDLER REFUSE DISPOSAL	CANDLER	BUNCOMBE	No
NONCD0000433	CANDOR DUMP	CANDOR	MONTGOMERY	No
NONCD0000755	CANNON MILLS LANDFILL		ROWAN	No
NONCD0000358	CANTON DUMP	CANTON	HAYWOOD	No
NONCD0000213	CAPE CARTERET DUMP	CAPE CARTERET	CARTERET	No
NONCD0000458	CAROLINA BEACH REFUSE	CAROLINA BEACH	NEW HANOVER	No
NONCD0000764	CAROVA BEACH LANDFILL	CAROVA BEACH	CURRITUCK	No
NONCD0000395	CARTER'S REFUSE DISPOSAL	KINSTON	LENOIR	No
NONCD0000214	CARTERET COUNTY LF	NEWPORT	CARTERET	No
NONCD0000209	CARTERET COUNTY LF - MOUNT	NEWPORT	CARTERET	No
NONCD0000446	CARTHAGE DUMP	CARTHAGE	MOORE	No
NONCD0000602	CARY DUMP	CARY	WAKE	No
NONCD0000377	CASHIER'S REFUSE DISPOSAL	CASHIERS	JACKSON	No
NONCD0000448	CASTALIA REFUSE DUMP	CASTALIA	NASH	No
NONCD0000459	CASTLE HAYNE SERVICE DUMP	CASTLE HAYNE	NEW HANOVER	No
NONCD0000460	CASTLE HAYNE TRASH SERVICE	CASTLE HAYNE	NEW HANOVER	No
NONCD0000216	CASWELL LF	YANCEYVILLE	CASWELL	No
NONCD0000392	CASWELL SCHOOL DUMP	KINSTON	LENOIR	No
NONCD0000222	CATAWBA COUNTY LF	HICKORY	CATAWBA	No
NONCD0000217	CATAWBA DUMP		CATAWBA	No
NONCD0000254	CHADBOURN DUMP	CHADBOURN	COLUMBUS	No
NONCD0000642	CHAMBERLAND-HODGE DUMP	YADKINVILLE	YADKIN	No
NONCD0000484	CHAPEL HILL LANDFILL	CHAPEL HILL	ORANGE	No
NONCD0000716	CHARLIE LITTLE RD LDFL	DUDLEY SHOALS	CALDWELL	No
NONCD0000182	CHARLOTTE MOTOR SPEEDWAY		CABARRUS	No
NONCD0000183	CHARLOTTE MOTOR SPEEDWAY		CABARRUS	No
NONCD0000185	CHARLOTTE MOTOR SPEEDWAY		CABARRUS	No
NONCD0000582	CHATHAM REFUSE DISPOSAL	ELKIN	SURRY	No
NONCD0000587	CHEROKEE INDIAN DUMP	CHEROKEE	SWAIN	No
NONCD0000627	CHERRY HOSPITAL DUMP	GOLDSBORO	WAYNE	No
NONCD0000779	CHERRY POINT LANDFILL	CHERRY POINT	CRAVEN	No
NONCD0000778	CHERRY POINT MCAS LANDFILL	CHERRY POINT	CRAVEN	No
NONCD0000250	CHERRYVILLE DUMP	CHERRYVILLE	CLEVELAND	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000187	CHESTER REFUSE DISPOSAL		CALDWELL	No
NONCD0000540	CHINA GROVE DUMP	CHINA GROVE	ROWAN	No
NONCD0000127	CHOCOWINITY DUMP	CHOCOWINITY	BEAUFORT	No
NONCD0000751	CITY OF ALBERMARLE DUMP	ALBERMARLE	STANLY	No
NONCD0000294	CITY OF DURHAM LF	DURHAM	DURHAM	No
NONCD0000740	CITY OF FAYETTEVILLE LDFL	FAYETTEVILLE	CUMBERLAND	No
NONCD0000739	CITY OF FAYETTEVILLE LDFL	FAYETTEVILLE	CUMBERLAND	No
NONCD0000244	CITY OF KINGS MTN.	KINGS MOUNTAIN	CLEVELAND	No
NONCD0000712	CITY OF LUMBERTON LDFL	LUMBERTON	ROBESON	No
NONCD0000332	CITY OF OXFORD LF	OXFORD	GRANVILLE	No
NONCD0000612	CITY OF RALEIGH - WILDERS	RALEIGH	WAKE	No
NONCD0000699	CITY OF SHELBY LDFL (STUBBS)	STUBBS	CLEVELAND	No
NONCD0000674	CITY OF WILSON LANDFILL	WILSON	WILSON	No
NONCD0000743	CITY OF WINSTON-SALEM	WINSTON-SALEM	FORSYTH	No
NONCD0000744	CITY OF WINSTON-SALEM	WINSTON-SALEM	FORSYTH	No
NONCD0000308	CITY OF WINSTON-SALEM LF	WINSTON-SALEM	FORSYTH	No
NONCD0000726	CIVIC CENTER AREA	GRAHAM	ALAMANCE	No
NONCD0000147	CLARKTON REFUSE DISPOSAL	CLARKTON	BLADEN	No
NONCD0000280	CLEMENT REFUSE DUMP	MOCKSVILLE	DAVIE	No
NONCD0000157	CLEMMONS LF	BOLIVIA	BRUNSWICK	No
NONCD0000544	CLIFFSIDE MILL DUMP	CLIFFSIDE	RUTHERFORD	No
NONCD0000558	CLINTON DUMP	CLINTON	SAMPSON	No
NONCD0000363	CLYDE LEACH DUMP	ARABIA	HOKE	No
NONCD0000745	COATS MODIFIED LDFL	COATS	HARNETT	No
NONCD0000353	COATS REFUSE DISPOSAL	COATS	HARNETT	No
NONCD0000142	COLERAIN REFUSE DISPOSAL	COLERAIN	BERTIE	No
NONCD0000314	COLLEGE ST DUMP	YOUNGSVILLE	FRANKLIN	No
NONCD0000426	COLLINS & AIKMAN LF	OLD FORT	MCDOWELL	No
NONCD0000595	COLUMBIA DUMP	COLUMBIA	TYRRELL	No
NONCD0000503	COLUMBUS REFUSE DISPOSAL	COLUMBUS	POLK	No
NONCD0000180	CONCORD LANDFILL	CONCORD	CABARRUS	No
NONCD0000295	CONETOE REFUSE DISPOSAL	CONETOE	EDGECOMBE	No
NONCD0000218	CONOVER DUMP	CONOVER	CATAWBA	No
NONCD0000470	CONWAY REFUSE DISPOSAL	CONWAY	NORTHAMPTON	No
NONCD0000301	COUNTY GARBAGE LANDFILL	WINSTON-SALEM	FORSYTH	No
NONCD0000372	COUNTY GARBAGE LANDFILL	STATESVILLE	IREDELL	No
NONCD0000103	COUNTY GARBAGE SERVICE	ALAMANCE	ALAMANCE	No
NONCD0000322	CRAMERTON LF	CRAMERTON	GASTON	No
NONCD0000261	CRAVEN COUNTY	HAVELOCK	CRAVEN	No
NONCD0000262	CRAVEN COUNTY-VANCEBORO	VANCEBORO	CRAVEN	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000333	CREEDMORE DUMP	CREEDMOOR	GRANVILLE	No
NONCD0000430	CRESCENT RESOURCES INC.	LEMLEY	MECKLENBURG	No
NONCD0000620	CRESWELL REFUSE DISPOSAL	CRESWELL	WASHINGTON	No
NONCD0000122	CROSSNORE REFUSE DUMP	CROSSMORE	AVERY	No
NONCD0000741	CUMBERLAND CO LDFL		CUMBERLAND	No
NONCD0000736	CUMBERLAND CO LDFL - BEAVER		CUMBERLAND	No
NONCD0000733	CUMBERLAND CO LDFL - BONES		CUMBERLAND	No
NONCD0000734	CUMBERLAND CO LDFL - TRAILER		CUMBERLAND	No
NONCD0000735	CUMBERLAND CO LDFL - WADE		CUMBERLAND	No
NONCD0000279	DALTON REFUSE DUMP	MOCKSVILLE	DAVIE	No
NONCD0000753	DAN JOHNSON LDFL	ELKIN	WILKES	No
NONCD0000575	DANBURY DUMP	DANBURY	STOKES	No
NONCD0000272	DARE COUNTY DUMP	MANTEO	DARE	No
NONCD0000738	DAVIDSON CO LDFL		DAVIDSON	No
NONCD0000428	DAVIDSON LANDFILL	DAVIDSON	MECKLENBURG	No
NONCD0000591	DAVIDSON RIVER DUMP		TRANSYLVANIA	No
NONCD0000184	DAVIDSON SANITARY LANDFILL	DAVIDSON	CABARRUS	No
NONCD0000309	DEMOLITION LANDFILL		FORSYTH	No
NONCD0000275	DENTON DUMP	DENTON	DAVIDSON	No
NONCD0000277	DENTON LANDFILL	DENTON	DAVIDSON	No
NONCD0000276	DENTON LANDFILL	DENTON	DAVIDSON	No
NONCD0000408	DENVER LANDFILL	DENVER	LINCOLN	No
NONCD0000391	DOBBS FARM DUMP	KINSTON	LENOIR	No
NONCD0000259	DOVER REFUSE DUMP	DOVER	CRAVEN	No
NONCD0000531	DRAPER DUMP	DRAPER	ROCKINGHAM	No
NONCD0000172	DREXEL DUMP	DREXEL	BURKE	No
NONCD0000144	DUBLIN REFUSE DUMP	DUBLIN	BLADEN	No
NONCD0000671	DUDLEY LANDFILL	DUDLEY	WAYNE	No
NONCD0000769	DUDLEY SHOALS RD LDFL #1	DUDLEY SHOALS	CALDWELL	No
NONCD0000770	DUDLEY SHOALS RD LDFL #2	DUDLEY SHOALS	CALDWELL	No
NONCD0000292	DUKE AND GREGSON ST. DUMP	DURHAM	DURHAM	No
NONCD0000650	DUKE POWER DUMP	HICKORY	ALEXANDER	No
NONCD0000351	DUNN REFUSE DISPOSAL	DUNN	SAMPSON	No
NONCD0000352	DUNN-ERWIN DUMP	ERWIN	HARNETT	No
NONCD0000666	DUPONT DUMP	RALEIGH	WAKE	No
NONCD0000289	DURHAM COUNTY LANDFILL		DURHAM	No
NONCD0000293	DURHAM COUNTY SANITARY LF		DURHAM	No
NONCD0000291	DURHAM LAND DISPOSAL AREA	DURHAM	DURHAM	No
NONCD0000723	DURHAM ST LDFL	BURLINGTON	ALAMANCE	No
NONCD0000169	DYSARTSVILLE DUMP	DYSARTSVILLE	BURKE	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000236	E.Z. SANITATION DUMP	LATTIMORE	CLEVELAND	No
NONCD0000439	EAGLE SPRINGS DUMP	EAGLE SPRINGS	MOORE	No
NONCD0000178	EARNHARDT ROAD DUMP	KANNAPOLIS	CABARRUS	No
NONCD0000757	EAST LAKE SHORE DRIVE LDFL	WILIMINGTON	NEW HANOVER	No
NONCD0000541	EAST SPENCER DUMP	EAST SPENCER	ROWAN	No
NONCD0000614	EAST WAKE COUNTY LF	KNIGHTDALE	WAKE	No
NONCD0000245	ECHO SERVICE, INC.	SHELBY	CLEVELAND	No
NONCD0000233	EDENTON LANDFILL	EDENTON	CHOWAN	No
NONCD0000653	EDGECOMBE COUNTY LANDFILL	TARBORO	EDGECOMBE	No
NONCD0000488	ELIZABETH CITY LF	ELIZABETH CITY	PASQUOTANK	No
NONCD0000145	ELIZABETHTOWN REFUSE	ELIZABETHTOWN	BLADEN	No
NONCD0000123	ELK PARK DUMP	ELK PARK	AVERY	No
NONCD0000581	ELKIN LANDFILL	ELKIN	SURRY	No
NONCD0000547	ELLENBORO DUMP	ELLENBORO	RUTHERFORD	No
NONCD0000516	ELLERBE DUMP	ELLERBE	RICHMOND	No
NONCD0000638	ELM CITY REFUSE DISPOSAL	ELM CITY	WILSON	No
NONCD0000107	ELON COLLEGE DUMP	ELON COLLEGE	ALAMANCE	No
NONCD0000730	ELON COLLEGE LDFL - AMICK RD	ELON COLLEGE	ALAMANCE	No
NONCD0000212	EMERALD ISLE DUMP	EMERALD ISLE	CARTERET	No
NONCD0000340	ENFIELD REFUSE DISPOSAL	ENFIELD	HALIFAX	No
NONCD0000367	ENGLEHARD DUMP	ENGLEHARD	HYDE	No
NONCD0000410	ENVIRONETICS BURN SITE	LINCOLNTON	LINCOLN	No
NONCD0000632	EUREKA REFUSE DISPOSAL	EUREKA	WAYNE	No
NONCD0000396	EVERETT GARBAGE SERVICE	KINSTON	LENOIR	No
NONCD0000255	FAIR BLUFF DUMP	FAIR BLUFF	COLUMBUS	No
NONCD0000365	FAIRFIELD DUMP	FAIRFIELD	HYDE	No
NONCD0000521	FAIRMONT DUMP	FAIRMONT	ROBESON	No
NONCD0000287	FAISON DUMP	FAISON	DUPLIN	No
NONCD0000498	FALKLAND DUMP	FALKLAND	PITT	No
NONCD0000641	FALL CREEK COMM. DUMP		YADKIN	No
NONCD0000497	FARMVILLE REFUSE DISPOSAL	FARMVILLE	PITT	No
NONCD0000267	FAYETTEVILLE CITY LF	FAYETTEVILLE	CUMBERLAND	No
NONCD0000163	FISHBURNE REFUSE DUMP		BUNCOMBE	No
NONCD0000179	FISHERTOWN DUMP	KANNAPOLIS	CABARRUS	No
NONCD0000328	FONTANA VILLAGE DUMP	FONTANA VILLAGE	GRAHAM	No
NONCD0000554	FOREST CITY	FOREST CITY	RUTHERFORD	No
NONCD0000496	FOUNTAIN REFUSE DISPOSAL	FOUNTAIN	PITT	No
NONCD0000379	FOUR OAKS DUMP	FOUR OAKS	JOHNSTON	No
NONCD0000313	FRANKLIN COUNTY SANITARY LF		FRANKLIN	No
NONCD0000412	FRANKLIN DISPOSAL	FRANKLIN	MACON	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000310	FRANKLINTON DUMP	FRANKLINTON	FRANKLIN	No
NONCD0000508	FRANKLINVILLE DUMP	FRANKLINVILLE	RANDOLPH	No
NONCD0000628	FREEMONT REFUSE DISPOSAL	FREMONT	WAYNE	No
NONCD0000606	FUQUAY VARINA DUMP	FUQUA VARINA	WAKE	No
NONCD0000580	GARBAGE SERVICE DUMP	MT AIRY	SURRY	No
NONCD0000562	GARLAND DUMP	GARLAND	SAMPSON	No
NONCD0000604	GARNER TRASH DUMP	GARNER	WAKE	No
NONCD0000188	GARNES REFUSE DUMP		CALDWELL	No
NONCD0000321	GASTON CO LF (MT HOLLY LF)	MT HOLLY	GASTON	No
NONCD0000324	GASTON COUNTY LF (HARDEN	DALLAS	GASTON	No
NONCD0000475	GASTON REFUSE DISPOSAL	GASTON	NORTHAMPTON	No
NONCD0000658	GASTONIA REFUSE DUMP		GASTON	No
NONCD0000327	GATES COUNTY LF	GATESVILLE	GATES	No
NONCD0000326	GATESVILLE DUMP	GATESVILLE	GATES	No
NONCD0000564	GIBSON REFUSE DUMP	GIBSON	SCOTLAND	No
NONCD0000338	GIBSONVILLE TOWN LF	GIBSONVILLE	GUILFORD	No
NONCD0000173	GLEN ALPINE DUMP	ST PAUL	BURKE	No
NONCD0000630	GOLDSBORO DUMP	GOLDSBORO	WAYNE	No
NONCD0000227	GOLDSTON DUMP	GOLDSTON	CHATHAM	No
NONCD0000576	GORDON'S DUMP		STOKES	No
NONCD0000104	GRAHAM DISPOSAL	GRAHAM	ALAMANCE	No
NONCD0000725	GRAHAM MEMORIAL PARK	GRAHAM	ALAMANCE	No
NONCD0000186	GRANITE FALLS DUMP	GRANITE FALLS	CALDWELL	No
NONCD0000121	GREEN VALLEY DUMP		AVERY	No
NONCD0000336	GREENE COUNTY LF	SNOW HILL	GREENE	No
NONCD0000500	GRIFTON DUMP	GRIFTON	PITT	No
NONCD0000495	GRIMESLAND REFUSE DUMP	GRIMESLAND	PITT	No
NONCD0000150	GRISSETTOWN LANDFILL	SEASIDE	BRUNSWICK	No
NONCD0000343	HALIFAX DUMP		HALIFAX	No
NONCD0000418	HAMILTON DUMP	HAMILTON	MARTIN	No
NONCD0000515	HAMLET DUMP	HAMLET	RICHMOND	No
NONCD0000519	HAMLET TRASH DISPOSAL AREA	HAMLET	RICHMOND	No
NONCD0000722	HANOVER RD LDFL	BURLINGTON	ALAMANCE	No
NONCD0000317	HARDIN REFUSE DUMP		GASTON	No
NONCD0000207	HARKERS ISLAND REFUSE	HARKERS ISLAND	CARTERET	No
NONCD0000370	HARMONY REFUSE DISPOSAL	HARMONY	IREDELL	No
NONCD0000258	HAVELOCK REFUSE DUMP	HAVELOCK	CRAVEN	No
NONCD0000548	HAWKINS REFUSE DISPOSAL	FOREST CITY	RUTHERFORD	No
NONCD0000235	HAYESVILLE DUMP	HAYESVILLE	CLAY	No
NONCD0000553	HAYNES REFUSE DUMP		RUTHERFORD	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000355	HAZELWOOD DUMP	HAZELWOOD	HAYWOOD	No
NONCD0000191	HELTON REFUSE DUMP		CALDWELL	No
NONCD0000680	HENDERSON DR LDFL	JACKSONVILLE	ONSLOW	No
NONCD0000359	HENDERSON DUMP	HENDERSONVILLE	HENDERSON	No
NONCD0000538	HENDIX GARBAGE DUMP		ROWAN	No
NONCD0000549	HENDRICKS DUMP	FOREST CITY	RUTHERFORD	No
NONCD0000171	HENRY RIVER COMM. DUMP		BURKE	No
NONCD0000718	HERTFORD CO LDFL		HERTFORD	No
NONCD0000492	HERTFORD DUMP	HERTFORD	PERQUIMANS	No
NONCD0000651	HICKORY LANDFILL	HICKORY	CATAWBA	No
NONCD0000707	HIGH POINT TRASH DUMP	HIGH POINT	GUILFORD	No
NONCD0000319	HIGH SHOALS DUMP		GASTON	No
NONCD0000413	HIGHLANDS REFUSE DISPOSAL	HIGHLANDS	MACON	No
NONCD0000170	HILDEBRAN DISPOSAL AREA	HILDEBRAN	BURKE	No
NONCD0000483	HILLSBOROUGH DUMP	HILLSBOROUGH	ORANGE	No
NONCD0000771	HILLSBOROUGH LDFL	HILLSBOROUGH	ORANGE	No
NONCD0000345	HOBGOOD DUMP	HOBGOOD	HALIFAX	No
NONCD0000429	HOLBROOK RD. LF	HUNTERSVILLE	MECKLENBURG	No
NONCD0000154	HOLDEN BEACH LF	HOLDEN BEACH	BRUNSWICK	No
NONCD0000478	HOLLY RIDGE REFUSE DISPOSAL	HOLLY RIDGE	ONSLOW	No
NONCD0000605	HOLLY SPRINGS DUMP	HOLLY SPRINGS	WAKE	No
NONCD0000335	HOOKERTON DUMP	HOOKERTON	GREENE	No
NONCD0000264	HOPE MILLS DUMP	HOPE MILLS	CUMBERLAND	No
NONCD0000535	HOPKINS GARBAGE DUMP	LEAKSVILLE	ROCKINGHAM	No
NONCD0000664	HORN OPEN DUMP		RUTHERFORD	No
NONCD0000416	HOT SPRINGS REFUSE DISPOSAL	HOT SPRINGS	MADISON	No
NONCD0000402	HOWARD CREEK LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000435	HURLEY'S DUMP	BISCOE	MONTGOMERY	No
NONCD0000763	I-85 LANDFILL	SALISBURY	ROWAN	No
NONCD0000269	INDEPENDENT TRASH SERVICE	MAMIE	CURRITUCK	No
NONCD0000311	J.H. WINSTON DUMP	BUNN	FRANKLIN	No
NONCD0000232	J.W. BRADLEY DUMP	EDENTON	CHOWAN	No
NONCD0000767	JACKSON DUNES, LOT 14	OCRACOKE	HYDE	No
NONCD0000469	JACKSON REFUSE DISPOSAL	JACKSON	NORTHAMPTON	No
NONCD0000479	JACKSONVILLE DUMP	JACKSONVILLE	ONSLOW	No
NONCD0000713	JAMES DEBRAHL LAFAYETTE		ROBESON	No
NONCD0000421	JAMESVILLES DUMP	JAMESVILLE	MARTIN	No
NONCD0000273	JENNETTE'S DUMP	BUXTON	DARE	No
NONCD0000749	JOHNSONVILLE MODIFIED LDFL	JOHNSONVILLE	HARNETT	No
NONCD0000400	JONES AIRPORT LANDFILL	LINCOLNTON	LINCOLN	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000643	JONESVILLE DUMP	JONESVILLE	YADKIN	No
NONCD0000646	JOYNER REFUSE DUMP	YADKINVILLE	YADKIN	No
NONCD0000136	KELFORD DUMP	KELFORD	BERTIE	No
NONCD0000282	KENANSVILLE DUMP	KENANSVILLE	DUPLIN	No
NONCD0000380	KENLY DUMP	KENLY	JOHNSTON	No
NONCD0000393	KENNEDY HOME DUMP	KINSTON	LENOIR	No
NONCD0000626	KERMIT GURLEY DUMP	GOLDSBORO	WAYNE	No
NONCD0000303	KERNERSVILLE DUMP	KERNERSVILLE	FORSYTH	No
NONCD0000678	KERR CITY PARK	JACKSONVILLE	ONSLOW	No
NONCD0000271	KILL DEVILS HILLS DUMP	KILL DEVIL HILLS	DARE	No
NONCD0000572	KINGS DUMP	KING	STOKES	No
NONCD0000675	KINGS MOUNTAIN LANDFILL	KINGS MOUNTAIN	CLEVELAND	No
NONCD0000239	KINGS MTN. DUMP	KINGS MOUNTAIN	CLEVELAND	No
NONCD0000399	KINSTON SANITARY LANDFILL	KINSTON	LENOIR	No
NONCD0000491	KIRKLAND'S DUMP		PENDER	No
NONCD0000175	KIRKSEY DRIVE LF	MORGANTON	BURKE	No
NONCD0000603	KNIGHTDALE DUMP	KNIGHTDALE	WAKE	No
NONCD0000461	KURE BEACH REFUSE DISPOSAL	KURE BEACH	NEW HANOVER	No
NONCD0000394	LA GRANGE REFUSE DISPOSAL	LA GRANGE	LENOIR	No
NONCD0000228	LAKE HINASSEE RESORT DUMP		CHEROKEE	No
NONCD0000357	LAKE LOGAN DUMP	CANTON	HAYWOOD	No
NONCD0000552	LAKE LURE DUMP	LAKE LURE	RUTHERFORD	No
NONCD0000592	LAKE TOXAWAY DUMP	LAKE TOXAWAY	TRANSYLVANIA	No
NONCD0000253	LAKE WACCAMAW DUMP	LAKE WACCAMAW	COLUMBUS	No
NONCD0000697	LAKES APTS	RALEIGH	WAKE	No
NONCD0000539	LANDIS WASTE DISPOSAL AREA	LANDIS	ROWAN	No
NONCD0000237	LATTIMORE DUMP	LATTIMORE	CLEVELAND	No
NONCD0000565	LAURINBURG DUMP	LAURINBURG	SCOTLAND	No
NONCD0000534	LEAKSVILLE LANDFILL	LEAKSVILLE	ROCKINGHAM	No
NONCD0000411	LEDFORD PICK-UP SERVICE	FRANKLIN	MACON	No
NONCD0000193	LENOIR DUMP	LENOIR	CALDWELL	No
NONCD0000140	LEWISTON REFUSE DISPOSAL	LEWISTON	BERTIE	No
NONCD0000512	LIBERTY DUMP	LIBERTY	RANDOLPH	No
NONCD0000266	LIEBER SANITATION DUMP		CUMBERLAND	No
NONCD0000350	LILLINGTON DUMP	LILLINGTON	HARNETT	No
NONCD0000746	LILLINGTON MODIFIED LDFL	LILLINGTON	HARNETT	No
NONCD0000409	LINCOLN COUNTY LF	LINCOLNTON	LINCOLN	No
NONCD0000405	LINCOLNTON REFUSE DISPOSAL	LINCOLNTON	LINCOLN	No
NONCD0000304	LINK ROAD DUMP	WINSTON-SALEM	FORSYTH	No
NONCD0000423	LINVILLE FALLS REFUSE	LINVILLE FALLS	MCDOWELL	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000422	LITTLE SWITZERLAND LANDFILL	LITTLE SWITZERLAND	MCDOWELL	No
NONCD0000339	LITTLETON DUMP	LITTLETON	HALIFAX	No
NONCD0000155	LONG BEACH REFUSE DISPOSAL	LONG BEACH	BRUNSWICK	No
NONCD0000219	LONG VIEW REFUSE DUMP	LONG VIEW	CATAWBA	No
NONCD0000315	LOUISBURG DUMP	LOUISBURG	FRANKLIN	No
NONCD0000655	LOUISBURG SITE #2	LOUISBURG	FRANKLIN	No
NONCD0000657	LOUISBURG SITE #3	LOUISBURG	FRANKLIN	No
NONCD0000373	LOVE VALLEY DUMP		IREDELL	No
NONCD0000323	LOWELL REFUSE DUMP	LOWELL	GASTON	No
NONCD0000522	LUMBER BRIDGE REFUSE	LUMBER BRIDGE	ROBESON	No
NONCD0000528	LUMBERTON CITY LF	ST PAULS	ROBESON	No
NONCD0000527	LUMBERTON DUMP	LUMBERTON	ROBESON	No
NONCD0000105	MAC BROOM SERVICE DUMP		ALAMANCE	No
NONCD0000296	MACCLESFIELD DUMP	MACCLESFIELD	EDGECOMBE	No
NONCD0000407	MACHPELAH LANDFILL	IRON STATION	LINCOLN	No
NONCD0000619	MACKEY'S DUMP		WASHINGTON	No
NONCD0000617	MACON DUMP	MACON	WARREN	No
NONCD0000536	MADISON LANDFILL	MADISON	ROCKINGHAM	No
NONCD0000286	MAGNOLIA DUMP	MAGNOLIA	DUPLIN	No
NONCD0000220	MAIDEN DUMP	MAIDEN	CATAWBA	No
NONCD0000748	MAMERS MODIFIED LDFL	MAMERS	HARNETT	No
NONCD0000270	MANTEO DUMP	MANTEO	DARE	No
NONCD0000425	MARION REFUSE DISPOSAL	MARION	MCDOWELL	No
NONCD0000415	MARS HILL REFUSE DISPOSAL	MARS HILL	MADISON	No
NONCD0000414	MARSHALL REFUSE DISPOSAL	MARSHALL	MADISON	No
NONCD0000203	MARSHALLBERG DUMP	MARSHALLBERG	CARTERET	No
NONCD0000600	MARSHVILLE DUMP	MARSHVILLE	UNION	No
NONCD0000747	MASON'S STORE MODIFIED LDFL		HARNETT	No
NONCD0000781	MATTHEWS POINT DUMP	HAVELOCK	CRAVEN	No
NONCD0000524	MAXTON DUMP	MAXTON	ROBESON	No
NONCD0000387	MAYSVILLE REFUSE DISPOSAL	MAYSVILLE	JONES	No
NONCD0000318	MCADENVILLE DUMP	MCADENVILLE	GASTON	No
NONCD0000101	MEBANE DUMP	MEBANE	ALAMANCE	No
NONCD0000545	MICHAEL'S DUMP		RUTHERFORD	No
NONCD0000449	MIDDLESEX DUMP	MIDDLESEX	NASH	No
NONCD0000215	MILES GARBAGE DUMP	YANCEYVILLE	CASWELL	No
NONCD0000462	MILITARY CUTOFF LANDFILL	WILIMINGTON	NEW HANOVER	No
NONCD0000204	MILL CREEK REFUSE DUMP	MILL CREEK	CARTERET	No
NONCD0000513	MODERN GARBAGE DUMP	RANDLEMAN	RANDOLPH	No
NONCD0000752	MONROE CRAIG LDFL	WALNUT COVE	STOKES	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000599	MONROE LANDFILL	MONROE	UNION	No
NONCD0000720	MOORE CO LDFL-CARTHAGE	CARTHAGE	MOORE	No
NONCD0000376	MOORESVILLE DUMP	MOORESVILLE	IREDELL	No
NONCD0000374	MOORESVILLE LANDFILL		IREDELL	No
NONCD0000205	MOREHEAD CITY REFUSE DUMP	MOREHEAD CITY	CARTERET	No
NONCD0000177	MORGANTOWN DUMP	MORGANTON	BURKE	No
NONCD0000116	MORVEN DUMP	MORVEN	ANSON	No
NONCD0000585	MOUNT AIRY LF	MT AIRY	SURRY	No
NONCD0000434	MOUNT GILEAD DUMP	MT GILEAD	MONTGOMERY	No
NONCD0000181	MOUNT PLEASANT DUMP	MT PLEASANT	CABARRUS	No
NONCD0000709	MT OLIVE LDFL	MOUNT OLIVE	WAYNE	No
NONCD0000584	MT. AIRY DUMP	MT AIRY	SURRY	No
NONCD0000631	MT. OLIVE REFUSE DISPOSAL	MOUNT OLIVE	WAYNE	No
NONCD0000362	MURFREESBORO DUMP	MURFREESBORO	HERTFORD	No
NONCD0000230	MURPHY REFUSE DUMP	MURPHY	CHEROKEE	No
NONCD0000737	N DAVIDSON CO LDFL		DAVIDSON	No
NONCD0000634	N. WILKESBORO DUMP	NORTH WILKESBORO	WILKES	No
NONCD0000456	NASHVILLE DUMP	NASHVILLE	NASH	No
NONCD0000607	NC DEPT. OF AGRICULTURE LF	RALEIGH	WAKE	No
NONCD0000611	NC STATE FAIR LF	RALEIGH	WAKE	No
NONCD0000263	NEW BERN SANITARY DUMP	NEW BERN	CRAVEN	No
NONCD0000463	NEW HANOVER CO. LANDFILL	CAROLINA BEACH	NEW HANOVER	No
NONCD0000368	NEW HOLLAND DUMP	SWAN QUARTER	HYDE	No
NONCD0000196	NEWBY'S TRASH SERVICE DUMP	CAMDEN	CAMDEN	No
NONCD0000124	NEWLAND REFUSE DUMP	NEWLAND	AVERY	No
NONCD0000559	NEWTON GROVE DUMP	NEWTON GROVE	SAMPSON	No
NONCD0000221	NEWTON LANDFILL	NEWTON	CATAWBA	No
NONCD0000615	NORLINA DUMP	NORLINA	WARREN	No
NONCD0000403	NORTH BROOK LANDFILL	VALE	LINCOLN	No
NONCD0000246	NORTH EARL DUMP	EARL	CLEVELAND	No
NONCD0000625	NORTHERN WAYNE LF	BUCK SWAMP	WAYNE	No
NONCD0000570	NORWOOD DUMP	NORWOOD	STANLY	No
NONCD0000417	OAK CITY DUMP	OAK CITY	MARTIN	No
NONCD0000569	OAKBORO DUMP	OAKBORO	STANLY	No
NONCD0000656	OCEAN ISLE DUMP	OCEAN ISLE	BRUNSWICK	No
NONCD0000153	OCEAN ISLE LANDFILL	OCEAN ISLE	BRUNSWICK	No
NONCD0000369	OCRACOKE DUMP	OCRACOKE	HYDE	No
NONCD0000111	OLD ALEXANDER COUNTY LF (SR	TAYLORSVILLE	ALEXANDER	No
NONCD0000110	OLD ALEXANDER COUNTY LF (SR	TAYLORSVILLE	ALEXANDER	No
NONCD0000113	OLD ALLEGHENY COUNTY LF	SPARTA	ALLEGHANY	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000106	OLD CITY OF BURLINGTON SOLID	BURLINGTON	ALAMANCE	No
NONCD0000290	OLD DURHAM COUNTY LF		DURHAM	No
NONCD0000424	OLD FORT REFUSE DISPOSAL	OLD FORT	MCDOWELL	No
NONCD0000665	OLD HOLLY SPRINGS DUMP/	HOLLY SPRINGS	WAKE	No
NONCD0000375	OLD IREDELL COUNTY DISPOSAL		IREDELL	No
NONCD0000404	OLD LINCOLN COUNTY LF	LINCOLNTON	LINCOLN	No
NONCD0000766	OLD QUARRY LANDFILL	HAW RIVER	ALAMANCE	No
NONCD0000684	OLD RALEIGH LF #1	RALEIGH	WAKE	No
NONCD0000693	OLD RALEIGH LF #10	RALEIGH	WAKE	No
NONCD0000694	OLD RALEIGH LF #11	RALEIGH	WAKE	No
NONCD0000685	OLD RALEIGH LF #2	RALEIGH	WAKE	No
NONCD0000686	OLD RALEIGH LF #3	RALEIGH	WAKE	No
NONCD0000687	OLD RALEIGH LF #4	RALEIGH	WAKE	No
NONCD0000688	OLD RALEIGH LF #5	RALEIGH	WAKE	No
NONCD0000689	OLD RALEIGH LF #6	RALEIGH	WAKE	No
NONCD0000690	OLD RALEIGH LF #7	RALEIGH	WAKE	No
NONCD0000691	OLD RALEIGH LF #8	RALEIGH	WAKE	No
NONCD0000692	OLD RALEIGH LF #9	RALEIGH	WAKE	No
NONCD0000445	OLD ROBBINS-HIGH FALLS LF	ROBBINS	MOORE	No
NONCD0000299	OLD ROCKY MOUNT LF	ROCKY MOUNT	EDGECOMBE	No
NONCD0000698	OLD SHELBY LANDFILL	SHELBY	CLEVELAND	No
NONCD0000777	OLD SMITHFIELD LANDFILL	SMITHFIELD	JOHNSTON	No
NONCD0000156	OLD SOUTHPORT LF		BRUNSWICK	No
NONCD0000648	OLD YADKIN COUNTY LF	YADKINVILLE	YADKIN	No
NONCD0000593	OLIN-MATHEISON DUMP	PISGAH FOREST	TRANSYLVANIA	No
NONCD0000681	ONSLOW PINES RD LDFL	JACKSONVILLE	ONSLOW	No
NONCD0000760	OPTIMIST BALL PARK	WILIMINGTON	NEW HANOVER	No
NONCD0000486	ORIENTAL DUMP	ORIENTAL	PAMLICO	No
NONCD0000198	OTWAY COMMUNITY REFUSE	OTWAY	CARTERET	No
NONCD0000331	OXFORD DUMP	OXFORD	GRANVILLE	No
NONCD0000719	PAMLICO CO LDFL	REELSBORO	PAMLICO	No
NONCD0000130	PANTEGO DUMP	BELHAVEN	BEAUFORT	No
NONCD0000133	PANTEGO REFUSE DISPOSAL	PANTEGO	BEAUFORT	No
NONCD0000520	PARKTON DUMP	PARKTON	ROBESON	No
NONCD0000249	PATTERSON SPRINGS	EARL	CLEVELAND	No
NONCD0000118	PEACHLAND DUMP	PEACHLAND	ANSON	No
NONCD0000229	PEACHTREE COM. DUMP	PEACHTREE	CHEROKEE	No
NONCD0000525	PEMBROKE DUMP	PEMBROKE	ROBESON	No
NONCD0000474	PERDUE, INC.	CONWAY	NORTHAMPTON	No
NONCD0000234	PERQUIMANS-CHOWAN LF	TYNER	CHOWAN	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000677	PHILLIPS PARK	JACKSONVILLE	ONSLOW	No
NONCD0000240	PHILLIPS REFUSE DUMP	GROVER	CLEVELAND	No
NONCD0000629	PIKEVILLE DUMP	PIKEVILLE	WAYNE	No
NONCD0000708	PIKEVILLE LDFL	PIKEVILLE	WAYNE	No
NONCD0000583	PILOT MT. REFUSE DUMP	PILOT MT	SURRY	No
NONCD0000440	PINE BLUFF DUMP	PINE BLUFF	MOORE	No
NONCD0000382	PINE LEVEL DUMP	PINE LEVEL	JOHNSTON	No
NONCD0000298	PINETOPS REFUSE DUMP	PINETOPS	EDGECOMBE	No
NONCD0000427	PINEVILLE DUMP	PINEVILLE	MECKLENBURG	No
NONCD0000397	PINK HILL DUMP	PINK HILL	LENOIR	No
NONCD0000621	PLYMOUTH REFUSE DUMP	PLYMOUTH	WASHINGTON	No
NONCD0000115	POLKTON DUMP	POLKTON	ANSON	No
NONCD0000248	POLKVILLE DUMP	POLKVILLE	CLEVELAND	No
NONCD0000388	POLLOCKSVILLE DUMP	MAYSVILLE	JONES	No
NONCD0000776	POLLOCKSVILLE DUMP #2	POLLOCKSVILLE	JONES	No
NONCD0000164	POND ROAD LF #1	ASHEVILLE	BUNCOMBE	No
NONCD0000727	PORTER AVENUE LDFL	GRAHAM	ALAMANCE	No
NONCD0000137	POWELLSVILLE REFUSE	POWELLSVILLE	BERTIE	No
NONCD0000383	PRINCETON DUMP	PRINCETON	JOHNSTON	No
NONCD0000297	PRINCEVILLE DUMP	TARBORO	EDGECOMBE	No
NONCD0000482	PUMPKIN CENTER LF	JACKSONVILLE	ONSLOW	No
NONCD0000132	PUNGO DUMP	PANTEGO	BEAUFORT	No
NONCD0000364	RAEFORD DUMP	RAEFORD	HOKE	No
NONCD0000610	RALEIGH LANDFILL - DORTHEA	RALEIGH	WAKE	No
NONCD0000506	RAMSEUR	RAMSEUR	RANDOLPH	No
NONCD0000511	RANDLEMAN DUMP	RANDLEMAN	RANDOLPH	No
NONCD0000481	RAY'S RURAL DUMP	JACKSONVILLE	ONSLOW	No
NONCD0000211	RAYNOR GARBAGE DISPOSAL	BOGUE	CARTERET	No
NONCD0000529	RED SPRINGS DUMP	RED SPRINGS	ROBESON	No
NONCD0000537	REIDSVILLE LANDFILL	REIDSVILLE	ROCKINGHAM	No
NONCD0000190	RHODHISS DUMP	RHODHISS	CALDWELL	No
NONCD0000176	RHODHISS LANDFILL	ICARD	BURKE	No
NONCD0000473	RICH SQUARE REFUSE DISPOSAL	RICH SQUARE	NORTHAMPTON	No
NONCD0000742	RICHARD FRANKLIN LDFL	WAYNESVILLE	HAYWOOD	No
NONCD0000477	RICHARDS REFUSE DISPOSAL	RICHLAND	ONSLOW	No
NONCD0000566	RICHFIELD DUMP	RICHFIELD	STANLY	No
NONCD0000251	RIEGELWOOD DUMP	RIEGELWOOD	COLUMBUS	No
NONCD0000347	ROANOKE RAPIDS CITY LF	ROANOKE RAPIDS	HALIFAX	No
NONCD0000341	ROANOKE RAPIDS LANDFILL	ROANOKE RAPIDS	HALIFAX	No
NONCD0000437	ROBBINS DUMP	ROBBINS	MOORE	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000329	ROBBINSVILLE DUMP	ROBBINSVILLE	GRAHAM	No
NONCD0000420	ROBERSONVILLE DUMP	ROBERSONVILLE	MARTIN	No
NONCD0000711	ROBESON CO RENNERT LDFL	RENNERT	ROBESON	No
NONCD0000530	ROBESON COUNTY LF	ROWLAND	ROBESON	No
NONCD0000517	ROCKINGHAM DUMP	ROCKINGHAM	RICHMOND	No
NONCD0000455	ROCKY MOUNT LANDFILL	ROCKY MOUNT	NASH	No
NONCD0000710	ROCKY MOUNT LDFL (LIEBERS)	ROCKY MOUNT	EDGECOMBE	No
NONCD0000715	ROHN ANDERSON LDFL		COLUMBUS	No
NONCD0000601	ROLESVILLE DUMP	ROLESVILLE	WAKE	No
NONCD0000618	ROPER REFUSE DISPOSAL	ROPER	WASHINGTON	No
NONCD0000281	ROSE HILL DUMP	ROSE HILL	DUPLIN	No
NONCD0000561	ROSEBORO DUMP	ROSEBORO	SAMPSON	No
NONCD0000590	ROSMAN DUMP	ROSMAN	TRANSYLVANIA	No
NONCD0000589	ROSMAN RESEARCH LF		TRANSYLVANIA	No
NONCD0000523	ROWLAND REFUSE DUMP	ROWLAND	ROBESON	No
NONCD0000494	ROXBORO DUMP	ROXBORO	PERSON	No
NONCD0000139	ROXOBEL REFUSE DISPOSAL	ROXOBEL	BERTIE	No
NONCD0000467	RURAL GARBAGE SERVICE		NEW HANOVER	No
NONCD0000274	RURAL GARBAGE SERVICE, INC.	THOMASVILLE	DAVIDSON	No
NONCD0000555	RUTHERFORDTON DISPOSAL	RUTHERFORDTON	RUTHERFORD	No
NONCD0000724	S MEBANE ST LDFL	BURLINGTON	ALAMANCE	No
NONCD0000557	SALEMBURG DUMP	SALEMBURG	SAMPSON	No
NONCD0000543	SALISBURY LANDFILL	SALISBURY	ROWAN	No
NONCD0000505	SALUDA REFUSE DUMP	SALUDA	POLK	No
NONCD0000706	SAMPSON CO LDFL (CARTERS		SAMPSON	No
NONCD0000702	SAMPSON CO LDFL (INGOLD)	INGOLD	SAMPSON	No
NONCD0000703	SAMPSON CO LDFL (IVANHOE)	IVANHOE	SAMPSON	No
NONCD0000701	SAMPSON CO LDFL (MT GILEAD)	MT GILEAD	SAMPSON	No
NONCD0000705	SAMPSON CO LDFL (ROWAN)	ROWAN	SAMPSON	No
NONCD0000700	SAMPSON CO LDFL (SPIVEYS	SPIVEYS CORNER	SAMPSON	No
NONCD0000704	SAMPSON CO LDFL	SUTTONTOWN	SAMPSON	No
NONCD0000514	SANDFILL INDUSTRIAL DUMP	ROCKINGHAM	RICHMOND	No
NONCD0000390	SANFORD DUMP	SANFORD	LEE	No
NONCD0000305	SANITARY LANDFILL		FORSYTH	No
NONCD0000109	SANITARY PICK-UP SERVICE	TAYLORSVILLE	ALEXANDER	No
NONCD0000637	SARATOGA DUMP	SARATOGA	WILSON	No
NONCD0000563	SCOTLAND COUNTY COMM. DUMP	LAURINBURG	SCOTLAND	No
NONCD0000344	SCOTLAND NECK DUMP	SCOTLAND NECK	HALIFAX	No
NONCD0000596	SCUPPENONG COMM. DUMP	SCUPPERNONG	TYRRELL	No
NONCD0000471	SEABOARD REFUSE DISPOSAL	SEABOARD	NORTHAMPTON	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000507	SEAGROVE DUMP	SEAGROVE	RANDOLPH	No
NONCD0000381	SELMA REFUSE DUMP	SELMA	JOHNSTON	No
NONCD0000398	SEVEN SPRINGS DUMP	SEVEN SPRINGS	LENOIR	No
NONCD0000159	SHALLOTTE REFUSE DUMP	SHALLOTTE	BRUNSWICK	No
NONCD0000152	SHALLOTTE SANITARY LANDFILL	SHALLOTTE	BRUNSWICK	No
NONCD0000450	SHARPSBURG DUMP	SHARPSBURG	NASH	No
NONCD0000242	SHELBY REFUSE DUMP	SHELBY	CLEVELAND	No
NONCD0000195	SHEW REFUSE DISPOSAL		CABARRUS	No
NONCD0000225	SILER CITY DUMP	SILER CITY	CHATHAM	No
NONCD0000639	SIMS REFUSE DISPOSAL	SIMS	WILSON	No
NONCD0000385	SMITHFIELD REFUSE DUMP	SMITHFIELD	JOHNSTON	No
NONCD0000337	SNOW HILL DUMP	SNOW HILL	GREENE	No
NONCD0000493	SOLOMON'S DUMP	ROXBORO	PERSON	No
NONCD0000775	SOUND SHORES LOTS 18 & 19	OCRACOKE	HYDE	No
NONCD0000247	SOUTH EARL DUMP	EARL	CLEVELAND	No
NONCD0000668	SOUTH SAUDERS STREET DUMP	RALEIGH	WAKE	No
NONCD0000762	SOUTHERN PINES DUMP	SOUTHERN PINES	MOORE	No
NONCD0000447	SOUTHERN PINES LANDFILL	SOUTHERN PINES	MOORE	No
NONCD0000480	SOUTHWEST LF	JACKSONVILLE	ONSLOW	No
NONCD0000472	SOVERN REFUSE DISPOSAL		NORTHAMPTON	No
NONCD0000114	SPARTA REFUSE DISPOSAL	SPARTA	ALLEGHANY	No
NONCD0000542	SPENCER LAND DISPOSAL AREA	SPENCER	ROWAN	No
NONCD0000550	SPINDALE REFUSE DISPOSAL	SPINDALE	RUTHERFORD	No
NONCD0000533	SPRAY DUMP		ROCKINGHAM	No
NONCD0000452	SPRING HOPE DUMP	SPRING HOPE	NASH	No
NONCD0000268	SPRING LAKE DUMP	SPRING LAKE	CUMBERLAND	No
NONCD0000432	SPRUCE PINE REFUSE DISPOSAL	SPRUCE PINE	MITCHELL	No
NONCD0000526	ST. PAULS DUMP	ST PAULS	ROBESON	No
NONCD0000206	STACY REFUSE DUMP	STACY	CARTERET	No
NONCD0000567	STANFIELD DUMP	STANFIELD	STANLY	No
NONCD0000316	STANLEY REFUSE DUMP	STANLEY	GASTON	No
NONCD0000371	STATESVILLE DUMP	STATESVILLE	IREDELL	No
NONCD0000635	STATONSBURG DUMP	STANTONSBURG	WILSON	No
NONCD0000265	STEDMAN DUMP	STEDMAN	CUMBERLAND	No
NONCD0000578	STOKES COUNTY LF		STOKES	No
NONCD0000573	STOKES GARBAGE SERVICE		STOKES	No
NONCD0000721	STONE QUARRY RD LDFL	BURLINGTON	ALAMANCE	No
NONCD0000532	STONEVILLE DUMP	STONEVILLE	ROCKINGHAM	No
NONCD0000330	STOVALL DUMP	STOVALL	GRANVILLE	No
NONCD0000125	SUBURBAN SANITATION SERVICE	WASHINGTON	BEAUFORT	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000518	SUBURBAN WASTE & GARBAGE	ROCKINGHAM	RICHMOND	No
NC0210020541	SUNNY POINT BASE LANDFILL	SOUTHPORT	BRUNSWICK	No
NONCD0000588	SWAIN COUNTY DUMP	BRYSON CITY	SWAIN	No
NONCD0000366	SWAN QUARTER DUMP	SWAN QUARTER	HYDE	No
NONCD0000476	SWANSBORO DUMP	SWANSBORO	ONSLOW	No
NONCD0000378	SYLVA DUMP		JACKSON	No
NONCD0000257	TABOR CITY DUMP	TABOR CITY	COLUMBUS	No
NONCD0000759	TALLMAN CLAY PIT	WILMINGTON	NEW HANOVER	No
NONCD0000143	TARHEEL REFUSE DISPOSAL	TARHEEL	BLADEN	No
NONCD0000729	TATE ST LDFL	MEBANE	ALAMANCE	No
NONCD0000112	TAYLORSVILLE DUMP	TAYLORSVILLE	ALEXANDER	No
NONCD0000278	THOMASVILLE LANDFILL	THOMASVILLE	DAVIDSON	No
NONCD0000406	TIN MINE LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000750	TOWN OF HAMLET LDFL	HAMLET	RICHMOND	No
NONCD0000714	TOWN OF MAXTON LDFL	MAXTON	ROBESON	No
NONCD0000135	TOWN OF WASHINGTON PARK	WASHINGTON PARK	BEAUFORT	No
NONCD0000356	TOWN OF WAYNESVILLE DUMP	WAYNESVILLE	HAYWOOD	No
NONCD0000386	TRENTON REFUSE DISPOSAL	TRENTON	JONES	No
NONCD0000436	TROY LANDFILL	TROY	MONTGOMERY	No
NONCD0000504	TRYON REFUSE DISPOSAL	TRYON	POLK	No
NONCD0000223	UNKNOWN	CONOVER	CATAWBA	No
NONCD0000661	UNKNOWN #1 - PITT		PITT	No
NONCD0000662	UNKNOWN #1 - RANDOLPH	PLEASANT RIDGE	RANDOLPH	No
NONCD0000660	UNKNOWN #2 - PITT	GREENVILLE	PITT	No
NONCD0000663	UNKNOWN #2 - RANDOLPH	COLERIDGE	RANDOLPH	No
NONCD0000238	UPPER CLEVELAND DUMP	FALLSTON	CLEVELAND	No
NONCD0000174	VALDESE REFUSE DUMP	VALDESE	BURKE	No
NONCD0000260	VANCEBORO DUMP	VANCEBORO	CRAVEN	No
NONCD0000487	VANDEMERE DUMP	VANDEMERE	PAMLICO	No
NONCD0000441	VASS DUMP	VASS	MOORE	No
NONCD0000676	W DAVIDSON CO LDFL		DAVIDSON	No
NONCD0000772	W R BONSAL #1	LILESVILLE	ANSON	No
NONCD0000774	W R BONSAL #2		ANSON	No
NONCD0000243	WACO DUMP	WACO	CLEVELAND	No
NONCD0000117	WADESBORO LANDFILL	WADESBORO	ANSON	No
NONCD0000613	WAKE FOREST TOWN LF	WAKE FOREST	WAKE	No
NONCD0000288	WALLACE DUMP	WALLACE	DUPLIN	No
NONCD0000577	WALNUT COVE DUMP	WALNUT COVE	STOKES	No
NONCD0000574	WALNUT COVE LF	WALNUT COVE	STOKES	No
NONCD0000189	WALSH REFUSE DUMP		CALDWELL	No

INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY

OLD UNLINED LANDFILLS (Cont.)

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000334	WALSTONBURG DUMP	WALSTONBURG	GREENE	No
NONCD0000609	WALTON'S DUMP	WENDELL	WAKE	No
NONCD0000696	WALTON'S SANITATION SERVICE	MORRISVILLE	WAKE	No
NONCD0000616	WARRENTON DUMP	WARRENTON	WARREN	No
NONCD0000285	WARSAW DUMP	WARSAW	DUPLIN	No
NONCD0000129	WASHINGTON DUMP	WASHINGTON	BEAUFORT	No
NONCD0000134	WASHINGTON PARK DUMP	WASHINGTON	BEAUFORT	No
NONCD0000624	WATAUGA COUNTY LF	BOONE	WATAUGA	No
NONCD0000598	WAXHAW DUMP	WAXHAW	UNION	No
NONCD0000667	WE BUFFALOE, JR PRIVATE	GARNER	WAKE	No
NONCD0000161	WEAVERVILLE LANDFILL	WEAVERVILLE	BUNCOMBE	No
NONCD0000346	WELDON CITY LANDFILL	WELDON	HALIFAX	No
NONCD0000342	WELDON REFUSE DISPOSAL	WELDON	HALIFAX	No
NONCD0000438	WEST END DUMP	WEST END	MOORE	No
NONCD0000586	WEYERHAUSER LF	ELKIN	SURRY	No
NONCD0000652	WHEELERS SAND ROCK PIT		DAVIDSON	No
NONCD0000444	WHISPERING PINES DUMP		MOORE	No
NONCD0000453	WHITAKERS DUMP	WHITAKERS	NASH	No
NONCD0000146	WHITE LAKE REFUSE DUMP	WHITE LAKE	BLADEN	No
NONCD0000256	WHITEVILLE DUMP	WHITEVILLE	COLUMBUS	No
NONCD0000670	WICKER PARK LANDFILL	PINEHURST	MOORE	No
NONCD0000754	WILKES CO LDFL	ROARING RIVER	WILKES	No
NONCD0000633	WILKESBORO REFUSE DISPOSAL	WILKESBORO	WILKES	No
NONCD0000419	WILLIAMSTON DUMP	WILLIAMSTON	MARTIN	No
NONCD0000466	WILMINGTON LANDFILL	WILMINGTON	NEW HANOVER	No
NONCD0000756	WILMINGTON LDFL (KIDDER ST)	WILIMINGTON	NEW HANOVER	No
NONCD0000640	WILSON SANITARY LF	WILSON	WILSON	No
NONCD0000141	WINDSOR REFUSE DISPOSAL	WINDSOR	BERTIE	No
NONCD0000597	WINGATE DUMP	WINGATE	UNION	No
NONCD0000151	WINNABOW LANDFILL	WINNABOW	BRUNSWICK	No
NONCD0000210	WINSTON HILL LF	ATLANTIC	CARTERET	No
NONCD0000499	WINTERVILLE DUMP	WINTERVILLE	PITT	No
NONCD0000360	WINTON DUMP	WINTON	HERTFORD	No
NONCD0000758	WISTERIA DR LDFL	WILMINGTON	NEW HANOVER	No
NONCD0000468	WOODLAND REFUSE DISPOSAL	WOODLAND	NORTHAMPTON	No
NONCD0000464	WRIGHTSVILLE BEACH DUMP	WRIGHTSVILLE BEACH	NEW HANOVER	No
NONCD0000647	YADKINVILLE REFUSE DISPOSAL	YADKINVILLE	YADKIN	No
NONCD0000158	YAUPON BEACH DUMP	YAUPON BEACH	BRUNSWICK	No
NONCD0000608	ZEBULON DUMP	ZEBULON	WAKE	No

January 28, 2003 ERC Meeting
EXHIBIT S

Annual Report to the North Carolina General Assembly

The NC Brownfields Program

January 2003

NCDENR
NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

Superfund Section
Division of Waste Management
http://www.ncbrownfields.org/

Department of Environment and Natural Resources

Michael F. Easley
Governor

William G. Ross Jr.
Secretary
NC Department of Environment and Natural Resources

Dexter R. Matthews
Director
Division of Waste Management

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Brownfields Property Reuse Act
Annual Report to the General Assembly
January 2003

Executive Summary

This report to the General Assembly, required by the Brownfields Property Reuse Act (BPRA) of 1997 (G.S. 130-310.30 *et seq.*), describes the Brownfields Program's growth during 2002. It also examines the effectiveness of the BPRA in encouraging and facilitating the safe reuse of abandoned, idled or underutilized properties where environmental liability has hindered redevelopment.

DENR reports that the Brownfields Program continued to build on its past success with expanded cost effectiveness and leveraging capability. The program completed a record 10 brownfields agreements during 2002, which brought the total number of completed agreements to 26. These 26 projects represent more than $400 million in committed private investment in brownfields redevelopment across the state. Demand for services is increasing. In 2002, the program received a record 21 Letters of Intent from prospective developers seeking entry into the program. DENR's efforts to address the program's expanding inventory and the increasing demand are briefly described below.

1) In May, DENR filled the position funded by a cooperative agreement between Charlotte and DENR. The agreement set a national precedent by establishing the first state brownfields program position funded directly by a municipality. The brownfields staff member works in a city-supplied office and works exclusively to advance Charlotte's brownfields projects. The city is a proven center of brownfields redevelopment activity with nine agreements completed and many more pending.
2) In October, the U.S. EPA's Region 4 recognized the program's progress and demonstrated success by approving DENR's request for increased funding to hire another staff member. The additional $170,000 continues funding for the existing federally funded staff position and allowed the program to fill its third brownfields staff position, a hydrogeologist, to work on projects across the state.
3) In December 2002, DENR submitted a grant proposal entitled "Brownfields Assessment Outreach for Rural North Carolina Communities" to take advantage of federal funds made available to local and state governments by the U. S. EPA under the new federal brownfield statute. If awarded, the grant has a potential value as high as $700,000.

Background

Brownfield properties are abandoned, idled or underutilized properties whose redevelopment is hindered by actual or perceived environmental contamination. The BPRA creates a mechanism that modifies the environmental liability barrier for prospective developers who did not cause or contribute to the contamination. The legal vehicle to do this is termed a brownfields agreement. Under the BPRA, DENR may provide prospective developers a brownfields agreement that limits their cleanup liability to those specific actions DENR deems necessary to make the property safe for reuse. As a result, these projects can obtain financing for redevelopment without the cloud of uncertainty associated with cleanup liability. Under the BPRA, DENR gained the authority to enter into brownfields agreements with prospective developers as of October 1, 1997.

The BPRA provides guidelines for a new public policy that allows DENR to treat prospective developers of brownfield properties differently from the polluters of these properties. Rather than requiring cleanup of the site to current standards, DENR requires the developer to make the site safe for reuse by first examining the health or environmental risk on a site and then determining what, if anything, the prospective developer must do to ensure safe redevelopment. These actions can range from land-use restrictions to cleanup, or a mixture of both. Typically, prospective developers achieve economic viability for the brownfields project by not having to clean up groundwater to state 2L standards where the prospective developer can show that the groundwater does not threaten wells, surface water or other receptors. However, DENR reserves the right to enforce against any parties responsible for the contamination by requiring cleanup to current 2L groundwater standards. A brownfields agreement defines the actions that the prospective developer must perform. In return, the prospective developer receives liability protection once those activities are completed.

The steps involved in creating a brownfields agreement are shown below:

Summary of the Brownfield Process

Step 1 - DENR determines if the prospective developer and the property proposed for reuse are eligible under the BPRA statute.

Step 2 - DENR reviews existing site data to determine the risk posed by contamination at the site. If the data are insufficient to evaluate such risk, DENR advises the prospective developer on further site assessment to gather the necessary data.

Step 3 - DENR determines what actions are necessary to make the site safe for reuse and includes these actions in a brownfields agreement.

Step 4 - The brownfields agreement is published with a 60-day public comment period.

Step 5 - The brownfields agreement is finalized after any public comments are considered and incorporated. Once the agreement is final, the prospective developer uses the brownfields agreement, and the liability protection it provides, to obtain financing for the project. Liability protection is contingent on completion of safe-making steps.

The overall result is a win-win scenario for both the environment and economic development. Risk reductions and cleanups are achieved at sites that could have posed a risk to the public or

the environment and prospective developers are able to redevelop abandoned properties that otherwise had little hope for redevelopment or productive reuse. The ancillary public benefits of job creation, improved quality of life in the surrounding neighborhoods, expansion of the local tax base and general fund revenue are other positive impacts.

The program also supports smart growth, sustainability, and the One North Carolina agenda since every project that reuses property in urban centers reduces suburban sprawl and preserves green space. Were it not for the availability of brownfields agreements, many of the redevelopment dollars spent on these projects would otherwise have been spent on projects that contribute to suburban sprawl or promote commercial development in greenspace areas. In a very real sense, for each brownfield redeveloped, a greenspace is saved.

Program Status

A record number of Letters of Intent were submitted during 2002, despite economic conditions that were less favorable for development than in previous years. This clearly indicates an increase in demand for Brownfields Program service. Demand is expected to increase as a result of the program's improved capacity to educate the development community about the brownfield property tax incentive. The award of federal assessment and cleanup grant funding to some of the North Carolina municipalities will further increase demand. The brownfields staff added in 2002 are critically needed to meet current and anticipated demands and provide the resources needed to continue the program's momentum.

A summary description of all brownfields projects in the program's pipeline at the end of 2002 is provided in the Appendix. The table is divided into three sections: active eligible projects, projects pending eligibility and projects with finalized brownfields agreements.

Active eligible projects are those that meet the statutory eligibility criteria and are in some stage of data gathering, analysis, or negotiation of a brownfields agreement. While most are awaiting the submittal of additional site data requested by the program, a few projects are delayed due to past staffing limits.

Projects pending eligibility are those that have not yet been determined to be eligible for the Program under the statutory requirements. For those few projects, the Program is waiting for requested clarification or additional information from the prospective developer regarding specific eligibility requirements.

Projects with finalized brownfields agreements have either completed the public notice phase of the brownfields process and have a signed agreement or the agreement is waiting to be executed.

Brownfield Project Demographics

Brownfield sites in heavily industrial regions of the country tend to be almost exclusively in urban areas. However, North Carolina's tradition of rural manufacturing creates a significant number of rural brownfields opportunities.

This fact is reflected in the program's inventory of projects. Four of the 10 agreements completed during 2002, and about one-third of the program's 26 completed agreements, are for projects in rural settings. Additionally, half of the program's 40 eligible and pending projects are rurally located.

The staff hired last year will greatly expand the outreach needed to make rural communities more aware of the state's Brownfields Program. As a result, the public benefits of brownfields reuse so familiar to urban centers will be increasingly realized in rural regions of the state. DENR recognizes the importance of rural brownfields to their surrounding communities. The most recent EPA brownfields grant application targets an expansion of its rural efforts for the safe and productive redevelopment of brownfields.

Significant Events Affecting Brownfields

In January 2002, long-awaited brownfields related reforms of the federal Superfund Program became reality when President Bush signed into law the Small Business Liability Relief and Brownfields Revitalization Act (SBLRBRA). This statute makes changes to the Comprehensive Environmental Response, Compensation and Liability Act's liability framework. The reforms provide liability relief to small business and removes prospective purchasers of brownfields properties from federal liability as long as they did not cause the contamination at the site. It is interesting to note that the federal act's disparate treatment between causative and non-causative parties is similar to the public policy found in North Carolina's BPRA.

The SBLRBRA also provides for direct funding for state and local brownfields programs, an element of equal or greater importance than the liability reform. The fact that this funding was generally not possible under CERCLA was one of the driving forces for reform. The law authorizes a total of up to $250 million annually through 2006 for this effort. For a summary of the SBLRBRA provisions that affect brownfields redevelopment, please see Table 2.

In a significant event for the state and Charlotte, the U.S. EPA held its national conference, "Brownfields 2002: Investing in the Future," in the city. The conference was the largest to date and drew over 3,400 brownfields professionals to Charlotte from November 13th through November 15th. DENR's Secretary Ross was an active participant. He spoke five times over three days, co-hosted the national awards show, and signed the state's 24th and most highly valued brownfields project to date in a well attended public ceremony.

Table 1. Summary of the Major Provisions of the Small Business Liability Relief and Brownfields Revitalization Act.

Liability Provisions

1. Provides liability relief for future buyers of brownfields property who are not responsible for contamination, allow site access for cleanup, and exercise appropriate care with respect to the contamination. These buyers are subject to windfall liens placed on the property for the value of the property, or for the total amount of government resources expended for cleanup, whichever is less.
2. Clarifies liability relief provided to both innocent landowners (who had no reason to know the property was contaminated) and contiguous property owners and the showings each must make to obtain that relief.
3. Protects sites cleaned up under a state response program (in North Carolina, the State Inactive Hazardous Sites Program) from being subject to Federal Enforcement or CERCLA.
4. Specifies the circumstances under which the federal government reserves rights to reopen a site or bring its own enforcement action. This includes sites where it is determined that a cleanup conducted by the state is no longer protective, at sites whenever requested by a state, or when the site contamination crosses state lines or onto federal property.

Funding Provisions

1. The Act authorizes $50 million annually from 2002 through 2006 in direct federal grants to support state and Indian tribe response programs. (This provision is a marked departure from CERCLA, which did not permit federal funding of state voluntary cleanup or brownfields programs.) These funds may be used flexibly by states and tribes to broadly enhance the capability of these programs as well as to provide specific brownfield incentives: for example, capitalizing a revolving loan fund.
2. The Act authorizes $200 million annually in additional funds in years 2002 through 2006 for grants to states, tribes, and local or municipal governments. Funds are used to assess and cleanup brownfields properties or to provide technical assistance for such efforts. $50 million of this amount (or 25 percent of the ultimate budgeted amount if less than $200 million) is set aside for brownfield sites with petroleum contamination. (This provision is interesting in that the funding provided would be for sites that may be outside CERCLA liability, since petroleum contamination is exempt from CERCLA.)

Funding Opportunities in Flux

To date, DENR has relied exclusively on limited federal funds provided by targeted brownfields cooperative agreements to operate the Brownfields Program. DENR broke new ground with its funding agreement with Charlotte. With Charlotte funding a staff person to work on brownfield agreements in the city, the program was expanded without additional overhead. Funding uncertainties inherent to relying on grants continue to exist, but the developing federal infrastructure appears more likely to provide significant future funds. DENR has taken the following active steps to take full advantage of the opportunity to garner federal funds to support brownfields redevelopment in the state.

1. In December, DENR submitted a SBLRBRA Subtitle A Grant proposal, "Brownfields Assessment Outreach for Rural North Carolina Communities," on behalf of 10 small North Carolina communities. The objective is to stimulate brownfields redevelopment in the state's rural areas by providing funding for environmental assessment to communities with identified brownfields redevelopment opportunities that lack the infrastructure to apply for and administer these funds themselves. In selecting the 13 initial sites for this proposal, DENR, in partnership with the N.C. Department of Commerce, solicited input from brownfields stakeholders in rural communities across the state. If the EPA chooses the grant proposal, up to $700,000 will be provided for environmental assessment at these 13 sites and, possibly, additional rural brownfields properties.

2. DENR plans to apply for a SBLRBRA Subtitle C Cooperative Agreement in 2003. The objective is to operate a significantly expanded brownfields program capable of meeting the increasing demand. At the request of EPA Region 4, and in advance of the formal proposal, DENR recently submitted a preliminary funding request summary that outlines the scope of the envisioned program. Most significantly, the request includes funding for brownfields staff in most, if not all, of DENR's seven regional offices. Improved customer service and reduced processing times are the expected outcomes. If granted, the cooperative agreement's value could equal or exceed $1 million.

All federal funding opportunities are still uncertain because Congress has not yet budgeted the money into the program as authorized under the act. Once this step is accomplished, the EPA will seek formal funding applications from states. It is anticipated that these funds will not be provided until October 2003, the start of the next federal fiscal year. At present, the program has two federally funded staff members and one funded through the agreement with Charlotte.

Improving Effectiveness

In its five-year existence, the Brownfields Program has provided a high "bang for the buck" on the federal and city funds on which it has operated. The 26 completed brownfields agreements represent over $400 million in committed private investment in brownfields projects. To date, the program has spent approximately $200,000 in public funds ($170,000 from federal cooperative funding, and $30,000 from Charlotte). The extent to which these funds have been successfully leveraged proves that the BPRA is effective. However, increasing the volume of projects moved through the brownfields process will significantly improve current levels of effectiveness.

Adding program staff in 2002 significantly reduced the queue of projects pending and moved others more quickly through the pipeline. In addition to effectiveness, the program made gains in efficiency as well. Implementing internal technical protocols and a project tracking system reduced process time, as did streamlining various administrative elements. Improvements to and maintenance of the program's Web site made additional and more timely information available to brownfields stakeholders. The result was less time spent personally conveying this information and more time spent processing Brownfields Program applications. The net result was a record number of completed agreements in 2002.

For 2003 and beyond, any large volume increase in program output will come from staff resources derived from federal funds under the SBLRBRA. This opportunity to provide a higher volume of brownfields redevelopment, and their commensurate public benefits, will be DENR's focus for the future.

Fund Status

As of the end of calendar year 2002, the Brownfields Property Reuse Act Implementation Account has a balance of $23,958.81. 2002 expenditures measured $4,622.57, the majority of which was spent on program informational brochures and DENR's participation in the Brownfields 2002 conference EPA hosted in North Carolina this year.

Further Information

For additional information on the Brownfields Program and how it works, please visit our Web site at **www.ncbrownfields.org.**

Appendix - Status Summary of Brownfield Projects as of January 1, 2003

ACTIVE ELIGIBLE PROJECTS (33)

8th STREET LANDFILL
West 8th Street
Kannapolis, Rowan Co.
PD: City of Kannapolis

Former landfill operated by Cannon Mills for the disposal of residential, commercial and industrial waste from the early 1900s through 1972. Landfill contents may include hazardous and regulated compounds. Prospective Developer intends to redevelop the site for public recreational and dedicated open space uses.

ABC ENGRAVERS
724 North I-85
Charlotte, Mecklenburg Co.
PD: Holden Business Park, LLC

Former engraving and plating facility with known chromium and chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site as an office complex.

AIRPORT EXXON
3305 North Liberty St.
Winston-Salem, Forsyth Co.
PD: Mrs. Becky Flowers

Former automobile engine repair and maintenance facility with known soil and likely groundwater contamination involving petroleum and degreasing solvent constituents. Intended redevelopment is a gas station/convenience store to serve Smith-Reynolds Airport users and employees.

ALAMAC AMERICAN
1885 Alamac Road
Lumberton, Robeson Co.
PD: Alamac American Knits, LLC

150 acre site containing a textile manufacturing facility. Known chlorinated solvent contamination from previous site operations exists in groundwater at the site. PD intends to take over existing water quality monitoring plan prepared under NC Division of Water Quality and to redevelop the property in textile manufacturing.

AUSTIN FOODS
315 East Chatham Street
Cary, Wake Co.
PD: Cary Ice Company

Six acre site containing former food processing and warehousing facilities. Known pesticide and herbicide contamination from previous site operations exists in site soil and groundwater. PD intends to redevelop the property as an ice manufacturing and distribution facility.

BROWN'S SOLVENT CO.
2935 Griffith Street
Charlotte, Mecklenburg Co.
PD: Kathryn C. Bell Estate

Former paint and solvent formulation facility with known solvent-impacted soil and groundwater. PD intends to initially renovate and reuse the existing structure for office/warehouse use. The long-term plan is to raze the building and redevelop the site as a mixed office/retail complex in keeping with other redevelopment taking place in Charlotte's South End.

BURLINGTON – JAMESTOWN
6008 High Point Road
Jamestown, Guilford Co.
PD: Alberdingk Boley, Inc.

22-acre site containing an abandoned chemical formulation facility operated to support Burlington Industries textile manufacturing operations. Known chlorinated and petroleum hydrocarbon contamination in soil and groundwater is being addressed under a DENR consent order. PD intends to redevelop the property as polyurethane and polyacrylate emulsions manufacturing facility.

BURLINGTON MILLS
476 South Main St.
Mooresville, Iredell Co.
PD: Cherokee Investment Partners

Abandoned textile-manufacturing facility with known petroleum hydrocarbon contamination in soil and groundwater and chlorinated solvent contamination in groundwater. PD intends to redevelop the site as an auto racing industry complex with office, flex, shop and R&D space.

CAMEL CITY CLEANERS
501 East Third St.
Winston-Salem, Forsyth Co.
PD: Brownfields Redevelopment International, LLC

Former dry cleaning facility with chlorinated solvent-impacted soil and groundwater from dry cleaning operations and semi-volatile impacted groundwater from a nearby manufactured gas plant facility. Intended reuse is for commercial/light industrial flex space.

CAROLINA LOG BUILDINGS
Howard Gap Rd at US Hwy. 25
Fletcher, Henderson Co.
PD: Town of Fletcher

Former wood treating facility with known pentachlorophenol contamination in soil and groundwater. PD intends to redevelop the 30-acre site as the new heart of the Town of Fletcher to include various office and retail uses.

CAROLINA METALS
Howard Gap Rd at US Hwy. 25
Fletcher, Henderson Co.
PD: Town of Fletcher

Former metal fabrication facility with metals contamination in soil, and metals and chlorinated solvent-impacted groundwater. PD intends to redevelop the 4.2-acre site as a residential apartment complex.

CHATHAM MANUFACTURING
NC Hwy. 268
Elkin, Surry Co.
PD: Town of Elkin

30 acre site containing solid waste disposal area used by former textile manufacturing facility. Volatile and semi-volatile organic compound contamination exists in groundwater at the site. PD intends to redevelop the property for park and recreational uses in keeping with the current use of adjoining property as baseball fields.

CHEROKEE OIL
925 Summit Avenue
Charlotte, Mecklenburg Co.
PD: M & J Equities, LLC

Approximately two acre site was formerly a non-permitted hazardous waste storage facility and the site of an EPA removal action. Known arsenic, oil and grease, and solvent contamination in soil and groundwater. PD intends to redevelop the property as a nightclub and parking facility.

CLAWSON RADIATOR
So. Tryon St. & W. Park Ave.
Charlotte, Mecklenburg Co.
PD: Mr. Gains Brown

Former automobile radiator repair facility with metals contamination in soil and groundwater. PD intends to redevelop the site as studio and office space for professionals in the graphic and industrial design industry.

CMI WWTP
NC Hwy. 268
Elkin, Surry Co.
PD: Town of Elkin

Eleven acre site in the Yadkin River flood plain that was once home of an industrial waste water treatment plant with excess permitted capacity. Known VOC and SVOC contamination in soil and groundwater. PD intends to consolidate the town's sanitary and current industrial waste into this facility that allows for current and future waste treatment requirements.

DYNATECH INDUSTRIES
2213 Toomey Ave.
Charlotte, Mecklenburg Co.
PD: R. G. Automation, Inc.

Former plating facility with metals-impacted soil and groundwater. EPA conducted soil removal activities at the site and has classified it as no further remedial action planned. PD intends to redevelop the property for use as mixed office/retail complex.

EAST GANNON PROPERTY
SE corner East Gannon and Arendell Avenues
Zebulon, Wake Co.

P.D. Berkshire-Hudson Capital XI, LLC

This property consists of four parcels of land totaling 1.75 acres with four existing structures (former restaurant, current auto sales, auto service garage and hair salon). Site to be redeveloped into a stand-alone Eckerd Drug Store with surrounding complementary retail tenants. Soil and groundwater are contaminated with petroleum constituents from above ground storage tanks used by previous gas station.

EAST PARK – JOAL REALTY
Elizabeth Ave. parcels
Charlotte, Mecklenburg Co.
PD: East Park, LLC

Portion of 24 acre site encompassing a six-block area with known chlorinated solvent contamination. PD intends to redevelop the site as a model for urban infill mixed-use development with an emphasis on the needs of pedestrians in an urban setting. The site is part of the City of Charlotte's East Park re-development zone located between the central business district and the historic residential neighborhoods of Elizabeth and Myers Park.

EAST PARK – KOSSOVE
East Fourth St. parcels
Charlotte, Mecklenburg Co.
PD: East Park, LLC

Portion of 24 acre site encompassing a six-block area with known chlorinated solvent contamination. PD intends to redevelop the site as a model for urban infill mixed use development with an emphasis on the needs of pedestrians in an urban setting. Also part of the City of Charlotte's East Park re-development zone.

FISHBURNE EQUIPMENT
Airport Road
Arden, Buncombe Co.
PD: R. & P. Van Praag

Former metal fabrication and tobacco press manufacturing facility with suspected VOC contamination in soil and groundwater, based on detection of these compounds on adjoining, downgradient property, the former Buncombe County landfill. PD intends to redevelop the site for light manufacturing/assembly, warehousing and public storage uses.

FLEMINGTON LANDFILL
NC Hwy. 421
Wilmington, New Hanover Co.
PD: Cape Fear SoccerPlex, LLC

Site of a closed (1979), privately operated domestic and industrial solid waste landfill with VOC-impacted soil and groundwater. Intended reuse is for a soccer complex. This is the first former landfill property proposed for redevelopment under the N.C. brownfields statute. The project's feasibility and technical challenges are being carefully evaluated as a model for future like projects.

GLEN RAVEN MILLS
114 Raven Circle
Kings Mountain, Cleveland Co.
PD: Consortium for Progress

Former textile manufacturing facility with solvent contamination in groundwater. PD intends to redevelop the property as a residential/retirement center for senior citizens. Responsible party will continue assessment and/or cleanup activities under state Voluntary Cleanup Program.

GREY HOSIERY MILL
Fourth & Laurel Streets
Hendersonville, Henderson Co.
PD: Old Mill Arts Committee

Former hosiery manufacturing facility located in downtown Hendersonville with low concentrations of chlorinated solvents in site groundwater. PD intends to renovate the building and redevelop the property as a performing arts center.

GUILFORD MILLS
West Wendover Ave.
Greensboro, Guilford Co.
PD: Wendover Crossing, LLC

55 acre site containing former textile manufacturing facility with known VOC contamination in soil and groundwater. PD intends to redevelop the property in mixed retail uses. Public benefits include the creation of an estimated 500 jobs and substantial tax role increases.

HOME INNOVATIONS SITE
Hwy 52 S & Ratliff Gin Road
Morven, Anson Co.
PD: Dan River Inc.

Former textile manufacturing facility with petroleum hydrocarbon and VOC contamination in soil and groundwater. PD intends to redevelop the site as a modern textile manufacturing operation that will not use the contaminating VOC compounds. Project has significant job creation potential.

MALLARD CREEK Mallard Creek Road Charlotte, Mecklenburg Co. PD: Colonial Properties Trust	21 acre site adjacent to former auto service station and chainsaw service center operations. Petroleum hydrocarbon and chlorinated solvent contamination in groundwater has migrated onto the subject property. PD intends to redevelop the property as an apartment complex.
QUALITY METAL PRODUCTS 1111 Oates Road Gastonia, Gaston Co. PD: Porter's Fabrications	This 11 acre site contains an abandoned facility of 48,000 square feet formerly used as for metal fabrication. Parts cleaning activities resulted in solvent impacts to site soil and groundwater. PD intends to refurbish the facility for metal fabrication utilizing high-tech, non-contaminating methods.
REDMAN HOMES Redman Crossing Road Mebane, Orange Co. PD: Barber & Ross Company	Former mobile home manufacturing facility with metals and solvent contamination in soil and groundwater. PD has performed drum removal and soil remediation activities. PD intends to redevelop the site as a manufacturing facility to produce windows and doors.
SANFORD WWTP US Hwy 1 and Spring Lane Sanford, Lee Co. PD: S. Wornom & G. Perkins	Former municipal waste water treatment plant site with petroleum impacted sewer sludge and metals impacts in soil and low concentrations of VOCs and SVOCs in groundwater. PD intends to redevelop the property for commercial use, including restaurant, retail space and a multi-screen movie theater.
SHELBY DYEING & FINISHING 1000 West Grover Street Shelby, Cleveland Co. PD: GMAC Commercial Credit, LLC	Former textile dyeing and finishing facility with solvent and metals contamination in soil and groundwater. Through its sale of the property to Environmental Fibers, PD intends to facilitate the redevelopment of the site as a cotton recycling facility. This will bring the two site buildings back into productive use and create jobs and tax base improvements to the community.
SHELBY WILLIAMS 401 Meacham Road Statesville, Iredell Co. PD: Lou Jay Associates, LLC	The 28-acre site contains an idled furniture manufacturing facility with metals contamination in soil and groundwater from former plating operations. Applicant-PD intends to up-fit the facility for the production of high-end cabinetry and add an estimated 650 jobs in the next three years.
SOUTHERN MANUFACTURING 1000 Seaboard Street Charlotte, Mecklenburg Co. PD: Fiber Mills, LLC	This nine-acre site located in inner Charlotte was a former asbestos tile manufacturing facility. Asbestos operations were discontinued in 1986 and the facility was closed in 1999. The site has known asbestos contamination in soils. Intended reuse of the site includes an outdoor amphitheater, a technical business park, or a mixed-use development with industrial, commercial and residential components.
WESTOVER SHOPPING CENTER 1506 West Boulevard Charlotte, Mecklenburg Co. PD: City of Charlotte	Dilapidated shopping center seized in a drug raid by the U.S. Dept. of Justice that has been approved for transfer to the city of Charlotte. Site had VOC and chlorinated solvent contamination in soil and groundwater. The city intends to transfer the property to a not-for-profit development corporation to redevelop the site as commercial retail shopping facility.

PROJECTS PENDING ELIGIBILITY (7)

CENTRAL PARK LANDFILL
NE of intersection of Salem Street and South Main Street
Winston-Salem, Forsyth Co.
PD: Salem Recreational Fields

Former municipal landfill operated by Winston-Salem with low levels of SVOC and VOC contamination in soil and groundwater, respectively, and significant methane generation. Currently an underutilized city park, the PD plans to construct two soccer and one baseball fields for Salem College/Academy on this seven-acre site. Salem College, who will be able to build over their current athletic fields on its landlocked campus, will allow public access to the soccer fields when not in use by the college.

EAST PARK – BOYER
1607 & 1611 E. Fourth St.
Charlotte, Mecklenburg Co.
PD: James & Cecil Boyer

A portion of the 24-acre East Park Development with chlorinated solvent contamination. PD intends to redevelop the site as a pedestrian urban infill mixed-use development. The site is part of the City of Charlotte's East Park re-development zone.

LEARY BROTHERS STORAGE
Virginia & Broad Streets
Edenton, Chowan Co.
PD: Charles M. Reeves III

Approximate six-acre site containing former flower distribution and pesticide storage facility. Known arsenic contamination exists in site soil and groundwater. PD intends to redevelop the property in commercial retail uses.

MOSER-HALL
Indian Trail, Union Co.
PD: Moser-Hall, LLC

Property with petroleum hydrocarbon contamination in groundwater which has migrated onto the property. The source of the contamination was a release from a leaking underground storage tank system located on an adjoining parcel. PD intends to redevelop the site in commercial/retail use.

NATIONAL TEXTILES
Jamestown Road
Morgantown, Burke Co.
PD: National Textiles

Former textile manufacturing facility with chlorinated solvent contamination in soil and groundwater. The Applicant -PD intends to sell the site to an identified potential buyer for conversion and reuse as a furniture manufacturing facility.

RADIATOR SPECIALTY
1900 Wilkinson Blvd.
Charlotte, Mecklenburg Co.
PD: Suttle Avenue, LLC

Idled automotive chemicals, hardware and plumbing supplies manufacturing facility with volatile, semi-volatile and metals contamination in soil and groundwater. PD intends to redevelop the property into a major mixed-use office, retail, commercial, and multi-family residential development.

SPANCO, Inc.
1604 Boone Trail Road
Sanford, Lee Co.
PD: Pier Real Estate, Ltd.

Former hosiery manufacturing facility on approximately 10 acres with chlorinated solvent contamination in soil and groundwater. Applicant-PD intends to redevelop the property for use as a fasteners manufacturing and distribution facility.

FINALIZED BROWNFIELDS AGREEMENTS EITHER IN FORCE OR PENDING SIGNATURE (26)

ALAMAC KNIT FABRIC
Hamilton, Martin Co.

Former textile manufacturing facility with known soil and groundwater contamination involving chlorinated solvents. Site is undergoing active remediation under N.C. DWQ corrective action plan. Intended reuse as a school locker manufacturing facility that will employ some 350 workers.

ANCHOR MILL
Huntersville, Mecklenburg Co.

Abandoned textile manufacturing facility with metals contamination in soil, and groundwater contaminated with lead, chlorinated solvents and petroleum hydrocarbons. PD intends to redevelop the 32-acre site as a mixed-use transit village that reuses the old mill building and adds new office, retail and residential components.

BALDOR ELECTRIC
Charlotte, Mecklenburg Co.

Former electric motor and component manufacturing and assembly facility with solvent impacted soil and groundwater. PD intends to redevelop the property for use as industrial condominiums.

BURKHART CAROLINA
Henderson, Vance Co.

Former pickle processing and packing facility with chloride impacted soil and groundwater and minor solvent contamination in groundwater. PD intends to redevelop the property for commercial retail use. Simultaneously, the responsible party will implement groundwater remediation at the site under separate action. The PD's development will provide an impervious cap on the site, further assisting remedial efforts.

CAMDEN SQUARE
Charlotte, Mecklenburg Co.

Abandoned knitting and printing operations rebuilt into the "Design Center of the Carolinas". Project supported by the Wilmore Community as a vital redevelopment in an economically depressed area. Land use restrictions for chlorinated solvents in groundwater.

CAMDEN SQUARE ADDITION
Charlotte, Mecklenburg Co.

This project added 4.5 acres by amendment to the first brownfields agreement completed in North Carolina. Camden Square is located in Charlotte's South End redevelopment corridor. Contamination includes VOC and SVOC impacted soil and groundwater. Intended reuse is for mixed office and retail.

CAROLINA PRODUCTION FINISHING
Asheville, Buncombe Co.

Former textile finishing facility with metals contamination in both soil and groundwater. PD intends to redevelop the site for warehousing and as a sewing operation. PD is in the process of reviewing DENR's draft brownfields agreement for this site.

C.K. LAND DEVELOPMENT
Charlotte, Mecklenburg Co.

A large mixed use development on a former industrial services firm adjacent to a manufactured gas plant. Ground floor retail and studio with office and residential units above. Project is in vicinity of Camden Square and provides redevelopment to economically depressed area. Capping and land use restrictions regarding polyaromatic hydrocarbons in soil and chlorinated solvents in soil and groundwater.

CUMBERLAND SHOPPING CENTER Greensboro, Guilford Co.	Site of former shopping center and dry cleaner with chlorinated solvent impacted soil and groundwater. PD is a not-for-profit community development corporation. The PD has performed soil remediation activities and intends to redevelop the site with affordable residential housing.
ERWIN SQUARE Durham, Durham Co.	This approximately six-acre property is a portion of a former Burlington Industries site, other portions of which have already been redeveloped. There is known chlorinated solvent contamination in groundwater. These impacts are being addressed under an approved DWQ CAP. PD intends to redevelop the site in high density residential use.
FOOD LION Winston-Salem, Forsyth Co.	A new, large supermarket placed on the site of an abandoned grocery store in urban Winston-Salem. Project had strong community support as a quality of life issue because the community had no supermarket. Land use restrictions for chlorinated solvent contamination in groundwater. Brownfield assessment determined the source to be nearby drycleaner.
HAMILTON PROPERTY Charlotte, Mecklenburg Co.	Dilapidated property bought for the expansion of Cost Effective Maintenance Inc., a small business in the South End area of Charlotte. Expansion into this property allowed CEM to stay in Charlotte instead of move to suburbs. Land use restrictions for chlorinated solvent contamination in groundwater.
HILLSBOROUGH VENTURES Raleigh, Wake Co.	Project involves redeveloping an area of parking lots and dilapidated, underused retail structures. Land use restrictions are in place for the petroleum hydrocarbon and chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the property as mixed residential (private student dormitory for N.C. State University) and retail complex.
HILLSBOROUGH VENTURES ADDITION Raleigh, Wake Co.	Prospective developer added acreage to the footprint of original Hillsborough Ventures project, which involves redeveloping an area of parking lots and dilapidated, underused retail structures adjacent to N.C. State University for mixed residential (private student dormitory) and retail uses.
LEWITH TEXTILE Charlotte, Mecklenburg Co.	Project involves the redevelopment of over 50 acres of abandoned and underused commercial and industrial property, including the former Lewith Textile facility. Contaminants include petroleum hydrocarbon and chlorinated solvents in soil and groundwater. PD intends to redevelop the site as an industrial park for light manufacturing and warehousing/distribution.
LUCENT TECHNOLOGIES Greensboro, Guilford Co.	Former cotton mill and manufacturing facility with chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site in mixed commercial retail/office and residential.
OXFORD PRINTING Oxford, Granville Co.	Former textile printing and finishing facility with VOC contamination in groundwater. PD has conducted remediation of floor drain contents. PD intends to redevelop the site for industrial/distribution use.

PILOT MILLS
Raleigh, Wake Co.

Abandoned, condemned turn-of-the-century textile mill in downtown Raleigh with chlorinated solvent contamination in groundwater and metals contamination in soil. The site has been redeveloped into office space and a charter school. The restored Mill is listed on the National Register of Historic Places.

SINGER COMPANY
Chocowinity, Beaufort Co.

Abandoned rural manufacturing facility with lead and phthalate contamination in soil and groundwater. The brownfields agreement provides for partial site remediation. PD intends to redevelop the site with mixed retail and light industrial uses.

SMITH METAL & IRON
Charlotte, Mecklenburg Co.

Former site of a scrap metal yard and a waste cell created for the temporary disposal of impacted soil removed during the construction of the adjoining Carolina Panther's practice field. The waste in the cell has been removed, but minor chlorinated solvent impacts remain in site groundwater. PD intends to redevelop the site as part of the campus of Johnson and Wales University, a school of culinary arts with an anticipated 2,500 students.

SMITH PROPERTY
Shelby, Cleveland Co.

Project involves the redevelopment of an area occupied by seven underused and dilapidated residential homes with petroleum hydrocarbon and chlorinated solvent contamination in groundwater. PD has the support of local residents to reuse the site as a parking lot serving the Cleveland County Offices.

STATE FARM ROAD
Boone, Watauga Co.

Former residential property with low levels of chlorinated solvent contamination in groundwater and a surface water spring. Contamination resulted from a release at a nearby textile facility. PD intends to redevelop the site as a medical office complex.

TARTAN MARINE
Hamlet, Richmond Co.

Former boat manufacturing facility with lead contamination in soil. Additional site sampling conducted by the PD indicated that previous soil removal actions left no lead contamination above the risk-based cleanup standard. PD intends to redevelop the site as a chair and table base manufacturing facility.

TERRELL MACHINE
Charlotte, Mecklenburg Co.

Site of former textile manufacturing and gearbox machining operations located in Charlotte's South End district. It is being redeveloped with ground floor retail and office/residential above. Remedial actions to eliminate hot spot contamination included soil removal and groundwater pump and treat. Land use restrictions are in place to address remaining chlorinated solvent contamination in groundwater.

VANIER GRAPHICS
Eden, Rockingham Co.

Former printing facility with petroleum and chlorinated hydrocarbon contamination in the soil and solvent contamination in the groundwater. PD intends to redevelop the site as a furniture assembly and upholstering facility.

WEST MOREHEAD
Charlotte, Mecklenburg Co.

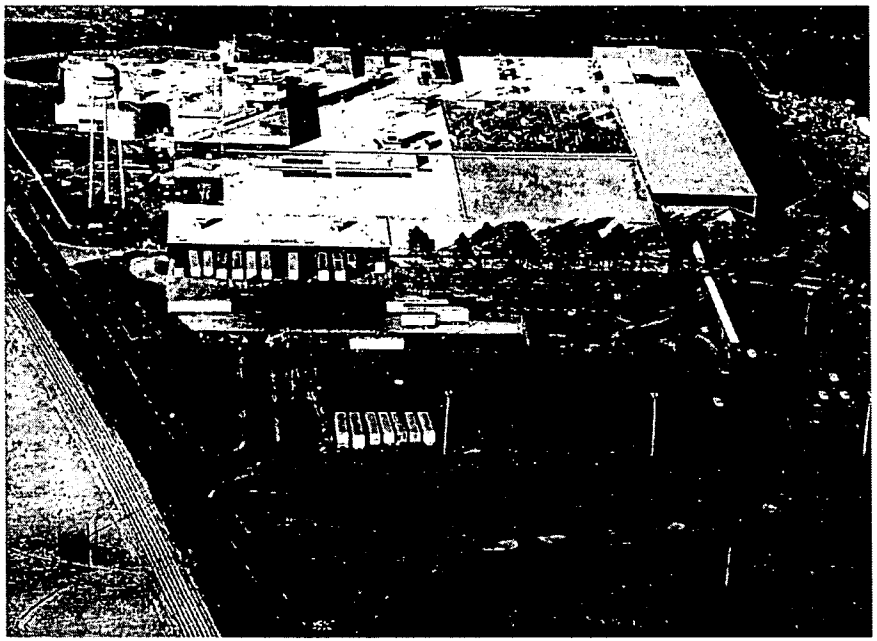
Former automobile repair and maintenance facility with chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site, to include both facility renovation and new construction for use as commercial office/retail.

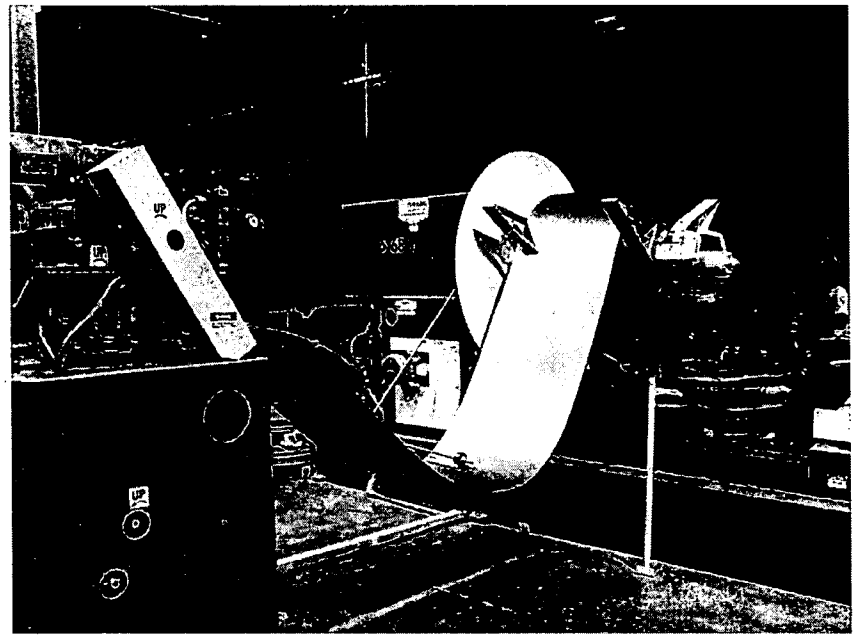
NC Brownfields Program Status

- 66 Projects in Program's Inventory
  - 40 under consideration for an agreement
  - 26 with completed Brownfields Agreement
  - Projects in 26 counties across NC
  - More than a third are rural sites (28 of 66)
  - About a third are former textile facilities

- 2002 Actions
  - 21 Site Applications
  - 10 Completed Agreements

Penco Products, Hamilton, NC

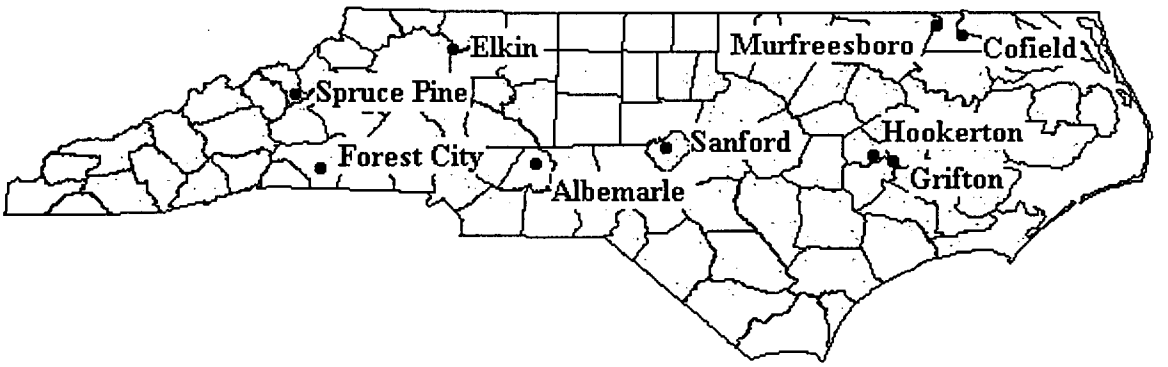




"The NC Brownfields Program enabled the redevelopment of an otherwise abandoned site, allowing us to hire 300 people. Had it not been for this program, Penco would be elsewhere."

Bob Heffernan, Penco Products, August 2002

Brownfields Assessment Outreach for Rural North Carolina Communities



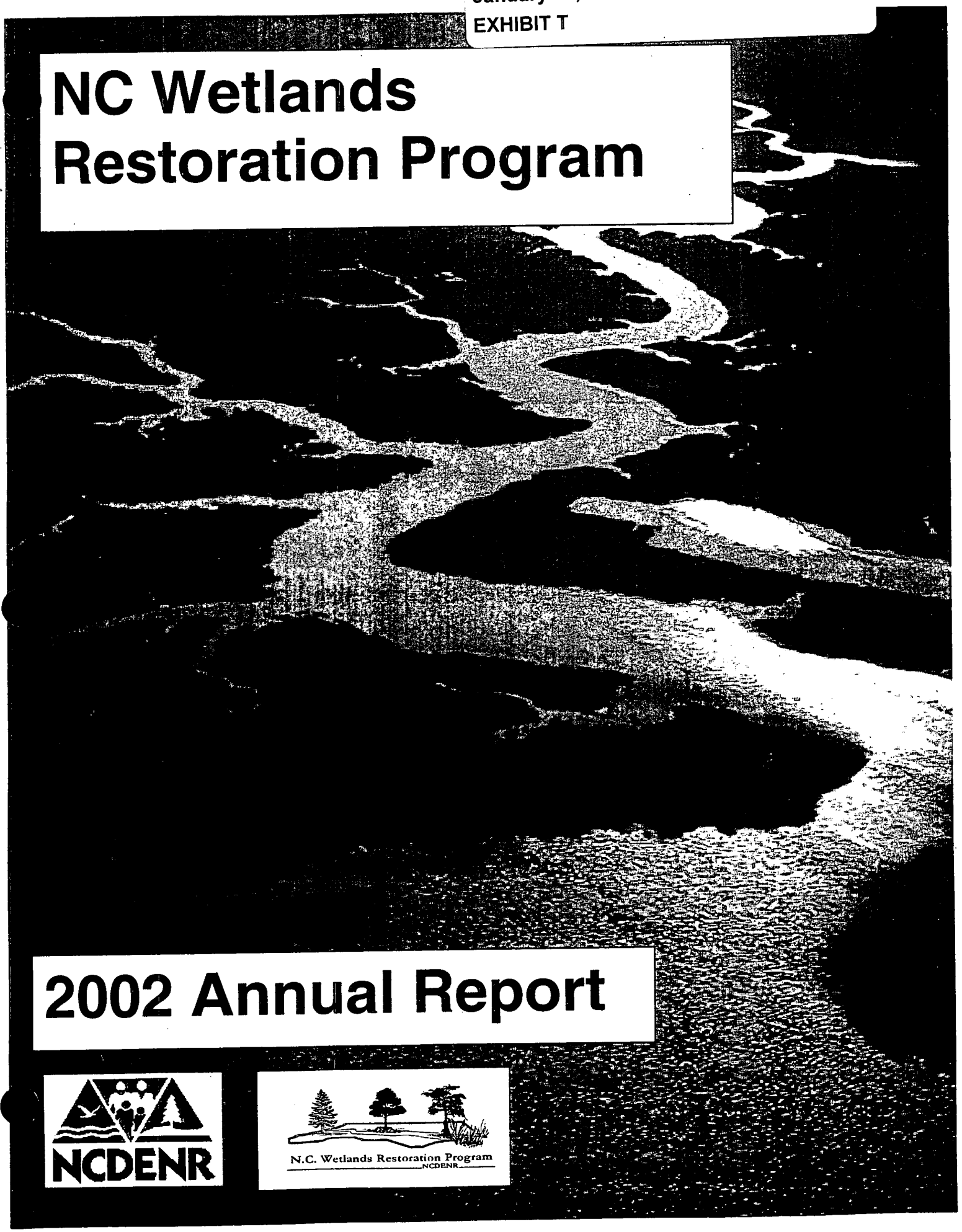
Brownfields Subtitle A
Assessment Grant Application

The North Carolina Department of
Environment and Natural Resources
Division of Waste Management

December 16, 2002

January 28, 2003 ERC Meeting
EXHIBIT T

NC Wetlands Restoration Program



2002 Annual Report

NCDENR

N.C. Wetlands Restoration Program
NCDENR

Section 1: Program Accomplishments

Planning Initiatives

Watershed Restoration Plans

The Wetlands Restoration Program conducts a comprehensive review and revision of each Watershed Restoration Plan every 5 years in accordance with the schedule used by the Division of Water Quality for the review and revision of the Basinwide Water Quality Management Plans. Basin planning activities occurred in nine river basins during FY01-02 (Table 1.1). Four (4) plans were completed during the fiscal year (Savannah, White Oak, Watauga and Little Tennessee). All completed plans are available through the WRP web site: http://h2o.enr.state.nc.us/wrp/index.htm. Additional information on the process of watershed plan development and the targeting of local watersheds can be found in previous annual reports and in Appendix B of this report.

TABLE 1.1. UPDATE ON WATERSHED RESTORATION PLAN DEVELOPMENT

River Basin	DWQ Workshop(s) and location	Solicit Resource Professional Input [Draft Targeted Local Watersheds Selected]	Date Comments Due	Date for Plan Completion [on WRP website within a month]
Savannah	10/16/00 Sapphire	12/6/00 Pisgah	8/10/01	12/01
White Oak	10/23/00 & 10/24/01 Morehead City and Jacksonville	6/21/01 Morehead City	8/13/01	1/02
Watauga	11/16/00 Boone	9/20/01 Boone	10/31/01	2/02
Little Tennessee	3/12/01 & 3/13/01 Sylva, Franklin, Robbinsville	10/4/01 Bryson City	12/14/01	4/02
Chowan	3/22/01 & 3/27/01 Ahoskie, Edenton	Spring 2002 [via mail]	6/07/02	7/02
Pasquotank	3/26/01 & 3/27/01 Manteo and Elizabeth City	8/22/01 Camden	1/31/02	7/02
Neuse	6/4/01, 6/5/01, 6/11/01, & 6/14/01 Raleigh, Durham, Goldsboro, New Bern	6/02	4/12/02	10/02
Broad	10/29/01 & 10/30/01 Forest City, Shelby	5/02	6/15/02	12/02
Yadkin-Pee Dee	4/22/02, 4/23/02, 4/24/02 & 4/30/02 Elkin, Winston-Salem, Uwharrie & Fairview	will solicit input via mail, Fall 2002	11/02	3/03

Local Watershed Plans

The Wetlands Restoration Program continues the development and implementation of Local Watershed Plans throughout North Carolina. The primary purpose of the Local Watershed Plans is to identify the causes of water quality and habitat degradation and to develop strategies to address these problems that are consistent with the objectives of the local communities. This process ensures that compensatory mitigation projects are designed and located to replace those functions within each watershed that provide the maximum benefits in restoring and protecting our natural resources. Please refer to the 2000 Annual Report for a detailed explanation of the Local Watershed Planning process. During FY 01-02, work continued on three plans that were initiated in FY 00-01and eight additional plans were initiated. A summary of the location and status of each Local Watershed Plan is provided in Appendix Table B-2.

Implementation of Restoration Projects

At the end of FY 01-02, sixty-three projects were at or beyond the initial design phase. The phases of project implementation are described in Section 5 of the 2001 Annual Report. Twenty projects have been completed resulting in the restoration, enhancement or preservation of 206.7 acres of wetlands, 58,632 linear feet of streams, and 153.2 acres of riparian buffer. The remaining projects are currently in the design phase and will be constructed during FY02-03. Collectively these 63 projects will result in the restoration, enhancement, and preservation of 627.2 acres of wetland, 192,662 linear feet of streams, and 316.5 acres of riparian buffer (Table 1.2). These projects are located throughout North Carolina in 11 different river basins and 30 counties. Seventy-three percent of these projects are located within Targeted Local Watersheds that have been identified by the Wetlands Restoration Program planning process as watersheds in need of restoration activities

The WRP continues to work with landowners, federal, state and local government agencies, non-profit conservation groups, and others to identify and implement restoration projects. Nineteen additional projects were identified during FY 01-02 and when complete will result in the restoration, enhancement, and/or preservation of 184 acres of wetlands, 63,000 linear feet of streams, and 116 acres of riparian buffer. Negotiations with landowners and/or property acquisition are underway for these projects with anticipated construction dates late in FY02-03 or early FY03-04 (Table 1.3).

In order to provide an opportunity for private mitigation providers to provide fully restored sites to the WRP a Request for Proposals to restore 150 acres of riparian buffer in the Neuse River basin was issued in May 2002. Six additional Requests for Proposals for wetland and stream restoration will be issued in early FY 02-03. Collectively these Requests for Proposals will fund the restoration of up to 575 acres of wetlands, 19,000 linear feet of streams, and 190 acres of riparian buffer.

TABLE 1.2. RESTORATION SITES BY RIVER BASIN

Project Name	Project ID	Compensatory Mitigation	Basin	Cataloging Units	County	Wetland (ac.) R/C	Wetland (ac.) Enh	Wetland (ac.) Pres	Stream (linear feet)	Buffer (acres)	Project Status
Price Park	CF-002-GU-S-PP	Yes	Cape Fear	03030002	Guilford				1,710	2.8	6
Sydnor Property	CF-002-AL-S-WC	Yes	Cape Fear	03030002	Alamance				5,000	5.7	4
Brown Bark Park	CF-002-GU-S-BBP	Yes	Cape Fear	03030002	Guilford				2,630	3.0	4
Hillsdale Park	CF-002-GU-S-HP	Yes	Cape Fear	03030002	Guilford				5,000	5.7	4
Benbow Park	CF-002-GU-S-BP	Yes	Cape Fear	03030002	Guilford				1,200	1.4	4
Gillespie Golf Course	CF-002-GU-S-GGC	Yes	Cape Fear	03030002	Guilford				3,000	3.4	4
Little Beaver Creek	CF-002-WK-SW-LBC	Yes	Cape Fear	03030002	Wake	5.0			5,000		4
Suck Creek	CF-003-MO-S-SC	Yes	Cape Fear	03030003	Moore				2,700	1.5	4
Jumping Run Creek	CF-004-HN-SW-JRC	Yes	Cape Fear	03030004	Harnett	75.0			5,500		4
Hadley/Newlin Property	CF-002-AL-S-HNP	Yes	Cape Fear	03030002	Alamance				5,000	5.2	4
Cross Creek	CF-004-CB-S-CC	Yes	Cape Fear	03030004	Cumberland				2,400	5.0	4
Sandy Creek	CF-002-DU-SW-SC	Yes	Cape Fear	03030002	Durham	3.0			3,000		4
Boiling Springs	CF-005-BR-SW-BS	Yes	Cape Fear	03030005	Brunswick	10.0	10.0		1,500		4
Reedy Branch	CF-002-AL-S-RB	Yes	Cape Fear	03030002	Alamance				2,500	5.7	4
Forest Hills	CF-002-DU-S-FH	Yes	Cape Fear	03030002	Durham				3,000	5.5	4
Pine Valley	CF-001-NH-S-PV	Yes	Cape Fear	03030001	New Hanover				2,500	2.9	4
Dixon	CF-002-AL-S-DX	Yes	Cape Fear	03030002	Alamance				2,500	2.9	4
McPherson	CF-002-AL-S-MP	Yes	Cape Fear	03030002	Alamance				1,500	1.7	4
Haw River	CF-002-RK-P-HR	Yes	Cape Fear	03030002	Rockingham			80.0			6
			Cape Fear Total			**93**	**10.0**	**80.0**	**55,640**	**52.4**	
Payne Dairy	CT-101-AX-S-PD	Yes	Catawba	03050101	Alexander		3.0		7,000	12.9	6
Wike Property	CT-101-CT-S-WP	Yes	Catawba	03050101	Catawba				2,300	12.6	6
Brown Branch	CT-101-CL-S-BB	Yes	Catawba	03050101	Caldwell				7,000	8.0	6
Freedom Park	CT-103-MK-S-FP	Yes	Catawba	03050103	Mecklenburg				5,000	5.7	4
Whitehurst Road	CT-103-MK-S-WR	Yes	Catawba	03050103	Mecklenburg				1,000	1.1	4
Roslyn	CT-103-MK-S-RS	Yes	Catawba	03050103	Mecklenburg				1,500	1.7	4
McIntyre Creek	CT-103-MK-S-MC	Yes	Catawba	03050103	Mecklenburg				2,500	2.9	3
			Catawba Total			**0.0**	**3.0**	**0.0**	**26,300**	**44.9**	
High Vista	FB-105-BN-S-HV	Yes	French Broad	06010105	Buncombe				3,500	4.3	6
Clear Creek	FB-105-HD-S-CC	Yes	French Broad	06010105	Henderson				1,200	6.4	4

Lewis Creek	FB-105-HD-S-LC	Yes	French Broad	06050105	Henderson				2,000		3
Hendersonville	FB-105-HD-W-HW	Yes	French Broad	06050105	Henderson	15.0					3
			French Broad Total			**15.0**	**0.0**	**0.0**	**6,700**	**10.7**	
Middle Swamp Creek	LU-203-RB-W-MSC	Yes	Lumber	03040203	Robeson	6.0	5.0				3
			Lumber Total			**6.0**	**5.0**	**0.0**	**0**	**0.0**	
Hominy Swamp Creek	NU-203-WS-S-HSC	Yes	Neuse	03020203	Wilson				2,232	5.0	6
Beamon's Run	NU-203-GN-B-BR	No	Neuse	03020203	Greene					19	6
Howell Woods	NU-201-JS-W-HW	Yes	Neuse	03020201	Johnston	20.0	80.0			5.0	6
Kentwood Park	NU-201-WK-S-KP	Yes	Neuse	03020201	Wake				3,000	5.5	6
Chavis Park	NU-201-WK-S-CP	Yes	Neuse	03020201	Wake				2,500	4.6	6
Smith/Austin Creek	NU-201-WK-SWB-SAC	Yes	Neuse	03020201	Wake				9,500	32	6
Bertie Creek	NU-201-WK-S-BC	Yes	Neuse	03020201	Wake				1,200	2.2	3
Stillhouse Creek	NU-201-DU-S-SC	Yes	Neuse	03020201	Durham				1,500	1.7	4
Richland Creek	NU-201-WK-S-RC	Yes	Neuse	03020201	Wake				300	0.5	6
Whitelace Creek	NU-202-LN-SW-WC	Yes	Neuse	03020202	Lenoir	20.0	10.0		8,000	10.0	4
Prestonwood G.C.	NU-201-WK-S-PW	Yes	Neuse	03020201	Wake				3,000	3.4	4
Wake Forest C.C.	NU-201-WK-S-WF	Yes	Neuse	03020201	Wake				1,500	1.7	4
Ellerbee Creek	NU-201-DU-S-EC	Yes	Neuse	03020201	Durham				2,500	2.9	3
			Neuse Total			**40.0**	**90.0**	**0.0**	**35,232**	**93.5**	
Brush Creek	NW-001-AG-S-BC	Yes	New	05050001	Alleghany				4,000	7.3	6
			New Total			**0.0**	**0.0**	**0.0**	**4,000**	**7.3**	
Charles Creek	PA-105-PA-SW-CC	Yes	Pasquotank	03010105	Pasquotank	2.0			1,500	1.7	3
Knobs Creek	PA-205-PA-P-KC	Yes	Pasquotank	03010205	Pasquotank			19.0			6
			Pasquotank Total			**2**	**0.0**	**19.0**	**1,500**	**1.7**	
Snow Creek	RN-103/104-SK-S-SC	Yes	Roanoke	03010103/04	Stokes				3,000	3.4	4
			Roanoke Total			**0.0**	**0.0**	**0.0**	**3,000**	**3.4**	
Bear Swamp Creek	TP-101-FR-S-BSC	Yes	Tar-Pamlico	03020101	Franklin				2,000	5.0	6
Louisburg	TP-101-FR-S-LB	Yes	Tar-Pamlico	03020101	Franklin				2,000	5.0	3
			Tar-Pamlico Total			**0.0**	**0.0**	**0.0**	**4,000**	**10.0**	
Sturgeon City (Phase I)	WO-001-ON-W-SC1	Yes	White Oak	03030001	Onslow	3.0					4
Hammock's State Park	WO-106-ON-W-HSP	No	White Oak	03020106	Onslow	0.3					6
Jumping Run Creek	WO-106-CR-W-JRC	Yes	White Oak	03020106	Carteret	4.4					6
Sturgeon City (Phase II)	WO-001-ON-W-SC2	Yes	White Oak	03030001	Onslow	2.5					4
North River	WO-106-CR-W-NR	No	White Oak	03020106	Carteret	250.0					4
			White Oak Total			**260.2**	**0.0**	**0.0**	**0**	**0.0**	

Stone Mountain	YD-101-WL-S-SM	Yes	Yadkin	03040101	Wilkes				9,590	19.5	6
Beaver Creek	YD-101-SU-S-BC	Yes	Yadkin	03040101	Surry				4,000	9.2	6
Bugaboo Creek	YD-101-WL-S-BC	Yes	Yadkin	03040101	Wilkes				5,500	9.2	4
Cato	YD-105-MK-S-CA	Yes	Yadkin	03040105	Mecklenburg				2,200	5.0	4
Brushy Fork	YD-101-FS-S-BF	Yes	Yadkin	03040101	Forsyth				5,000	6.9	3
Warrior Creek	YD-101-WL-S-WC	Yes	Yadkin	03040101	Wilkes				8,500	6.8	4
Purlear Creek	YD-101-WL-SW-PC	Yes	Yadkin	03040101	Wilkes	2	2.0		17,000	31.0	4
Shaffner Park	YD-101-FS-S-SP	Yes	Yadkin	03040101	Forsyth				4,500	5.0	3
			Yadkin Total			**2**	**2.0**	**0.0**	**56,290**	**92.6**	
			Compensatory Mitigation		**Total**	**167.9**	**110.00**	**0**	**192,662**	**287.5**	
					Total	**418.20**	**110.00**	**99.0**	**192,662**	**316.5**	

*Project status; 1. restoration site assessment, 2. site acquisition phase, 3. initial design, 4. design phase, 5. construction phase, 6. post-construction monitoring

TABLE 1.3. NCWRP PROJECTS IN ACQUISITION PHASE

Project	River Basin	Cataloging Unit	County	Stream (Linear Feet)	Wetland: Restoration/ Preservation (Acres)	Riparian Buffer (Acres)
Tributary to Billy's Creek	Tar-Pamlico	03020101	Franklin	1,600		3
Kildare Farms	Neuse	03020201	Wake	3,700		8
Palms Apartments	Neuse	03020201	Wake	2,200		5
Mills Creek	Yadkin	03040101	Forsyth	3,000		6
Ararat River	Yadkin	03040101	Surry	2,500		5
Naked Creek	Yadkin	03040101	Wilkes	5,500		12
Big Warrior Creek (II)	Yadkin	03040101	Wilkes	7,000		16
Little Warrior	Yadkin	03040101	Wilkes	6,000		13
Purlear Creek (II)	Yadkin	03040101	Wilkes	4,500		10
Toby Creek	Yadkin	03040105	Mecklenburg	1,700		3
Edsel Creek	Catawba	03050103	Mecklenburg	2,000		4
Derita Creek	Catawba	03050103	Mecklenburg	3,500		8
Torrence Creek	Catawba	03050101	Mecklenburg	2,000	4	
Sharon Memorial	Catawba	03050103	Mecklenburg	3,000		6
Foley Station	Catawba	03050101	Mecklenburg	2,000	10	
Coffey Creek	Catawba	03050103	Mecklenburg	6,000		13
Little Sugar-downtown	Catawba	03050103	Mecklenburg	3,500		8
King's Creek	French Broad	06010105	Transylvania	3,300		7
N. River	White Oak	03020106	Carteret		170	
Total				**63,000**	**184**	**127**

Section 2: Compensatory Mitigation Requirements

One of the functions of the Wetlands Restoration Program is to provide a compensatory mitigation option that is available to permit applicants throughout North Carolina (NCGS 143-214.9). The option to pay a fee to the Wetlands Restoration Program to satisfy compensatory mitigation requirements of Section 404 permits and 401 Water Quality Certifications has been available since November 1998. The Wetlands Restoration Program also accepts payments for riparian buffer mitigation requirements in the Neuse, Tar-Pamlico and Catawba River basins, and nitrogen offset payments in the Neuse River Basin. This section summarizes the payments that have been accepted and the progress that has been made in implementing projects to meet these obligations. Please refer to Appendix A of this report and the 1999 Annual Report for additional information concerning the Memorandum of Agreement between the U.S. Army Corps of Engineers and the Wetlands Restoration Program.

Section 404/401 Water Quality Certification Mitigation Requirements

The compensatory mitigation requirements for 65 projects permitted by Section 404 or 401 certifications were accepted during FY01-02. The mitigation requirements of these permits/certifications total 42,861 linear feet of streams and 46.99 acres of wetlands (Table 2.1). Since 1998, the compensatory mitigation requirements of 273 Section 404 permits and 401 Water Quality Certifications have been accepted. The cumulative mitigation requirements accepted by the Wetlands Restoration Program total 220,238 linear feet of streams and 252.34 acres of wetlands in 13 river basins.

TABLE 2.1 COMPENSATORY MITIGATION REQUIREMENTS ACCEPTED BY NCWRP BY RIVER BASIN

River Basin	Mitigation requirements accepted FY2001-2002		Cumulative mitigation requirements accepted since NCWRP inception	
	Stream mitigaton (feet)	Wetlands Mitigation (acres)	Stream mitigation (feet)	Wetlands Mitigation (acres)
Broad	0	0	800	0.00
Cape Fear	6,978	14.95	61,612	108.13
Catawba	24,274	1.10	71,474	21.01
Chowan	0	0	0	0.00
French Broad	0	0	5,938	0.25
Hiwassee	0	0	0	2.75
Little Tennessee	0	0	0	0.00
Lumber	0	0.09	0	4.49
Neuse	6,885	24.99	31,481	49.25
New	320	0.00	1,780	1.20
Pasquotank	0	2.42*	1,047	8.88
Roanoke	0	0.25	3,676	8.68
Savannah	0	0	0	0.00
Tar-Pamlico	0	0	1,596	34.04
Watauga	0	0	0	0.00
White Oak	0	1.00	0	3.25
Yadkin	4,404	2.20	40,834	10.42
Totals	**42,861**	**46.99**	**220,238**	**252.35**

Riparian Buffer Mitigation

The buffer mitigation requirements of 23 Certificates of Authorization were accepted during FY01-02. These payments require the restoration of 33.68 acres of buffer in the Neuse River basin. Since 1999, the buffer mitigation requirements of 42 projects have been accepted. Ninety-nine percent of these payments are for impacts within the Neuse River Basin, the remainder of the payments are for impacts within the Tar-Pamlico River basin. No payments have been received for buffer impacts in the Catawba River basin. Cumulative riparian buffer mitigation requirements in the Neuse and Tar-Pamlico River basins are shown in Table 2.2.

TABLE 2.2 RIPARIAN BUFFER COMPENSATORY MITIGATION REQUIREMENTS ACCEPTED BY NCWRP

River Basin	Mitigation requirements accepted FY2001-2002 (acres)	Cumulative mitigation requirements accepted since NCWRP inception (acres)
Catawba	0	0
Neuse	33.70	75.06
Tar-Pamlico	0.00	0.08

Nitrogen Offset Payments in the Neuse River Basin

As required by the Neuse River Basin, Nutrient Sensitive Waters Management Strategy: Basinwide Stormwater Requirements (15A NCAC 2B .0235) certain local governments within the Neuse River basin must implement strategies to ensure that development activities within the jurisdiction of these local governments do not result in an increase in the amount of nitrogen loading to the Neuse River basin. One option available to help in achieving this goal is the payment of a nitrogen-offset fee to the Wetlands Restoration Fund (15A NCAC 2B .0240).

A total of 166 nitrogen-offset payments were received during FY01-02 (Appendix D, Table D-2). These payments require the implementation of projects that will provide 87,986 pounds of nitrogen reduction over 30 years within the Neuse River basin. Cumulatively payments have been received since FY00-01 that will fund the implementation of projects that will provide 88,740 pounds of nitrogen reduction over 30 years. The WRP is working with the local governments that are affected by the Neuse River Basin, Nutrient Sensitive Waters Management Strategy: Basinwide Stormwater Requirements (15A NCAC 2B .0235) to identify and implement projects that will achieve the required nitrogen reduction.

Progress in Meeting Compensatory Mitigation Requirements For FY 01-02

The NCWRP has accepted eighty-seven 401 Water Quality Certifications and forty-three Section 404 permits which were due to have implemented projects by the close of FY 01-02. Ninety-one percent of the 401 Water Quality Certifications and ninety percent of the 404 permits have projects assigned.

Wetland Mitigation Requirements

Fifteen wetland restoration and enhancement projects have been initiated that will restore 168 acres of wetlands. These projects will meet the compensatory mitigation requirements of 83% of the permits that

are due to be implemented by the WRP through the end of FY 01-02 (Table 1.2). The total acreage of wetland restoration implemented by the WRP on a statewide basis exceeds the acreage of wetland compensatory mitigation requirements due by the end of FY01-02. However, additional projects that will restore 16 acres of wetlands are needed in the Cape Fear, Catawba, Roanoke, and Yadkin River basins to meet the specific permit requirements of four Section 404 permits and three 401 Water Quality Certifications.

Stream Mitigation Requirements

Fifty-three projects have been implemented that will restore 192,662 linear feet of streams (Table 1.2). These projects will meet the compensatory mitigation requirements of 93% of the permits assumed by the WRP through the end of FY 01-02 (Table 1.2). The total linear feet of stream restoration implemented by the WRP on a statewide basis exceeds the linear feet of stream compensatory mitigation requirements due by the end of FY01-02. However, additional projects that will restore 3250 linear feet of streams are needed in the French Broad, Broad, Cape Fear and Tar-Pamlico River basins to meet the specific permit requirements of one Section 404 permit and six 401 Water Quality Certifications.

Riparian Buffer Mitigation Requirements

Two projects (Beamon's Run and Smith /Austin Creeks) have been implemented that will restore 28 acres of riparian buffer in the Neuse river basin. These projects will meet the riparian buffer mitigation requirements of 5 Certificates of Authorization issued by the Division of Water Quality. The Request for Proposals for 150 acres of riparian buffer restoration issued in May 2002 will address the remaining riparian buffer mitigation requirements in the Neuse River basin. Projects to meet the riparian buffer mitigation requirements in the Tar Pamlico River basin will be identified in FY 02-03.

Section 3: Trust Funds

Wetlands Trust Fund

The Wetlands Trust Fund was established by the General Assembly as a repository for funds to restore, create, enhance, and preserve wetlands and riparian areas throughout North Carolina. Three accounts have been established within the Wetlands Trust Fund: Account 2980 – Wetland Restoration; Account 2981 – Compensatory Mitigation; and Account 2982 – Riparian Buffer. Account 2980 is the repository for appropriations received from the General Assembly. This account is used to implement restoration projects to compensate for cumulative losses of wetlands and riparian areas associated with projects that are below the threshold that triggers the compensatory mitigation requirement. Account 2981 is the repository for payments made to the Wetlands Restoration Program to satisfy the compensatory mitigation requirements of Section 404 permits and 401 Water Quality Certifications, and nitrogen offset payments. Payments to this account and the interest earned on these funds are used to implement projects designed to meet the compensatory mitigation requirements of projects accepted by the Wetlands Restoration Program and to implement projects to reduce nitrogen loading within the Neuse River Basin. Account 2982 is the repository for payments to satisfy the buffer mitigation requirements for permitted impacts to riparian buffers in the Neuse, Tar-Pamlico, and Catawba River basins. Payments to this account and the interest earned on these funds are used to implement riparian buffer restoration projects within these river basins.

During FY 01-02, the NCWRP received 233 payments for compensatory mitigation associated with Section 404/401 permits, permitted riparian buffer impacts, and nitrogen offset payments. The majority of the payments (207 or 89%) were received from the private sector, 9 payments (4%) were received from the Department of Transportation and 17 payments (7%), were received from other state, federal and local government agencies.

Of the total dollar amount of payments received 62% were for stream restoration and 11% for wetland restoration associated with Section 404/401 permits. Riparian buffer payments comprised 16% with the remaining 11% for nitrogen offset payments. Refer to Appendix D for a complete listing of payments.

Income/Expenditures

Account 2980 – Wetlands Restoration Fund

The beginning balance of Account 2980 in FY01-02 was $10,576,756. A total of $388,814 was deposited into this account during the fiscal year. Income received during the fiscal year was derived from the interest earned on the funds within this account. Total expenditures for FY01-02 were $7,703,653. These funds were expended for activities associated with the restoration, enhancement, or preservation of wetland, streams, and riparian buffers; the transfer of interest to funds 2981 and 2982; and the reversion of $4,400,000 to the General Fund due to the budget emergency. Of the remaining balance $3,257,072 is encumbered for activities associated with the restoration and enhancement of wetlands, streams and riparian areas. At the end of FY01-02 the unencumbered balance of Account 2981 was $4,845. Please refer to Table 3.1 for additional details concerning this account.

Account 2981 – Compensatory Mitigation Fund

The beginning balance of Account 2981 in FY01-02 was $32,509,756. A total of $12,530,549 was deposited into this account during the fiscal year. Income received during the fiscal year was derived from payments to satisfy the compensatory mitigation requirements of Section 404 permits and 401 Water Quality Certifications, nitrogen offset payments as required by 15A NCAC 2B .0242, and the interest earned on the funds within this account. Total expenditures for FY01-02 were $2,444,310. These funds were expended for activities associated with the restoration, enhancement, or preservation of wetland, streams, and riparian buffers. Of the remaining balance $6,902,756 is encumbered. At the end of FY01-02 the unencumbered balance of Account 2981 was $35,693,239 (Table 3.2).

The unencumbered balance is reserved for the implementation of projects to meet the compensatory mitigation requirements of Section 404 permits and 401 Water Quality Certifications accepted by the Wetlands Restoration Program, watershed assessments, and nitrogen reduction projects. These projects will restore and enhance approximately 185,000 linear feet of streams, 220 acres of wetlands, and 425 acres of riparian buffers. Approximately 3,000 pounds of nitrogen per year will be removed through the implementation of nitrogen reduction projects in the Neuse River basin. The projected cost of these projects is $30,100,000 with $25,800,000 allocated for stream projects, $3,300,000 for wetland projects, $1,000,000 for nitrogen reduction projects, and of the remaining unencumbered funds, $4,700,000 is reserved for the development of Local Watershed Plans as required by the Memorandum of Agreement with the Department of Transportation. Please refer to Section 2 and Appendix D for additional information concerning compensatory mitigation requirements assumed by the Wetlands Restoration Program. Information concerning the Memorandum of Agreement with the Department of Transportation can be found in Appendix B.

Account 2982– Riparian Buffer Fund

The beginning balance of Account 2982 in FY01-02 was $1,792,669. A total of $1,516,721 was deposited into this account during the fiscal year. Income received during this fiscal year was derived from payments for the compensatory mitigation requirements associated with permitted impacts to buffers, and the interest earned on the funds within the account. No funds were expended from this account during FY 01-02. At the end of FY01-02 the unencumbered balance of Account 2982 was $3,309,390. These funds are reserved for contracts that will be issued to private mitigation providers for 150 acres of buffer restoration resulting from the Request for Proposals that was issued in May 2002. Contracts will be awarded by November 2002. Please refer to Table 3.3 for additional details concerning this account.

TABLE 3.1. NC DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (DENR) WETLANDS TRUST FUND-WETLANDS RESTORATION

Account 2980		
Balance on 7/1/01		*10,576,756*
Revenue (FY00-01)		388,814
Receipts	0	
Interest	388,814	
Expenditures		(7,703,653)
Site identification	(46,260)	
Site acquisition	(501,584)	
Design/construction management	(1,650,508)	
Construction	(347,257)	
Monitoring	(38,759)	
Maintenance/management	0	
Interest transfers to correct FY 98-99, 99-00	(719,285)	
2981	(715,290)	
2982	(3,995)	
Reversion to general fund	(4,400,000)	
Balance as of 6/30/02		*3,261,917*
Current contractual encumbrances		(3,257,072)
Balance of unencumbered funds		*4,845*

TABLE 3.2. NC DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (DENR) WETLANDS TRUST FUND-COMPENSATORY MITIGATION

Account 2981		
Balance on 7/1/01		*32,509,756*
Receipts (FY01-02)		12,530,549
Compensatory mitigation payments	6,299,625	
Nitrogen offset payments	967,828	
DOT/MOU	2,500,000	
Interest	2,763,096	
Expenditures (FY01-02)		(2,444,310)
Site identification (including LWP)	(803,642)	
Site acquisition	(584,444)	
Project design/construction management	(629,757)	
Construction	56,125	
Monitoring	(29,211)	
Maintenance/management	(2,640)	
Administration	(255,351)	
Refunds	(83,140)	
Balance as of 6/30/02		*42,595,995*
Current contractual encumbrances		(6,902,756)
Balance of unencumbered funds		*35,693,239*

TABLE 3.3. NC DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (DENR) WETLANDS TRUST FUND – RIPARIAN BUFFER RESTORATION

Account 2982		
Balance as of 7/1/01		*1,792,669*
Receipts (FY01-02)		1,516,721
Compensatory mitigation payments	1,409,129	
Interest	107,592	
Balance as of 6/30/02		*3,309,390*

Summary

During FY 01 – 02, the pace of expenditures increased significantly with total expenditures from Accounts 2980 and 2981 doubling during this time period (Figure 3.1). This increase is associated with expenditures on the design and implementation of restoration projects identified and the initiation of a more comprehensive watershed planning process. Although the planning process has resulted in some delay in the implementation of projects, the benefits associated with the implementation of high quality projects identified through the watershed planning process will provide long-term benefits. In addition to expenditures, as of 6/30/02 more than $10 million remained encumbered in 46 active contracts in the Wetlands Trust Fund accounts (Table 3.4). Of this total, $7,740,675 in 32 new contractual agreements were encumbered during FY01-02. These contracts will provide local watershed planning, site identification, design, construction, construction management and monitoring of the restored sites. The pace of expenditures will continue to increase as the planning process matures and the WRP increases the efficiency of its implementation processes.

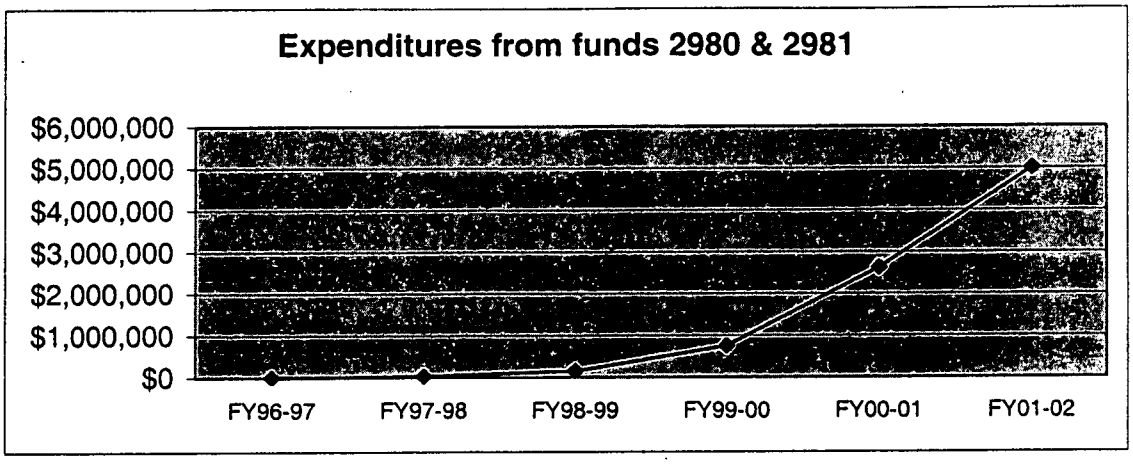


Figure 3.1. WRP Expenditures from Accounts 2980 and 2981 by Fiscal Year since 1996.

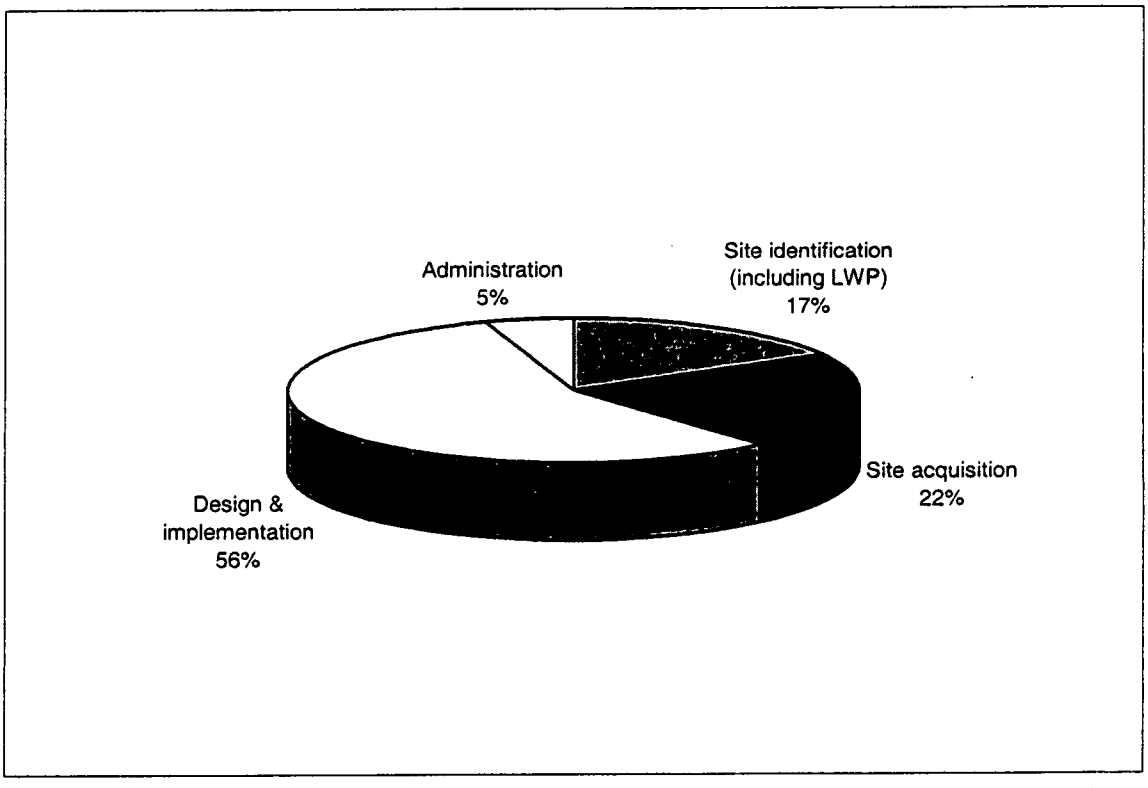


Figure 3.2. Project Expenditures by Major Category from Accounts 2980 and 2981
Based on total expenditures of $ 4,945,538

TABLE 3.4 CONTRACTUAL ENCUMBRANCES
DENR WETLANDS TRUST FUND ACCOUNTS 2980 AND 2981.

Contractor	Encumbrance remaining
Arcadis Geraghty & Miller	$636,650
Becky Ward Consulting	$64,879
Biohabitats	$80,302
Blue Land Water Infrastructure	$571,957
Buck Engineering	$347,779
Camp Dresser & McKee	$542,340
CH2M Hill	$934,498
CREP contractual MOA	$1,155,000
City of Hendersonville	$97,263
City of Wilmington	$20,000
Earth Tech, Inc.	$674,207
Ecologic Associates	$45,095
Ecoscience Corporation	$493,769
HDR Engineering, Inc	$332,336
KCI Associates of Raleigh	$347,113
Kimley Horn and Associates	$423,086
Landmark Design Services	$223,778
Natural Areas Ecosystems	$423,381
Natural Resource Conservation Service	$849,775
NC State University	$279,659
North State Environmental	$88,045
Shamrock Environmental	$640,557
Soil and Environmental Consulting	$343,712
Tetratech Inc	$530,622
Tennessee Valley Authority	$7,350
UNC-Wilmington	$6,677
Total encumbrances	**$10,159,830**

Section 4. Analysis of Restoration Costs

The Wetlands Restoration Program evaluates the cost of restoration projects on an annual basis and compares this cost to the Schedule of Fees and the cost of restoration projects implemented by the private mitigation banking industry. Please refer to Section 5 of the 2001 Annual Report for information on the methods used in this analysis.

Stream Restoration Projects

The construction of thirteen stream restoration projects had been completed by the end of FY 01-02. Five of these projects are located in urban areas and eight projects are located in rural areas. These projects restored 55,951 linear feet of stream at an overall average cost per linear foot of $128.50. As shown on Tables 4.1 and 4.2 there is a significant difference in the costs of urban and rural projects. The average per linear foot cost of urban projects is $164.50. The average per linear foot cost of rural projects is $111.78.

TABLE 4.1. STREAM RESTORATION COSTS FOR URBAN PROJECTS

Urban Project	Hominy Swamp	Price Park	Smith/Austin	Kentwood Park	Chavis Park
Site identification	$2,450	$1,690	$4,750	$1,800	$2,250
Site acquisition	$2,500	$62,526	$300,368	$12,711	$0
Project assessment-design	$123,903	$86,380	$240,717	$93,559	$72,461
Construction management	$12,600	$21,666	$136,323	$38,334	$30,329
Site restoration	$322,618	$154,789	$446,602	$94,862	$281,703
Post monitoring/Maintenance*	$51,000	$74,035	$112,380	$61,604	$57,060
Long-term management	$3,000	$3,000	$3,000	$3,000	$3,000
Length (ft)	2,232	1,710	9,500	1,800	2,500
Total cost	$518,071	$403,786	$1,244,141	$305,870	$446,723
Cost/linear foot	**$232**	**$227**	**$131**	**$170**	**$179**
Project status	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring
* Projected Cost for five-year period					

The increased costs of urban projects are due to a number of factors. In most urban stream settings there are numerous constraints that must be addressed during the design and construction of projects. Examples of these constraints include roads, sewer lines, water lines power lines, fiber optic cables, and gas lines. These constraints must be avoided or relocated during a stream restoration project. In addition these constraints also influence the design and maintenance of the restoration project which further increases project cost. Other common constraints in urban situations include numerous road crossings, protecting city park equipment, and ensuring the compatibility of the project with surrounding buildings and structures.

Another factor that significantly increases the cost of restoration in urban areas is that stream reaches suitable and available for restoration tend to be shorter than those in rural areas because of a higher density of land ownership and smaller parcel size. Shorter restoration projects decrease the "economies of scale" for urban projects since the initial mobilization of equipment is one of the larger costs in constructing stream restoration projects. The one-time cost of construction staging and delivering equipment becomes more economical as project length increases.

TABLE 4.2. STREAM RESTORATION COSTS FOR RURAL PROJECTS

Rural Project	Payne Dairy	Stone Mountain	Brush Creek	County Line Creek	Lyle Creek	Brown Branch	Beaver Creek	Bear Swamp
Site identification	$3,700	$5,200	$2,200	$1,750	$1,150	$3,500	$2,200	$750
Site acquisition	$86,965	$0	$864	$30,414	$35,166	$0	$2,300	$6,902
Project assessment-design	$178,357	$242.781	$109,690	$97,663	$72,522	$104,164	$90,858	$44,300
Construction management	$64,234	$76,708	$58,020	$41,354	$36,679	$67,052	$50,447	$17,440
Site restoration	$413,221	$656,230	$228,280	$196,098	$88,045	$261,521	$265,038	$87,537
Post monitoring/ Maintenance*	$73,732	$73,000	$43,900	$56,025	$52,758	$64,033	$59,137	$58,098
Long-term management	$9,500	$9,500	$5,250	$5,250	$5,250	$9,500	$9,500	$5,250
Length (ft)	6,997	10,622	3,590	3,500	2,300	5,400	4,300	1,500
Total cost	$829,709	$1,063,419	$448,204	$428,554	$291,571	$509,770	$479,481	$220,277
Cost/linear foot	**$119**	**$111**	**$125**	**$122**	**$127**	**$94**	**$111**	**$147**
Project status	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring

* Projected Cost for five-year period

Wetland Restoration Projects

Five wetland restoration projects had been constructed by the end of FY 01-02. Three of these projects involved the restoration of coastal wetlands and two projects involved the restoration/enhancement of riparian wetlands. All of these projects were located in the coastal plain physiographic region of the state and resulted in the restoration and enhancement of 108.5 acres of wetlands.

Riparian Wetlands

The construction of two riparian wetland restoration projects had been completed by the end of FY 01-02 resulting in the restoration and enhancement of 104.4 acres of wetlands (Table 4.3). The Jumping Run Creek project is located in an urban setting and had an average cost per acre of $25,085. The Howell Woods project is located in a rural area and involves the restoration/enhancement of 100 acres of riparian wetlands in the floodplain of the Neuse River. Wetland hydrology and vegetation has been restored on 20 acres at an average cost per acre of $20,109. The Howell Woods project will also result in the enhancement of 80 acres of wetlands and the preservation of 39 acres of forested buffer. The differences in the per acre costs of these two projects demonstrates the savings associated with economies of scale. Due to the fixed mobilization costs that are similar regardless of project size, large projects will generally provide a lower per acre cost than small projects.

TABLE 4.3. COSTS OF RIPARIAN WETLAND RESTORATION

Project	Jumping Run Creek	Howell Woods
Site identification	$4,050	$5,695
Site acquisition	$0.00	$36,800
Project design	$16,125	$66,916
Construction management	$12,500	$48,734
Site Restoration	$66,000	$183,577
Post monitoring*	$8,250	$56,064
Long-term management*	$3,450	$6,700
Size (acres)	4.4	20
Wetland type	Riparian (urban)	Riparian (rural)
Total cost	$110,375	$404,486
Cost/acre	**$25,085**	**$20,109**
Project status	Monitoring	Monitoring

Coastal Wetlands

The construction of three coastal wetland restoration projects had been completed by the end of FY 01-02 resulting in the restoration of and enhancement of 4.11 acres of wetlands at an average cost of $101,148 per acre. Please refer to Section 5 of the 2001 Annual Report for additional information on these projects.

Non-riparian wetlands

The Wetlands Restoration Program had not completed any non-riparian wetland restoration projects at the end of FY 01-02 therefore no cost analysis of non-riparian wetland restoration is reported.

Cost Analysis of Private Mitigation Bank Restoration Projects

The enabling legislation for the Wetlands Restoration Program requires an annual cost comparison on a per acre basis between the restoration costs of the Wetlands Restoration Program and private mitigation banks. To obtain the data necessary to accomplish this task, a survey requesting restoration cost information is sent to the sponsor of each approved bank each year (Table 4.4). The only response received this fiscal year was from EcoBank. EcoBank reported a per acre cost of $8,675 for non-riparian wetlands. During FY 99 – 00, responses were received from two sponsors, Triangle Group and EcoBank, representing four separate mitigation banks. The average per acre cost for non-riparian wetlands for these four banks was $9,665 (page 41, NCWRP 2000 Annual Report).

As noted above, the Wetlands Restoration Program has not completed any non-riparian wetland restoration projects, therefore no actual cost data to compare with the private mitigation banking industry is available. The private mitigation industry has not provided any information concerning the costs of restoring other types of wetlands or streams therefore cost comparisons with the Wetlands Restoration Program projects are not possible at this time.

TABLE 4.4. APPROVED MITIGATION BANKS IN NORTH CAROLINA

Mitigation Bank Name[1]	County	River Basin	Cataloging Unit	Restoration Type	Sponsor
Scuppernong River Corridor Mitigation Bank	Tyrrell	Pasquotank	03010205	Non-Riparian	Green Vest, LLC
Great Dismal Swamp Restoration Bank	Pasquotank, Perquimans	Pasquotank	03010205	Non-Riparian	Great Dismal Swamp Mitigation Bank, LLC
Hidden Lake Mitigation Bank	Tyrrell	Pasquotank	03010205	Non-Riparian	Green Vest, LLC
Barra Farms Cape Fear Regional Mitigation Bank	Cumberland	Cape Fear	03030005	Non-Riparian Stream	EcoBank, LLC
Greater Sandy Run Wetland Mitigation Bank	Onslow	White Oak	03030001	Non-Riparian	Camp LeJeune Marine Base
Flat Swamp Wetland Mitigation and Stream Restoration Bank	Craven	Neuse	03020202	Non-Riparian Stream	Green Vest, LLC
NEU-CON Mitigation Bank	Lenoir, Jones, Greene	Neuse	03020202 03020203 03020204	Non-Riparian Stream	Environmental Bank and Exchange, LLC
Fisher River Mitigation Bank[2]	Surry	Yadkin	03040101	Riparian	American Wetlands

Green Vest, LLC
1001 Capability Dr. Suite 312
Raleigh, N.C. 27606
(919) 831-1234

EcoBank, LLC
1555 Howell Branch Rd.
Winter Park, FL 32789
(407) 629-6044

Soil and Environmental Consultants, Inc
11010 Raven Ridge Road
Raleigh, NC 27614

Great Dismal Mitigation Bank, LLC
Winthrop, Stimson, Putnam & Roberts
1133 Connecticut Ave. NW
Washington, D.C. 20036

Environmental Banc & Exchange, LLC.
1119-M Whisperwood Court
Greensboro, N.C. 27104
(336) 851-5902

[1]The mitigation banks included in this table have a mitigation banking instrument that has been signed by some or all of the federal and state review agencies

[2]The Fisher River Mitigation Bank was not contacted for this survey.

Comparison of Restoration Costs with Schedule of Fees

The Wetlands Restoration Program conducts an annual comparison of actual restoration costs incurred by the Wetlands Restoration Program and costs reported by the private mitigation banking industry with the Schedule of Fees found at 15A NCAC 2R .0402. The purpose of this annual review is to ensure that the Schedule of Fees reflects the actual cost of restoration activities.

Based on the results of the analysis of restoration costs conducted last fiscal year, rulemaking was initiated during FY 01-02 to increase the fee for stream restoration to $200 per linear foot. A public hearing on the proposed increase was held in July 2002. If approved, the increase will be effective in 2003

Based on the comparison of actual costs for riparian wetlands, non-riparian wetlands and coastal wetlands with the Schedule of Fees, no adjustment to the Schedule of Fees for these categories is recommended at this time.

Section 5. Statewide Wetland and Stream Losses and Gains

Introduction

The Department of Environment and Natural Resources is one of the agencies responsible for protecting and restoring the functions and values of wetlands and streams across the state. The N.C. Wildlife Resources Commission, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Association, local governments, and countless non-profit organizations are all working to maintain and add to North Carolina's remaining inventory of wetlands and streams. Despite the efforts of these groups, there is still an annual net loss of streams in North Carolina, and a net loss of wetlands in some river basins.

The Division of Water Quality and Division of Land Resources within the Department of Environment and Natural Resources regulate construction activities near streams and wetlands. The intent of these regulatory programs is to minimize the impact of construction projects to these resources and to ensure that unavoidable impacts are addressed through mitigation projects. DENR also funds restoration projects through the North Carolina Wetland Restoration Program, the 319 Program, Clean Water Management Trust Fund, and Division of Water Resources Grant Program that can help to offset stream and wetland impacts.

This section presents a summary of information gathered by the NCWRP concerning statewide wetland and stream losses and gains that occurred in the state during FY 2001-2002. This information represents the activities of not only the Division of Water Quality, but also other agencies and programs working to protect and restore wetlands and streams across the state. Wetland, stream and buffer losses and gains are tracked through the Wetland/401Unit of the Division of Water Quality, and are presented under the heading Regulatory Losses and Gains. Information about other programs is presented under the heading Non-Regulatory Gains.

Regulatory Losses and Gains

The information presented in this section is based on the 401 Water Quality Certification database maintained by the Wetland/401 Unit of the Division of Water Quality. This database tracks wetland and stream losses that are authorized through the issuance of a 401 Water Quality Certification. The issuance of a 401 Water Quality Certification by the Division of Water Quality is required before the Corps of Engineers can issue a Section 404 Permit authorizing the fill or alteration of wetlands and/or streams. Although in the majority of cases the impacts authorized by the 401 Water Quality Certification are consistent with the impacts authorized by the Section 404 Permit, it should be noted that the amount of impact authorized by the Section 404 Permit may be less than that authorized by the 401 Water Quality Certification and, in some cases, a Section 404 Permit may never be issued. In addition, the authorized impacts may not occur during this fiscal year and in some cases may never occur. The Division of Water Quality is increasing its efforts to monitor and track the impacts that actually occur during each fiscal year. Questions about information presented in this report regarding regulatory wetlands losses and gains should be directed to Mr. John Dorney with the Division of Water Quality's Wetland/401 Unit at (919) 733-9646.

In addition to the wetland and stream impacts that are tracked in the database, an unknown amount of permanent wetland and stream losses occurs that can be attributed to two causes. First, projects that affect less than one-third of an acre of wetlands or less than 150 linear feet of stream are not required to receive written confirmation from the Division of Water Quality and, therefore, might not be reported. Second, at this time, the magnitude of unauthorized impacts to wetlands and streams is still being assessed. The Division of Water Quality is working to resolve this issue.

Permitted Wetlands Impacts

During FY 2001-2002, the Division of Water Quality issued Water Quality Certifications authorizing 235.82 acres of wetland impact. Table 5-1 summarizes the permitted wetland impacts that occurred

throughout the state by river basin. The majority of these impacts occur in river basins that flow through the coastal plain.

Permitted Stream Impacts

During the FY 2001-2002, Water Quality Certifications were issued authorizing 158,178 linear feet of permanent stream impact. These impacts are summarized by river basin in Table 5-1. The majority of these impacts occur in the piedmont and mountain regions of the state and in urban areas. The state of North Carolina does not require mitigation for impacts to intermittent streams, but impacts to these streams are reported in the table. The reported loss of 78,167 linear feet of stream is partially attributable to intermittent streams.

Permitted Riparian Buffer Impacts in the Neuse and Tar-Pamlico River Basins

The Riparian Buffer Rules are currently in effect for both the Neuse and Tar-Pamlico river basins. These rules apply to 50-foot wide riparian buffers directly adjacent to surface waters including intermittent and perennial streams, lakes, ponds, and estuaries. Activities within riparian buffers are categorized as exempt, allowable, allowable with mitigation, or prohibited. The Wetland/401 Unit of the Division of Water Quality regulates activities in riparian buffers and maintains the database of riparian buffer losses that are permitted through the issuance of an Authorization Certificate.

During FY01-02, 32.29 acres of buffer impact in the Neuse River Basin and 3.53 acres in the Tar Pamlico River Basin were authorized. There was .48 acre of riparian buffer impact in the Catawba River Basin during the FY 2001-2002.

Compensatory Mitigation

The purpose of compensatory mitigation is to replace wetland and stream functions that are lost through permitted impacts to stream and wetlands. Eighty-one of the 401 Water Quality Certifications issued during FY01-02 required wetland or stream mitigation. Of those, 69 percent were satisfied through payment to the NCWRP. Compensatory mitigation requirements for 7 percent were satisfied through payment to private mitigation banks. The applicants conducted the remaining 23 percent of the required compensatory mitigation on site.

Wetlands

During FY 2001-2002, a total of 230.38 acres of wetland restoration and creation was required as compensatory mitigation through the issuance of 401 Water Quality Certifications (Table 5-1). The statewide compensatory mitigation requirements for wetlands were 5.44 acres less than the authorized impacts. Twenty two percent (53.16 acres) of this total amount of wetland impact is attributed to projects that impact less than one acre of wetland and, therefore, those impacts do not require compensatory mitigation as a condition of the 401 Water Quality Certification.

Streams

The compensatory mitigation requirements of the 401 Water Quality Certifications issued during FY 2001-2002 totaled 158,178 linear feet of stream (Table 5-1). The authorized stream impacts exceeded the compensatory mitigation requirements for stream restoration in every river basin. The authorized impacts statewide exceed the compensatory mitigation requirements by 78,167 feet. This substantial difference between permitted stream impacts and compensatory mitigation requirements is attributable to two factors. First, stream impacts must exceed the minimum threshold of 150 linear feet before compensatory mitigation is required. Second, mitigation is only required for impacts to perennial streams. No mitigation was required for the loss of intermittent streams.

Non-Regulatory Gains

In addition to restoration projects associated with compensatory mitigation requirements, there are numerous state, federal and local government agencies as well as non-profit organizations that are involved in restoration activities. In order to determine the magnitude of these efforts and to provide a mechanism to share information on restoration efforts, the NCWRP conducted a survey to collect information concerning the amount of wetlands and streams that have been restored, created, enhanced, and preserved during the FY 2001-2002 (Appendix C, Appendix Table C-1). Based on the results of this survey, 0.5 acres of wetland restoration/creation and 33,600 linear feet of stream restoration were completed during the FY 2001-2002. A listing of these projects, as well as the organizations that received the survey, are shown in (Appendix C, Appendix Table C-1). The full text of the survey is presented at the end of Appendix C.

The NCWRP is committed to tracking stream and wetland restoration efforts that are conducted outside of regulatory requirements. The data for wetland and stream restoration presented in this section should be evaluated with the following caveats:

The distinction between restoration and enhancement is difficult to discern. Projects that are categorized by survey respondents as restoration projects may actually be enhancement projects.

The NCWRP makes every effort to notify appropriate organizations about the restoration project survey. It is likely, however, that some restoration projects completed during FY01-02 are not recorded in the NCWRP database. The NCWRP is continuing to improve methods of data collection to increase the accuracy of the information provided in this section.

Net Gains / Losses of Wetlands and Streams Including Regulatory and Non-Regulatory Gains in Wetlands and Streams

As depicted in Tables 5-2and 5-3 when regulatory losses, compensatory mitigation requirements, and non-mitigation projects are combined, there is a net gain of 0.56 acres of wetlands and a net loss of 44,567 linear feet of streams for the state during FY01-02. There was a net loss of wetlands in some river basins. Additional wetland, riparian and buffer preservation efforts were reported (Appendix C, Table C-1). Preservation of 18,521 acres of wetlands was reported in the Cape Fear, Catawba, Lumber, Pasquotank, Tar-Pamlico, Watauga, and White Oak River Basins. Riparian buffer preservation totaling 9,639 acres was reported in the Cape Fear, Catawba, French Broad, Little Tennessee, Lumber, Neuse, Tar-Pamlico, Watauga, White Oak, and Yadkin River Basins.

Compensating for Non-Mitigated Wetlands Losses and Gains

An important role of the NCWRP is to provide compensation for permitted impacts to wetlands and streams that fall below the regulatory threshold requiring compensatory mitigation by the 401 Water Quality Certification. As discussed previously, the Division of Water Quality does not require compensatory mitigation for impacts to wetlands that are less than one acre or for impacts to streams that are less than 150 feet. On an annual basis, the cumulative effects of these impacts result in a substantial loss of wetland and riparian resources. During FY 2001-2002, an estimated total of 53.16 acres of wetlands were lost due to permitted impacts less than one acre in size. These impacts are summarized by river basin in Table 5-1.

Through the Wetlands Trust Fund, the NCWRP has resources to fund projects that offset these wetland losses. The NCWRP uses appropriated funds, interest earned by the Wetlands Trust Fund and grant awards to work in areas where non-mitigated impacts are significant.

TABLE 5.1. STATEWIDE WETLAND, STREAM AND RIPARIAN BUFFER LOSSES AND GAINS.

Wetlands Impacts					
Basin	Impacts <1acre	Impacts >1acre	Total Impacts (acres)	Mitigation (acres)	Gain or change (acres)
Broad	0	0	0	0	0
Cape Fear	9.98	141.27	151.25	172.23	+20.98
Catawba	2.85	15.6	18.45	20.69	+2.24
Chowan	1.63	0	1.63	0.96	-0.67
French Broad	0.85	1.11	1.96	2.25	+0.29
Hiwassee	0	0	0	0	0
Little Tennessee	0.47	0	0.47	0.19	-0.28
Lumber	2.14	0	2.14	0	-2.14
Neuse	14.7	14.06	28.76	15.9	-12.86
New	0	0	0	0	0
Pasquotank	8.52	1	9.52	1	-8.52
Roanoke	2.06	0	2.06	0	-2.06
Savannah	0.01	0	0.01	0	-0.01
Tar-Pamlico	4.83	0	4.83	0	-4.83
Watauga	0	0	0	0	0
White Oak	1.59	5.64	7.23	6	-1.23
Yadkin-PeeDee	3.53	3.98	7.51	11.16	+3.65
Totals	**53.16**	**182.66**	**235.82**	**230.38**	**-5.44**

Stream Impacts					
Basin	Impacts <150ft	Impacts >150ft	Total impacts (linear feet)	Mitigation (linear feet)	Gain or change (linear feet)
Broad	2,177	595	2,772	0	-2,772
Cape Fear	10,695	41,937	52,632	27,037	-25,595
Catawba	8,310	27,228	35,538	28,427	-7,111
Chowan	153	0	153	0	-153
French Broad	4,476	4,615	9,091	4,631	-4,460
Hiwassee	691	1,320	2,011	1,630	-381
Little Tennessee	2,084	1,716	3,800	948	-2,852
Lumber	626	0	626	0	-626
Neuse	9,104	13,246	22,350	6,760	-15,590
New	2,901	1,253	4,154	560	-3,594
Pasquotank	224	164	388	0	-388
Roanoke	1,476	160	1,636	0	-1,636
Savannah	355	0	355	0	-355
Tar-Pamlico	4,212	1,259	5,471	599	-4,872
Watauga	555	0	555	0	-555
White Oak	40	1,870	1,910	2,768	858
Yadkin-Pee Dee	7,297	7,439	14,736	6,651	-8,085
Totals	**55,376**	**102,802**	**158,178**	**80,011**	**-78,167**

Buffer Impacts					
Basin	Impacts <1acre	Impacts >1acre	Total Impacts (acres)	Mitigation (acres)	Gain or change (acres)
Catawba	0.48	0	0.48	0	-0.48
Neuse	5	27.29	32.29	42.2	+9.91
Tar-Pamlico	0.93	2.6	3.53	6.04	+2.51
Totals	**6.41**	**29.89**	**36.3**	**48.24**	**+11.94**

TABLE 5-2. NET GAINS/LOSSES OF ACRES OF WETLANDS BY RIVER BASIN, FY2001-2002

River Basin	Regulatory gains or losses (acres)	Non-regulatory gains restoration /creation (acres)	Net gains/losses (acres)
Broad	0	0	0
Cape Fear	+20.98	0	+20.98
Catawba	+2.24	0	+2.24
Chowan	-0.67	0	-0.67
French Broad	+0.29	0	+0.29
Hiwassee	0	0	0
Little Tennessee	-.28	0	-.28
Lumber	-2.14	0	-2.14
Neuse	-12.86	0	-12.86
New	0	0	0
Pasquotank	-8.52	+6	-2.52
Roanoke	-2.06	0	-2.06
Savannah	-0.01	0	-0.01
Tar-Pamlico	-4.83	0	-4.83
Watauga	0	0	0
White Oak	-1.23	0	-1.23
Yadkin	-3.65	0	-3.65
Total	**-5.44**	**+6**	**+.56**

TABLE 5-3. NET GAINS/LOSSES OF ACRES OF WETLANDS BY RIVER BASIN, FY2001-2002

River Basin	Regulatory gains or losses (linear feet)	Non-regulatory gains restoration /creation (linear feet)	Net gains/losses (linear feet)
Broad	-2,772	0	-2,772
Cape Fear	-25,595	0	-25,595
Catawba	-7,111	+2,000	-5,111
Chowan	-153	0	-153
French Broad	-4,460	0	-4,460
Hiwassee	-381	0	-381
Little Tennessee	-2,852	0	-2,852
Lumber	-626	0	-626
Neuse	-15,590	0	-15,590
New	-3,594	0	-3,594
Pasquotank	-388	+30,000	+29,612
Roanoke	-1,636	0	-1,636
Savannah	-355	0	-355
Tar-Pamlico	-4,872	0	-4,872
Watauga	-555	+1,600	+1,045
White Oak	+858	0	+858
Yadkin	-8,085	0	-8,085
Total	**-78,167**	**33,600**	**-44,567**

The North Carolina Wetlands Restoration Program
2002 Annual Report to the
U.S. Army Corps of Engineers
Wilmington District

As required by paragraph VI of the Memorandum of Understanding (MOU) between the U.S. Army Corps of Engineers, Wilmington District (Corps of Engineers) and the Department of Environment and Natural Resources, Wetlands Restoration Program (NCWRP) a report documenting the activities of the NCWRP related to the MOU has been prepared and is submitted to the Corps of Engineers for review.

Please note that the majority of the information concerning the activities of the NCWRP is documented in the main body and appendices of this report that has been prepared for the Environmental Review Commission of the North Carolina General Assembly as required by the enabling legislation for the NCWRP. The 2002 Annual Report, including this appendix, documents all activities of the NCWRP during FY2001-02 (July 1, 2000 through June 30, 2001). This appendix will address the specific reporting requirements found in Paragraphs V and VI of the MOU.

Memorandum of Understanding: Reporting Requirements

As specified in paragraphs V and VI of the MOU, the following information is presented in this report: the administrative costs associated with the MOU; a summary of monitoring results of projects that have been implemented; an accounting of the amount of restoration, creation, enhancement or preservation that has been conducted in each river basin by Catalog Unit; an accounting of the acres of mitigation required by Section 404 permits in each river basin by Catalog Unit; documentation concerning the implementation of projects in accordance with the time frame specified in the MOU; and an accounting of the funds that have been paid into the Wetlands Restoration Fund to satisfy the compensatory mitigation requirements of Section 404 permits.

Administrative Costs Associated with Implementation of the MOU

The salaries, travel and other operating expenses of five positions are funded through the Compensatory Mitigation Fund (Account 2981). The cost of these positions during FY01-02 was $255,351, which is equivalent to 2.61% of the payments to Account 2981. Administrative costs are incorporated within the fee structure, and will not reduce the funding available for compensatory mitigation projects.

Summary of Monitoring Results of Projects

As required by Paragraph IV F of the MOU, monitoring reports and as-built plans for each project will be submitted to the Corps of Engineers upon completion of each project. In addition, the appropriate Corps of Engineers Regulatory Field Office is notified during the planning and design phase of each project to provide an opportunity for input during the design phase of the project.

The NCWRP has completed 15 projects and is monitoring these projects in accordance with the MOU (Table A-1). The monitoring reports contain hydrological, fluvial geomorphological, and vegetative monitoring data as appropriate for each project as well as project specific data that is necessary to ensure success of the restoration project. The first monitoring report for each project is submitted to NCWRP during the fall after the first full growing season after the initial planting of vegetation. Monitoring continues for at least five full growing seasons after planting, or until after all success criteria have been met.

Three projects (YD-101-WL-S-SM, Stone Mountain; CT-101-AX-S-PD, Payne Dairy; and WO-001-ON-W-SC1, Sturgeon City) completed the first year of monitoring during FY01-02. The results of these monitoring reports are summarized below. Three additional projects will complete their first year of monitoring during FY02-03 (NU-203-WS-H-HSC, Hominy Swamp; CF-0020GU-S-PP, Price Park; and

NW-001-AG-S-BC, Brush Creek). The full monitoring reports for all projects are submitted to the USACE by January 1st of each year and are available for review at the NCWRP office.

Monitoring of Stream Restoration Projects

The monitoring of stream restoration projects involves the measurement of fluvial geomorphological and vegetative parameters. Fluvial geomorphological parameters include the measurement of channel dimension (cross-sections), pattern (sinuosity), and profile (channel slope). In addition, channel substrate is measured by performing pebble counts at identified pool and riffle cross-sections. Vegetative monitoring focuses on the growth, survival, and diversity of vegetation within the riparian buffer of stream restoration projects.

Stream Restoration Success Criteria

The success criteria for stream restoration projects are based on the stability of the fluvial geomorpholocical parameters. Channel stability is primarily based on the measurement of dimension and slope. A determination is made that the success criteria has been met when there is no significant difference between the measurements for dimension and slope in the restored channel and the range for these parameters for the specific stream type identified as the reference type for the project. A significant change is defined as a value that falls outside the specified range in the morphological table for the reference stream type.

Vegetative monitoring focuses on the survival and growth and diversity of planted species in the riparian area (25-50 feet on both sides of the stream). The vegetative success criterion is met by documenting the survival and growth of at least 320 trees per acre of the species selected for each site. In addition, the species composition of the riparian buffer must meet the species diversity criteria established for each project based on site-specific conditions.

Monitoring of Wetland Restoration Projects

The monitoring of wetland restoration/enhancement projects involves the measurement of the hydrological and vegetative parameters. Hydrologic monitoring includes the measurement of groundwater hydrology, i.e. the depth from the surface to the groundwater table throughout the year. Vegetative monitoring focuses on the growth, survival, and diversity of vegetation within the riparian buffer of stream restoration projects.

Wetland Restoration/Enhancement Success Criteria

The hydrological success criterion documents that the restored site meets the hydrological criteria for each site based on site-specific conditions associated with landscape position and soil types. At a minimum, monitoring must document that the groundwater table is within 12 inches of the ground surface from 5-12% of the growing season. In addition, the NCWRP monitors a reference wetland that is similar in type and landscape position and compares this data to data from the restored site. Success is achieved when the hydroperiod of the restored site is within +/- 10% of the hydroperiod of the reference site.

Vegetative monitoring focuses on the survival and growth and diversity of planted species within the restored/enhanced wetland. The vegetative success criterion is met by documenting the survival and growth of at least 320 trees per acre of the species selected for each site. In addition, the species composition of the restored/enhanced wetland must meet the species diversity criteria established for each project based on site-specific conditions.

Summary of Results from Individual Projects

YD-101-WL-S-SM - Stone Mountain

A stream restoration project consisting of 7,000 linear feet of restoration and 2,590 of enhancement was performed on the East Prong of the Roaring River in Stone Mountain State Park in 2000. The primary objectives of this project were to improve water quality and habitat by returning the river channel to a stable pattern, dimension and profile.

Success Criteria:

Fluvial Geomorphology:
Stream cross-sections (dimension) and slope (profile) show no significant change from the as-built plan therefore the success criteria for fluvial geomorphology has been met for this reporting period.

Vegetation:
All monitoring plots show a survival of at least 320 stems per acre. The diversity of species within each plot is within the range established for this project

Comments/Recommendations/Remedial Actions:

A large log cross vane was repaired in reach 2 during the past year.
To ensure adequate diversity and continued survivability of a minimum of 320 stems per acre, additional planting (live stakes and bare root seedlings) will be performed during winter 2002-03.
The deer browse continues to be a problem at the Stone Mountain site. Deer repellent was sprayed on many of the seedlings last winter; however, deer browse was still considerable. Tree shelters may be utilized if this continues to be a problem.

CT-101-AX-S-PD - Payne Dairy

A stream restoration project was performed on a 7,000 linear foot reach of Jumping Run Creek in Alexander County. Priority I restoration was performed on 5,180 linear feet of stream channel. The remainder of the project consisted of 470 linear feet of Enhancement I and 1,350 linear feet of Enhancement II. The entire 7,000 linear foot reach was fenced to remove cattle from the stream on an active dairy farm. The primary objective of this project was to improve water quality and habitat through the restoration of a stable channel and restoring the vegetation in the adjacent riparian buffer.

Success Criteria:

Fluvial Geomorphology:
Stream cross-sections (dimension) and slope (profile) show no significant change from the as-built plan therefore the success criteria for fluvial geomorphology has been met for this reporting period.

Vegetation:
The survival of the bare-rooted seedlings in the riparian buffer was significantly less than 320 stems per acre therefore the success criteria was not met. The survival of willow stakes within the stream channel exceeded the requirement of 320 stems per acre.

Comments/Recommendations/Remedial Actions:

No further repairs to structures and/or banks are required at this time.
The head-cut in Area 1 will be monitored with repairs made as necessary.
Minor bank failure (<10 feet) was observed in one location along the 5,755 linear feet of restoration. This area will be monitor with remedial actions taken as necessary.
Two rock cross vanes had some minor flow through at low flow but were still serving as grade control. Over time, the small holes between the header rocks of the second structure should be filled in by bedload. This area will be monitored and additional actions will be taken if necessary.
The riparian buffer areas were replanted in the spring of 2002.

WO-001-ON-W-SC1 - Sturgeon City

Three acres of brackish coastal marsh and tidal creek were restored at the site of an abandoned wastewater treatment plant on Wilson Bay, Jacksonville, NC. This project involved the removal of fill and debris that had been used to fill the marsh. The area was graded to the elevation of adjacent marshes and planted with giant cordgrass (Spartina cynosuroides) and other species. The goal of the project was to stabilize the shoreline with native vegetation and to improve water quality and habitat through the restoration of the marsh. This project is one of a number of actions that have been taken to improve the water quality of Wilson Bay and demonstrates how compensatory mitigation projects can be incorporated into watershed scale projects.

Success Criteria:

Hydrology:
The hydrology of the reference site was not properly monitored therefore no assessment of compliance with success criteria can be made at this time. However, the automatic groundwater monitoring gauges indicate that diurnal tidal fluctuations occur at the restored site and that the tidal creek is functioning as designed.

Vegetation:
All monitoring plots show good survival of planted species. The stem counts indicate that the success criterion of 25% cover after year 1 has been met.

Comments/Recommendations/Remedial Actions:

The deficiencies in the monitoring report will be addressed.
The invasive grasses observed in some plots will continued to be monitored with actions taken as necessary to ensure that these grasses do not impede the growth of desired species.

Accounting of the Amount of Restoration, Creation, Enhancement or Preservation Conducted in Each River Basin by Catalog Unit

The NCWRP currently has 60 projects that meet the definition of "instituted" and will be used to meet the compensatory mitigation requirements of Section 404 permits (Table 1-2). Collectively these 60 projects will restore, enhance, and preserve approximately 376.9 acres of wetlands, 192,662 linear feet of stream channel, and 297.1 acres of riparian buffer. As defined in the MOU, "instituted" means that a site has been identified, the property has been acquired, and a contractor has been assigned to design the project. An additional 19 projects that will result in the restoration of 184 acres of wetlands and 63,000 linear feet of streams have been identified and will be instituted during FY02-03 or FY03-04 (Table 1-3).

Accounting of the Compensatory Mitigation Required by Section 404 Permits Assumed by NCWRP in Each River Basin by Catalog Unit

During FY01-02 the NCWRP assumed the compensatory mitigation requirements of 68 Section 404 permits related to 36 impacts. The compensatory mitigation requirements of these permits require the restoration of 39,820 linear feet of stream channel and 41.04 acres of wetlands (Table A-2). Payments to fund mitigation projects associated with these impacts totaled $5,849,085 (Table A-3).

Since the effective date of the MOU (November 4, 1998) the NCWRP has assumed the compensatory mitigation requirements of 108 Section 404 permits. The cumulative compensatory requirements of these permits require the restoration of 164,051 linear feet of stream channel and 194.06 acres of wetlands. The impacts accepted are distributed among 11 river basins and 22 catalog units (Table A-4).

Documentation Concerning the Implementation of Projects in Accordance with the Time Frame Specified in the MOU

As stipulated in paragraph IV of the MOU, the NCWRP has a specified amount of time from the date a payment for compensatory mitigation is received to implement projects that satisfy the compensatory mitigation requirement. The long-term goal of the NCWRP is to identify and implement projects that are incorporated into watershed restoration strategies in advance of permitted impacts. Although significant progress has been made in achieving this goal, the current emphasis of the NCWRP is compliance with the timeframes established by the MOU. This section will examine the progress NCWRP has made in meeting the compensatory mitigation requirements of Section 404 permits from the initiation of the MOU through the end of FY01-02.

In accordance with the schedule established by the MOU, there were 73 Section 404 permits with compensatory mitigation requirements due by the end of FY 01-02 (Table A-5). The mitigation requirements of 92% of these permits have been met by projects that met the definition of instituted by the end of FY01-02. The mitigation for 84% of the permits was provided within the timeframe established in the MOU. The mitigation requirements of 95% of the permits will have been met when the projects listed on Table 1.3 are instituted in FY02-03.

Statewide the NCWRP has assumed the responsibility of Section 404 permits with compensatory mitigation requirements totaling 67.55 acres of wetlands and 52,955 linear feet of stream. The NCWRP has instituted projects that will result in the restoration, enhancement or preservation of 376.9 acres of wetlands and 192,662 linear feet of stream channel.

Although the total amount of restoration instituted by the NCWRP exceeds the total amount of required mitigation on a statewide basis there are mitigation obligations that have not been met. Specifically, at the end of FY01-02, there were 6 permits for which the mitigation requirements were not met within the specified timeframe. A number of actions have been initiated to address the outstanding mitigation requirements. These activities include the allocation of additional staff resources to the watersheds of concern, the development of Local Watershed Plans in these watersheds to assist in the identification of appropriate projects, and the issuance of Requests for Proposals for wetland and stream restoration. It is anticipated that the outstanding mitigation requirements as of June 30, 2002 will be met by June 30, 2003.

Accounting of the Funds Paid into the Wetlands Restoration Fund to Satisfy the Compensatory Mitigation Requirements of Section 404 permits

As required by the MOU, the NCWRP has established a separate account, 2981 - Compensatory Mitigation within the DENR Wetlands Trust Fund as a repository for all payments made to the NCWRP for the purpose of satisfying Section 404 compensatory mitigation requirements. As reflected in Section 3 of the 2001 Annual Report, Compensatory Mitigation Account 2981 is a repository for payments that satisfy both Section 404 permit and 401 Water Quality Certification compensatory mitigation requirements. During FY01-02, payments to Account 2981 to satisfy the compensatory mitigation requirements of Section 404 permits totaled $9,197,500. These payments fulfill the compensatory mitigation requirements of 44 permits (Table A-7). Since the effective date of the MOU, November 4, 1998, 86 payments totaling $24,140,218.31 have been made to Account 2981 for the purpose of satisfying the compensatory mitigation requirements of Section 404 permits.

Please refer to Section 3 for an explanation of the use of the funds deposited into Account 2981 during FY 01-02.

Additional Actions Taken To Implement the Memorandum of Understanding

Establishment of the Advisory Team

The Memorandum of Understanding between DENR and the U.S. Army Corps of Engineers (see Appendix B, 1998 Annual Report) requires the NCWRP to convene an Advisory Team to review the progress of the NCWRP in meeting compensatory mitigation requirements of Section 404 permits. The appropriate state and federal agencies have been invited to appoint a representative to serve on the Advisory Team. It is anticipated that the first meeting of the Advisory Team will be held during January 2002.

Development of Reporting Formats for Site-Specific Restoration Plans and Monitoring Reports

The NCWRP has submitted recommendations to the Corps of Engineers for review and comment on the format for site-specific restoration plans and monitoring reports. These formats will be finalized during FY 02-03.

Quarterly Progress Reports

The NCWRP acknowledges the need to provide information to the Corps and other interested parties concerning the progress it has made in meeting assumed compensatory mitigation requirements of Section 404 projects. Although the Annual Report meets the reporting requirements of the Memorandum of Understanding the NCWRP will began providing quarterly reports to the Corps in January 2002. These reports will be posted on the NCWRP web page for review by interested parties.

TABLE A-1. STATUS OF MONITORING FOR NCWRP PROJECTS

Project Name	Project #	Project Type	River Basin	Cataloging Unit	County	Date Construction Completed	Date Planted	First Monitoring Report Due
Stone Mountain	YD-101-WL-S-SM	S	Yadkin	03040101	Wilkes	Jul-00	Feb-01	Nov-01
Payne Dairy	CT-101-AX-S-PD	S	Catawba	03050101	Alexander	Mar-01	Mar-01	Nov-01
Sturgeon City (Phase I)	WO-001-ON-W-SC1	W	White Oak	03030001	Onslow	Mar-01	Mar-01	Nov-01
Hominy Swamp Creek	NU-203-WS-S-HSC	S	Neuse	03020203	Wilson	Aug-01	Dec-01	Nov-02
Price Park	CF-002-GU-S-PP	S	Cape Fear	03030002	Guilford	Jul-01	Dec-01	Nov-02
Brush Creek	NW-001-AG-S-BC	S	New	05050001	Alleghany	Jun-01	Dec-01	Nov-02
High Vista	FB-105-BN-S-HV	S	French Broad	06010105	Buncombe	Aug-02	Dec-02	Nov-03
Wike Property	CT-101-CT-S-WP	S	Catawba	03050101	Catawba	Jul-02	Dec-02	Nov-03
Howell Woods	NU-201-JS-W-HW	W	Neuse	03020201	Johnston	Jul-02	Dec-02	Nov-03
Kentwood Park	NU-201-WK-S-KP	S	Neuse	03020201	Wake	Aug-02	Dec-02	Nov-03
Chavis Park	NU-201-WK-S-CP	S	Neuse	03020201	Wake	Aug-02	Dec-02	Nov-03
Smith/Austin Creek	NU-201-WK-SWB-SAC	S,W,B	Neuse	03020201	Wake	Aug-02	Dec-02	Nov-03
Brown Branch	CT-101-CL-S-BB	S	Catawba	03050101	Caldwell	Sep-02	Dec-02	Nov-03
Beaver Creek	YD-101-SU-S-BC	S	Yadkin	03040101	Surry	Aug-02	Dec-02	Nov-03
Bear Swamp Creek	TP-101-FR-S-BSC	S	Tar-Pamlico	03020101	Franklin	Jul-02	Dec-02	Nov-03

TABLE A-2. SECTION 404 COMPENSATORY MITIGATION ACCEPTED DURING FY01-02

					Mitigation Requirement			
COE #	River Basin	CU#	Payment Date	Date Mitigation Due	Stream (linear feet)		Wetland (acres)	
					Cold/ cool	Warm	Riparian	Non-Riparian
200120354	Neuse	03020201	7/2/2001	7/2/2002		135.00	0.28	
200031430	Catawba	03050101	7/6/2001	7/6/2002		16,574.00		0.52
199601404	Roanoke	03010107	7/6/2001	7/6/2002			0.25	
200120158	Yadkin	03040103	7/16/2001	7/16/2002		3,100.00		
200100510, 199300309	Cape Fear	03030007	8/14/2001	8/14/2002				2.56
200120939	Neuse	03020201	8/14/2001	8/14/2002			0.31	
200001592, 200001598	Yadkin	03040201	9/24/2001	9/24/2002		242.00		
200120868	Neuse	03020201	10/3/2001	10/3/2002			0.32	
200210001-26	Pasquotank	03010205	10/15/2001	10/15/2002			2.42	
199911192	Neuse	03020202	10/22/2001	10/22/2002			0.75	7.00
199601917, 199700884	Neuse	03020201	10/22/2001	10/22/2002			4.00	
200021074	Neuse	03020201	10/22/2001	10/22/2002			4.54	
200120284	Neuse	03020201	10/22/2001	10/22/2002			0.45	
199821210	Neuse	03020201	10/23/2001	10/23/2002		500.00		
200220055	New	05050001	11/8/2001	11/8/2002		320.00		
200110916	Neuse	03020204	11/24/2001	11/24/2002		374.00		
200120353	Cape Fear	03030002	12/17/2001	12/17/2002		5,304.00	0.52	1.06
200100628	Cape Fear	03030005	12/20/2001	12/20/2002			0.42	
200200226	Cape Fear	03030004	2/19/2002	2/19/2003			0.88	
200020732	Cape Fear	03030002	2/22/2002	2/22/2003			1.34	
199920268	Neuse	03020201	2/28/2002	2/28/2003		490.00	1.75	
200121014, 200220223	Cape Fear	03030002	3/14/2002	3/14/2003		268.00		
200101075	Cape Fear	03030007	4/5/2002	4/5/2003				0.66
200100007	Cape Fear	03030005	4/5/2002	4/5/2003				3.10
200230067	Catawba	03050101	4/11/2002	4/11/2003		220.00		
200220329	Cape Fear	03030003	4/22/2002	4/22/2003		185.00		
200101048	Yadkin	03040201	5/13/2002	5/13/2003				2.20

Table A-2 continued

200120036	Neuse	03020201	5/22/2002	5/22/2003			0.88	
200100576	Cape Fear	03030004	5/23/2002	5/23/2003				0.50
200120869, 200121149	Neuse	03020201	5/29/2002	5/29/2003			0.05	
200031274	Catawba	03050101	6/3/2002	6/3/2003		5,895.00	0.58	
200121286	Neuse	03020201	6/5/2002	6/5/2003				0.50
199601836	Neuse	03020201	6/6/2002	6/6/2003		5,172.00	2.20	
200100555, 199403372	New River	03030001	6/12/2002	6/12/2003				1.00
199930472, 200230730	Catawba	03050101	6/14/2002	6/14/2003		709.00		
200120682	Neuse	03020201	6/20/2002	6/20/2003		332.00		
				Total	**0.00**	**39,820.00**	**21.94**	**19.10**
							Total Wetands	**41.04**

TABLE A-3. SECTION 404 COMPENSATORY MITIGATION PAYMENTS

		Mitigation Requirement			
404 Permit#	Payment Date	Stream (linear feet)	Non-Riparian Wetland (acres)	Riparian Wetland (acres)	Payment Amount
199601404	7/6/2001			0.25	$6,000
199601836	6/6/2002	5,172		2.20	$700,500
199821210	10/23/2001	500			$62,500
199911192	10/22/2001		7	0.75	$102,000
199920268	2/28/2002	490		1.75	$145,250
200020732	2/22/2002			1.34	$36,000
200021074	10/22/2001	5,895		4.54	$114,000
200031274	6/3/2002			0.58	$754,875
200031430	7/6/2001	16,574	0.52		$2,080,750
200100007	4/5/2002		3.10		$39,000
200100576	5/23/2002		0.50		$12,000
200100628	12/20/2001			0.42	$12,000
200101048	5/13/2002		2.20		$27,000
200101075	4/5/2002		0.66		$9,000
200110916	11/24/2001	374			$46,750
200120036	5/22/2002			0.88	$24,000
200120158	7/16/2001	3,100			$387,500
200120284	10/22/2001			0.45	$12,000
200120353	12/17/2001	5,304	1.06	0.52	$696,000
200120354	6/29/2001	135		0.28	$28,875
200120682	6/20/2002	332			$41,500
200120868	10/3/2001			0.32	$12,000
200120939	8/14/2001			0.31	$12,000
200121286	6/5/2002		0.50		$6,000
200200226	2/19/2002			0.88	$24,000
200220055	11/8/2001	320			$40,000
200220329	4/22/2002	185			$23,125
200230067	4/11/2002	220			$27,500

Table A-3 continued

199601917, 199700884	10/22/2001			4.00	$96,000
199930472, 200230730	6/14/2002	709			$96,210
200001592, 200001598	9/24/2001	242			$30,250
200100510, 199300309	8/14/2001		2.56		$33,000
200100555, 199403372	6/12/2002		1.00		$12,000
200120869, 200121149	5/29/2002			0.05	$6,000
200121014, 200220223	3/14/2002	268			$33,500
200210001-26	10/15/2001			2.42	$60,000
Totals		**39,820**	**19.10**	**21.94**	**$5,849,085**

TABLE A-4. CUMULATIVE COMPENSATORY MITIGATION REQUIREMENTS BY RIVER BASIN AND CATALOGING UNIT, 11/1/1998 - 6/30/2002

Basin	CU	Wetlands		Streams	
		Non-Ripairan	Riparian	Cold/Cool	Warm
Cape Fear	03030002	1.06	37.60		40,540
Cape Fear	03030003				185
Cape Fear	03030004	0.5	33.84		5,594
Cape Fear	03030005	4.08	0.42		
Cape Fear	03030007	3.22	7.00		9,569
Catawba	03050101	0.52	2.14	7,410	25,997
Catawba	03050103		9.84		4,137
French Broad	06010105		0.00	4,671	
Lumber	03040203		4.35		
Neuse	03020201	0.93	28.11		21,317
Neuse	03020202	7	1.27		4,966
Neuse	03020204				374
New (mountain)	05050001		1.20	730	
New (coastal plain)	03030001	1			
Pasquotank	03010205	5.46			
Roanoke	03010103				2,906
Roanoke	03010107		8.68		770
Tar-Pamlico	03020101	26.76			212
Tar-Pamlico	03020103	0			1,198
Yadkin	03040101		3.25	26,010	3,833
Yadkin	03040201	5.08	0.75		532
Yadkin	03040103				3,100
Totals		**55.61**	**138.4499**	**38,821**	**125,230**
	Total wetland	**194.06**			
	Total stream			**164,051**	

TABLE A-5. CUMULATIVE REQUIRED COMPENSATORY MITIGATION AND NCWRP RESTORATION PROJECTS (404 ONLY) DUE BY 6/30/02.

			Mitigation Requirement								
COE #	River Basin	CU#	Stream (linear feet)		Wetland (acres)		Date Mitigation Due	Date Instituted[1]	Project Code	Mitigation Requirement	Mitigation needed
			cold/ cool	warm	riparian	non-riparian				met	
199921172, 200020339, 200021898	Cape Fear	03030002		1,116			11/14/2001	4/5/2000	CF-002-GU-S-PP	x	
199602359	Neuse	03020201		460			12/2/2001	6/30/1999	NU-201-WK-S-KP	x	
199502585	Neuse	03020201			2.37		12/2/2001	7/15/1999	NU-201-JS-W-HW	x	
199302820	Cape Fear	03030004		2,686			12/3/2001	8/13/2001	CF-004-HN-SW-JRC	x	
199830659	French Broad	06010105	780				12/3/2001	9/25/2001	FB-105-HD-S-CC	x	
200021861	Neuse	03020201			0.47		12/6/2001	7/15/1999	NU-201-JS-W-HW	x	
199417015	Roanoke	03010103		2,906			12/14/2001	3/26/2002	RN-103/104-SK-S-SC	x	
200021946, 200021887	Neuse	03020201		189			12/28/2001	6/30/1999	NU-201-WK-S-KP	x	
200021946, 200021887	Neuse	03020201			0.11		12/28/2001	7/15/1999	NU-201-JS-W-HW	x	
199820937	Cape Fear	03030004			5.64		1/4/2002	8/13/2001	CF-004-HN-SW-JRC	x	
199705426	Neuse	03020202		2,483			1/22/2002	5/30/2002	NU-202-LN-SW-WC	x	
200021484-86	Yadkin	03040101		406			1/22/2002	11/27/2001	YD-101-WL-S-BC	x	
200100100	Cape Fear	03030005				0.98	1/24/2002	1/22/2002	CF-005-BR-SW-BS	x	

Table A-5 continued

199820685	Cape Fear	03030002		268			2/4/2002	4/5/2000	CF-002-GU-S-PP	x	
199831147	French Broad	06010105	1,285				2/15/2002	9/25/01, 7/9/01	FB-105-HD-S-CC, FB-105-BN-S-HV	x	
199801874	Lumber	03040203			1.6		2/20/2002	7/21/2002	LU-203-RB-W-MSC	x	
200000991	Cape Fear	03030004		100			2/28/2002	8/13/2001	CF-004-HN-SW-JRC	x	
200000991	Cape Fear	03030004			28.2		2/28/2002	8/13/2001	CF-004-HN-SW-JRC	x	
200001398	Yadkin	03040201			0.75		3/1/2002				**0.75 (acres^2)**
199831046	Catawba	03050103			3.9		3/6/2002	4/16/2002	CT-103-MK-S-MC		**2.4 (acres^2)**
199831046	Catawba	03050103		1,400			3/6/2002	2/26/2002	CT-103-MK-S-FP	x	
199921144	Neuse	03020201		372			3/27/2002	6/30/1999	NU-201-WK-S-KP	x	
199602420 and 200021006	Yadkin	03040101	3,642				3/27/2002	5/5/1999	YD-101-WL-S-SM	x	
200120708, 200020902	Neuse	03020201				0.43	4/19/2002	7/15/1999	NU-201-JS-W-HW	x	
200120708, 200020902f	Neuse	03020201			1.16		4/19/2002	7/15/1999	NU-201-JS-W-HW	x	
200120708, 200020902f	Neuse	03020201		1,249			4/19/2002	6/30/99, 1/18/00	NU-201-WK-S-KP, NU-201-WK-S-CP	x	
200120090	New	05050001	410				4/19/2002	4/4/2000	NW-001-AG-S-BC	x	
200120287 - 288	Tar-Pamlico	03020101		212			4/19/2002	5/16/2001	TP-101-FR-S-BSC	x	
199920910	Cape Fear	03030002			0.82		4/25/2002	9/25/2001	CF-002-WK-SW-LBC	x	

Table A-5 continued

199931141	Catawba	03050101			1.56		4/28/2002	12/5/1999	CT-101-AX-S-PD	x	
199931141	Catawba	03050101	3,746				4/28/2002	5/29/2001	CT-101-CL-S-BB	x	
199930003, 199931059, 60, 61, 62, 63	French Broad	06010105	1,744				4/28/2002	7/9/2001	FB-105-BN-S-HV	x	
199300197	Cape Fear	03030004		1,148			5/1/2002	8/13/2001	CF-004-HN-SW-JRC	x	
199501526	Cape Fear	03030002			4		5/1/2002	9/25/2001	CF-002-WK-SW-LBC	x	
199501526	Cape Fear	03030002		3,494			5/1/2002	4/5/00, 11/27/01	CF-002-GU-S-PP, CF-002-GU-S-HP	x	
199920326	Neuse	03020201		532			5/1/2002	1/18/2000	NU-201-WK-S-CP	x	
199820670	Yadkin	03040101	2,560				5/1/2002	5/5/1999	YD-101-WL-S-SM	x	
199603343	Lumber	03040203			2.75		5/18/2002	7/21/2002	LU-203-RB-W-MSC	x	
199500032	Roanoke	03010107			3		5/21/2002				**3 (acres^2)**
199820755, 199821133	Neuse	03020201		480			5/21/2002	1/18/2000	NU-201-WK-S-CP	x	
200021059	Cape Fear	03030002		1,368			5/21/2002	11/27/2001	CF-002-GU-S-HP	x	
199601917, 199700884	Neuse	03020201		10,226			5/26/2002	1/18/00, 4/3/01	NU-201-WK-S-CP, NU-201-WK-SWB-SAC	x	
199402528	Yadkin	03040101			3.25		5/26/2002	5/14/2002	YD-101-WL-SW-PC		**0.59 (acres^2)**
199402528	Yadkin	03040101		2,928			5/26/2002	5/5/99, 11/27/01	YD-101-WL-S-SM	x	
200120770	Neuse	03020201			0.66		6/5/2002	7/15/1999	NU-201-JS-W-HW	x	

Table A-5 continued

199603836	Cape Fear	03030007		875			6/6/2002	5/2/2002	CF-001-NH-S-PV4	x	
200030933 - 942	Catawba	03050103		742			6/6/2002	2/26/2002	CF-002-GU-S-PP	x	
200110187 & 200110384	Tar-Pamlico	03020103		1,198			6/6/2002				1198 feet[3]
200020715, 200021152	Neuse	03020201			0.16		6/11/2002	7/15/1999	NU-201-JS-W-HW	x	
199304806	Cape Fear	03030004		1,660			6/12/2002	4/9/2002	CF-004-CB-S-CC	x	
200011238	Pasquotank	03010205				5.46	6/12/2002	8/1/02, 7/25/02	PA-105-PA-SW-CC, PA-205-PA-P-KC	x	
200020223-4 & 200020538	Cape Fear	03030002		155			6/22/2002	11/27/2001	CF-002-GU-S-HP	x	
200120354	Neuse	03020201			0.28		6/29/2002	7/15/1999	NU-201-JS-W-HW	x	
200120354	Neuse	03020201		135			6/29/2002	4/3/01, 12/6/01	NU-201-WK-SWB-SAC, NU-201-WIK-S-BC	x	
Totals			**14,167**	**38,788**	**60.68**	**6.87**					**6.74 (acres[2]), 1198 feet[3]**

*Description of mitigation required. Warm, cool, or cold stream restoration is sometimes specified on the Section 404 permit.

Non-riparian or riparian restoration is specified for all permits that require wetland mitigation.

[1] As defined in COE/DENR MOU

[2] Acres of wetlands

[3] Linear feet of stream

[4] Mitigation is in the adjacent cataloging unit 03030001

APPENDIX B. 2001-2002 DEPARTMENT OF TRANSPORTATION ANNUAL REPORT

Department of Environment and Natural Resources and Department of Transportation Memorandum of Understanding

On July 7, 1999, the Department of Environment and Natural Resources and the Department of Transportation signed a Memorandum of Understanding designed to help address future Department of Transportation compensatory mitigation needs while protecting and improving water quality and habitat through the restoration of wetlands and streams and other activities that restore the biological, chemical and physical integrity of the waters of the state (refer to Memorandum of Understanding copy within Appendix B of the 2000 Annual Report). The agreement calls for the Department of Transportation to pay the Department of Environment and Natural Resources Wetlands Trust Fund $2.5 million annually for a period of seven years, through 2006. These resources are allocated strictly for the development of Local Watershed Plans within cataloging units where the Department of Transportation is anticipating compensatory mitigation needs. Refer to Table B-1 for a summary of receipts and expenditures related to this MOU.

TABLE B-1. RECEIPTS AND EXPENDITURES RELATED TO THE MOU WITH NCDOT

Local Watershed Plan	FY00-01	FY01-02
Catawba		57,705
Lower Yadkin		79,191
Middle Cape Fear		81,513
Lower Cape Fear	110,728	287,023
French Broad	17,543	49,000
Pasquotank		101,208
Upper Cape Fear		112,865
Upper Yadkin		35,137
Subtotal	**28,271**	**803,642**
Administrative	167,163	255,351
	295,434	1,058,993
Total Receipts		**7,500,000**
Total Expenditures		**1,354,427**

NCWRP Progress in Development of Local Watershed Plans

Significant progress has been made with Local Watershed Planning initiatives this past fiscal year. From July 1, 2001 through June 30, 2002 the NCWRP continued efforts in three areas where Local Watershed Plans were initiated in FY 2000 and began eight additional plans. Other accomplishments during FY01-02 included the development of an agreement between DOT and the NCWRP regarding the catalog units for which each is responsible and when those responsibilities are effective. This agreement is included as an attachment at the end of this appendix. A summary of the status of each Local Watershed Plan is provided in Table B-2.

The implementation of Local Watershed Plans across North Carolina in order to meet projected NCDOT mitigation needs has generated a number of important benefits at local, state and national levels. Highlights of these benefits include:

- At the ***local*** level, communities and local governments are working with the NCWRP to help identify watershed needs and feasible solutions to address them. Data generated during the

planning process is being used to attract grant funds to implement solutions that cannot be implemented with mitigation funds. These efforts enhance and complement restoration projects implemented by the NCWRP to meet NCDOT mitigation needs. Additionally, the planning process is promoting education and awareness of water quality and habitat issues at a local scale which is generating community buy-in for project implementation as well a community involvement in watershed solutions.

- At the ***state*** level, Local Watershed Planning has laid the groundwork for the development of an innovative new program, the Ecosystem Enhancement Program, that will provide all of NCDOT's mitigation needs across the state beginning in January of 2005. The development of the Ecosystem Enhancement Program is benefiting directly from the experiences gained through Local Watershed Planning.

- ***Nationally***, the experiences generated through the Local Watershed Planning process are adding to a growing database of watershed planning and management examples. Each effort advances the science toward the development of the best approaches to characterizing watershed conditions and developing effective and locally supported solutions. Approaches being applied are inclusive of data analysis, model application and stakeholder involvement.

Status of Other Provisions Outlined in the Memorandum of Understanding

Beyond the development and implementation of Local Watershed Plans, other provisions of the Memorandum of Understanding include: development of a North Carolina Watershed Restoration Policy Committee, Department of Transportation involvement in Local Watershed Plan implementation, and a Department of Transportation commitment to minimize impacts to certain types of wetland, stream andriparian habitats. The policy committee has not been established due to the implications of the development of the Ecosystem Enhancement Program. However, an advisory committee established in accordance with the NCWRP's MOU with the Corps of Engineers is being used to hear recommendations resulting from LWP efforts as they are completed. The NCWRP continues to involve DOT in LWP activities as evidenced in the agreement presented at the end of this report.

Another component of the MOU is a commitment by the NCDOT to increase the avoidance and minimization of impacts to high quality resources. As part of the Permit Process Improvement Initiative involving NCDENR, NCDOT, USACOE and other regulatory agencies, the High Quality Resources Identification Team has been initiated. This team will identify the types and locations of High Quality Resources throughout North Carolina. In unison with the Local Watershed Planning approach, this commitment works to ensure that proactive planning to protect critical areas occurs in advance of road development impacts.

In accordance with the MOU, the NCWRP continues to provide mitigation for NCDOT projects within 11 watersheds. During FY 01-02, nine projects were permitted with the NCWRP assuming the mitigation requirements (Table B-3). The NCWRP will assume responsibility for one additional watershed during FY 02-03, Cape Fear 03030007.

TABLE B-2. SUMMARY OF CURRENT LOCAL WATERSHED PLANNING INITIATIVES

River Basin	8-Digit CU	14-Digit HU	Local Watershed Name	Comments/Status	Contact / Plan Lead
Lower Cape Fear	03030007	03030007140010	Northeast Cape Fear	Due for completion in fall of 2002.	Bonnie Duncan Bonnie.Duncan@ncmail.net (919) 733-5315
Upper Neuse	03020201	030202010600100 3020201050010	Lake Rogers & Ellerbe Creek	Building from EPA grant for the Upper Neuse Basin Association. Anticipated completion at the end of 2002.	George Norris George.Norris@ncmail.net (919) 733-5312
French Broad	06010105	06010105030020 060101050300300 6010105030040	Mud Creek	Due for completion at the end of 2002.	Kristin Cozza Kristin.Cozza@ncmail.net (919) 716-1922
Upper Cape Fear	03030002	030300020100100 3030002010030	Troublesome and Little Troublesome Creeks	Watershed characterization complete, stakeholder effort well underway – 4 meetings held during FY01-02.	Hal Bryson Hal.Bryson@ncmail.net (919) 715-7452
Upper Cape Fear	03030002	03030002060100 03030002060070 03030002060080	Morgan and Little Creeks	Initial stakeholder work and watershed characterization started during FY01-02.	Bonnie Duncan Bonnie.Duncan@ncmail.net (919) 733-5315
Middle Cape Fear	03030004	030300040700100 3030004070020	Crane Creek	Characterization complete, stakeholder effort well underway – 3 meetings held during FY01-02.	Jim Stanfill Jim.Stanfill@ncmail.net (919) 218-6872
Catawba	03050101, 03050103	03050101170010 03050101170020 03050103020020 03050103020030 03050103020040 03050103020050	McDowell, Long, Sugar / Irwin, Little Sugar, McMullen, and McAlpine Creeks	Working with City and County stakeholders and had two meetings with them during FY01-02. Compilation and analysis of existing data completed.	Jocelyn Elliott Jocelyn.Elliott@ncmail.net (919) 716-1921
Pasquotank	03010205	03010205050010, 03010205010020, 03010205040010	Pasquotank River	Watershed characterization complete and stakeholder effort well underway. Four meetings held during FY01-02.	Bonnie Duncan Bonnie.Duncan@ncmail.net (919) 733-5315
Lower Yadkin	03040105	03040105010020, 03040105010010	Clarke Creek, West Branch Rocky River	Watershed characterization complete and two stakeholder meetings held during FY01-02. Working primarily with local resource professionals as stakeholders.	Hal Bryson Hal.Bryson@ncmail.net (919) 715-7452
Upper Yadkin	03040101	03040101010100 03040101020010, 03040101010110	Lewis Fork, Tucker Hole, Warrior Creek	Watershed characterization complete and one stakeholder meetings held during FY01-02. Working primarily with local resource professionals as stakeholders.	Kristin Cozza Kristin.Cozza@ncmail.net (919) 716-1922
Middle Neuse	03020203	03020203020040	Hominy Swamp Creek	Building off of an EPA grant. Conducted internal GIS analysis of watershed.	Jocelyn Elliott Jocelyn.Elliott@ncmail.net (919) 716-1921

Agreement between the NC Department of Transportation and the NC Wetlands Restoration Program on Meeting NCDOT Compensatory Mitigation Requirements in Specified Watersheds

Geographic Areas of NCWRP Coverage Including Future Assumption Dates as Appropriate

River Basin	Cataloging Unit *	Comments
Hiwassee	06020002	NCWRP will continue to accept all NCDOT mitigation responsibilities
French Broad	06010105	NCWRP will continue to accept all NCDOT mitigation responsibilities
New	05050001	NCWRP will continue to accept all NCDOT mitigation responsibilities
Catawba	03050101	NCWRP will continue to accept all NCDOT mitigation responsibilities
Catawba	03050103	NCWRP will continue to accept all NCDOT mitigation responsibilities
Yadkin	03040101	NCWRP will continue to accept all NCDOT mitigation responsibilities
Cape Fear	03030002	NCWRP will continue to accept all NCDOT mitigation responsibilities
Cape Fear	03030004	NCWRP will continue to accept all NCDOT mitigation responsibilities
Neuse	03020201	NCWRP will continue to accept all NCDOT mitigation responsibilities
Tar-Pamlico	03020101	NCWRP will continue to accept all NCDOT mitigation responsibilities
White Oak	03030001	NCWRP will continue to accept all NCDOT mitigation responsibilities
Cape Fear	03030007	NCWRP is engaged in Local Watershed Planning and will assume all of NCDOT's mitigation needs on 1/1/03
Pasquotank	03010205	NCWRP is engaged in Local Watershed Planning and will assume all of NCDOT's mitigation needs on 1/1/04
Yadkin	03040105	NCWRP is engaged in Local Watershed Planning and will assume all of NCDOT's mitigation needs on 1/1/04
Broad (Catawba)	03050105	NCWRP will engage in Local Watershed Planning in 2002 and will assume all of NCDOT's mitigation needs on 1/1/05

* Note: River Basins and Cataloging Units are based on "Hydrologic Unit Map – 1974, State of North Carolina," published by the US Department of Interior Geological Survey.

Conditions

Mitigation for Transportation Improvement Projects (TIP) with a let date earlier than the NCWRP assumption date will not be accepted unless specifically agreed upon on a case-by-case basis. The TIP (26th Edition; 2002-2008) will be used as a "let date" baseline for planning purposes. This condition

applies only to the following Regional Watersheds: lower Cape Fear (03030007), lower Yadkin (03040105), Pasquotank (03010205), and the Broad (Catawba 03050105) watersheds.

The NCWRP is committed to providing for NCDOT's mitigation needs in the above listed Cataloging Units as projected in the impact numbers received by the NCWRP in January, 2002. These summary figures will be considered a baseline for NCWRP planning purposes. Annual updates of NCDOT's impacts will be provided to the NCWRP each January. Any subsequent annual increases over in the baseline figures within a given Cataloging Unit for a given year greater than 15% will be considered for NCWRP assumption on a case-by-case basis taking into account NCDOT justification.

By March of each year, the NCWRP will inform the NCDOT of the 14-digit hydrologic units that will be the focus of a LWP. Within a month of this notification, the NCDOT will provide the NCWRP the following information for each identified LWP area:

The results of any previous site searches conducted after 1998

EAs/EISs for the LWP area for projects scheduled to be let within 2 years after the completion of the LWP Specific information regarding permitted impacts to convey the types (as well as extent) of impacts that the LWP will need to address, these types include columns showing impacts by catalog unit for non-riparian, riparian, and coastal wetlands in addition to SAVs, and cold, cool, and warm stream impacts. For river basins with buffer rules, a column should also be included which lists buffer impacts.

The location and type of any existing mitigation projects or properties that NCDOT has implemented or purchased in the watershed (including remaining credits and any project problems)

The location of the chosen road alignment of future, unconstructed projects (in MicroStation format) The NCDOT agrees to pay for the total cost of restoration projects even when they are in excess of the NCWRP's established fee schedule.

The NCDOT agrees to advance funds to the NCWRP for projects identified prior to the time that payment must be made for permit issuance.

The NCWRP agrees to work with NCDOT to make up mitigation deficits caused by failed restoration sites in the above listed cataloguing units. In those areas, the NCDOT will notify the NCWRP of potential failures as soon as they become evident or may initiate measures to locate a mitigation site(s) prior waiting for a deficit to occur for which NCWRP cannot meet, provided that NCDOT coordinates with NCWRP to prevent duplication or overlap of efforts of the two organizations. Upon successful implementation of any replacement mitigation (whether used or not), NCDOT will "donate" any excess mitigation to the NCWRP program for later use for other NCDOT transportation projects.

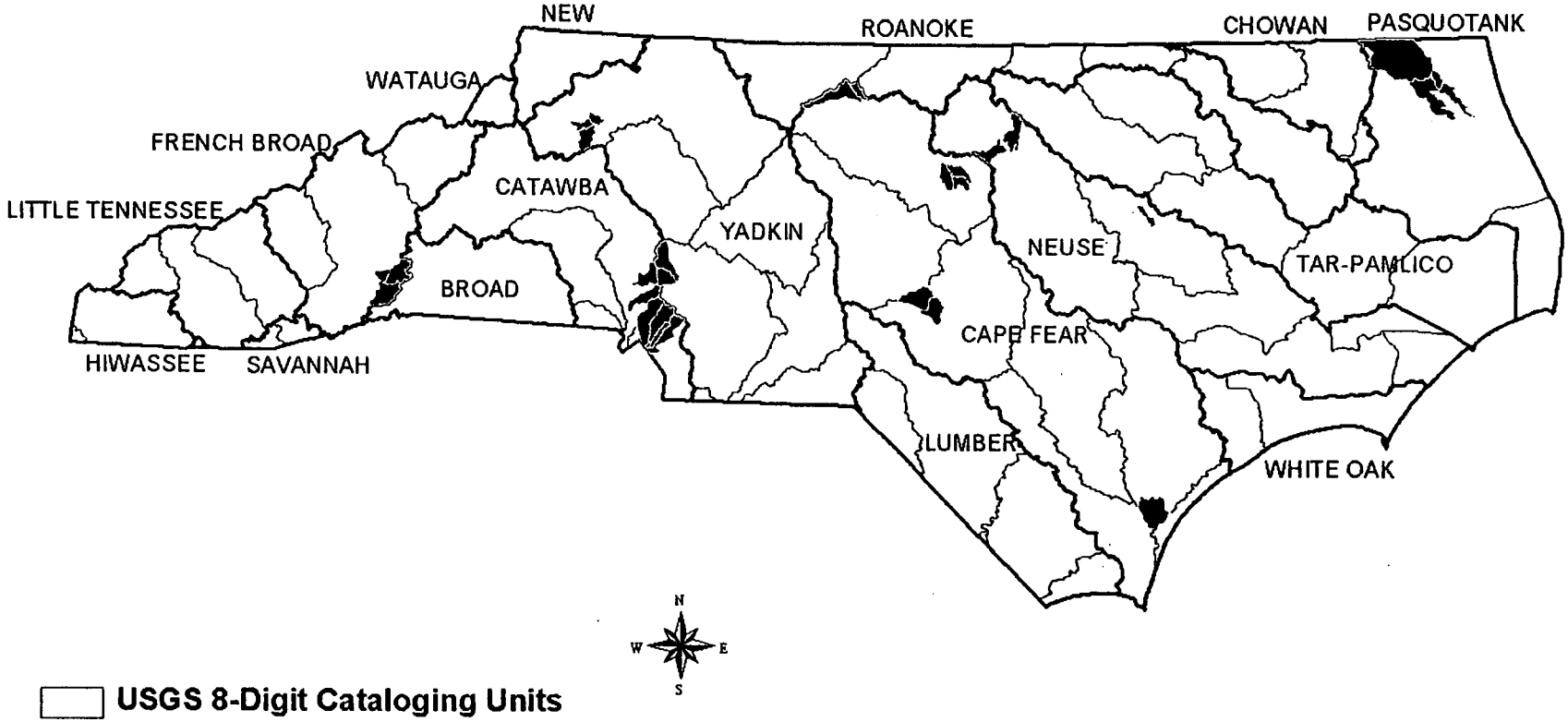
The NCDOT agrees to have PD&EA staff make an informational presentation to each of the stakeholder groups at a Local Watershed Plan meeting and to coordinate with other groups within NCDOT to provide presentations on other issues of interest (sedimentation, erosion control, or stormwater issues) to the stakeholders.

TABLE B-3. PAYMENTS ACCEPTED FROM DOT FOR COMPENSATORY MITIGATION

TIP #	401 Cert#	404 Permit#	River Basin	CU	County	Mitigation Requirement			Payment Date	Payment Amount
						Wetland (acres)	Stream (linear feet)	Buffer (square feet)		
B3055	001447	199921027	Neuse	03020201	Wake			34,195	7/6/01	$32,827
R2112BB	000505	199601404	Roanoke	03010107	Martin	0.25 R*			7/6/01	$6,000
R2206A	001232	200031430	Catawba	03050101	Gaston/ Lincoln	0.52 NR**	16,574		7/6/01	$2,080,750
R2000EA ,EB	960319	199601917, 199700884	Neuse	03020201	WAKE	4 R			10/22/01	$96,000
R2719BA	010048	199911192	Neuse	03020202	Lenoir	0.75 R, 7 NR		279,220	10/22/01	$370,051
SR1550	011092		Neuse	03020201	Orange			5,881	10/22/01	$5,646
R2906	010120	200120353	Cape Fear	03030002	Wake/ Durham	0.52 R, 1.06 NR	5,304		12/17/01	$696,000
U2307AB ,AD,AE	000914	200031274	Catawba	03050101	Catawba	0.58 R	5,895		6/3/02	$754,875
R-2809	010550	199601836	Neuse	03020201	Wake	2.2 R	5,172	755,330	6/6/02	$1,425,617
Total payment						**$318,000**	**$4,118,125**	**$1,031,640**		**$5,467,766**

*R Riparian wetlands ** NR Non-riparian wetlands

NCWRP Local Watershed Plan
Targeted Local Watersheds



APPENDIX C. WETLANDS AND STREAM RESTORATION SURVEY AND RESULTS

The Wetlands Restoration Program surveys organizations that restore, enhance and protect wetlands and riparian area. The survey and tabulated results are shown in the following section.

North Carolina Wetland, Stream and Riparian Restoration, Creation, Enhancement and Preservation Survey for Fiscal Year 2001-2002

PROGRAM INFORMATION: ***If your organization has more than one program conducting wetland or stream restoration, please fill out separate surveys for each program or make note of which projects are associated with different programs.***

Program Title / Agency:_____
Program Representative and Contact Information:
Name
Address_____
Phone:_ Fax:_____
E-Mail:_____

PROJECT INFORMATION: Please provide as much of the requested information as possible for each wetland/stream project.

Only include NON-COMPENSATORY MITIGATION projects initiated or completed between July 1, 2001 – June 30, 2002.

- List information for each project individually. You will need to make copies of the survey if you initiated or completed more than one project during the last fiscal year.
    - Provide details on projects completed before fiscal year 2001 - 2002 by noting the appropriate fiscal year for each project on your survey.

1. **Project Name / Number:**_____
   (assigned by your program or organization)

Purpose of the Project: general information about your project's purpose (i.e. to improve water quality, to reopen closed shellfish waters, improve fisheries and wildlife habitat, etc.).

Project Completion Date or Target Date of Completion: (Month/Year) Include the percentage of your project that was completed by June 30, 2002, if you provided a targeted project completion date.
Completion or Targeted Completion Date: _____
% of Project Completed as of June 30, 2002: _____

Project Funding Source(s) / Partners Involved: List any programs or granting entities that are funding your project and any other partners involved with your project.

Location Reference(s): The River basin, subbasin, county, 14-digit hydrologic unit – or whatever geographical unit your program uses for referencing projects.

River Basin:

____Broad ____Little Tennessee____Savannah
____Cape Fear ____Lumber ____Tar-Pamlico
____Catawba ____Neuse ____Watauga
____Chowan ____New ____White Oak
____Hiwassee ____Roanoke ____Pasquotank
____French Broad ____Yadkin-Pee Dee

Subbasin (if known):

Subbasin Number: _____
USGS 14-Digit Hydrologic Unit: _____
County:_____ Nearest Town:_____

Type of legal instrument used to protect restored/protected project properties: If you are using conservation easements, please indicate the term length (i.e. 10, 15, 30 years or perpetuity).

____Conservation Easement (number of years_____or permanent).
____Purchase Fee-Simple
____Contract (number of years_____)

2. **Project Activities:** *Review the definitions below, and then complete the table by placing a check next to the activities that apply to this project. Specify the number of acres / feet where appropriate.*

Wetland Restoration: Re-establish wetland hydrology and vegetation in an area where it previously existed.

Wetland Enhancement: Increase one or more of the functions of an existing wetland by manipulating vegetation or hydrology.

Wetland Creation: Establishing wetland hydrology, vegetation and soils in an area where wetlands did not exist in the recent past.

Stream Restoration: The process of converting an unstable, altered or degraded stream corridor, including adjacent riparian zone and floodprone areas to its natural or referenced, stable conditions considering recent and future watershed conditions. This process also includes restoring the geomorphic dimension, pattern, and profile as well as biological and chemical integrity, including transport of water and sediment produced by the stream's watershed in order to achieve dynamic equilibrium.

Stream Enhancement: Protecting and/or enhancing stream stability and functions by establishing vegetated buffers; increasing buffer width, and/or stabilizing streambanks using bioengineering techniques.

Wetlands and Stream Segment Preservation: Protecting wetlands and stream segments by purchasing, donating or conveying a conservation easement to an appropriate government or non-profit agency to manage.

Nonwetland Riparian Buffer Restoration: Establishing a vegetated buffer (minimum 25 ft. width) and maximizing sheet flow through buffer by receiving concentrated flow areas.
Nonwetland Riparian Buffer Enhancement: Increasing width of existing vegetated buffer and maximizing sheet flow through buffer by reducing concentrated flow amounts.
Nonwetland Riparian Buffer Preservation: Preserving existing forested buffers (minimum 25 ft. width).

Wetland

	Please Check	Specify Acres
_____Restoration		_____Acres
_____Enhancement		_____Acres
_____Creation		_____Acres
_____Preservation		_____Acres

Stream

Please Check Specify Feet
_____Restoration _____Feet

_____Enhancement _____Feet
_____Creation _____Feet
_____Preservation _____Feet

Non-Wetland Riparian Buffers

Please Check	Specify Square Feet	or Acres
_____Restoration	_____Sq. Feet	_____Acres
_____Enhancement	_____Sq. Feet	_____Acres
_____Creation	_____Sq. Feet	_____Acres
_____Preservation	_____Sq. Feet	_____Acres

Send completed surveys, by Oct. 11, 2002, to:
NC Wetlands Restoration Program
1619 Mail Service Center
Raleigh, NC 27699-1619
Or Fax: (919) 733-5321.

Questions? Call (919) 733-5312 or
send e-mail to George.Norris@ncmail.net.

APPENDIX TABLE C-1. RESULTS OF STREAM, WETLANDS, AND BUFFER RESTORATION SURVEY

Project Name	Program/Agency Name	River Basin	Stream Length -- feet			Wetlands - acres				Buffers - acres	
			R	E	P	R	E	P	C	R	P
Buckridge	Division of Coastal Management	Pasquotank					12				
Buxton Woods	Division of Coastal Management	Pasquotank						82			
Kitty Hawk Woods	Division of Coastal Management	Pasquotank						317			
Roper Island	Division of Coastal Management	Pasquotank						8,720			
Bird Island	Division of Coastal Management	Lumber						1,076			
Newland	Albemarle RCD and NRCS	Pasquotank	30,000						5	40	
Winfall	Albemarle RCD and NRCS	Pasquotank				0.5			0.5		
Allens Creek	CWMTF	French Broad									379
Eno River	CWMTF	Neuse									85
Watauga River	NCSU CES	Watauga	1,600	2,200				10			5
Fayetteville/Cross Creek	CWMTF	Cape Fear									122
Tuckaseigee	CWMTF	Little Tennessee									20
Sandy Creek	Piedmont Land Conservancy	Cape Fear									32
Gastonia Greenway	CWMTF	Catawba									77
Belhammon Tract	NCWRC	Cape Fear									1,076
Hassell Tract	NCWRC	Pasquotank						492			
Bass Lake	CWMTF	Neuse								10	10
Wilson Creek	CWMTF	Catawba									4
Mears Fork	Haw River Assembly	Cape Fear									106
Town Creek	NC Coastal Land Trust	Cape Fear									888

Van Swamp	NC WRC	Tar-Pamlico						5,784			
Duck Creek	NC WRC	Neuse									2,700
Patterson School	NC WRC	Yadkin									359
Drowning Creek	Sandhills Area Land Trust	Lumber						15			21
North Fork Little River	Durham County	Neuse									127
North River	NC Coastal Federation	White Oak						1,477			806
Catawba River	Catawba Land Trust	Catawba									7
Fishing Creek	Nature Conservancy	Tar-Pamlico									201
White Oak River	NC Coasatal Federation	White Oak						200			576
Gum Thickett	Neuse River Foundation	Neuse									330
Raeford	CWMTF	Cape Fear									40
South Fork Catawba	Catawba Land Trust	Catawba									252
Nags Head Woods	Nature Conservancy	Pasquotank						49			
Foy Creek	NC Coastal Land Trust	Cape Fear									140
Eno River	NC DPR	Neuse									20
Breeden Tract	NC WRC	Lumber									100
Roanoke Island	NC WRC	Pasquotank						46			
Roaring Creek	Southern Appalachian Cons	French Broad									129
Catawba Creek	CWMTF	Catawba	2,000								4
Jenkins Tract	Blue Ridge Land Trust	Yadkin									479
Buck & Smith Tracts	Catawba Land Trust	Catawba									80
Duggers Creek	Cons Trust for NC	Catawba									174
Mulford Creek	DFR	Cape Fear						253			20
Goose Creek	NC WRC	Tar Pamlico									270
Totals			33,600	2,200		0.5	12	18,521	5.5	50	9,639

APPENDIX D. TRUST FUNDS

TABLE D-1. BUFFER, WETLAND AND STREAM PAYMENTS DEPOSITED TO WETLANDS TRUST FUND ACCOUNTS 2981 AND RIPARIAN BUFFER RESTORATION ACCOUNT 2982 DURING FY01-02

Payment Date	Applicant	404 Permit#	401 Certification #	Stream[1]	Non Riparian Wetland	Riparian Wetland	Buffer	Payment Amount
				Linear Feet	Acres	Acres	Square Feet	
06/29/01	Butner Correctional Facility	200120354	010013	135		0.28	43,123	70,273
06/29/01	Piedmont Center		010549	295				36,875
07/06/01	US64 S. of Everetts, near Williamston	199601404	000505			0.25		6,000
07/06/01	NC Dept of Transportation	200031430	001232	16,574	0.52			2,080,750
07/06/01	DOT Bridge over Terrible Creek		001447				34,194	32,827
07/16/01	W.D. of Thomasville	200120158	001399	3,100				387,500
07/18/01	Johnsie Markham		010823				330	317
07/30/01	Charles Coats		010795				1,609	1,545
08/03/01	Long Creek Village Subdivision		010846	338				42,250
08/14/01	Smith Farms	200120939	010505			0.31		12,000
08/14/01	Castle Hayne substation expansion	200100510, 199300309	010855		2.56			33,000
08/23/01	James Massengill		010992				19,050	18,288
09/24/01	Anson County Correctional Facility	200001592, 200001598	01048	242				30,250
09/24/01	St. Lawrence Homes		010829				975	936
09/25/01	KBB Developers		010737	197				24,625
10/03/01	Ransdell Subdivision	200120868	010800			0.32		12,000
10/15/01	NC Natural Gas	200210001-26	001474			2.42		60,000
10/17/01	Player's Club		010672		0.09			3,000
10/17/01	Sam Wilson Road/Airpark		010817	293				36,625

Payment Date	Applicant	404 Permit#	401 Certification #	Stream[1]	Non Riparian Wetland	Riparian Wetland	Buffer	Payment Amount
10/22/01	NC Dept of Transportation	199911192	010048		7	0.75	279,220	370,050
10/22/01	Sunset Lake Road	200021074	001446			4.54		114,000
10/22/01	Sunset Lake Road	200120284	001446			0.45		12,000
10/22/01	Northern Wake Expressway	199601917, 199700884	960319			4.00		96,000
10/22/01	NC Dept of Transportation		011092				5,881	5,646
10/23/01	Pinacle Park	199821210	000280	500				62,500
11/24/01	Marine Corps - APOE Taxiway	200110916	011061	374			85,269	128,609
11/08/01	West Jefferson Elementary	200220055	011471	320				40,000
11/21/01	Dale Earnhardt Blvd		001422	391				48,875
12/12/01	Chad/Tonia Collins		010768				225	216
12/14/01	Meadow Creek Subdivision - DHIC	n/a	011314				1,525	1,464
12/17/01	NC Dept of Transportation	200120353	010120	5,304	1.06	0.52		696,000
12/17/01	Arthur Kepes		010374			1.68	7,734	49,425
12/20/01	Purolator Outfall-City of Fayetteville	200100628	010314			0.42		12,000
12/21/01	White Oak Crossing Shopping Center	n/a	011431		2.02			27,000
01/15/02	King's Grant Club		010034		0.41			6,000
01/21/02	Crossman Communities		010985	30				3,750
01/25/02	NW Cary Parkway	na	011818				2,260	2,170
02/07/02	Ninth Street Sewer Improvements	n/a	011506				37,020	35,539
02/19/02	Combat Aviation Brigade Barracks Complex-Airborne, Fort Bragg		010844	215		0.88		50,875
02/22/02	new pump station for Durham WWTP		010678			1.34		36,000
02/26/02	Brier Creek		010907				47,209	45,321
04/24/02	Johnston County Landfill	199920268	980470	490		3.50		145,250
02/28/02	Hare Snipe Creek		020002				900	864
03/11/02	Robert Carruthers		011806				516	495
03/14/02	Panther Creek, Cary Glen Golf	200121014, 200220223	011670	268				33,500
04/05/02	Cambridge Heights	200100007			3.1			39,000
04/05/02	Swordfish and Bowfin Lanes	200101075			0.66			9,000

Payment Date	Applicant	404 Permit#	401 Certification #	Stream[1]	Non Riparian Wetland	Riparian Wetland	Buffer	Payment Amount
04/11/02	Beltway Business Park	200230067	011511	220				27,500
04/22/02	Jordan-Kirby Partnership National Golf Club	200220329	020091	185				23,125
04/25/02	Mallard Creek Village		011896	333				41,625
05/10/02	Pulte Homes		011549	372			72,048	115,666
05/13/02	Vulcan Materials	200101048	020408		2.2			27,000
05/22/02	RDU Center 3&4	200120036	010168			0.88		24,000
05/23/02	Battalians Barracks Complex	200100576	011210		0.5			12,000
05/29/02	St. Andrews Subdivision	200120869, 200121149	010828			0.05		6,000
06/03/02	NC Dept of Transportation	200031274	000914	5,895		0.58		754,875
06/05/02	EMD Pharmaceudicals/Treyburn Industrial Park	200121286			0.5			6,000
06/06/02	NC Dept of Transportation	199601836	010550	5,172		2.20	755,330	1,425,617
06/12/02	Pointe Summerset	200100555, 199403372	950207		1			12,000
06/12/02	Back Creek Subdivision		020578				345	331
06/13/02	White Oak Shopping Center		020663				2,169	2,082
06/14/02	Linville Ridge Development	199930472, 200230730	020505	770				96,250
06/17/02	Johnston County		002174				2,751	2,641
06/20/02	City of Raleigh-Leesville Rd	200120682	020215	332			68,150	106,924
06/20/02	Red Rock Landfill		020128	516				64,500
	Totals			**42,861**	**21.62**	**25.3727**	**1,466,934**	**7,708,746**

[1]Maximum mitigation requirement

TABLE D-2. NUTRIENT OFFSET PAYMENTS DEPOSITED DURING FY01-02

Payment Date	Payment Amount	Municipality/Applicant
6/29/01	$8,910.00	City of Raleigh/Kotis Property
6/29/01	$3,064.51	Town of Cary/Leith Auto Park Expansion
7/12/01	$298.00	City of Raleigh/TKE Fraternity Chapter House
7/13/01	$3,766.79	Town of Cary/Primrose School
7/13/01	$3,359.65	City of Wilson/Texas Steakhouse and Saloon
7/20/01	$3,370.13	City of Raleigh/South Central Pool Supply
7/30/01	$2,151.60	Johnston County Utilities Department Austin Meadows Subdivision
8/2/01	$8,322.34	City of Raleigh/Avalon
8/2/01	$8,322.60	City of Raleigh/Creedmoor Centre Ferbytown
8/3/01	$1,320.00	City of Raleigh/Morning Star Mini Storage
8/8/01	$10,296.00	City of Raleigh/Glenwood Training center
8/8/01	$898.92	Johnston Co. Public Utilities Presley Pointe subdivision section I
8/14/01	$3,717.12	Town of Cary/Cary Ale House
8/14/01	$1,437.38	City of Durham/Operation Breakthrough Day Care
8/20/01	$18,150.66	City of Raleigh/Arcadis Building
8/20/01	$4,158.53	City of Raleigh/Brookhaven subdivision, section 17 part D
8/23/01	$1,897.27	City of Raleigh/Hillsborough Street Site
8/23/01	$174.87	City of Wilson/Silver Lake Fire Department expansion
8/28/01	$1,841.40	City of Raleigh/KFC Taco Bell
8/29/01	$1,841.40	City of Raleigh/
9/7/01	$2,813.58	Town of Garner Faith Alliance Church of Garner
9/7/01	$2,791.80	City of New Bern Neuse River Congregation Kingdom Hall
9/18/01	$2,830.81	City of Goldsboro/Bojangles Restaurant
9/18/01	$1,735.80	City of Raleigh/Rex Healthcare Parking Deck
9/18/01	$585.00	City of Raleigh/Sunset Terrace Lot 1
9/20/01	$4,254.36	City of Goldsboro/or Raleigh Grace Baptist Church
9/20/01	$4,435.46	City of Wilson/Walgreens (Ward Blvd & West Nash Street)
9/24/01	$9,304.22	Johnston County Public Utilities Lancaster Place & Presley Pointe
9/24/01	$3,115.20	City of Raleigh/Outdoor Equipment Company
9/25/01	$2,690.03	Johnston County Public Utilities E-Zee II Auto Sales and Repairs
9/25/01	$7,306.00	City of Raleigh/Falls River Town Center
10/2/01	$911.07	Johnston county Public Utilities Park Place Subdivision
10/2/01	$16,984.24	City of Raleigh/Pepsi Company
10/2/01	$640.00	City of New Bern West Thurman Fire station
10/5/01	$1,074.74	City of Raleigh/Carquest Auto Parts
10/5/01	$3,783.78	City of Raleigh/Hargrove Road, Lot 6
10/5/01	$3,301.76	City of Durham/McDonald's at Imperial Corners
10/8/01	$7,149.38	Town of Cary/White Tiger Tae Kwon Do
10/12/01	$12,614.58	City of Durham/Nitronex
10/16/01	$3,965.81	Town of Cary/Christ the King Lutheran Church
10/17/01	$2,479.00	City of Durham/Delta Park West Office and Warehouse Phase III
10/22/01	$6,825.39	City of Raleigh/Rex Healthcare Satellite parking Lot
10/30/01	$5,296.43	A+ Self Storage 01-SP-101

Payment Date	Payment Amount	Municipality/Applicant
10/30/01	$2,813.58	City of Raleigh/5132 Departure Drive
10/30/01	$1,728.54	Johnston County Public Utilities Mt. Zion United Methodist Church
11/1/01	$3,138.20	City of Goldsboro/Goldsboro OB-Gyn
11/1/01	$16,449.21	Johnston county Public Utilities McGee's Crossing
11/1/01	$6,101.87	Town of Cary/North State Storage
11/1/01	$5,139.09	City of Raleigh/Raleigh Vineyard Christian Church
11/1/01	$12,216.30	City of Raleigh/Meadows at Fox Run and Village of Fox Run
11/8/01	$3,292.08	Town of Cary/115 Crescent
11/8/01	$27,045.00	City of Raleigh/Avera Place
11/8/01	$24,825.05	City of Durham/Colonial Grand at Arringdon
11/8/01		City of Raleigh/World Trade Park-all $5,640--refunded April 16, 2002
11/15/01	$1,823.56	City of Raleigh/Harbourgate
11/15/01	$12,682.30	Town of Cary/Mill Pond Village - Infrastructure
11/15/01	$1,536.48	Town of Smithfield Old Farm Acres Subdivision
11/21/01	$1,186.61	City of Goldsboro/Wayne Christian School
11/21/01	$3,955.00	Town of Smithfield Surles Auto Sales
11/27/01	$2,669.57	City of Goldsboro/ Chili's Grill and Bar
11/29/01	$8,167.83	City of Durham/Arringdon building VII
11/29/01	$967.63	Town of Cary/Bethel Baptist Church
11/29/01	$6,138.00	City of Goldsboro/Deeper Life Church Ministries
11/29/01	$4,683.36	City of Raleigh/Greystone Baptist
11/30/01	$5,932.00	City of Raleigh/Division of Transportation
11/30/01	$1,405.21	City of Durham/Durham Memorial Baptist Church
12/4/01	$3,497.84	City of Raleigh/Duraw Manufacturing
12/4/01	$2,642.41	City of Goldsboro/Georgetowne Office Park
12/7/01	$5,180.74	City of Raleigh/St. Matthew Baptist Church
12/10/01	$4,646.40	City of Raleigh/Wesvil Medical Center
12/12/01	$3,880.00	Goldsboro Church Building Project
12/18/01	$4,745.40	City of Raleigh/3100 Spring Forest Road
12/18/01	$3,752.08	Town of Cary/Haddock Autobody 01-SP-088
12/27/01	$451.95	County of Wayne Christian care Academy IV
12/28/01	$2,072.78	City of Durham/BB & T Imperial Corners
1/8/02	$1,862.19	BJ's Gas Station
1/9/02	$2,112.00	City of Raleigh/900 Freedom Drive
1/9/02	$10,499.18	City of Raleigh/Brier Creek Apartments
1/9/02	$2,933.00	Town of Cary/Gallup Road Extension
1/9/02	$122.10	County of Wayne Rachel K Subdivision
1/9/02	$10,501.00	City of Raleigh/Trailwood Apartments
1/15/02	$2,236.54	City of Goldsboro/Logan's Roadhouse
1/15/02	$2,356.73	Town of Cary/McDonald's @ Mill Pond
1/15/02	$1,300.20	City of Goldsboro/Terminix
1/23/02	$3,116.63	City of New Bern/Armistead Orthopedic Office/Rehab Clinic
1/25/02	$843.87	City of Raleigh
1/30/02	$14,169.38	Town of Cary/Airport Parking
1/30/02	$2,317.39	City of Raleigh/Gorman Street Apartments
1/30/02	$554.27	City of Goldsboro/St. Andrews Church

Payment Date	Payment Amount	Municipality/Applicant
2/6/02	$6,374.56	City of Raleigh/Universal Health Care
2/15/02	$2,804.51	County of Wayne Commercial/Retail
2/15/02	$1,677.23	County of Wayne Mini Storage
2/15/02	$1,042.07	County of Wayne NC Christian School Association
2/15/02	$10,489.25	City of Raleigh/Tabernacle Pentacostal
2/15/02	$3,536.28	City of Raleigh St. Michael's Episcopal church
2/19/02	$2,699.40	Town of Cary/West Cary Middle School
2/22/02	$1,848.00	City of Raleigh/4916 Alpinis Drive
2/22/02	$1,125.70	City of Raleigh/Libson Woods
2/22/02	$3,778.93	City of Raleigh/W-Bldg (3214 Charles B. Root Wynd)
2/22/02	$1,568.87	Town of Smithfield St. Peter Church of Christ
2/25/02	$1,508.76	City of Raleigh/Raleigh Montessori
2/26/02	$2,143.68	City of Goldsboro/Goldsboro Milling
3/13/02	$6,398.83	City of Durham/Erwin Square #2
3/14/02	$4,026.66	Johnston County Stormwater Austin Meadows Subdivision, Phase II
3/14/02	$4,660.10	City of Durham
3/22/02	$14,643.20	City of Raleigh/Cary Elementary School
3/22/02	$683.64	City of Wilson/Kenan Street Note:296.47 of this was refunded
3/22/02	$866.42	City of Goldsboro/Goldsboro Neurological
3/22/02	$3,667.36	City of Durham/Irwin Properties
3/22/02	$1,642.53	City of Durham/Lynn Hollow Development
3/22/02	$1,466.60	City of Raleigh/Redwolf Crossing
4/5/02	$1,202.52	City of Wilson/Lamm Subdivision
4/5/02	$120.78	City of Durham/Marly Plaza
4/5/02	$109.00	City of Raleigh/Mitchell Mill Animal Hospital
4/8/02	$113,720.38	Town of Garner/White Oak Crossing
4/11/02	$75,595.00	City of New Bern BSH Home Appliances Corporation
4/15/02	$843.87	Town of Cary/CP & L Cary Evans Road
4/15/02	$1,516.98	Town of Cary/Cary Family YMCA- Weight Room
4/15/02	$1,188.00	City of Durham/Cook Out Restaurant
4/15/02	$1,385.51	Town of Smithfield/Office Building on Peedin Road
4/15/02	$1,832.06	Town of Smithfield/Venture Business Center
4/15/02	$2,566.00	City of Raleigh/Six Forks Development
4/18/02	$190.86	Property of Carl T. and Doris M. Bouchard Rockingham County
4/22/02	$52,404.00	City of Raleigh/Long Lake Subdivision
4/22/02	$1,224.96	City of Goldsboro/Mickey's Pastry Shop
4/24/02	$428.71	City of Durham/Next Step Housing
4/24/02	$3,463.68	City of Durham/Triangle Auto Body
4/24/02	$5,161.91	City of Durham/The Wood Property (Detention Pond)
5/2/02	$7,027.02	Town of Garner/Country Connection
5/2/02	$123.32	County of Wayne Forehand Road (lot 1)
5/2/02	$128.00	City of Raleigh/Glenwood Animal Hospital
5/2/02	$114.34	County of Wayne/Shepherd's field Subdivision
5/2/02	$20.30	County of Wayne/Wesley Shackleford (Walnut Point subdivision)
5/6/02	$250.80	County of Wayne/James B. Sasser Const. Company
5/7/02	$1,332.05	City of Raleigh/Bridgewater Subdivision

Payment Date	Payment Amount	Municipality/Applicant
5/8/02	$16,311.73	Town of Cary/Crossroads Ford Vehicle Storage Lot
5/8/02	$2,610.70	Town of Cary/Kerr Store No. 422
5/8/02	$1,017.39	City of Durham/Roxboro Office Park
5/8/02	$2,392.82	City of Raleigh/Westlake Pointe
5/9/02	$2,043.33	Town of Cary/BB&T Branch Bank at Preston Corners
5/13/02	$3,076.36	City of Durham/IHOP- Gateway
5/17/02	$3,022.67	City of Goldsboro/Municipal golf course Maintenance bldg.
5/17/02	$3,216.58	Town of Cary/Hendrick Pre-Owned Automobile New Showroom
5/17/02	$8,532.71	City of Raleigh/Springstone
5/23/02	$1,782.00	Town of Garner/White Oak Business Park Lot 10
5/23/02	$14,095.12	City of Durham/Pagehurst Phases 3B and 4
5/23/02	$7,914.98	Town of Smithfield Booker Dairy Plantation
5/23/02	$986.16	City of Raleigh/All Saints Church
5/23/02	$4,583.04	City of Raleigh/Leesville Forset, Lot 5
5/23/02	$1,606.00	County of Wake/84 Lumber Yard Expansion
5/29/02	$1,661.09	N. Durham Branch, cardinal State Bank - Review #3
6/3/02	$834.30	Genesis United Methodist Church
6/3/02	$2,983.56	Mill Towne Commons S-5-2002
6/3/02	$3,809.52	Rugworks at Brassfield Review #3 City of Durham
6/3/02	$803.88	Town of Garner Wayne Day Enterprises
6/3/02	$12,768.13	City of Havelock Tucker Creek Woods - Phase I
6/5/02	$36,517.40	Eagle Ridge Golf Community Massengill Tract (phase 8)
6/5/02	$3,197.87	Rex Medical Office building 01-SP-154
6/5/02	$3,427.00	Not specified
6/12/02	$3,688.08	Adam's Office Building
6/12/02	$2,723.19	Middle Creek High school Stadium
6/12/02	$1,964.82	City of Raleigh/Stonehaven
6/13/02	$1,450.19	Proposed Dr. Richard Carlyle Office
6/20/02	$3,530.93	Faith Temple Church
6/20/02	$641.52	City of Durham/Delta Park West
6/20/02	$23,158.94	Durham School of the Arts
Total	**$967,868.00**	

APPENDIX E. NC WETLANDS RESTORATION PROGRAM PROPERTY INVENTORY

Property Name	County	River Basin	Linear Feet	Acres Surveyed	Type of Acquisition	PO-1	Date
Brown Branch	Caldwell	Catawba	6,500				
Chavis Park	Wake	Neuse	2,500				
Stone Mountain State Park	Wilkes	Yadkin	10,622				
Basket Creek-Wesleyan Blvd.	Nash	Tar-Pamlico		41.500	Easement	Yes	05/14/97
Holloman Wetland	Greene	Neuse		27.500	Easement	Yes	10/31/97
Buckhead Subdivision	Cumberland	Cape Fear		4.560	Easement	Yes	12/01/98
Barra Farms	Cumberland	Cape Fear		622.940	Easement	Yes	03/19/99
Carteret-Craven EMC Wetland	Carteret	White Oak		4.140	Easement	Yes	11/19/99
Payne Dairy	Alexander	Catawba	7,000	40.220	Easement	Yes	12/30/99
Hoffman Forest Preservation Site	Onslow	White Oak		100.000	Fee Simple	Yes	04/06/00
Nucor Steel Mill Site	Hertford	Chowan		150.270	Fee Simple	Yes	04/18/00
Brush Creek	Alleghany	New	4,000	2.890	Easement	Yes	05/09/00
Brush Creek	Alleghany	New	Above	7.780	Easement	Yes	05/09/00
Contentnea Creek, Neuse River	Greene	Neuse		80.000	Easement	Yes	08/18/00
Providence Road	Mecklenburg	Yadkin		8.809	Easement	Yes	09/27/00
Providence Flat Swamp Forest	Mecklenburg			17.900	Easement	Yes	09/27/00
Wilson Bay-Sturgeon City	Onslow	Onslow		3.060	Easement	Yes	12/18/00
Hobbs Road	Guilford	Cape Fear		3.310	Easement	Yes	03/27/01
Hominy Swamp Creek	Wilson	Neuse	2,232	3.900	Easement	Yes	06/06/01
Reed Creek	Buncombe	French Broad	1,500	1.320	Easement	Yes	06/25/01
Smith-Austin Creek	Wake	Neuse	9,500	33.420	Fee Simple	Yes	09/08/01
Clear Creek	Henderson	French Broad	1,300	6.397	Easement	Yes	

Property Name	County	River Basin	Linear Feet	Acres Surveyed	Type of Acquisition	PO-1	Date
							10/16/01
Sandy Creek	Durham	Cape Fear	3000	10.390	Easement	Yes	10/23/01
Scott-Lamb Wetland	Pasquotank	Pasquotank		22.640	Fee Simple	Yes	12/31/01
Howell Woods	Johnston	Neuse		139.860	Easement	Yes	02/08/02
Little Beaver Creek	Wake	Cape Fear	5000	40.924	Easement	Yes	03/15/02
Wike Stream	Catawba	Catawba	2,300	12.420	Easement	Yes	04/19/02
Haw River-Bouchard Preservation Site	Rockingham	Cape Fear		95.431	Easement	Yes	05/09/02
Mud Creek (Brevard Church Property)	Henderson	French Broad		14.000	Easement	Yes	05/15/02
Mine Site	Chatham	Cape Fear		38.400	Easement	Yes	05/30/02
Moncure Site	Lee	Cape Fear		13.500	Easement	Yes	05/30/02
County Line Stream	Buncombe	French Broad	3,500	0.077	Easement	Yes	06/29/02
County Line Stream	Henderson	French Broad	Above	6.543	Easement	Yes	06/29/02
Maritime Museum	Carteret	White Oak		0.890	Easement	Yes	07/01/02
Murphy Farm	Franklin	Tar-Pamlico	2000	4.170	Easement		07/01/02
	Total			**1,557.901**			

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
WETLANDS RESTORATION PROGRAM
2002 ANNUAL REPORT
TO THE
ENVIRONMENTAL REVIEW COMMISSION
JANUARY 28, 2003

Activities to Improve the Ecological Effectiveness of Restoration Projects

During the past several years there have been numerous studies conducted to determine if the compensatory mitigation required for permitted impacts to wetlands and streams was achieving the goal of replacing the lost functions due to permitted impacts. In general these studies have documented that the "no net loss" goal is not being met. One of the primary reasons for failure to achieve the "no net loss" goal is that the location of many mitigation projects is not conducive to replacing the desired functions. Most of these studies have recommended that watershed planning be used to identify the most appropriate locations for mitigation projects.

For example, as stated in the recommendations of the report published by the National Research Council in 2001, "Compensating for Wetland Losses Under the Clean Water Act"

> "Site selection for wetland conservation and mitigation should be conducted on a watershed scale in order to maintain diversity, connectivity, and appropriate proportions of upland and wetland systems ... Regional watershed evaluation should greatly enhance the protection of wetlands and/or the creation of wetland corridors that mimic natural distributions of wetlands in the landscape."

In addition the 2000 "Federal Guidance on the Use of In-Lieu-Fee Arrangements for Compensatory Mitigation" states:

"Local watershed planning efforts, as a general matter, identify wetland and other aquatic resources that have been degraded and usually have established a prioritization list of restoration needs. In-lieu fee mitigation projects should be planned and developed to address the specific resource needs of a particular watershed."

The Wetlands Restoration Program has adopted watershed planning as a central component of its efforts to improve the ecological effectiveness of restoration projects. Basinwide Watershed Restoration Plans are developed at the river basin scale and identify watersheds where restoration projects provide the maximum benefit based on a number of factors. Local Watershed Plans are developed on a smaller scale and involve the local community in making decisions on the specific types and locations of restoration projects. These efforts ensure that projects implemented by the Wetlands Restoration Program provide the maximum water quality and habitat benefits. These plans also provide a mechanism to coordinate the efforts of others, such as Clean Water Management Fund projects, so that mitigation projects compliment other efforts that are underway in each watershed.

During FY01-02 the Wetlands Restoration Program conducted the following planning activities. Please refer to Section 1, page 1-1 of the 2002 Annual Report and the 2001 Annual Report for additional information on planning activities.

- Basinwide Watershed Restoration Plans
  - The review and revision of plans in 9 river basins was initiated.
  - The revision of 4 plans was completed.

- Local Watershed Plans
  - Eleven Local Watershed Plans are under development.
  - Eight plans were initiated during FY01-02.

Providing Compensatory Mitigation Option for all Permit Applicants

One of the purposes for the establishment of the Wetlands Restoration Program was to provide a compensatory mitigation option that is available throughout North Carolina. The 1998 Memorandum of Understanding between the WRP and the U.S. Army Corps of Engineers, Wilmington District established the guidelines that provides Section 404 permit applicants with the option of paying a fee to the Wetlands Restoration Program to satisfy compensatory mitigation requirements. This option is also available for permitted impacts to riparian buffers in the Neuse, Tar-Pamlico and Catawba River basins.

- During FY 01-02, the mitigation requirements of 88 permits (65 Section 404/401 permits, 23 riparian buffer) were satisfied through payment to the Wetlands Restoration Funds.

- Since 1998, the mitigation requirements of 315 permits (273 Section 404/401 permits, 42 riparian buffer) were satisfied through payment to the Wetlands Restoration Funds. Of these permits,
    - 64% were issued to the private sector;
    - 26% were issued to NCDOT; and
    - 10% were issued to other local, state and federal government agencies.

- An analysis of the funds received for assuming the mitigation requirements of these permits reveals that:
    - 76.5% were from the NC Department of Transportation;
    - 18.5% were from the private sector; and
    - 5% were from other local, state and federal government agencies.

Progress in Meeting Compensatory Mitigation Requirements

Since 1998, the Wetlands Restoration Program has assumed mitigation requirements that require the restoration of approximately 228,000 linear feet of stream channel; 265 acres of wetlands; and 164 acres of riparian buffer. On a statewide basis, the Wetlands Restoration Program has constructed, instituted, or identified projects that exceed the amount of mitigation assumed (Table 1). At the end of FY01-02, the mitigation requirements of over 90% of permits with mitigation due had been met. Please refer to Section 2 and Appendix A of the 2002 Annual Report for additional information concerning progress in meeting compensatory mitigation requirements.

Status of Wetland Trust Funds

Outlined below is the status of each of the Wetland Trust Funds as of December 31, 2002. Please refer to Section 3 of the 2002 Annual Report for additional information concerning these funds.

Account 2980 – Wetlands Restoration Fund

The balance of Account 2980 as of 12/31/02 was $2,488,069. Of this amount, $2,397,696 was encumbered leaving an unencumbered balance of $90,373 (Table 2). Since July 1, 2001, a total of $497,652 in revenue has been deposited into Account 2981. Expenditures during this period totaled $8,586,339, including a reversion of $4,400,000 to the General Fund to assist with the budget emergency.

Account 2981 – Compensatory Mitigation Fund

The balance of Account 2981 as of 12/31/02 was $44,139,592. Of this amount, $8,750,504 was encumbered leaving an unencumbered balance of $35,389,088 (Table 2). Since July 1, 2001, a total of $19,044,590 in revenue has been deposited into Account 2981. Expenditures during this period totaled $7,414,754. Of the unencumbered balance, $18,000,000 is reserved for the construction of projects currently in design, and $16,000,000 is reserved for the design and construction of identified projects that are required to meet the compensatory mitigation requirements of Section 404 permits and 401 Water Quality Certifications. The remaining balance is reserved to implement nitrogen reduction projects in the

Neuse River basin in accordance with 15A NCAC 2B .0240. It must be noted that the majority of the funds deposited into Account 2981 are voluntary payments from permit applicants to satisfy the compensatory mitigation requirements of federal permits. Failure to utilize these funds for the restoration, enhancement, and preservation of wetlands, streams, and riparian areas will result in environmental degradation and will jeopardize the agreement with the U.S. Army Corps of Engineers that authorizes the in-lieu-fee mitigation program.

Account 2982 – Riparian Buffer Fund

The balance of Account 2982 as of 12/31/02 was $7,286,035. Of this amount, $3,285,547 was encumbered leaving an unencumbered balance of $4,000,488 (Table 2). Since July 1, 2001, a total of $5,493,366 in revenue has been deposited into Account 2982. The remaining unencumbered balance is reserved for the design and implementation of buffer restoration projects in the Neuse, Tar-Pamlico, and Catawba River basins.

Progress in Meeting 2002 Implementation Goals

During 2002 the Wetlands Restoration Program increased the pace of implementation of restoration projects. This increased activity reflects the maturity of the planning process and actions that were taken to address concerns with the pace of implementation of restoration projects. Provided below is information concerning Wetland Restoration Program restoration, enhancement and preservation projects and documentation concerning program activities associated with implementation during 2002.

Project Status

As of December 31, 2002 the Wetlands Restoration Program has 68 projects that have completed the site identification and property acquisition phases. All of these projects will be completed or under construction within 14 months. Collectively these projects will restore, enhance or preserve 806 acres of wetlands, 194,562 linear feet of streams, and 300 acres of riparian buffer (Table 3). The status of each of these projects is summarized in Table 4. An additional 18 projects that will restore approximately 184 acres, 58,500 linear feet of streams, and 135 acres of riparian buffer are in the property acquisition phase (Table 5).

Progress in meeting 2002 goals

Goal 1: 9 projects in construction by June 30, 2002

- All 9 projects in construction by June 30, 2002

Goal 2: 13 projects in construction by December 31, 2002

- 4 projects are in construction
- 1 project will be in construction by February 28, 2003
- 5 projects to bid by February 28, 2003 and under construction by April 30, 2003
- 2 projects delayed due to combining 4 projects in Greensboro to save on design and construction costs, 2 of the 4 projects will be in construction in April with work beginning on the other 2 projects when construction complete on first 2 projects. Construction will be completed by June 2003.
- 1 project delayed due to presence of an endangered species. The endangered species issue has been resolved; construction bids will be solicited in February 2003 with construction scheduled for April 2003.

Goal 3: 21 projects at the "construction bid" phase by December 31, 2002.

- 7 projects to bid by February 28, 2003, construction scheduled for April/May 2003.
- 7 projects to bid by April 30, 2003, construction scheduled for May/June 2003.

Goal 3: 21 projects at the "construction bid" phase by December 31, 2002 (continued)

- 2 projects to bid by June 30, 2003, construction scheduled for July/August 2003.
- 2 projects delayed until Fall 2003 at the request of the property owners. These projects are located on golf courses and the construction has been delayed so that play is not interrupted during the spring and summer.
- 3 wetland projects have been delayed due to additional monitoring necessary for the design of these projects. These projects will be under construction within 14 months.

Pace of Implementation of Projects

As shown in Tables 6 and 7 there was a significant increase during 2002 in all phases of project implementation. For example, the number of design contracts executed increased 68% and the number of projects in construction increased 110%. This increase in activity is further documented by the increase in expenditures and contract encumbrances. The total expenditures/encumbrances doubled during 2002 (Table 8). The amount of design contracts increased sixfold and the amount of construction contracts increased fivefold during 2002 (Tables 9 and 10).

Utilization of Private Mitigation Providers

One of the recommendations of the Environmental Review Commission last year was for the Wetlands Restoration Program to provide opportunities for private mitigation providers to supply full delivery restoration projects. During 2002, seven Requests for Proposals were issued for the restoration of 150 acres of riparian buffer, 575 acres of wetlands, and 19,000 linear feet of streams. In response to these requests, eight different firms submitted proposals. Contracts have been issued to four firms for 151 acres of riparian buffer restoration. Recommendations to issue contracts to 3 firms for 42 acres of wetland restoration and 10,000 linear feet of stream restoration have been submitted (Table 11). The total value of these contracts is $7,660,347. The proposals for 455 acres of wetland restoration in the Pasquotank River basin are due February 28, 2003.

Summary

As documented by the information presented in this report to the Environmental Review Commission, the Wetlands Restoration Program has made significant progress in meeting the statutory mandates established by the General Assembly. The foundation that has been laid through careful watershed planning and project selection is yielding the desired results of replacing lost wetland are riparian area functions throughout North Carolina.

Table 1. NCWRP Mitigation through 12/31/02

Type	Total Mitigation	Total Mitigation	NCWRP Mitigation Projects			
	Accepted 12/31/02[1]	Due 12/31/02[2]	Constructed	Instituted[4]	Identified[5,7]	Total
Streams (linear feet)	228,702	203,351	47,556	140,680	72,650	260,886
Total Wetlands (acres)	264.30	235.26	57.87	229.70	48.80	336.37
Riparian Wetlands (acres)	187.39	168.26	57.87	154.70	18.80	231.37
Non-riparian Wetlands (acres)	76.91	67.00	0.00	75.00	30.00	105.00
Buffer (acres)	164.61	N/A	28.00	151.00[6]	0.00	179.01

[1]Total payment in amount specified in 404/401 permit received and deposited in Account 2981.

[2]In accordance with 1998 MOU, all mitigation requirements assumed by 11/8/2001, were due by 11/8/2002. All mitigation requirements now due within 12 months of receipt of payment.

[3]This number reflects the amount of restoration projects implemented to meet compensatory mitigation requirements. The NCWRP has implemented additional projects

to address the cumulative and historical loss of wetland and riparian area functions.

[4]Instituted, as defined in 1998 MOU, means that a site has been acquired and has designer assigned; will be constructed within 2 years.

[5]Identified means that the site is in acquisition phase, construction will occur within 2 years.

[6]Includes Buffer RFP contracts.

Table 2.
NC DENR Wetlands Trust Fund – Wetlands Restoration
Account activity from 6/30/02 through 12/31/02

Account 2980		
Balance as of 6/30/02		*3,261,917*
Revenue as of 12/31/02	108,838	
Receipts	0	
Interest	108,838*	
Expenditures		(882,686)
Balance as of 12/31/02		*2,488,069*
Current contractual encumbrances		(2,397,696)
Balance of unencumbered funds		*90,373*
*A portion of the interest earned during December2002 will be transferred to 2981 and 2982 during January.		

Account 2981		
Balance as of 6/30/02		*42,595,995*
Revenue as of 12/31/02	6,514,041	
Receipts	5,523,825	
Interest	990,216	
Expenditures		(4,970,444)
Balance as of 12/31/02		*44,139,592*
Current contractual encumbrances		(8,750,504)
Balance of unencumbered funds		*35,389,088*

Account 2982		
Balance as of 6/30/02		*3,309,390*
Revenue as of 12/31/02	3,976,645	
Receipts	3,837,425	
Interest	139,219	
Expenditures		0
Balance as of 12/31/02		*7,286,035*
Current contractual encumbrances		(3,285,547)
Balance of unencumbered funds		*4,000,488*

Table 3. NCWRP Project Status 12/31/02

Project Name	Project ID	Project Type	Basin	Cataloging Units	County	Acquisition Process	Site Acquired	Request for Design	Design	Permits	Final Design	Request for Construction Bids	In Construction	Constructed	Monitoring	Wetland (ac.) R/C	Wetland (ac.) Enh	Wetland (ac.) Pres	Stream (linear feet)	Buffer (acres)
Haw River	CF-002-RK-P-HR	P	Cape Fear	03030002	Rockingham	Preservation						n/a						80.0		
Knobs Creek	PA-205-PA-P-KC	P	Pasquotank	03010205	Pasquotank	Preservation						n/a						19.0		
Stone Mountain	YD-101-WL-S-SM	S	Yadkin	03040101	Wilkes				NCSU						year 2				9,590	19.5
Payne Dairy	CT-101-AX-S-PD	S	Catawba	03050101	Alexander				Kimley-Horn						year 2		3.0		7,000	12.9
Sturgeon City (Phase I)	WO-001-ON-W-SC1	W	White Oak	03030001	Onslow				Blue						year 2	3.0				
Hammock's State Park	WO-106-ON-W-HSP	W	White Oak	03020106	Onslow				Blue						year 2	0.3				
Jumping Run Creek	WO-106-CR-W-JRC	W	White Oak	03020106	Carteret				S&EC						year 2	4.4				
Hominy Swamp Creek	NU-203-WS-S-HSC	S	Neuse	03020203	Wilson				KCI						year 1				2,232	5.0
Price Park	CF-002-GU-S-PP	S	Cape Fear	03030002	Guilford				EarthTech						year 1				1,710	2.8
Brush Creek	NW-001-AG-S-BC	S	New	05050001	Alleghany				HDR						year 1				4,000	7.3
Maritime Museum	WO-106-CR-W-MM	W	White Oak	03020106	Carteret				Blue						year 1	0.2				
Beamon's Run	NU-203-GN-B-BR	B	Neuse	03020203	Greene				PBS&J						year 1					16.5
Burnt Mill Creek	CF-007-NH-W-BMC	W	Cape Fear	03030007	New Hanover				KCI						year 1	0.8				
High Vista	FB-105-BN-S-HV	S	French Broad	06010105	Buncombe				Kimley-Horn						year 1				3,500	4.3
Wike Property	CT-101-CT-S-WP	S	Catawba	03050101	Catawba				EcoScience						year 1				2,300	12.6
Howell Woods	NU-201-JS-W-HW	W	Neuse	03020201	Johnston				EcoScience						year 1	20.0	80.0			5.0
Kentwood Park	NU-201-WK-S-KP	S	Neuse	03020201	Wake				Arcadis						year 1				3,000	5.5
Chavis Park	NU-201-WK-S-CP	S	Neuse	03020201	Wake				NAE						year 1				2,500	4.6
Smith/Austin Creek	NU-201-WK-SWB-SAC	S,W,B	Neuse	03020201	Wake				Buck						year 1				9,500	32
Brown Branch	CT-101-CL-S-BB	S	Catawba	03050101	Caldwell				Biohabitats						year 1				7,000	8.0
Beaver Creek	YD-101-SU-S-BC	S	Yadkin	03040101	Surry				EarthTech						year 1				4,000	9.2
Bear Swamp Creek	TP-101-FR-S-BSC	S	Tar-Pamlico	03020101	Franklin				Arcadis						year 1				2,000	5.0
Richland Creek	NU-201-WK-S-RC	S	Neuse	03020201	Wake				Earth Tech						year 1				300	0.5
Suck Creek	CF-003-MO-S-SC	S	Cape Fear	03030003	Moore				Kimley-Horn										2,700	1.5
North River	WO-106-CR-W-NR	W	White Oak	03020106	Carteret				NCSU							250.0				
Hillsdale Park	CF-002-GU-S-HP	S	Cape Fear	03030002	Guilford				Buck				Apr-03						5,000	5.7
Bugaboo Creek	YD-101-WL-S-BC	S	Yadkin	03040101	Wilkes				EarthTech				Jan-03						5,500	9.2
Gillespie Golf Course	CF-002-GU-S-GGC	S	Cape Fear	03030002	Guilford				Buck				Apr-03						3,000	3.4
Clear Creek	FB-105-HD-S-CC	S	French Broad	06010105	Henderson				Ecologic				Apr-03						1,200	6.4
Cato	YD-105-MK-S-CA	S	Yadkin	03040105	Mecklenburg				CH2M Hill				Feb-03						2,200	6.0
Brown Bark Park	CF-002-GU-S-BBP	S	Cape Fear	03030002	Guilford				Buck				Jun-03						2,630	3.0
Benbow Park	CF-002-GU-S-BP	S	Cape Fear	03030002	Guilford				Buck				Jun-03						1,200	1.4
Freedom Park	CT-103-MK-S-FP	S	Catawba	03050103	Mecklenburg				HDR				Apr-03						5,000	5.7
Hadley/Newlin Property	CF-002-AL-S-HNP	S	Cape Fear	03030002	Alamance				Arcadis				Apr-03						5,000	5.2
Snow Creek	RN-103/104-SK-S-SC	S	Roanoke	03010103/04	Stokes				Ecologic				Apr-03						3,000	3.4
Sandy Creek	CF-002-DU-SW-SC	W,S	Cape Fear	03030002	Durham				Besky Ward							3.0			3,000	
Purlear Creek	YD-101-WL-SW-PC	S,W	Yadkin	03040101	Wilkes				Kimley-Horn							2	2.0		17,000	31.0
Pine Valley	CF-001-NH-S-PV	S	Cape Fear	03030001	New Hanover				NCSU			Aug-03							2,500	2.9
Sydnor Property	CF-002-AL-S-WC	S	Cape Fear	03030002	Alamance				Arcadis			Feb-03							5,000	5.7
Warrior Creek	YD-101-WL-S-WC	S	Yadkin	03040101	Wilkes				CDM			Apr-03							8,500	6.8
Prestonwood G.C.	NU-201-WK-S-PW	S	Neuse	03020201	Wake				S&EC			Aug-03							3,000	3.4
Shaffner Park	YD-101-FS-S-SP	S	Yadkin	03040101	Forsyth				Buck			Feb-03							4,500	5.0
Cross Creek	CF-004-CB-S-CC	S	Cape Fear	03030004	Cumberland				Earth Tech			Apr-03							2,400	5.0
McIntyre Creek	CT-103-MK-S-MC	S	Catawba	03050103	Mecklenburg				KCI			Feb-03							2,500	2.9
Bertie Creek	NU-201-WK-S-BC	S	Neuse	03020201	Wake				Arcadis			Apr-03							1,200	2.2
Whitehurst Road	CT-103-MK-S-WR	S	Catawba	03050103	Mecklenburg				HDR			Jun-03							1,000	1.1
Stillhouse Creek	NU-201-DU-S-SC	S	Neuse	03020201	Durham				NRCS			Apr-03							1,500	1.7
Brushy Fork	YD-101-FS-S-BF	S	Yadkin	03040101	Forsyth				URS			Apr-03							5,000	6.9
Sturgeon City (Phase II)	WO-001-ON-W-SC2	W	White Oak	03030001	Onslow				Blue			Feb-03				2.5				
Reedy Branch	CF-002-AL-S-RB	S	Cape Fear	03030002	Alamance				Ecologic			Feb-03							2,500	5.7
Forest Hills	CF-002-DU-S-FH	S	Cape Fear	03030002	Durham				KCI			Apr-03							3,000	5.5
Louisburg	TP-101-FR-S-LB	S	Tar-Pamlico	03020101	Franklin				Earth Tech			Jun-03							2,000	5.0
Ellerbee Creek	NU-201-DU-S-EC	S	Neuse	03020201	Durham				Stantec			Apr-03							2,500	2.9
Whitelace Creek	NU-202-LN-SW-WC	S,W	Neuse	03020202	Lenoir				EcoScience		Dec-03					20.0	10.0		8,000	
Charles Creek	PA-105-PA-SW-CC	S,W	Pasquotank	03010105	Pasquotank				SEC		Dec-03					2.0			1,500	
Boiling Springs	CF-005-BR-SW-BS	S,W	Cape Fear	03030005	Brunswick				SEC		Nov-03					10.0	10.0		1,500	
Wake Forest C.C.	NU-201-WK-S-WF	S	Neuse	03020201	Wake				Dewberry		Mar-03								1,500	1.7
Roslyn	CT-103-MK-S-RS	S	Catawba	03050103	Mecklenburg				CH2M-Hill		Aug-03								1,500	1.7
Little Beaver Creek	CF-002-WK-SW-LBC	W,S	Cape Fear	03030002	Wake				EarthTech		May-03					5.0			5,000	
Jumping Run Creek	CF-004-HN-SW-JRC	W,S	Cape Fear	03030004	Harnett				Blue		Apr-03					75.0			5,500	
Dixon	CF-002-AL-S-DX	S	Cape Fear	03030002	Alamance				Stantec		Oct-03								2,500	2.9
McPherson	CF-002-AL-S-MP	S	Cape Fear	03030002	Alamance				Stantec		Oct-03								1,500	1.7
Harris Tract	PA-105-PA-W-HT	W	Pasquotank	03010105	Pasquotank				SEC		Dec-03					70.0				
Middle Swamp Creek	LU-203-RB-W-MSC	W	Lumber	03040203	Robeson				BLUE		Nov-03					6.0	5.0			
Little River	CF-004-MO-W-LR	W	Cape Fear	3030004	Moore				BLUE		Feb-04					65		33.0	1,000	
Billy's Creek	TP-101-FR-S-BC	S	Tar-Pamlico	03020101	Franklin				URS		Oct-03								1,400	
Purlear Creek II	YD-101-WL-SW-PC2	W,S	Yadkin	03040101	Wilkes				Kimley-Horn		Nov-03					2	3.0		1,500	
Hendersonville	FB-105-HD-W-HW	W	French Broad	06050105	Henderson						Apr-04					20.0				
																561.2	113.0	132.0	194562.0	303.3
																Total:	806.2			

Table 4. Status of NCWRP Projects (from Table 2)

Projects Constructed/Monitoring	21
Projects to-bid	4
Projects in construction	4
Projects in design	37
Preservation projects	2
Total	**68**

Table 5. NCWRP Projects in Acquisition Phase

Project	River Basin	Cataloging Unit	County	Stream (Linear Feet)	Wetland: Restoration/ Preservation (Acres)	Riparian Buffer (Acres)
Tributary to Billy's Creek	Tar-Pamlico	03020101	Franklin	1,600		3
Kildare Farms	Neuse	03020201	Wake	3,700		8
Palms Apartments	Neuse	03020201	Wake	2,200		5
Mills Creek	Yadkin	03040101	Forsyth	3,000		6
Ararat River	Yadkin	03040101	Surry	2,500		5
Naked Creek	Yadkin	03040101	Wilkes	5,500		12
Big Warrior Creek (II)	Yadkin	03040101	Wilkes	7,000		16
Little Warrior	Yadkin	03040101	Wilkes	6,000		13
Toby Creek	Yadkin	03040105	Mecklenburg	1,700		3
Edsel Creek	Catawba	03050103	Mecklenburg	2,000		4
Derita Creek	Catawba	03050103	Mecklenburg	3,500		8
Torrence Creek	Catawba	03050101	Mecklenburg	2,000	4	
Sharon Memorial	Catawba	03050103	Mecklenburg	3,000		6
Foley Station	Catawba	03050101	Mecklenburg	2,000	10	
Coffey Creek	Catawba	03050103	Mecklenburg	6,000		13
Little Sugar-downtown	Catawba	03050103	Mecklenburg	3,500		8
King's Creek	French Broad	06010105	Transylvania	3,300		7
N. River	White Oak	03020106	Carteret		170	
Total				**58,500**	**184**	**134.7**

Table 6. Project Activity during Calendar Year 2002

Project Activity	4/25/02	12/31/02	% Increase
Sites Identified	64	87	35.94%
Sites Acquired	59	68	15.25%
Design Contracts Executed	38	64	68.42%
Request for Construction Bids	20	29	45.00%
In Construction	10	21	110.00%
Monitoring	9	20	122.22%

Table 7. Projects in Construction (by year)

	Stream	Wetland	Buffer	Total
2000	2	3		**5**
2001	3	2	1	**6**
2002	11	2	2	**15**
2003 (projected)	30	7	4	**41**

Table 8
Annual expenditures and encumbered
Wetlands Trust Fund accounts 2980 & 2981

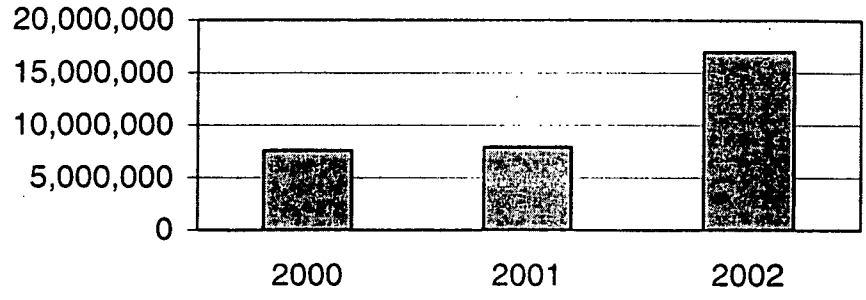


Table 9
Amount ($) encumbered in Design /
Construction Management Contracts

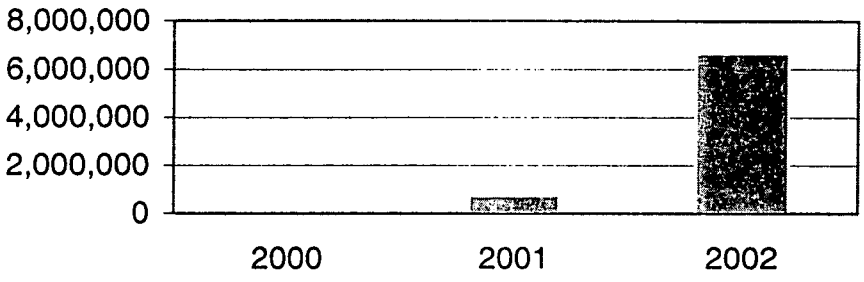


Table 10
Amount ($) encumbered in Construction
Contracts

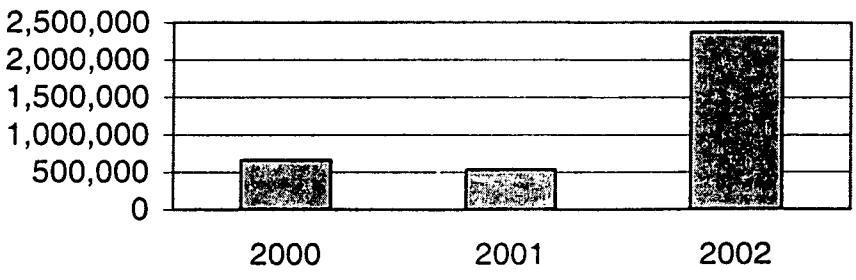


Table 11. Request for Proposal Summary

RFP #	Location	Restoration Requested	# Firms Responding	Total offered	# Sites	Contract Award
16-EW02048	Neuse	Buffer 150 acres	6	400.35 acres	16	151 acres $3,285,547
16-AW03001	Cape Fear 03030002	Riparian wl- 45 acres	1	12 acres	1	12 acres $1,260,000
16-AW03002	Cape Fear 03030004	Riparian wl- 25 acres	2	35 acres	2	No contract awarded*
16-AW03003	Catawba 03050101	Streams- 10,000 linear feet	3	23,900 linear feet	3	10,000 linear feet $1,895,400
16-AW03004	Catawba 03050103	Riparian wl- 20 acres Streams 9,000linear feet	1	2,950 linear feet	1	2,950 linear feet $625,400
16-AW03005	Tar Pamlico 03020101	Non-riparian wl- 30 acres	4	210 acres	7	30 acres $594,000
16-AW03010	Pasquotank 03010205	Riparian- 180 acres Non-riparian 275 acres	Proposals due 2/28/03			
					Total	$7,660,347 Buffer-151 acres Wetlands-42 acres Streams-12,950 linear feet

*No acceptable proposals were received

List of Firms submitting bids:

Environmental Banc & Exchange, LLC
Greene Environmental
KCI Associates of NC, PA
Land Management, Inc
The Louis Berger Group, Inc
Restoration Systems, LLC
Rummel, Klepper, and Kahl
Spaulding and Norris, PA

2003-2004

ENVIRONMENTAL REVIEW COMMISSION

MINUTES

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ENVIRONMENTAL REVIEW COMMISSION
February 6, 2004

The Environmental Review Commission (ERC) met on Friday 6 February 2004 at 9:30 a.m. in Room 643 of the Legislative Office Building.

Senator Charles Albertson presided over the 6 February 2004 meeting. The following members were present: Senators Albertson, Clodfelter, Dorsett, Horton, Kinnaird and Swindell and Representatives Fox, Gibson, Hackney, LaRoque, Weiss and Williams. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Jennifer McGinnis, Assistant Commission Counsel, Tim Dodge, Research Assistant, and Mary Watson, Commission Clerk were also present.

On 29 January 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Senator Albertson called the meeting to order and asked members to introduce themselves and tell which district they represent.

George Givens, Commission Counsel, was asked to introduce the staff members for the Commission, give a brief history of the ERC, and to explain the agenda.

Mr. Givens said that the Environmental Review Commission began in 1986 as a special provision in the budget bill that directed there be a study as to whether there should be the consolidation of environmental regulatory agencies and whether there should be a State Environmental Protection Agency. As it was, the original provision did not provide a name, so they operated the first year under the name Consolidation of Environmental Regulatory Agency Study Committee and the next year it was changed to Commission. Along the way, it occurred to a number of folks that if they were going to be looking at executive branch consolidation of functions, there ought to be a legislative entity that had overall responsibility for oversight and study of environmental, natural resources and public health issues. So, in 1988, the original Commission, with its members intact, was renamed the Environmental Review Commission. At that time, there were relatively few statutory oversight commissions to serve as a model for ERC.

Mr. Givens said that it had been his honor to be counsel to the ERC since its inception in 1986, along with Representative Hackney the original House co-chair of the Commission.

Mr. Givens said that he had distributed to each member, copies of current membership of the Commission, authorizing legislation and a summary of enactments in 2003 that may be of interest. Mr. Givens also explained a copy of reports that are required to be made to the Environmental Review Commission. These handouts are listed as **Exhibit D**.

Mr. Givens said that in addition to formal meetings of the Commission, there is a planning process that includes a public meeting that is available to anyone who wants to attend to give ideas and suggestions that should be considered in the development of the agenda. These meetings are held in advance of each Commission meeting.

Mr. Givens added that under the auspices of the ERC and individual members of substantive committees, he convenes working groups on various topics from time to time in an effort to resolve outstanding issues. There are two substantive committees active at the moment, one of Underground Storage Tanks and one on the Chronic Rainfall Issue, with others to follow.

Mr. Givens then explained the agenda. He said that today's item on stormwater runoff is moving into a new and more expansive geographic area with an option of Phase II regulations which are quite controversial. They are in the process of development, right now. The Environmental Management Commission (EMC) and the Department of Environment and Natural Resources (DENR) hope and anticipated that these rules would be before the legislature in the 2004 Session for legislative review. If that occurs, then he fully anticipates that a bill would be introduced to disapprove the rules.

Mr. Givens said he thought it was important to note what the issues are that you may be confronted with in the short session. Various people have asked him to convene a 605 working group, including one of the co-chairs, ever since April of last year and he had not thought it was timely to do so while the rules were still in flux.

Mr. Givens said that his thought was that once those rules are in the form likely to be presented to the legislature, if we get to that point, he would go ahead and begin the negotiation process in anticipation of a bill being filed and in anticipation of the likelihood that it would be difficult to conclude successful negotiations in the time available if he waits until the time that the short session actually convenes.

Mr. Givens said that where we are in the process, and it is very timely that we meet today on this matter, the EMC has adopted proposed rules, which have gone to the Rules Review Commission (RRC). The RRC met last month and took action, which has been the subject of some controversy and confusion. Their counsel will appear today to explain where they are in the process. Just yesterday he issued his formal letter explaining what the RRC has done and he will be here to talk about that.

Mr. Givens said that in the sequence of events, between now and the February 24, 2004 meeting, the EMC will meet and will have received a decision from the RRC and will perhaps determine what they are going to do.

And, in our meeting of the ERC later in February, Dr. Moreau, Chairman of the EMC, will be here to give a quarterly report. In particular to stormwater, Dr. Moreau will be advancing that discussion by telling us what the EMC proposes to do.

Mr. Givens said that this is not the only time we will have a discussion on stormwater but this gets the discussion going with a comprehensive overview at a critical point in time.

Mr. Givens added that the ERC receives many reports and, in exercise of our oversight function, we hear some of those reports and some are distributed as read-only reports. A packet of all the reports, which are determined it best be reviewed at your leisure, are handed out to you and listed as **Exhibit E**.

Mr. Givens asked members to let him know if they feel that any of these reports should be presented orally.

Mr. Givens said that the next business meeting of the ERC is scheduled for Tuesday and Wednesday, 24 and 25 February 2004. He said that time had been set aside to make up for lost meeting time and to possibly have some out of town meetings. Some of the co-chairs have indicated that they would like to meet out of town, that this would be a matter of discussion, and he would welcome any input that members would care to give.

Mr. Givens said that the planning meeting for the end of February meeting will be held next Tuesday, February 10, 2004, at which time a determination will be made as to whether that meeting should be a one-day or a two-day meeting.

Mr. Givens said there is a list of potential agenda items that has been handed out to members and is listed as **Exhibit F**.

Mr. Givens said that the planning meeting for today's meeting was held at 2:00 p.m. on Tuesday, 13 January 2004.

Mr. Givens asked visitors to sign the visitor registration sign-in sheet and asked members to sign and send forward their reimbursement forms.

Mr. Givens said that with respect to stormwater, no decision is needed by the Commission today; however, this Commission will need to be informed if there are recommendations to be made to the 2004 Session. In the event that there is no rule over here for approval or disapproval, the question then becomes whether the legislature ought to statutorily enact something with regard to stormwater. One of the issues that have arisen in the debate about the stormwater rules is the adequacy of statutory authority. This is easily corrected by the legislature.

Senator Kinnaird asked Mr. Givens if part of the explanation would be on the relationship and requirements of the federal government on us for stormwater management so that we can conform to that.

Mr. Givens said that Ms. Smith and Dr. Moreau would both speak to her question.

Mr. Givens added that the legislature has another entity called the Administrative Oversight Commission (AOC) on which Representative Gibson serves. The AOC will be meeting later this month and will be looking at this issue, focusing on the procedural and rulemaking aspects and we will focus on the substantive aspects, although he expected there to be some overlap in the process.

Senator Kinnaird expressed concern that if this road is so bumpy and curved, the end result is still that we start at the federal government and end up at the federal government, no matter how many groups are looking at this issue.

Mr. Givens said that we certainly have to meet the requirements under the Clean Water Act and through the regulations adopted by the Environmental Protection Agency (EPA). The issues are, how we go about that and what we do to protect the environment as it relates to stormwater to meet those requirements and to meet the other needs of the State.

Mr. Givens said that we have a good panel of presenters today and he anticipates that we should be able to conclude today's meeting without a lunch break and adjourn in the early afternoon.

Robin W. Smith, Assistant Secretary for Policy and Planning, DENR, gave a report of procedural and substantive issues involved in the development, adoption and implementation of the Phase II stormwater rules and programs to control stormwater runoff.

Ms. Smith explained that she had handed out to each member copies of a memorandum, PowerPoint slides and chronology of the development of Phase II stormwater program. These handouts are listed as **Exhibit G**.

Ms. Smith said she would try to hit the basics of what were the main concerns and what there may be confusion about.

Ms. Smith started with the question that Senator Kinnaird raised which is what do the federal rules require.

Ms. Smith said that one of the most important things to understand about the Phase II stormwater program is that it is a federal program, not a state program. It is a program that requires that the owners and operators of municipal storm sewer systems obtain a federal, national pollution discharge elimination system (NPDES) permit under the Federal Clean Water Act.

Ms. Smith said that Congress directed the Environmental Protection Agency (EPA) in the late 1980s to develop a stormwater program under the authority of EPA to address discharges of pollutants to waters of the United States. In 1990, EPA adopted the first set of federal stormwater rules. Those

rules were directed to the large municipalities and required those municipalities to obtain NPDES stormwater permits. Those rules became known as the Phase I rules. So, they looked first at the largest municipalities in North Carolina in cities such as Charlotte and Raleigh that have Phase I NPDES permits and have had those permits for a number of years. The State Department of Transportation has a Phase I stormwater permit for the entire State road system. It was treated as a large system for purposes of Phase I stormwater.

Ms. Smith added that in 1999, again in direct response to this congressional directive to develop stormwater regulations, EPA adopted what have become Phase II stormwater rules. Those rules were designed to reach the next tier of owners and operators of storm sewer systems; the small and medium sized municipalities and other public entities smaller than the large cities and large entities that had to obtain Phase I permits and extended that stormwater permitting requirement to that next tier or municipal storm sewer systems.

Ms. Smith said that the basic requirement in the federal rules is that municipal separate storm sewer systems must have the NPDES permit. This includes any system owned or operated by a city, a county, or any other federal or state agency. So, it is not just cities and counties, it could be a community college, a university system or any public entity.

Ms. Smith said that the federal rules set out what the basic requirements are to obtain that NPDES permit. She added that there has probably been a little bit of a misconception that she has heard from a number of folks that, if the state were not doing state rules on Phase II stormwater, this requirement would go away. This is not the case. If there were no state rulemaking, these small and medium municipalities and other public entities in North Carolina would still have to get a NPDES stormwater permit under the Clean Water Act. And, in order to get that permit, they would have to develop a stormwater management program.

Ms. Smith said that these permits are a little bit different from the other Clean Water Act permits that tend to be directed toward specific discharges. These permits really require that the public entities develop a stormwater program to address stormwater pollution within their jurisdiction. The federal rule set out six minimum measures that those local or community entities programs need to include. That list starts at the midpoint of page one of Exhibit H.

Ms. Smith said that these measures include: public education and outreach, public involvement and development of the program, detection of illegal discharges to the municipal storm sewer system, control of stormwater runoff from active construction sites (what EPA calls post construction stormwater management). What that really means is stormwater design criteria for new development.

Ms. Smith said that EPA was looking toward future development in urbanizing areas and requiring these permitted storm sewer systems to start

exercising some design controls on those new developments to manage their projected inputs of stormwater into that system.

Ms. Smith said that the final minimum measure is pollution prevention, good housekeeping measures for actual municipal operations. For example, if you have a school bus garage, you need to have good housekeeping measures in place to make sure that oil from your buses aren't getting into the storm drains.

Ms. Smith said that these six minimum measures are all set out in the federal rules so that every entity that requires a Phase II permit has to develop a program that includes all six of those measures.

Ms. Smith said that one of the things that the EMC has struggled with in developing the Phase II program, is that when it came to the point of talking about once the local governments submit their Phase II permit applications, how do you determine whether they have an adequate program or not and whether or not you issue them a permit.

Ms. Smith said that the federal standards for approving these programs are very broad. Basically those standards are that the local government has to show that their program, which incorporates those six minimum measures, is going to be sufficient to control stormwater pollution to the maximum extent practical and protect water quality standards.

Ms. Smith explained the State's role in all of this. She said the State's role in NPDES permitting is that DENR has been delegated the authority to issue NPDES permits in the State of North Carolina. If the Department were not issuing these permits, the federal EPA would issue the permits directly. EPA has actually run NPDES programs in some states for a period of time. They actually ran the Florida NPDES program for a number of years.

Ms. Smith said that DENR has a delegation from EPA to issue these federal permits in North Carolina. As part of that authority the EMC, in beginning to develop these rules, started looking at the need to provide some additional guidance to local governments on what would be approvable so that when they came in and submitted their permit application, they would know what would be approvable under the program.

Ms. Smith said there are some other issues that the EMC felt needed to be flushed out in the federal rules. Before we get there, let's talk about to whom the rules apply. As mentioned before, it is small and medium storm sewer systems. Ms. Smith made reference to one of the attachments in Exhibit G that lists all of the cities and counties in North Carolina that have been identified under the federal rules as requiring a Phase II stormwater permit.

Ms. Smith said that the way the federal rules went about designating these local governments, when the federal rules were actually published in 1999, the rules themselves included a specific list of cities and counties for every state in the nation. That list was developed based on a determination of

which cities and counties in that state met the definition of an urbanized area under the census. The federal rules are written in a way that they will also pick up cities and counties that, as a result of growth and future census determinations, become urbanized areas. So, when the federal rules were published in 1999, there was a list published with those rules. But, the rules themselves were written in a way that they would capture additional local governments as they grew and fell into the EPA definition of an urbanized area.

Ms. Smith said that in fact, in North Carolina as in many states, we have had another batch of cities in particular that as a result of the 2000 Census are now considered urbanized areas under the federal rules and automatically fall under the Phase II stormwater program. The list in Exhibit G includes both the communities that were originally listed in the federal rules, based on the 1990 Census, and the additional cities that fall under the federal rules by virtue of the 2000 Census.

Ms. Smith said that within those areas, the basic Phase II requirement is that any owner or operator of a storm sewer system has to have this permit. So, the permits aren't necessarily issued to a county or a community college automatically. They only require a permit if they own or operate a storm sewer system.

Ms. Smith said that the federal rules also require the state to look at designating additional local governments as needing Phase II permits, based on a finding that those jurisdictions are going to be significant contributors of stormwater pollution. The State has not done that yet but is required to look at additional state designations. One of the things that the EMC did in their rules was set up a process for making those additional designations. But, to date, the only communities that are directly affected by the Phase II program are the ones that have been federally identified.

Ms. Smith said that the state rules are trying to accomplish a number of things. They are trying to establish the criteria for the state designations. Basically, what the EPA said was that states have to look at additional areas and assess whether these additional areas that they have not identified at the federal level are in fact going to be significant contributors to stormwater pollution.

Ms. Smith said that the federal rules actually had a deadline of December 2002, by which the state was to have done that. But, it allowed states to establish a different timeline and a different process for doing those designations. That is one of the things that the EMC has used the state rules to do. The rules adopted by the EMC set up a process by which, in North Carolina, we would look at those additional state designations on a river basin basis as our river basin management plans came up for regular review. So, instead of needing to do all of our state designations by December 2002, we set up a phased process that would link those designations or at least the study of whether designations were needed with our river basin planning process.

Ms. Smith said that the rules also set out what the basic criteria would be for making those state designations. Federal rules really don't provide any guidance on that. One of the things that the EMC heard from local governments was that they liked more certainty than the federal rules applied on a number of issues and this was one of them. So, one of the things that the state rules do is try to describe what the process will be and what standards will be applied in making those state designations.

Ms. Smith said the other thing the state is required to do under the federal rules is to consider petitions for additional designations. So, any person can petition the state to have an additional local government brought into the Phase II stormwater program. So, another issue in development of the state rules has been to set up a process for considering those petitions. The EMC included in its state rules a set of criteria describing what kind of information a petition would need to include and how the EMC would make decisions on petitions received from third parties for additional designations.

Ms. Smith added that the EMC rules also attempted to provide a little bit more certainty on what it means to have an approvable, post-construction runoff control program. That is one of the six minimum measures that the EPA requires, the federal standards for approval are very broad, as mentioned before.

Ms. Smith said that another thing they heard consistently from local governments throughout this process was that they wanted more certainty and more direction on what an approvable program might look like, largely because there are a number of relatively small communities captured in the federal list of communities that don't have very large planning and engineering staffs. So, one of the things the EMC responded to was a desire that the states lay out more clearly what a basic approvable program would look like.

Ms. Smith said that the rules also; however, include the option for local governments, particularly those who have better-developed planning staffs, allowing them to come in and propose something that looks different from these minimum requirements, as long as they provide the same level of stormwater protection. So, the rules were trying to do two things: one was to provide a little bit more of a template for smaller local governments who wanted to be able to follow a recipe for developing their stormwater management program but it also provided the out that said if you want to do something different, you can do that as long it provides the same level of protection.

Ms. Smith said that one problem they immediately ran into that turned out to be fairly unique to North Carolina was the problem of counties. Ms. Smith pointed out on the list of designated local governments that EPA developed that there are both cities and counties. EPA was making the assumption that counties own and operate municipal storm sewer systems. In most states, the counties maintain the road system in the unincorporated areas of the county. In North Carolina, and in perhaps two other states, that is not the case.

Ms. Smith said the road system and the drainage that is associated with the road system in those unincorporated areas actually is the primary storm sewer system out in the counties. In most of the United States, because those roads are county roads, that would, under the Phase II program, lead to a county permitted stormwater program.

Ms. Smith said that in North Carolina, that is not the case because counties do not own and operate the major storm sewer system in the unincorporated areas because North Carolina Department of Transportation (NCDOT) does.

Ms. Smith said that as she had mentioned earlier, NCDOT has a Phase I permit for the state road system. So, immediately the issue came up as to how does the Phase II program work in North Carolina with respect to counties. After going back and forth a number of times, seeking an advisory opinion from the Attorney General's office and consulting with EPA, the conclusion was that in North Carolina, because counties don't own and operate that road drainage system, the counties for the most part don't need a county-wide Phase II stormwater permit. In fact, the only Phase II NPDES stormwater permit they need is one for any actual county facility that has its own storm sewer system.

Ms. Smith said that if you have a county, multi-building facility, number of acres has a network of drainage ditches, then the counties would need to get a Phase II permit for that storm sewer system. But, obviously that system is not going to cover the entire unincorporated area of the county. So, that left North Carolina in a somewhat unique position of not having the counties as the permittee in those unincorporated areas under Phase II.

Ms. Smith said that the EMC worked through that in a couple of different ways. Obviously, the counties had strong feelings about not being required to get an NPDES permit if they didn't have to have one, the cities had very strong feelings about not having stormwater controls in the urbanized areas in the counties immediately adjacent to a city because of the inequities that might create for development to avoid the city boundaries and move to the county, and the EMC had concerns about that because stormwater pollution doesn't stop being stormwater pollution when it gets to the boundary of the extra territorial jurisdiction (ETJ) of the city. The issue is there; and in fact, the EPA was largely attempting to reach, with Phase II stormwater, the new development that would be going into areas that are urbanized. In these unincorporated areas of the counties, that is where much of the new development is going. It is very difficult to have an effective stormwater management program in these urbanizing counties without covering the unincorporated area. But, the fact is, under the federal rules, the counties were not required to get the NPDES permit.

Ms. Smith said that the EMC first wrote the state rules to do two things. They had a set of rules that addressed the cities and other entities that clearly operate storm sewer systems, and those permits issued to those entities would be federal Phase II stormwater permits under the Clean Water Act. Then, the EMC adopted a parallel rule under state stormwater authority that

would have required the counties to develop a stormwater management program in the unincorporated areas only in the designated counties listed for Phase II coverage.

Ms. Smith said that the requirements for the counties were exactly parallel to those of the cities. In subsequent developments though review by the Rules Review Commission (RRC) and additional comments by the counties; ultimately what the EMC did in December was to revise those rules one more time. The part of the rules that address the cities remained unchanged. The state stormwater rule that was written to fill the gap in the unincorporated areas of the counties was revised one more time so that instead of requiring the counties to develop a stormwater program in those unincorporated areas, the last version of the rules provided that the state would do that. Again, the criteria didn't change; it was an exactly parallel program to the program required of the counties. The design criteria for new development didn't change. The only thing that changed in that last revision of the rules was instead of the counties approving new development and reviewing new development for compliance with those stormwater management standards, the state would have been doing it directly.

Ms. Smith said that one additional reason for concern about those unincorporated areas was that DOT is the owner of that storm sewer system and under their NPDES permit, DOT is responsible for the output from their storm sewer discharges. And, of course, DOT is different from any of those other systems in that it is owns and operates a fairly discreet drainage system and obviously their mission is to maintain that state highway and road system. But, they are also receiving stormwater from any number of private developments. Ultimately, much drainage from private development goes into the DOT road drainage system and ultimately, DOT is responsible for the stormwater impacts of the discharges from the DOT system. This puts DOT in the position of managing a system that is receiving a lot of input over which they have relatively little control.

Ms. Smith said that another concern, other than having an effective program that would cover both the cities and the unincorporated areas, was that DOT is holding a permit that makes them responsible for the discharges from that road drainage system. And, it appeared to be necessary to get some handle on the new inputs to that system and DOT wasn't really in a good position to do that, directly.

Ms. Smith added that the EMC first looked at the counties to do that and ultimately decided that the state would do it through the Division of Water Quality in those areas. But, one goal was to make sure that the new development was required to address stormwater since, in many cases, the drainage from those new developments would be going into a state storm sewer system.

Ms. Smith said that this was what the final version of the rules look like. Ms. Smith noted that copies of the memo handed out to members was missing page 4 and promised to provide copies of the missing page. A

complete copy of the memo was handed to the Committee Clerk after the meeting.

Ms. Smith next covered impacts on private development. She said one thing that is really confusing about Phase II is private developments aren't required to get Phase II stormwater permits but public entities are. And, EPA's general scheme was that anticipation of these Phase II stormwater permits would go to the public entity, that owned and operated the storm sewer system, and because the federal rules said in order to get that permit, the public entity had to, in essence, regulate new development and require new development to incorporate new stormwater management into their design. It would be the local governments that would be addressing the private development activity. So, it was a two-step process instead of a one-step process. But, it creates a requirement that these storm sewer systems address design for new development and stormwater controls.

Ms. Smith said that nothing in the Phase II program and nothing in the State rules affects existing development. There is no requirement under the federal program that existing development be retrofitted to address stormwater management. There is nothing in the State rules implementing Phase II or in the State stormwater rule that was developed to address the unincorporated areas of the counties. Neither set of rules requires retrofitting of existing development for stormwater. It is all focused on development that will happen in the future after these stormwater management programs are in place. And, it is intended to be prospective in setting up design criteria for new development to meet.

Ms. Smith noted that members had a summary of what the State rule that goes into some details as to what those minimum standards are for approval of these local programs. Most of those minimum criteria are fleshing out what the requirements would be for post-construction runoff controls. So, the State rules go into the kind of additional detail that the local governments said they needed in describing what, at minimum, need to be done with these post-construction runoff controls.

Ms. Smith added that the rules identify a level of development, below which no stormwater controls are required. It is a threshold. There has been some misunderstanding of the rules. It is easily to look at the rules and think that what these rules set out is a density cap—they do not. They say the threshold above which a new development would need to incorporate stormwater management into its design. There is no ultimate cap on the density of new development. It is just a threshold below which no structural stormwater controls are required and above which structural stormwater controls are required.

Ms. Smith said there are also other minimum stormwater measures that are described that are tailored specifically to more sensitive water bodies like trout waters and shellfish waters that have a very stringent water quality standard for bacteria in order to protect public health. So, there are some variations within these rules intended to provide a specific level of protection for those waters. The same thing for trout waters: in that case often the issue

is sedimentation. So, the general approach is the same. It is using thresholds at which stormwater controls are necessary.

Ms. Smith repeated something she said earlier. There is something also in the rules that allows local governments the flexibility to develop programs that look different from these minimum standards as long as they provide the same level of protection.

Ms. Smith explained the chronology of the development of these rules shown in the handout listed as Exhibit G. As shown in the chronology, there have been two stakeholder groups, innumerable workshops and public hearings, both before the rules were drafted and again after the rules were drafted. These rules have probably had the most significant degree of public participation as any set of rules she has ever seen come out of the EMC and probably most other state agencies. So, it has been a long process and in many ways a very difficult process because it presented some legal issues that was unique to North Carolina that had to be sorted through. She said that the EMC had tried very hard, throughout; to develop a program that they believed would be fair and equitable in the way it treated the cities and the counties in the urbanizing areas that would lead to an effective stormwater program and would respect the need for these local governments to have some additional guidance on how to develop an approvable program.

Ms. Smith went on to say that on NPDES permits of all types, one of the things that raises the stakes on a program like this, is that for federal NPDES permits, under the Clean Water Act, there are a couple of additional factors to be dealt with. One is, there is the opportunity for direct federal enforcement requirements and there is authority for third party citizens suits to enforce the requirements. So, another reason for the EMC and the Department to spend a lot of time to work with governments to develop a rule that would give them some more certainty about approval of their program is that if you don't have some level of certainty, if you are using simply the very broad standards in the Clean Water Act for approval of these programs, you have a much greater risk of third party challenges to those permits.

Ms. Smith said that one of the things that the EMC was trying to do was to provide something of a shield that would show they had gone through a rulemaking process and determined if they had a program that meets these basic standards you have met those federal requirements that you protect water quality and that you manage stormwater to the maximum extent practical. If that goes away and you step back to those very broad federal standards, aside from the uncertainty that the local governments face in terms of how to put their program together, there is the additional uncertainty of will they be challenged when it is all over with, through that citizen suit provision.

Senator Albertson asked Ms. Smith if there would be any federal dollars to accompany these rules and, if not, who pays and what is the estimated cost.

Ms. Smith said that federal dollars is an excellent question and is something the states have been pushing for, ever since the Phase II federal

rules were adopted. So, far there has not been a good response to that in the federal budget. One response recently from the EPA was that there is a certain amount of funding that they have been providing for a number of years under their Section 319 grants. Generally, these grants have been used for more traditional water quality point source oriented projects. One of the things EPA has said recently is that those Section 319 grant monies can be used for non-point source stormwater controls.

Ms. Smith added that she was not aware of any proposal that the federal administration has made to provide additional monies for Phase II stormwater implementation.

Senator Albertson asked Ms. Smith if she had any idea of what this might cost.

Ms. Smith said there was a federal fiscal note prepared for the federal rules and then there was a State fiscal note that basically used the federal note to a large degree for the State rules. She said she did not recall exactly what the fiscal note says.

Ms. Smith called on Coleen Sullins from the Division of Water Quality (DWQ) to answer Senator Albertson's question.

Ms. Sullins said that she did not remember the specifics of that fiscal note but she would be happy to provide a copy to the members.

Senator Albertson asked Ms. Smith about the coordination of permitting. He said it sounded like this permitting process could be all over the place.

Ms. Smith said they were trying to avoid that. One of the goals of the rulemaking process was to be pretty clear about what the standards would be and who would be subject to the permitting requirements. This does fall within NPDES permitting which is a pretty well established program within DENR.

Ms. Smith added that one of the challenges would be that it is a new and much expanded stormwater program that did not come with additional federal resources to implement it. But, they are prepared to do the best they can with the resources available.

Senator Kinnaird asked Ms. Smith what NPDES stands for.

Ms. Smith said it was the National Pollutant Discharge Elimination System.

Ms. Smith added that the NPDES permits were originally designed to address point source discharges—pipes coming out of municipal treatment plants or industrial discharges. The relatively recent development on the federal level has been to take that NPDES point source discharge program and start applying it to stormwater discharges.

Senator Kinnaird asked if all stormwater systems would collect at one point and then be cleaned up as municipal waste is. And, has anybody anticipated how new developments in unincorporated areas will tie into the new city municipal systems.

Ms. Smith said that this is the reason why the EMC felt it necessary to address what would otherwise have been a gap in North Carolina's Phase II program by creating a separate state stormwater rule that would require the same level of post construction runoff controls in the unincorporated areas of the county that would be required in the municipality. So, the idea was that you didn't want to have that disconnect. If you have an urbanizing county, you don't want to have stormwater controls inside the city limits and none outside the city limits where inevitably most of that new development would be going on. This is one of the reasons for having the complimentary rules in North Carolina's case. One was an NPDES rule and the other was a State stormwater rule that would address those unincorporated areas so that as new development went on in both the city and the county they would be occurring under very similar sets of development standards.

Senator Kinnaird followed up by asking if the State would be a third entity that is floating out there and isn't actually operating yet for stormwater controls.

Ms. Smith said that what the EMC had proposed was that using its authority to regulate stormwater, statewide, that it would create a state program to be implemented by the Division of Water Quality in those unincorporated areas of the designated Phase II counties. So, the answer is yes, it would be the State's responsibility.

Senator Clodfelter asked Ms. Smith if we still have anybody in the designated cities and counties who use combined systems and what is the status of combined systems.

Ms. Smith called on Ms. Sullins to respond to Sen. Clodfelter's question.

Ms. Sullins said that there are not any combined storm sewer wastewater systems in the State of North Carolina.

Senator Clodfelter asked what defines a municipal storm sewer system. The only experience he has to draw on in this question is that at home he doesn't know what is done elsewhere and he expects it is different from county to county and that is probably one of the issues we need to be sensitive to. "But, Mecklenburg County doesn't maintain any roads or streets, but he defies anyone to say they don't operate a municipal storm sewer system because they channelize stream and creeks, they armor creek banks, they clean and maintain culverts and police the natural system of drainage in the county, both in the incorporated and unincorporated areas. And, if that is not part or the storm sewer system, I think we are wacko if we don't think it is. The county maintains that, maintains it regularly, has a huge budget for it,

office for it, they call it stormwater services and has nothing to do with streets and roads. Is that under the regulations, a storm sewer system?"

Ms. Smith answered Sen. Clodfelter by saying that potentially it could be. The federal definition of a storm sewer system is very broad and would really capture any system of conveyance of stormwater, which could include ditches and culverts and does include that. She said that one of things they have recognized in looking at the county issue is that to some extent you may find yourself trying to make a county-by-county determination. Mecklenburg has long intended, and has applied, for a countywide Phase II stormwater permit because they want to address this on a countywide basis.

Senator Clodfelter said that he feels this is a critical point and the thing that concerns him about a statewide rule for unincorporated areas is that is does not recognize that urbanization occurs in different ways in different counties in a different context. "And, some counties, his being one, may be very important for the county to be the permit holder in order to provide a better management and integration of activity and development in permitting at the local level." In other counties, they may not do that or want to do that. So, he has a concern about a statewide rule that applies to all unincorporated areas.

Ms. Smith said that they are really focused on the urbanized county. It is not a statewide program in the sense that it applies to all 100 counties. The program developed by the EMC only applies to the counties that were designated under Phase II and, one of the things that is going on right now is that there are some counties, including Mecklenburg, that applied for a Phase II, NPDES program. Part of what Mecklenburg was doing was linking together a number of different small municipal and then county systems, and then asking for a permit to cover that entire network, which is clearly allowed under the federal Phase II program. What the EMC rules are trying to address was where it is not as clear where you have a countywide municipal storm sewer system as being owned and operated by the county, you still need somebody addressing the post-construction runoff issue so that you get stormwater designs in place for new development.

Senator Clodfelter asked Ms. Smith if the last proposed version from EMC would not pre-empt the existing county stormwater programs nor prevent a county that wanted to have a Phase II permit locally from getting one.

Ms. Smith said that is correct.

Senator Horton asked Ms. Smith if DOT has its own NPDES permit and asked her to explain their stormwater system. Is DOT's stormwater system merely ditches on either side of the road?

Ms. Smith said that to a large extent it is.

Senator Horton said that as he understands it, most of the ditches on either side of the road simply discharge right into a watercourse. So, how can they get a permit when they don't have any pollution control whatsoever?

Ms. Smith said that she could not address the details of what was in the Phase I permit for DOT but essentially there were some specific requirements placed on those large municipal and in this case DOT's system. A lot of these requirements have to do with mapping their system, identifying illegal discharges. Under neither Phase II nor I requires the kind of end of pipe treatment that Senator Kinnaird was asking about. Phase II actually tries to avoid getting to that issue by putting into place post-construction runoff controls.

Ms. Sullins was called on to address Senator Horton's questions. She said that both the Phase I and Phase II rules really does have to do with post-construction activities. The Phase I rules and the rules under which DOT was initially permitted was required to do things like best management practices to minimize the amount of pollutants that would get into their storm drainage systems. So, that might be something they would be doing associated with their maintenance activities on the roads, fertilizing of the stream sides, checking their systems to make sure that there is not any illicit discharges coming into them where somebody might have connected wastewater directly from a house to their ditch and some of those sorts of things. It is more of a planning and management type of approach to things. Those are the types of things that DOT's initial permit was issued under.

Ms. Sullins said that DENR is required to address the post-construction aspect with DOT as well. It is one of the things, as they design new roads and is designing new construction activities; they are addressing stormwater controls associated with the road system itself.

Senator Horton said that all we are doing seems to be diagramming or noting where the ditches are and nothing is being done to control the runoff. As you know, one of biggest source of sedimentation pollution is the public transportation and ditches alongside the roads. He said he gathered that they are permitted but are not forbidden in any way to continue to discharge into the surface waters. If that is so, then we have a problem there that we are not addressing at all.

Ms. Smith added to Ms. Sullins response that the Phase I and Phase II programs separately address construction stormwater impacts. One of the things we get with Phase II is an enhanced look at putting stormwater controls on active constructions sites whether it is a DOT site or a subdivision site. Those sites, if they are more than an acre, will now require a federal Phase II NPDES permit, individually, to manage stormwater during the construction phase.

Ms. Smith said she didn't talk about this much because most of the focus on the Phase II program has been on post-construction runoff requirements but it also includes an enhanced construction runoff control.

Senator Albertson asked Ms. Smith if this means they are going to have to do more than they are presently doing to control runoff.

Ms. Sullins said that they are going to be putting in more controls associated with their stormwater runoff and a higher degree of controls. She said that Bradley Bennett said that DOT, as part of their Phase I permit, has also agreed to go in and put in some BMP measures to address pollutants associated with the more sensitive waters. They are going back in and retrofitting their system to put in some of those management measures, starting first with the most sensitive waters.

Representative Gibson asked Ms. Smith to put the monetary piece of Phase II into a form so that it is easier to understand.

Ms. Smith said they would take a look at that. One thing that makes this difficult is that there is a fair amount of flexibility from local government to local government and how they do this and some of them have existing programs already in place to meet the requirements of Phase II.

Representative Gibson asked Ms. Smith that in her estimation would there be any more additions to the list of counties.

Ms. Smith said there would be no automatic federal additions to the list before the next Census. So, the only thing that could happen before the next Census would be if there were state designations made and the federal rules do direct them to look at whether additional state designations should be made. But, this is a whole separate process.

Representative Gibson asked Ms. Smith if there was a possibility on a state regulation or third party designee reducing the number from 146. While we might be able to include more folks based on what we do regulatory wise, in your estimation, is there no way to change the gross number that we are looking at now in Phase II?

Ms. Smith said that is correct, because it is based on what the federal definition of what an urbanized area is. Unless they change that urbanized area definition and raise the threshold for that definition, that basic list would not change. Ms. Smith said she believed there is a process under the federal rules for us to opt out a community. If they find out, based on its peculiar circumstances that it just doesn't have the potential for contributing stormwater pollution; there is an option to take individual storm sewer systems out of that permitting requirement. This is pretty much a case-by-case determination.

Senator Clodfelter explained that he had asked the Sergeant at Arms to distribute to members a memo that discusses the Attorney General's opinion under what circumstances in North Carolina a county might be deemed to operating a municipal stormwater system even though it doesn't operate roads and streets. A copy of this memo is listed as **Exhibit H**.

Representative Williams asked Ms. Smith if there is a place they could go to look at what the federal definition of urbanized counties is.

Ms. Smith said that the definition is in the federal rules and that DENR could provide that on their website link or provide it to him directly.

Mr. Joseph DeLuca, Staff Director, Rules Review Commission (RRC), gave a report on the review of the Phase II stormwater rules by the Rules Review Commission. A copy of a letter from the RRC to the EMC stating that the rules were being returned to the EMC for failure to adopt the rules in accordance with Part 2 of Article 2A, Chapter 150B, is listed as **Exhibit I**.

Mr. DeLuca said the RRC had been working on the stormwater runoff rules for a number of months. He said he would briefly explain what has been going on and what the position is of the Commission and take any questions and amplify on that to whatever extent is necessary.

Mr. DeLuca said that these rules originally came over to the RRC in the fall of 2003 after their final adoption by the EMC. Through a series of requests and revisions they were revised and finally reviewed for much more substantive issue at the meeting in January 2004. This was the first time the Commission took a good hard substantive look at the set of rules.

Mr. DeLuca said that to understand the Commission's action, you would need to understand a peculiar difficulty with this particular set of rules and the review process. As you may or may not be aware, the law, the Administrative Procedure Act (APA), was changed last year and there was a process that would apply to new permanent rules that were adopted after October 1, 2003. If the rules were adopted after the legislation was put into effect by the Governor's signature, then there was a period of time that the rules in the old rulemaking process could make their way through the system and go through the system without making them start all over again on every rulemaking. And, this rule and set of rules is the last one and the only one in a sense that got caught in the middle. The EMC adopted their final draft of these rules prior to October 1, 2003, so the rules from at least one point of view would be under the old rulemaking system.

Mr. DeLuca said that if the rules are under the old rulemaking system, then obviously the APA, as it was before the changes, applies to this set of rulemaking. And, there is less flexibility for the agency under the old rulemaking system. What happened was that the RRC, as you can see from the letter in front of you, returned the rules to the agency for failure to comply with the APA as it existed prior to those changes. Mr. DeLuca said that under that old law, this ends the rulemaking on these rules and that essentially would be the position of the RRC.

Senator Horton asked Mr. DeLuca to explain what the difference is between the old rules and the new rules.

Mr. DeLuca said that under the old set of rules, there were different notice requirements depending on whether the rules had a substantive fiscal impact of affected state and local governments or municipalities. There were different lengths of time that the rules had to be noticed in the register. Under the new system it is all just a 60-day notice. Under the old system, rules had

to wait for legislative review. Any rules approved by the RRC, the month before the legislature would reconvene, would go to legislative review and unless a bill was filed to keep them from becoming effective, would be effective on the 31st legislative day of that next session. That applied to all rules. The rules would wait to become effective until essentially that 31st legislative day. As soon as the legislature reconvened, you would start a new time period where you would be collecting rules that were approved by the RRC after that date for the next legislative session. So, you could have a rulemaking that could easily take, if it was in the wrong cycle, a year and a half to become effective. The change last year, the main things about it, was it changed so that most rules that are non-controversial could become effective the month after RRC approved the rules. They could still be disapproved by the legislature. None of that was taken away, but they could become effective, essentially a month after they were approved by the RRC.

Mr. DeLuca said that if they were controversial rules and people wanted the legislature to continue to look at those and the Commission approved them, there was a procedure then subjecting them to a legislative delay for the effective date of the permanent rule.

Mr. DeLuca explained that rulemaking goes through two or three adoptions. The first one is when an agency decides to make a rule and now, under the new process, drafts a version of that rule. This is called a notice of text and is published in the register. This requires EMC action to get it that far. Then it goes through the notice period and the comment period.

Mr. DeLuca said that the RRC, at its January meeting, ended up voting 4 to 1 to return the rules to the EMC for failure to comply with the APA. Under the old law, that essentially ends the rulemaking. Under the new APA, that could be an objection that the Commission could then attempt to satisfy.

Representative Hackney said that he was looking at the letter dated February 5, 2004 and asked Mr. DeLuca if this was an example of the way you respond to agencies.

Mr. DeLuca said that it was the way he responded to agencies.

Representative Hackney said that he was appalled that there was absolutely no detail in it, but that he had cited without any explanation that there was lack of statutory authority with going forward as to making findings as to why that might be true or as to what the law is on what they based their findings on.

Representative Hackney then said that he felt that the RRC needed to make findings and conclusion and support what you do other than with a cursory, perfunctory letter like this.

Mr. DeLuca said that this is what the action of the RRC was. The objection in the letter is really more of an alternative, from his point of view. The action of the RRC is in the first paragraph to return the rules to the agency for failure to comply with the APA. That is what the Commission did.

Representative Hackney said he understands that. But, as any court would or any agency would go forward to explain what they found and why it was wrong and in terms of appellate procedure would be returned for findings because nobody knows what you did and why.

Mr. DeLuca said that as they have been told many times, and the position of the RRC, is that they are not a judicial agency, but an executive agency.

Representative Hackney asked Mr. DeLuca if the RRC did not indeed have an obligation to the legislature, which passes the authority for these things and to the agency which in good faith promulgates rules, to explain their decisions.

Mr. DeLuca said that he believed anybody who was at the meeting would have a good sense of what the problems were that his Commission was facing with it. The tapes are available for people to listen to. He said he was sure that each of the Commissioners had their own reasons for taking the position that they did and they did not each explain their reason for doing it. The letter describes the action that the RRC took and that is the best he can do with it.

Senator Clodfelter said he was going to preface what he was about to say with a comment that his remarks have nothing to do with the substance of the EMC rule, which he does not understand or know enough about yet.

Senator Clodfelter asked Mr. DeLuca if the rule adopted by the EMC was adopted before October 1, 2003 or after.

Mr. DeLuca said the rule was adopted before October 1, 2003.

Senator Clodfelter said that the statutory language says that if it was adopted before October 1, 2003, the old APA applies. So, the RRC's conclusion is flat wrong under the statute.

Senator Clodfelter asked Mr. DeLuca what the effect of the rule right now given that the RRC has sent it back to the EMC based upon a flat contradiction to the General Assembly statute. The rule was adopted before October 1, 2003. The statute says that if it was adopted before October 1, 2003 the old rules apply. So, the RRC's action is void but where does it leave the rule?

Mr. DeLuca answered Senator Clodfelter by saying that with all due respect he thought under the APA, as it was in existence at that point, there was a provision for the RRC to return a rule to the agency for failure to comply with the APA.

Senator Clodfelter said that they were faulting the agency for not complying with the new rule.

Mr. DeLuca said the RRC's position was that they did not comply with the old APA.

Senator Clodfelter asked Mr. DeLuca to point out where in the letter it says that because you are citing to the new statute.

Mr. DeLuca responded by saying that at the end of the fourth line in the letter, "and it is returnable under the N.C. Gen. Stat. 150B-21.9(a) (2001)."

Senator Clodfelter asked him to read on.

Mr. DeLuca read "or objectionable under the new statute".

Senator Clodfelter said that Representative Hackney's question is pertinent, and asked Mr. DeLuca what did they decide? Which one of those did they decide?

Mr. DeLuca said they decided that it is returned to the agency under the old APA or if it is not under the old Act, then it should be returned under the new Act, since the non-responsive rulemaking was concluded after October 1, 2003.

Senator Clodfelter asked Mr. DeLuca what was the defect in compliance under the old APA?

Mr. DeLuca said that he was limited to what the RRC has said.

Senator Clodfelter asked again, how are we supposed to know if you don't state it in the letter?

Mr. DeLuca said it is a failure to comply with the APA and that is what the Commission's decision was.

Senator Clodfelter asked Mr. DeLuca in what respect did they fail to comply?

Mr. DeLuca told Senator Clodfelter that he could not give him a better answer.

Mr. Givens added that Mr. DeLuca makes reference to what people would know had they been at the meeting. "Well, of course, it should not matter whether you have been at the meeting or not. The record should speak for itself. But, in Mr. DeLuca's defense and what he is not able to say, I will say for him. That his Commission failed to follow his advice and now he is in the unhappy position of being the messenger thereof."

Senator Albertson said that if that is the case, then he hoped they would get the message over there.

Senator Clodfelter said that his fundamental question still stands: What in the world is the status of this rule right now given this piece of paper?

Representative Hackney said that surely Mr. DeLuca must have an opinion on that even though he wasn't willing to put it in his letter.

Senator Albertson asked Mr. DeLuca if he could respond to that.

Mr. DeLuca said that his opinion was that the rulemaking was concluded.

Representative Hackney asked Mr. DeLuca what that means.

Mr. DeLuca said that it was finished and if they want these rules they have to start a new rulemaking.

Representative Hackney asked if it would take five more years.

Mr. DeLuca said it did not have to be that long. Under the law it could be six to eight months.

Representative Hackney said that after all these years, the RRC can vote 4 to 1, give no reasons and just cause the whole thing to start all over without telling the agency what the defect was.

Mr. DeLuca said that the defect was that they failed to comply with the APA.

Representative Hackney asked in what respect did they fail to comply?

Mr. DeLuca said that in looking through the APA they failed to comply with it.

Representative Hackney asked in what respect did they fail to comply?

Mr. DeLuca said that was the only thing that he can tell him.

Mr. Givens said he was inclined to think that the options for the EMC, which is the next entity to react to this, and they meet later this month, are to either start all over again, if this rulemaking is indeed concluded, or appeal to the courts, or appeal to the legislature for some way out of this morass which is what he eluded to earlier and is why we have this matter before the Commission. Because one way or the other, we will have a rule here in 2004 which the legislature will be reviewing under the APA or we have an issue here without a rule which the legislature could address in one-way or another.

Senator Clodfelter said he would like to make one more comment because he was rather agitated. There is a concept in the law, and it applies whether you call the RRC an executive agency or a judicial agency, a decision that is rendered without reasons is arbitrary and capricious and is void and he has not seen anything like this in a long time.

Senator Kinnaird asked Mr. DeLuca if the ERC members could get a summary or a few of the sentences from the transcript from the meeting so that they could get a sense of what this is all about or in the alternative could the Chair come and speak with the ERC.

Mr. DeLuca said he would be happy to have the Chair of the RRC come and talk with the ERC. He said he believed that there is a prepared transcript because they had a number of requests for copies of the tapes. It may well be that there are already transcripts available.

Senator Kinnaird asked Mr. DeLuca if this was a public meeting? And, if it was, then transcripts have to be available to the public.

Mr. DeLuca said that as a taped meeting, they do not make a transcript because they don't have those kinds of resources, but they could make tapes of the meeting available so that someone else can make a transcript.

Senator Albertson called an end to this discussion He said he believes everyone knows exactly where we are in these discussions and what has to be done and we will precede to fix it.

Representative Gibson said that the Administrative Procedures Oversight Commission (APOC) was aware of this problem, was looking at it and would try to help resolve the gray area between the old rules and the new rules, so we probably ought to be monitoring what the APOC does and bring that into our deliberations.

Representative Weiss said that she respected that we had taken up a lot of time on this issue but she did want to ask Ms. Smith about this. Isn't there a right of third party action for enforcement?

Ms. Smith said that for those communities that are under the federal Phase II NPDES program, there is third party enforcement and there is federal enforcement. There are issues that were addressed in the state rules that are not addressed in the federal rules. For example, we gave a longer time for the municipalities that came under this rule as a result of the 2000 Census, to apply for their permit. The federal rules would have required them to apply in March of 2003; our rules gave them an additional 18 months to submit their permit application. If the state rules go away, you fall back to the federal rules. So, we have a few glitches where the state had the opportunity to create some processes and timelines that were and to the extent they are no longer available to us. As a result of the RRC's action, it creates some legal uncertainty for some of these communities and for the State as to how we go forward with this permitting program.

Ms. Lisa D. Martin, Director of Regulatory Affairs, North Carolina Home Builders Association (NCHBA), made comments on the Phase II stormwater rules.

Ms. Martin said that the NCHBA have been very involved with this issue since its inception and the one consensus they all have is that they hope this will come to some conclusion.

Ms. Martin said that what happened in the last six months is not a conclusion—it simply wasn't finished. She said she would highlight what the NCHBA's substantive issues are and what some of the remedies are that they have suggested over this long period of time that have not been taken up by the State.

Ms. Martin said that the NCHBA does not and has never challenged the fact that the State of North Carolina needs to adopt an NPDES program. They do know they have to adopt the minimum requirements and are aware that the state has adopted the minimum federal requirements.

Ms. Martin said that in February of 2000, the State adopted the minimum federal NPDES stormwater requirements. There is a baseline program on the books in North Carolina. Admittedly, that adoption did not include certain parts of the program such as the petitioning aspect; it did not include the State designation aspect. But, for the most part, the minimum federal requirements have been adopted by reference, going on four years now.

Ms. Martin said that the NCHBA does support state, statewide stormwater education, the enforcement of existing water quality laws, local land use implementation and implementation of the NPDES Phase II program based on science not on speculation.

Ms. Martin said that what the NCHBA does not support, and have not supported since day one, is a one-size fit all approach for a state as diverse as North Carolina.

Ms. Martin said that one of the remarks Ms. Smith made regarding rulemaking was that one of the reasons was to incorporate a model approvable program that local governments could use. The NCHBA believes that adopting a model ordinance could have done this. A model program can go in a model ordinance. A model ordinance would give the agency flexibility to get very specific about guidance into what types of BMPs work and other items that could be used by local government based on the sophistication and the ability that they have to enforce that. The NCHBA has all along supported the creation of a model ordinance. The State EMC has promised a model ordinance and believes there is one in existence with the League of Municipalities, which can be viewed in rough form on their website.

Ms. Martin said that over the past four years, there has never been a movement by the EMC to create or implement a model ordinance. So, an attempt was made to put this model approval program into regulations. It now becomes regulatory.

Ms. Martin said that the NCHBA has three specific topics of issues they have with the stormwater rules. They are flexibility, authority and ambiguity. One of the highlights of this program was flexibility. In fact the EPA said that the Phase II permitting approach provides flexibility for regulated operators to determine the most appropriate stormwater controls in their jurisdiction. North Carolina has not done that. They chose one built upon area that applies everywhere in the state with the exception of areas that drain into shell fishing waters and they don't have any consideration in that of land use and soil characteristics. One example is the difference in land use between industrial and commercial facilities versus residential. You may have a residential subdivision that has 28 or 30 percent built upon area. A lot of the stormwater falling on that is carried into the stormwater system, but a lot of it is not. That stormwater falls on the roof, goes through a roof drain and into the yard where it is absorbed and put back into the groundwater or into the water table.

Ms. Martin said the NCHBA had suggested that one way the State could incorporate flexibility and recognize these differences and put more enforcement on the industrial and commercial areas would be to look at directly connected impervious surface. They provided the state with a study done by a national consulting firm that said there are a number of states that have very advanced stormwater programs like Maryland and Massachusetts that use this directly connected impervious surface. It is a way you can really look at what is going into your storm sewer system; give a little more flexibility for residential developments in areas where you can design it. If you can design the impervious surface such that the water is filtered naturally, then you don't have to count it. They suggested that they provide evidence and it was ignored.

Ms. Martin said they also have a problem with the authority that the state is using to implement this. The restrictions that the State has in these rules include requirements for buffers, density restrictions and prohibitions on new discharges in coastal waters. These restrictions greatly exceed the EMC's authority and directly usurp the authority of land use decisions that are made by the counties and the cities and allowed by statute.

Ms. Martin said that in the past, when the General Assembly has wanted the EMC to regulate density or built upon area or provide buffers; they have expressly provided that authority. An example is the Water Supply Watershed Protection Act. That wasn't done for this.

Ms. Martin said that another example of exceeding their authority was in the regulations for local governments to coordinate with the local health departments. Coordination is not a bad thing, but the way the rules are written and the fact that they are in rules imply that they are now going to be impinging on the authority of the Commission for Health Services in requiring counties to coordinate on-site wastewater permits. So, it is another example of the EMC overstepping their authority.

Ms. Martin said that in the final version of the EMC's rules adopted in December, the EMC requires all private projects disturbing more than one acre or more within an urbanizing county to go to the state and get a permit.

The Department claimed that was a logical extension of what they were attempting to do when they required the counties to do it.

Ms. Martin said that NCHBA disagrees with that. First of all, there is no requirement that says the trigger for this is a sedimentation erosion control permit. It simply says that all projects that disturb this amount of land have to get a sedimentation erosion control permit and have to provide post construction and they have to do public education and they have to do elicit discharges and they have to do good house keeping. All private projects would have to do all six minimum measures, not that those wouldn't have been done if they were required, but they would have been done through an entity that had the ability to write ordinances and enforce this. If you look at how something like this would be enforced in a subdivision, the homeowners associations would be responsible. She said that she couldn't imagine that type of thing being successful over time. Maybe in the initial phases when it is built, but over time, these homeowners associations are not going to be able to provide annual operation and maintenance and public education and do all these things they are required to do. So, the fact that this second version of these rules reached out and grabbed these projects instead of trying to get the public entities that were forcing land use in those areas was wrong and exceeded the authority of the EMC.

Ms. Martin said that the EMC's rules also provided for exceptions to the rules. And the federal government mentions this and says they provide some exceptions in the federal rules and that the state-permitting agency should do this. The problem was that when the EMC created their exceptions, they did so based on factors that were not pertinent to water quality. Such as, you would not get an exception if you bought the property after a specific date. That has nothing to do with water quality. And, frankly, in land use, if the project would have been eligible for a variance or exception 100 years ago, it should be eligible for one 100 years from now. These requirements are supposed to be based on the land, not on who owns it. So, this is the kind of place where the state overstepped its bounds in creating this type of exception.

Ms. Martin said that ambiguity is strewn throughout these rules. The words practicality, practically accomplished, lack of a practical alternative are given no definition. What the NCHBA doesn't know is what sort of standard practicality is. Is it a technical standard or practical from an economic standard, or a combination of both? If it is a test of an economic or financial practicality, who is responsible for that? None of this was specified in any version of the rules.

Ms. Martin said that what the NCHBA wants to know is what constitutes a hardship, how is it determined? This is arbitrary and not written in the rules.

Ms. Martin said another term they see a lot is reasonable. They see that in terms of a reasonable return, a reasonable use and are a fuzzy term. But as it stands in the rule, it allows DENR the absolute and arbitrary authority to determine what constitutes reasonable economic return and reasonable use.

Ms. Martin concluded by saying that what is most disturbing in these rules is the concept of substantial justice. When you use the terms hardship and reasonable use test, they provide that these exceptions have to maintain some sort of substantial justice. The question of the NCHBA is what does that mean and what bearing does this have on water quality?

Ms. Martin said it was obvious that the EMC's rules have parts of them that are beyond the authority of the EMC. There are many terms that, even if they are quoted from the federal rules, are still ambiguous and need to be clarified.

Ms. Martin said that NCHBA had submitted meaningful comments, participated in every round of the rulemaking, provided scientific evidence, commissioned a study to be done by national experts that didn't go out and necessarily look at North Carolina but simply compared what other states are doing. We don't have to emulate those programs but it gives a really good basis to show what sort of things are being done in these states that we look to for guidance. They are still willing to work with this and are trying to understand what position they are in now. They still have issues that are not resolved.

Mr. Richard Zechini, Director of Regulatory Affairs, North Carolina Association of Realtors (NCAR), gave his comments on the stormwater rules.

Mr. Zechini said that the realtors in the state do not oppose the concept of stormwater management. They have long been as an association components of protecting the environment and believe that only if they do together protect the environment will the state continue to prosper. They do, however, have concerns with the rules and the process by which they were adopted.

Mr. Zechini said that he would be speaking to substantive issues regarding this subject. NCAR is concerned that the EMC went beyond their statutory authority in adopting these rules. For example, they don't have the authority to require local governments adopt specific ordinance or programs. They also believe that the EMC erred in including typical land use regulatory measures in these rules. These types of measures are reserved exclusively to local governments and NCAR thinks the EMC has usurped their authority in including those provisions in the stormwater rules.

Mr. Zechini said that they are also concerned that the rules are very ambiguous and unclear. They are important, yet undefined terms throughout the rules. In addition there are vague and nebulous phrases riddled in the rules as well. They are concerned that as far as folks trying to comply with these rules, it is going to be very difficult and has the potential to result in subjective, arbitrary and inequitable enforcement if that should be the case.

Mr. Zechini said that the NCAR does not object to the concept or idea of stormwater management regulation nor do they expect that every provision of every rule adopted by an agency be exactly to their liking. They do have

certain expectations about rulemaking and the substance of the rules. They expect that the process be fair, that everybody have notice and an opportunity for comment and that the rules be adopted pursuant to the authority that the legislature vests in the agency. They expect that these rules not be arbitrary, capricious or ambiguous and be reasonable in nature.

Representative Hackney asked Mr. Zechini why NCAR is stating a position on whether we have stormwater management or not.

Mr. Zechini said that although he knows they are required by law to participate in stormwater management, he wanted to make it clear that NCAR was supportive of stormwater management.

Representative Hackney asked Mr. Zechini what it was that NCAR thinks we should do, back out of stormwater entirely and let everyone apply to Region 4 in Atlanta for permits?

Mr. Zechini said that was not the case. As Ms. Martin said, the EMC has adopted rules that are a base upon which we can build as a state and NCAR looks forward to working with the ERC and EMC and other interested parties in determining as a state where we go beyond that. One size does not fit all in a state as diverse as North Carolina. He believes we all need to get together and work from here.

Representative Hackney said it was his understanding that we had been getting together for several years now and everybody has had ample opportunity for public input and asked Mr. Zechini if he agreed with this.

Mr. Zechini said he did not feel they had succeeded in getting together and coming together with something that is clear and reasonable to the regulating community.

Senator Clodfelter asked for a question for the future and was not directed at anyone in particular. If there is a problem with ambiguities or lack of specificity he wants to be sure that we are not injecting new ambiguities in the regulations above what the feds have already done. He wants a more specific comment on that issue next time we talk about it. How are the EMC proposals more ambiguous than the default rules that the feds have promulgated?

Senator Horton asked Mr. Zechini if NCAR has a position on the threshold of 24 percent built upon area.

Mr. Zechini said that NCAR had not taken a specific position on this provision in the rules; however, he said that it is of grave concern to them and they think the concept of including density provisions is beyond the statutory authority of the EMC.

Senator Horton asked why this is of grave concern to NCAR.

Mr. Zechini said it should be of grave concern to everybody if the EMC is acting outside of authority. As a practical matter, anytime you have different layers of requirements it becomes problematic from a compliance standpoint for folks who are going out and develop property. The more layers we have out there the more type of land use regulatory measures are included in state rules beyond those that are already included at the local level and becomes problematic.

Senator Kinnaird commented that there is lots of help out there.

Mr. Zechini said that one of the concerns that NCAR has with any type of regulatory requirement is that it ultimately increases the cost of home ownership and they are very careful when they consider any new regulatory measure that will increase the cost of housing to folks. NCAR is a strong proponent of affordable housing.

Mr. Craig A. Bromby, Attorney-at-Law with Hunton & Williams, LLP, Representing the Business Alliance for a Sound Economy (BASE), gave his comments on the stormwater rules.

Mr. Bromby said that the Business for a Sound Economy is concerned because they believe that in the areas where their members are, on the coast, that the rules that were proposed by the EMC did not take into account considerations unique to the coast. The impervious surface requirements they believe are unrealistic for coastal development. They also point out that the coastal areas covered by Coastal Resources Commission (CRC) and its regulations to which they already have to comply, has taken into account a lot of the factors that the stormwater rules would be addressing in addition to the county regulations.

Mr. Bromby said there are recognitions within the CRC process that can accommodate those unique needs of the coastal area but those mechanisms have not been incorporated and are not preserved in the stormwater rules and indeed the rules propose the most stringent of any number of overlapping requirements. That is why he is representing BASE today.

Mr. Bromby said there was an unfortunate use of terminology when talking about the difference in the state and federal program and the use of the term delegate is imprecise.

Mr. Bromby said that the state agency is not the delegate of EPA for the purpose of stormwater permitting or any other type of point source permitting. The state DENR has an approved program under the Clean Water Act, which means that they issue their permits under state law and their state law program has to be demonstrated to EPA to be the equivalent of the federal program. If that program is approved then state law based permits are issued reviewed by EPA and EPA still retains the authority to come in and object to permits or take federal enforcement directly. But, it is the extent of state law that determines whether or not their regulations are valid. The fact that state law may not totally accommodate what the federal program wants

does not create authority in the state to do something more than existing state law provides for them.

Mr. Bomby said that also counties are not covered by Phase II programs by virtue of their status, they are covered by Phase II programs only because they happen to have some sort of a stormwater discharge that fits within these definitions. And, in fact, as was pointed out repeatedly, all of these systems are already covered under a permit issued to DOT. So, these are all permitted systems, there is not an unpermitted system out there presently except perhaps in some of the cities. But the counties are already permitted in a point source permit. NPDES permits apply only to point sources. If a stormwater conveyance does not terminate in a point source, it is not subject to the permitting requirements.

Mr. Bromby said that the state rule we are talking about is 15 NCA 2h0126. This rule has been on the books since 1986. In 1992, the EMC adopted, by reference, the federal stormwater rule, 40cfr122.21.26 providing that any amendments to that rule would also be incorporated by reference in the state rule. So, we presently have in North Carolina the federal program adopted by reference. It was a temporary rule adopted in November of 2002 that went beyond that to adopt, by reference, other federal rules that had subsequently been adopted and it also incorporated a program much like a program that was in the rules before the RRC.

Mr. Bromby said that because of the adoption by reference of the federal rules, the EMC presently has the authority today to require permits for point source dischargers of Municipal Separate Storm Sewer System (MS4s). The temporary rule imposed a system of permitting much like the rules that went before the RRC and were returned. That temporary rule now is probably dead because the rule was returned and according to the APA that was in force at the time. When a rule is returned, the temporary rule expires if that rule was based on that permanent rule or was returned. So, what we have defaulted to at this point is the EMC has the program adopted by reference that does not have everything in it or what the rules subsequently provided. But what that means is not that they cannot issue permits or accomplish what they want to in those permits, but that they have to issue them on a case-by-case basis.

Mr. Bromby said that Phase I and Phase II permits are both NPDES permits. They are terms to distinguish the development of the rule at the federal level. Developments within an urbanizing county, if they are greater than an acre, are going to be required under another provision within the federal rule, which has been adopted by reference by the state, to get permits of their own.

Mr. Bromby said that with respect to the RRC process, he disagrees that there is no reasoning in this letter to the EMC from the RRC. In fact, the last sentence says the creation of a permanent obligation for entities, which are not owners, or operators of MS4s and not governmental bodies is not responsive to the objection but that it was new rulemaking designed to accomplish a comparable substantive results. What he is saying there, in his

opinion, is that what the RRC decided (and he had provided Mr. Givens with a transcript his firm had prepared from the tapes of the meeting) is the change in the rule is a wholesale rewrite. It purported to regulate an entirely new class of persons. It was not a response to the objection that was lack of statutory authority. It was a recognition that the statutory authority didn't exist but they wanted to achieve a comparable substantive result. So, what they did was making a wholesale change in the rule and went right through the counties, in this particular case, to entities within those urbanizing counties and said now you will have a permitting obligation from the state. That was not a change in the rule in response to the objection. That was a new rule designed to achieve a comparable substantive result to what the prior rule to what had been objected to on the basis of statutory authority would otherwise have provided for them. So, what the RRC said was that this is not a change and therefore you are not allowed to do this. This is new rulemaking, you didn't go to public notice with this, you didn't comply with part two under the 2001 APA and that rule has to be returned. What the RRC said was, however, on the strength on the rule itself, we also find it to be objectionable on this basis that it does not have statutory authority and there are ambiguities in it. So, It had to be returned but they made finding nevertheless that if it did not have to be returned, it would nevertheless have been objectionable. In addition to that change where they went through the counties to subject an entirely new class of people to a permit obligation, there was also a change to the 85 percent removal design standard. In the rule, as it was presented in October, it was 85 percent as a design standard. In the rule, as it was presented in January, it was an 85 percent performance standard. That change was responsive to no objection made by the State but by the RRC; therefore, the RRC found that this was a change in the rule that was not permissible under the EPA and returned for failure to comply with Phase II.

Representative Hackney said that with all due respect we couldn't read this letter and know what Mr. Bromby just said to us and are we not as citizens or even as ordinary country lawyers entitled to have a document before us which tells us what the RRC did without having to have an interested party come and tell us what it did. Aren't we entitled to something on paper that tells us all of this?

Mr. Bromby said that he thinks believes that the ERC is entitled to that but the RRC process is not an adversary process so in his remarks was he neither invited to or was it appropriate for him to have written an order for them. His firm prepared a transcript and he believed everything he has said could be found in that transcript.

Senator Kinnaird said this is sort of like the Nixon tapes that showed up at the hearing before Congress. She asked Mr. Bromby who owns those transcripts and how much would he charge to let the ERC get a summary of them?

Mr. Bromby said that he had provided a transcript that was prepared by his firm to Mr. Givens. He said they were sent to a transcription service and the tapes don't identify speakers. He believes that this transcript tells what occurred at the meeting.

Mr. Bromby said that with respect to Representative Hackney, he believed that the reasoning that it is a new rule for the fact of the permit obligation was passed through to those other entities is, in fact, in this letter. The 85 percent is not. He cannot explain that.

Representative Hackney asked Mr. Bromby if he was referring to the last sentence?

Mr. Bromby replied in the affirmative.

Representative Hackney said that you couldn't read the last sentence and tell where it came from and what facts support it or what the defects are other than in a very exclusory manner.

Mr. Bromby said that he was not the author and it was not his process to work. He was, however, at the meeting and provided testimony and this is his interpretation of what happened and offers it primarily because what he had heard previously was quite fair for the process.

Senator Horton asked Mr. Bromby if he could tell us how these are unfair to the coastal areas as a practical matter.

Mr. Bromby said the development pressure in the coastal area, the impervious surface requirements therefore put an additional burden on developers and builders and on property owners just to get some value out of their real estate that is going to be marketable. The problem for the coastal developers are that a lot of the issues that the stormwater rule is trying to address have already been addressed in the CRC requirements in the county regulations in all sorts of other regulatory programs. These have been debated over the years and have been negotiated in the General Assembly and have gotten these coastal resources program and county programs where they think they can work with them. Now, we come in with the stormwater rule that applies one standard across the state and it explicitly provides that the most stringent of the overlapping requirements applies even to the coast.

Senator Horton asked Mr. Bromby if what he is trying to say is that sand absorbs water a whole lot quicker than clay?

Mr. Bromby said this was correct.

Senator Clodfelter asked Mr. Bromby if the proposed rule from the EMC is inconsistent with any existing regulations?

Mr. Bromby said he believed the proposed rule does not provide for some of the flexibility or some of the other means to achieve the same goal that you would find in CRC rules or in the county ordinances.

Senator Clodfelter said that if we were to have rules to go into effect, is there anyway to reconcile those differences or inconsistencies?

Mr. Bromby said this is a problem and the most stringent of the overlapping rules applies and that is where the problem occurs.

Ms. Kimberly S. Hibbard, Associate General Counsel, North Carolina League of Municipalities (NCLM), commented on the stormwater rules on behalf of NCLM, representing 531 cities, towns and villages throughout the State of North Carolina.

Ms. Hibbard said that 123 of NCLM's members were designated under the federal Phase II rule. Sixty of those applied in October 2003 and the other 63 were to apply, under the State's temporary rule, by May 2004; however, given the action by the RRC, it appears that the temporary rule has been killed and that the State deadline no longer exists and we are placed back under the federal rule. So, it appears that we have already missed the federal deadline, which is March of 2003 for those designated municipalities to have applied.

Ms. Hibbard asked members to note on their list of designated unit that some very small municipalities were automatically designated because they are located within urbanizing areas as defined by EPA and that definition is based on population and density of the particular area. As has been emphasized today, Phase II is a federal program and it applies the six minimum requirements to entities that own or operate municipal separate storm sewer system, the MS4's.

Ms. Hibbard added that the vast majority of municipalities in North Carolina, even the very small ones, have responsibility for maintaining some amount of public streets and streets are by definition under that federal law considered to be MS4's or municipal separate storm sewer systems. But even a very tiny town like Spencer Mountain, which is on your list, population 50 or 51 is covered and designated on that list because it maintains a third of a mile of road and because it is located within a larger area that is considered urbanized under those definitions. Therefore, municipalities are subject to the federal mandate whether we like it not or whether it makes sense to us or not, we are subject to it. So, I want to tell you that this is the current state of affairs from the municipal standpoint. We are between a rock and a hard place here. We are in an unenviable position of trying to comply with the federal mandate when the requirements have not been finalized at the state level.

Ms. Hibbard went on to say that with the objections of the RRC, it appears unlikely that the uncertainty that we are facing as to state requirements can be resolved through the administrative rulemaking process. So, essentially we are in a Catch 22. Municipalities have to make investments and expend resources to comply with Phase II in spite of that uncertainty. If we don't move ahead now, we are in violation of federal rules and we may be vulnerable to federal enforcement action as well as to third party lawsuits. But, because of the lack of finality, the requirements are kind of a moving target. The designated towns know they need to comply but they don't know exactly how to comply and if what they do expend their money on to create a program will be enough to comply with those requirements. So, frustration is an understatement for the municipalities at this point.

Ms. Hibbard said that for NCLM, as a practical matter, the bottom line is that they need to get on with it. Phase II for us, for those federally designated municipalities, is not optional. They need to know what is required, they needed to know it yesterday or at least by March of 2003, so we are suggesting that it may be time now to formulate a legislative solution to this problem and we are asking for your help in protecting these municipalities and their investments, we are glad to assist in anyway that we can with that. League policy does support implementation of the Phase II regulations and the application of similar requirements to development in urbanized areas, generally. We ask for a flexible program that will allow us a cost effective means of compliance that will address everyone in an equitable way. At best, even the most costly efforts of municipalities will not be enough to correct stormwater problems if the rules only apply to development that takes place in municipalities. In order to protect water quality, control stormwater, those controls need to be applied to all development in urbanizing areas, not just that which takes place within municipalities.

Ms. Hibbard said that although opponents have at times argued that we should rely only on the bare bones of the federal rules and what is in that program, in order to implement the state program, that would have a couple of major consequences for municipalities. First of all, those federal rules are very broad and ambiguous and they don't really provide much in the way of specific direction to the regulated parties. They depend on the state to flesh out the details of those programs. That includes things like design standards that our municipalities would need to know in order to develop a program that complies. Secondly, relying on the federal rules alone would in effect prevent the application of stormwater regulations to development that does take place in urbanized areas outside municipalities. And, we do have serious concerns about that from an effectiveness and equity standpoint. Such an approach might place the regulatory burden disproportionately on municipalities and put us at a competitive disadvantage for purposes of economic development. Therefore, we have generally supported the state rules as a means of creating a more equitable, more effective program and providing adequate guidance to the regulated parties. To that end we have worked extensively with DENR and with the EMC throughout this process. Particularly in the last version of the rules, we felt that we had made significant progress towards crafting some more reasonable and more feasible standards that would allow a great deal of the flexibility that we had requested.

Ms. Hibbard said that the EMC did take into consideration a number of our concerns and revised those rules to address them, so we appreciate DENR and the EMC for their willingness to work with us on some of those issues. But, as you know sometimes, in spite of our best efforts, there are issues that the rulemaking process is unable to resolve. So, we believe that the guidance of the General Assembly is needed now to allow municipalities to comply with those federal requirements. I might also add that there may be another reason that legislation would be needed in this general area of stormwater. Only the General Assembly has the ability to address issues of municipal statutory authority and, as I believe I have mentioned to this group in the past, there are some gaps in municipal authority, currently, to implement all of the measure that would be required under federal Phase II

within particularly areas of extraterritorial jurisdictions. So, we do ask that you do take these comments into consideration and help us, if you possibly can, to address these issues in a timely manner.

Senator Clodfelter asked Ms. Hibbard: as a result of the recent action with respect to the Rule, if that action is valid, are you saying that some of your members are now automatically in violation of the federal rule by default because they did not get their permits in time?

Ms. Hibbard said that this would be her interpretation. That federal deadline for applications was March of 2003. The State, through the temporary rule, was able to develop other timelines.

Senator Clodfelter asked Ms. Hibbard if you have to default back to the federal rule you don't get the benefit of those timelines now?

Ms. Hibbard said that this was her understanding.

Senator Clodfelter ask Ms. Hibbard if NCLM had any comfort from EPA that they would not get tagged while we are trying to get this mess worked out here? Have you had any informal discussions with EPA about this?

Ms. Hibbard said they had not had any indication one way or the other about that.

Senator Clodfelter said that he had an idea and that he would like to hear more comment on it when we covered this topic next time. He said he remembered when he went through this process back in Mecklenburg County, one of the real concerns, and they had to get enabling legislation so the county and city could set up a stormwater management system, that they wanted only one system in Mecklenburg County. They didn't want to have to worry about the water flowing across the city limits of Matthews and Pineville and Charlotte and under different systems, so the enabling legislation given by the General Assembly really required a coordinated system.

Senator Clodfelter said that he understood under the federal rules you had to have only one permit holder per system. But, would it make sense, at the state level, if we do any supplementation of the federal regulations, if there are multiple permit holders within a county, they should at least have programs that are consistent, coordinated and match. Would that make sense as a policy? Otherwise, you could have a hodgepodge of stormwater programs within a single county.

Ms. Hibbard said it certainly makes sense to her that NCLM should look at and address that.

Senator Clodfelter asked Ms. Hibbard and Mr. Meyer and DENR to talk more about this in detail because it is an important issue.

Representative Gibson asked Ms. Hibbard if it was fair to say that the Phase I folks that are getting a little wiggly because of the process mess that we have, and don't we have a pretty good idea of where they are headed? The wiggle that they are having and the uncertainty and concern that you have expressed here, aren't your folks headed in the right way? Is the concern is that something might change? Is that fair to say?

Ms. Hibbard said that Representative Gibson had hit it on the head. NCLM is trying to proceed in good faith, understanding that for most of those listed are under the federal law and will have to do something. Their concern is that trying to go forward doing consulting, engineering and studies and making those expenditures to try to get those applications done and get those programs in place, if they don't know exactly what those regulations are and what the guidance is, they may be wasting effort and money and have to do something different down the line.

Representative Gibson asked Ms. Hibbard if she had heard anything that she sees that would cause NCLM any problems from the LGA perspective? He said he is confident that if we need a legislative solution between ERC and APO and the fact that there are influential lobbyists, we should be able to get a legislative solution. He added that we ought to be able to get EPA and whoever would send the lightening bolts down to you because we haven't done something correctly will understand this. That entire aside, do you feel pretty comfortable that we will be able to get this done—even the barriers we have heard about today and the consternation that some of the members have expressed, do you feel that we can get this resolved? Do you think we have enough time to get this resolved in a timely fashion?

Ms. Hibbard said that she thinks we have already made significant progress, just in their discussions with DENR and EMC in addressing municipal issues. She said they have no reason to believe they could not try to come to some type of agreement with the other stakeholders about a reasonable approach.

Representative Gibson asked if the other folks in the southeast are having any problems like we are? Are their people at the table having the same concerns about flexibility, one size fits all, about timeline implications? Our uniqueness in this particular day is that we have changed our APA and that is what has caused all of our wrinkles and we are going to fix that. But I'm more interested in the amount of money in this economy, especially those of us who are losing traditional economies. If you look down the list at these 130 or 140 municipalities, some of those are the hardest hit municipalities in our whole world. And, what are other states doing, what are the feds saying about the impact, financially, and the planning implications? You can't expect Valdese to have the same thing as Charlotte has.

Ms. Hibbard said that she could not answer that but hoped that Representative Hackney had some information about other states.

Representative Hackney said that this is not one of the issues that he hears a lot about at the national level because he thinks everyone believes the program is in place and is being implemented.

Mr. Givens said that this is something we can look at but he would observe that at least as far as the relationship between the cities and the counties, we are somewhat unique because of our transportation structure, and don't have much to model by.

Mr. Paul A. Meyer, Assistant General Counsel, North Carolina Association of County Commissioners spoke to the issue. He said that the counties are in a position now of wanting a handful of things. The most recent iteration of the rules that are apparently dead, did in fact address many of the concerns that we had concerning county authority and a variety of other things.

Mr. Meyer said they would be interested in looking at the implementation of the federal rules as they currently are plus what was in the most recent iteration of rules that died. In concept, that is what they think would be the fix to this problem.

Mr. Meyer said that, secondly, in order to address the questions about flexibility for differing counties across the state with differing circumstances, we would want to maintain the existing authority that are currently in the statutes, providing for a voluntary system of participation by county governments in the unincorporated areas.

Mr. Meyer mentioned that Senator Clodfelter was asking for more specificity and said he could draw his attention G.S. 143-214.7 where it lays out pretty clearly the desire or concept of a model ordinance developed by the state that is then put before counties for their adoption on a voluntary basis of a similar type ordinance.

Mr. Meyer said that in addition they would be looking for a state stormwater education program, so that the counties that in fact were to adopt and implement a voluntary program could rely on that state program to move their programs forward.

Mr. Meyer said there was a lot of question about counties and whether they in fact should be in this program or not. There has been an Attorney General's opinion, passed out by Senator Clodfelter. During the confusion about whether counties in North Carolina were in fact part of this program or not, the Association of County Commissioners asked EPA if counties in North Carolina were part of the Phase II stormwater program and they received a letter from them that said no, that in fact counties in North Carolina are not covered under Phase II stormwater regulations. So, he has a copy of that letter and did not bring it today but if folks are interested in seeing it, he would be glad to provide it.

Mr. Meyer said that in light of everything that is going on in the confusion, there are still a number of counties who are acting in a voluntary way already. Anecdotally, they have six to eight counties who either do own or operate and have applied for a permit with DENR, some folks who have applied for a permit voluntarily and two counties that are operating programs voluntarily and have for a number of years. Despite this consternation, we do have some folks who are actively pursuing these environmental goals.

Mr. Meyer said that he wanted to touch briefly on one other thing and that is one piece on the history of the rules that they are concerned about. There are a number of counties in which urbanizing areas just barely breach the county line, four square miles of a county can be an urbanizing area, yet under the current rulemaking process, they would expect the entire county to implement these types of rules. They have some concerns about this. There is a significant difference between Mecklenburg County and Stokes, Haywood, Alexander, Davie, Nash, Edgecombe and Hoke with respect to resources in terms of development of land use controls. As we move forward to develop the final result of this issue, they hope to take that into concern.

Representative Hackney asked Mr. Meyer if his concept of participation was the municipalities should all, to the extent designated, be covered but the urbanizing areas within counties which are not within a municipality should be covered only at the choice of the county itself.

Mr. Meyer said that first of all the municipalities have to participate because of the federal regulations and the fact that they are owners and operators of these conveyance systems. Under the most recent iteration of the rules, DENR would serve as the permitting entity for the development itself, but if a county wanted to go ahead and take the program voluntarily or delegate the program, they could do that. In fact, the most recent round of the rules laid that out. It said that if a county wants to voluntarily or in a delegated fashion act on behalf of the state for the development in the unincorporated areas, they could.

Representative Hackney asked Mr. Meyer if he meant that the stormwater controls would be voluntary whether the county or the state did it?

Mr. Meyer said that was correct.

Representative Gibson made the observation that if there is a silver lining to this swirl that we have had today it is that we have had inequities between the counties and we had problems with the cities and through whatever process, bad or good, these guys have gotten really close and they should be complimented on something as technical and the fact they have had 95 percent of this worked out is a good sign.

Senator Clodfelter seconded Representative Gibson's comments and said that this is a rather different presentation than the one he remembered hearing two years ago and commended him on the advances they had made. He said that when he hears all of these folks talking about local flexibility and accommodation of difference, which he thinks is critical, you guys are the only

ones who can provide that. And this is the only way to avoid the default position of a one size fits all from the state and he's really glad to see that they recognize that even though they may have a position that is legally a little different. They recognize it is very important to their citizens that they soften that legal position and provide what folks like the development community and the municipalities really need.

Mr. Trip Van Noppen, Carolinas Office Director, Southern Environmental Law Center (ELC), spoke on the issue. He said that like all of the others who have spoken, he had been working on this issue with all of these interested parties for all of these years and he was here on behalf of a number of environmental groups, not just the SELC who have been involved in this.

Mr. Van Noppen said that he was called on to be more blunt than Mr. DeLuca was able to be about the train wreck that has happened here and he had a different characterization that he thinks members need to hear about where we are as to what has happened.

Mr. Van Noppen said that first of all the Phase II program has been described as something brand new when in fact that we have been managing stormwater in our cities for many years, we have been managing stormwater in our 20 coastal counties for many years, we have stormwater programs in our watershed and we have stormwater programs now for the entire Neuse basin and the entire Tar Pamlico Basin. This is not new; we are talking about spreading stormwater management requirements to a broader part of the State. But, we know how to do it, it is being managed at the state and local levels and a lot of work has gone into solving the problems among most of the parties.

Mr. Van Noppen said that what you haven't had described to you, yet, is at the RRC last month, all of the parties that have spoken here, other than the homebuilders and the realtors, were prepared to postpone consideration of those rules for one month and work out these remaining differences and have an agreed upon set of rules at the RRC. That request was made by the agency at the RRC and was opposed by nobody but the NCHBA, it was not adopted at the RRC and instead you had the outcome that has been mentioned here. In other words, this was not a commission acting on its own, it was acting at the behest of one of the many interests involved in this dispute.

Mr. Van Noppen said that the RRC's action was very explicit to send the whole package back. I defy to find anybody to find any reference from the mouth of any commissioner to some 85 percent standard or any other detail about the rules other than send it back and make them start over. That was the very explicit command and outcome of this thing.

Mr. Van Nappen went on to say that we have a train wreck. Because as has been said, permits are not being issued and won't be issued for some time and local governments who have to get this have no guidance on what to go on. And that's not the job of the legislature. It has been mentioned that

this should have a legislative solution when in fact writing technical rules for stormwater management is not the job of the legislature. The legislature has passed a statute quite some time ago in the 1980's that said we should have a statewide stormwater management system.

Mr. Van Noppen said that five years ago, the Department tried to start this process by knitting together these fragmented stormwater systems all over the state that have different requirements for different people in different parts of the state that often times have overlapping requirements. They tried to bring the parties together and have a statewide system. That was torpedoed—no this should not be a statewide stormwater system, we should only do what Phase II requires was the demand of some participants in the statewide stakeholder process. So, instead and unfortunately, we set about the process of writing these Phase II rules. And, at first, it was let's have a program that will be administered by local governments. That was the original set of rules that were adopted, because, in fact, response to this objection was that we shouldn't have a statewide program. So, okay, we will have the counties and cities implemented. That went to the RRC with objection. Counties shouldn't do it, so they come back to write a program that say to let the state do it. State writes a program that they will do it and permit the developers just like they already do on the coast and just like what they were told to do when they objected to our locally government run program. "No, objection, there is no authority for that either."

Mr. Van Noppen added that this is a never ending set of obstacles that has been presented and he thinks that a gauntlet was thrown down that it was not a let's get together and work it out. Environmental groups have, in essence, held their fire. They have not been bringing these citizen suits to date that the municipalities and the developers say they are worried about. In other parts of the country, local governments have been sued for their failure to get these permits. Developers have been sued for their failure to get these permits. And, it appears that there is no other alternative to make progress in North Carolina than to get the message across that stormwater management is important, it can't be obstructed, we have to have this happen by cooperation with state and local governments, it has to happen with developers doing the stormwater management that the law requires and not trying to use procedural devices to torpedo five years of work of getting a responsible program in place. So, he just wanted to be candid with members that this is just isn't a situation where we are all going to work it out because that has not been the way this has been carried out. It has become a serious problem and is the worst water quality problem that we have in the state and we are not able to make progress on it while we are in this train wreck.

Mr. Van Noppen said that he had not addressed the substance of the rules, there are many issues that have been brought up about the substance of the rules, he knows that is not what we are trying to do here today, but rather to get a picture of where do we stand. He regrets to say that this is where we stand.

Senator Kinnaird asked Mr. Van Noppen if we took what the EMC has cranked out within the past five years and the RRC turned down, and you say that it is not a legislative solution, is it possible to take what the EMC did and the legislature says that this is what we are passing?

Mr. Van Noppen said that he didn't mean that the legislature couldn't solve the problem; it is typically not the business of the legislature to take a general policy need such as stormwater management and try to decide if 12 percent impervious surface or 15 percent impervious surface is the right answer. That is what you have created the EMC to do but certainly the legislature could adopt these rules as statutes and we could go forward.

Senator Kinnaird said that this was not the best solution because rules are things that can be changed more easily. But, this is an emergency and wanted to know if this was a possibility.

Mr. Van Noppen said that it was a possibility.

Representative Hackney asked Mr. Van Noppen if he thinks this is unlikely to be worked out.

Mr. Van Noppen said that he had seen no indication so far, despite all of the parties having almost no differences among themselves. Also, Mr. DeLuca didn't say that at the RRC, the staff recommendation, Mr. DeLuca's recommendation was there were not any remaining big problems with these rules. So, even at the level of the RRC's staff, we didn't get there and that is his concern.

Senator Clodfelter said that he was intrigued by Ms. Martin's concept of directly connected impervious surfaces because it sounded like a concept that encourages incentives and design to manage impervious surface without any discharges of the site at all. He asked Mr. Van Noppen to come back next time and talk about this concept in substance.

Senator Clodfelter also reinforced with Mr. Van Noppen the issue of ambiguities in the state regulations and asked for his analysis when he comes back with the comparative ambiguity of the federal regulations that we would be operating under by default.

Mr. Van Noppen said that he looked forward to that part of the discussion because a large part of the purpose of this five-year effort was to give more specificity to the North Carolina program than a very general set of federal rules does.

Representative Gibson asked Mr. Van Noppen if he believes that this process is not going to be completed and is there some way that the parties in opposition to process will come to an agreement?

Mr. Van Noppen said that is what makes sense to him but he is not able to say that he has optimism based on what he has seen so far.

Representative Gibson said it appears that there is no other alternative, other than a lawsuit, and what would that do to expedite it. In an effort to get this resolved, whether it is legislative or adopting EMC rules, don't you think that a lawsuit would make this even worse? Wouldn't it create an EPA issue? Don't you think we should get everyone in a room and lock the door and come up with a solution in a 30-day period?

Mr. Van Noppen said that the fundamental premise of the state and Federal Clean Water law is that you can't discharge pollutants from a point source including a stormwater ditch without a permit. So everyone out there now, whether they are in a Phase II community or not, is violating that basic principle of our water quality laws. So far, it hasn't seemed to matter that much to the developers that they are in violation, but it matters a great deal to the local governments. I don't know if that's because they don't realize they are in violation. Certainly being found liable would bring home that message that it does matter to get rules in place and permits issued because otherwise they are vulnerable.

Senator Kinnaird asked Mr. Van Noppen if a sustainable zero runoff, which is very expensive, would raise the cost of housing.

Mr. Van Noppen said that there is a lot of work done on this and a lot of experimentation going on. Whether it costs more or not depends on how you do it and where you are. People at the coast are doing a lot of very low impact, low impervious surface development that doesn't necessarily cost more. If you take a piece of land and cluster the development well and protect other areas, you may be able to put as many units on it at the same cost as if you spread them all out and increased the amount of impervious road surface that you have. You get benefits to the stormwater system basically by having a lot of buffer and you also get economic benefits from that. In other words, this may increase the benefits to the developer to have some of these buffers and conservation lands because people will pay more for that kind of development.

Senator Albertson said that it appears to him that the whole process needs some coordination and streamlining. This is one of the most frustrating processes he has ever heard tell of and how anybody works through it he doesn't know.

Mr. Givens announced that the next actor in this will be the EMC when it meets later this month and, as he see it, they will either need to start all over again at whatever cost and time, to initiate litigation, or to seek a legislative solution. He said it appears to him, as Senator Clodfelter and others have suggested, if the EMC chose to treat the return of the rule by the RRC as invalid, the only way it would have to enforce that would be through litigation. One effect of that might be that if the EMC took the position that the rule was valid, then the municipalities would at least get the protection it might be afforded from citizen suits. This is certainly a matter for the EMC to consider.

Mr. Givens said that it appears unlikely that we will have a rule and that the legislature could address the issue more quickly than the courts, so there

may need to be a 605 meeting regarding this. So, on Friday, 5 March 2004, a meeting will be held to see what they can do. What will happen in the meantime, in addition to the EMC meeting, is that the ERC will meet and Dr. Moreau will be here at our next meeting to address the ERC on the quarterly reports of the EMC and will address this issue.

Mr. Givens said that perhaps we should hear from the Attorney General's office regarding question of statutory authority. That would at least help move the ball forward in the 605 process. He said he would echo what Senator Clodfelter said with regard to the questions of ambiguity. If folks would identify their specific issues, this would help the process in a subsequent presentation before the full Commission or more likely in 605.

Senator Albertson asked members to note the memo regarding future meetings.

The meeting was adjourned at 1:00 p.m.

Senator Charles Albertson	Mary R. Watson
Presiding Co-Chair	Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Review of Legislative Action on the Environment
EXHIBIT E:	List of Potential Agenda Topics for 24 and 25 February ERC Meeting
EXHIBIT F:	Reports and follow-up items submitted to the Environmental Review Commission since the last report distribution in March 2003 that will not be presented orally
EXHIBIT G:	Memo from Robin Smith to ERC regarding Phase II Stormwater, and copy of Powerpoint slides and chronology of the development of Phase II stormwater program
EXHIBIT H:	Memo requested by Sen. Clodfelter from DENR that discusses the Attorney General's opinion under what circumstances in North Carolina a county might be deemed to operating a municipal stormwater system even though it doesn't operate roads and streets
EXHIBIT I:	Copy of letter from the RRC to the EMC stating that the rules were being returned to the EMC for failure to adopt the rules in accordance with Part 2 of Article 2A, Chapter 150B

February 6, 2004 ERC Meeting
EXHIBIT A

General Assembly of N
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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29 January 2004

TO: Interested Parties – Environmental Review Commission

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meeting; Additional Information**

COMMISSION MEETING:

The 27 January 2004 **Environmental Review Commission meeting**, which was cancelled due to inclement weather, **has been rescheduled for 9:30 a.m. Friday 6 February 2004 in Room 643 of the Legislative Office Building in Raleigh**. The agenda will consist of issues related to stormwater management.

SCHEDULE OF FUTURE MEETINGS:

Below is a schedule of meetings of the Commission for February through May 2004. Please note the following:

1. This schedule provides for two-day meetings in February, March, and April. In some months it may be desirable to have a two-day meeting to accommodate the workload. This also allows for the possibility of one or more out of town meetings that could include field trips. Thus this schedule is tentative and subject to adjustment. For planning purposes, however, please reserve these dates.

2. Meetings normally begin at 9:30 a.m., include a lunch break, and run until mid-afternoon. Please plan on meeting from 9:30 a.m. until 3:30 p.m.

3. To facilitate development of the agenda for meetings of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel holds informal planning meetings for staff and interested parties. Commission members are not expected to attend these meetings.

4. The 2004 Regular Session is scheduled to begin at 12:00 noon on Monday 10 May. The Commission normally meets shortly after the beginning of the session to complete work on legislative proposals prior to the commission/committee bill request deadline, which in 2004 is 4:00 p.m. Wednesday 12 May. The Tuesday 11 May meeting date is tentatively scheduled for this purpose.

Commission Meeting	Staff Planning Meeting
9:30 a.m. Tuesday and Wednesday 24 and 25 February	10:00 a.m. Tuesday 10 February
9:30 a.m. Thursday and Friday 25 and 26 March	10:00 a.m. Friday 12 March
9:30 a.m. Thursday and Friday 22 and 23 April	10:00 a.m. Tuesday 13 April
9:30 a.m. Wednesday 5 May	
2:30 p.m. Tuesday 11 May	

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Chronic Rainfall Working Group
2:00 p.m. Monday 9 February 2004 – 605 Legislative Office Building

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. Friday 27 February 2004 – 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel at (919) 733-2578.

February 6, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — February 6, 2004
Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
R. Paul Wiles	NCHBA
Bob Sheeum	NC Forestry Assoc.
Preston Howard	MCIC
Rick Zechini	NC Assoc. of Realtors
Craig Bromby	Hunton & Williams on behalf of B.A.S.E.
Lisa Martin	NC Home Builders Assoc.
Tommy Stevens	NC Pork Council
Kim Hibbard	NCLM
John Spurrell	NCLM
Paul Meyer	NCACC
Ross M. Smith	PCS Phosphate

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — February 6, 2004

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Mack Paul	Helms Mulliss Wicker
JOE DELUCA	NC RRC
Jim Stephenson	NC Coastal Federation
Beth Warren	AG's Office
Sharon Stroud	State Energy Office
Lisa Glaser	AGs office (DOT)
TOM BEAN	NC ENV. / Environmental Defense
Alan Klimek	NC DENR - DWQ
Kady McDonald	Sen. Kennaird
Grady McCallie	N.C. Conservation Network.
Marshall Williams	USACE / ATLANTA GA

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — February 6, 2004

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Jim Gulick	NC AGO
Janet Cowell	Natl Caucus Env. Legislators.
Mary Penny Thompson	NC DENR
Coleen H. Sullins	NC DENR
Steve Wall	NC DENR
Amy Pickle	Southern Env. Law Center
Trip Van Noppen	" " "
Bradley Bennett	NC DENR
Ken Pickle	NCDENR, DWQ
MICHEAL F RANDALL	NCDENR, DWQ
David Williams	DENR- DSWC

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — February 6, 2004

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
T REEDER	DWQ
Jeff Manning	DWQ
Boyd DeVane	DWQ
Mark Pearson	Capitol Thomp
Robin Smith	DENR
Sheryl Stephens	NC DENR
Linda Culpepper	DENR DWM
Louise Romanow	League of Women Voters
Pricy Harrison	
Anita Watkins	NCLM
Brian Buckley	CapNet

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — February 6, 2004

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Crissy Parks	Smith Anderson
Amy Fulbright	Hunton & Williams
Jeri Gray	WRRI
Jamy Bentley	LBA
Molly Diggins	NC Sierra Club

February 6, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
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AGENDA
9:30 a.m. Friday 6 February 2004
Room 643 – Legislative Office Building

1. Call to order; Introduction of Commission members
   Senator Charles W. Albertson, Presiding

2. Introductory remarks by Cochairs
   Senator Charles W. Albertson
   Senator Daniel G. Clodfelter
   Representative Pryor A. Gibson
   Representative Daniel F. McComas

3. Introduction of Commission staff; History, statutory authority, and powers and duties of the Commission (G.S. 120-70.41 *et seq.*); Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Discussion of procedural and substantive issues involved in the development, adoption, and implementation of the Phase II stormwater rules and programs to control stormwater runoff
   Annual report on the stormwater management program (G.S. 143-214.7(e)); Explanation of the development and substantive provisions of the Phase II stormwater rules
   Robin W. Smith, Assistant Secretary for Policy and Planning
   DENR

   Report on the review of the Phase II stormwater rules by the Rules Review Commission
   Joseph DeLuca, Staff Director
   Rules Review Commission

   Comment on the Phase II stormwater rules by interested parties
   Lisa D. Martin, Director of Regulatory Affairs
   North Carolina Home Builders Association

   Richard A. Zechini, Director of Regulatory Affairs
   North Carolina Association of Realtors

Craig A. Bromby, Attorney-at-Law
Hunton & Williams, LLP,
Representing the Business Alliance for a Sound Economy

Kimberly S. Hibbard, Associate General Counsel
North Carolina League of Municipalities

Paul A. Meyer, Assistant General Counsel
North Carolina Association of County Commissioners

Trip Van Noppen, Carolinas Office Director
Southern Environmental Law Center

5. Commission discussion and announcements

6. Adjourn

SCHEDULE OF FUTURE MEETINGS:
Below is a schedule of meetings of the Commission for February through May 2004. This schedule provides for two-day meetings in February, March, and April. Two days have been reserved in these months because it may be necessary or desirable to have a two-day meeting to accommodate the workload. This also allows for the possibility of one or more out of town meetings that could include field trips on one of the two days. Thus this schedule is tentative and subject to adjustment.

To facilitate development of the agenda for meetings of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel holds informal planning meetings for staff and interested parties. The schedule of these public Commission Staff Planning Meetings is also set out below.

9:30 a.m. Tuesday 24 February and 9:30 a.m. Wednesday 25 February 2004
Location: 643 Legislative Office Building
Staff Planning Meeting: 10:00 a.m. Tuesday 10 February 2004 – 605 Legislative Office Building

Thursday 25 March and Friday 26 March 2004
Location: To be determined
Staff Planning Meeting: 10:00 a.m. Friday 12 March 2004 – 605 Legislative Office Building

Thursday 22 April and Friday 23 April 2004
Location: To be determined
Staff Planning Meeting: 10:00 a.m. Tuesday 13 April 2004 – 605 Legislative Office Building (This meeting will also serve as the public Commission Staff Planning Meeting for the Commission meetings scheduled for 5 May 2004 and 11 May 2004.)

Wednesday 5 May 2004
Location: 643 Legislative Office Building

Tuesday 11 May 2004
Location: 643 Legislative Office Building

OTHER MEETINGS:
The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Chronic Rainfall Working Group
2:00 p.m. Monday 9 February 2004 – 605 Legislative Office Building

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. Friday 27 February 2004 – 605 Legislative Office Building

February 6, 2004 ERC Meeting
EXHIBIT D

Review of Legislative Action on the Environment

2003

2003 General Assembly Regular Session 2003

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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6 February 2004

To: Environmental Review Commission Members
From: Environmental Review Commission Staff
Re: 2003 Environmental Legislation

We are pleased to present you with this overview of the Environmental Review Commission and a review of environmental actions taken by the General Assembly in the 2003 Regular Session. The review includes the following documents:

1. Membership of the Environmental Review Commission
2. Authorizing Legislation
3. 2003 Summaries: Environment and Natural Resources Legislation
4. Summary of Funding for Environmental Initiatives, 2003 Session
5. Table of Reports to the Environmental Review Commission Required or Authorized by North Carolina Law
6. Table of Reports by the Environmental Review Commission Required or Authorized by North Carolina Law

ENVIRONMENTAL REVIEW COMMISSION
2003-2004

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Beulaville, NC 28518
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(704) 694-5957

Senator Daniel G. Clodfelter, Co-Chair
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Charlotte, NC 28204
(704) 331-1041

Representative Daniel F. McComas, Co-Chair
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Wilmington, NC 28403
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Senator Katie Dorsett
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Representative Stan Fox
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Representative Carolyn H. Justice
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Senator Eleanor Kinnaird
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Senator A. B. Swindell
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Representative Jennifer Weiss
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Senator David Weinstein
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Representative Keith P. Williams
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North Carolina General Statutes
ARTICLE 12D.

Environmental Review Commission.

§ 120-70.41. Commission established.

The Environmental Review Commission is hereby established.

§ 120-70.42. Membership; cochairs; vacancies; quorum.

(a) The Environmental Review Commission shall consist of six Senators appointed by the President Pro Tempore of the Senate, six Representatives appointed by the Speaker of the House of Representatives, who shall serve at the pleasure of their appointing officer, the Chair or a Cochair of the Senate Committee on Agriculture, Environment, and Natural Resources or the equivalent committee, the Chair or a Cochair of the House of Representatives Committee on Environment and Natural Resources or the equivalent committee, the Chair or a Cochair of the Senate Committee on Appropriations – Natural and Economic Resources or the equivalent committee, and the Chair or a Cochair of the House of Representatives Committee on Appropriations – Natural and Economic Resources or the equivalent committee.

(b) The President Pro Tempore of the Senate shall designate one Senator to serve as cochair and the Speaker of the House of Representatives shall designate one Representative to serve as cochair.

(c) Except as otherwise provided in this subsection, a member of the Commission shall continue to serve for so long as the member remains a member of the General Assembly and no successor has been appointed. A member of the Commission who does not seek reelection or is not reelected to the General Assembly may complete a term of service on the Commission until the day on which a new General Assembly convenes. A member of the Commission who resigns or is removed from service in the General Assembly shall be deemed to have resigned or been removed from service on the Commission. Any vacancy that occurs on the Environmental Review Commission shall be filled in the same manner as the original appointment.

(d) A quorum of the Environmental Review Commission shall consist of nine members.

§ 120-70.43. Powers and duties.

(a) The Environmental Review Commission shall have the following powers and duties:

(1) To evaluate actions of all boards, commissions, departments, and other agencies of the State and local governments as such actions relate to the environment or protection of the environment, including but not limited to an evaluation of:

a. Benefits of each program relative to costs;

b. Achievement of program goals;

c. Use of measures by which the success or failure of a program can be measured; and
d. Conformity with legislative intent;

(2) To study on a continuing basis the organization of State government as it relates to the environment or to the protection of public health and the environment, including but not limited to:
a. Improvements in administrative structure, practices, and procedures;
b. Increased integration and coordination of programs and functions;
c. Increased efficiency in budgeting and use of resources;
d. Efficient administration of licensing, permitting, and grant programs;
e. Prompt, effective response to environmental emergencies;
f. Opportunities for effective citizen participation; and
g. Broadening of career opportunities for professional staff;

(3) To make any recommendations it deems appropriate regarding the reorganization and consolidation of environmental regulatory agencies and the recodification of statutes relating to the environment, including but not limited to:
a. Ways in which agencies may operate more efficiently and economically;
b. Ways in which agencies can provide better services to the State and to the people; and
c. Instances in which functions of agencies are duplicative, overlapping, incomplete in scope or coverage, fail to accomplish legislative objectives, or for any other reason should be redefined or redistributed;

(4) To review and evaluate changes in federal law and regulations, relevant court decisions, and changes in technology affecting the environment or protection of the environment;

(5) To review existing and proposed State law and rules affecting the environment or protection of the environment and to determine whether any modification of law or rules is in the public interest;

(6) To make reports and recommendations, including draft legislation, to the General Assembly from time to time as to any matter relating to the powers and duties set out in this section; and

(7) To undertake such additional studies as it deems appropriate or as may from time to time be requested by the President Pro Tempore of the Senate, the Speaker of the House of Representatives, either house of the General Assembly, the Legislative Research Commission, the Joint Legislative Commission on Governmental Operations, the Joint Legislative Utility Review Committee, or the Joint Select Committee on

Low-Level Radioactive Waste and to make such reports and recommendations to the General Assembly regarding such studies as it deems appropriate; provided that the Environmental Review Commission shall not undertake any study which the General Assembly has assigned to another legislative commission or committee.

(b) The Environmental Review Commission may continue the study of environmental agency consolidation and reorganization. The study of environmental agency consolidation shall include, but is not limited to:

(1) Monitoring the implementation of Session Laws 1989, c. 727;

(2) Evaluation of the organization, programs, and operation of the Department of Environment and Natural Resources;

(3) Evaluation of the organization, functions, powers, and duties of the components of the Department of Environment and Natural Resources, including boards, commissions, councils, and regional offices; and

(4) Recodification of the General Statutes relating to the environment and environmental agencies.

(c) In addition to its general powers and duties, the Environmental Review Commission shall have the following powers and duties with respect to hazardous waste management:

(1) To study the current and projected need for hazardous waste treatment, storage, and disposal capacity in the State in light of anticipated generation of hazardous waste and alternatives for hazardous waste treatment and disposal;

(2) To evaluate the potential for the development of additional hazardous waste treatment, storage, and disposal capacity by the private sector;

(3) To study the necessity for and scope of hazardous waste treatment, storage, and disposal facilities which are sited, owned, or operated by the State;

(4) To review progress in securing a volunteer county to host a hazardous waste treatment facility;

(5) To study incentives and compensation for the community which hosts, either voluntarily or involuntarily, a hazardous waste treatment facility, including any additional incentives and compensation which may be needed, whether there should be differential compensation for a volunteer county, options for use of funds by local governments, distribution of compensation among local governments, and methods of providing flexibility in the development of an incentives and compensation package for a particular local community;

(6) To review progress in developing interstate agreements for the treatment, storage, and disposal of hazardous waste;

(7) To assist in the development of cooperative, comprehensive regional approach to hazardous waste treatment and disposal;

(8),(9) Repealed by Session Laws 2001-474, s. 12.

(10) To study the capacity assurance requirement under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Pub. L. No. 96-510, 94 Stat. 2767, 42 U.S.C. 9601 et seq., as amended, and the Superfund Amendments and Reauthorization Act of 1986, Pub. L. No. 99-499, 100 Stat. 1613, as amended as it relates to the continued eligibility of North Carolina for remedial actions under Superfund;

(11) To study alternatives available to the State for dealing with hazardous waste and the ramifications of those alternatives; and

(12) To receive and evaluate reports of every State agency, board, and commission which has any power or duty with respect to hazardous waste management.

§ 120-70.44. Additional powers.

The Environmental Review Commission, while in the discharge of official duties, may exercise all the powers provided for under the provisions of G.S. 120-19, and G.S. 120-19.1 through G.S. 120-19.4. The Environmental Review Commission may meet at any time upon the call of either cochairman, whether or not the General Assembly is in session. The Environmental Review Commission may meet in the Legislative Building or the Legislative Office Building upon the approval of the Legislative Services Commission.

Notwithstanding any rule or resolution to the contrary, proposed legislation to implement any recommendation of the Environmental Review Commission regarding any study the Environmental Review Commission is authorized to undertake or any report authorized or required to be made by or to the Environmental Review Commission may be introduced and considered during any session of the General Assembly.

§ 120-70.45. Compensation and expenses of members.

Members of the Environmental Review Commission shall receive subsistence and travel expenses at the rates set forth in G.S. 120-3.1.

§ 120-70.46. Staffing.

The Legislative Services Officer shall assign as staff to the Environmental Review Commission professional employees of the General Assembly, as approved by the Legislative Services Commission. Clerical staff shall be assigned to the Environmental Review Commission through the offices of the Supervisor of Clerks of the Senate and Supervisor of Clerks of the House of Representatives. The expenses of employment of clerical staff shall be borne by the Environmental Review Commission.

§ 120-70.47. Funding.

From funds available to the General Assembly, the Legislative Services Commission shall allocate monies to fund the work of the Environmental Review Commission.

2003 Summaries: Environment and Natural Resources Legislation

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Air Quality

Air Quality Permits

S.L. 2003-428 (SB 945) clarifies the extent to which a prospective air quality permit applicant for a new facility may engage in construction prior to obtaining the air quality permit and specifies the circumstances under which a person who holds an air quality permit may alter or expand the facility. The act makes the following changes:

Consistency with local government ordinances. – The act requires a person that proposes to construct or expand a facility to ensure that the construction or expansion of the facility is consistent with local zoning or subdivision ordinances prior to operation. The act provides that its provisions do not affect the validity of any lawfully adopted franchise, local zoning, subdivision, or land-use planning ordinance or affect the responsibility of any person to comply with any local ordinance.

Procedures for construction of new air pollution facilities. – The act prohibits the construction or operation of an air contaminant source, equipment, or associated air cleaning device at a site or facility where, at the time of the construction, there is no other air contaminant source, equipment, or associated air cleaning device for which an air permit is required. A person may, however, undertake the following activities prior to obtaining a permit if the person complies with the requirements of the act:

- Clearing and grading.
- Construction of access roads, driveways, and parking lots.
- Construction and installation of underground pipe work, including water, sewer, electric, and telecommunications utilities.
- Construction of ancillary structures, including fences and office buildings, that are not a necessary component of an air contaminant source, equipment, or associated air cleaning device.

Procedures for facilities currently holding a permit. – The act requires a permittee to submit a notice of intent to alter or expand the physical arrangement or operation of an air contaminant source, equipment, or associated air cleaning device in a manner that alters the emission of air contaminants at least 15 days prior to commencing alteration or expansion. The notice of intent must include the following information:

- The name and location of the proposed facility and the name and address of the permit applicant.
- The current permit number.
- The nature of the contaminant sources and equipment associated with the modification.
- An estimate of regulated emissions under the proposed modification.
- The air cleaning devices that will be employed to address each contaminant source.
- The expected construction schedule.
- An acknowledgement by the permittee that the actual air contaminant sources may not be operated in a manner that alters the permitted emissions until a modified permit is obtained.
- An acknowledgement that any construction of an air contaminant source prior to obtaining a modified permit will be performed at the permittee's own risk.
- A certification under oath of the accuracy of the notice of construction or modification.

The act also requires the permittee to give notice by publication, in a newspaper having general circulation in the county or counties where the facility is located, at least 15 days prior to alteration or expansion. The notice by publication must include the first six items listed above.

Review and Determination by the EMC. – Within 15 days of receipt of a complete notice of intent, the act directs the Environmental Management Commission (EMC) to make a determination of whether the following conditions have been met:

- The permittee is and has been in substantial compliance with other permits issued to the permittee.
- The facility will be altered or expanded so that it will be used for either the same or a similar use as the use already permitted.
- The alteration or expansion will not result in a disproportionate increase in the size of the facility already permitted.
- The alteration or expansion will result in the same or substantially similar emissions as that of the facility already permitted.
- The alteration or expansion will not have a significant effect on air quality.
- The EMC is likely to issue the permit modification.

If the EMC determines that all of the forgoing criteria have been met, it must notify the permittee that alteration or expansion may begin. If the EMC determines that one or more of the conditions has not been met, the EMC must notify the permittee that alteration or expansion may not begin.

Order to Cease Construction, Alteration, or Expansion. – The act authorizes the EMC to order a permittee to cease construction, alteration, or expansion if the EMC determines that the permittee will not qualify for a permit or permit modification.

Administrative and Judicial Review of Permit Decisions. – The act prohibits the use of any evidence of prior financial investment, construction, alteration, or expansion undertaken, or economic loss incurred in a contested case or judicial proceeding by a person or permittee who proceeds with construction, alteration, or expansion without first obtaining a permit or permit modification.

State, EMC, and Employees Not Liable. – The act provides that the State, EMC, and their employees are not liable for any loss incurred by a person, permittee, or owner of a facility as a result of the enforcement of the provisions of the act.

Compliance With Other State Laws Not Affected. – The act does not relieve any person of the obligation to comply with any other requirement of State law.

Federal Air Quality Programs Not Affected. – The act does not affect a person's duty to comply with any federal requirement, federal delegation, federally approved requirement in any State Implementation Plan, or federally approved requirement under the Title V permitting program, nor does the act apply if it is inconsistent with any federal requirement.

Fee. – The act provides that an applicant or permittee shall pay a processing fee of $200 at the time of notification.

This act became effective August 19, 2003, and applies to construction of any new facility and alteration or expansion associated with the modification of a permit for an existing facility that commences on or after that date. (GG, TD)

Coastal Development

Erosion Control Structures

S.L. 2003-427 (HB 1028) authorizes the Coastal Resources Commission to adopt rules to establish a general permit for the construction of offshore sills for estuarine shoreline protection and wetland enhancement. The act also codifies the ban on the construction of new permanent erosion control structures in ocean shorelines and prohibits the construction of temporary erosion control structures in ocean shorelines using any material other than sandbags.

The provision establishing the general permit for the construction of offshore sills became effective July 1, 2003. The provision codifying the ban on the construction of permanent erosion control structures became effective August 19, 2003. (GG, TD)

Environmental Health

Consecutive Water System/Manufactured Homes

S.L. 2003-173 (HB 1201) expands the definition of "contiguous premises" so that landlords who rent spaces for manufactured homes or who rent manufactured homes, may meter the water consumption of each tenant and charge for actual water usage at the same cost the landlord pays the supplier of the water, plus an administrative charge set by the Utilities Commission.

This act became effective June 12, 2003. (TD)

Fisheries

Limit Shellfish Lease Area in Core Sound

S.L. 2003-64 (SB 765) limits the area of western Core Sound that may be leased for shellfish cultivation to the area that was subject to shellfish cultivation leases on June 30, 2003.

Core Sound is a body of water located between mainland Carteret County and Core Banks. A moratorium on issuing new shellfish cultivation leases in the western, mainland side of Core Sound was established May 1, 1996. This act allowed the moratorium to expire on July 1, 2003, but limited the area of western Core Sound available for shellfish cultivation leasing to the area that was subject to shellfish cultivation leases on June 30, 2003. On June 30, 2003, 95 acres of western Core Sound were subject to shellfish cultivation leases. Thus, the effect of the act is to limit shellfish cultivation leasing in western Core Sound to these 95 acres.

The act also:

- Expresses the intent of the General Assembly that the limitation on shellfish cultivation leasing in western Core Sound be permanent.
- Provides that shellfish cultivation leases in western Core Sound remain transferable.
- Directs the Division of Marine Fisheries in the Department of Environment and Natural Resources to report to the Joint Legislative Commission on Seafood and Aquaculture on or before January 1, 2004, on the implementation of the limitation on shellfish cultivation leasing in western Core Sound.

The shellfish leasing provisions became effective June 30, 2003. The study provision became effective May 20, 2003. (JH)

Amend Atlantic States Marine Fisheries Commission Appointment

S.L. 2003-92 (SB 979) authorizes the Governor to appoint the legislative member of North Carolina's delegation to the Atlantic States Marine Fisheries Commission (ASMFC) and deletes language that provides for Senate approval of the Governor's appointment of the citizen member of North Carolina's delegation to the ASMFC.

In 1940, Congress authorized the creation of the Atlantic States Marine Fisheries Compact (Compact) and the ASMFC for the better management and utilization of the fisheries of the Atlantic seaboard. The 1940 congressional act authorized the member states of the Compact to appoint three members each to the ASMFC: the executive branch officer responsible for the conservation of marine fisheries resources; a member of the state legislature appointed by the state commission on interstate cooperation or, if there is no commission on interstate cooperation, by the Governor; and a citizen with knowledge of and interest in marine fisheries issues appointed by the Governor. This congressional directive as to how a state is to appoint its members to the ASMFC is controlling and must be followed by a state that chooses to become a member of the Compact.

In 1949, the General Assembly enacted legislation to authorize North Carolina's entrance into the Compact and membership in the ASMFC. This legislation, as amended over time, provided that North Carolina's delegation would consist of the Director of the Division of Marine Fisheries in the Department of Environment and Natural Resources, a member of the General Assembly who is a member of and appointed by the North Carolina Commission on Interstate Cooperation, and a citizen member appointed by the Governor, with the advice and consent of the Senate.

In 1992, the General Assembly enacted legislation to abolish the North Carolina Commission on Interstate Cooperation. This legislation did not include a conforming change to the ASMFC appointment statute. This resulted in a statutory requirement that the legislative member of North Carolina's delegation to the ASMFC be a member of and appointed by a commission that no longer exists.

The act corrects this oversight by providing that the Governor will appoint the legislative member of North Carolina's delegation to the ASMFC. The act also deletes language that provides for the advice and consent of the Senate in the Governor's appointment of the citizen member of North Carolina's delegation to the Commission and makes a number of technical, clarifying, and conforming changes to the ASMFC appointment statutes.

This act became effective May 30, 2003. (JH)

Extend Coastal Habitat Protection Plan Adoption Deadline

S.L. 2003-111 (HB 1134) extends the deadline for the adoption of Coastal Habitat Protection Plans from July 1, 2003, to December 31, 2004.

In 1997, the General Assembly enacted the Fisheries Reform Act of 1997, which overhauled the licensing of marine fishing; required systematic, long-range planning for management of marine fisheries resources; increased penalties for violation of marine fisheries laws; and authorized a number of studies related to marine fisheries. The act also required the Department of Environment and Natural Resources to work with the Marine Fisheries Commission, the Environmental Management Commission, and the Coastal Resources Commission to jointly develop and adopt Coastal Habitat Protection Plans (Plans). The goal of the Plans is the long-term enhancement of marine fisheries through the protection of habitats important to these fisheries, such as wetlands, spawning grounds, nursery areas, shellfish beds, and submerged aquatic vegetation beds. Once the Plans are adopted, the three environmental rulemaking

commissions are required to ensure, to the maximum extent practicable, that their actions are consistent with the Plans.

This act became effective May 31, 2003. (JH)

Amend Fisheries Proclamation Process

S.L. 2003-154 (HB 987) authorizes the Director of the Division of Marine Fisheries to issue proclamations governing quota-managed fisheries that are effective immediately upon issuance.

The Marine Fisheries Commission (MFC) may delegate to the Director of the Division of Marine Fisheries in the Department of Environment and Natural Resources (Fisheries Director) the authority to issue proclamations suspending or implementing rules of the Commission that are affected by variable conditions. This act removes the proclamation provisions from G.S. 113-221 and recodifies them in new G.S. 113-221.1. This act amends the recodified proclamation provisions to provide that a proclamation that governs a quota-based fishery may be made effective immediately upon issuance. This act also:

- Provides that a person who violates a proclamation that is made effective immediately upon issuance may not be charged with a criminal offense for the violation if the violation occurred between the time of issuance and 48 hours after the issuance and the person did not have actual notice of the issuance of the proclamation.
- Expands the authority of the MFC to call an emergency meeting to review proclamation issues to include review of the desirability of directing the Fisheries Director to issue a proclamation to prohibit the taking of certain fisheries resources.
- Makes technical, clarifying, and conforming changes to existing G.S. 113-221 and new G.S. 113-221.1.

This act became effective July 1, 2003. (JH)

Parks and Public Spaces

State Parks added to State Park System

S.L. 2003-106 (HB 1078) and S.L. 2003-108 (HB 1025) authorize the Department of Environment and Natural Resources (DENR) to add Mayo River State Park and Haw River State Park, respectively, to the State Parks System. G.S. 113-44.14(b) provides that DENR may add a State park, State natural area, State recreation area, State trail, State river, or State lake to the State Parks System upon authorization by an act of the General Assembly.

Mayo River State Park will be located in northwestern Rockingham County. The Mayo River is a popular recreational river, with whitewater for canoeing, kayaking, and rafting near the Virginia state line. Mixed hardwoods dominate the rough and hilly scenic corridor. Steep slopes, numerous outcrops, and a mosaic of soil types result in an unusual assemblage of plant communities. At least nine rare species are known to occur along the river, as well as the State's best example of the Piedmont calcareous mafic cliff natural community type. The river valley also has a rich cultural history.

Haw River State Park will be located north of Greensboro along the border between Guilford and Rockingham Counties. The Haw River supports several natural communities within the river floodplain and on the adjacent bluffs and uplands. The river corridor contains a large collection of wetlands, including what may be the largest complex of beaver ponds in the Piedmont. There

are several areas with high quality upland forests, habitat for rare plant and animal species, and significant historic and archaeological resources.

Both parks will be located in a region of the State that is one of four areas identified in the 2000 Systemwide Plan for the North Carolina State Parks System as underserved by the current parks system, based on State park acres per capita. This area was identified as a high priority for the addition of new parks.

The boundaries of the proposed parks have not yet been determined. It is likely that both parks will include linear corridors protecting the water quality and natural resources of the rivers as well as one or more upland nodes at each park that will support State park facilities such as a visitor centers, campgrounds, picnic areas, trails, and river access. DENR is considering several different revenue sources to fund land acquisition for the new parks, including the Natural Heritage Trust Fund, the Clean Water Management Trust Fund, the Ecosystem Enhancement Program, and the Parks and Recreation Trust Fund. Park facilities will be constructed in future years when suitable land has been acquired for the parks.

These acts became effective May 31, 2003. (JM)

State Nature and Historic Preserve Additions and Removals

S.L. 2003-234 (SB 627) dedicates and accepts certain properties as part of the State Nature and Historic Preserve (Preserve), removes certain lands from the Preserve, and deletes Waynesborough State Park from the State Parks System. Section 5 of Article XIV of the Constitution of North Carolina establishes the Preserve, which is intended to insure that lands and waters acquired and preserved for public park, recreation, conservation, and historic preservation purposes continue to be used for these purposes. Upon inclusion in the Preserve, these lands may not be used for other purposes except as authorized by a law enacted by a vote of three-fifths of the members of each house.

The act:

- Dedicates and accepts into the Preserve over 6,700 acres of property added to the North Carolina Park System since the last acceptance of properties in 2001. This property includes Beech Creek Bog, Elk Knob State Natural Area, and Lea Island State Natural Area as new components of the Preserve.
- Removes the following properties from the Preserve:
  - A portion of a parcel at Crowders Mountain State Park is deleted in order to resolve multiple encroachments on the Park and to improve an irregular boundary in a section of the Park.
  - Portions of two parcels at South Mountains State Park that are needed for the realignment of Secondary Road 1904 within the Park.
  - A portion of a parcel at South Mountains State Park that contains the Walker Top Baptist Church is deleted in order to allow transfer of the property to the Trustees of the Church for use for church purposes, with a clause providing that the property shall revert to the State if it ever ceases to be used for church purposes.
  - A portion of a parcel at Eno River State Park that contains a scenic easement is deleted in order to allow for the exchange of easement areas with adjacent landowners. The easement area that the State will receive in exchange is greater than the easement area that is being removed and increases the width of the buffer that the State Park and easement provides to the Eno River.
- Amends the statute that directs the Secretary of State to forward a certified copy of the enacted law to the register of deeds of the counties in which the accepted properties are located, to require that the Secretary of State also forward copies of

the enacted law to the register of deeds of counties in which properties that have been removed from the Preserve are located.

- Deletes Waynesborough State Park from the State Parks System. The Systemwide Plan for the North Carolina State Parks System for 2000 through 2005 issued by the Division of Parks and Recreation of DENR recommended that the Park be removed on the basis that the Park does not contain the biological, archaeological or other resources that make it suitable for continued inclusion in the State Parks System. The Park is located on property that was once a landfill constructed by the City of Goldsboro in 1960. The City of Goldsboro, Wayne County, and the Old Waynesborough Historical Commission have expressed an interest in assuming ownership of the property. The Park closed in August 2002.

This act became effective June 19, 2003. (JM)

Study/Impact of Acquisition of Land for Conservation Purposes on Local Government Ad Valorem Tax Revenues

S.L. 2003-284, Sec. 11.7(HB 397, Sec. 11.7) directs the Property Tax Subcommittee of the Revenue Laws Study Committee to study the positive and negative impacts of the acquisition of land by the State and nonprofit organizations for conservation purposes on local government ad valorem tax revenues. The Subcommittee must report its findings to the Joint Legislative Commission on Governmental Operations, the Revenue Laws Study Committee, and the Fiscal Research Division.

The Subcommittee shall, by January 15, 2004, report its findings to the Joint Legislative Commission on Governmental Operations, the Revenue Law Study Committee and the Fiscal Research Division.

Solid Waste

Franchise Not Required Smokestacks Landfills

S.L. 2003-37 (HB 1205) exempts sanitary landfills that are used only to dispose of waste generated by a coal-fired generating unit that is owned or operated by an investor-owned utility subject to the "Clean Smokestacks Act" (S.L. 2002-4) from the requirement that a franchise be obtained for the operation of those landfills. Generally, an applicant for a new permit, a permit renewal, or a substantial amendment to a permit for a sanitary landfill, is required to obtain a franchise for the operation of the landfill from each local government with jurisdiction over any part of the land on which the landfill is located.

This act became effective May 14, 2003. (JM)

Underground Storage Tanks

Underground Storage Tank Program Amendments

S.L. 2003-352 (HB 897) makes the following changes to the Leaking Petroleum Underground Storage Tank (UST) Cleanup Program:

Cost-effectiveness. – The act provides that the Commercial Leaking Petroleum Underground Storage Tank Cleanup Fund (Commercial Fund) and the Noncommercial Leaking Petroleum

Underground Storage Tank Cleanup Fund (Noncommercial Fund) will not be used to reimburse costs in excess of those required to achieve the most cost-effective cleanup. An owner, operator, or landowner may select a cleanup method other than the cost-effective cleanup method approved by the EMC as long as the EMC determines that the alternative cleanup method will address imminent threats to human health and the environment. The Department of Environment and Natural Resources (DENR) will not, however, pay or reimburse costs in excess of the cost of implementing the approved cost-effective cleanup.

Performance-based cleanups. – The act authorizes DENR to use up to $250,000 of the funds in the Noncommercial Fund and $2,500,000 in the Commercial Fund during each fiscal year for performance-based cleanups of leaking UST sites. The act also provides that before a cleanup contract is awarded, the environmental service firm must secure a surety or performance bond equal to the price of the firm's services under the contract and must demonstrate having secured the bond to the satisfaction of DENR. The performance-based cleanup program is scheduled to expire on October 1, 2006.

Secondary containment. – The act authorizes the EMC to adopt rules to establish standards and requirements for secondary containment for nontank components of petroleum UST systems, including all piping and fittings, pump heads, and dispensers. The rules will apply to any new UST system that is installed on or after the date on which the rules become effective and to the replacement of any nontank component of an UST on or after that date.

Commingled plumes. – Under current law, a discharge or release of petroleum from an UST may be cleaned up to risk-based cleanup standards, but a discharge or release of petroleum from an aboveground storage tank must be cleaned up to State groundwater standards. The act provides that a plume of contamination that results from the commingling of contamination from a leaking UST and a leaking aboveground storage tank may be cleaned up to risk-based standards. The Commercial Fund and Noncommercial Fund may only be used to pay or reimburse the portion of the costs of assessment or remediation that result from the leaking UST.

Preapproval and cleanup schedule. – The act directs DENR to establish the degree of risk to human health and the environment posed by a discharge or release from a leaking commercial UST and to determine a schedule for further assessment and cleanup based on those factors. If any of the costs of assessment or cleanup are eligible to be paid from the Commercial Fund, DENR must also consider the availability of funds in the Commercial Fund. Once DENR has established a cleanup schedule, the costs of any assessment or cleanup activities are not eligible for reimbursement from the Commercial Fund until the actions are authorized by DENR pursuant to the schedule. An owner, operator, or other person may choose to undertake assessment or cleanup before receiving authorization from DENR, but the costs for the assessment or cleanup will only be reimbursed after DENR has paid or reimbursed the costs for all assessments and cleanups authorized by DENR. The preapproval requirements will expire on October 1, 2005.

Testing requirements. – The act authorizes the EMC to adopt rules to modify testing requirements in order to reduce costs associated with the assessment and cleanup of discharges and releases of petroleum from leaking petroleum UST cleanup sites.

Study UST Program. – The act authorizes the Environmental Review Commission (ERC) to study the following issues related to the UST program:

- The adequacy of program funding.
- Options for management of available funds, including prioritization of cleanups and preapproval of cleanups.
- Changes in deductible and co-payment requirements.
- Options to increase program funding.
- The availability and use of private insurance to pay or reimburse the costs of the assessment and cleanup of releases and discharges of petroleum from petroleum USTs and of any liability of owners and operators of those tanks to third parties.

- Issues related to the inclusion of aboveground storage tanks in the program, including registration, fees and other funding issues, cleanup standards, and regulation of these tanks.
- Issues related to the provision of liability protection to a bona fide purchaser of a petroleum-contaminated property who has knowledge of, but did not cause or contribute to, the contamination of the property.

The ERC may report its findings and recommendations, including any proposed legislation, to the 2004 Regular Session of the 2003 General Assembly, or to the 2005 General Assembly.

This act became effective July 27, 2003. The preapproval requirements expire on October 1, 2005. (GG, TD)

Water Quality/Quantity/Groundwater

General Nondischarge Permits/Animal Operations

S.L. 2003-28 (SB 733) directs the Department of Environment and Natural Resources (DENR) to extend the expiration of general permits for animal waste management systems for swine, cattle, and poultry operations and of the certificates of coverage issued under these general permits that were set to expire on April 30, 2003, to October 1, 2004. The act also directs DENR to study the use of general non-discharge permits for animal waste management systems for swine, cattle, and poultry operations, including the impact on land application and potential discharge of nitrogen and phosphorous to surface water and groundwater in the State. DENR will conduct the study in consultation with the Department of Agriculture and Consumer Services; the College of Agriculture and Life Sciences at North Carolina State University; representatives of swine, cattle, and poultry farmers; representatives of environmental protection and natural resources conservation groups; and other interested parties. In the course of the study, DENR will prepare and circulate draft revised general permits for these operations, along with drafts of the forms that farmers would be required to use in connection with these permits, among interested parties for comment. DENR may, consistent with water quality protection goals and strategies, further revise the draft general permits and associated forms on the basis of comment from interested parties. DENR will report its findings and recommendations to the Environmental Review Commission on or before March 1, 2004.

This act became effective April 30, 2003. (JM)

Monitor Coastal Water Quality

S.L. 2003-149 (SB 959) authorizes the Commission for Health Services to adopt rules regarding monitoring of coastal recreation waters in order to implement the federal Beaches Environmental Assessment and Coastal Health Act of 2000. The rules will address definitions, surveys, sampling, action standards, and posting of information on the water quality of coastal recreation waters. The act also provides that a person who removes or destroys a sign posted to convey information on the water quality of coastal recreation waters is guilty of a Class 2 misdemeanor.

This act became effective June 4, 2003, except that the criminal penalty provision becomes effective December 1, 2003, and applies to offenses committed on or after that date. (JM)

Extend Swine Moratoria

S.L. 2003-266 (SB 593) extends the moratoria on the issuance of a permit by the Environmental Management Commission for the construction of a new swine farm or expansion of an existing swine farm from September 1, 2003, until September 1, 2007. These moratoria were first established in 1997 by S.L. 1997-458 and were extended in 1998, 1999, and 2001. The act allows time for the completion of ongoing studies of animal waste management technologies and related research and allows for the implementation of any legislation that may be enacted as a result of the studies.

This act became effective June 26, 2003. (TD)

Cost Share Funds for Limited Resource/New Farmers

S.L. 2003-284, Sec. 11.6 (HB 397, Sec. 11.6) provides that the limitation on the State share of agriculture cost share funding will be increased from 75% to 90% if the assisted farmer is a limited-resource farmer or a beginning farmer. The assisted farmer will be responsible for providing 10% of the funding, which may include in-kind support. Awards of agriculture cost share funding under this allocation formula are limited to $100,000 per year per farmer. A "beginning farmer" is a farmer who has not operated a farm or who has operated a farm for not more than 10 years. A "limited-resource farmer" is a farmer with direct and indirect gross farm sales that do not exceed $100,000.

This section became effective July 1, 2003. (JH)

Local Water Supply Plans

S.L. 2003-387 (HB 1062) requires a community water system that regularly serves 1,000 or more service connections or 3,000 or more individuals to comply with the local water supply planning requirements that apply to local governments. The act requires these community water systems and local governments to include in their local water supply plans a description of how the community water system or local government will respond to water shortage emergencies and continue to meet essential public water supply needs. The act directs the Department of Environment and Natural Resources to establish a Drought Management Advisory Council (Council) in order to enhance coordination among governmental bodies in order to improve the management and mitigation of the harmful effects of drought, and to provide consistent and accurate information to the public about drought conditions. The act authorizes the Council to assist local governments and other water users in taking appropriate drought response actions by issuing drought advisories that designate:

- Specific areas of the State where drought conditions are impending.
- Specific areas of the State as suffering from drought conditions.
- The level of severity of drought conditions.

This act became effective August 7, 2003. The first local water supply plans prepared by community water systems are due on or before January 1, 2004. (JM)

Swift Creek Reclassification

S.L. 2003-433 (HB 566) approves, effective August 1, 2003, portions of two administrative rules, 15A NCAC 2B.0225 (Outstanding Resource Waters) and 15A NCAC 2B.0316 (Tar-Pamlico River Basin), that reclassify a 14-mile stretch of Swift Creek to Outstanding Resource Waters (ORW) and impose an ORW management strategy on all waters and lands that

are located west of Nash County State Road 1003 (Red Oak Road). The act also provides that portions of the rules that impact all waters and lands that are located east of Nash County State Road 1003 (Red Oak Road) shall become effective only as the 2004 Regular Session of the 2003 General Assembly may provide by law. The act also authorizes the Environmental Review Commission to identify and evaluate options to protect water quality and endangered species in the portion of Swift Creek and its watershed in the Tar-Pamlico River Basin that are located east of Nash County State Road 1003 (Red Oak Road) and report its findings to the 2004 Regular Session of the 2003 General Assembly.
This act became effective August 19, 2003. (GG, JM)

Miscellaneous

Protect Certain Reptiles and Amphibians

S.L. 2003-100 (SB 825) authorizes the Wildlife Resources Commission (Commission) to adopt rules limiting, regulating, or prohibiting the taking, possession, transportation, collection, purchase and sale of species of Amphibia and Reptilia that do not meet the criteria for listing as a protected species, but that the Commission has determined require conservation measures to prevent the species from becoming listed. The Commission may not adopt rules to prohibit the taking of species solely to protect persons, property, or habitat. The rules must allow for the possession of 4 or fewer reptiles and 24 or fewer amphibians.

The act also prohibits the commercial taking of all species of turtles or terrapins in the families Emydidae and Trionychidae until the Commission adopts rules to regulate their taking. The turtles covered include the large basking turtles and sliding turtles. Commercial taking is defined as the taking, possession, collection, transportation, purchase or sale of five or more individual turtles from either of the two families. Persons who violate the turtle or terrapin provisions are guilty of a misdemeanor punishable as set forth in G.S. 113-135; however, this does not apply to licensed veterinarians, bona fide zoos operated by the federal government, the State or a local government, or to bona fide scientific, biological, medical, or veterinary education or research.

The provision relating to Amphibia and Reptilia became effective May 31, 2003. The provision relating to turtles or terrapins became effective July 1, 2003, and applies to offenses committed on or after that date. (BR)

Soil and Water Conservation Commission

S.L. 2003-198 (HB 727) amends the statute that specifies the membership of the Soil and Water Conservation Commission to allow members of the Commission to concurrently hold one elective office and one other appointive office or two other appointive offices.

This act became effective June 13, 2003. (JM)

Express Review Pilot Program

S.L. 2003-284, Sec. 11.4A (HB 397, Sec. 11.4A) authorizes the Department of Environment and Natural Resources (DENR) to develop the Express Review Pilot Program (Program). Under the Program, DENR will provide expedited review of certain environmental permits, approvals, and certifications and may charge fees higher than those set by statute for the normal review process. DENR will determine which project applications will receive express review from those submitted by applicants who request to participate in the Program. The Program may apply to

permits, approvals, or certifications under the erosion and sedimentation control program, the coastal management program, and the water quality programs, and will focus on stormwater permits, stream origination certifications, water quality certifications, erosion and sedimentation control permits, and Coastal Area Management Act permits. DENR may establish up to eight positions to administer the Program. No later than May 1, 2004, DENR will report to the General Assembly regarding its findings on the Program and whether the Program should be continued or expanded.

This section became effective July 1, 2003. (JH)

Environmental Permits on Department of Transportation Construction Projects

S.L. 2003-284, Sec. 29.6 (HB 397, Sec. 29.6) provides that any permit required for a Department of Transportation project and issued by the Department of Environment and Natural Resources, or any agency within that Department, remains in effect until the project is completed, subject to exceptions listed in the section.

This section became effective July 1, 2003.

Metropolitan Planning Organizations/Rural Transportation Planning Organizations Transportation Planning Funding

S.L. 2003-284, Sec. 29.14 (HB 397, Sec. 29.14) does the following:

- Authorizes any lead planning agency for a Metropolitan Planning Organization in a nonattainment or maintenance area under the Federal Clean Air Act to apply to the Department of Transportation for funds to avoid a plan conformity lapse; and
- Authorizes any regional transportation planning agency in a nonattainment or maintenance area under the Federal Clean Air Act to apply to the Department of Transportation for funds to support local transportation planning efforts.

This section became effective July 1, 2003.

Department of Environment and Natural Resources Fees

S.L. 2003-284, Secs. 35.1 and 35.1A (HB 397, Secs. 35.1 and 35.1A) provide that the Department of Environment and Natural Resources (DENR) may collect reasonable fees for:

- Vehicle access for off-road driving at the beach at Fort Fisher State Recreation Area.
- The erection, maintenance, and use of a marina at Carolina Beach.
- The use of boats and other watercraft that are purchased and maintained by DENR.

These sections also make a number of technical, clarifying, and conforming changes to G.S. 113-34 and G.S. 113-35, which govern State forests and State parks.

These sections became effective July 1, 2003. (JH)

Amend Environmental Laws

S.L. 2003-340 (SB 824) makes changes to various environmental laws as follows:

- Makes clarifying, conforming, and technical changes and corrections to various environmental statutes.

- Recodifies Article 13A (Clean Water Management Trust Fund) of Chapter 113 (Conservation and Development) of the General Statutes as a new Article 18 of Chapter 113A (Pollution Control and Environment) of the General Statutes.
- Modifies the reporting requirements on implementation of the performance-based cleanup program for underground storage tanks to conform with the annual reporting requirement for the consolidated report on the Leaking Petroleum Underground Storage Tank Cleanup Program, which is due on September 15 of each year.
- Expands what constitutes a permissible base of operations for a pushcart or mobile food unit to include commissaries.
- Increases by two the membership of the Environmental Review Commission.
- Extends by one year the time that temporary rules to protect water quality and riparian buffers in the Catawba River Basin will remain in effect.
- Extends the pilot program for inspection of animal waste management systems by two years and amends the reporting requirement for the pilot program.
- Establishes an exemption to the Moore County moratorium on swine farm and swine waste management system expansion or construction.

This act became effective July 27, 2003. However, the provision that extends the time period that temporary rules protecting water quality and riparian buffers in the Catawba River Basin will remain in effect, became effective retroactively to June 30, 2003. (GG, JM)

Clean Water Management Trust Fund Board Terms

S.L. 2003-422 (SB 831) staggers the terms of members of the Clean Water Management Trust Fund Board of Trustees (Board) to facilitate a regular interval of appointments and expirations. When fully implemented, the staggered four-year cycle will result in the expiration of five terms in each of years one through three and six terms in year four. The act increases the appointments made to the Board by the Governor from six to seven and increases the appointments made upon the recommendation of the President Pro Tempore of the Senate and the Speaker of the House of Representatives from six to seven each. The act also establishes a uniform date for the expiration of terms (July 1) and makes clarifying changes to the statutes regarding vacancies and quorum for the Board to conform to the provisions of similar appointive bodies.

This act became effective July 1, 2003, except that the act is effective retroactively to December 31, 2002 with respect to the term of any person whose term as a member of the Board would otherwise have expired on December 31, 2002. (TD)

Studies

Referrals to Existing Commissions/Committees

General Nondischarge Permits/Animal Operations

S.L. 2003-28, Sec. 2 (SB 733, Sec. 2) directs the Department of Environment and Natural Resources (DENR) to study the use of general non-discharge permits for animal waste management systems for swine, cattle, and poultry operations, including the impact on land application and potential discharge of nitrogen and phosphorous to surface water and groundwater in the State. DENR will conduct the study in consultation with the Department of

Agriculture and Consumer Services; the College of Agriculture and Life Sciences at North Carolina State University; representatives of swine, cattle, and poultry farmers; representatives of environmental protection and natural resources conservation groups; and other interested parties. In the course of the study, DENR will prepare and circulate draft revised general permits for these operations, along with drafts of the forms that farmers would be required to use in connection with these permits, among interested parties for comment. DENR may, consistent with water quality protection goals and strategies, further revise the draft general permits and associated forms on the basis of comment from interested parties. DENR will report its findings and recommendations to the Environmental Review Commission on or before March 1, 2004.

This section became effective April 30, 2003. (JM)

Underground Storage Tank Program Amendments

S.L. 2003-352, Sec. 12 (HB 897, Sec. 12) authorizes the Environmental Review Commission (ERC) to study the following issues related to the Leaking Petroleum Underground Storage Tank (UST) cleanup program:

- The adequacy of program funding.
- Options for management of available funds, including prioritization of cleanups and preapproval of cleanups.
- Changes in deductible and co-payment requirements.
- Options to increase program funding.
- The availability and use of private insurance to pay or reimburse the costs of the assessment and cleanup of releases and discharges of petroleum from petroleum USTs and of any liability of owners and operators of those tanks to third parties.
- Issues related to the inclusion of aboveground storage tanks in the program, including registration, fees and other funding issues, cleanup standards, and regulation of these tanks.
- Issues related to the provision of liability protection to a bona fide purchaser of a petroleum-contaminated property who has knowledge of, but did not cause or contribute to, the contamination of the property.

The ERC may report its findings and recommendations, including any proposed legislation, to the 2004 Regular Session of the 2003 General Assembly, or to the 2005 General Assembly.

This section became effective July 27, 2003. (TD)

Swift Creek Reclassification

S.L. 2003-433, Sec. 3 (HB 566, Sec. 3) authorizes the Environmental Review Commission to identify and evaluate options to protect water quality and endangered species in the portion of Swift Creek and its watershed in the Tar-Pamlico River Basin that are located east of Nash County State Road 1003 (Red Oak Road) and report its findings to the 2004 Regular Session of the 2003 General Assembly.

This section became effective August 19, 2003. (JM)

Pending Legislation

Coastal Recreational Fishing License

HB 831 (Sixth Edition) would establish a program for the licensing of coastal recreational fishing. An annual Coastal Recreational Fishing License (CRFL) would cost $10. An individual could engage in coastal recreational fishing without holding a CRFL if the individual:

- Is under 16 years of age.
- Is 62 years of age or older.
- Holds a Standard Commercial Fishing License or a Retired Standard Commercial Fishing License.
- Holds a Lifetime Resident Comprehensive Fishing License or a Lifetime Sportsman License.
- Is fishing from a public bridge.
- Is fishing from the shore or a shore-based structure.
- Is fishing with hook and line in the county of the individual's residence using natural bait.

Fees collected from the sale of CRFLs would be credited to the General Fund and could be used only for the management, protection, restoration, and enhancement of the marine resources of the State.

HB 831 would authorize the Department of Environment and Natural Resources to use up to $1,100,000 for the 2003-2004 fiscal year and up to $2,000,000 for the 2004-2005 fiscal year of funds appropriated by the 2003 Budget Bill (S.L. 2003-284) to implement the licensing program. HB 831 also provides that no funds appropriated to the Division of Forest Resources or the Division of Soil and Water Conservation may be used to implement the licensing program.

This bill is pending in the Senate Agriculture/Environment/Natural Resources Committee. (JH)

Clean Air Trust Fund

HB 866 (First Edition) and SB 981 (First Edition) would establish the Clean Air Trust Fund (Fund). The purpose of the Fund is to finance projects to protect and restore air quality and to prevent and reduce emissions of various air pollutants. State agencies, local governments, and nonprofit corporations with an environmental purpose are eligible to apply to the Fund for grants and loans. The acts would also establish the Clean Air Trust Fund Board of Trustees, which would develop criteria for awarding grants and loans, and the Clean Air Trust Fund Advisory Council, which would advise the Board of Trustees with regard to criteria, guidelines, and allocations made from the Fund.

The House Bill is pending in the House Environment and Natural Resources Committee. The Senate Bill is pending in the Senate Agriculture/Environment/Natural Resources Committee. (TD)

Improve Environmental Enforcement

HB 868 (Second Edition) and SB 911 (Second Edition) would:

- Add a civil penalty of up to $10,000 for the first day of a violation of the Sedimentation Pollution Control Act of 1973 or ordinance, rule, or order adopted pursuant to the act.
- Increase the maximum amount of the civil penalty that may be assessed for a minor development violation under the Coastal Area Management Act of 1974 (CAMA) from $250 to $1,000. HB 868 would also increase the maximum amount of the civil penalty that may be assessed for a major development violation under CAMA from

$2,500 to $25,000. SB 911 would increase the maximum amount of this penalty from $2,500 to $10,000.

- Authorize the assessment of reasonable costs of any investigation, inspection, or monitoring that results in the imposition of a civil penalty for major and minor development violations under CAMA.
- Provide that the Secretary of Environment and Natural Resources or a local health director may institute an action for injunctive relief against a person who violates an order issued pursuant to Chapter 130A of the General Statutes. This authority would be in addition to existing authority under the Statute to institute actions for injunctive relief for violations of the Chapter, or any rule adopted by the Commission for Health Services or a local board of health.
- Increase the maximum amounts of certain administrative penalties that may be assessed for violations of Article 9 (Solid Waste Management) and Article 11 (Wastewater Systems) of Chapter 130A of the General Statutes.
- Add a penalty for false reporting under the North Carolina Drinking Water Act.
- Repeal a 10% cap on actual costs of collection that may be deducted from civil penalties and civil forfeitures that are collected and payable to the County School Fund.

The House Bill is pending in the Senate Agriculture/Environment/Natural Resources Committee. The Senate Bill is pending in the Senate Finance Committee. (JM)

Establish Electronics Recycling Program

HB 878 (First Edition) and SB 970 (First Edition) would impose a privilege tax on electronic devices that contain cathode ray tubes (i.e., in general, televisions and computer monitors) in order to establish an electronics recycling program and to provide local governments with funds to implement the program. Effective January 1, 2007, the bills would also prohibit the disposal of certain electronic devices in landfills and permitted incinerators.

The House Bill is pending in the House Environment and Natural Resources Committee. The Senate Bill is pending in the Senate Finance Committee. (TD)

Certification of Wastewater Site Evaluators

HB 912 (First Edition) and SB 907 (First Edition) would direct the Water Pollution Control System Operators Certification Commission (Commission) to establish a certification and training program for wastewater system site evaluators. Effective July 1, 2005, the bills would require a certified site evaluator to review and certify all wastewater system permits applications before submission to a local health department, and would require all wastewater system permits applications be reviewed and approved or denied only by a certified site evaluator employed by the local health department. The bills would increase the membership of the Commission from 11 to 13 members, reconfigure the qualifications for each individual commission seat, and provide for a system of staggered three-year terms.

The House Bill is pending in the House Finance Committee. The Senate Bill is pending in the Senate Agriculture/Environment/Natural Resources Committee. (TD)

Sedimentation Act Amendments

HB 953 (First Edition) would:

- Require self-inspection of an area covered by an approved erosion and sedimentation control plan by the person who submitted the plan or the person's agent.
- Raise the fee for the review of an erosion and sedimentation control plan to $150 per acre from a maximum of $50 per acre.
- Allow a local government with an approved erosion and sedimentation control program to regulate land-disturbing activities conducted by that local government.
- Require exposed slopes to be planted or provided with ground cover within 10 working days or 21 calendar days, whichever is shorter, of completion of any phase of grading.
- Authorize a local government to establish a limited erosion and sedimentation control program. Under a limited program, the local government would be responsible for inspecting land-disturbing activities. The Division of Land Resources of the Department of Environment and Natural Resources (DENR) would be responsible for all other program functions (e.g. plan approval and enforcement).
- Require DENR to report annually to the Environmental Review Commission on the implementation of the Sedimentation Pollution Control Act of 1973.

This bill is pending in the House Environment and Natural Resources Committee. (JM)

North Carolina Climate Action Registry

HB 1045 (First Edition) and SB 863 (First Edition) would establish the North Carolina Climate Action Registry (Registry). The primary purpose of the Registry is to promote the voluntary reduction of greenhouse gas emissions in the State. The bill defines greenhouse gases to include carbon dioxide, methane, oxides of nitrogen, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The bills directs the Department of Environment and Natural Resources to adopt rules to establish monitoring and tracking systems for greenhouse gas emissions in the State, to establish programs to promote participation in the Registry, to encourage companies and organizations to establish greenhouse gas emissions reduction goals, and to adopt a uniform format for reporting emissions baselines and reductions in order to facilitate their recognition in any future regulatory scheme. Participation in the Registry would be voluntary.

The House Bill is pending in the House Environment and Natural Resources Committee. The Senate Bill is pending in the Senate Agriculture/Environment/Natural Resources Committee. (TD)

Certify On-Site Wastewater Contractors

HB 1127 (First Edition) and SB 927 (First Edition) would create the nine-member North Carolina On-Site Wastewater Contractors and Inspectors Certification Board (Board) to establish training and certification requirements for personnel involved in the construction, installation, repair, and inspection of on-site wastewater systems. Effective July 1, 2005, the bills would prohibit the construction, installation, repair, or inspection of an on-site wastewater system in the State by non-certified personnel.

The House Bill is pending in the House Finance Committee. The Senate Bill is pending in the Senate Agriculture/Environment/Natural Resources Committee. (TD)

Closure of Industrial Lagoons

HB 1145 (First Edition) would authorize the Environmental Management Commission to adopt rules governing the maintenance, operation, closure, and post-closure care of industrial lagoons. The bill would require an owner of an industrial lagoon to: (1) establish and maintain evidence of financial responsibility to ensure sufficient availability of funds for facility closure and post-closure

monitoring and corrective measures, (2) close the lagoon within one year of cessation of activities for which the lagoon was permitted, and (3) perform post-closure remediation activities that may be necessary to comply with applicable statutes and rules.

The bill would also require the Department of Environment and Natural Resources to perform closure or postclosure remediation activities for an industrial lagoon, if the lagoon's owner fails to do so. The bill would provide that any person owning the land on which an industrial lagoon is or has been located, or who owned the land while the lagoon was in operation, or who disposed of waste in the lagoon, shall have joint and several liability for closure or remediation costs that exceed the amount of financial responsibility established by the owner. The bill would also establish an annual fee of $1,000 for any treatment works for which a water quality permit is required that includes an industrial lagoon.

This bill is pending in the House Environment and Natural Resources Committee. (JM)

Phase Out Swine Waste Lagoons and Sprayfields

HB 1188 (First Edition) would:

- Delete the provision that establishes moratoria on the construction and expansion of swine farms and on lagoons and animal waste management systems for swine farms.
- Codify and make permanent performance standards for swine farm animal waste management systems (performance standards) established by the General Assembly in 1998.
- Provide that the Environmental Management Commission (EMC) may issue a permit for the construction, operation, or expansion of an animal waste management system only if the EMC determines that the system meets or exceeds the performance standards.
- Provide that an owner or operator of an animal waste management system that employs a lagoon and sprayfield system that is phased out pursuant to the provisions of the bill must close all of the components of the animal waste management system in compliance with all applicable federal and State laws.

This bill is pending in the House Environment and Natural Resources Committee. (JM)

Catawba River Basin Bi-State Advisory Commission

SB 859 (Second Edition) would establish the Catawba River Basin Bi-State Advisory Commission. The Commission would have no regulatory authority. The purposes of the Commission would be to:

- Provide guidance and make recommendations to local, state, and federal legislative and administrative bodies on the use, stewardship, and enhancement of the water and other natural resources within the Basin.
- Provide a forum for discussion of issues affecting the Basin's water quality, water quantity, and natural resources.
- Promote communication, coordination, and education among stakeholders.
- Undertake studies and publish reports related to water quantity, water quality and other natural resources of the Basin.

This bill is pending in the House Environment and Natural Resources Committee. (TD)

Summary of Funding for Environmental Initiatives
2003 Legislative Session

	FY 2003-04	FY 2004-05
Total Funding for Environmental Initiatives	**$500,000**	**$0**
Express Permitting Pilot Program	$500,000	$0

Prepared by Fiscal Research Division, December 2003

Status of Reports to the ERC Required by Law

Organized by topics: air quality, coastal issues, environmental health, fishing, general, hazardous substances, land quality, parks and conservation, solid waste, water quality, water quantity, wetlands

air quality

DAQ	Report To/ Authority	Report Due	Status*
Study issues related to monitoring emissions of mercury and the development and implementation of standards and plans to implement programs to evaluate available control technologies; shall estimate the benefits and costs of alternative strategies to	EMC, ERC S.L. 2002-4, Section 12	Annually (Interim 1 Sep 2003) (Findings 1 Sep 2005)	Sep 03 in
Study issues related to the development and implementation of standards and plans to implement programs to control emissions of carbon dioxide (CO2) from coal-fired generating units and other stationary sources; evaluate available control technologies and	EMC, ERC S.L. 2002-4, Section 13	Annually (Interim 1 Sep 2003) (Findings 1 Sep 2005)	Sep 03 in

DENR	Report To/ Authority	Report Due	Status*
Progress in increasing the use of alternative-fueled and low emission light duty cars and trucks in privately owned fleets	ERC GS 143-215.107C(c)	Annually (Oct 1)	16 Mar 00 27 Sep 00 oral 6 Oct 03 in
Cost of the Title V program	ERC, Fiscal Research GS 143-215.3A(c)	Annually (1 Nov)	Mar 00 mail 3/29/00 May 02 oral 5/21/02 Jan 04 in

DENR, Utilities Commission	Report To/ Authority	Report Due	Status*
Implementation of SL 2002-4 (Clean Smokestacks)	ERC, Joint Legislative Utility Review Committee S.L. 2002-4, Section 14	Annually (1 Jun 2003)	28 Jan 03 30 May 03 In

Department of Administration	Report To/ Authority	Report Due	Status*
Progress in dev, implement plan w/DENR, DOT for 75% of new State cars, light trucks alt-fueled or low-emission by 1/1/2004.	ERC GS 143-215.107C(b)	Annually (Sep 1)	Sep 00 Distrib 1/18/01 Mar 02 Distrib 5/21/02

Department of Transportation	Report To/ Authority	Report Due	Status*
Evaluation/ adjustment of region served by each Metropolitan Planning Organization	ERC, Joint Legislative Transportation Oversight Committee GS 136-202(d)	Nov 1 of each year regions evaluated and adjusted (every 5 years, including year following federal census)	

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "In" indicates that the report has been received but not yet distributed.

Plan developed with DOA, Commerce, DENR to reduce VMT & vehicle emissions from private sector employee travel.	ERC, Joint Legislative Transportation Oversight Committee GS 143-215.107C(e)	Annually (Oct 1)	16 Mar 00 oral 27 Sep 00 distrib

EMC	Report To/ Authority	Report Due	Status*
Progress in rulemaking to regulate NOx from complex sources (EMC Quarterly Report)	ERC SL 1999-328(4.9)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 15 Apr 2003 in
Desirability of requiring and the feasibility of obtaining reductions in emissions of oxides of nitrogen (Nox) and sulfur dioxide (SO2) beyond those required by G.S. 143-215.107D.	ERC, General Assembly SL 2002-4, Section 11	Annually, starting 2005 (Sep 1)	

Office of State Personnel	Report To/ Authority	Report Due	Status*
Plan developed with DOA, DOT, DENR to reduce VMT & vehicle emissions from State employee travel.	ERC, Joint Legislative Transportation Oversight Committee SL 1999-328(4.6)	Annually (Oct 1)	09/00 Oral 12/00 Mar 02 Distrib 5/21/02
Promotion of telecommuting, as recommended by State Auditor	ERC SL 1999-328(4.8)	Annually (Oct 1)	09/00 Oral 12/00 Distrib 1/18/01 Feb 02 Distrib 5/21/02

fishing

CRC, EMC, and MFC	Report To/ Authority	Report Due	Status*
Progress in developing and implementing Coastal Habitat Protection Plans	ERC, S&A GS 143B-279.8(e)	Annually (Sep 1)	Sep 99 oral 11/23/99 Sep 00 oral 01/11/01 Sep 01 distrib 01/30/02 Sep 03 in

DENR	Report To/ Authority	Report Due	Status*
Fish kills within the preceding year	ERC GS 143B-279.7(c)	Annually (Dec 1)	Dec 99 oral 1/20/00 Jan 01 oral 1/18/01 Feb 02 oral 2/21/02 Jan 04 in

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Individual Coastal Habitat Protection Plans	ERC, S&A GS 143B-279.8(f)	30 days after complete or substantially revise draft plan	

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Scientific Adv Council on Water Res & Coastal Fisheries Mgmt	Report To/ Authority	Report Due	Status*
Implementation of a coordinated water resources and coastal fisheries management program	Secretary, Governor, ERC, Gov Ops GS 143-215.22K(c)	Annually (Oct 1)	

general

DENR	Report To/ Authority	Report Due	Status*
Cost of State's environmental permitting program	ERC, Fiscal Research GS 143-215.3A(c)	Annually (Nov 1)	April 00 distrib
Cost of implementing the Mining Act of 1971	ERC GS 74-54.1(c)	Annually (Sep 1)	Jan 02 distrib 01/30/02 Aug 03 in
One Stop Permit Assistance Pilot Projects	ERC, NER subcommittees, Fiscal Research S.L. 2000-67(13.7) S.L. 2001-424 (19.6)	April 1, 2001; April 1, 2002; April 1, 2003	Apr 01 mail 05/04/01 29 July 2003 in

DENR (Secretary)	Report To/ Authority	Report Due	Status*
State of the Environment Report	General Assembly,ERC GS 143B-279.5(a)	Feb 15 of each odd-numbered year	Feb 1, 2000

EMC	Report To/ Authority	Report Due	Status*
EMC operation, activities, programs, and progress (see also other reports with "EMC Quarterly Report" noted at the end of the topic line)	ERC GS 143B-282(b)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15); upon request	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 15 Apr 2003 in

Utilities Commission	Report To/ Authority	Report Due	Status*
Investigation of green power and public benefit fund voluntary check-off programs, as well as additional items listed in 2002-167, Sec. 6(a).	ERC, Commission on the Future of Electric Service in North Carolina 2002-167, Sec. 6	15 Mar 03	6 Mar 03, Dist 20 Mar 03

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hazardous substances

DENR	Report To/ Authority	Report Due	Status*
Implementation of the Resident Inspectors Program at commercial hazardous waste facilities	ERC GS 130A-295.02(m)	Annually (Sep 1)	Sep 99 distrib 11/99 Oct 00 distrib 1/18/01 Oct 01 distrib 10/29/01 Oct 2002 (distrib 1/16/03) Sep 03 in
Evaluation of effectiveness of Brownfields Property Reuse Act	ERC GS 130A-310.40	Annually (Oct 1)	interim oral 3/16/00 11/00 oral 1/18/01 Feb 02 oral 2/21/02 Jan 03 oral 1/28/03 Jan 04 in

DENR (Division of Waste Management)	Report To/ Authority	Report Due	Status*
Implementation of comprehensive hazardous waste management plan; implementation of the comprehensive hazardous waste plan, including an evaluation of how well the State and private parties are managing and cleaning up hazardous waste.	ERC GS 130A-294(l) SL 2002-148, Sec. 4	Annually (1 Oct)	8/11/00 distrib 1/18/01 8 Nov 2002 5 Oct 03 in

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Inactive Hazardous Waste Sites Program	ERC GS 130A-310.10	Annually (Oct 1)	11/00 oral 1/18/01 11/01 mail 11/09/01 1/30/02 oral Jan 03 oral 1/28/03 Sep 03 in

DENR, Office of State Budget and Management	Report To/ Authority	Report Due	Status*
Amount and source of available funds used for 10% cost share required for Superfund cleanup of NPL sites, the o&m costs associated w/ these cleanups, and the cleanup of priority inactive hazardous substance or waste sites	ERC, Gov Ops SL 1999-237(15.6)(b)	30 days after spend Superfund/ Inactive Haz Sites funds	-Sep 00 (Mecklenburg) distrib 1/18/01 - May 01 distrib 10/29/01 - Dec 01 distrib 01/30/02 - Feb 02 distrib 03/21/02 - 29 Sep 03 in

parks and conservation

DENR	Report To/ Authority	Report Due	Status*
Report on the conservation easement program + inventory of all conservation easements held by DENR	ERC GS 113A-235(c)	Annually (Nov 1)	12/00 oral 12/21/00 Feb 02 oral 2/21/02 (Jan 03 oral 1/16/03)

DENR (North Carolina Parks and Recreation Authority)	Report To/ Authority	Report Due	Status*
Activities and allocations from the Parks and Recreation Trust Fund from the prior fiscal year	ERC, Gov Ops, NER, Fiscal Research GS 113-44.15(c)	Annually (Oct 1) + progress (March 15)	Mar 01 mail 05/04/01 Oct 01 mail 10/29/01 Feb 02 distrib 03/21/02 (Jan 03 oral 1/16/03) Mar 03 distrib 03/20/03 Oct 03 in

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DENR (Secretary)	Report To/ Authority	Report Due	Status*
Acquisitions made with funds from the Natural Heritage Trust Fund	ERC, NHTF Trustees, Gov Ops, NER, Fiscal Research GS 113-77.9(e)	Semiannually, within 30 days of each revision	10/18/00 oral 10/13/00 Mar 01 mail 05/04/01 Aug 01 distrib 10/29/01 Feb 02 oral 2/21/02 (Jan 03 oral 1/16/03) Mar 03 distrib 03/20/03 Nov 03 in
Progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands	ERC, Governor GS 113A-241(c)	Annually (Sep 1)	Sep 00 oral 10/13/00 Oral 2/21/02 Jan 03 oral 1/16/03 Dec 03 in

solid waste

DENR	Report To/ Authority	Report Due	Status*
Solid Waste Management Annual Report (see also other reports with "SWM Annual Report" noted at the end of the topic line)	Governor, ERC GS 130A-309.06(c)	Annually (Jan 15)	Mar 99 mail, oral 11/4/99 Mar 00 oral 4/6/00 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03
Assessment of the recycling industry and recyclable materials market (SWM Annual Report)	ERC GS 130A-309.06(c)(6)	Annually (Jan 15)	Jan 02 oral 1/30/02 Jan 03 oral 1/28/03
Condition and use of funds in the Solid Waste Management Trust Fund (SWM Annual Report)	ERC GS 130A-309.12(c) GS 130A-309.06(c)(8)	Annually (Jan 15)	Sep 99 oral 11/04/99 Sep 00 oral 11/27/00 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03
Scrap Tire Disposal Account (SWM Annual Report)	ERC GS 130A-309.63(e) GS 130A-309.06(c)(10)	Annually (Jan 15)	May 99 mail Oct 99 oral 4/6/00 Oct 00 oral 11/27/00 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03
Management of white goods (SWM Annual Report)	ERC, Revenue Laws Study Committee GS 130A-309.85 GS 130-309.06(c)(11)	Annually (Jan 15)	Feb 99 oral Feb 00 oral 4/6/00 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03
Recycled materials specified or used in DOT contracts (SWM Annual Report) (DPPEA portion)	ERC, Gov Ops, Trans Oversight GS 136-28.8(g) GS 130A-309.06(c)(12)	Annually (Jan 15)	Dec 99 oral 4/6/00 Dec 00 oral Jan 02 oral 1/30/02 Jan 03 oral 1/28/03
Purchase of materials and supplies with recycled content by State institutions (SWM Annual Report) (DPPEA portion)	ERC, Gov Ops GS 143-58.2(f) GS 130A-309.06(c)(13)	Annually (Jan 15)	Dec 99 oral 4/6/00 Dec 00 oral Jan 02 oral 1/30/02 Jan 03 oral 1/28/03

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

Removal of Abandoned Vessels Pilot Program	ERC S.L. 2000-74	Interim, January 1, 2002; final January 1, 2003	Feb 02 distrib 2/21/02

DOT and DOA	Report To/ Authority	Report Due	Status*
Bid procedures and the purchase and use of reusable, refillable, repairable, more durable, and less toxic supplies and products (SWM Annual Report)	ERC GS 130A-309.14(a1)(3) GS 130A-309.06(c)(9) S.L. 2003-340, Sec. 1.6	Annually (Jan 15)	Oct 00 Distrib 1/18/01 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03

Governor	Report To/ Authority	Report Due	Status*
Litter enforcement, prevention, and removal efforts.	ERC, JLTOC, NER Subcommittees SL 2001-512, Sec. 9 and 10 GS 147-12(b)	Semiannually (March 1 and Sep 1)	Mar 02 oral 3/21/02 Dec 03 in (online)

State Board of Education	Report To/ Authority	Report Due	Status*
Recycling efforts of public schools in the State	ERC, Joint Legislative Education Oversight Committee SL 2001-512, Sec. 11	Annually by Dec 15 (2003-2007)	

water quality - general

Clean Water Management Trust Fund (Chair, Board of Trustees)	Report To/ Authority	Report Due	Status*
Implementation of the Clean Water Management Trust Fund; Projects awarded grants	ERC, Gov Ops, NER Subcommittees, Fiscal Research GS 113-145.6A(e) SL 2002-148 (Sec. 3)	Annually (Dec 1)	Nov 99 oral 11/4/99 Jan 01 in Feb 02 oral 2/21/02 Jan 03 oral 1/16/03 Dec 03 in

DENR	Report To/ Authority	Report Due	Status*
Study the use of general nondischarge permits for animal waste management systems that serve swine, cattle, and poultry operations to protect water quality.	ERC 2003-28, Sec. 2	1 March 04	
Status of permitting and inspecting animal waste management systems/ Animal Waste Compliance Report	ERC, Fiscal Research GS 143-215.10M SL 2002-148 (Sec. 6)	Annually (Oct 1)	Sep 00 oral 11/27/00 Nov 01 oral 01/30/02 Apr 02 dist 5/28/02 Nov 2002 (dist 01/16/03) Oct 03 in
Two Year Action Plan for Livestock Operations	ERC SL 1999-329(13.4) SL 2002-148(Sec 2)	1 Oct 2002 1 Oct 2003	Jan 02 oral 1/30/02 May 02 oral 5/21/02 Jan 03 oral 1/28/03

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

Wastewater Discharge Elimination System program	ERC, Fiscal SL 2001-452(2.9)	Annually (15 Oct)	15 Dec 03 in

DENR (Division of Water Quality)	Report To/ Authority	Report Due	Status*
Compliance/ enforcement of water quality laws for facilities that discharge into surface waters	ERC, Fiscal Research GS 143-215.9A SL 2002-148(Sec. 5)	Annually (Oct 1)	Oct 00 oral 11/27/00 Nov 01 oral 01/30/02 May 02 distrib 5/28/02 Dec 03 in
Effectiveness of Surface Water Identification Training and Certification Program	ERC SL 2001-404(2)	Sep 1, 2002; Sep 1, 2003; and Mar 1, 2004	Sep 03 in

DENR (Divisions of Water Quality, Soil & Water Conservation)	Report To/ Authority	Report Due	Status*
Pilot program for inspection of animal waste management systems, including a comparison of the costs of conducting operations reviews and inspections under the pilot program with the costs of conductng ors and insps pursuant to 143-215.10D and 143-215.10F	ERC, Fiscal Research SL 1999-329(3.3) SL 2001-254(6) SL 2002-176 (1.2)	Semiannual: 15 April and 15 Oct Final: Oct 1, 2005.	Sep 00 oral 11/27/00 Dec 01 in May 02 oral 5/21/02 Oct 03 in

DENR (Soil and Water Conservation Commission)	Report To/ Authority	Report Due	Status*
Effectiveness of projects funded under the Agriculture Cost-Share Program for Nonpoint Source Pollution Control	ERC, Fiscal Research GS 143-215.74(e)	Annually (Jan 31)	Jan 99 oral Oct 00 Distrib 1/18/01 21 March 2002 Dec 03 in

DENR, EMC	Report To/ Authority	Report Due	Status*
Basinwide Water Quality Management Plans	ERC GS 143-215.8B(d)	Annually (Oct 1)	Jan 01 distrib 1/18/01 Feb 02 oral 2/21/02 Apr 02 oral 4/25/02 Oct 03 in

EMC	Report To/ Authority	Report Due	Status*
Progress in developing and implementing wastewater collection system permit program (EMC Quarterly Report)	ERC 143-215.9B	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 15 Apr 2003 in
Implementation of stormwater runoff rules and programs	ERC GS 143-214.7(e)	Annually (Oct 1)	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 15 Apr 03 10 Dec 2003 in

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

Extent to which facilities seeking new or modified discharge permits are funded with public funds; their impact on water quality; whether there are cost-effective alt. technologies that would achieve greater water quality benefit (EMC Quarterly Report)	ERC GS 143-215.1(h)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 15 Apr 2003 in
Implementation of the Neuse River Basin NSW Management Stategy, Progress in achieving 30% nitrogen reduction goal and other Neuse River water quality milestones, Impact of Neuse River NSW Management Strategy on the regulated community	ERC SL 1998-221(1.9)	Annually Dec 1, 2000; Dec 1, 2001	Oral 1/18/01 Mar 02 distrib 3/21/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 15 Apr 2003 in
Progress in developing engineering standards to allow regional interconnection of municipal and domestic wastewater collection systems (EMC Quarterly Report)	ERC SL 1999-329(11.1)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 15 Apr 2003 in

Roanoke River Basin Bi-State Commission	**Report To/ Authority**	**Report Due**	**Status***
Annual report, including any recommendations.	Governor, ERC, General Assembly of NC, Governor of VA, General Assembly G.S. 77-98	Annually	

UNC System (UNC-CH Water Resources Research Institute)	**Report To/ Authority**	**Report Due**	**Status***
Modeling and Monitoring of the Neuse River	ERC, Gov Ops, SAC GS 143-215.8C	Progress reports Jan 1/ July 1 until complete	Jan 99 oral 11/23/99 Jan 01 oral 1/18/01

Upper Neuse River Basin Association	**Report To/ Authority**	**Report Due**	**Status***
Activities and programs to develop cooperative, comprehensive, integrated State-local watershed management plan for the Upper Neuse Rier Basin to serve as a model watershed management approach	ERC, Gov Ops, Fiscal Research SL 1998-212(14.15)	Mar 1 each year until plan is complete (begin 1999)	Mar 00 oral 4/6/00 Feb 02 oral 2/21/02 Oct 03 in

Water Quality Workgroup	**Report To/ Authority**	**Report Due**	**Status***
Status of tasks: Synth current science on water quality;Identify knowledge gaps, fill with projects;Maintain water quality data website; Org & eval existing water quality databases; Prioritize knowledge gaps for $; Develop Rivernet mon syst.	SAC, ERC, NER Chairs, Chancellor of NCSU G.S. 143-215.8D	Annually (Jan 30)	Jan 00 oral 3/16/00 Jan 02 oral 2/21/02

water quality - ground

DENR	**Report To/ Authority**	**Report Due**	**Status***
Implementation of Pay for Performance Program	ERC SL 2001-442, SL 2003-340, Sec. 2	Annually (in UST report) 1 Sept (ending Oct 1, 2006)	21 Mar 2002 16 Jan 2003

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Contamination, site, and fiscal information related to the Dry-Cleaning Solvent Cleanup Act of 1997	ERC GS 143-215.104U	Annually (Oct 1)	Oct 99 oral 2/17/00; oral 4/25/00 Oct 00 Distrib 1/18/01 Jan 02 oral 2/21/02 Dec 03 in
Leaking Petroleum Underground Storage Tank Cleanup Program	ERC GS 143-215.94M SL 2002-148(Sec. 7)	Annually (1 Sept)	Mar 01 distrib 10/29/01 Sep 01 distrib 01/30/02 Mar 02 distrib 03/21/02 Jan 03 oral 1/16/03 Jan 04 in

water quantity

DENR	Report To/ Authority	Report Due	Status*
Evaluate water conservation measures being implemented in the State and identify incentive programs and other voluntary programs that can help foster water conservation and reuse.	ERC, EMC SL 2002-167, Sec. 5	Interim 15 Mar 03 Final 15 Feb 04	25 Aug 03 in

DENR (Division of Water Resources)	Report To/ Authority	Report Due	Status*
Implementation of State Water Supply Plan	ERC, Gov Ops GS 143-355(n)	Annually (Sep 1)	Sep 99 in, oral 1/20/00 Oct 00 oral 1/18/01 Jan 02 oral 1/30/02 (Jan 03 oral 1/16/03) Sep 03 in

EMC	Report To/ Authority	Report Due	Status*
Study impact of development on frequency and intensity of flood events (EMC Report)	ERC SL 2000-150(4)	February 15 2001	Apr 01 distrib 1/30/02 Jul 01 distrib 1/30/02 Oct 01 distrib 1/30/02 Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 15 Apr 2003 in

wetlands

DENR	Report To/ Authority	Report Due	Status*
Implementation of Wetlands Restoration Program and use of Wetlands Restoration Fund, including inventory of property and easements	ERC GS 143-214.13	Annually (Nov 1)	Nov 99 oral 1/20/00 Dec 00 oral 1/11/01 Dec 01 oral 01/30/02 Jan 03 oral 1/28/03 Dec 03 in

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Studies to be Conducted by the Environmental Review Commission

Organized by topics: air quality, coastal issues, environmental health, fishing, general, hazardous substances, land quality, parks and conservation, solid waste, water quality, water quantity, wetlands

Water quality - general

ERC	Report To/ Authority	Report Due
Identify and evaluate options to protect water quality and endangered species in the portion of Swift Creek that is located east of Nash County Road 1003.	General Assembly 2003-433	2004 Regular Session of 2003 General Assembly

water quality - ground

ERC	Report To/ Authority	Report Due
Study issues related to the LUST program, including any of the following: 1) the adequacy of program funding; 2)Options for management of available funds, including prioritization and preapproval; 3) changes in deductible and copayment reqs., etc.	General Assembly SL 2003-352, Sec. 12	2004 Regular Session or 2005 General Assembly

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6 February 2004

MEMORANDUM

To: Members of the Environmental Review Commission
From: Tim Dodge, Research Assistant for Environmental Issues
Re: Reports distribution – February 2004

Attached to this memorandum are copies of the following reports submitted to the Environmental Review Commission since the last report distribution in March 2003 that are not scheduled to be presented orally at the 6 February 2004 Commission meeting.

READ-ONLY REPORTS

Air Quality:

1) *Annual report on the cost of the Title V Program.* Department of Environment and Natural Resources (DENR). 22 December 2003. Statutory Authority: G.S. 143-215.3A(c).

2) *Annual report on progress in increasing the use of alternative-fueled and low emission light duty cars and trucks in privately owned fleets.* DENR. 6 October 2003. Statutory Authority: G.S. 143-215.107C(c).

Coastal Management:

3) *Annual report on progress in developing and implementing coastal habitat protection plans.* Coastal Resources Commission, EMC, and Marine Fisheries Commission. 21 September 2003. Statutory Authority: G.S. 143B-279.8(e).

Hazardous Waste Management:

4) *Biennial report of the North Carolina Hazardous Waste Management Plan.* Division of Waste Management, DENR. 5 October 2003. Statutory Authority: G.S. 130A-294(i).

5) *Annual report on implementation of the resident inspectors program at commercial hazardous waste facilities.* Division of Waste Management, DENR. 5 September 2003. Statutory Authority: G.S. 130A-295.02(m).

Land Resources:

6) *Annual Report on the cost of implementing the Mining Act of 1971.* Division of Land Resources, DENR. 26 August 2003. Statutory Authority: G.S. 74-54.1(c).

Parks and Recreation / Land Conservation:

7) *Annual Report on the North Carolina Aquariums Fund.* Division of North Carolina Aquariums, DENR. 25 September 2003. Statutory Authority: G.S. 143B-289.44(d).

Water Quality:

8) *Semiannual report on the effectiveness of the Pilot Program for Inspection of Animal Waste Management Systems.* Division of Soil and Water Conservation, DENR. 17 October 2003. Statutory Authority: S.L. 2003-340, Sec. 6.2.

9) *Annual report on the Upper Neuse River Basin Association's activities and programs to develop a cooperative, comprehensive, integrated State-local watershed management plan for the upper Neuse River basin to serve as a model watershed management approach for river basins and subbasins in North Carolina.* Upper Neuse River Basin Association. 8 October 2003. Statutory Authority: S.L. 1998-212, Sec. 14.15.

10) *Annual Report on the Wastewater Discharge Elimination Program.* DENR. 15 December 2003. Statutory Authority: S.L. 2001-452, Sec. 2.9.

Please contact George Givens, Jeff Hudson, Jennifer McGinnis, Susan Iddings, or Tim Dodge at (919) 733-2578 if you have any questions or comments.

STATE OF NORTH CAROLINA

TITLE V AIR QUALITY PERMIT PROGRAM

ACCOUNTABILITY REPORT

PURSUANT TO

N.C.G.S. 143-215.3A(c)

15A NCAC 2Q .0206(f)

40 CFR 70.9

NOVEMBER 2003

DIVISION OF AIR QUALITY

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

EXECUTIVE SUMMARY

The original Clean Air Act was signed into law in 1963. However, it was the Clean Air Act of 1970, reviewed and amended by Congress in 1975 and 1977 that formed the basis of the federal air pollution control currently in place. Health-based national ambient air quality standards are the strategic basis of the Clean Air Act. The standards were to be met through the application of control technology that would reduce emissions continuously and result in improved air quality. Costs of technological capability were to be subordinated to public health protection requirements. Also, all requirements were to be national, with no facility having a competitive edge by having to meet less stringent controls. The Environmental Protection Agency (EPA) is responsible for carrying out the program.

Prior to the 1990 Clean Air Amendments, EPA set two kinds of National Ambient Air Quality Standards (NAAQS) specifying maximum acceptable levels of pollutants for outdoor air. Primary standards set limits that protect human health; secondary standards protect plants and animals. EPA set primary and secondary standards for six criteria pollutants: carbon monoxide, nitrogen oxides, lead, sulfur, sulfur dioxides, ozone and particulates. Eight substances were listed as hazardous air pollutants: asbestos, beryllium, mercury, vinyl chloride, radionuclides, inorganic arsenic, benzene, and coke oven emissions. National Emissions Standards for Hazardous Pollutants (NESHAPS) were promulgated for sources of seven of these pollutants.

Most air pollution comes from either stationary sources, such as factories, power plants and smelters, or mobile sources such as cars, trucks and airplanes. To limit mobile source pollution, controls were established for automobile emissions. EPA also set standards that applied to new industrial plants and existing ones that were substantially modified. Additionally, state governments were required to draw up State Implementation Plans (SIP's) that set out other measures to achieve acceptable air quality.

Congress mandated the Title V Permit Program, primarily for regulating major air pollution sources, under the Federal Clean Air Act Amendments of 1990. The North Carolina Environmental Management Commission (EMC) established the state Title V Permit Program in 1994 in accordance with state and federal laws and with guidance from the N.C. Clean Air Act Advisory Council. The state Division of Air Quality (DAQ) carries out the program, which received interim approval from the U.S. Environmental Protection Agency (EPA) on December 15, 1995 and final approval in October 2001. To date, the DAQ has issued 354 Title V permits. The division has about 26 additional applications under review and expects to issue all of the remaining initial Title V permits by early 2004.

The Clean Air Act requires that permit fees cover the entire cost of the Title V Program. In North Carolina, the revenue raised from Title V permit fees is close to the estimated cost of the program. This is true even though the total fees collected are only about 78 percent of the minimum fees presumed necessary to run the program under the Federal

Clean Air Act. Many other states charge the minimum presumptive fee, which is $25 per ton in 1990 dollars. The permanent staff size for carrying out North Carolina's Title V program is considered adequate, given the current number of permit applications, the known program requirements, and the DAQ's experience with the program. Contract personnel were, until December 2002, used to assist in the completion of the work on the initial round of permit applications.

The following additional points are provided to clarify/highlight the information provided in this report:

- The issuance of permits is progressing in a satisfactory manner. The prospect of meeting the Divisions goal of completing the first round of permit issuance in the first quarter of 2004 is good.

- The Division has been able to run a fiscally sound program collecting less in fees than was authorized by the oversight committee at the start of the program.

- The break down of staff between the Central Office and the Regional Offices has adequately covered the needs of the Division to date. This distribution will be reviewed after the issuance of the initial Title V Permits has been completed.

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INTRODUCTION

This Accountability Report describes the Title V Permit Program in North Carolina as carried out by the Division of Air Quality, Department of Environment and Natural Resources. The report focuses on funding and staffing issues. It does not cover Title V permit programs under the jurisdiction of local air pollution control programs in Buncombe, Forsyth, and Mecklenburg counties.

Congress established the Title V Permit Program under the Federal Clean Air Act (1990 Amendments), primarily as a way to regulate major air pollution sources. Under the Clean Air Act, Title V Permits are required for certain industry groups as designated by the EPA as well as facilities that emit at least:

- 100 tons per year of most regulated pollutants; or
- 10 tons per year of any hazardous air pollutant; or
- 25 tons per year of any combination of hazardous air pollutants.

In North Carolina, the General Assembly enacted laws in 1991 and 1993 authorizing the Title V program. The legislature also established the North Carolina Clean Air Act Advisory Council to develop the programs needed to comply with the Clean Air Act, including the structure of the Title V permit fees. The Clean Air Act Advisory Council issued a final report in August 1992, and the Environmental Management Commission followed the council's recommendations in adopting rules for the state Title V Permit Program in 1994. The EPA gave interim approval to North Carolina's Title V Permit Program on December 15, 1995, with final approval pending certain rules changes, which have been submitted to EPA. Final approval was given in October 2001.

The Clean Air Act as well as the General Assembly, the EPA, the EMC and the Clean Air Act Advisory Council all required or recommended accountability measures for the state Title V program. This Accountability Report includes:

- A discussion of program accomplishments and goals;
- A detailed description of the Title V permit fee structure for calendar year 2003;
- A detailed, line-item budget for state fiscal year 2003;
- An organizational chart for total staff in the Division of Air Quality and Title V related positions; and
- An account of Title V receipts and expenditures from state fiscal year 1992 to 2002;

The Division of Air Quality started receiving Title V permit applications after EPA's interim approval of the program on December 15, 1995. Facilities were given until December 1996 to submit their applications or they would be considered in violation of the permitting rules. Applications received during the aforementioned timeframe were called "Initial Title V Applications" and all other Title V applications received after December 1996 were called "First Time Title V Applications". By January 1998, DAQ had 475 Title V applications under review. Since program approval the DAQ has received a total of 558 Title V applications (488 initial and 70 first time). To date DAQ has issued 354 initial Title V permits and expects to issue 24 of the remaining 26 permits

by December 2003. The issuance of the last two permits has been delayed by the need for public hearings. One hundred and eight of the initial Title V applications have been withdrawn due to reclassification or closure. To date DAQ has issued 45 of the First Time Title V permits and is currently reviewing 47 applications. Four of the First Time Title V applications have been withdrawn. Currently, DAQ has 402 operating facilities classified as Title V facilities.

Questions about this accountability Report or request for copies should be directed to Charles Valrie, Division of Air Quality, Department of Environment and Natural Resources, 1641 Mail Service Center, Raleigh, NC 27699-1641; telephone (919) 715-6281; email: Charles.Valrie@ncmail.net.

ACCOMPLISHMENTS AND GOALS

The Division of Air Quality (DAQ), the Department of Environment and Natural Resources (DENR), and the North Carolina Environmental Management Commission (EMC) have accomplished the following measures in developing and carrying out a Title V Permit Program in North Carolina. Goals are included where applicable.

1. The DAQ has established a Title V Permit Program based on rules adopted by the EMC (15A NCAC 2Q .0500). The program meets the requirements of state law (N.C.G.S. §§143-215.3 and 143-215.108) that authorized the program in North Carolina and set up the North Carolina Clean Air Act Advisory Council. The EPA gave interim approval to the program in 1995, and following the DAQ's revision to the Title V regulations; EPA gave final program approval in October of 2001.

2. In 2002 the DAQ revised the Title V application forms including the development of special forms for the renewal of Title V permits. These revised forms are intended to facilitate the application process, and they have been placed on the Division's website (http://daq.state.nc.us).

3. The DAQ has developed a permit fee schedule that generates an appropriate amount of revenue to carry out the Title V permitting program. The Federal Clean Air Act requires that Title V permit holders pay fees sufficient to cover the cost to administer the permitting program. The DAQ will continue to evaluate the fee structure to ensure that the necessary fees are collected.

4. The DAQ has hired approximately 139 staff members to operate the Title V program since it started in 1992. The total staff size is still smaller than the projected size from the Final Report of the Clean Air Act Advisory Council and has remained constant for several years. There are no plans to increase the number of positions funded by the Title V fees above the current level.

5. DENR has established a Small Business Assistance Program, hired a Small Business Ombudsman, and appointed a Compliance Advisory Panel to conduct citizen overview of small business activity.

6. The DAQ continues to hold meetings, including quarterly Outside Involvement Committee meetings, to provide guidance and allow citizen input into DAQ's permitting and planning procedures.

7. DAQ provided and continues to provide a range of options to qualify facilities as Non-Title V facilities. Many facilities have taken advantage of these options, which is one of the reasons why the number of Title V facilities is much less than initial estimates; that is, 402 Title V facilities now versus the 2000 estimated in the Clean Air Act Advisory Council's Final Report. For example, the DAQ established the synthetic minor program so facilities could avoid the Title V permitting program by taking permitted emission limits and/or operating restrictions. Also, the EMC adopted and EPA approved exclusionary rules to

allow reasonable potential emission calculations in cases where standard methods would produce unreasonably high potential emissions thus subjecting such facilities to Title V. **Goal:** The DAQ will continue to issue appropriate permits to qualified facilities that wish to remain non-Title V facilities.

8. To Date DAQ has received 402 Title V permit applications and issued 354 (380 initial and 22 others). **Goal:** DAQ will issue 24 of the remaining 26 initial permits by the end of December 2003.

9. In 1994 the DAQ conducted its first comprehensive emissions inventory for all facilities in North Carolina. This comprehensive inventory process has been repeated every three years for all sources while Title V facilities are required to submit an inventory annually. This emission information is stored on a computer database that the DAQ uses to calculate fees and for use in regulatory planning. **Goal:** The DAQ has started to develop an electronic on-line inventory system and the system was made available to permittees to use in 2003.

CALENDAR YEAR 2003 PERMIT FEES TABLE

NOTES AND EXPLANATION

The federal Clean Air Act requires that the entire cost of the Title V Permit Program, including both direct and related expenses, be funded by facilities' permit fees and that Title V permit fees be used only for this purpose. The Clean Air Act also set a presumptive minimum for total fees at $25 per ton of air pollutant emissions in 1990 dollars, with a cost-of-living escalator that has raised this minimum to $36.60 in 2002 dollars. The Title V permit fees schedule for North Carolina now yields only 78 percent of the presumptive minimum. However, DAQ considers this amount adequate to run the program as long as all other funding sources for DAQ remain unchanged. The Title V permit fees are required by Federal Statues and DAQ rules to be adjusted each January 1st by an official cost-of-living factor from the U.S. Environmental Protection Agency.

The Clean Air Act Advisory Council (Council) established by the General Assembly recommended in 1992 that the Title V permit fees should total $25 per ton of emission (adjusted annually for cost-of-living from the 1990 base), rather than the $36.45 per ton shown by the workload analysis in the Council's Final Report. The Council recommended this level so North Carolina could remain competitive with neighboring states — most of which were expected to use the $25/ton plus inflation presumptive minimum — and because of the many uncertainties in the program at that time.

The council also considered the fairness of basing fees entirely on the amount of pollutants emitted, rather than on the amount of work required to administer Title V permits for various types of facilities. Because some work is required to issue every Title V permit, regardless of the facility's emissions, the Council recommended that half of the total Title V permit fees come from an applications fee (an annual flat fee for each permit) and the other half of the revenues come from annual per-ton charges.

A major uncertainty during the Council's work was the number of facilities that would be required to hold Title V permits and their emissions levels. This existed because a comprehensive emission inventory had never been required for all facilities. Since the Council concluded its work, the EPA has issued many regulations, policies, clarifications, and changes to the Title V program, and the state has responded accordingly.

The state also has shown flexibility in the Title V program by using size exclusions for some industry groups (such as service stations, grain elevators, dry cleaners and emergency generators) and by allowing facilities to adopt permit limits that reduce their potential emissions below the Title V thresholds (known as synthetic minor sources). As a result, the number of Title V facilities has decreased from an estimated 2,000 in the Clean Air Act Advisory Council's Final Report, to 850 when the Title V permit fees schedule was adopted effective March 8, 1994, to about 402 facilities today. The total amount of emissions has changed little since the Council's Final report.

In Table I, "non-attainment" refers to permits issued under special rules applicable in areas that are in non-attainment with federal standards for criteria air pollutants such as

ozone or carbon monoxide. "PSD" refers to permits issued under federal Prevention of Significant Deterioration rules. "NSR/NAA" refers to permits issued under special rules for New Source Review in Non-attainment Areas.

Another feature of the fee schedule that should be noted is that no permit application fee is charged for a simple renewal of a permit. In addition, no permit application fee is charged when the reason for the change is initiated by the Director of the Division of Air Quality or the Environmental Management Commission, e.g., new control equipment required by a new rule or even the initial Title V permits for existing permitted sources.

CALENDAR YEAR 2003 PROJECTED TITLE V PERMIT FEES 4/3/03

TITLE V PRESUMPTIVE MINIMUM	324711 TONS *	$36.60 =		$11,884,422.60	IN 2003 $
FEES PER NC RULE (TOTALS FROM BELOW)		TITLE V		$8,898,387.62	IN 2003 $
		AVERAGE TITLE V $/TON		$27.40	IN 2003 $
		AVERAGE TITLE V $/TON		$18.72	IN 1990 $
		% OF PRESUMPTIVE		$74.87	

TITLE V	ANNUAL FEES	PERMITS	FEE RATE	FEE SUBTOTAL	
	BASIC	455	$6,074.00	$2,763,670.00	IN 2003 $
	TONS/TONNAGE FACTOR	324711	$17.42	$5,656,465.62	
	NONATTAINMENT	0	$3,097.00	$0.00	
TITLE V	APPLICATION FEES				
	SIGNIFICANT MODIFICATION	6	$8,576.00	$51,456.00	
	MINOR MODIFICATION	165	$834.00	$137,610.00	
	OWNERSHIP CHANGE	2	$60.00	$120.00	
	NEW	11	$8,576.00	$94,336.00	
	PSD OR NSR/NAA	15	$12,982.00	$194,730.00	
	PSD & NSR/NAA	0	$25,250.00	$0.00	

*The 2001 presumptive minimum fee was used in these calculations.

Fees03da.wk3

TITLE V EXPENDITURE BUDGET
STATE FISCAL YEAR 2003

ACCOUNT	ACCOUNT DESCRIPTION	BUDGETED AMT
531212	SPA-REG SALARIES-RECPT	5,713,006.00
531462	EPA&SPA-LONGVTY PAY-REC	29,531.00
531512	SOCIAL SEC CONTRIB-RECPT	435,842.00
531522	REG RETIRE CONTRIB-RECPT	609,071.00
531562	MED INS CONTRIB-RECPTS	337,523.00
531631	WRKER COMP-MED PAYMENTS	0
531651	COMPENSATION TO BOARD ME	15
532110	LEGAL SERVICES	116,597.00
532140	OTH INFORMATION TECH SVC	881,000.00
532160	ENGINEERING SERVICES	0
532170	ADMIN SERVICES	157,017.00
532199	MISC CONTRACTUAL SERVICE	0
532210	ENRG SER -ELECTRICAL	20,000.00
532331	REPAIRS-MOTOR VEHICLES	3,379.00
532332	REPAIRS-OTH COMPUTER EQP	200
532333	REPAIRS-OTHER EQUIPMENT	1,202.00
532390	REPAIRS-OTHER	3,875.00
532430	MAINT AGREEMENT-EQUIP	3,080.00
532440	MAINT AGREEMENT-DP EQUIP	4,175.00
532441	MAINT AGRMT-OTHER SOFTWR	3,455.00
532443	MAINT AGRMT-OTHER DP EQP	2,000.00
532450	MAINT AGREE-SERVER EQUIP	1,946.00
532490	MAINT AGREEMENT-OTHER	0
532512	RENT/LEASE-BLDINGS/OFFIC	193,131.00
532513	RENT/LEASE-OTH FACILITIE	6,500.00
532521	RENT/LEASE-MOTOR VEHICLE	187,054.00
532590	RENT/LEASE OTHER PROPERT	43,212.00
532711	TRANSP AIR - IN STATE	683
532712	TRANS AIR-OUT STATE,IN U	13,449.00
532714	TRANSP-GRND - IN STATE	38,540.00
532715	TRANS GRND-OUT STA,IN US	3,274.00
532717	TRANSP OTHER - IN STATE	120
532718	TRANS OTH-OUTSTATE, IN U	600

TITLE V EXPENDITURE BUDGET
STATE FISCAL YEAR 2003

ACCOUNT	ACCOUNT DESCRIPTION	BUDGETED AMT
532721	LODGING - IN STATE	12,243.00
532722	LODGING-OUT STATE, IN US	19,472.00
532724	MEALS - IN STATE	10,200.00
532725	MEALS-OUT OF STATE,IN US	8,600.00
532727	MISC - IN STATE	100
532728	MISC - OUT STATE, IN US	157
532731	BD/NON-EMPLOYEE TRANSP	60
532811	TELEPHONE SERVICE	73,569.00
532812	TELECOMMUN DATA CHRG	28
532814	CELLULAR PHONE SERVICES	9,427.00
532819	TELEPHONE WIRING SVC CHR	0
532821	COMPUTER/DATA PROCESS SV	13,416.00
532840	POSTAGE, FREIGHT & DELIV	8,733.00
532840001	POST,FR&DEL-MAILING SVCS	100
532840003	POST,FR&DEL-POSTAL METER	1,600.00
532850	PRINT,BIND,DUPLICATE	13,758.00
532860	ADVERTISING	27,542.00
532911	PROPERTY-INSURANCE	5,200.00
532912	MOTOR VEHICLE INSURANCE	2,900.00
532913	LIABILITY INSURANCE	862
532930	REGISTRATION FEES	3,000.00
532942	OTHER EMP EDUCATIONAL EX	3,900.00
532950	EMP MOVING EXPENSES	2,500.00
533110	GENERAL OFFICE SUPPLIES	10,400.00
533120	DATA PROCESSING SUPPLIES	19,600.00
533130	PHOTOGRAPHIC SUPPLIES	451
533150	SECURITY & SAFETY SUPP	3,923.00
533190	OTHER ADMIN SUPPLIES	233
533240	CARPENTRY & HARDWARE SUP	850
533310	GASOLINE	7,950.00
533330	OIL, LUBRICANTS, FLUIDS	1,070.00
533340	TIRES & TUBES	1,300.00
533350	MOTOR VEH REPLCEMNT PART	1,050.00
533640	OPTICAL SUPPLIES	1,500.00
533710	SCIENTIFIC SUPPLIES	49,740.00
533720	EDUCATIONAL SUPPLIES	1,700.00
533900	OTHER MATERIALS & SUPP	11,252.00

TITLE V EXPENDITURE BUDGET
STATE FISCAL YEAR 2003

ACCOUNT	ACCOUNT DESCRIPTION	BUDGETED AMT
534210	BUILDING ACQUISIT COSTS	12,694.00
534511	FURN-OFFICE	359
534521	OFFICE EQUIPMENT	628
534523	EQUIP-SCIENTIFIC/MEDICAL	75,500.00
534530	OTHER DP EQUIPMENT	14,885.00
534534	PC/PRINTER EQUIPMENT	0
534620	TEXTBOOKS	10
534630	LBRRY&LRNING RESRCE COLL	970
534711	OTHER COMPUTER SOFTWARE	20,250.00
535830	MEMBERSHIP DUES&SUBSCRIP	1,870.00
535900	OTHER EXPENSES	1,069.00
536929	OTHER CONT/GRT-ED-INST	75,000.00
536989	OTHER CONTRACTS/GRANTS	285,509.00
538010	DEPENDENT CARE-OP TFR	3,464.00
538102	I 1615	301,496.00
538108	TFR IND. COST 1940/14300	126,299.00
538111	TRANSFER TO CODE 14300	236,445.00
538129	TFR TO REG FIELD OFFIC	143,896.00
	PROJECTED BUDGET	10,438,207.00

HISTORY
TITLE V FEES/ASSESSMENTS AND EXPENDITURES
EXPLANATION

DENR collected Title V assessments until the Environmental Management Commission adopted rules setting the permit fees schedule in 1994, as specified by the General Assembly in House Bill 551(N.C.G.S. 143-215.3 and 143-215.108). The rule adoption process occurred after the North Carolina Clean Air Act Advisory Council issued its final report in 1992, as specified by the legislature. Assessments were collected in state fiscal years 1992 (starting July 1, 1991) 1993, and 1994. The Title V permit fees set by rule were collected beginning in state fiscal year 1995 (starting July 1, 1994).

In 1997, facilities received a partial refund of Title V fees. This was accomplished by sending the facility a check, valued at 21% of the permit fees paid in 1997. This refund was to reduce the budgeted carry forward as of July 1, 1998.

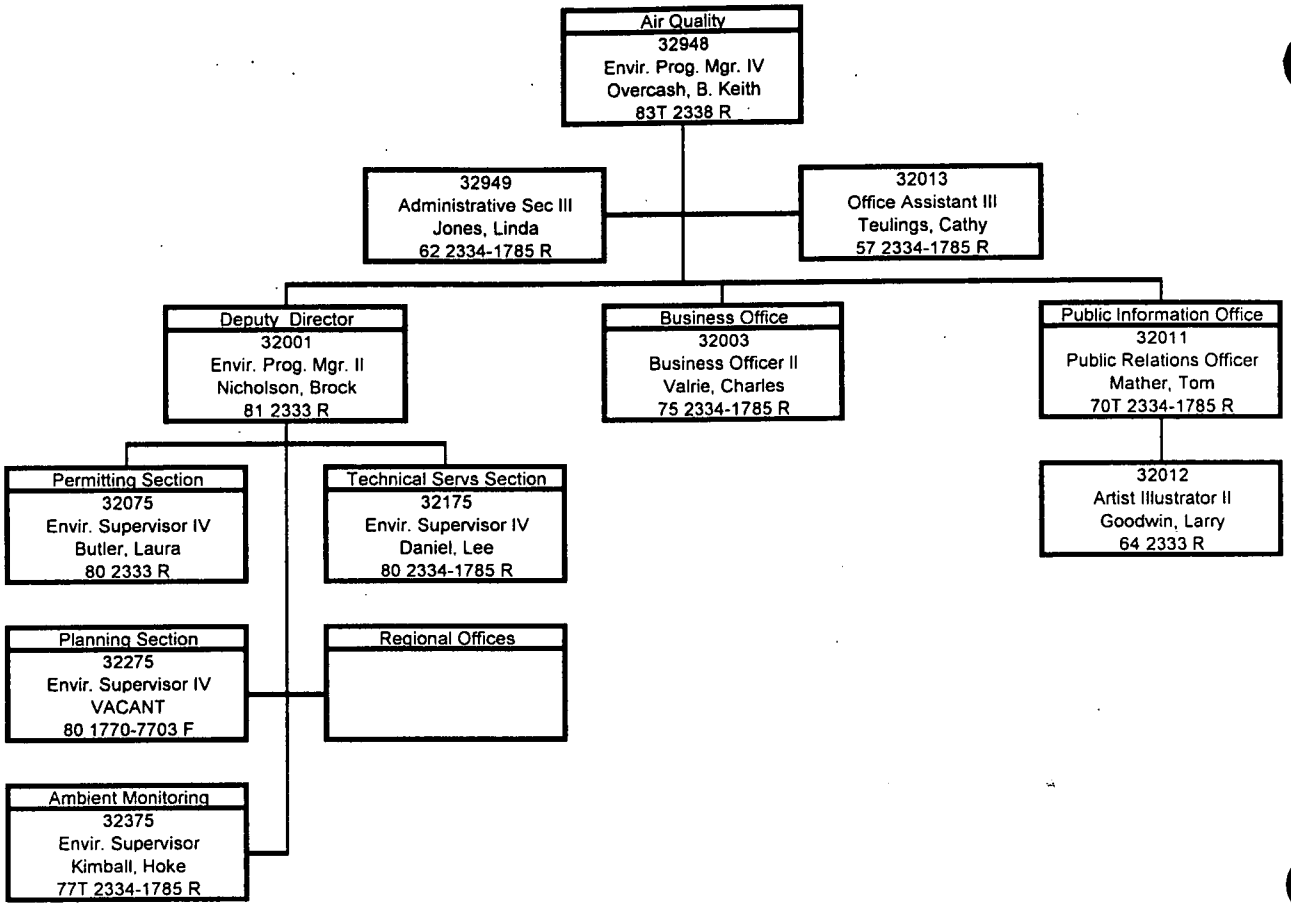
Air Quality, based on an analysis of variability in fuel tax revenue, decided that it is prudent to have a carry forward of about 35%. The 35% is well within the statutory limitation that allows a state's Title V program to carry forward 100% of the expected cost of the Title V program for the next year. By terms of the Federal Clean Air Act, the entire cost of the Title V program must be paid with Title V permit fees, and Title V permit fees can only be used for this purpose.

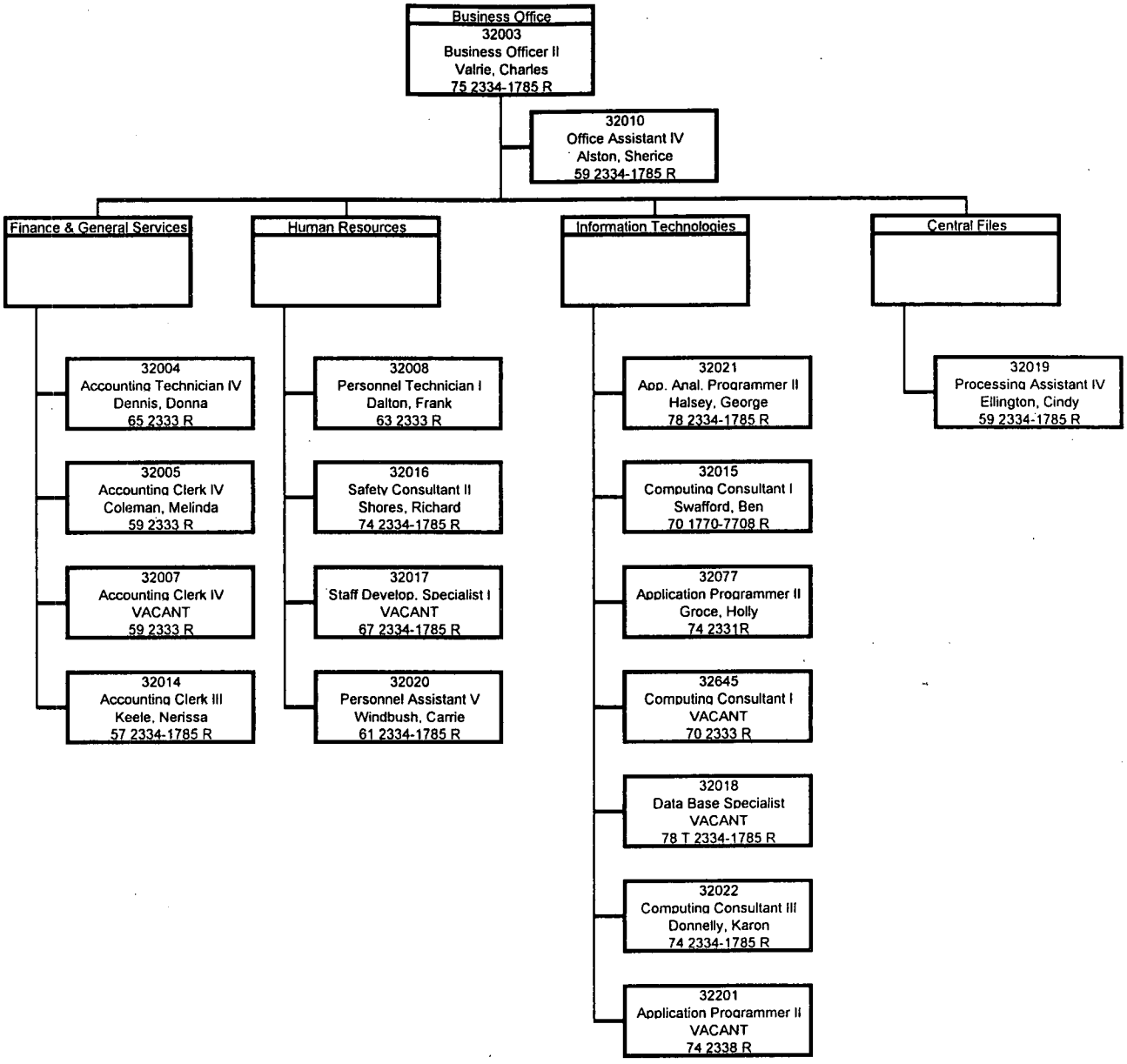
HISTORY
TITLE V FEES/ASSESSMENTS AND EXPENDITURES
(MILLIONS $)

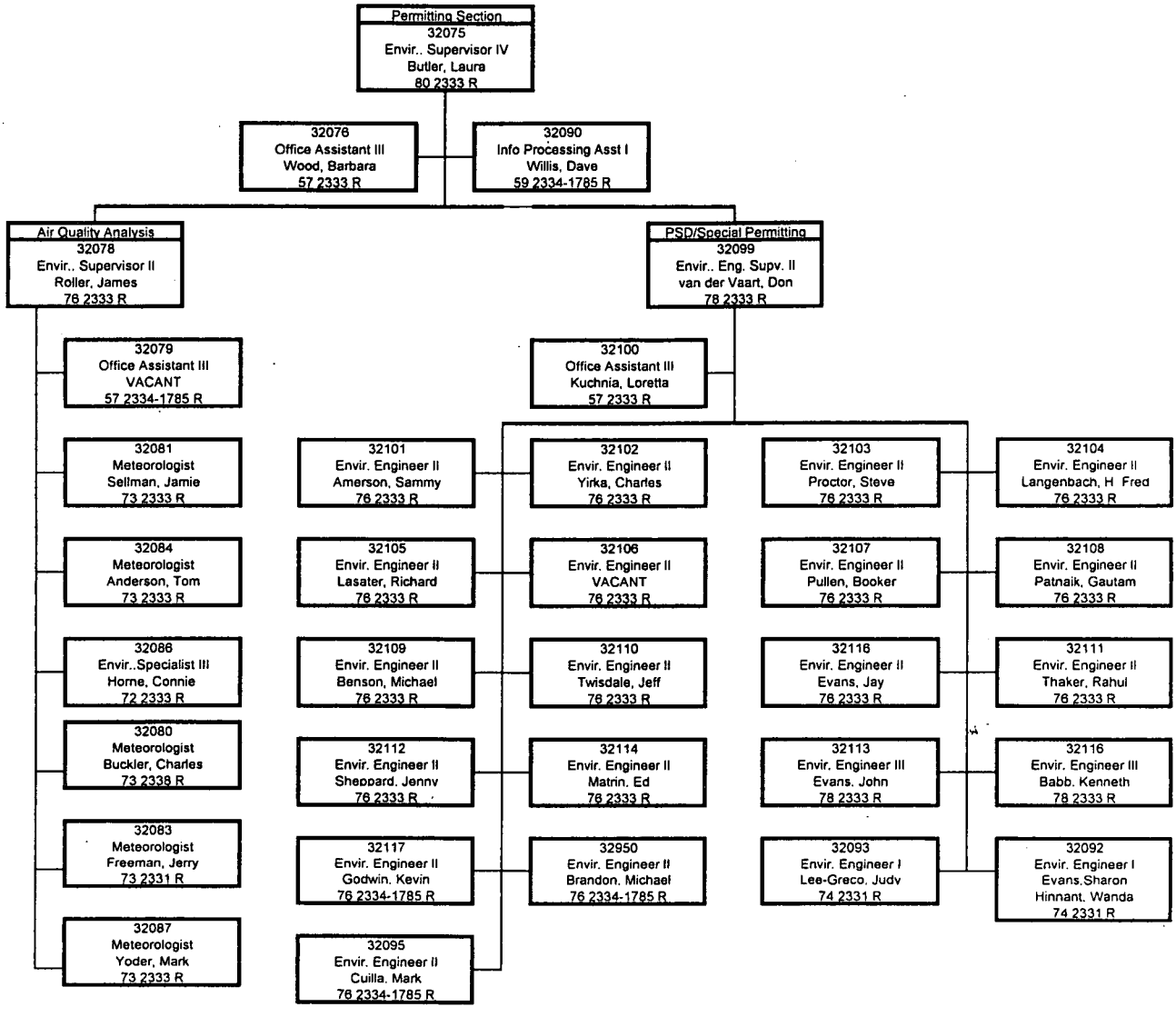
State Fiscal Year	92	93	94	95	96	97	98	99	00	01	02	Budgeted 03
Carried Forward	0	0.6	1.8	1.7	2.8	4.5	5.5	5.7	5.4	4.8	4.5	5.6
Fees Beginning '95/Assessments before	0.9	3.9	3.5	6.3	7.9	7.6	9.3	7.8	7.9	8.7	9.1	8.9
Salary	0.1	0.9	2.3	3.6	4.2	4.7	5.1	5.8	6.0	6.4	5.9	7.1
Travel		0.1	0	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2
Supplies	0.1	0.3	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.3
Equipment	0.1	1.1	0.3	0.5	0.3	0.2	0.4	0.3	0.4	0.2	0.1	0.5
Contracts		0.3	0.4	0.2	0.1	0.2	0.3	0.1	0.3	0.3	0.3	0.6
Other (Rent, Utilities, Regl. Office Fund, etc)			0.3	0.4	0.7	0.6	0.9	0.8	0.8	1.2	0.7	0.9
Small Business Ombudsman's			0.2	0.2	0.3	0.3	0.1	0.3	0.3	0.3	0.3	0.3
Transfer to DENR Agencies					0.2	0.3	0.4	0.6	0.4	0.4	0.4	0.5
Total Expenses	0.3	2.7	3.6	5.2	6.2	6.6	7.5	8.1	8.5	9.0	7.9	10.4
Refund to Sources							1.6					
To Be Carried Forward	0.6	1.8	1.7	2.8	4.5	5.5	5.7	5.4	4.8	4.5	5.6	4.1

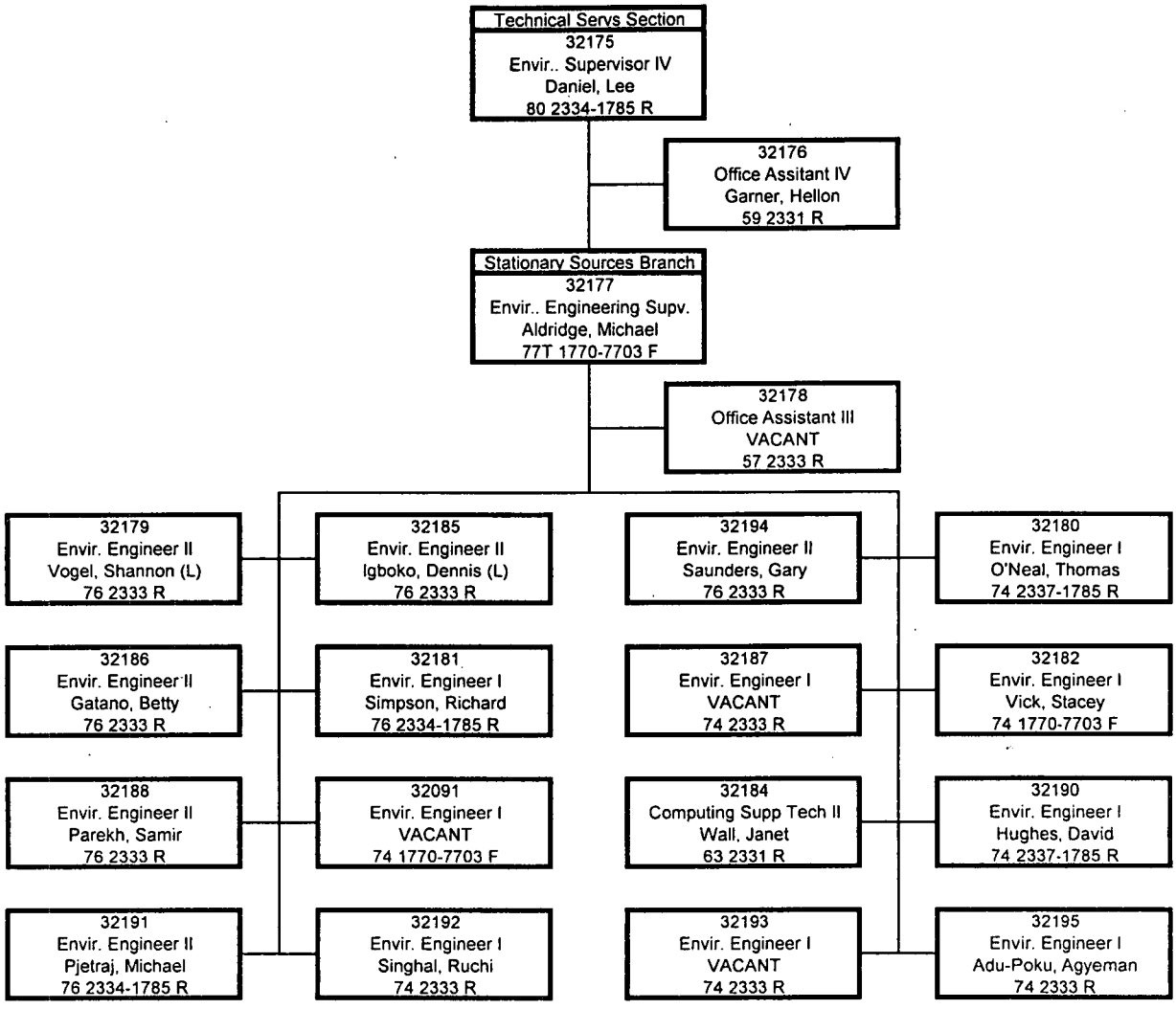
ORGANIZATION CHART EXPLANATION

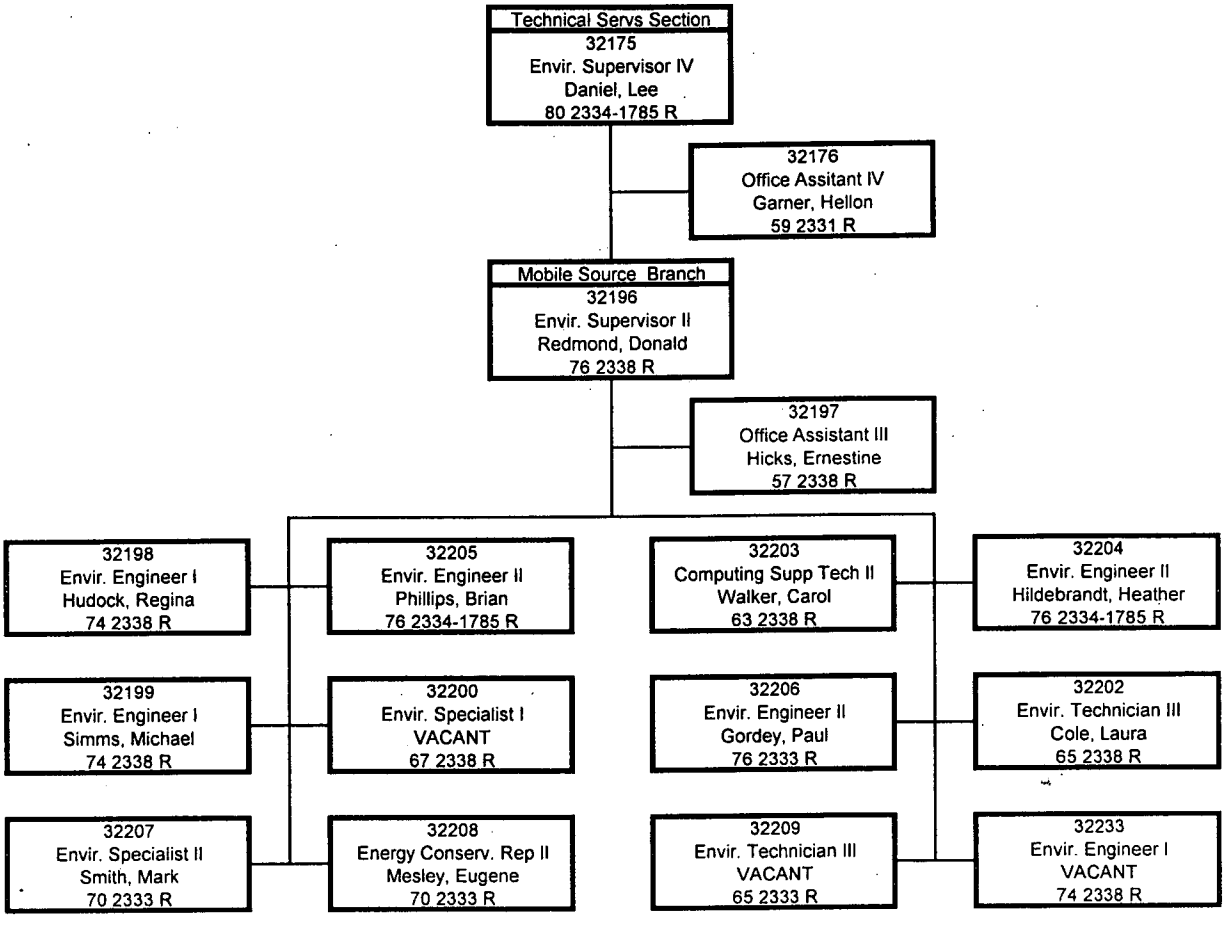
The organization chart shown in this document list all the positions authorized by State Personnel for the Division of Air Quality. Positions that are funded using Title V fees are listed with a funding designation of 2333R. Additionally, positions outside the Division of Air Quality that are funded through the transfer of Title V funds are listed separately.

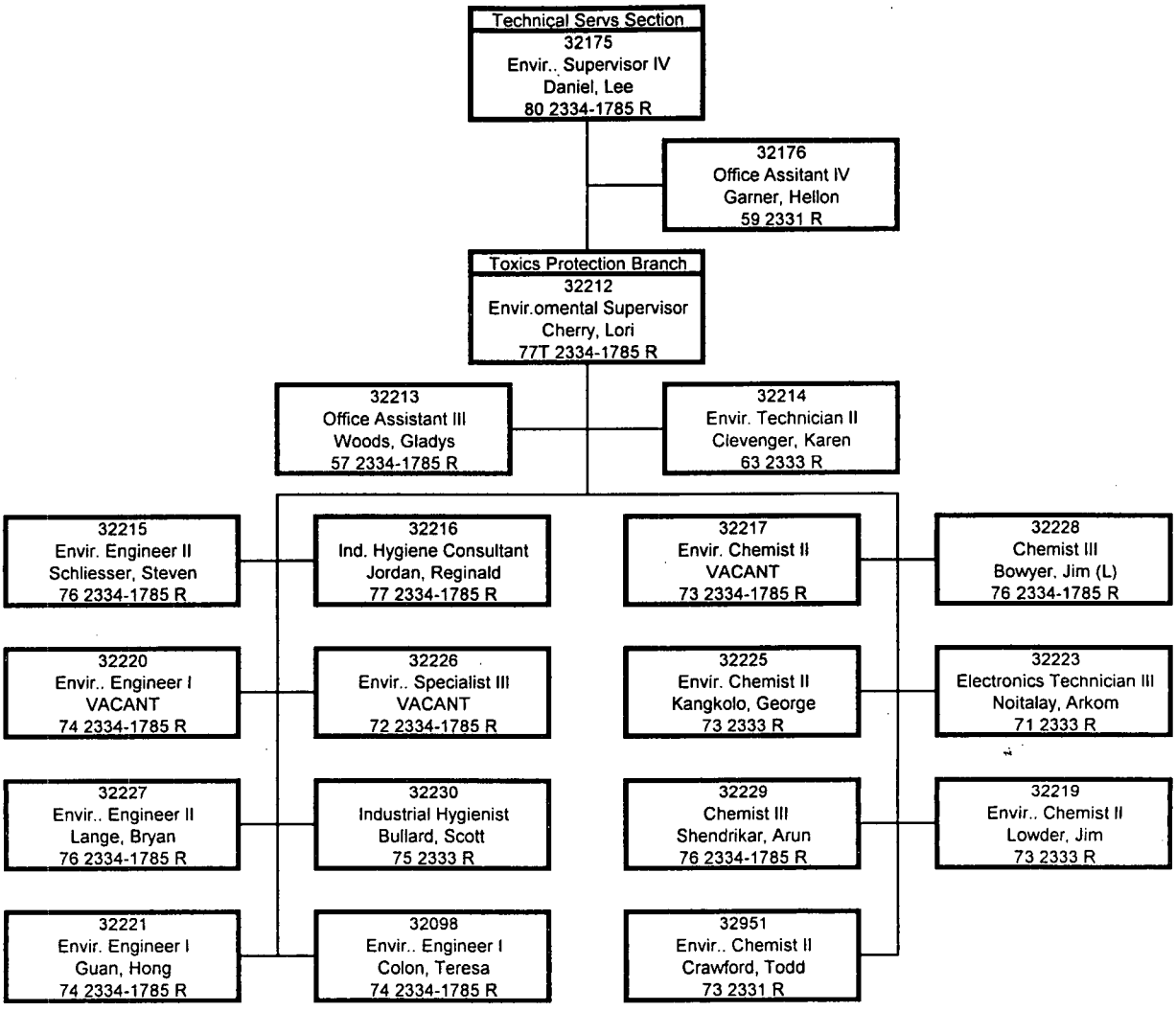

Air Quality
32948
Envir. Prog. Mgr. IV
Overcash, B. Keith
83T 2338 R
32949
Administrative Sec III
Jones, Linda
62 2334-1785 R
32013
Office Assistant III
Teulings, Cathy
57 2334-1785 R
Deputy Director
32001
Envir. Prog. Mgr. II
Nicholson, Brock
81 2333 R
Business Office
32003
Business Officer II
Valrie, Charles
75 2334-1785 R
Public Information Office
32011
Public Relations Officer
Mather, Tom
70T 2334-1785 R
32012
Artist Illustrator II
Goodwin, Larry
64 2333 R
Permitting Section
32075
Envir. Supervisor IV
Butler, Laura
80 2333 R
Technical Servs Section
32175
Envir. Supervisor IV
Daniel, Lee
80 2334-1785 R
Planning Section
32275
Envir. Supervisor IV
VACANT
80 1770-7703 F
Regional Offices
Ambient Monitoring
32375
Envir. Supervisor
Kimball, Hoke
77T 2334-1785 R

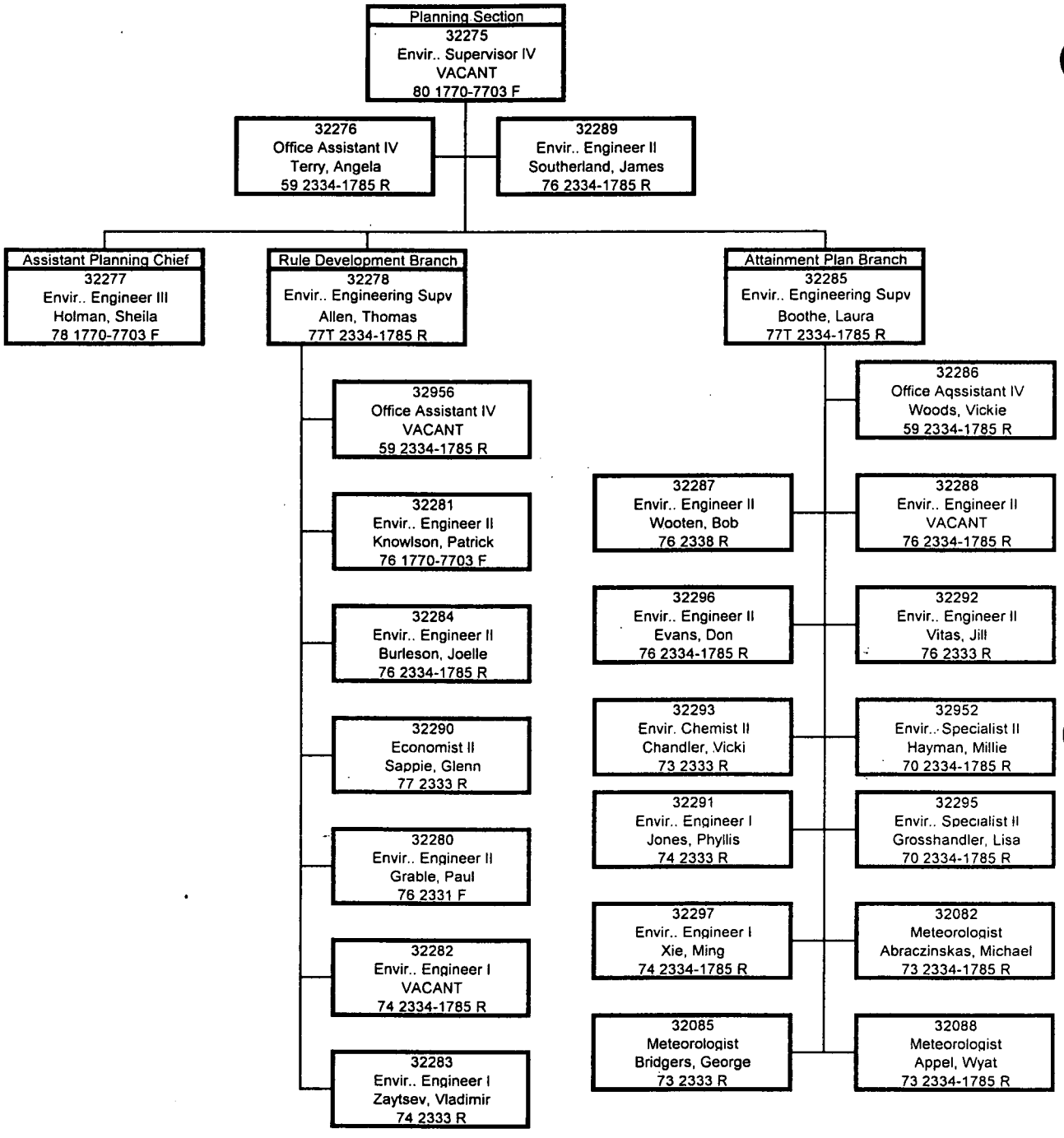

Business Office
32003
Business Officer II
Valrie, Charles
75 2334-1785 R
32010
Office Assistant IV
Alston, Sherice
59 2334-1785 R
Finance & General Services
Human Resources
Information Technologies
Central Files
32004
Accounting Technician IV
Dennis, Donna
65 2333 R
32005
Accounting Clerk IV
Coleman, Melinda
59 2333 R
32007
Accounting Clerk IV
VACANT
59 2333 R
32014
Accounting Clerk III
Keele, Nerissa
57 2334-1785 R
32008
Personnel Technician I
Dalton, Frank
63 2333 R
32016
Safety Consultant II
Shores, Richard
74 2334-1785 R
32017
Staff Develop. Specialist I
VACANT
67 2334-1785 R
32020
Personnel Assistant V
Windbush, Carrie
61 2334-1785 R
32021
App. Anal. Programmer II
Halsey, George
78 2334-1785 R
32015
Computing Consultant I
Swafford, Ben
70 1770-7708 R
32077
Application Programmer II
Groce, Holly
74 2331R
32645
Computing Consultant I
VACANT
70 2333 R
32018
Data Base Specialist
VACANT
78 T 2334-1785 R
32022
Computing Consultant III
Donnelly, Karon
74 2334-1785 R
32201
Application Programmer II
VACANT
74 2338 R
32019
Processing Assistant IV
Ellington, Cindy
59 2334-1785 R


Permitting Section
32075
Envir.. Supervisor IV
Butler, Laura
80 2333 R
32076
Office Assistant III
Wood, Barbara
57 2333 R
32090
Info Processing Asst I
Willis, Dave
59 2334-1785 R
Air Quality Analysis
32078
Envir.. Supervisor II
Roller, James
76 2333 R
PSD/Special Permitting
32099
Envir.. Eng. Supv. II
van der Vaart, Don
76 2333 R
32079
Office Assistant III
VACANT
57 2334-1785 R
32100
Office Assistant III
Kuchnia, Loretta
57 2333 R
32081
Meteorologist
Sellman, Jamie
73 2333 R
32101
Envir. Engineer II
Amerson, Sammy
76 2333 R
32102
Envir. Engineer II
Yirka, Charles
76 2333 R
32103
Envir. Engineer II
Proctor, Steve
76 2333 R
32104
Envir. Engineer II
Langenbach, H Fred
76 2333 R
32084
Meteorologist
Anderson, Tom
73 2333 R
32105
Envir. Engineer II
Lasater, Richard
76 2333 R
32106
Envir. Engineer II
VACANT
76 2333 R
32107
Envir. Engineer II
Pullen, Booker
76 2333 R
32108
Envir. Engineer II
Patnaik, Gautam
76 2333 R
32086
Envir..Specialist III
Horne, Connie
72 2333 R
32109
Envir. Engineer II
Benson, Michael
76 2333 R
32110
Envir. Engineer II
Twisdale, Jeff
76 2333 R
32116
Envir. Engineer II
Evans, Jay
76 2333 R
32111
Envir. Engineer II
Thaker, Rahul
76 2333 R
32080
Meteorologist
Buckler, Charles
73 2338 R
32112
Envir. Engineer II
Sheppard, Jenny
76 2333 R
32114
Envir. Engineer II
Matrin, Ed
76 2333 R
32113
Envir. Engineer III
Evans, John
78 2333 R
32116
Envir. Engineer III
Babb, Kenneth
78 2333 R
32083
Meteorologist
Freeman, Jerry
73 2331 R
32117
Envir. Engineer II
Godwin, Kevin
76 2334-1785 R
32950
Envir. Engineer II
Brandon, Michael
76 2334-1785 R
32093
Envir. Engineer I
Lee-Greco, Judy
74 2331 R
32092
Envir. Engineer I
Evans,Sharon
Hinnant, Wanda
74 2331 R
32087
Meteorologist
Yoder, Mark
73 2333 R
32095
Envir. Engineer II
Cuilla, Mark
76 2334-1785 R


Technical Servs Section
32175
Envir.. Supervisor IV
Daniel, Lee
80 2334-1785 R
32176
Office Assitant IV
Garner, Hellon
59 2331 R
Stationary Sources Branch
32177
Envir.. Engineering Supv.
Aldridge, Michael
77T 1770-7703 F
32178
Office Assistant III
VACANT
57 2333 R
32179
Envir. Engineer II
Vogel, Shannon (L)
76 2333 R
32185
Envir. Engineer II
Igboko, Dennis (L)
76 2333 R
32194
Envir. Engineer II
Saunders, Gary
76 2333 R
32180
Envir. Engineer I
O'Neal, Thomas
74 2337-1785 R
32186
Envir. Engineer II
Gatano, Betty
76 2333 R
32181
Envir. Engineer I
Simpson, Richard
76 2334-1785 R
32187
Envir. Engineer I
VACANT
74 2333 R
32182
Envir. Engineer I
Vick, Stacey
74 1770-7703 F
32188
Envir. Engineer II
Parekh, Samir
76 2333 R
32091
Envir. Engineer I
VACANT
74 1770-7703 F
32184
Computing Supp Tech II
Wall, Janet
63 2331 R
32190
Envir. Engineer I
Hughes, David
74 2337-1785 R
32191
Envir. Engineer II
Pjetraj, Michael
76 2334-1785 R
32192
Envir. Engineer I
Singhal, Ruchi
74 2333 R
32193
Envir. Engineer I
VACANT
74 2333 R
32195
Envir. Engineer I
Adu-Poku, Agyeman
74 2333 R


Technical Servs Section
32175
Envir. Supervisor IV
Daniel, Lee
80 2334-1785 R
32176
Office Assitant IV
Garner, Hellon
59 2331 R
Mobile Source Branch
32196
Envir. Supervisor II
Redmond, Donald
76 2338 R
32197
Office Assistant III
Hicks, Ernestine
57 2338 R
32198
Envir. Engineer I
Hudock, Regina
74 2338 R
32205
Envir. Engineer II
Phillips, Brian
76 2334-1785 R
32203
Computing Supp Tech II
Walker, Carol
63 2338 R
32204
Envir. Engineer II
Hildebrandt, Heather
76 2334-1785 R
32199
Envir. Engineer I
Simms, Michael
74 2338 R
32200
Envir. Specialist I
VACANT
67 2338 R
32206
Envir. Engineer II
Gordey, Paul
76 2333 R
32202
Envir. Technician III
Cole, Laura
65 2338 R
32207
Envir. Specialist II
Smith, Mark
70 2333 R
32208
Energy Conserv. Rep II
Mesley, Eugene
70 2333 R
32209
Envir. Technician III
VACANT
65 2333 R
32233
Envir. Engineer I
VACANT
74 2338 R


Technical Servs Section
32175
Envir.. Supervisor IV
Daniel, Lee
80 2334-1785 R
32176
Office Assitant IV
Garner, Hellon
59 2331 R
Toxics Protection Branch
32212
Envir.omental Supervisor
Cherry, Lori
77T 2334-1785 R
32213
Office Assistant III
Woods, Gladys
57 2334-1785 R
32214
Envir. Technician II
Clevenger, Karen
63 2333 R
32215
Envir. Engineer II
Schliesser, Steven
76 2334-1785 R
32216
Ind. Hygiene Consultant
Jordan, Reginald
77 2334-1785 R
32217
Envir. Chemist II
VACANT
73 2334-1785 R
32228
Chemist III
Bowyer, Jim (L)
76 2334-1785 R
32220
Envir.. Engineer I
VACANT
74 2334-1785 R
32226
Envir.. Specialist III
VACANT
72 2334-1785 R
32225
Envir. Chemist II
Kangkolo, George
73 2333 R
32223
Electronics Technician III
Noitalay, Arkom
71 2333 R
32227
Envir.. Engineer II
Lange, Bryan
76 2334-1785 R
32230
Industrial Hygienist
Bullard, Scott
75 2333 R
32229
Chemist III
Shendrikar, Arun
76 2334-1785 R
32219
Envir.. Chemist II
Lowder, Jim
73 2333 R
32221
Envir. Engineer I
Guan, Hong
74 2334-1785 R
32098
Envir.. Engineer I
Colon, Teresa
74 2334-1785 R
32951
Envir.. Chemist II
Crawford, Todd
73 2331 R


Planning Section
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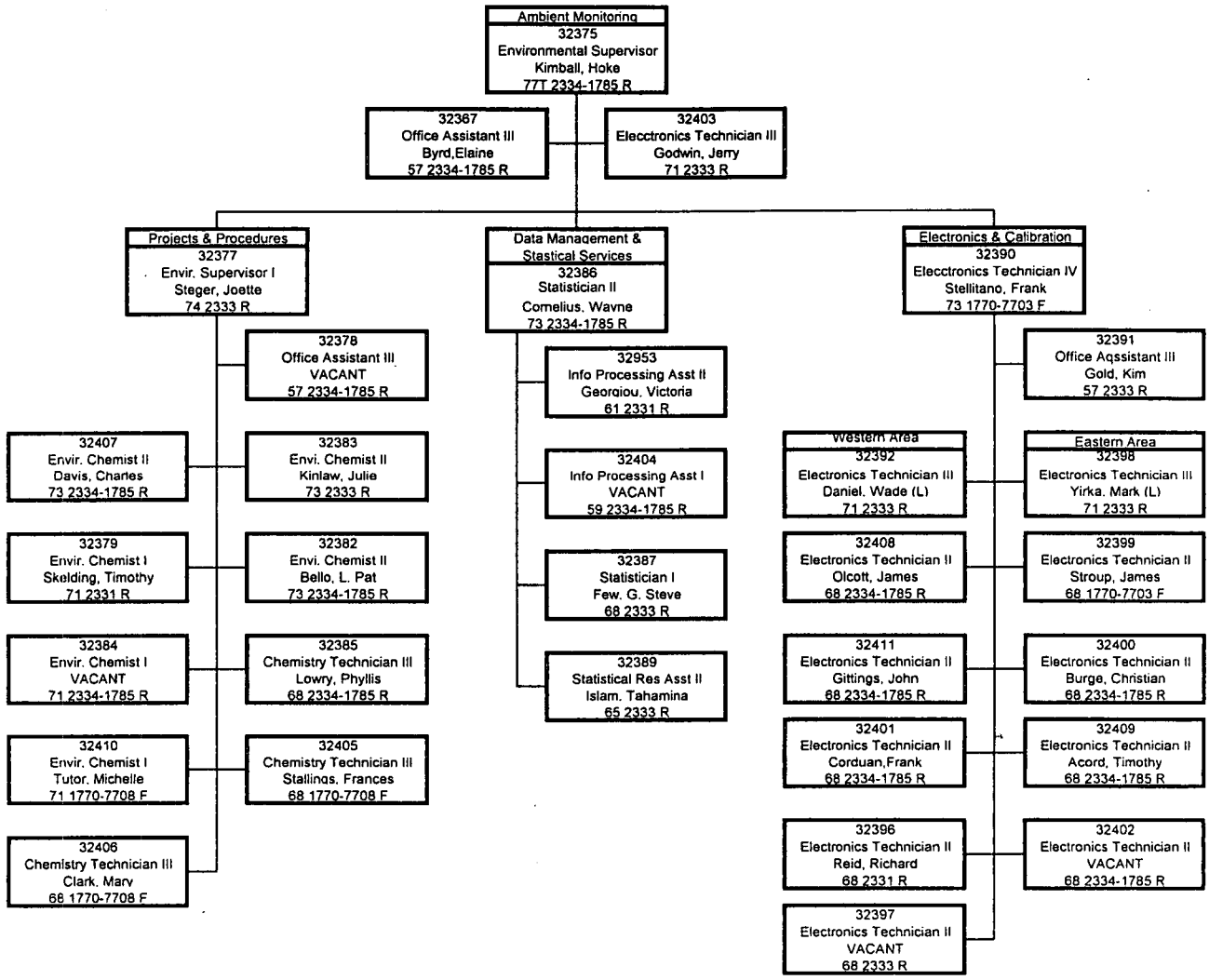
Envir.. Supervisor IV
VACANT
80 1770-7703 F
32276
Office Assistant IV
Terry, Angela
59 2334-1785 R
32289
Envir.. Engineer II
Southerland, James
76 2334-1785 R
Assistant Planning Chief
32277
Envir.. Engineer III
Holman, Sheila
78 1770-7703 F
Rule Development Branch
32278
Envir.. Engineering Supv
Allen, Thomas
77T 2334-1785 R
Attainment Plan Branch
32285
Envir.. Engineering Supv
Boothe, Laura
77T 2334-1785 R
32956
Office Assistant IV
VACANT
59 2334-1785 R
32281
Envir.. Engineer II
Knowlson, Patrick
76 1770-7703 F
32284
Envir.. Engineer II
Burleson, Joelle
76 2334-1785 R
32290
Economist II
Sappie, Glenn
77 2333 R
32280
Envir.. Engineer II
Grable, Paul
76 2331 F
32282
Envir.. Engineer I
VACANT
74 2334-1785 R
32283
Envir.. Engineer I
Zaytsev, Vladimir
74 2333 R
32286
Office Aqssistant IV
Woods, Vickie
59 2334-1785 R
32287
Envir.. Engineer II
Wooten, Bob
76 2338 R
32288
Envir.. Engineer II
VACANT
76 2334-1785 R
32296
Envir.. Engineer II
Evans, Don
76 2334-1785 R
32292
Envir.. Engineer II
Vitas, Jill
76 2333 R
32293
Envir. Chemist II
Chandler, Vicki
73 2333 R
32952
Envir.. Specialist II
Hayman, Millie
70 2334-1785 R
32291
Envir.. Engineer I
Jones, Phyllis
74 2333 R
32295
Envir.. Specialist II
Grosshandler, Lisa
70 2334-1785 R
32297
Envir.. Engineer I
Xie, Ming
74 2334-1785 R
32082
Meteorologist
Abraczinskas, Michael
73 2334-1785 R
32085
Meteorologist
Bridgers, George
73 2333 R
32088
Meteorologist
Appel, Wyat
73 2334-1785 R


Ambient Monitoring
32375
Environmental Supervisor
Kimball, Hoke
77T 2334-1785 R
32367
Office Assistant III
Byrd,Elaine
57 2334-1785 R
32403
Elecctronics Technician III
Godwin, Jerry
71 2333 R
Projects & Procedures
32377
Envir. Supervisor I
Steger, Joette
74 2333 R
Data Management & Stastical Services
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Statistician II
Cornelius, Wayne
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Electronics & Calibration
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VACANT
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Info Processing Asst II
Georgiou, Victoria
61 2331 R
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Office Aqssistant III
Gold, Kim
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Davis, Charles
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Kinlaw, Julie
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Burge, Christian
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Acord, Timothy
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Clark, Mary
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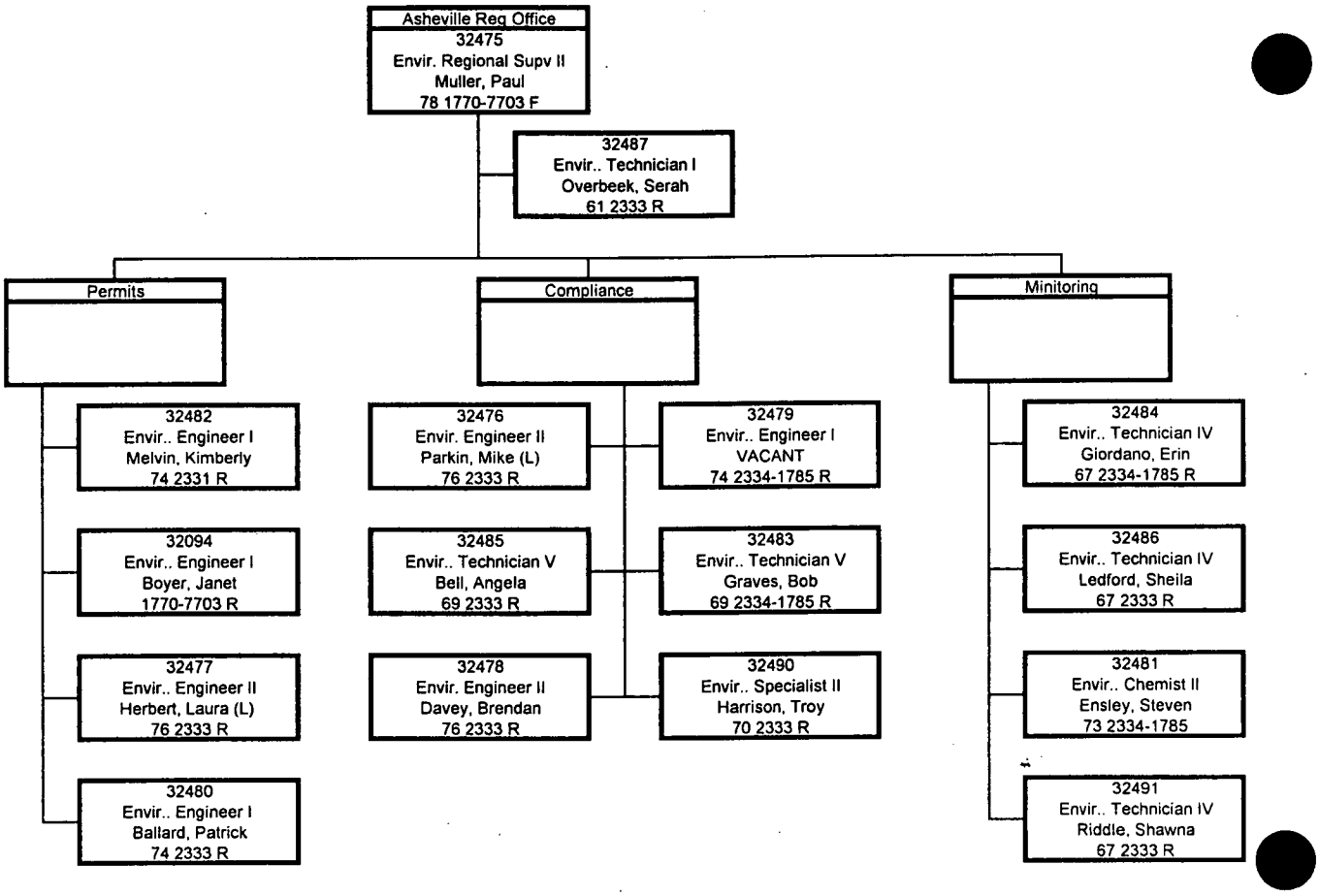
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Herbert, Laura (L)
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Ballard, Patrick
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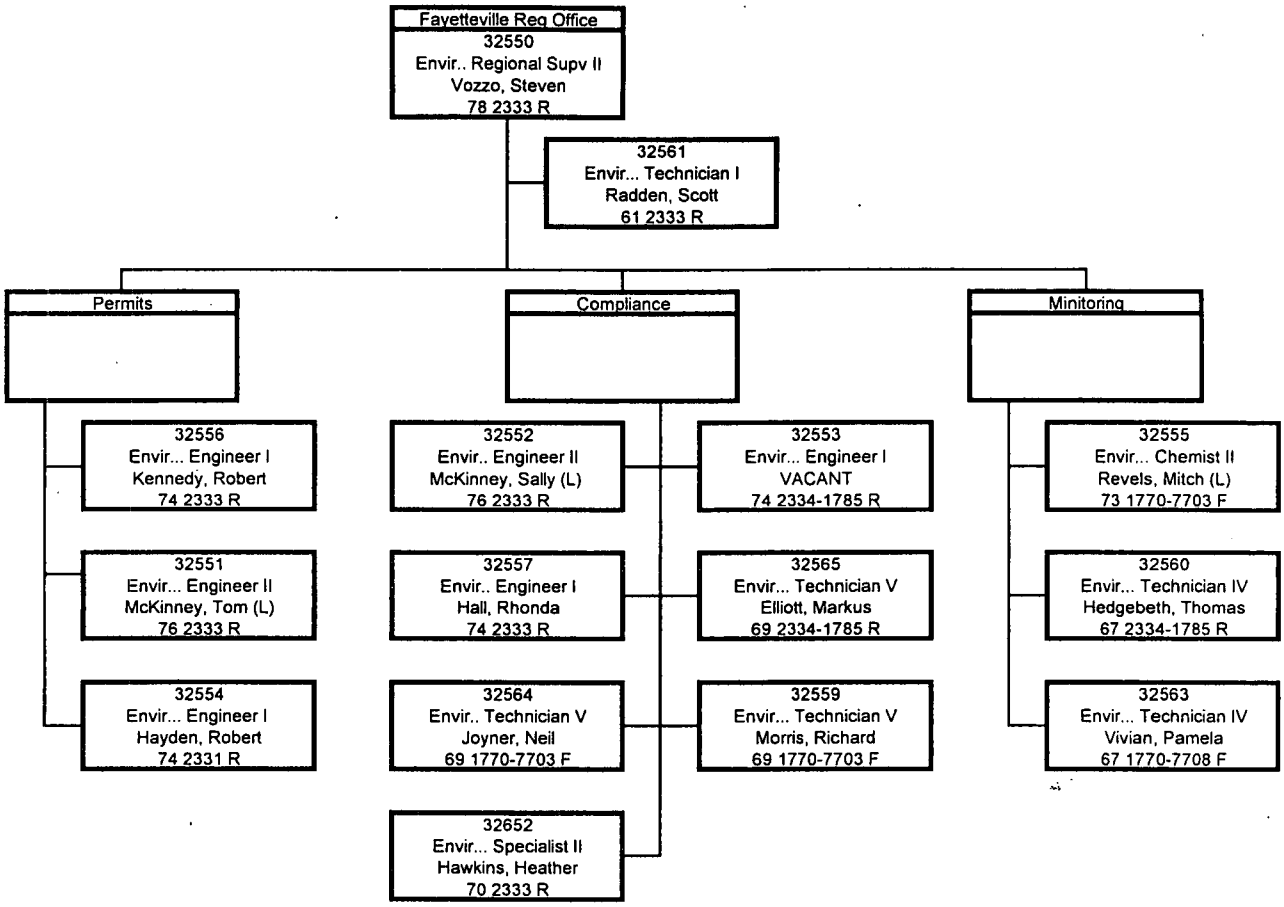
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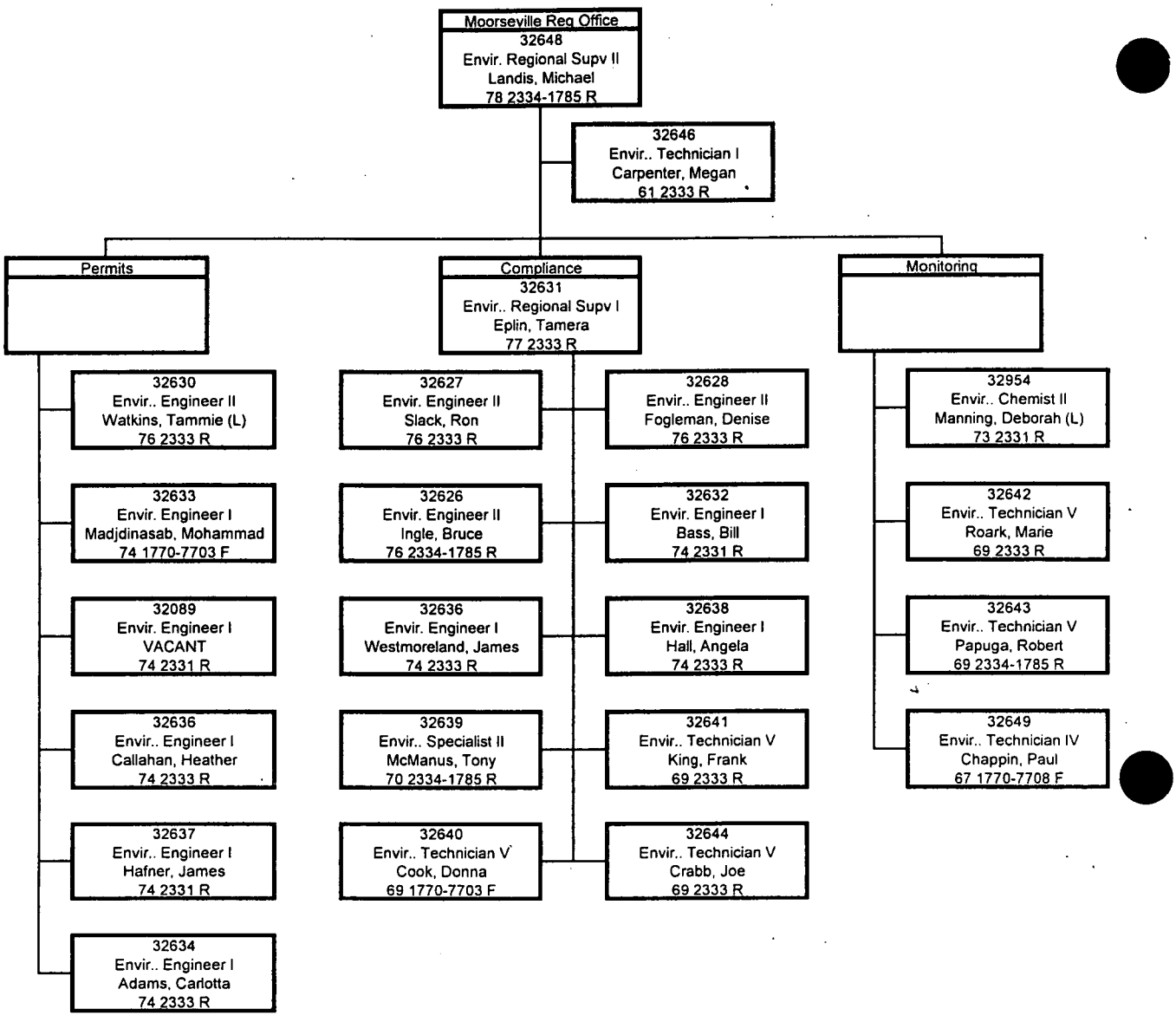
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Eplin, Tamera
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Slack, Ron
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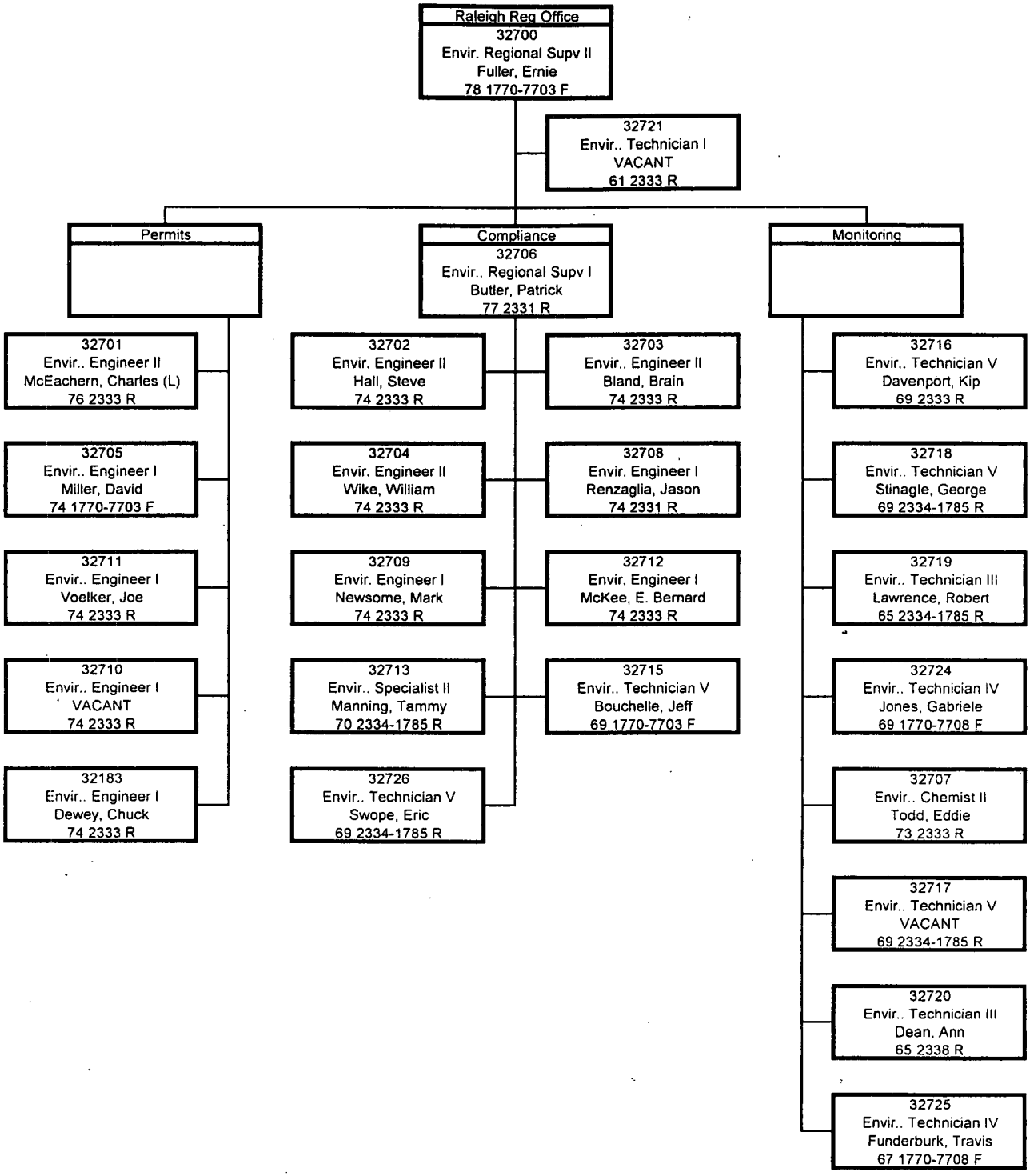
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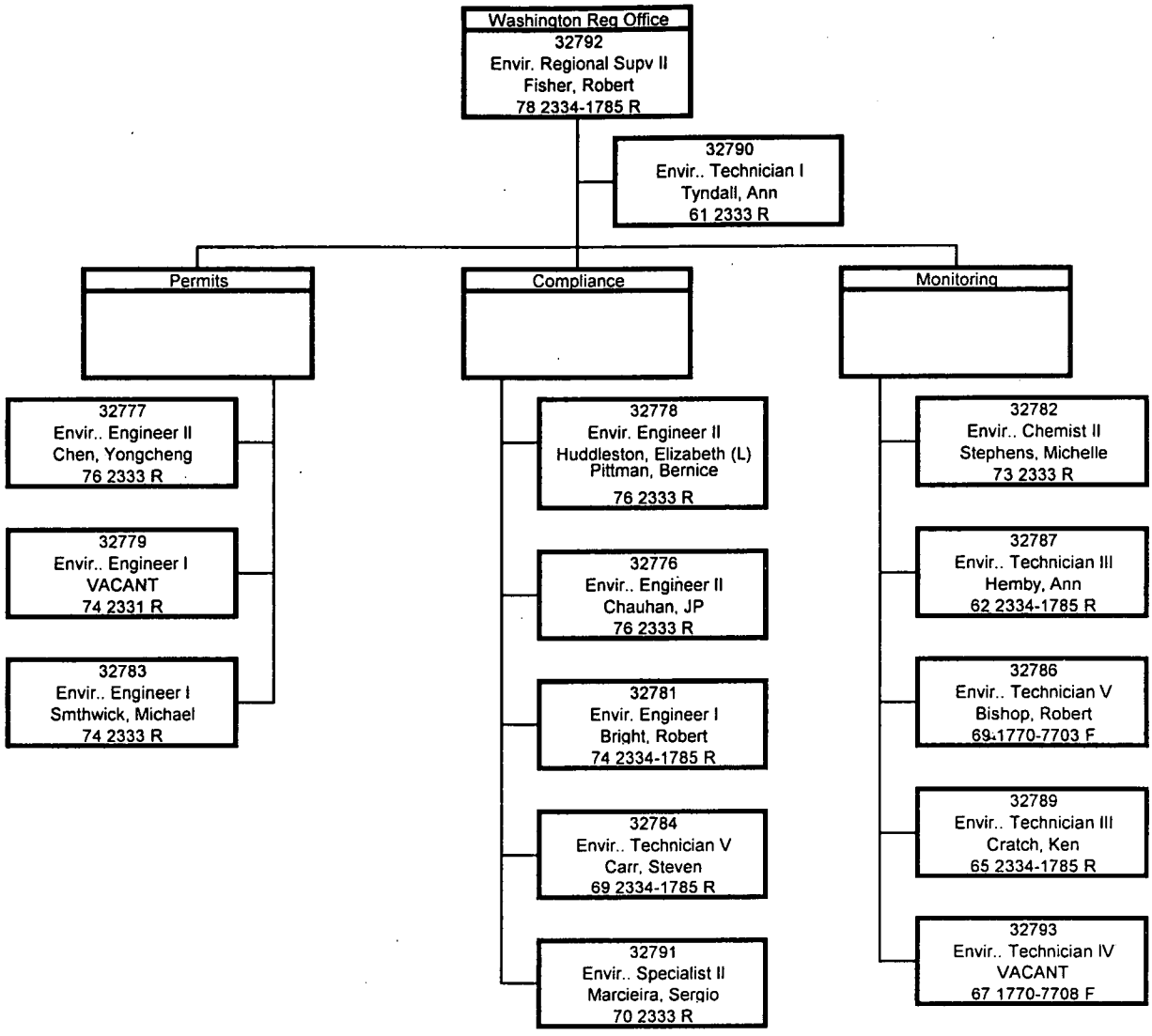
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Chen, Yongcheng
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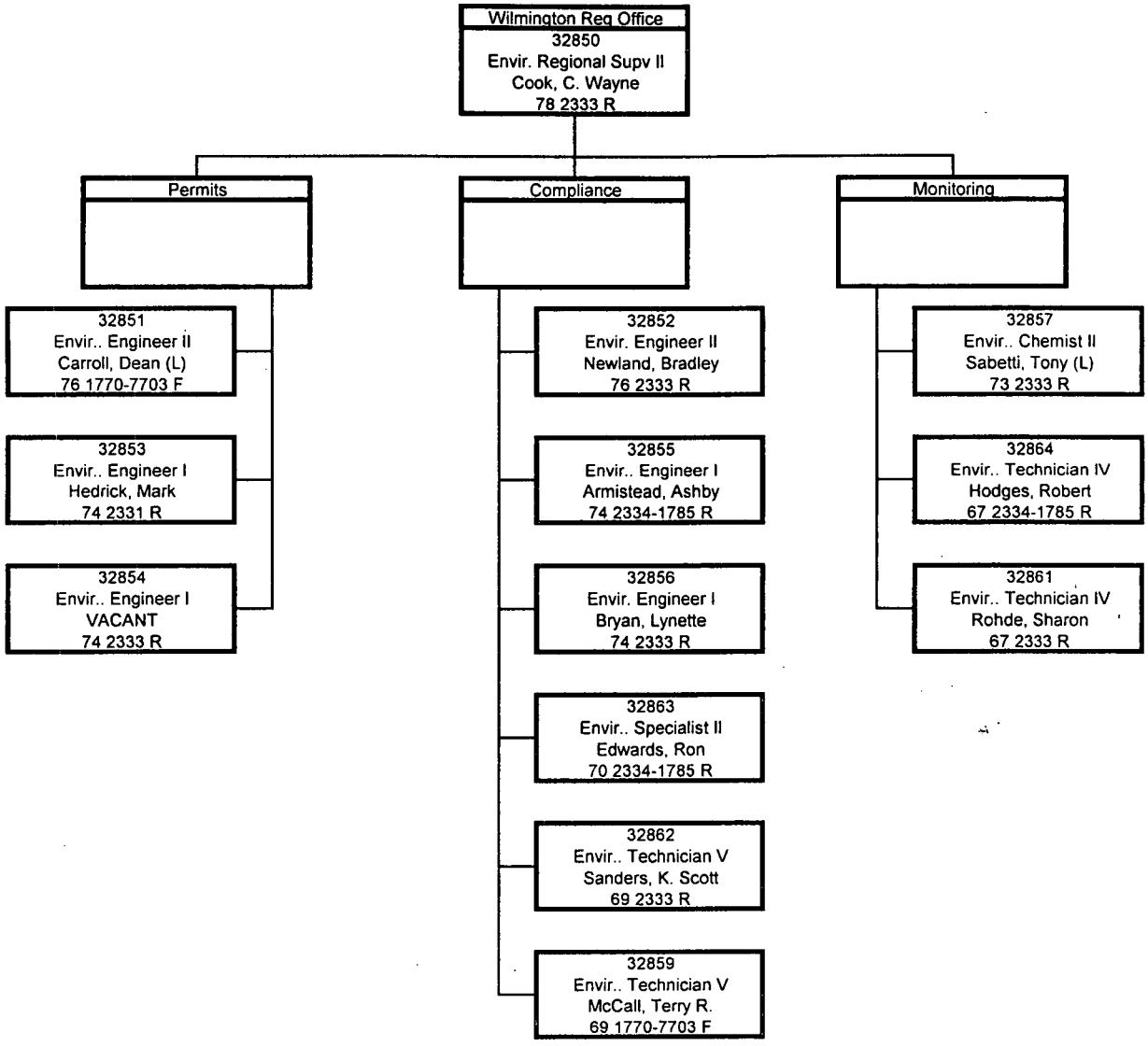
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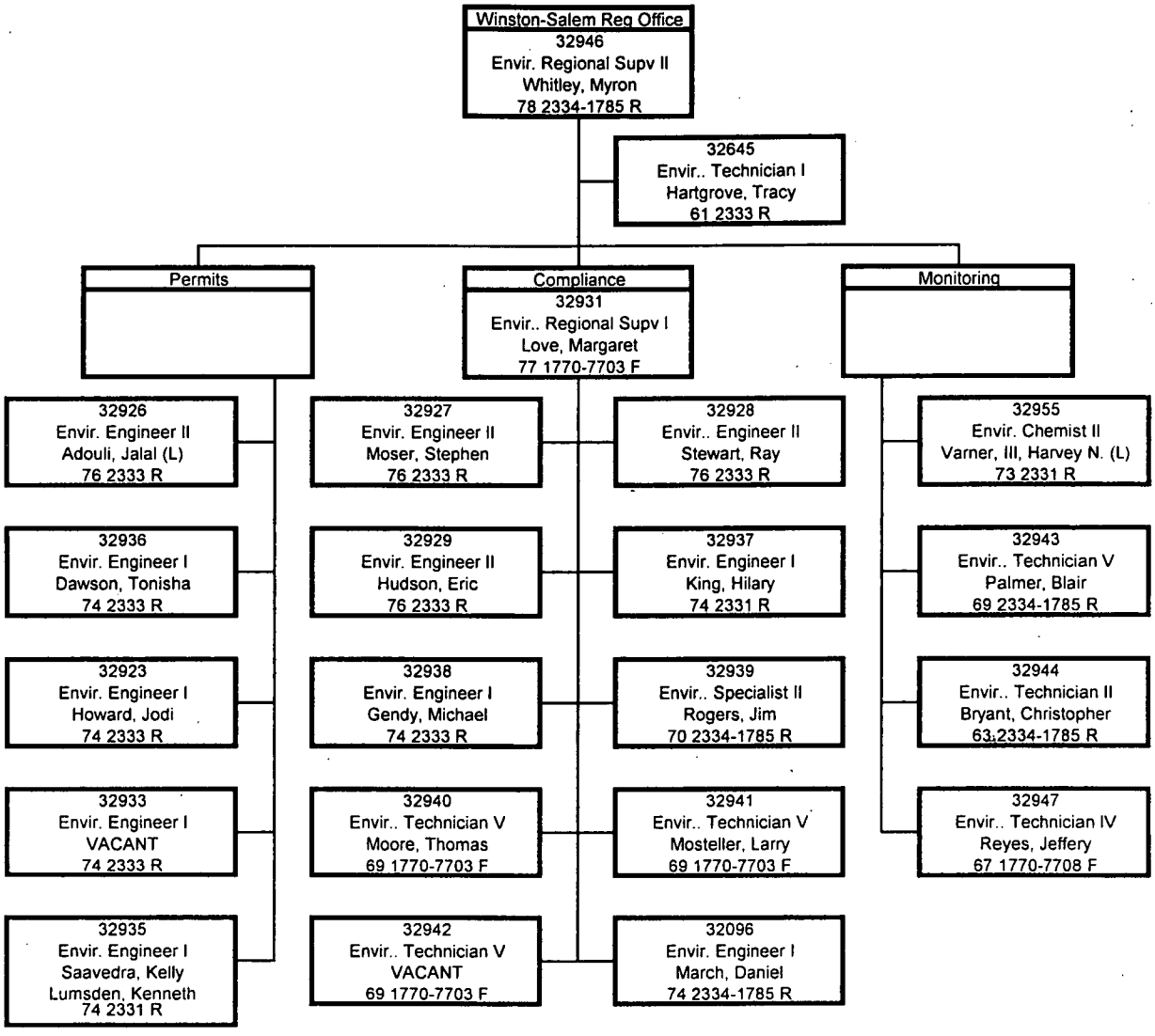
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Love, Margaret
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Adouli, Jalal (L)
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Moser, Stephen
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Stewart, Ray
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Varner, III, Harvey N. (L)
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Dawson, Tonisha
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King, Hilary
74 2331 R
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Palmer, Blair
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Rogers, Jim
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Bryant, Christopher
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Moore, Thomas
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Reyes, Jeffery
67 1770-7708 F
32935
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Saavedra, Kelly
Lumsden, Kenneth
74 2331 R
32942
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VACANT
69 1770-7703 F
32096
Envir. Engineer I
March, Daniel
74 2334-1785 R

POSITIONS OUTSIDE THE DIVISION OF AIR QUALITY FUNDED BY TITLE V DURING STATE FISCAL YEAR 2002

2 Positions
Regional Office Local Area Network Managers
Regional Offices: Raleigh and Winston-Salem
$101,060

1 Position
Division of Pollution Prevention and Environmental Assistance
$56,000

2.3 Positions
Department of Environment and Natural Resources
$126,299

4 Positions
Office of Small Business Ombudsman
$249,932

5 Positions (2 are half-time)
Regional Office, Office Assistants
Regional Offices: Fayetteville, Raleigh, Mooresville, Washington, and Winston-Salem
$117,185

0.5 Positions
Division of Waste Management
$10,112

2.3 Positions
Attorney General's Office
$296,817

Total $957,405

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: George F. Givens
Environmental Review Commission Counsel

FROM: William G. Ross Jr.

DATE: October 6, 2003

RE: Report on Incentives to Increase the Use of Alternative-fueled Vehicles in North Carolina Pursuant to the Ambient Air Quality Improvement Act

Section 4.5 of Senate Bill 953 (Ambient Air Quality Improvement Act) requires the Department of Transportation (DOT), the Department of Commerce (DOC), and the Department of Environment and Natural Resources (DENR) to jointly develop recommendations for incentives to increase the use of alternative-fueled and low emission light duty trucks and cars in privately owned fleets. The attached report is the third report from DENR to fulfill this requirement.

This report outlines the current efforts underway in North Carolina to fulfill the requirements as stated in Section 4.5 of Senate Bill 953. In March 2000, a joint report from DOT, DOC, and DENR was presented to the Environmental Review Commission detailing possible incentive programs. Since then, two bills have been introduced and considered in the last two legislative sessions. The bills, House Bill 1213 and House Bill 806, are included in this report.

In spring of 1999, the Triangle J Council of Governments coordinated to form a Clean Cities Coalition Program in the Triangle. Since then the Coalition has launched a biofuels program to reduce transportation emissions and stimulate use of domestically produced fuels, partnered with NCDOT to expand biofuel programs, and conducted a workshop to explore alternative fuel options. In addition to the efforts in the Triangle, Centralina formed the Centralina Clean Fuels Coalition (CFCC). Recently, CFCC submitted an application for designation as a member of the Clean Cities Program and created the Sustainable Environment and Quality of Life (SEQL) program to implement and expand regional efforts to protect the quality of life in the bi-state Charlotte region. On a state level, the Mobile Source Emissions Reduction Grant Program (MSERG) recently awarded grants to projects achieving actual reductions from on- and off-road mobile source related emissions.

As technology advances and resources become available, North Carolina will continue to pursue the best course of action to continually work towards improving the air quality, and thus way of life, for its citizens.

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR

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Incentives to Increase the Use of Alternative-fueled Vehicles in Privately Owned Fleets in North Carolina 2003 Report

Prepared by

North Carolina Department of Environment and Natural Resources

Section 4.5 of Senate Bill 953 States:

The Department of Transportation, the Department of Commerce, and the Department of Environment and Natural Resources shall jointly develop recommendations for incentives to increase the use of alternative-fueled and low emission light duty cars and trucks in privately owned fleets. The Department of Environment and Natural Resources shall submit these recommendations to the Environmental Review Commission on or before 1 February 2000. The Department of Environment and Natural Resources shall report on progress in increasing the use of alternative-fueled and low emission light duty cars and trucks in privately owned fleets to the Environmental Review Commission on or before 1 October of each year beginning 1 October 2001.

Legislative Background

2001 and 2002 Legislation

On July 21, 1999, Governor James B. Hunt, Jr. signed into law Senate Bill 953, An Act to Enact the Ambient Air Quality Improvement Act of 1999. Section 4.5 of this bill directs the Department of Transportation (DOT), the Department of Commerce (DOC), and the Department of Environment and Natural Resources (DENR) to develop recommendations for incentives that would promote the use of alternative-fueled vehicles (AFVs) in privately owned fleets.

A report jointly prepared by DOT, DOC, and DENR was presented to the ERC on March 16, 2000. Contained in this report were descriptions of a loan program to provide low-interest loans for construction of refueling stations; tax credits to allow private fleet operators to recoup the incremental costs incurred for changing fleets to alternative fuels; tax incentives for the public that provide additional incentives to purchase AFVs; and tax incentives to fuel providers to encourage investments in alternative fuel infrastructure.

House Bill 1213, Alternative Fuel Vehicle Rebate and Infrastructure Grant Program, was introduced by Representative Joe Tolson on April 12, 2001 and was assigned to the committee on Finance. The bill was to provide funds for incremental costs of AFVs and AFV infrastructure, access for AFVs to HOV lanes, and special parking access. The fund to support the bill was based on a $2.00 increase in the annual

motor vehicle registration fees. The NC State Energy Office was to be assigned oversight of the AFV Rebate and Infrastructure Grant Program. The House Finance committee favorably recommended H1213 as amended on August 8, 2001. The bill was then re-referred to the Appropriations committee, and no further action was taken. A copy of this bill is included in the attachments at the end of this report.

2003 Legislation

In March 2003, House Bill 806, co-sponsored by Representatives Joe Tolson and Verla Insko, was referred to the committee on Finance. Entitled "Alternative Fuel and Vehicle Rebate and Infrastructure Grant Program," H806 would establish an alternative fuel and alternative fuel vehicle rebate program to be administered by the NC State Energy Office in the Department of Administration. The program would provide partial rebates to first owners for incremental cost differences for qualified alternative fuel and hybrid vehicles, limited rebates for State taxes paid on incremental costs for alternative motor fuels, and grants for alternative motor fuel infrastructure projects. The program would be funded by adding $1 on all vehicle registration fees for the three years of the program.

H806 incentives were designed to help improve the air quality in North Carolina by reducing ozone forming pollutants, importantly oxides of nitrogen; support economic development of biofuels in our state; and encourage future energy security through diversity of North Carolina's energy supply. The bill was heard in the Finance committee in June and there was general support for promoting alternative fuels, although there was expressed concern with the proposed fee increase to vehicle registration. Two amendments passed, one that reduced the program length from ten to three years, and the second that removed local and state governments from eligibility for grants and rebates. H806 passed the House Finance committee on June 26, 2003, and was sent to the Appropriations committee, where it remained at the end of the session. A copy of H806 can be found in the attachments at the end of this report.

North Carolina Clean Cities

Triangle Clean Cities Coalition

In spring of 1999, the State Department of Commerce's Energy Division asked the Triangle J Council of Governments (TJCOG) to coordinate a Clean Cities program in the Triangle. TJCOG accepted and the two agencies entered into a 15-month, $50,000 contract. In July of 2000 this contract was renewed for a 12-month period for another $50,000. The division's goal was to develop corridors that link major areas of the state with alternative fuel refueling options and to encourage the use of AFVs by federal fleets, state agencies, fuel providers and eventually municipal governments and private companies.

TJCOG has a long history of bringing together public and private groups to address regional issues such as initiatives to help improve air quality. In April 1999, TJCOG staff met in Atlanta with regional and national DOE staff and Clean Cities coordinators from the southeast region and began to develop a plan of action for the Triangle Region. Meetings with local and state government officials and with fuel providers indicated tremendous interest in the alternative fuel market. A 12-member steering committee was formed to establish a stakeholder list. The steering committee met regularly in preparation of the draft plan submittal to the DOE regional office in Atlanta. Comments on the draft plan indicated a need for more niche market activity, as well as a more thorough description of the Triangle Clean Cities Coalition's (TCCC's) objectives. Progress toward development of an approved plan continued through the fall of 2000.

On March 19, 2001, the Triangle Clean Cities Coalition was officially designated as North Carolina's first Clean Cities Coalition and the 80th US Clean Cities Coalition by the US Department of Energy Clean Cities Program. A luncheon was held as part of the *Advancing the Fuel Choice Conference* in Raleigh. The Conference provided a unique opportunity to learn about both alternative fuels and alternative fuel technology.

The Triangle Clean Cities has been successful in advancing alternative fuel incentives to the private sector through several initiatives. Through earnest grant applications and creative program planning TJCOG has been successful in implementing a biofuels grant program; deploying a publicly accessible biodiesel refueling station in Garner, NC; and facilitating future opportunities of biofuel availability in a multi-use service station soon to be located at the RDU airport. To date the request for proposals for the airport station site has not been awarded, but bidders are strongly encouraged to include in their bids alternative fuels such as ethanol, biodiesel, and propane. The BP/Han Dee Hugo station on Benson Road and Route 50 is North Carolina's first commercial biodiesel pump. Since its initial offering of this biofuel at the pump in July 2003, it now boasts that the volume sold has more than doubled. This increase in sales suggests that the public is interested in refueling with B20. More details on Triangle Clean Cities alternative fuel penetration into the private sector may be found in the attached press releases at the end of this report.

TJCOG Press Releases for Triangle Clean Cities

- TJCOG Launches Biofuels Program To Reduce Transportation Emissions And Stimulate Use of Domestically Produced Fuels (2002)
- TJCOG and NCDOT Partner Top Expand Biofuel Programs in the Triangle
- TJCO G – Garner BP retail station (B20)
- TJCOG Biofuels Program Grants (2003)
- Airport Workshop to Explore Alternative Fuel Options

Centralina Clean Cities Program (Pending USDOE designation)

The Centralina Clean Fuels Coalition (CCFC) program plan was recently submitted to the US Department of Energy (USDOE) to obtain designation as a member of the Clean Cities Program. The purpose of this coalition's strategy is to increase the community's existing alternative fuel market. The Coalition serves a population of 1.5 million in the nine-county Charlotte metropolitan region. The local existing alternative fuels market currently includes 671 AFVs. The coalition was originally established in May of 1999. The Centralina Council of Governments (CCOG) staffs the CCFC. CCFC is funded partially by the NC State Energy Office and partially by CCOG.

The Centralina Clean Fuels Coalition formed to take advantage of the environmental, public health, energy security, economic benefits and financial incentives that the Clean Cities Program will offer. Alternative fuels will benefit the region by creating commercial opportunities and jobs in the sale, conversion, and maintenance of AFVs and in the installation and service of associated infrastructure. The Centralina Clean Fuels Coalition will provide substantial opportunities for the expansion of the alternative fuel marketplace through the recruitment of stakeholders, coordination of public education and awareness, and assistance to those fleets facing AFV acquisition mandates.

In terms of alternative fuels, biodiesel currently has a strong presence in the region. The North Carolina Department of Transportation has more than 300 vehicles operating on biodiesel, and the City of Monroe will soon begin converting its fleet to this fuel. One hundred thirteen propane vehicles were identified through the survey, and there is strong interest by an active stakeholder to expand that market. There are 96 compressed natural gas (CNG) vehicles in the area and a number of CNG stations. Although none of these stations are currently open to the public, CCFC has been working with the City of Belmont to open their station. There are 520 identified ethanol (E85) vehicles in the region, but only those owned by Duke Energy have access to fueling with ethanol. CCFC has begun discussions with both the Charlotte/Douglas International airport and with Duke Energy about opening their respective stations to the public or to additional fleets. This alone would dramatically increase AFV usage in the region.

CCFC conducted a fleet survey to better understand the Centralina region's current and projected AFV population. The Centralina Clean Fuels Coalition developed a questionnaire in February of 2002. Staff identified key entities and types of fleets within the transportation sector that were most likely to have AFVs. This information was gathered from public and private fleets across the region by way of mailed or faxed written surveys, telephone calls, and one-on-one discussion with approximately 150 fleet managers located throughout the nine-county region. These fleets included local and state governments, school districts, universities, transportation providers, cable television and telephone companies, fuel providers, and distribution companies. Furthermore, all known fleets affected by EPAct were also contacted.

With a population of 1,540,714, the Centralina region is required (Clean Cities criteria) to have a minimum of 500 AFVs. The survey identified 1,121 AFVs, with an additional 232 vehicles proposed to be purchased within the next five years. Compressed natural gas (CNG) accounted for 96 of these vehicles. One hundred and thirteen vehicles ran on propane. Six were electric, and 386 ran on biodiesel. Although the survey identified 520 vehicles able to run on ethanol, only those owned by Duke Power have access to fueling with ethanol. Therefore, the final count of 671 AFVs represented vehicles not mandated under the Energy Policy Act of 1991 (EPACT) and could be credited toward the Clean Cities requirements.

Fueling station numbers were compiled during the 2002 survey and later updated in 2003. Additional fueling stations were located using the DOE *Alternative Fuels Data Center*. A total of 45 fueling stations were identified, with the majority being propane. Seven CNG sites were identified, three electric, and seven biodiesel. Only one ethanol fueling station was identified in the area, which is owned by Duke Energy and is only accessible to Duke Energy's fleet. CCFC has been in discussions with Duke regarding the possibility of opening this station to a limited number of other fleets. The survey data indicates that there is a need to establish state incentives that will help advance the fuels choice for alternative fuels by closing the gap on the incremental costs of AFVs for the private citizen and supporting the infrastructure to fuel these vehicles.

Centralina Clean Fuels Coalition expects to hear whether they will become a newly designated Clean Cities in the near term following final review of the plan by USDOE headquarters. If all goes as expected, CCFC may receive favorable news as early as December 2003 or January 2004.

Sustainable Environment for Quality of Life (SEQL)

Centralina Council of Governments has been awarded a $275,000 grant from the Environmental Protection Agency to implement and expand regional efforts to protect the quality of life in the bi-state metro Charlotte region. The program is called Sustainable Environment for Quality of Life (SEQL). Recognizing that the area currently faces many environmental challenges; SEQL will address these challenges by:

- Allowing local governments the opportunity to work across jurisdictional lines in regional cooperation and collaboration, setting a standard for the nation.

- Providing implementation assistance to local governments on environmental "commitment action items" developed under the Charlotte/Mecklenburg Sustainability Demonstration Project.

- Analyzing multiple air quality issues simultaneously, including ozone, particulate matter, and air toxics, while also addressing transportation, water, land use, energy use, and economic development.

This project supports the region's efforts to develop integrated, long-range plans to ensure economic development and a positive quality of life for its future. During the initial phase of the project, local municipalities agreed to a number of action steps, one of which was to support the Clean Cities effort.

Mobile Source Emissions Reduction Grant Program

Purpose and Background

The purpose of the Mobile Source Emissions Reduction Grants (MSERG) is to achieve actual reductions from on- and off-road mobile source related emissions in North Carolina to assist the State in maintaining the National Air Quality Standards primarily for ozone and carbon monoxide.

In 1993, the North Carolina General Assembly passed clean air legislation, which provided that, beginning on January 1, 1995, a portion of those taxes on the sale of gasoline in North Carolina would be used to fund portions of the State Air Quality Program.

The Department of Environment and Natural Resources formed a Grant Review Committee to help determine how to use the revenues generated from the gasoline tax. The committee represents a broad range of public interests, including environmental, industry, and city, county, and various State government agencies.

Funding for these grants is provided by a tax of 1/64 of a cent per gallon of gasoline sold, which currently generates about $800,000 annually. Grants are awarded by DENR with the assistance of the Grant Review Committee. Each year the Grant Review Committee selects a focus for the upcoming grant year. Although other projects may be submitted and funded, priority is placed on projects addressing the goal for that particular year. The goal for the 2004 grants will be to retrofit existing diesel school buses with newer technologies that will reduce the particulate emissions. In addition to the annual gas tax revenue, the Division of Air Quality has requested a $1,000,000 grant from the US EPA to broaden the school bus retrofit effort.

MSER grants were solicited and approved in 2001; however, due to a budget crisis, contracts for grants were not awarded. Grant funding rounds did not take place in 2002 for the same reason of a budget crisis. In 2003, the Division of Air Quality awarded grant monies for the two top ranked Alternative Fuels projects that previously were approved in 2001 but not funded. Both projects included fueling stations that will be designed and built to provide access for public use.

City of Asheville
Grant Award: $400,000
Project Title: Alternative Fuels Station for Asheville, NC
Summary: Funds will be used to construct a publicly accessible compressed natural gas (CNG) fueling station, train mechanics on the new technology, and purchase CNG vehicles.

Greenville Utilities
Grant Award: $291,000
Project Title: Greenville Area Clean Vehicle Program
Summary: Funds will be used to construct a fast-fill, publicly accessible compressed natural gas (CNG) refueling station and to purchase CNG vehicles.

2004 Model Year Alternative Fuel Vehicles Available or Nearing Completion

Alternative fuel vehicles are widely available for public and fleet purchase. A list of the 2004 model year AFVs is provided as an attachment to this report. For more details on the availability and related information for these vehicles, visit the Alternative Fuel Data Center web site at *http://www.afdc.doe.gov/*.

ATTACHMENTS

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2001

HOUSE BILL 1213
Committee Substitute Favorable 8/8/01

Short Title: Rebate and Grant Program for AFVs. (Public)
Sponsors:
Referred to:

April 12, 2001

A BILL TO BE ENTITLED

AN ACT TO ESTABLISH THE ALTERNATIVE FUEL VEHICLE REBATE AND INFRASTRUCTURE GRANT PROGRAM.

The General Assembly of North Carolina enacts:

SECTION 1. Chapter 113B of the General Statutes is amended by adding a new Article to read:

"Article 3.

"Alternative Fuel Vehicle Rebate and Infrastructure Grant Program.

"**§ 113B-30. Definitions.**

The following definitions apply in this Article:

(1) "Alternative fuel" means any of the following:
a. Electricity.
b. Natural gas either as compressed natural gas or liquefied natural gas.
c. Propane.
d. Hydrogen.
e. Ethanol used separately or in mixtures of seventy percent (70%) or more by volume mixed with gasoline.
f. Fuels derived from biological materials, such as biodiesel and methanol additives.

(2) "Alternative Fuel Vehicle" or "AFV" means a vehicle that has been developed for, and is intended to be operated using, one or more alternative fuels.

(3) "Alternative fuel infrastructure project" means fueling stations, fueling tanks, charging stations, and other equipment used to fuel AFVs.

(4) "Bi-fuel (dual-fuel) vehicle" means an AFV capable of running on either an alternative fuel or gasoline.

(5) "Conventional vehicle" means a vehicle running only on gasoline, reformulated gasoline, or diesel fuel.

(6) "Dedicated vehicle" means an AFV that can only be operated using an alternative fuel.

(7) "Flex-fuel vehicle" means an AFV capable of operating on either gasoline or diesel fuel in combination with an alternative fuel in various proportions.

(8) "Hybrid vehicle" means an AFV that is

powered by an electric motor and an engine combusting an alternative fuel, gasoline, or diesel fuel.

(9) "Incremental cost" means the difference in price between an alternative fuel vehicle and a conventional vehicle of the same make and model as provided by the original equipment manufacturer.

(10) "Low-speed vehicle" means a four-wheeled vehicle whose top speed is greater than 20 miles per hour but less than 25 miles per hour.

(11) "Person" means an individual, a business, a corporation, or a unit of municipal government or county government. "Person" does not include any unit of the federal government.

"**§ 113B-31. Administration.**

(a) The State Energy Office in the Department of Administration shall establish and administer policies determined in consultation with other state agencies, including the Departments of Transportation, Correction, Public Instruction, and Environment and Natural Resources, as well as interested organizations and businesses, to comply with environmental and energy regulations of the United States Department of Energy and the Environmental Protection Agency. Up to five percent (5%) of the funds collected in the program may be used by the State Energy Office and the Division of Motor Vehicles for administrative costs of the program.

(b) The State Energy Office shall place an annual cap on the number of vehicles eligible to receive rebates under the program based on the availability of funds. Commitments to vehicle rebates and infrastructure grants must never exceed funds collected and available. The State is not obligated to provide rebates or infrastructure grants beyond the funds available in the program.

(c) During the first two years of the program, annual funding for vehicle rebates shall not exceed forty percent (40%) of the total funds collected.

"**§ 113B-32. Rebate program.**

(a) A person who has purchased an alternative fuel vehicle weighing less than 8,500 pounds gross weight, either from an original equipment manufacturer or that has been retrofitted with a certified kit under the supervision or approval of a certified AFV technician approved by the administering agency, is eligible for the following rebates, subject to a maximum of thirty thousand dollars ($30,000) in total annual rebates:

(1) Eighty percent (80%) of the incremental cost for a dedicated vehicle, up to a maximum of five thousand dollars ($5,000) per vehicle.

(2) Fifty percent (50%) of the incremental cost for a bi-fuel, flex-fuel, or hybrid vehicle, up to a maximum of five thousand dollars ($5,000) per vehicle. Availability of the alternative fuel in the particular area the vehicle will be used must be documented prior to payment of the rebate.

(3) Twenty percent (20%) of the total purchase price of a low-speed vehicle or one thousand dollars ($1,000), whichever is less.

(4) Ten percent (10%) of the total purchase price for all other dedicated alternative fuel vehicles and hybrid vehicles designated as eligible by the administering agency that have no comparable conventional model on which to base incremental cost calculations, up to five thousand dollars ($5,000) per vehicle.

(b) A person who has purchased an alternative fuel vehicle weighing more than 8,500 pounds gross weight, either through an original equipment manufacturer or that has been retrofitted with a certified kit under the supervision or approval of a certified AFV technician approved by the administering agency, is eligible for the following rebates, subject to a maximum of one hundred thousand dollars ($100,000) in total annual rebates:

(1) Eighty percent (80%) of the incremental cost for a dedicated vehicle, up to a maximum of twenty-five thousand dollars ($25,000) per vehicle.

(2) Fifty percent (50%) of the incremental cost for a bi-fuel, flex-fuel, or hybrid vehicle, up to a maximum of twenty-five thousand dollars ($25,000) per vehicle. Availability of the alternative fuel in the particular area the vehicle will be used must be documented prior to payment of the rebate.

(3) Twenty percent (20%) of the total purchase price of a low-speed electric vehicle or one thousand dollars ($1,000), whichever is less.

(4) Ten percent (10%) of the total purchase price for all other dedicated alternative fuel vehicles and hybrid vehicles designated as eligible by the administering agency that have no comparable conventional model on which to base incremental cost calculations, up to twenty-five thousand dollars ($25,000) per vehicle.

(c) A person who leases an alternative fuel vehicle is eligible for the rebates in subsections (a) and (b) in the same manner as those persons who purchase an alternative fuel vehicle.

(d) A person seeking a rebate must complete a rebate form and provide proof of ownership and license registration of the alternative fuel vehicle. The rebate form may be obtained from automotive dealers, the State Energy Office, or the Division of Motor Vehicles.

"**§ 113B-33. Infrastructure grant program.**

(a) A person is eligible for a grant in an amount of up to fifty percent (50%) of the cost of an alternative fuel vehicle infrastructure project that is selected by the State Energy Office, subject to a maximum of five hundred thousand dollars ($500,000) per project.

(b) A person is eligible for a grant in an amount of up to seventy-five percent (75%) of the total cost of installing an ethanol infrastructure project, subject to a maximum of five hundred thousand dollars ($500,000) per project, not to exceed one million dollars ($1,000,000) annually.

(c) Any residual funds shall be available, on a quarterly basis, to State agencies for grants for alternative fuel infrastructure projects.

(d) To qualify for a grant under this program, the infrastructure must be accessible to the public, or serve vehicles used by the public, or for the public benefit by reducing harmful air emissions. Priority shall be given to projects serving 10 or more vehicles and to other persons before State agencies.

(e) Up to forty-five percent (45%) of funds collected annually will be awarded as grants for infrastructure projects during the first two years of the program. During the first two years of the program, priority for infrastructure grants will be awarded in those counties at risk for nonattainment penalties under federal EPA regulations.

"**§ 113B-34. Education fund for promotion of alternative fuel vehicles.**

Up to ten percent (10%) of the funds from the Alternative Fuel Vehicle Rebate and Infrastructure Grant Program may be used for education and awareness about the applications, advantages, and environmental benefits of alternative fuel vehicles.

"**§ 113B-35. Funding.**

The alternative fuel vehicle rebate and infrastructure grant program shall be funded for the first three years beginning on January 1, 2002, from a one-dollar ($1.00) increase in the cost of registering each motor vehicle licensed in this State. For the next seven years, beginning on January 1, 2005, the program shall be funded from a two-dollar ($2.00) increase in the cost of registering each motor vehicle in this State. At the end of 10 years, the program shall expire unless further action is taken by the General Assembly. Any residual funds shall then be transferred to the General Fund.

"**§ 113B-36. Reporting.**

(a) The State Energy Office shall provide a written report of the number of alternative fuel vehicles registered in North Carolina and of the expenditure of funds associated with this program to the Joint Transportation Oversight Committee on an annual basis for review of program effectiveness.

(b) The Division of Motor Vehicles shall provide to the State Energy Office quarterly reports of all registered vehicles identified by fuel type as required by G.S. 20-50.5."

SECTION 2. Chapter 20 of the General Statutes is amended by adding a new section to read:

"**§ 20-50.5. Division to furnish State Energy Office reports of registered alternative fuel vehicles.**

The Division shall provide to the State Energy Office quarterly reports of registered vehicles identified by fuel type."

SECTION 3. G.S. 20-57(b) reads as rewritten:

"(b) The registration card shall be delivered to the owner and shall contain upon the face thereof the name and address of the owner, space for the owner's signature, the registration number assigned to the vehicle, the fuel type of the vehicle, and a description of the vehicle as determined by the Commissioner, provided that if there are more than two owners the Division may show only two owners on the registration card and indicate that additional owners exist by placing after the names listed "et al." An owner may obtain a copy of a registration card issued in the owner's name by applying to the Division for a copy and paying the fee set in G.S. 20-85."

SECTION 4. G.S. 20-87 reads as rewritten:

"**§ 20-87. Passenger vehicle registration fees.**

(a) These shall be paid to the Division annually, as of the first day of January, for the registration and licensing of passenger vehicles, fees according to the following classifications and schedules:

...

(b) Upon initial registration or renewal, the following additional fee shall be paid to the Division during the specified time periods in addition to the fees authorized by subsection (a) of this section to fund the Alternative Fuel Vehicle Rebate and Infrastructure Grant Program created by G.S. 113B-30 through 113B-36:

January 1, 2002-December 31, 2004 $1.00

January 1, 2005-December 31, 2011 2.00".

SECTION 5. The North Carolina Department of Transportation is directed to study the feasibility of allowing alternative fuel vehicles to have access to high occupancy vehicle lanes and special parking privileges and to provide its findings and recommendations to the Joint Transportation Oversight Committee by June 1, 2002. The Joint Transportation Oversight Committee is directed to evaluate the success of the Alternative Fuel Rebate and Infrastructure Grant Program after 10 years and report its findings and recommendations to the 2011 General Assembly, including whether the program should be continued.

SECTION 6. This act becomes effective January 1, 2002, and expires on January 1, 2012.

HOUSE BILL 806
Committee Substitute Favorable 6/30/03

Short Title: Rebate and Grant Program for AFVs. (Public)
Sponsors:
Referred to:

March 31, 2003

A BILL TO BE ENTITLED

AN ACT TO ESTABLISH AN ALTERNATIVE FUEL AND VEHICLE REBATE AND INFRASTRUCTURE GRANT PROGRAM.

The General Assembly of North Carolina enacts:

SECTION 1. Chapter 113B of the General Statutes is amended by adding a new Article to read:

"Article 3.

"Alternative Fuel and Vehicle Rebate and Infrastructure Grant Program.

"**§ 113B-30. Alternative Fuel and Vehicle Rebate and Infrastructure Grant Program established.**

(a) There is created an alternative fuel and vehicle rebate and infrastructure grant program to be administered by the State Energy Office.

(b) The program shall provide for all of the following:

(1) Partial rebates to first owners for incremental cost differences for eligible alternative fueled and hybrid vehicles.

(2) Limited rebates for State taxes paid on the incremental costs of alternative motor fuels.

(3) Grants for alternative motor fuel infrastructure projects.

(c) The program shall include a cap on the number and amounts of rebates and grants to limit them to the available funds. There shall be no entitlement to any rebate or grant under the program.

"**§ 113B-31. Implementation and administration.**

(a) The State Energy Office shall adopt rules implementing the program established in G.S. 113B-30.

(b) These rules shall be adopted after consultation with other State agencies, including the Departments of Transportation, Correction, Public Instruction, Revenue, and Environment and Natural Resources, and interested organizations and businesses.

(c) These rules shall comply with environmental and energy regulations issued by the United States Department of Energy and the Environmental Protection Agency.

(d) The rules shall provide that State and local government entities are not eligible for rebates or grants under the Alternative Fuel and Vehicle Rebate and Infrastructure Grant Program.

"**§ 113B-32. Funding.**

(a) The program established pursuant to G.S. 113B-30 shall be funded by an increase in motor vehicle registration fees as provided in G.S. 20-87(b) and G.S. 20-88(i2).

(b) The funds collected by the Division of Motor Vehicles shall be transferred quarterly to a special account in the Department of Administration for the State Energy Office to administer the program and provide the rebates and grants.

(c) The State Energy Office and the Division of Motor Vehicles may use up to five percent (5%) of the funds collected under this section for the administration of the program.

(d) The State Energy Office may use up to ten percent (10%) of the funds collected under this section for education and awareness about the applications and advantages of alternative fuels and vehicles.

"**§ 113B-33. Alternative Fuel and Vehicle Rebate and Infrastructure Grant Program Fund established.**

The Alternative Fuel and Vehicle Rebate and Infrastructure Grant Program Fund is created as a nonreverting account within the Department of Administration. All fees collected pursuant to this Article shall be credited to the Fund. The Fund shall be used for the purposes set out in this Article.

"**§ 113B-34. Reports.**

(a) The Division of Motor Vehicles shall provide to the State Energy Office quarterly reports of all registered motor vehicles identified by fuel type.

(b) The State Energy Office shall provide an annual report to the Joint Legislative Transportation Oversight Committee on the expenditure of funds associated with the program established by G.S. 113B-30 and the number of alternative fuel vehicles registered in North Carolina."

SECTION 2. G.S. 20-87 reads as rewritten:

"**§ 20-87. Passenger vehicle registration fees.**

(a) ~~Those~~ There shall be paid to the Division annually, as of the first day of January, for the registration and licensing of passenger vehicles, fees according to the following classifications and schedules:

...

(b) Upon initial registration or renewal, an additional one-dollar ($1.00) fee shall be paid to the Division in addition to the fees authorized by subsection (a) of this section to fund the Alternative Fuel and Vehicle Rebate and Infrastructure Grant Program established in G.S. 113B-30."

SECTION 3. G.S. 20-88 is amended by adding a new subsection to read:

"(i2)Upon initial registration or renewal, an additional one-dollar ($1.00) fee shall be paid to the Division in addition to all other fees authorized by this section to fund the Alternative Fuel and Vehicle Rebate and Infrastructure Grant Program established in G.S. 113B-30."

SECTION 4. This act is effective when it becomes law. The State Energy Office shall adopt the rules to implement the program established by this act on or before January 1, 2004. This act shall expire on January 1, 2007.

News Release

Triangle J Council of Governments

FOR IMMEDIATE RELEASE

Contact: Anne Tazewell
(919) 558-9400

Triangle J Council of Government Launches Biofuels Program To Reduce Transportation Emissions And Stimulate Use of Domestically Produced Fuels

RESEARCH TRIANGLE PARK - Imagine giving money away in an effort to support clean air and agricultural interests in North Carolina. With funding provided from the NC Department of Transportation's Congestion Mitigation Air Quality program and additional assistance from the NC Department of Administration State Energy Office, Triangle J Council of Government (TJCOG) is launching a Biofuels Program to rebate the incremental costs of biodiesel and ethanol. Both of these transportation fuel alternatives reduce harmful emissions and can be grown and produced in North Carolina. Through the Biofuels Program, TJCOG will be awarding $265,000 in grants to eligible entities in Wake and Durham- the only counties in the Triangle Region eligible to receive these federal funds. A request for proposals is being issued to area fleets and service station operators with an application deadline of January 22, 2003 for the first round of funding.

Biodiesel (B100 / B20) is a renewable fuel that can be used in any diesel vehicle with no modifications. It can be blended with diesel fuel in any proportion although it's most commonly used as B20- a 20% blend with petroleum diesel . Biodiesel is a naturally oxygenated fuel produced from organic feed stocks such as soybeans, cooking oil and animal fats. Biodiesel use results in lower emissions of particulate matter, carbon monoxide, toxic contaminants, sulphur dioxide, hydrocarbons, visible smoke and noxious odors. B100 is also non-toxic and biodegradable and therefore does not pose a threat to water and soil resource if spilled.

Ethanol is a naturally oxygenated fuel produced by fermenting organic materials such as corn, grains, crop waste materials, and forestry waste materials. Ethanol is usually blended with gasoline at different levels. E10 is a premium high-octane gasoline for cars and E85 (85% ethanol 15% gasoline) is used as an alternative fuel for light-duty vehicles. Many vehicles on the road today are E85 capable flex fuel vehicles (FFVs). FFVs can operate on either gasoline or E85 and are readily available from auto manufacturers at no additional cost.

Because they rely on readily available vehicles and use the same refueling infrastructure as conventional vehicles both biodiesel and E85 offer 'pour and go' technology and provide vehicle operators an easy way to support initiatives aimed at reducing dependence on imported petroleum and improving emissions. The transportation sector of the U.S. economy is 97% dependant on petroleum and over 50% of the oil used is imported - often from parts of the world hostile to the U.S. Stimulating the use of American fuels such as biodiesel and E85 can help with domestic security and support agricultural interests in North Carolina. Program organizers at TJCOG and the Triangle Clean Cities Coalition, a public private partnership of over 40 stakeholders committed to accelerating the use of alternative fuels, hope that the Biofuel Program will provide assistance to open North Carolina's first commercially accessible service station that features biodiesel, ethanol and other American fuels. Currently these fuels are only available to fleets with their own private fueling facilities such as NC DOT, the City of Raleigh and the State Motor Fleet Management Division.

In reference to the launch of the new Biofuels Program, TJCOG's Clean Cities Coordinator, Anne Tazewell stated that " We are pleased to have the opportunity to serve the residents Wake and Durham and support the dual interests of improving emissions and supporting the state's agricultural heritage through the use of alternative fuels such as biodiesel and ethanol.

More information:
nnet@tjcog.org
ttp://www.triangleclecancities.org/

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News Release

Triangle J Council of Governments

FOR IMMEDIATE RELEASE
March 6, 2003

Contact: Anne Tazewell
(919) 558-9400

TRIANGLE J COUNCIL OF GOVERNMENT AND NCDOT PARTNER TO EXPAND BIOFUEL PROGRAMS IN THE TRIANGLE

Grants Will Help Reduce Transportation Emissions in Wake and Durham Counties

Raleigh - Triangle J Council of Governments (TJCOG) today awarded $183,000 for seven local organizations to expand their use of B20, a blend of 20% biodiesel and 80% diesel fuel. The funds were provided from the N.C. Department of Transportation through a federal Congestion Mitigation Air Quality grant.

Biodiesel is renewable fuel made from crops such as soybeans or waste oil that burns cleaner than petroleum diesel. It results in significantly lower emissions of carbon monoxide, toxic contaminants, sulfur dioxide, hydrocarbons, visible smoke and noxious odors than petroleum diesel. B20 can be grown and produced in North Carolina, reducing the state's dependence on imported petroleum.

"We are delighted to award grants to organizations who share our interest in supporting the state's agricultural heritage and protecting the environment through use of alternative fuels such as biodiesel," said TJCOG Executive Director Dee Freeman.

"Our support of TJCOG's Biofuels Program demonstrates the department's commitment to provide a transportation system that protects and enhances North Carolina's natural environment," said State Transportation Secretary Lyndo Tippett. "I look forward to working with local governments to help expand the use of this environmentally-friendly fuel."

Triangle J Council of Governments is home to the Triangle Clean Cities Coalition, a group of over 50 stakeholders working with the U.S. Department of Energy to increase the use of alternative transportation fuels such as Biodiesel to reduce our nation's dependence on imported petroleum and improve air quality.

TJCOG has awarded seven grants in Wake and Durham counties, the only counties in the region eligible for these federal funds. The grant recipients are : the Town of Cary, Duke University, Durham Public Schools, the City of Raleigh, N.C. State University, the Raleigh-Durham International Airport and Wake County. (A list of programs is attached.) Through the Biofuels Program grant recipients will displace almost 200,000 gallons of diesel fuel. Funded programs range from purchasing B20 to operate transit fleets to promotions educating the public on the importance of alternative fuels.

Biofuel Program Awards

City of Raleigh

- Received $41,000 to expand B20 use to operate 15 daily feeder and connector service buses.
- Already using biodiesel- in 2002 used over 300,000 gallons of B20 in 75% of its diesel fleet.
- Active participant on the Triangle Clean Cities Coalition Steering Committee

Duke University Transportation Services

- Awarded $28,120 to assist with the purchase of B20 to operate 31 campus transit buses and 14 other vehicles used for sanitation and recycling.
- These vehicles travel 2,800 miles daily, over 1,000,000 annually.

NC Department of Public Instruction /Durham Public Schools

- Awarded $75,000 towards the purchase of B20 to operate 284 Durham Public School buses.
- Biodiesel pilot project will run through June 2004. DPI/DPS are contributing over 60% of the additional costs of B20 for this project. Biofuel Program funding will cover the remaining 40%.
- Buses travel over 4,000,000 miles annually. Will share experiences with other schools systems

NC State University Biodiesel Committee

- Awarded $7,250 to operate campus transit system and other diesel equipment/vehicles such as recycling trucks, street sweepers, forklifts, tractors and mowers on B20.
- NC State Biodiesel Committee is a partnership of three University departments, a student and Connex, the bus contractor responsible for operating Wolfline services.
- Proposed a five-phase program over 2 ½ years to get all diesel vehicles and buses operating on B20. Current award will cover Phase I and II.

Raleigh-Durham International Airport

- Awarded $8,250 to operate lawn and construction tractors on B20. Will add passenger buses as leases which prohibit B20 use expire in September 2003.
- Converting diesel tank to biodiesel as part of expansion of existing refueling infrastructure.
- RDU encouraging the development of NC's first publicly accessible biofuels station by providing incentives for such in Mixed-Use Service Station bid solicitation.

Town of Cary

- Awarded $3,256 to assist with purchasing B20 to operate 6 buses and 2 vans that travel 1,700 miles/day in the C-Tran system. C-Tran is a shared-ride transit service operated by the Town that picks up and drops off riders at the door of pre-selected arrival/destination points.
- Town of Cary already utilizes B20 in 152 vehicles/equipment and have dispensed over 60,000 gallons of B20 during the past 6 months. Will continue the use of Biodiesel after grant expires.
- Town contracts with First Transit who will fuel with B20 at Town refueling.

Wake County Environmental Services Department

- Awarded $23,350 to offset 67% of the additional cost of operating 48 ¾ ton to 1 ½ ton diesel vehicles on B20.
- Willing to fuel commercially to support the availability of alternative fuels for the general public at commercial service stations.
- Educational promotions will appear on county vehicles to inform public they can "Breath easier - alternative fuels in use."

News Release

Triangle J Council of Governments

FOR IMMEDIATE RELEASE
July 1, 2003

Contact: Anne Tazewell
(919) 558-9400

Research Triangle Park- For the first time in North Carolina, diesel vehicle drivers can fill up with B20 at a retail service station in Garner. B20 is a cleaner burning, agriculturally derived blend of 20 percent biodiesel and 80 percent petroleum diesel. This opportunity has been made possible through a federal grant provided to the Triangle J Council of Governments (TJCOG) from the NC Department of Transportation with additional assistance from the NC Department of Administration State Energy Office. TJCOG has established a Biofuels Program to rebate the incremental costs of biodiesel and ethanol. Both of these transportation fuel alternatives reduce harmful emissions and can be grown and produced in North Carolina. Through the Biofuels Program, TJCOG has contracted with United Energy, Inc the operator of the BP/Han-Dee Hugo service station that is now providing B20 to the motoring public. In addition to the established customers of the station, line and service trucks from Progress Energy will serve as an "anchor fleet" for the new fuel at the 401 Benson Rd location in Garner. Because of the grant, B20 is being sold for the same price as conventional diesel in the area, increasing sales opportunities and the potential to educate the broader public about fueling alternatives.

Biodiesel (B100) is a renewable fuel that can be used in any diesel vehicle with no modifications. It can be blended with diesel fuel in any proportion although it's commonly used as B20 - a 20 percent blend. Biodiesel is a naturally oxygenated fuel produced from organic feed stocks such as soybeans, cooking oil and animal fats. Biodiesel use results in lower emissions of particulate matter, carbon monoxide, toxic contaminants, sulphur dioxide, hydrocarbons, visible smoke and noxious odors. B100 is also non-toxic and biodegradable and therefore does not pose a threat to water and soil resources if spilled. The biodiesel at the Garner station is being provided through the Grain Growers Cooperative, a farmer's group working to build a soy biodiesel plant in North Carolina. They have a marketing agreement with West Central Soy, a farmers' cooperative in Iowa, to supply soy biodiesel until the North Carolina plant is built.

Biodiesel is referred to as 'pour and go' technology because it relies on readily available vehicles and uses the same refueling infrastructure as conventional vehicles. This provides vehicle operators an easy, familiar way to support initiatives aimed at reducing dependence on imported petroleum and improving emissions. The transportation sector of the U.S. economy is 97 percent dependant on petroleum and over 50 percent of the oil used is imported. Stimulating the use of American fuels such as biodiesel can enhance domestic security, reduce harmful emissions and support agricultural interests in North Carolina. Program organizers at TJCOG and the Triangle Clean Cities Coalition, a public private partnership of over 40 stakeholders committed to accelerating the use of alternative fuels, hope that the Garner station will become one of several outlets in the Triangle area to offer this domestic fuel choice.

"We are interested in experimenting with B20 and examining potential benefits to the public and the environment. We know there are questions about it, but we're happy to do our part to participate in a meaningful way and learn what we can," said Progress Energy Northern Region General Manager Dewitt Smith. Further, at an event recognizing the launch of the B20 pump, Garner mayor Sam Bridges stated that "I am very proud that Garner is a leader in bringing alternative transportation fuels like biodiesel to the general public. Making B20 more available is an important step towards solving our air quality problems." State Representative Deborah Ross, Energy Office Director Larry Shirley and other local leaders spoke at the event which was highlighted by the presence of a BMW biodiesel race car, Progress Energy line trucks and the colorful soybean covered diesel pump.

More information:
annet@tjcog.org

Triangle Clean Cities Coalition

Fueling Alternative Choices Today

Biofuels Program Grant

TRIANGLE J COUNCIL OF GOVERNMENTS BIOFUELS PROGRAM GRANTS

Current funds available for this round of funding (September 2003-November 2003): **$71,000**

Deadline for submitting proposals: End of business ***November 5, 2003*** for this round of funding. Applications will be accepted on a rolling basis after this date if any un-obligated funds remain. You may download an application for the current round of funding here, or you may receive a copy by calling 558-9400. Awards will be announced in December 2003.

Initial awards of $183,000 were awarded in February 2003 (application deadline was January 22, 2003). The winners of the first round of funding include:

- Duke University Transportation Division
- Wake County
- City of Raleigh
- RDU Airport
- Depart of Public Instruction/Durham Public Schools
- N.C. State University
- Town of Cary

Check this website for upcoming invitations for proposals, or contact Anne Tazewell (phone: (919) 558-9400, email: annet@tjcog.org) for more information.

The purpose of this project is to increase the use of ethanol and biodiesel as a means to reduce transportation related emissions in Wake and Durham Counties.

Triangle J Council of Governments (TJCOG) in cooperation with the Triangle Clean Cities Coalition is issuing a new request for proposals (RFP) from fleet operators and fuel providers in Wake and Durham counties for projects that use E-85 (85% ethanol/15 % gasoline) and/or biodiesel (B20 - 20% biodiesel/80% diesel or B100 -100% biodiesel).

Both ethanol and biodiesel are renewable fuels that reduce harmful emissions when used in place of/or in conjunction with conventional gasoline and diesel. In addition, both fuels can be produced in North Carolina using agricultural products such as corn for ethanol and soy for biodiesel. Use of these fuels requires no vehicle or fueling infrastructure changes. Biodiesel can be blended with diesel fuel in any proportion but is typically formulated as B20. E-85 can be utilized in flex fuel vehicles (FFVs). Thousands of FFVs - vehicles capable of operating on either E-85 or gasoline - travel the roads today in Wake and Durham counties. However, vehicle operators are often not aware that they are driving a FFV. Accompanying these guidelines is a list of FFV models and instructions on their identification.

Funding for the Biofuels Program is provided through the North Carolina Department of Transportation's Congestion Mitigation Air Quality (CMAQ) Program. Typical emission reductions from biodiesel and ethanol are listed in the table below. One component of CMAQ funded projects is to track and quantify emission reductions.

FUEL	Carbon Monoxide (CO)	Hydrocarbons (HC)	Nitrogen Oxides (NOx)	Particulate Matter (PM)
ETHANOL- E85	40%	15%	10%	
BIODIESEL-B100	43%	56%	+5.8%	55.4%
BIODIESEL-B20	12.6%	11.0%	+1.2%	18%

Expanded use of E-85 and biodiesel is hampered by the increased costs of these fuels as compared to their conventional counterparts. Eligible fleet operators and fuel providers may apply for funding through this program to offset the added cost incurred with biodiesel and /or E-85. Funding will be awarded based on criteria outlined below. No more than 80% of the additional cost of the eligible fuels will be funded. THIS IS A REBATE PROGRAM. Funds must be expended first and will then be reimbursed to eligible users on a quarterly basis. Eligible entities must estimate annual usage of proposed fuel and will be granted a specific, not-to-exceed amount of funding based on estimated fuel usage and estimated incremental costs of proposed fuel. Applicants whose proposals are accepted will invoice TJCOG for their incremental fuel costs and TJCOG will pay up to the agreed-upon amount as stated in the grant proposal. Based on documentation provided by program participants, TJCOG will track fuel usage, mileage, and emission reductions as part of an overall final report on the Biofuels Program. Only fuel costs are eligible for reimbursement. No administrative costs incurred by grantees while documenting this program are eligible for reimbursement.

All proposals will be reviewed by a TJCOG selection committee.

Only entities purchasing and/or providing fuel in Wake and Durham counties are eligible to apply.

Evaluation Criteria

Priority shall be given for strength in the following criteria:

1. **New Users** - Program organizers are interested in expanding the use of biofuels beyond those entities already using E-85 and/or biodiesel in Wake and Durham counties and will give priority to new, "first time" users. However, existing users are eligible to apply for any incremental increase over the previous six months of use (see example below). This "new use" must be explained and documented in some manner in the application. This provision is not intended to fund current fuel users to drive more miles in vehicles that are already operating on a biofuel.

   Example: If an eligible entity was purchasing X amount of biodiesel for 50% of its fleet and wanted to expand usage to 100% of its fleet, it may apply for funding to assist with the expanded usage, above and beyond the current usage.

2. **Cost-share contribution** - Program organizers are interested in encouraging partnerships with grant recipients as demonstrated through the percentage of incremental costs that applicants are willing to contribute. Cost share is the portion of the incremental fuel cost that an applicant provides. Although up to 80% of the incremental costs of ethanol and biodiesel are eligible for reimbursement, program planners are requesting that applicants offer the maximum cost-share contribution they are able to provide. A minimum cost-share of 20% is required. Any applicant that provides for a higher percentage cost share contribution will be given more weight in the review process.

Example - If the average incremental cost of biodiesel is .15 cents/gallon and XYZ uses 50,000 gallons of fuel annually the total incremental costs would be $7,500. A cost- share of 20% would provide a $1,500 contribution to offset the total incremental cost. All other things being equal, an applicant that provides for a 40% cost share or $3,000 in the case of this example will be ranked higher in the review process than an applicant offering the 20% cost share match.

3. **Education/Increase Awareness** - Program planners are interested in the applicant's potential to educate and increase awareness of employees and the public about the benefits of the proposed fuel use. Applicants should describe how their proposal would contribute towards this goal. Some examples may include issuing press releases, in-house educational promotions and ways that applicants can partner with the Triangle Clean Cities Coalition to highlight the visibility of the project to the general public. Program organizers will rank applications based on the degree that the applicant can demonstrate the ability to promote and advertise the project, thereby leading by example and encouraging others to do the same.

4. **Potential for continued/expanded use** - Program planners are interested in increasing the likelihood that fuel use will continue after the grant ends. Letters of support from governing boards or organizational leaders that express the intent of continued use based on fuel satisfaction and budgetary provisions will be weighted more favorable in the application process.

5. **Potential to increase commercial fuel availability** - A goal of the Triangle Clean Cities Coalition is to develop commercially accessible refueling infrastructure so that the general public and fleets that do not have their own refueling station may have the opportunity to use fuels such as biodiesel and ethanol. Applicant fleets that are able/willing to fuel at a commercial location can serve as "anchor tenants" for fuel providers to ensure throughput activity. The flexibility of proposed applicant to fuel at publicly accessible stations when such stations become available in Wake and Durham counties will be given weight in the application process. Providers that operate commercial fueling facilities in Wake and Durham counties are especially encouraged to apply for assistance to offset the incremental costs of biofuels that they incorporate into new or existing operations.

TJCOG and Triangle Clean Cities members can assist applicants with any technical issues concerning fuel access, delivery and estimated fuel costs. Awardees will receive assistance in emissions calculations and tracking for the duration of the grant period. Applicants should base their proposals on annual estimated fuel purchases. Awardees may re-apply for a second year of assistance, if funding is available, but will only be eligible to receive ½ of the incremental cost share assistance awarded the first year. However, if they are expanding fuel use over the first year into more of their fleet than that expanded use would be eligible for up to 80% incremental cost share assistance. This provision is not to encourage the same vehicles to consume more biofuel but to allow for a broadened use of biofuels with in a fleet.

Example: If XYZ transit agency received 80% incremental cost rate funding for a demonstration project using B20 on half of their routes/buses the first year, they may reapply for assistance the second year at a 40% rate for ½ of their fleet. If they wish to expand use to the entire fleet, they may apply for up to 80% of the incremental costs for the portion of the fuel that is being utilized by the expanded fleet.

Program guidelines allow for funding projects until August 2005. After the initial round of projects, applications will be considered on periodic basis, based on the merits of the subsequent proposals. TJCOG reserves the right to set aside program funds for later rounds of funding. All applicants that

respond to this initial request will be notified of any subsequent rounds.

Proposals must be headed with the applicant's name, affiliated organization, mailing address, phone and email address. In a narrative form, applicants should address the above stated evaluation criteria. A brief description of overall operations, fleet composition, estimated annual fuel usage, number of vehicles involved with proposed project, procedural plan to incorporate the use of ethanol and/or biodiesel into current or future operations, and an estimate of incremental costs for proposed fuel are required. Refer to/use enclosed application form. Applications are also available electronically here.

Grant recipients will be funded a specific not-to-exceed dollar amount based on estimated annual usage of fuel, estimated incremental costs and the percentage of cost-share contribution requested. **Annual awards are capped at a fixed amount.** Fuel prices may fluctuate thereby changing incremental cost estimates. Grantees may have to adjust their purchases accordingly. The percentage of cost share contributions will remain constant while overall quantities of fuel purchased through the grant may vary depending on fluctuations in fuel price.

Example: ABC may be awarded $32,000 to reimburse 80% of the incremental cost of E-85 based on an estimated annual usage of 160,000 gallons and an incremental cost of .25 cents /gallon. If the annual incremental cost of E-85 averages $0.30 rather than the $0.25/gallon estimate, ABC is still only eligible to receive 80% of the incremental cost up to a total $32,000 for that award year. However, if ABC uses fewer gallons than estimated and the incremental cost of E-85 increases, they may apply the funds available based on the estimated number of gallons as long as the total does not exceed $32,000 and is not greater than 80% of the incremental cost.

If selected for funding, awardees will be required to submit an invoice with the dollar amount being requested, the quantity, date and fuel type purchased, the unit cost of fuel purchased, the cost of an equivalent quantity of conventional fuel and the cost-share percentage and contribution provided by awardees. Invoices will be accepted for reimbursement on a quarterly basis. TJCOG will assist grantees with emission reduction calculations and conduct a site visit to each award location at least once during each annual grant cycle.

Questions regarding this proposal should be directed to Anne Tazewell at (919)558-9400 or emailed to annet@tjcog.org. Completed applications must be received by TJCOG no later than ***November 5, 2003***. Applications may be mailed to:

Triangle J Council of Governments
PO Box 12276
RTP, NC 27709
Att'n: Biofuels Program

Electronic applications are encouraged and will be accepted at the above email address.

Application Form in MSWord Format

Triangle Clean Cities Coalition

Fueling Alternative Choices Today

News Release

FOR IMMEDIATE RELEASE

Contact: Anne Tazewell
(919) 558-9400

Airport Workshop to Explore Alternative Fuel Options

RALEIGH DURHAM INTERNATIONAL AIRPORT (RDU)- At the December 4th Airports and Alternative Fuels Workshop, participants will learn about improving air quality and domestic security through the use of biodiesel, ethanol, propane, and natural gas as transportation fuel choices. Speakers from Dallas/Fort Worth International Airport, Seattle-Tacoma International Airport and United Parcel Service will share alternative fuel success stories at the workshop being held from 9:00-3:00 at the RDU Center.

"At this crossroads, when our dependence on foreign oil is coming under increased scrutiny, alternative fuels offer a way to stimulate the domestic economy and clean up the air," said Anne Tazewell, Clean Cities Coordinator for the Triangle region.

The region's attention to air quality concerns is increasing as the Triangle becomes designated a "non-attainment" area in 2004 with regards to National Ambient Air Quality Standards. Alternative fuels provide a realistic solution to these concerns, as well as those of domestic security. The U.S. transportation sector is 97% reliant on petroleum and over 50% of the oil consumed is imported - approximately 10 million barrels a day. Much of this oil is from countries hostile to the U.S. Agriculturally based fuels such as biodiesel and ethanol can be produced in North Carolina, bolstering our rural economies. In addition, fuels such as natural gas and propane significantly reduce tail pipe emissions as compared to gasoline and diesel and are also produced in America.

At the workshop, a representative from the NC Division of Air Quality will speak about the Early Reduction Credit system they are establishing to track voluntary measures to improve air quality and the RDU Authority will speak about a planned Multi-Use Service Station at the airport. Workshop organizers hope that this station will become North Carolina's first commercially accessible refueling for biodiesel and ethanol. Clean Cities Coordinator Anne Tazewell stated, "This service station could be a model for the future - one where renewable fuels such as biodiesel and ethanol are offered along with conventional fuels to the public." In addition, workshop participants will have an opportunity to test drive a natural gas Honda Civic - rated as the cleanest burning vehicle on the road today.

The Triangle Clean Cities Coalition and the NC Solar Center are sponsoring the workshop with funding provided through the NC Department of Administration's State Energy Office. Triangle Clean Cities is a coalition of over 40 public and private stakeholders dedicated to increasing the use of alternative fuels and is hosted regionally by the Triangle J Council of Governments. The coalition in part of the U.S. Department of Energy's National Clean Cities program. Further workshop information available at http://www.trianglecleancities.org/ or by calling Anne Tazewell at 558-9400.

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Model Year 2004: Alternative Fuel Vehicles
Available or Nearing Completion

Fuel Type	Model	Vehicle Type	Emission Class	Power-train	[1]Fuel Capacity	[2]Range
American Honda Motor Corporation 888-CCHONDA www.civicgx.com						
CNG Dedicated	[5]Civic GX	Compact Sedan	SULEV (Tier II Bin II) (CA AT-PZEV)	1.7L, 4-cylinder	8 GGE	200 mi - 225 mi
DaimlerChrysler 1-800-999-FLEET www.fleet.chrysler.com						
E85 FFV	Dodge Ram Pickup 1500 Series	Pickup	Tier II Bin 10A	4.7L V8	26 GGE	416 mi
E85 FFV	[4]Chrysler Sebring Sedan, [4]Dodge Stratus Sedan	Sedan	Tier II Bin 8	2.7L V6	16 GGE	300 mi
Ford Motor Company 1-800-34-FLEET www.fleet.ford.com						
CNG Bi-Fuel	F-150 (4x2 & 4x4)	Light-Duty Pickup	ULEV	5.4L V8	12.3 GGE	175 mi
CNG Dedicated	E-Series Van (E250 and E350) E-Series Wagon (E350)	Van Wagon	SULEV II	5.4L V8	Standard 18.5 GGE/ Extended Range Wagon 28.1 GGE	Standard 280 mi/ Extended Range Wagon 420 mi
CNG Dedicated	F-150	Light-Duty Pickup	SULEV	5.4L V8	21.7 GGE	350 mi
NG Dedicated	Crown Victoria	Sedan	ULEV II Bin 3	4.6L V8	Standard 11.9 GGE/ Extended Range 15.8 GGE	Standard 250 mi/ Extended Range 350 mi
E85 FFV	[4]Taurus [4]Mercury Sable	Sedan/Wagon Sedan/Wagon	ULEV	3.0L V6	18 Gal	[5]250-350 mi
E85 FFV	[4]Explorer [4]Mercury Mountaineer [4]Explorer Sport Trac	SUV	LEV	4.0L SOHC V6	22.5 Gal	[5]250-350
LPG Bi-Fuel	F-150 (4x2 & 4x4)	Light-Duty Pickup	ULEV	5.4L V8	26.2 GGE	300-400 mi

Glossary of Abbreviations

AC = Alternate Current
AT-PZEV = Advanced Technology Partial Zero Emissions Vehicle
CA = California
CNG = Compressed Natural Gas
E85 = 85% Ethanol, 15% Gasoline
EV = Electric Vehicle
FFV = Flexible Fuel Vehicle
Gal = U.S. Gallon
kW = Kilowatts
L = Liter
LEV = Low Emission Vehicle
LPG = Liquefied Petroleum Gas (propane)
Mi = Miles
NiMH = Nickel Metal Hydride
PbA = Lead Acid
SULEV = Super Ultra Low Emission Vehicle
SUV = Sport Utility Vehicle
TBD = To Be Determined
ULEV = Ultra Low Emission Vehicle
U.S. DOE = U.S. Department of Energy
ZEV = Zero Emission Vehicle

Model Year 2004: Alternative Fuel Vehicles Available or Nearing Completion

Fuel Type	Model	Vehicle Type	Emission Class	Power-train	[1]Fuel Capacity	[2]Range
General Motors Corporation 1-888-GM-AFT-4U www.gmaltfuel.com						
CNG Bi-Fuel/ CNG Dedicated	Chevrolet Silverado GMC Sierra (4x2 & 4x4)	Light-Duty Pickup	bi-fuel: LEV/ dedicated: ULEV	6.0L V8	20.6 GGE bi-fuel and dedicated	220-280 mi bi-fuel and dedicated
CNG Bi-Fuel/ CNG Dedicated	Chevrolet Express GMC Savana	Cargo or Passenger Van	bi-fuel: Tier 2 Bin 10 (CA Level II ULEV)/ dedicated: Tier 2 Bin 8	6.0L V8	11.2 GGE (bi-fuel)/20.3 GGE (dedicated)	200 mi (bi-fuel)/400 mi (dedicated)
CNG Bi-Fuel	Chevrolet Cavalier	Sedan	Tier 2, Bin 8/ (CA LEV)	2.2L V4	6.2 GGE	142-199 mi
E85 FFV	[4]Chevrolet Tahoe [4]GMC Yukon	SUV	Tier 2 Bin 10	5.3L V8	26 Gal	260-338 mi
E85 FFV	[4]Chevrolet Suburban [4]GMC Yukon XL	SUV	Tier 2 Bin 10	5.3L V8	32.5 Gal	309-402 mi
E85 FFV	[4]Chevrolet Silverado [4]GMC Sierra (4x2 & 4x4)	Light-Duty Pickup	Tier 2 Bin 10	5.3L V8	34 Gal (long box) 26 Gal (short box)	327-392 mi (long)/255-306 mi (short)
Mercedes-Benz USA 800-367-6372 www.mbusa.com						
E85 FFV	C320 Sedan, Wagon, Sport Coupe	Sedan, Wagon, Sport Coupe	LEV	90-degree V6	16.4 Gal	293-441 mi
Solectria Corporation 781-932-9009 www.solectria.com						
Electric (PbA)	CitiVan	Service Van	ZEV	110kW AC Induction Direct-Drive	52 modules (Sealed PbA)	[5]40 mi

[1] CNG and LPG vehicles fuel capacity based on slow fill @ 3600 psi.

[2] Estimated range on alternative fuel and based on fuel capacity. For EVs, range depends on battery type.

[4] All E85 vehicles are considered flexible fuel vehicles (FFVs).

[5] This information has not been confirmed for the 2004 model year.

Glossary of Abbreviations

AC = Alternate Current
AT-PZEV = Advanced Technology Partial Zero Emissions Vehicle
CA = California
CNG = Compressed Natural Gas
E85 = 85% Ethanol, 15% Gasoline
EV = Electric Vehicle
FFV = Flexible Fuel Vehicle
Gal = U.S. Gallon
kW = Kilowatts
L = Liter
LEV = Low Emission Vehicle
LPG = Liquefied Petroleum Gas (propane)
MI = Miles
NiMH = Nickel Metal Hydride
PbA = Lead Acid
SULEV = Super Ultra Low Emission Vehicle
SUV = Sport Utility Vehicle
TBD = To Be Determined
ULEV = Ultra Low Emission Vehicle
U.S. DOE = U.S. Department of Energy
ZEV = Zero Emission Vehicle

Other Resources

Alternative Fuel Vehicle Buyer's Guide
www.ccities.doe.gov/vbg

Alternative Fuels Data Center
www.afdc.doe.gov
1.800.423.1DOE

U.S. DOE Office of Energy Efficiency and Renewable Energy
www.eere.energy.gov

U.S. DOE Clean Cities Program
www.ccities.doe.gov
1.800.CCITIES

COASTAL HABITAT PROTECTION PLAN PROGRAM

2002 - 2003
ANNUAL REPORT

TO THE

JOINT LEGISLATIVE COMMISSION ON SEAFOOD AND AQUACULTURE

AND

ENVIRONMENTAL REVIEW COMMISSION

OF THE

NORTH CAROLINA GENERAL ASSEMBLY

FROM

NORTH CAROLINA MARINE FISHERIES COMMISSION,
NORTH CAROLINA COASTAL RESOURCES COMMISSION, AND
NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

September 2003

SUMMARY

September 2002 – August 2003 Actions

- All six of the plan's basic habitat chapters are drafted; they are in various stages of technical review and revision.
- The Intercommission Review Committee is taking a very active role in the process, reviewing each habitat chapter and developing the draft management options.
- Staff of the divisions of Marine Fisheries and Coastal Management began detailed presentations on each of the six types of fish habitats to the Marine Fisheries and Coastal Resources commissions in January 2003.
- The public outreach process is underway; including an enhanced web site, an informational video, a brochure, a tabloid inserted in coastal newspapers, and a series of public information meetings during July – September 2003.
- The North Carolina General Assembly approved an extension of the Coastal Habitat Protection Plan deadline to 31 December 2004.
- Members of the Coastal Resources, Marine Fisheries, and Environmental Management commissions met together in October 2002 at the North Carolina Aquarium at Ft. Fisher to share information about the Coastal Habitat Protection Plan and to visit nearby coastal habitats.
- Elizabeth City State University has implemented a federal grant to establish a remote sensing program, partly to support the Coastal Habitat Protection Plan Program. Mapping of sea grass in the Albemarle Sound system is underway.

September 2003 – August 2005 Planned Actions

- Complete informational presentations on the six types of fish habitats to the Marine Fisheries and Coastal Resources commissions in Winter 2004.
- IRC complete development of initial management options during Spring 2004.
- Continue the public outreach effort on the draft North Carolina Coastal Habitat Protection Plan during Summer 2004
- Submit the Coastal Habitat Protection Plan to Commissions for adoption in Fall 2004.
- Begin development of management unit (watershed) plans in early 2005.

Introduction

Fisheries Reform Act

The North Carolina General Assembly established the Coastal Habitat Protection Plan program within the North Carolina Department of Environment and Natural Resources with passage of the Fisheries Reform Act of 1997. The Act (General Statute 143B-279.8) requires preparation of Coastal Habitat Protection Plans (CHPPs) for critical fisheries habitats in the coastal area. The Act states "[t]he goal of the Plans shall be the long-term enhancement of coastal fisheries associated with each coastal habitat." The Divisions of the Marine Fisheries, Water Quality, and Coastal Management are designated as the lead agencies for the program. The plans will:

1. Describe fisheries habitats and their biological systems;
2. Evaluate the functions, fisheries values, status, and trends in the habitats;
3. Identify existing and potential threats to the habitats and impacts on coastal fishing; and
4. Recommend actions to protect and restore the habitats.

Role of the Commissions

The Coastal Resources, Environmental Management, and Marine Fisheries commissions must each adopt the plans for them to become effective. Once the plans are approved, rule making and policy actions taken by all three commissions, are to comply, "to the maximum extent practicable" with the plans.

The three commissions are to report by 1 September each year to the Joint Legislative Commission on Seafood and Aquaculture and the Environmental Review Commission on progress in developing and implementing the plans. This document reports on progress made on Coastal Habitat Protection Plans during September 2002 – August 2003.

Recent Progress

North Carolina Coastal Habitat Protection Plan (NC CHPP)

The first draft of this document was sent out for initial Department review in January 2002. Due to the broad scope of the document, the complexity of the issues, and comments received on the draft, DENR staff realized that extensive restructuring, revisions, and additional coordination would be required to finalize the North Carolina Coastal Habitat Protection Plan.

The document has been reorganized to simplify the basic approach to discussion of fish habitats and threats to their productivity, while adhering to guidance provided in G.S. 143B-279.8. Accordingly, the plan is based on six basic types of fishery habitat: the water column, shell bottom, submerged aquatic vegetation, wetlands, soft bottoms, and ocean hard bottom. A chapter is devoted to each type. Each of the habitat chapters is organized to provide the information specified in the Act:

- Description and distribution of the habitat,
- Ecological role and function,
- Status and trends,

- Threats, and
- Recommended management actions to deal with the threats.

The NC CHPP will describe the function of habitats necessary for production of important fish stocks and the links between those habitats and various life history stages of the fish. The NC CHPP will also describe the various types of threats to the habitats upon which productive fisheries depend. The plan will also summarize the institutional structures for management of fisheries habitat, water quality, and fisheries in eastern North Carolina. Finally, the Plan will include management recommendations for the three regulatory commissions, DCM, DWQ, and DMF to implement in order to address the identified threats.

In support of this revised approach, the Intercommission Review Committee (IRC), composed of two members each from the Environmental Management, Coastal Resources, and Marine Fisheries commissions, is taking a more active role in the process. Specifically, members of the IRC are meeting every other month with technical staff from DENR divisions and the Wildlife Resources Commission (CHPP Development Team) to review each chapter in detail and to develop draft management options. This process should be completed by April 2004.

Attachment 1 lists the members of the IRC.

Attachment 2 shows the major milestones anticipated for development of the NC CHPP.

Meetings and Products

The CHPP Development Team, including staff from the divisions of Marine Fisheries, Coastal Management, Water Quality, Environmental Health (Shellfish Sanitation and Recreational Water Quality Section), and the Wildlife Resources Commission assisted DMF staff with writing and review of each chapter of the CHPP. The Development Team met four times with the IRC to review individual chapters and develop initial management options. Progress reports have been provided to all three commissions, the Intercommission Review Committee, and senior DENR staff.

Numerous presentations were made by DMF staff and Team members at various meetings addressing coastal issues. Sponsors of those meetings included the Coastal Resources Advisory Council, North Carolina Coastal Federation, Albemarle-Pamlico National Estuary Program Coordinating Council, and several local civic organizations. The CHPP poster was displayed at several public events, such as the "One North Carolina Naturally" conference in Raleigh (April 2003). Technical presentations were made at the Coastal GeoTools Conference in Charleston, S.C. and at the American Fisheries Society Southern Division meeting in Wilmington, N.C. The Massachusetts Office of Coastal Zone Management invited a CHPP Team member to Boston to explain the North Carolina program to assist them undertake a similar initiative.

Public Outreach

Using federal grant funds, the Department began a public outreach program. This activity included a four-part effort:

- An informational video describing the NC CHPP and inviting viewers to participate in the process (March – April 2003).
    - Over 200 copies of the video were distributed to local cable TV systems, educational groups, individual members of the Marine Fisheries and Coastal Resources commissions, members of the Coastal Resources Advisory Council, the North Carolina Ferry Division, the North Carolina Aquariums, the Estuarium, and other groups and individuals for public showing.

- An informational brochure that described the six types of coastal fish habitats and invited readers to participate in the process (May – June 2003).
    - About 15,000 copies of the brochures were distributed similarly to the video.
- A 12-page newspaper tabloid further describing the six types of fish habitat and threats to them was printed and inserted in coastal newspapers. The insert also invited readers to participate in the process, and listed the dates and locations for ten public meetings later in the year (July 2003).
    - About 250,000 copies of the insert were distributed via local coastal newspapers. Several thousand additional copies were mailed to interested persons and groups.
- Ten public meetings were convened throughout the coastal area, as well as inland as far west as Mooresville.
    - Participants provided comments on threats to the fish habitats and suggested potential management actions to address the threats.

Future Actions

North Carolina Coastal Habitat Protection Plan Development

Through the end of calendar year 2004 staff will concentrate on preparation of the NC CHPP to address threats facing coastal fisheries habitats throughout eastern North Carolina. It is being prepared using a wide variety of information sources including wetlands maps from the Division of Coastal Management; data on distribution of submerged aquatic vegetation from the National Oceanic and Atmospheric Administration, DMF, and DWQ; and data on topics as diverse as soil types, agricultural and forestry acreage, point source discharges, Natural Heritage sites, and recreational and commercial fisheries landings.

Plan Adoption

The process of working with the three commissions to lay the basis for consideration and adoption of the NC CHPP began in October 2002, with a tri-commission meeting, consisting of presentations and local field trips. DENR Secretary Ross addressed the commissions and discussed the NC CHPP with commissioners in a workshop setting. The meeting emphasized the importance of the CHPPs Program and began the process of developing a strategy for adoption and implementation of the plans. The divisions are presenting information from draft chapters of the NC CHPP to the commissions over several meetings in order to allow time for consideration of the plan in phases rather than all at once. This process began in January 2003 and will end during February – March 2004.

Management Unit Plans

Early in 2005 work will begin on development of the plans that will cover 11 specific geographic areas similar to the Division of Water Quality's river basins (see Attachment 3). These areas are referred to as Management Units, and the plans will provide more area-specific information and recommendations. It will take approximately 12 - 18 months to complete each Management Unit Plan. These documents will focus on identification and improved management of site-specific habitat areas.

Other Accomplishments and Issues

With assistance from the divisions of Coastal Management and Marine Fisheries, Elizabeth City State University received a grant to establish a remote sensing program and laboratory. Much of the justification for the grant was based on the need to obtain and analyze satellite data to aid in preparation of the NC CHPP and management unit documents. Under this program, staff initiated mapping of sea grass beds in the Albemarle Sound system late in 2002. This work is being expanded during 2003 – 04.

The 2001 - 2002 Annual Report noted several impediments to success of the CHPP Program. As in previous years, insufficient funding has prevented obtaining the following items that would greatly enhance the development of the NC CHPP:

- Dedicated environmental scientists (one each in DWQ, DCM, and DMF) to support work on CHPPs,
- Funds to subscribe to electronic scientific literature databases at DMF offices in Wilmington and Morehead City, and
- Funds to hire graduate students to assist in locating data and reports, either directly or through contracts with laboratories in Wilmington and Morehead City-Beaufort.

ATTACHMENT 1.

INTERCOMMISSION REVIEW COMMITTEE MEMBERS 2002 - 2003

MARINE FISHERIES COMMISSION

Dr. Barbara Garrity-Blake	Gloucester	252-729-8021
Dr. B. J. Copeland	Pittsboro	919-837-5024

ENVIRONMENTAL MANAGEMENT COMMISSION

Will Fowler	Newport	252-393-2699
Dr. Charles H. Peterson	Morehead City	252-726-6841

COASTAL RESOURCES COMMISSION

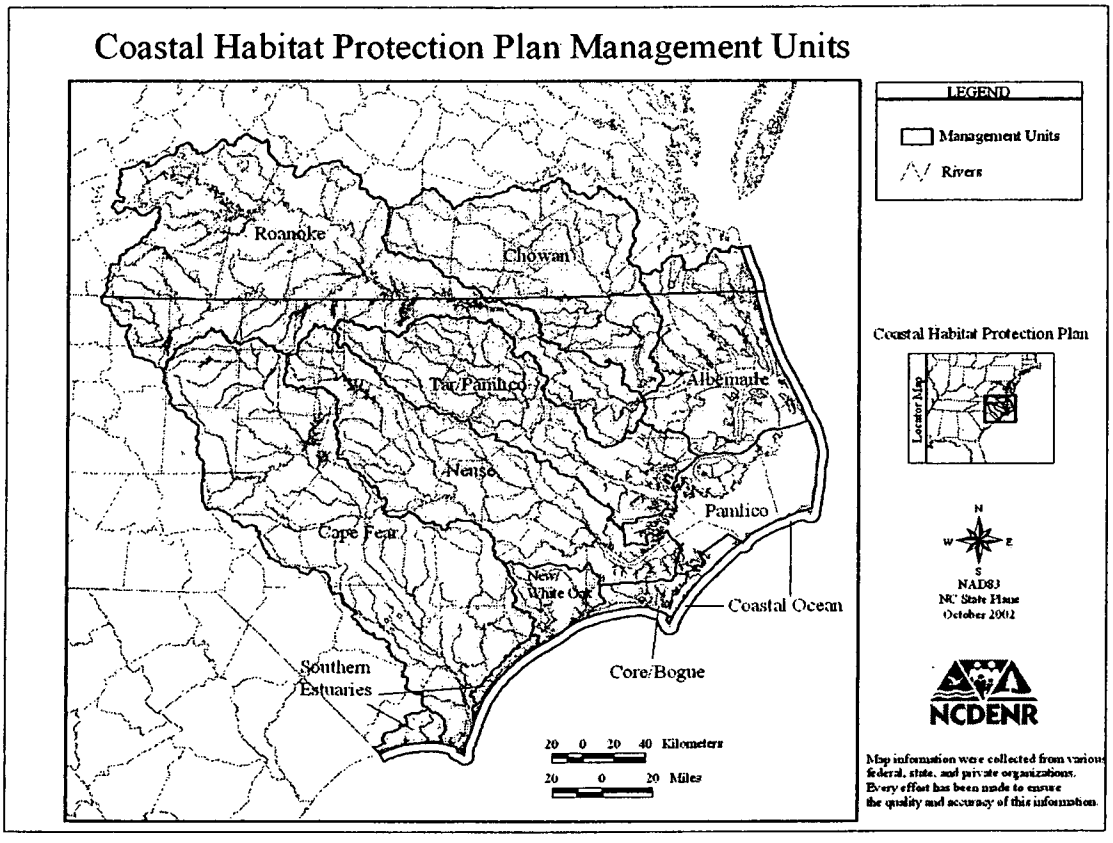
Lee Wynns	Colerain	252-356-4684
Pricey Taylor Harrison	Beaufort	252-728-1287

ATTACHMENT 2.

TIMELINE FOR NC COASTAL HABITAT PROTECTION PLANS JULY 2003 – December 2004

Task	Time Period
Draft NC CHPP	July – December 2003
Public outreach activities	July – December 2003
IRC review CHPP drafts	July 2003 – April 2004
IRC develop draft management options	July 2003 – April 2004
Public outreach activities	January – September 2004
IRC develop draft management recommendations	Spring 2004
DENR review draft NC CHPP	May – June 2004
Revise draft NC CHPP	July – August 2004
Public review	Summer – Fall 2004
Revise NC CHPP	July - August 2004
Submit NC CHPP to Commissions	September 2004
Commissions adopt NC CHPP	October - December 2004

ATTACHMENT 3
MAP OF COASTAL HABITAT PLAN MANAGEMENT UNITS



NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

October 5, 2003

Mr. George Givens, Commission Counsel
Environmental Review Commission
Room 545
Legislative Office Building
Raleigh, NC 27601-1096

Dear Mr. Givens:

Pursuant to G.S. 130A-294(i), the Department of Environment and Natural Resources is required to develop a comprehensive hazardous waste management plan for the state at two-year intervals and report on that plan annually. The most recent hazardous waste management plan was developed in 2002.

The 2003 Hazardous Waste Management Report discusses:

- North Carolina waste management;
- amount of waste generated;
- resource recovery, reuse and conservation;
- minimization of the amount of disposed hazardous waste; and
- implementation of recommendations in the 2002 Plan as noted in GS 130A – 294(i).

The 2003 Hazardous Waste Management Report is attached. If you have any questions, please contact Jill Pafford, Chief, Hazardous Waste Section at (919) 733-2178, ext. 219.

Sincerely,

William G. Ross Jr.
Secretary

Enclosure

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HAZARDOUS WASTE MANAGEMENT

2003 REPORT

Presented to

The Environmental Review Commission

October 1, 2003

NCDENR

North Carolina Department of
Environment and Natural Resources

INTRODUCTION

The State of North Carolina requires that the Department of Environment and Natural Resources (DENR) develop a comprehensive hazardous waste management plan every two years. The first plan was completed on July 1, 1990; the latest plan was completed in 2002. Beginning October 1, 2003, the department must also make an annual report on the hazardous waste management plan per GS 130A – 294(i). This report includes an evaluation of hazardous waste management in North Carolina and identifies DENR activities and recommendations in the following areas: improving waste management; cleaning up of hazardous waste; reducing the amount of waste generated; minimizing the amount of hazardous waste which must be disposed of; and maximizing resource recovery, reuse and conservation.

This report includes North Carolina data from the Environmental Protection Agency's 1999 "Biennial Report of Hazardous Waste Generation" (1999 BR). All North Carolina generators that reported Large Quantity Generator status in 1999 were required to provide EPA with 1999 waste generation and management information. The 1999 BR was published in June 2001 and can be found at http://www.epa.gov/epaoswer/hazwaste/data/#br. EPA has not published the 2001 report yet, so more recent data is not available at this time.

NORTH CAROLINA HAZARDOUS WASTE SECTION

The Hazardous Waste Section was authorized by EPA in 1980 to implement the Resource Conservation and Recovery Act (RCRA) in North Carolina in lieu of the EPA. Continuing developments in the hazardous waste program nationwide have required the section to continually apply for authorization in program areas, such as case development audits (criminal and administrative investigations), corrective action, and alternatives to permitting and emission monitoring. The Hazardous Waste Section has a staff of 54 people working in three branches: compliance, facility management and programs. Collectively, the branches' duties include, but are not limited to, the following areas:

- Regulate the management of hazardous waste by generators, transporters, treaters, storers, and disposers;
- Educate the public and the hazardous waste community by providing technical assistance through individual consultations and seminars;
- Protect public health and the environment through waste reduction, sound recycling methods, safe management practices and proper disposal as a last resort;
- Issue permits specifying requirements that each hazardous waste treatment, storage or disposal facility must meet;
- Conduct compliance audits and, with the cooperation of the North Carolina Attorney General's Office, take enforcement actions against those found in violation;
- Require groundwater assessments, facility investigations and corrective measures at facilities where hazardous wastes have previously been released into the environment;

- Ensure section staff is properly trained to implement their duties; and
- Ensure environmental improvement through emergency response and site cleanup.

The section participates in a national data management system that tracks hazardous waste activity. This system, RCRAInfo, is especially designed for the RCRA program. The Programs Branch maintains the information in RCRAInfo for North Carolina, by entering data on closure activities, corrective action activities, permitting activities, enforcement actions, compliance inspections, financial and other record reviews as reported by the Facility Management, Compliance and Programs Branches.

For RCRAInfo information, as well as other regulatory information for a particular site, visit http://www.epa.gov/enviro/. For more details about the Hazardous Waste Section and the Division of Waste Management visit http://www.wastenotnc.org/.

HAZARDOUS WASTE GENERATION, MANAGEMENT AND CLEANUP

In 1999, 508 North Carolina large quantity generators (LQGs) reported that 74,757 tons of hazardous waste were generated. Of the 508 LQGs, the top 10 facilities generated 34,405 tons, or 46 percent, of the total quantity of hazardous waste generated in North Carolina.

In 1999, 75 North Carolina treatment, storage or disposal facilities (TSDFs) reported they managed 20,405 tons of hazardous waste through treatment, storage or disposal. Of the 75 TSDFs, the top 10 facilities managed 20,352 tons, or 99.7 percent, of the total hazardous waste managed in North Carolina. Common hazardous waste management methods include solvent recovery, incineration, fuel blending, energy recovery, sludge treatment, stabilization and metals recovery.

Although only LQGs and TSDFs are required to report their hazardous waste generation and management amounts, it is important to note that North Carolina also has 2,024 small quantity generators and 3,984 conditionally exempt small quantity generators. These facilities do not generate enough hazardous waste in a year to qualify for reporting purposes. However, these facilities collectively generate a significant amount of hazardous waste that needs to be managed properly and in compliance with all applicable laws and rules.

North Carolina has 39 facilities in the permitting workload universe and 61 facilities in the post-closure workload universe. Approximately 97 percent of these facilities are under a permit, order or other approved control for management or remediation of their hazardous waste. This includes corrective action sites, where remediation progress is tracked through environmental indicators. Currently, 48 percent of high priority corrective action sites have human exposures under control and 52 percent of high priority corrective action sites have groundwater migration under control.

NORTH CAROLINA HAZARDOUS WASTE REDUCTION INITIATIVES

A. North Carolina Hazardous Waste Commitment toward Waste Minimization

The EPA is in the process of using its final "Waste Minimization" priority chemicals list to set regional waste minimization program priorities using a three-year time horizon. Once established, these program priorities will focus on industrial sectors that generate hazardous wastes containing priority chemicals and/or on specific priority chemicals that may be generated by several sectors. EPA will then assist states in determining the appropriate sectors to target in waste minimization efforts.

Until the priority chemical list is established, the Hazardous Waste Section has taken the following actions:

- Incorporate general pollution prevention training into annual generator workshops, industry meetings and enforcement settlement negotiations;
- Review facility requests for alternative uses of hazardous waste (use/reuse, substitution, reclassification and delistings).
- Conduct inspections that include monitoring facility compliance with Land Ban/Land Disposal restrictions, air rules, universal waste streams and used oil regulations. These regulations are all designed to reduce exposures and fugitive emissions, while they improve recycling options for all waste streams.

B. Environmental Stewardship Initiative Award

DENR's Environmental Stewardship Initiative promotes and encourages superior environmental performance by North Carolina's regulated community.

This voluntary program establishes incentives to stimulate the development and implementation of programs that use pollution prevention and innovative approaches to meet and exceed regulatory requirements. There are two levels of participation. "Environmental Partners" is for organizations interested in developing a systematic approach to improving their environmental performance. The "Environmental Steward" level is for those organizations that already display a commitment to exemplary environmental performance beyond what is required by law.

This program is implemented by the Division of Pollution Prevention and Environmental Assistance (DPPEA); however, the Hazardous Waste Section reviews the candidate list to determine the candidate's compliance with the appropriate hazardous waste laws and regulations. This information is shared with DPPEA for their final decision of the candidate's eligibility in the Environmental Stewardship Program.

C. Reduction of Hazardous Waste in the Dry Cleaning Industry

The North Carolina General Assembly has recently enacted legislation that provides state tax credits for those who purchase and install certain types of dry cleaning equipment and processes.

The two current predominant dry cleaning processes in North Carolina are PERC and Petroleum Class II. The Hazardous Waste Section assists the Solid Waste Section in reviewing the applications for the tax certification requests for dry cleaning recycling equipment.

OTHER INITIATIVES

Predicting trends from the 1999 BR data presented in the 2002 plan and this report is difficult. However, North Carolina facilities clearly generate and manage a significant amount of hazardous waste that must be managed properly. In addition to continuing its work with EPA and other DENR agencies on the waste reduction initiatives previously discussed, the Hazardous Waste Section has also accomplished the following:

- Received the necessary authorization updates for the Hazardous Waste Section from EPA in order to continue enforcing existing laws and regulations for the comprehensive management of hazardous waste.
- Made data management a priority, so that the necessary data for hazardous waste generation, management and enforcement is available to the regulatory agency, the regulated community and the public for sound decision-making and hazardous waste trend analysis. Both the Hazardous Waste Section and DPPEA have developed new databases within the approved DENR framework in order to share information easier internally. This service will expand eventually to the public. Both agencies also keep heavily requested documents electronically available on their web pages.
- Held three generator workshops in May 2003. These workshops help educate LQGs on hazardous waste regulations, the expectations of hazardous waste inspectors, and pollution prevention opportunities.
- Started a new initiative in 2002 to target the vast SQG universe through the use of a SQG self-certification form. This form was again sent out in 2003. Data collected after two years will be used to establish management trends and help identify educational needs of SQGs.
- Established a committee recently with DPPEA to identify North Carolina waste generation trends and mutual waste management goals and objectives.

An additional recommendation that was outlined in the 2002 Hazardous Waste Management Plan, but has not been implemented, is as follows:

- Find a source of revenue for the Hazardous Waste Emergency Response Fund. Fund revenue used to come from penalties levied on compliance orders. The practice was halted a few years ago due to a court ruling that requires all penalty money must go to the state school fund. Once this fund is depleted, the state will no longer be able to respond to emergency spill situations.
- Continue to support the passage of HB 1312, to establish a process where LQGs and SQGs would pay a security deposit before receiving an EPA ID number and commencing HW management. This deposit would be refunded in the event the generator notifies the agency of closure and cleans up their site. Should the generator abandon the facility, this deposit would be used to stabilize the site by overpacking, labeling and possibly disposing of drums left behind.

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

September 5, 2003

Mr. George Givens, Commission Counsel
Environmental Review Commission
Room 545
Legislative Office Building
Raleigh, NC 27601-1096

Dear Mr. Givens:

The Division of Waste Management is required under N.C.G.S. 130A-295.02 to employ resident inspectors to monitor the activities of all the commercial hazardous waste facilities within the state to ensure their compliance with laws and rules administered by the Department of Environment and Natural Resources.

Pursuant to N.C.G.S. 130A-295.02(m), I am transmitting an annual report on the implementation of this Resident Inspector Program. The attached report is for the fiscal year 2002-2003. If you have any questions, please contact Michael Brailsford, program supervisor for the Resident Inspector Program, Hazardous Waste Section, (919) 733-4996, ext. 359.

Sincerely,

for William G. Ross Jr.
Secretary

mb/WR
Enclosure

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RESIDENT INSPECTOR PROGRAM

2003 ANNUAL REPORT

Presented to

The Environmental Review Commission

September 2003

NCDENR

North Carolina Department of Environment and Natural Resources

HAZARDOUS WASTE SECTION

State of North Carolina
Michael F. Easley
Governor

Department of Environment and Natural Resources
William G. Ross Jr.
Secretary

Division of Waste Management
Dexter R. Matthews
Director

Hazardous Waste Section
Jill B. Pafford
Chief

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Resident Inspector Program
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RESIDENT INSPECTOR PROGRAM
2003 ANNUAL REPORT

This annual report is presented to the Environmental Review Commission pursuant to Article 9, G.S. 130A 295.02(m). The report covers the activities of the Resident Inspector Program from July 1, 2002 through June 30, 2003.

I. OVERVIEW

The Resident Inspector Program has been operating for more than 12 years in the Division of Waste Management. This program monitors all aspects of the commercial hazardous waste facilities in North Carolina and assures compliance with all laws and rules administered by the Department of Environment and Natural Resources. It may also enforce laws or rules administered by any other state agency through a memorandum of agreement.

The Resident Inspector Program was established "... to enhance the ability of the Department to protect the public health and the environment by providing the Department with the authority and resources necessary to maintain a rigorous inspection and enforcement program at commercial hazardous waste facilities" [G.S. 130A-295.02(f)].

II. PROGRAM STAFFING

For this fiscal year, the program was comprised of two resident inspectors assigned to home duty stations, one administrative assistant and a program supervisor (See Attachment 1 for the Organization Chart). The Resident Inspector Program resides within the Hazardous Waste Section's Compliance Branch.

III. THE RESIDENT INSPECTOR

Most state agencies perform their compliance monitoring inspections as required from their specific respective regulations. The Resident Inspector Program, however, is unique in that its inspections utilize a multi-media approach. This approach covers all regulatory responsibilities for which DENR is authorized, such as hazardous waste management and treatment requirements, workplace safety, air emissions requirements, waste water treatment and discharge requirements, etc.

There are inherent overlaps of DENR's regulatory requirements with regulations administered by other departments. Two examples include the Department of Labor's Occupational Safety & Health Act and the Department of Transportation's hazardous materials transportation regulations. Deviations from these various departments' regulations could adversely affect public health and the environment, as well as a facility's compliance with air, water or hazardous waste management regulations. As part of

the Resident Inspector Program's comprehensive approach to monitoring commercial hazardous waste facilities, resident inspectors also evaluate these sites for potential violations in these other regulatory areas. When necessary, they make recommendations to the facilities and/or make referrals to the authorized agency or agencies. The mandated frequency of inspection at each facility gives resident inspectors the time needed to achieve this high degree of oversight.

To prepare resident inspectors for their multimedia approach to inspections, initial training typically consists of Hazardous Waste Operations and Emergency Response (24 or 40 hours), Environmental Surveillance, RCRA Hazardous Waste Training, Hazardous Materials Transportation and the care and use of Level B / Personal Protective Equipment.

Annual training for resident inspectors includes an 8-hour Health & Safety Basic Refresher, Level B Update and Environmental Surveillance Update. Depending upon the inspector's area of expertise and responsibility, other miscellaneous training may be received, including Hazardous Waste Incineration, Ambient Air Monitoring, Air Pollution Control Devices, Chemical Safety Audit, OSHA Inspector's Course, Hazardous Materials Management and various EPA regulatory workshops.

IV. SUBJECT FACILITIES

To be subject to oversight by the Resident Inspector Program, the facility must be a commercial hazardous waste facility. The term "commercial," as it relates to a hazardous waste facility, is defined as a facility " ... that accepts hazardous waste from the general public or another person for a fee" [G.S. 130A-290(a)(3)]. Presently, there are 12 permitted commercial hazardous waste treatment, storage, and disposal facilities in North Carolina under the jurisdiction of the Resident Inspector Program. The formerly "interim status" (not yet permitted) facility, Carolina Solite Corporation, has withdrawn its application for a Part "B" Permit (a permit to operate light weight aggregate kilns fueled by hazardous waste) and has met the RCRA closure standards, in accordance with the North Carolina and federal regulations. The Carolina Solite facility continues to operate the light weight aggregate kilns utilizing "used oil" as a fuel and continues to be monitored by the Division of Air Quality. The permitted treatment, storage and disposal facility, Giant Resource Recovery, (which owns the Carolina Solite facility) continues with its previously announced intention to close all hazardous waste operations at the Stanley County, North Carolina location. The permitted treatment storage and disposal facility formerly known as EnviroChem Environmental Services had been in the process of closure due to the owner's bankruptcy. It has been purchased through foreclosure proceedings conducted by the mortgage holder. After a thorough background investigation, the permit was re-assigned to the new owner. The new owner/operator, EQ – North Carolina Inc., ceased closure proceedings and began hazardous waste storage operations at the Apex facility in January, 2003.

V. FACILITY CATEGORY RANKINGS

Each commercial hazardous waste treatment, storage and disposal facility is ranked to determine its required inspection fees and minimum inspection frequency as required under 15A NCAC 13A .0116. The frequency of the inspections at each facility is dependent upon its qualification as a "special purpose" commercial hazardous waste facility and the category ranking assigned to it. Currently, all

existing commercial hazardous waste treatment, storage and disposal facilities in North Carolina qualify as special purpose facilities. (See Attachment 2 for current category rankings and primary waste treatment activities for these facilities.) The designated categories of 1, 2 or 3 correspond to a minimum inspection frequency of two, four or six times per month, respectively.

VI. FUNDING & EXPENSES

The Resident Inspector Program is completely funded by fees collected from the commercial hazardous waste facilities. These fees are based upon each facility's category ranking and volume (tons) of hazardous waste handled. The category ranking system is designed to be an indirect measure of the costs associated with the oversight at each commercial hazardous waste facility. With the overall reduction of hazardous waste generation by industry, the commercial hazardous waste facilities' tonnage throughput has decreased. Consequently the fees received from these facilities have decreased. Currently, it is necessary for the Resident Inspector Program supervisor to conduct a portion of the required inspections in order to meet the Program's mandates.

For FY 2002-2003, the budget was developed using anticipated revenues from Resident Inspector Program fees of approximately $275,000. The actual hazardous waste tonnage received by many of the commercial facilities remains lower than projected due to the impact to general industry by the continued weakened economy. (A detailed list of the individual tonnages received by each of the commercial hazardous waste facilities in FY 2002-2003 can be found in Attachment 3.) The Actual Program receipts in FY 2002-2003 totaled $264,524. With the limited budget projections, and in accordance with state budget mandates, restrictions for travel, training and supplies were imposed and expenses were held to $236,955.

VII. INSPECTION GOALS & ACHIEVEMENT

During this past fiscal year, the program staff conducted a total of 567 inspections. Additional inspections, over the required minimum of 528 inspections, were performed to monitor closure activities at two facilities and to assist in improving compliance performance by other facilities. (A detailed list of the inspections performed by program staff at the commercial hazardous waste facilities in FY 2002-2003 can be found in Attachment 4.)

VIII. ENFORCEMENT & COMPLIANCE

Enforcement Activities

In general, the commercial hazardous waste facilities continue to be cooperative and have rapidly responded with corrective action in most cases when deficiencies or violations were cited or recommendations made. When either of these actions do not result in timely and consistent compliance, more severe enforcement action, such as compliance orders with administrative penalties, is taken.

During the past fiscal year, resident inspectors issued three Notices of Violation to commercial facilities (see Attachment 5). This translates to an overall compliance rate of 99.5 percent.

Compliance Assistance Activities

Compliance assistance activities offered under this program are conducted routinely during the inspectors' site visits. Since the inspectors are at these facilities at least semi-monthly, they have the opportunity to become very familiar with the operations of each facility and may offer compliance assistance in several ways. Inspectors identify past trouble areas and work with the facility toward a permanent solution. They also increase scrutiny of these areas during each visit to keep the facility's compliance awareness high. Inspectors communicate frequently with facility management and front-line workers to clarify the permit and current regulatory requirements, the reasons for the requirements, and the potential risks incurred for noncompliance. Inspectors continue to develop and schedule roundtable training workshops customized for each specific facility. These workshops cover the most frequent violations observed at commercial facilities, the most frequent violations observed at their particular facility, any potential areas of concern and positive facility operations.

If a facility repeats a violation, the primary inspector and program supervisor will set up an informal enforcement conference with the local facility compliance managers, the plant manager, and, if applicable, the corporate compliance officers. They discuss the facility's current compliance issues and work with the facility to find a permanent solution, which may include formal enforcement.

IX. PUBLIC MEETINGS / HEARINGS & PERMIT RENEWALS

Resident Inspector Program staff continue to observe and assist/support public meetings/hearings that involve existing and proposed commercial hazardous waste facilities in this state. A continuing program goal is for the staff to be fully aware of public concerns and to be conscious of these concerns during oversight efforts at these facilities. Program staff have provided assistance in facility compliance audits by generators, consultants, other agencies and the public. Program staff work with area schools to provide information in the classroom about environmental responsibility and how the facilities help with that responsibility.

The Resident Inspector Program staff continue to work with the Facility Management Branch (the permitting arm of the Hazardous Waste Section) and each commercial hazardous waste facility during the permit application process and permit renewal review periods. The purpose of this joint effort is to provide clarification, address areas of concern, and assist in ensuring the permit application accurately reflects the facility as it is operated.

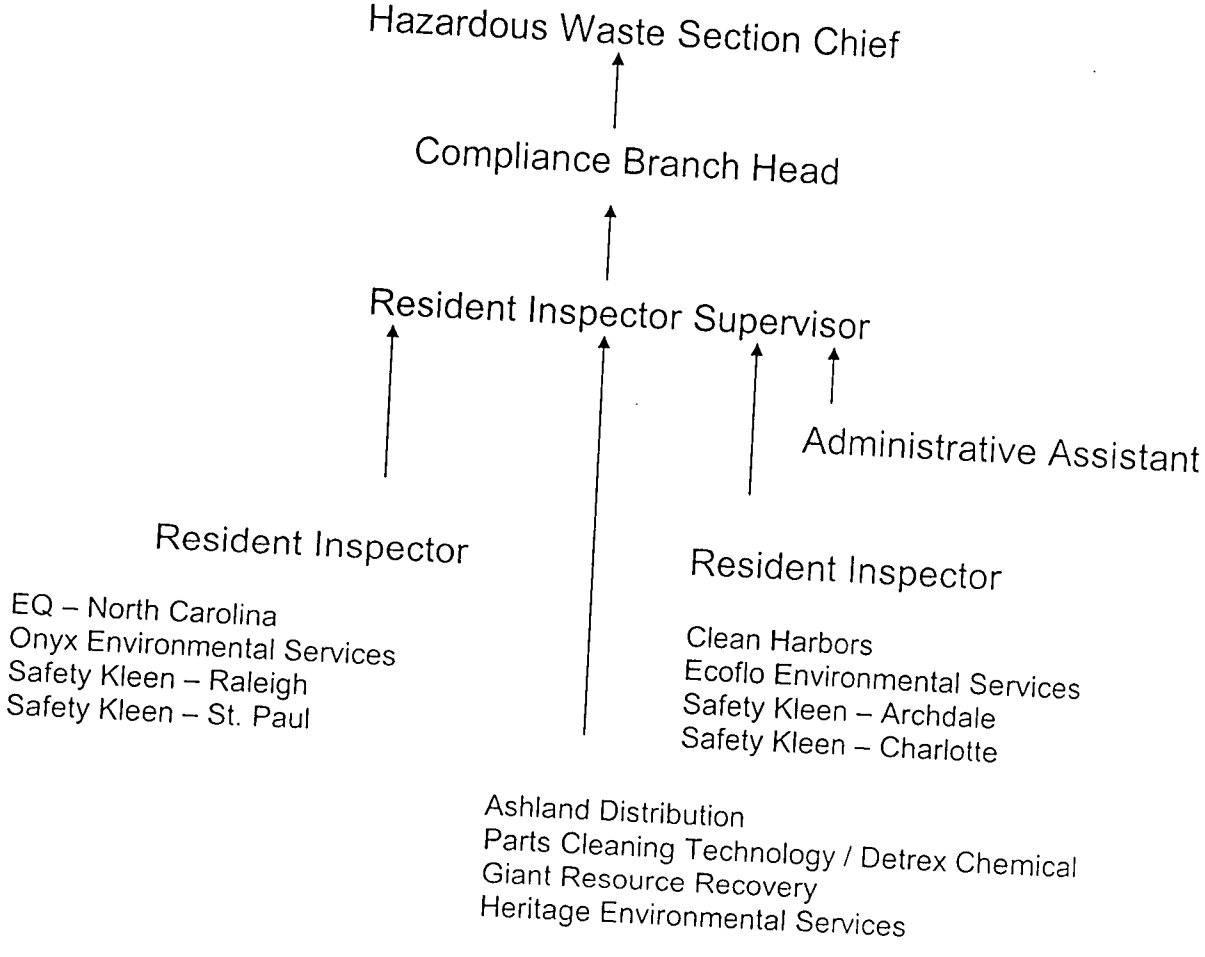
X. SUMMARY

At the conclusion of the program's 12th year, Resident Inspector staff continue to provide rigorous oversight of the commercial hazardous waste facilities in this state. This is reflected in the facilities' overall compliance rate of 99.5 percent. Staff constantly seek new approaches and initiatives to improve the department's ability to protect public health and the environment. Staff also work to ensure that new regulatory requirements are fully understood by the facilities so they can be implemented rapidly and correctly. Proactive approaches, such as workshops, program oversight and compliance assistance efforts, have clearly demonstrated a heightened level of compliance at the commercial hazardous waste facilities in North Carolina.

ATTACHMENTS

ATTACHMENT 1
RESIDENT INSPECTOR PROGRAM

ORGANIZATIONAL CHART



ATTACHMENT 2
RESIDENT INSPECTOR PROGRAM

CATEGORY RANKINGS & PRIMARY TREATMENT

Commercial Hazardous Waste Facilities (FY 2002-2003)

FACILITY	CURRENT CATEGORY RANKING	Primary Waste Treatment
Ashland Distribution Co.	1	Container Storage
Clean Harbors	3	Hazardous Waste Consolidation, Fuels Blending, Container Storage
Detrex Chemical / Parts Cleaning Technologies	2	Chlorinated Solvent Reclamation
ECOFLO, Inc.	3	Hazardous Waste Consolidation, Fuels Blending, Container Storage
EQ – North Carolina	2	Container Storage
Giant Resource Recovery *	2	Fuels Blending
Heritage Environmental Services	3	Aqueous Treatment, Fuels Blending, Container Storage, Hazardous Waste Consolidation
ONYX Environmental Services	2	Container Storage
Safety-Kleen / Archdale	1	Mineral Spirits Reclamation
Safety-Kleen / Charlotte	1	Mineral Spirits Reclamation
Safety-Kleen / Raleigh	1	Mineral Spirits Reclamation
Safety-Kleen / St. Pauls	1	Mineral Spirits Reclamation
Solite Corporation*+	N/A	Energy Recovery

* Giant Resource Recovery and Solite Corporation are located together and are inspected at the same time.

+ Solite Corporation was a special purpose facility - interim status – Application for a RCRA permit has been withdrawn and the facility RCRA operations have been CLOSED.

ATTACHMENT 3
RESIDENT INSPECTOR PROGRAM

RESIDENT INSPECTOR PROGRAM
ANNUAL HAZARDOUS WASTE TONNAGE REPORT
FY 2002/2003

COMMERCIAL FACILITY	TONNAGE 2002/2003	TONNAGE 2001/2002	TONNAGE 2000/2001	TONNAGE 1999/2000
ASHLAND	3,363.58	3,108.87	3,711.66	3,978.10
CLEAN HARBORS	4,199.94	5,333.92	4,788.78	5,207.73
DETREX	1,017.31	1,643.76	2,364.60	2,582.80
ECOFLO	4,916.60	4,131.37	6,221.00	6,092.37
EQ–North Carolina	152.52	0	176.39	873.74
GIANT/SOLITE	0	0	0	2,433.00
HERITAGE	920.54	2,501.15	4,850.90	5,519.38
ONYX	1,245.00	1,325.55	1,434.29	1,381.18
SK-ARCHDALE	564.50	728.90	854.30	858.70
SK-CHARLOTTE	493.20	653.30	865.20	952.00
SK-RALEIGH	512.00	676.50	829.80	863.54
SK-ST PAUL	339.90	396.00	482.90	534.22
TOTAL	**17,726.09**	**20,499.32**	**26,579.82**	**31,276.76**

ATTACHMENT 4
RESIDENT INSPECTOR PROGRAM

INSPECTION TOTALS

Commercial Hazardous Waste Facilities (FY 2002-2003)

FACILITY	REQUIRED INSPECTIONS	ACTUAL INSPECTIONS
Ashland Distribution Co.	24	30
Clean Harbors	72	74
Detrex Chemical / Parts Cleaning Tech.	48	52
ECOFLO, Inc.	72	72
EnviroChem Environmental Services	26	28
EQ - North Carolina	22	23
Giant Resource Recovery & Solite Corp.	48	52
Heritage Environmental Services	72	86
ONYX Environmental Services	48	51
Safety-Kleen / Archdale	24	24
Safety-Kleen / Charlotte	24	24
Safety-Kleen / Raleigh	24	26
Safety-Kleen / St. Pauls	24	25
TOTAL	528	567

ATTACHMENT 5
RESIDENT INSPECTOR PROGRAM

ENFORCEMENT OVERVIEW at COMMERCIAL HAZARDOUS WASTE FACILITIES (7/1/91 through 6/30/03)

FACILITY	NOVs FY 02-03	NOVs To Date	Compliance Orders FY 02-03	Compliance Orders To Date
ASHLAND	1	10	0	0
CLEAN HARBORS [1]	0	15	0	0
DETREX	0	11	0	1
ECOFLO	0	9	0	0
ENVIROCHEM [2]	0	8	0	1
EQ–North Carolina[2]	0	0	0	0
GIANT [3]	0	12	0	0
HERITAGE	1	30	0	3
ONYX	0	10	0	1
SK-ARCHDALE [4]	0	14	0	0
SK-CHARLOTTE [4]	1	15	0	0
SK-RALEIGH [4]	0	11	0	0
SK-ST PAUL [4]	0	15	0	0
SOLITE [5]	0	8	0	1
TOTALS	3	168	0	7

1 Clean Harbors (formerly Safety-Kleen Technical Services; formerly Laidlaw)
2 EnviroChem Environmental Services, Inc. bankrupt - EQ-North Carolina is current owner/operator
3 Giant Resource Recovery (formerly Oldover) - Currently in closure
4 SK = Safety-Kleen Corporation
5 Solite Corporation has ceased operation as a hazardous waste burner - CLOSED January 2003

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: George Givens, Environmental Review Commission Counsel

FROM: William G. Ross, Jr. WGR

DATE: August 26, 2003

RE: Report on Mining Permit Fee Use

Pursuant to G.S. 74-54.1(c), I am transmitting a report on the mining permit fees collected in FY 02-03.

The report was prepared by DENR's Division of Land Resources, which administers the Mining Program. If you have further questions or would like additional information, please contact Mell Nevils at 733-4574.

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR

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MINING PERMITTING PROGRAM

1. Monies Collected:

   Total fee monies of $70,904 were collected during fiscal year 2002-2003.

2. Monies Expended:

Salaries and Benefits	$33,189.00*
Purchased Services	4,056.00
Supplies	409.00
Intragovernmental Transfer	25,012.00
Total	$62,666.00

One position, an assistant mining specialist, was funded this year to assist in application review and permit issuance.

*The position was vacant for approximately four months

NORTH · CAROLINA
AQUARIUMS

417 North Blount Street, Raleigh, NC 27601-1009 · (919) 733-2290 · FAX: (919) 733-4271
David Griffin, Director

MEMORANDUM

TO: Senator David Weinstein, Senate Chair
Natural and Economic Resources

Representative Roger West, House Co-Chair
Natural and Economic Resources

Representative Stan Fox, House Co-Chair
Natural and Economic Resources

Senator Marc Basnight, Co-Chair
Joint Legislative Commission on Governmental Operations

Representative James Black, Co-Chair
Joint Legislative Commission on Governmental Operations

Representative Richard Morgan, Co-Chair
Joint Legislative Commission on Governmental Operations

Jim Johnson, Director of Fiscal Research

FROM: David R. Griffin, Director
Aquariums Division

DATE: September 25, 2003

RE: Annual Admission Fund Report

Pursuant to NCAC 143B-289.44 (d), please find attached a report detailing revenues to and expenditures from the North Carolina Aquariums' Admission Fund (Fund 2865) during fiscal year 2003. This report also includes information on the disposition of exhibits and exhibit components no longer needed by the Aquariums during fiscal year 2003 (NCAC 143B-289.41(a)(1c)).

Memorandum

To: Joint Legislative Commission on Governmental Operations
Natural and Economic Resources Appropriations Subcommittees
Fiscal Research Division

From: David R. Griffin, Director
Aquariums Division

Subject: Aquariums Exhibit Disposal
Aquariums Admission Fund

Date: September 25, 2003

During the 2002-2003 fiscal year, a collection of miscellaneous exhibit components was sold by the NC Aquarium at Pine Knoll Shores to the National Aquarium in Baltimore, MD totaling $1265, and six exhibit light boxes were sold to The History Place, Morehead City, NC for $150 (Ref. S.L. 1999-49).

Following is a report on the revenues and expenditures of the Aquariums Special Admission Fund (Fund 2865) for the 2002-2003 fiscal year (Ref. G.S. 143B-289.44(d)).

Total Admission Fund Revenues:	**$3,510,789**

Expenditures:

Admissions Administration & Staff	350,000
Seasonal/Temporary Positions	220,000
Maintenance/Repairs	300,000
Operating Support (Replace Cuts in State Appropriations)	370,000
Husbandry Support	220,000
Exhibits Support	88,000
Education Program Support	40,000

Advertising/Promotions	75,000
Printing/Publications	50,000
New Changing Exhibit (R/I)	250,000
Expansion Design Fees (PKS)	915,000
Total:	**$ 2,878,000**

Admission Fund Growth '02-'03 (Revenues – Expenditures)	**$ 632,789**

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: George Givens, Environmental Review Commission Counsel

Jim Johnson, Director of Fiscal Research

FROM: William G. Ross Jr.

DATE: October 17, 2003

RE: Report on Pilot Program for Animal Waste Inspection

This memorandum transmits the June 2003 Report on the Pilot Program for Animal Waste Inspection in accordance with Session Law 2003-340, Section 6.2. The statute requires the Department to provide reports to the Environmental Review Commission and the Fiscal Research Division regarding progress on the Pilot Program. This report is presented in the form of an Addendum to the May 2002 Interim Report.

If you have any questions or need additional information, please contact David Vogel, Director of the Division of Soil and Water Conservation, at 715-6097 or by e-mail at david.vogel@ncmail.net.

Attachment
cc: David Vogel
Sheryl Stephens
Alan Klimek

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR
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THE ENVIRONMENTAL REVIEW COMMISSION AND FISCAL RESEARCH DIVISION OF THE NORTH CAROLINA GENERAL ASSEMBLY

INTERIM REPORT ON THE PILOT PROGRAM FOR INSPECTIONS OF ANIMAL WASTE MANAGEMENT SYSTEMS June 30, 2003

North Carolina Department of Environment and Natural Resources

I. REPORT CONTENTS

- Introduction
- Site Visit Findings for 2002
- Categorizing Farms and Targeting Potential High Impact Farms
- New Technical Assistance Site Visit Reporting Form
- Estimated Program Implementation Costs
- Conclusions

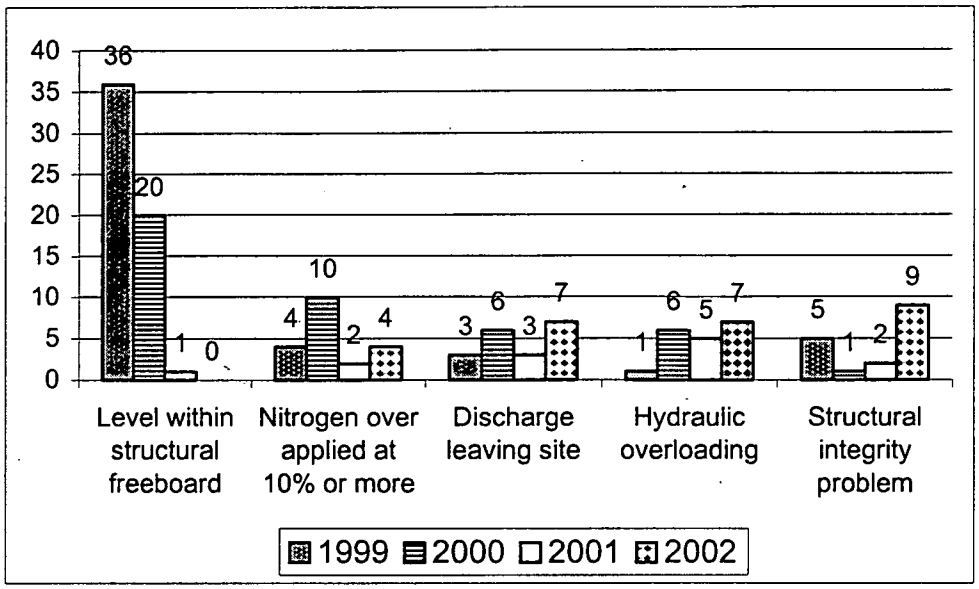
II. INTRODUCTION

This interim report is intended to supplement information provided in the Department's November 2001 interim and May 21, 2002 addendum Environmental Review Commission (ERC) reports on the Pilot Program for Inspections of Animal Waste Management Systems. It contains updated results from the continuation of the Pilot Program as extended by the 2002 General Assembly. The reader is encouraged to refer to details in the November 2001 and May 21 reports for a full explanation of data collection and analysis, and for a detailed description of findings regarding compliance for swine farms for previous program years. This report includes new 2002 data and outlines DENR's continued targeting of technical assistance and enforcement resources within the pilot program area of Brunswick, Columbus and Jones Counties.

III. SITE VISIT FINDINGS FOR 2002

Program year 2002 was a period of mixed compliance trends, particularly given that 2001 and 2002 were similar. Both years documented below average rainfall and were similar in other factors such as technical assistance, directed enforcement and operator initiatives. The number of farms categorized as having "low environmental impact" remained fairly constant (to be discussed in more detail in the next section). The number of recorded "Immediate Threat" problems on High Impact Farms either equaled or slightly increased over 1999 numbers for every category except structural freeboard lagoon. There were no structural freeboard violations noted in 2002. See Figure 1.

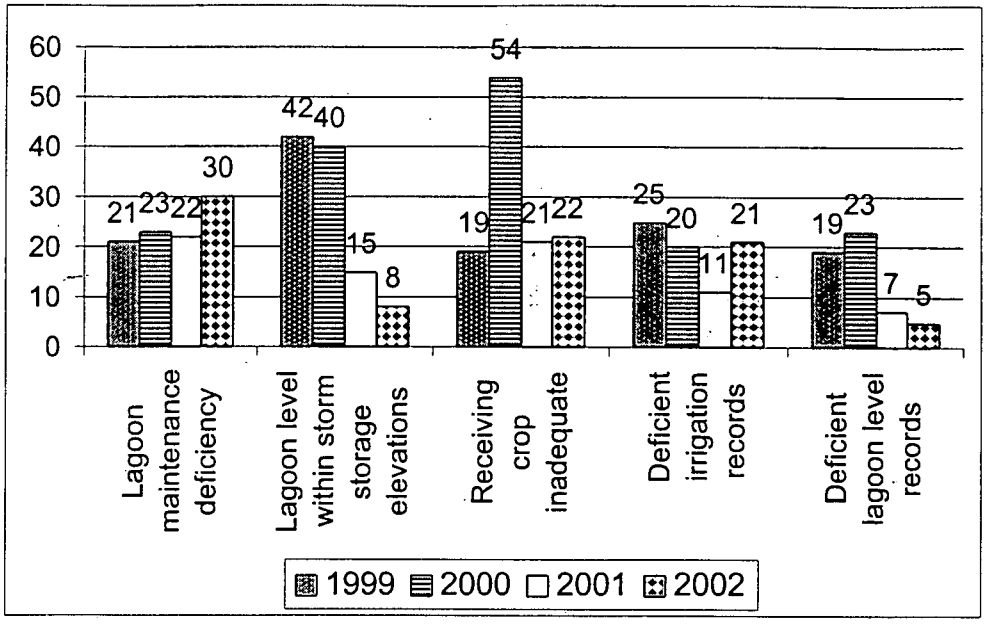
Figure 1: "Immediate Threat" Problems for Pilot Farms Recorded 1999 - 2002



NOTE: Y-axis represents number of recorded "Immediate Threat" Problems. These results are based on 1,252 site visits by DENR staff.

Deficiencies recorded as "Potential Threat" problems for the pilot program farms from 1999-2001 are shown in Figure 2. The data shows continued improvement for managing lagoons below the storm storage elevations and properly managing lagoon levels records. Again, this may be a direct function of below average rainfall documented for 2002. However, other "Potential Threat" problems such as lagoon maintenance deficiencies and irrigation record deficiencies reveal flat or increasing noncompliance trends for the four-year period.

Figure 2: "Potential Threat" Problems for Pilot Farms Recorded 1999 - 2002



NOTE: Y-axis represents number of recorded "Potential Threat" Problems.
These results are based on 1,252 site visits by DENR staff.

Previous pilot program reports have focused on compliance comparisons between company-owned operations and contract grower/independently-owned farms. During 2002, economic factors within the industry caused five swine operations in the pilot counties to switch ownership status from company-owned to contract grower, thus changing the make up of the established control groups and affecting the data sorting and comparison. This report does not include trends between ownership status and compliance due to ever-shifting numbers between these categories.

IV. CATEGORIZING FARMS AND TARGETING POTENTIAL HIGH IMPACT FARMS

In the May 21, 2002 Addendum ERC Report, an illustrative Environmental Scale was used to illustrate a process for separating livestock operations based on their compliance performance and relative (potential) environmental impact. The two main purposes of this point system are to recognize that some parameters are more significant than others relative to environmental impact, and that not all problem occurrences should be treated equally.

This process was used for categorizing farms at the end of the 1999, 2000, 2001 and 2002 program years. Annually, problem parameters were (1) noted in all DENR site visit reports for a specific program year, (2) compiled for each swine farm, and (3) matched with the appropriate environmental points as outlined in Figure 3. The 108 pilot program farms were then scaled in ascending order of points received as a measure of compliance performance and to determine the level of potential environmental impact for each farm for a specific program year.

Figure 3: DENR Environmental Scale Problem Parameters & Point Assignments

PROBLEM PARAMETERS TRACKED THROUGH PILOT PROGRAM	Environmental Points
Lagoon level in the structural freeboard	16
Lagoon level in the storm storage elevations	11
Nitrogen over-application =/> 10%	12
Nitrogen over-application < 10%	8
Waste spill or discharge leaving the site	20
Waste spill or discharge contained on site	12
Hydraulic overloading by excessive ponding or exceeding CAWMP	15
Structural integrity compromised	18
Structural maintenance deficiency	10
Marginal sprayfield conditions	9
Receiving crop needs improvement	8
Receiving crop inconsistent with CAWMP	10
Irrigation system maintenance deficiency	11
Irrigation records deficient	10
Late or missing waste analysis	8
Late or missing soils analysis	7
Late or missing lagoon level records	9

* Problem parameters were scaled from 1 to 20 with 20 representing the highest potential for environmental impact.

Swine farms in the pilot counties were categorized into three groups as determined by their compliance performance and the environmental scaling process. Figure 4 shows how pilot farms performed for each of the four program years of 1999-2002.

Figure 4: 1999–2002 Performance Comparisons of Pilot Program Farms Based on DENR Environmental Scale Results

	1999	2000	2001	2002
Farms receiving perfect scores of "0"	36	37	68	71
Low Impact Farms (0-12 points per year)	58	55	86	87
Medium Impact Farms (13-30 points per year)	25	29	9	11
High Impact Farms (31+ points per year)	25	24	13	10
Maximum points received (with duplications)	123	193	289	356
Total number of site visits by DENR personnel	311	395	264	282

From Figure 4, the following items are noteworthy:

- After the 2001 dramatic increase in farms receiving perfect scores (no points assigned for deficiencies or violations) for compliance performance, the number slightly increased for 2002.
- In 2002, farms determined to be "low impact" remain relatively constant at 81% while farms categorized as "high impact" decreased to less than 10% of the pilot program's 108 farms.
- The maximum number of points received by one farm for documented problems in 2002 increased from 2001, and is at an all time high of 356 points. It should be noted that the number of points received may be a result of duplication in points counted between DSWC and DWQ since each division is generating more

site visit reports related to problem farms, and due to repeat visits associated with improved identification, surveillance and resource targeting.

During the 2002 program year, DSWC and DWQ continued the process of targeting potential high impact farms for joint compliance auditing, and the transfer of inspection responsibility from DSWC to DWQ for farms with continual noncompliance. The process was more formally established by applying the following criteria to farms:

- Level 1: farm in good compliance status and subject to a *routine* operation review and *routine* compliance inspection by DSWC staff.
- Level 2: due to noncompliance factors (points received) farm is subject to an environmental audit by team of DSWC (*routine* operation review) & DWQ (*other* compliance inspection) staff. If audit reveals farm is in compliance and/or has corrected deficiencies, the farm returns to Level 1. If audit indicates continued noncompliance, farm is elevated to Level 4 by team.
- Level 4: farm is subject to routine and other compliance inspections by DWQ staff. Farm can be referred to DSWC by DWQ for technical assistance. Farm will remain at this level until compliance is achieved or farm is deactivated. If the farm returns to compliance, it is lowered to Level 3 by DWQ.
- Level 3: farm is subject to an environmental audit by team of DWQ (*routine* compliance inspection) and DSWC (*other* operation review) staff. If audit reveals continued compliance, farm is returned to Level 1. If audit indicates noncompliance, farm returns to Level 4 by team.

Figure 5: Tracking Chart for Pilot Audits & DWQ Routine Inspections

Region/Date	Level 1	Level 2	Level 3	Level 4	Comments
Brunswick & Columbus (WiRO) July-Dec 2001	54	8	-	-	Auditing process initiated by Wilmington staff
Jones County (WaRO) July-Dec 2001	46	-	-	-	Washington DWQ unable to participate due to workload
Brunswick & Columbus (WiRO) Jan-June 2002	58	3	-	1	Second round of audits and site visits by Wilmington staff
Jones County (WaRO) Jan-June 2002	38	7	1	-	Auditing process initiated by Washington staff. One farm was moved to level 3 due to recent spill & noncompliance history.
Brunswick & Columbus (WiRO) July-Dec 2002	61	-	1	-	Third round of audits and site visits by Wilmington staff
Jones County (WaRO) July-Dec 2002	38	3	-	5	Second round of audits and site visits by Washington staff
Brunswick & Columbus (WiRO) Jan-June 2003	60	2	-	-	Fourth round of audits and site visits by Wilmington staff
Jones County (WaRO) Jan-June 2003	40	-	-	6	Third round of audits and site visits by Washington staff

Figure 5 summarizes the tracking of the auditing and inspection process for pilot farms since its implementation in the last half of 2001. The tracking chart was broken down into six-month increments and by DENR region with Jones County located within the Washington region and Brunswick and Columbus located within the Wilmington region.

DSWC and DWQ staff assigned to work in the pilot counties confirms that the team auditing approach provides a comprehensive evaluation of each targeted farm, improves communication between division staff, and relays a consistent and unified message to all farms about the state's regulatory approach to noncompliance.

Figure 6 shows the 2003 targeted efforts and projected January through June workload for DENR regional staff related to individual farms. Of the 108 farms in the pilot counties, the top 20 farms receiving the highest points for 2002 are listed. Farms with an indicated status of "DWQ only" are Level 4 farms, considered Potential High Impact due to noncompliance, and are subject to DWQ inspections. It should also be noted that although this process is the first quantitative approach used to categorize farms based on compliance performance, DENR regional staff retained its authority to immediately elevate Low Impact Farms to Level 2 requiring a "joint audit" based on occurrence(s) of "Immediate Threat" problems. See farms #19 & #20 in Figure 6.

Figure 6: 2003 DENR Targeting Efforts of Potential High Impact Farms

POTENTIAL HIGH IMPACT FARMS – Revised 1-28-03						
2003 DENR Targeting Efforts as Established by Pilot Program						
Identification Number	2002 rank & total points received w/duplication points included	Final 2002 rank & adjusted points (duplications removed)	2002 status for quarters 1&2	2002 status for quarters 3&4	2003 status for quarters 1&2	2003 activity as of 1-28-03
1	high - 356	high - 238	S&W only	joint audit	DWQ only	
2	high - 254	high - 165	joint audit	DWQ only	DWQ only	
3	high - 166	high - 100	joint audit	DWQ only	DWQ only	
4	high - 87	high - 59	joint audit	DWQ only	DWQ only	
5	high - 57	high - 47	joint audit	DWQ only	DWQ only	
6	high - 51	high - 41	joint audit	S&W only	S&W only	
7	high - 50	medium - 30	joint audit	DWQ only	DWQ only	
8	high - 48	high - 38	S&W only	joint audit	S&W only	
9	high - 38	medium - 28	joint audit	S&W only	S&W only	chronic record keeping problems
10	high - 34	medium - 22	S&W only	joint audit	S&W only	
11	medium - 30	medium - 20	joint audit	S&W only	S&W only	
12	medium - 27	medium - 27	joint audit	S&W only	S&W only	
13	medium - 25	medium - 25	S&W only	S&W only	S&W only	
14	medium - 24	medium - 24	S&W only	S&W only	S&W only	
15	medium - 24	medium - 16	joint audit	S&W only	S&W only	
16	medium - 22	medium - 22	S&W only	S&W only	S&W only	chronic management & recordkeeping problems
17	medium - 21	medium - 21	S&W only	S&W only	S&W only	chronic high lagoon problems

18	medium - 16	low - 8	joint audit	S&W only	S&W only	
19	low - 0	low - 0	S&W only	DWQ only	joint audit	1-9-03 discharge
20	low - 0	low - 0	S&W only	S&W only	joint audit	ponding issues & complaints
	low = 0-12 medium = 13-30 high = 31+					

V. NEW TECHNICAL ASSISTANCE SITE VISIT REPORTING FORM

Conclusion #4 of the November 30, 2001 ERC Interim Report states that "*Due to the increased level of field effort, the pilot program's data set is larger, more complete and more robust than data contained in the state database for non-pilot farms.*" It is this discrepancy in data that has prevented a simple comparison between pilot counties and other counties as to the exact nature of improvement in compliance. While staff see evidence in the field that their increased level of effort and assistance to pilot farms is paying off, the overall statewide database for non-pilot farms does not contain sufficient data for comparative purposes. DSWC recognized that better data are needed for technical assistance efforts statewide, and developed a revised tracking form to compile information about technical assistance activities associated with operation reviews.

Attachment A is the new Technical Assistance Site Visit Reporting Form for use by DSWC and its partners, statewide, in reporting operation review and technical assistance efforts. The new form was designed to:

- Document site visits related to operation review and technical assistance. Staff will continue to document compliance inspections on the current state inspection form.
- Capture noncompliance data specifically related to the 17 problem parameters (page 2 of form) as established and tracked through the Pilot Program.
- Determine technical assistance needs (page 2 of form) for individual farms as well as technical assistance needs trends for the animal industry.
- Determine if a relationship exists between provided technical assistance and compliance. For example - Did failure to secure technical assistance result in continued noncompliance?
- Document positive improvements made to animal operations (page 2 of form).
- Account for and evaluate the substantial level of technical assistance provided to animal operations from public sector technical specialists employed with DSWC, Natural Resources Conservation Services, local Soil and Water Conservation Districts, Cooperative Extension Service and the North Carolina Department of Agriculture and Consumer Services.

Questions 1-6 on page 1 of the new form are written for "Immediate Threat" problems that require direct referral to DWQ by state and county staff pursuant to G.S. 143-215.10E. A majority of the noncompliance issues represented in the current state inspection form are also represented in the parameter section of the new form, and contribute to data used to provide the needed information for DENR's quarterly reports to the ERC (e.g., lagoon maintenance).

DWQ will maintain the data generated from the new form within the statewide DENR database. It is anticipated that within two years these data will allow comparisons between pilot and non-pilot farms for compliance trends related to the parameters outlined in the pilot program reports.

VI. ESTIMATED PROGRAM IMPLEMENTATION COSTS

This section is presented in response to language included in the Pilot Program's reauthorization by the 2002 General Assembly, and questions raised by ERC members and staff about costs associated with the Pilot Program.

Since its establishment in 1997, no additional resources were appropriated or allocated to DSWC for the Pilot Program. Because existing staff resources were used, DSWC efforts through additional site visits and related pilot work have resulted in reduced technical assistance opportunities for farms in non-pilot counties. However, program implementation costs and the impact of reduced services in non-pilot counties were not routinely tracked.

The DSWC operation review program's operating costs and work performance for 2001 and 2002 were evaluated to determine the pilot program's implementation costs.

Figures 7a and 7b outline operating costs and site visit numbers for 2001, 2002 and an average of the two years for farms in pilot and non-pilot counties. The data is based on the following:

- Overall statewide, DSWC maintains an operation review eight-member core staff for which statewide operation review data are compiled. Other DSWC technical staff members occasionally assist with the operation review workload. In addition, technical specialists with local Soil and Water Conservation Districts perform approximately 8.5% of the annual routine operation reviews statewide. However, this report is based on the operation review core staff hours and site visits only.
- The Pilot Program is carried out by four of the eight DSWC operation review staff members.
- For both tables (both pilot and non-pilot counties), reductions in hours (line B) and number of site visits (lines C & D) from 2001 to 2002 are a direct result of extended staff vacancies in two of the eight DSWC operation review positions.
- Base operating costs for operation reviews was used as a *unit cost*. Technical assistance provided in pilot counties essentially represents greater units than non-pilot counties.

Figure 7a: Operating Costs for Farms in Non-Pilot Counties

NON-PILOT FARMS	2001	2002	2001-02
A. Current annual employee salary & benefits for operation review core staff; average operating costs (office space rental, admin assistance, supplies, etc.); and base mileage (mileage based on min. motor fleet requirement of 1050 miles/month at $0.31/mile cost). Figure is calculated as a unit cost per hour.	$24.22	$24.22	$24.22
B. Hours coded for operation review work conducted in non-pilot counties plus pro-rated admin time coded for program administration, training, prep time, etc.	12,252.23	10,039.61	
C. Total site visits made to non-pilot farms by core DSWC staff.	2,055	1,709	
D. Total "routine" site visits made to non-pilot farms by core staff. Since farms receive only one "routine" review per year, this number will represent number of farms in non-pilot counties that are reviewed by core staff.	2,017	1,690	
E. Average number of site visits made to an individual non-pilot farm. (Line C/D)	1.02	1.01	1.015
F. Average time in hours (travel, on-site & report processing times) per non-pilot farm site visit. (Line B/C)	5.96	5.87	5.92
G. Average total time in hours (prep, travel, on-site & report processing times) per each non-pilot farm. (Line B/D)	6.07	5.94	6.01
H. DSWC cost per each site visit to a non-pilot farm. (Line A x F)	$144.35	$142.17	$143.26
I. DSWC cost per non-pilot farm. (Line A x G)	$147.02	$143.87	**$145.45**

Figure 7b: Operating Costs for Farms in Pilot Counties

PILOT FARMS	2001	2002	2001-02
A. Current annual employee salary & benefits for operation review core staff; average operating costs (office space rental, admin assistance, supplies, etc.); and base mileage (mileage based on min. motor fleet requirement of 1050 miles/month at $0.31/mile cost). Figure is calculated as a unit cost per hour.	$24.22	$24.22	$24.22
B. Hours coded for operation review work conducted in pilot counties, plus pro-rated admin time coded for program administration, training, prep time, etc.	1745.77	1106.39	
C. Total site visits made to pilot farms by DSWC pilot program staff.	261	235	
D. Number of farms in the pilot program area of Brunswick, Columbus & Jones counties.	108	108	
E. Average number of site visits made to an individual pilot farm. (Line C/D)	2.42	2.18	2.30
F. Average time in hours (travel, on-site & report processing times) per each pilot farm site visit. (Line B/C)	6.69	4.71	5.70
G. Average total time in hours (prep, travel, on-site & report processing times) per pilot farm. (Line B/D)	16.16	10.24	13.20
H. DSWC cost per each site visit to a pilot farm. (Line A x F)	$162.03	$114.08	$138.06
I. DSWC cost per pilot farm. (Line A x G)	$391.40	$248.01	**$319.71**

The 2001-2002 DSWC average cost per site visit to a non-pilot farm is $143.26 and slightly higher than the same 2001-2002 average cost per site visit to a pilot farm at $138.06. The difference is attributed to differences in travel distances and additional training costs for new employees working outside of pilot counties.

The significant difference between efforts by DSWC staff in pilot versus non-pilot counties is a direct function of the number of site visits (line "E") and as reflected in line "I" of figures 7a and 7b. Pilot farms, on average, cost $319.71 per farm per year and non-pilot farms cost $145.45 per farm per year. In other words, the annual cost to the DSWC is almost 120% higher per farm in a pilot county than a farm in a non-pilot county.

VII. CONCLUSIONS

1. Based on the DENR Environmental Scale, pilot county farms continued the level of improvement shown in 2002, with almost 66% of the farms receiving perfect scores for compliance performance.

2. In 2002, the number of pilot farms determined to be "low impact" remain relatively constant at 81% while farms categorized as "high impact" decreased to less than 10% of the pilot program's 108 farms.

3. The maximum number of points received by one farm increased in 2002 to an all time high of 356 points. Aside from poor performance by the farm, this increase may be attributed to better identification and surveillance of problem farms as reflected in duplication points received for noncompliance documented by DSWC and DWQ staff through targeting and team audits.

4. DSWC and DWQ staff working in the pilot counties confirm that the team auditing approach provides a more comprehensive evaluation of potential "high impact" farms and improves communication between DENR staff, and with farm operators. Future records will help determine how effective this increased coordination and partitioning of farms between divisions is in improving compliance.

5. DENR is providing a unified message to all farms in the pilot counties about the state's regulatory approach to noncompliance, with direct targeting of DWQ's enforcement resources to farms that were poor performers and were determined to be of potential "high impact" to the environment. All other pilot farms were rewarded with a continuing technical assistance focus through a working relationship with DSWC.

6. DSWC's new Technical Assistance Site Visit Reporting Form was implemented in early 2003 to generate the necessary information to allow comparison between compliance performance in pilot and non-pilot counties beginning within two years, and to collect the necessary data to better determine the impact of targeting technical assistance and regulatory resources on compliance performance.

7. Based on DSWC 2001-2002 operating costs and site visit numbers, the annual inspections and technical assistance cost per farm in a pilot county is 120% higher than the cost of DSWC services provided to a farm in a non-pilot county. This increased cost is a direct function of the increased number of site visits made to pilot county farms.

8. Past and current findings support continuation of the Pilot Program. Because the department continues to experience problems with limited resources, DENR needs to continue to "test" technical assistance and enforcement targeting programs, and to evaluate the resulting data to identify those measures that best

promote improved compliance in the overall operation of the animal waste management system.

Technical Assistance Site Visit Report

ATTACHMENT A

- O Division of Soil and Water Conservation
- O Natural Resources Conservation Service
- O Soil and Water Conservation District
- O Other...

Facility Number [ ] - [ ] Date: [ ] Time: [ ] Time On Farm: [ ]

Farm Name _____ County _____ Phone: _____

Mailing Address _____

Onsite Representative _____ Integrator [ ]

Type Of Visit

- ☐ Operation Review
- ☐ Compliance Inspection (pilot only)
- ☐ Technical Assistance
- ☐ Confirmation for Removal

- ☐ No Animals-Date Last Operated:
- ☐ Operating below threshold

☐ Swine ☐ Poultry ☐ Cattle ☐ Horse

Purpose Of Visit

- O Routine
- O Response to DWQ/DENR referral
- O Response to DSWC/SWCD referral
- O Response to complaint/local referral
- O Requested by producer/integrator
- O Follow-up
- O Emergency
- O Other...

	Design Capacity	Current Population
☐ Wean to Feeder		
☐ Feeder to Finish		
☐ Farrow to Wean		
☐ Farrow to Feeder		
☐ Farrow to Finish		
☐ Gilts		
☐ Boars		

	Design Capacity	Current Population
☐ Layer		
☐ Non-Layer		
☐ Dairy		
☐ Non-Dairy		
☐ Other		

GENERAL QUESTIONS:

1. Is waste discharging from any part of the operation and reaching surface waters or wetlands? ☐ yes ☐ no
2. Is there evidence of a past waste discharge from any part of the operation that waste reached surface waters or wetlands? ☐ yes ☐ no
3. Does any problem pose an immediate threat to the integrity of the waste structure (large trees, seepage, severe erosion, etc.)? ☐ yes ☐ no
4. Is there evidence of nitrogen over application, hydraulic overloading or excessive ponding requiring DWQ notification? ☐ yes ☐ no
5. Is there evidence of improper dead animal disposal that poses a threat to the environment and/or public health? ☐ yes ☐ no
6. Is the waste level within the structural freeboard elevation range for any waste structure? ☐ yes ☐ no

	Structure1	Structure 2	Structure 3	Structure 4	Structure 5
Identifier					
Level (Inches)					
CROP TYPES					
SPRAYFIELD SOIL TYPES					

What type of technical assistance does the onsite representative feel is needed? (list in comment section)

Facility Number _____ - _____ Date: _____

PARAMETER

8. Waste spill leaving site
9. Waste spill contained on site

☐ 10. Level in structural freeboard
☐ 11. Level in storm storage

☐ 12. Waste structure integrity compromised
☐ 13. Waste structure needs maintenance

☐ 14. Over application >= 10% & 10 lbs.
☐ 15. Over application < 10% or < 10 lbs.
☐ 16. Hydraulic overloading

☐ 17. Deficient irrigation records
☐ 18. Late/missing waste analysis
☐ 19. Late/missing lagoon level records
☐ 20. Late/missing soils analysis

☐ 21. Crop needs improvement
☐ 22. Crop inconsistent with waste plan

☐ 23. Irrigation maintenance deficiency
☐ 24. Deficient sprayfield conditions

Regulatory Referrals

☐ Referred to DWQ Date:
☐ Referred to NCDA Date:
☐ Other... Date:

LIST IMPROVEMENTS MADE BY OPERATION

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

○ No assistance provided/requested

TECHNICAL ASSISTANCE	Needed	Provided
25. Waste Plan Revision or Amendment	☐	☐
26. Waste Plan Conditional Amendment	☐	☐
27. Review or Evaluate Waste Plan w/producer	☐	☐
28. Forms Need (list in comment section)	☐	☐
29. Missing Components (list in comments)	☐	☐
30. 2H.0200 re-certification	☐	☐
31. Five & Thirty day Plans of Action (PoA)	☐	☐
31. Irrigation record keeping assistance	☐	☐
32. Organize/computerization of records	☐	☐
33. Sludge Evaluation	☐	☐
34. Sludge or Closure Plan	☐	☐
35. Sludge removal/closure procedures	☐	☐
36. Waste Structure Evaluation	☐	☐
37. Structure Needs Improvement	☐	☐
38. Operation & Maintenance Improvements	☐	☐
39. Marker check/calibration	☐	☐
40. Site evaluation	☐	☐
41. Irrigation Calibration	☐	☐
42. Irrigation system design/installation	☐	☐
43. Secure irrigation information (maps, etc.)	☐	☐
44. Operating improvements (pull signs, etc.)	☐	☐
45. Wettable Acre Determination	☐	☐
46. Evaluate WAD certification/rechecks	☐	☐
47. Crop evaluation/recommendations	☐	☐
48. Drainage work/evaluation	☐	☐
49. Land shaping, subsoiling, aeration, etc.	☐	☐
50. Runoff control, stormwater diversion, etc.	☐	☐
51. Buffer improvements	☐	☐
52. Field measurements(GPS, surveying, etc.)	☐	☐
53. Mortality BMPs	☐	☐
54. Waste operator education (NPDES)	☐	☐
55. Operation & maintenance education	☐	☐
56. Record keeping education	☐	☐
57. Crop/forage management education	☐	☐
58. Soil and/or waste sampling education	☐	☐

Facility Number [ ] - [ ] Date: [ ]

COMMENTS:

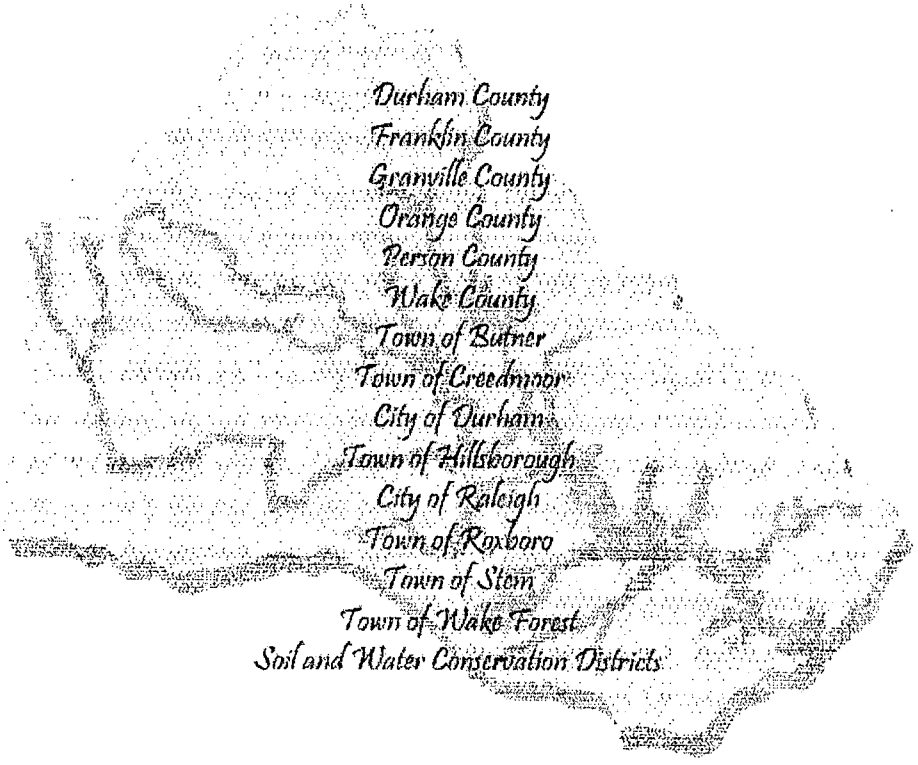
TECHNICAL SPECIALIST [ ] [ ] [ ]

SIGNATURE _____ _____ _____

Date Entered: [ ] Entered By: [ ]

UPPER NEUSE RIVER BASIN ASSOCIATION

Annual Report 2002 - 2003



UNRBA Mission:

To preserve and protect the water quality in the Upper Neuse River Basin through innovative, cost effective and environmentally sound strategies and to create a coalition of local governments and stakeholders in a water resources partnership.

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UPPER NEUSE RIVER BASIN ASSOCIATION FACTS

Date Established:	March 22, 1996 (By-laws approved. Non-profit status gained in 1999)
Geographical Area:	771-square mile watershed above the Falls Lake Dam
Organizational Partners:	13 Local Governments With Local Planning and Zoning Control County Soil and Water Conservation Districts (SWCD)(See list of UNRBA members below)
Board of Directors:	13 Directors appointed to represent each organization partner with planning and zoning control; 1 Director appointed to represent all six SWCDs; Each partner also appoints one Alternate Director.

GOALS OF THE ASSOCIATION

The mission of the Upper Neuse River Basin Association is to preserve the water quality of the Upper Neuse River Basin through innovative and cost-effective strategies, and to constitute a forum to cooperate on water supply issues within the Upper Neuse River Basin by:

1. Forming a coalition of units of local government, public and private agencies, and other interested and affected communities, organizations, businesses, and individuals to secure and pool financial resources and expertise;
2. Collecting and analyzing information and data and developing, evaluating and implementing strategies to reduce, control and manage pollutant discharge and to manage water resources; and
3. Providing accurate technical, management, regulatory and legal recommendations regarding the implementation of strategies and appropriate effluent limitations on discharges into the upper portion of the Neuse River.

UNRBA MEMBERSHIP

The UNRBA Board of Directors is comprised of one Director and one Alternate Director from each of the thirteen jurisdictions in the watershed. Additionally, the County Soil and Water Conservation Districts elect one Director and Alternate Director to the UNRBA Board. The Directors and Alternates are listed below.

Corporate Members	Director	Alternate Director
Town of Butner	Tom McGee	(no alternate)
City of Creedmoor	Joel Cross	Tony Hammond
City of Durham	William Bell	Cora Cole-McFadden
Durham County	*Becky Heron, Chair*	Ellen Reckhow
Franklin County	Dr. John Ball	Kevin Martin
Granville County	*Ronald R. Alligood, Vice Chair*	Dudley Watts
Hillsborough	Joe Phelps	Margaret Hauth
Orange County	Barry Jacobs	Paul Thames
Person County	Jimmy Clayton	Steve Carpenter
City of Raleigh	Janet Cowell	Dale Crisp
Town of Stem	Jack Day	(no alternate)
Wake County	*Kenn Gardner, Secretary/Treasurer*	Herb Council
Town of Wake Forest	Vivian Jones	Mark Williams
Soil and Water Conservation Districts	Tom Davidson (Durham County)	Donnie Woodlief (Wake County)

Italics denotes Executive Officer

FY 2002 - 2003 ACCOMPLISHMENTS

The year 2002 - 2003 was a successful one for the Association. In April, the UNRBA Board of Directors accepted the first Upper Neuse Watershed Management Plan for review by the member local governments. This is an exciting step in the Upper Neuse because it means that, for the first time in North Carolina, local governments have worked together in a voluntary association to create a comprehensive watershed management plan. In many cases, the strategies go beyond state and federal requirements. We are proud of this accomplishment, and we look forward to implementing the management strategies in the year ahead.

Below is a brief list of the major accomplishments of the Association for this year.

Finalization of first Upper Neuse Watershed Management Plan

- *UNRBA Board of Directors accepted the Plan for local government review (April 29, 2003)*
- *Plan acceptance accomplished with a minimum of additional UNRBA funds (over $71,000 balance in funds for continued work on Plan).*

Implementation of key components of the Management Plan

Plan recommendations to local governments (present recommendations to each member local government)--*The UNRBA began presenting the findings and recommendations from the Plan to local government staff and decision-making bodies. Thus far, the UNRBA has:*

- *Presented to staff in Durham City, Durham County, Granville County, Franklin County, Orange County, Person County, Raleigh, Wake County, and Wake Forest.*
- *Presented to Councils/Commissions/Planning Boards in Raleigh, Wake Forest, Franklin County, and Person County. Of note, Raleigh is now considering the adoption of several recommendations, most notably a performance standard for limiting phosphorous in runoff from new developments in the Upper Neuse.*
- *Presented to the NC Division of Soil and Water Conservation and the NC Homebuilder's Association.*

Appendix A includes meeting summaries from staff meetings.

Basinwide monitoring planning (demonstrate progress toward establishing a water quality monitoring network)--*The UNRBA negotiated a contract between the USGS and the NC*

Wetlands Restoration Program to create a "watershed evaluation tool" for local governments. This tool will be based on nationally standardized data and will facilitate several facets of watershed planning. A deliverable of the project, to be completed by the USGS, is a guidance document for creating a water quality-monitoring network in the Upper Neuse. The project will begin this fall.

Critical land protection efforts (assist local governments with identifying critical sites and securing funding, and document UNRBA involvement)--*The Upper Neuse Watershed Management Plan includes an analysis of potential wetland and riparian protection and restoration sites in the Upper Neuse. The NC Wetlands Restoration Program helped to develop this analysis. The UNRBA has been encouraging local governments to use the analysis to support their restoration efforts.*

LID model sites in urban areas, including retrofits--*The UNRBA has been working with the Wake County Public School System to encourage funding for a stormwater LID retrofit project.*

Fundraising efforts to support implementation

***USGS "watershed evaluation tool"**--$150,000 of work to be done by USGS, funding from USGS and NCWRP*

***Upper Neuse Watershed Evaluation Tool**--The UNRBA has received a grant of $39,750 from the State of NC Division of Water Quality Nonpoint Source (Section 319, Clean Water Act) Program to support the Upper Neuse Watershed Site Evaluation Tool.*

Ellerbe Creek Watershed Management Plan

- *The UNRBA was a stakeholder in the Ellerbe Creek Local Watershed Management Plan. The Draft Plan was finished by stakeholder group in April, and the UNRBA will support the City of Durham in its efforts to adopt specific recommendations.*

UNRBA budget

The UNRBA has made several strides toward improving financial stability and accountability. These include:

- *Unanimously passing a FY 2004 budget of $104,582 with local government dues of $86,242 (the highest amount of dues yet committed by the UNRBA members). The budget is summarized on page 11.*
- *Working with TJCOG Finance staff to establish a spreadsheet for managing the UNRBA budget*
- *Receiving regular, end-of-month reports from the TJCOG financial department regarding revenues and expenses. In addition, the financial department has agreed to itemize separate projects in the UNRBA budget.*
- *For the second time, filing with the Internal Revenue Service on time.*

Improved marketing of Upper Neuse Watershed Management Plan

- *Eno River Festival--an estimated 350 people visited the booth, receiving information about local government efforts to protect the watershed. The "Know your watershed" map and handouts were a great success, and the UNRBA will host a booth again next year.*
- *March Association of Environmental Professionals meeting--The UNRBA Coordinator presented "Watershed Planning and Water Conservation", focusing on opportunities to clean up our streams and conserve water.*

Improved community outreach

- *The UNRBA Coordinator was a member of the group that planned the statewide LID Summit, hosted by the Water Resources Research Institute in Pinehurst in early 2003. The Summit is an early step in establishing statewide guidance for Low-Impact Development.*

Internship to support watershed protection efforts

The UNRBA hired an intern, Ben Bearden, for the summer (June-August). Ben:

- *Supported local government presentations;*
- *Coordinated the Eno River Festival booth;*
- *Completed a local government ordinance review; and*
- *Supported the Watershed Evaluation Tool by completing an analysis of subwatersheds in the Upper Neuse.*

FY 2003 - 2004 GOALS

In the 2003-2004 fiscal year, the UNRBA hopes to provide more and better assistance to the local communities that it serves. The primary goal is adoption of recommendations in the Upper Neuse Watershed Management Plan. However, meeting the overall challenge of protecting water quality will require improved technical support, more community outreach, and more direct grants writing assistance to local communities. Below is a list of some of the UNRBA goals for the coming year.

Goal 1: Implement recommendations from the Upper Neuse Watershed Management Plan--Work with key staff members from local governments to implement specific recommendations in the Plan. Work with these staff members to complete the necessary research and recommendations, and propose specific recommendations to the appropriate decision-makers in each community. Some specific objectives of this goal are:

- Make progress on implementing phosphorous and nitrogen performance standards
- Begin developing a basinwide monitoring plan for the Upper Neuse
- Facilitate pilot stormwater low-impact development projects (focus on Wake County School System and the NC Museum of Life and Science)
- Team with local stakeholders to win grants toward specific recommendations in the Plan
- Adoption of Ellerbe Creek Local Watershed Plan in Durham
- Team with local stakeholders to begin other local watershed plans in the Upper Neuse

Goal 2: More frequent and effective direct technical assistance to local governments--In presenting recommendations to the local governments, I have been challenged to answer a host of detailed questions and provide information to local government staff. The site evaluation tool and watershed evaluation tool projects are efforts to both implement plan recommendations and provide a high level of technical support to local governments. In addition, I will attend the

Center for Watershed Protection's Watershed Restoration Institute in Reiserstown, Maryland in September and will share this information with local stormwater managers in a meeting.

Goal 3: Support land protection efforts that will have beneficial effects on water in the Upper Neuse--Partly as a result of UNRBA efforts, the NC Natural Heritage Program is proposing to the Natural Heritage Trust Fund to complete Natural Heritage Inventories for Person and Granville Counties. The UNRBA will support this effort whenever possible and to use the results from the inventories to encourage the protection of any land that will have positive water resource effects.

Goal 4: Support local watershed plans--Work with local governments to encourage the NC Wetlands Restoration Program to fund more local watershed plans in the Upper Neuse. Eight local watersheds in the Upper Neuse are "targeted" for local watershed plans.

Goal 5: Better bookkeeping and finances--As previously mentioned, the UNRBA worked with TJCOG finance to create a spreadsheet for our budget and receive regular reports from the Finance Department. The following are additional objectives to improve finance practices:

- Make regular reports to the UNRBA's Treasurer (Kenn Gardner of Wake County) and
- Seek opportunities to offset UNRBA member government costs (for example, work done for TJCOG's Water Resources Advisory Committee).

Goal 6: Improve Marketing of the UNRBA and Plan--The UNRBA will take the following efforts to increase awareness of the effort.

- Eno Festival 2004
- Increase media coverage of the effort
- Present to the NC House Committee on the Environment

- Team with the Eno River State Park and the City of Durham to hold another of the successful "Living Water Workshops" for educators in the area.

Goal 7: Improve Organizational Effectiveness--The UNRBA will continue to seek the most efficient approaches for maximizing our effectiveness and minimizing the work asked of our members. This year, the UNRBA will continue to:

- Strengthen Partners Network;
- Use task groups on issues for which full TAC involvement is not necessary; and
- Use the website wherever possible to communicate with members.

FY 2003 - 2004 BUDGET

	FY 2002-2003	FY 2003-2004
Salary	$33,057	$36,363
+ Fringe (80% time)	+ $9,917	+ $10,909
Water Resources Mgr. (5% time)	$ 3,407	$ 3,407
Information Systems Mgr. (5% time for regular support)	$ 3,963	$ 3,963
Indirect Cost (56% salary & fringe)	$28,193	$30,599
Travel (workshops, conferences)	$ 0	$ 1,000
Subtotal Costs	**$78,537**	**$86,242**
Paid from dues	$70,961	$86,242*
Implementation Activities Expenses (travel, presentation materials, web support copies of plan, aditional time, intern)	$ 7,370	$18,340
FY 2004 Expenses	**$78,537**	**$104,582**

Total Increase = $26,045

Option chosen for meeting expenses increase

1) Increase dues to $86,242 and meet additional implementation costs with up to $18,500 from State Appropriation (from $90,000 remaining in State Appropriation). $71,500 of Appropriation available for consultant support.

*Board of Directors accepted this budget and new dues schedule on April 29, 2003

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: George Givens, Environmental Review Commission Counsel

Jim Johnson, Director of Fiscal Research

FROM: William G. Ross Jr.

DATE: December 15, 2003

RE: Report on the Wastewater Discharge Elimination Program

Pursuant to S.L. 1996-18es, Section 27.26, I am transmitting a report on the progress of the Wastewater Discharge Elimination (WaDE) Program. This program was established to identify and eliminate discharges from straight pipes and failing septic systems to land surface and streams primarily in western North Carolina.

This report was prepared by DENR's Division of Environmental Health, On-site Wastewater Section, which oversees the WaDE Program. If you have further questions or would like additional information, please contact Terrell Jones at (828) 686-9077.

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NC Wastewater Discharge Elimination Program
2003 Report

The NC Wastewater Discharge Elimination (WaDE) Program is located in the On-site Wastewater Section of DENR's Division of Environmental Health. The WaDE Program was established pursuant to S.L. 1996-18es, Section 27.26, to identify and eliminate discharges from straight pipes and failing septic systems to land surface and streams primarily in western North Carolina. The Program was created as a result of requests from Governor James B. Hunt, Jr., and delegates at the 1995-1996 Year of the Mountains Conference. Funds appropriated by the NC General Assembly support a two-member team to address the straight pipe and failing septic system issues in North Carolina. Additional financial support has been secured through grants from the NC Clean Water Management Trust Fund (CWMTF) and the US EPA 319 Nonpoint Source Program. Strong collaboration with local and federal agencies as well as the public, the media, and environmental groups is the hallmark of the WaDE program and the key to its successes thus far.

Program Goals

The primary goal of the WaDE Program is to identify and correct violations of on-site wastewater systems through door-to-door surveys in collaboration with local health departments. The Program also identifies sources of financial assistance for low-income homeowners in need of septic system repairs. This financial assistance is usually in the form of grants and loans issued through collaboration with regional councils of government and non-profit housing rehabilitation agencies. The WaDE Program also provides public health and environmental education to homeowners and other stakeholders at the community, county, regional, state, and federal levels related to on-site wastewater issues. In addition, to meet the statewide demand for septic system repair and straight pipe elimination, the WaDE Program is currently developing a model for a statewide septic repair program that will include financial assistance.

Previous Accomplishments

During the first four years of the program, the two-person WaDE Team directed one survey project (Buncombe County) and assisted in four other independent county surveys funded by the CWMTF, NC Department of Commerce/Division of Community Assistance (DCA), and NC Rural Communities Assistance Project (NCRCAP). Those counties targeted in the independent surveys were Alleghany/Ashe, Jackson, Madison, and Avery/Mitchell/Yancey. There were approximately 19,150 homes surveyed during these independent efforts, and violations were found at 2,505 (13%) of these homes. To date, 1,244 (50%) of those violations have been corrected, with 480 (39%) violations being corrected with financial assistance (see attachment for additional survey statistics). At the minimum rate of 240 gallons of wastewater per household per day, this represents 298,560 gallons of untreated wastewater removed from the streams daily.

The Expanded WaDE Program

In 2001, the WaDE Team proposed a new model for achieving the goals of the Program, and this model was approved and funded for three years by the CWMTF ($1.2 million over three years)

and the US EPA 319 Nonpoint Source Program ($500,000 over three years). Under the new model, five new team members (surveyors) were added to the WaDE staff. The additional surveyors provide support to county environmental health specialists who have the responsibility for issuing septic system repair permits and inspecting the repaired work. These surveyors are needed due to the volume of violations identified from WaDE surveys, which significantly add to the already full workloads of the local health departments' normal day-to-day operations. In the past ten months alone, WaDE Team members have surveyed 1,419 homes and identified 161 violations (11% violation rate) in Macon, Wilkes, Watauga, and Burke counties. About 20 repairs have been completed, 6 of them with financial assistance (see attachment for additional survey statistics).

The expanded WaDE Program provides financial assistance for septic system repairs in 19 counties in western North Carolina. Financial assistance is being provided through collaboration with CWMTF, DCA, USDA's Rural Development Program, and regional councils of government that have experience with similar housing rehabilitation programs. In addition, the WaDE Program works to identify sources of temporary financial assistance for septic repairs in 26 counties in western North Carolina.

The WaDE Program also provides public education on various public health concerns and environmental issues. This information is offered to the public through such mechanisms as door-to-door visits by trained WaDE surveyors, teachers' guides and videos for school children, outreach to the NC Real Estate Commission on property disclosure requirements, and other various publications, slide shows, and talks geared toward local, state, and national audiences. The program has also received positive attention from the local media, which has aided in getting the public informed and encouraging owners of failing systems and straight pipes to come forward for assistance.

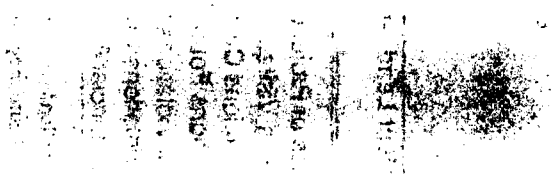
Ongoing Challenges

The WaDE Program is performing well within its limited mandate and scope, but there are several challenges that need to be addressed to realize the full potential of this Program: limited human capacity, limited geographical scope, and limited financial resources for system repair/replacement.

- *Limited human capacity.* As previously mentioned, the WaDE Program provides services with a small staff, in conjunction with the already full workloads of local health departments. While the Program has developed strong relationships with the local health departments serving the 26 counties in which it works, as well as with state and federal funding agencies, the number of failing on-site wastewater systems that can be addressed is limited by the small staff.

- *Limited geographical scope.* The WaDE Program currently serves 26 western counties in North Carolina. However, the impacts of straight pipes and failing septic systems are not limited to these counties. Failing septic systems present a threat to public health and to the environmental quality of North Carolina's waterways in communities across the State.

- *Limited financial resources available for repair/replacement.* A large number of systems in need of repair or replacement are identified during each door-to-door survey. Many of these systems belong to people with limited financial resources who are unable to pay for system repairs even when the local health departments waive the repair permit fees. Therefore, sources of financial assistance are critical for these systems. Temporary funding for financial assistance has been secured by the WaDE Program, but a permanent funding source for system repairs needs to be identified to remove more untreated waste from North Carolina's streams and rivers.



WaDE Program Straight Pipe and Failing Septic System Survey Summary 1998-2003

Project Lead Agency	WaDE/ Buncombe	Madison	Toe River	Jackson	Ashe-Alleghany	WaDE	Totals
Dates of Project	01/00-03/02	03/98-05/03	04/99-12/03	06/98-09/03	04/00-30/03	06/02-06/05	
Homes Visited	2,027	10,000 (est.)	1,100 (est.)	2,844	6,200 (est.)	2,150	24,321
Inspections Completed*	1,844	5,360	707	2,354	2,800 (est.)	1,419	14,484
Violations Found**	265	996	213	179	625	161	2,666
Total Violations Corrected	151	446	194	129	324	16	1,260
Violations Corrected with Financial Assistance	12	143	127	4	295	10	591

*Inspections were not completed at every home visited due to some residents not being at home when visits were made

**This figure may be lower for some counties due to a higher concentration of vacation homes in those counties

February 6, 2004 ERC Meeting
EXHIBIT F

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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6 February 2004

MEMORANDUM

To: Members of the Environmental Review Commission
Interested parties

From: George F. Givens
Commission Counsel

Re: Potential Agenda Topics—24 and 25 February 2004

The following have been identified as potential agenda topics for the 24 and 25 February 2004 meeting of the Environmental Review Commission.

Air Quality:

1) *Annual Report on implementation of S.L. 2002-4 (Clean Smokestacks Act).* DENR and the North Carolina Utilities Commission. 30 May 2003. Statutory Authority: S.L. 2002-4, Sec. 14.

2) *Annual Report on issues related to the development and implementation of standards and plans to implement programs to control emissions of mercury and carbon dioxide from coal-fired generating units and other stationary sources of air pollution.* Division of Air Quality, DENR. 1 September 2003. Statutory Authority: S.L. 2002-4, Sec. 12-13.

3) *Discussion of current State and federal air quality issues, including:*
   - Proposed modification of rules governing Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR) as a result of modification of federal air quality regulations by the U.S. Environmental Protection Agency that became final on 31 December 2002 (the "December rule")
   - Proposed modification of the rule setting out the acceptable ambient level (AAL) for hydrogen sulfide
   - The non-attainment process for fine particulate matter (PM2.5)
   - The non-attainment process for ozone

4) *Report on the progress in implementing the motor vehicle inspection and maintenance (I/M) program.*

General:

5) *Report on the activities of the Environmental Management Commission.* Environmental Management Commission. Statutory Authority: G.S. 143B-282(b).

6) *Annual report on the resolution of submerged lands claims.* DENR. 2 October 2003. Statutory Authority: G.S. 113-206(f).

7) *Semiannual report on agency litter enforcement, litter prevention, and litter removal efforts.* Office of the Governor. 1 September 2003. Statutory Authority: G.S. 147-12(b).

8) *One-Stop Permit Assistance and Coordination Program status report.* DENR. 29 July 2003. Statutory Authority: S.L. 2001-424, Sec. 19.6.

Hazardous Waste Management:

9) *Annual report on the Inactive Hazardous Sites Program.* Division of Waste Management, DENR. 29 September 2003. Statutory Authority: G.S. 130A-310.10.

10) *Report of Superfund cost share fund expenditures for cleanup of sites on the National Priorities List.* Division of Waste Management, DENR. 29 September 2003. Statutory Authority: S.L. 1999-237(15.6)(b).

11) *Report on the management of low-level radioactive waste in North Carolina.* Radiation Protection Commission, DENR. April 2003. Statutory Authority: G.S. 120-70.33(7).

12) *Annual report on the Effectiveness of the Brownfields Property Reuse Act.* DENR. 13 January 2004. Statutory Authority: G.S. 130A-310.40.

Parks and Recreation / Land Conservation:

13) *Parks and Recreation Trust Fund Annual Report, Fiscal Year 2002-2003.* Division of Parks and Recreation, DENR. 1 October 2003. Statutory Authority: G.S. 113-44.15(c).

14) *North Carolina Natural Heritage Trust Fund Award Report, Fiscal Year 2002-2003.* Division of Parks and Recreation, DENR. 12 November 2003. Statutory Authority: G.S. 113-77.9(e).

15) *Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands.* DENR. 24 November 2003. Statutory Authority: G.S. 113A-241(c).

16) *Annual report on implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR.* DENR. Statutory Authority: G.S. 113A-235(c).

Renewable / Alternative Energy:

17) *Final Report Regarding Investigation of Voluntary Green Check-Off Program and Other Efforts to Stimulate Renewable Energy Production in the State.* North Carolina Utilities Commission. March 2003. Authority: S.L. 2002-167.

18) *Information items on State Energy Plan and NC Green Power program.*

Solid Waste Management:

19) *Annual report on the status of solid waste management efforts.* DENR. Statutory Authority: G.S. 130A-309.06(c).

20) *Presentation on the Waste Reduction Partners program.* Division of Pollution Prevention and Environmental Assistance, DENR.

Water Quality:

21) *Annual report on fish kills within the preceding year.* DENR. 13 January 2004. Statutory Authority: G.S. 143B-279.7(c).

22) *Interim Report on the Effectiveness of Surface Water Identification Training and Certification Program.* Division of Water Quality, DENR. 18 September 2003. Statutory Authority: S.L. 2001-404, Sec. 2.

23) *Annual Report on permitting and inspecting animal waste management systems/Animal Waste Compliance Report.* Division of Water Quality, DENR. 2 October 2003. Statutory Authority: G.S. 143-215.10M.

24) *Annual Report on the compliance/ enforcement of water quality laws for facilities that discharge into surface waters.* Division of Water Quality, DENR. 4 December 2003. Statutory Authority: G.S. 143-215.9A.

25) *Annual report on the effectiveness of projects funded under the Agricultural Cost Share Program for Nonpoint Source Pollution Control.* Division of Soil and Water Conservation, DENR. 25 November 2003. Statutory Authority: G.S. 143-215.74(e).

26) *Annual report on implementation of the Wetlands Restoration Program and use of the Wetlands Restoration Fund.* DENR. 12 December 2003. Statutory Authority: G.S. 143-214.13.

27) *Annual Report on implementation of the Clean Water Management Trust Fund.* Clean Water Management rust Fund. 29 December 2003. Statutory Authority: G.S. 113-145.6A(a).

28) *Annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund.* Division of Waste Management, DENR. 13 January 2004. Statutory Authority: G.S. 143-215.94M.

Water Quantity:

29) *Interim report on water conservation measures being implemented in the State and incentive programs and other voluntary programs that can help foster water conservation and reuse.*

Division of Water Resources, DENR. 25 August 2003. Statutory Authority: S.L. 2002-167, Sec. 5.

30) *Annual report on the progress of water supply planning.* Division of Water Resources, DENR. 29 September 2003. Statutory Authority: G.S. 143-355(n).

Please contact George Givens, Jeff Hudson, Jennifer McGinnis, Susan Iddings, or Tim Dodge at (919) 733-2578 if you have any questions or comments.

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: Environmental Review Commission

FROM: Robin W. Smith, Assistant Secretary
Planning and Policy

RE: Phase II Stormwater

DATE: February 6, 2004

FEDERAL REQUIREMENTS

Beginning in 1990, EPA required large municipalities to get an NPDES permit (a permit for discharge of pollutants to surface waters) for stormwater discharges from municipal storm sewer systems --the Phase I stormwater program. In 1999, EPA adopted rules extending NPDES stormwater permitting requirements to the next tier of small and medium sized communities--Phase II. The basic requirement is that "municipal storm sewer systems" must have NPDES permits – this would include any system owned or operated by a city, county, or other state or federal entity. Cities and counties subject to Phase II were required to apply for those permits by March 10, 2003. NPDES permits are enforceable by EPA, by the State (as the delegated permitting agency) and by any person through the filing of a citizen suit.

EPA has adopted federal rules that:

1. **Identify by name the cities and counties that must have Phase II permits for their storm sewer systems. (A copy of the federally designated cities and counties is attached.)**

2. **Require states to designate additional cities and counties as requiring Phase II permits based on potential to contribute to stormwater pollution.**

3. **Set the minimum requirements that cities and counties must meet in order to get a Phase II NPDES permit. The local government must develop a stormwater management program that includes the following six minimum measures ---**

    - **Public education and outreach (on stormwater pollution)**

- **Public involvement and participation (in development and implementation of the local program)**

- **Detection and elimination of illegal discharges to the municipal storm sewer system**

- **Construction site stormwater runoff control**. The intent is to require implementation of stormwater controls (primarily measures to prevent soil erosion and sedimentation runoff) at active construction sites.

- **Post-construction stormwater management for new development and redevelopment – which really means establishing design standards to be applied to new development for purposes of stormwater management**. Other than the requirement for construction-phase runoff controls, this is the only measure that potentially affects private development activities. It affects only future development or redevelopment; there is no direct requirement for installation of stormwater controls at existing development. **Under federal rules, the local government's post-construction stormwater program must control stormwater "to the maximum extent practicable" and protect water quality standards**.

- **Pollution prevention/good housekeeping measures for municipal operations.** This measure requires the local government to develop a pollution prevention program for their facilities.

STATE ROLE

EPA has delegated to North Carolina the authority to issue federal Clean Water Act NPDES stormwater permits to these local governments. To approve a Phase II stormwater permit, the State must find that the local government's proposed stormwater program will include all six of the minimum measures; be sufficient to control stormwater pollution to the maximum extent practicable; and protect water quality standards. Federal rules also require the State to identify additional local governments as needing Phase II permits based on potential for contributing to violations of water quality standards. The State may designate additional communities directly or in response to a petition from any person.

The proposed State rules: 1) establish the criteria for state designations of additional communities; 2) create a process for consideration of third-party petitions; and 3) provide

design standards for post-construction runoff controls that can be approved as controlling stormwater pollution "to the maximum extent practicable" and protecting water quality standards.

LOCAL GOVERNMENTS AFFECTED

In North Carolina, 123 cities and 33 counties have been identified by EPA as potentially needing Phase II permits. (The EPA designations basically covered cities and counties that are "urbanized" under the federal census definition of that term.) The State can identify additional State and local government entities as needing a Phase II permit because of their potential contribution to stormwater pollution. No State designations have been made; the proposed rules would set up the criteria for making State designations in the future. A citizen, group, or another government entity may also petition the State to require a local government or an individual discharge to get a Phase II permit.

Counties

EPA has specifically designated 33 North Carolina counties as jurisdictions subject to the federal Phase II rules. Only public entities that actually "own or operate" a municipal storm sewer system need a Phase II NPDES permit, however. In unincorporated areas (outside any city's extraterritorial jurisdiction), the most extensive stormwater system is associated with the public road system. In other states, county designation will generally lead to a county-wide Phase II stormwater permit based on the county's responsibility for the road drainage system. In North Carolina, all public roads and associated road drainage systems in unincorporated areas are maintained by the State Department of Transportation (NCDOT) (which already has a Phase I stormwater permit). As a result, North Carolina counties will require a Phase II NPDES stormwater permit only for any discrete storm sewer system actually owned or operated by county. An example would be a stormwater drainage system associated with a county facility – such as a park or large complex of government buildings.

North Carolina's unique situation left a potential gap in stormwater coverage unanticipated by the federal rules (which were drafted under the assumption that counties would be owners and operators of county-wide stormwater systems). NCDOT, as the owner or operator of the primary stormwater system in the unincorporated areas, has a Phase I NPDES stormwater permit for the entire State road system. Under the federal Clean Water Act, NCDOT is responsible for the water quality impacts of any discharges from that system -- although the DOT drainage system receives stormwater runoff from many private developments. Recognizing that it would be very difficult for NCDOT to manage new stormwater discharges to its drainage system, and looking for a consistent program, the Environmental Management Commission initially looked to the counties to set stormwater management standards for new development in the unincorporated areas –

CONTENT OF STATE RULES

The State rules:

1. Identify a level of development that would require no stormwater controls. Generally, stormwater controls would not be required for new development falling below a threshold of 24% built-upon area so long as the development used grassed swales to carry stormwater as much as possible and any built-on area was setback 30 feet landward of any surface waters. The threshold for stormwater controls is lower (12% built-upon area) for areas draining to shellfish waters because those waters have much stricter water quality standards for bacterial contamination in order to protect the public from disease potentially transmitted by eating infected shellfish. NOTE: These are thresholds above which stormwater control measures must be incorporated into the project design and not density caps.

2. Establish minimum stormwater control measures required for new development that exceeds the threshold level:

   •stormwater controls capable of controlling or treating the one-inch of runoff and controlling the 1-year, 24-hour storm so that its discharge does not exceed the pre-development discharge rate;
   •structural stormwater systems designed to remove an average of 85% of total suspended solids;
   •location of all built-on area at least 30 feet landward of surface waters;
   •recorded deed restrictions and protective covenants.

Many of these control measures are specifically identified in EPA guidance as appropriate measures to address urban stormwater.

3. Allow the option of developing local stormwater standards that differ from those set out in the State rules as minimum requirements so long as those standards are at least as effective.

4. Set some additional standards for particularly sensitive waters, such as shellfish waters and trout waters.

Application of the proposed State rules to counties identified as needing Phase II permits.

Under rule 2H.0126, the 33 designated counties must get a federal Phase II NPDES stormwater permit for any storm sewer system that the county actually owns or operates. The Phase II permit would cover only the jurisdictional area of the storm sewer system.

The EMC adopted a separate set of state stormwater rules to fill the gap in the NPDES program coverage with respect to the designated Phase II counties. For the areas outside of county-owned storm sewer systems (which would receive an NPDES permit under 2H.0126), DENR would implement the stormwater management program under the same standards that apply to local government jurisdictions requiring an NPDES stormwater permit.

FEDERALLY DESIGNATED PHASE II CITIES IN NORTH CAROLINA (BASED ON 1990 AND 2000 CENSUS)

Alamance
Apex
Archdale
Asheville
Ayden
Belmont
Belville
Bermuda Run
Bethania
Bessemer City
Biltmore Forest
Black Mountain
Brookford
Burlington
Carrboro
Cajah's Mountain
Canton
Carolina Beach
Carrboro
Cary
Chapel Hill
China Grove
Claremont
Clemmons
Clyde
Concord
Connelly Springs
Conover
Cornelius
Cramerton
Davidson
Dallas
Dortches
Drexel
Elon College
Flat Rock
Fletcher
Fuquay-Varina
Gamewell
Garner
Gastonia
Gibsonville
Glen Alpine
Goldsboro
Graham
Granite Falls
Greenville
Green Level
Harrisburg
Haw River
Hemby Bridge
Hendersonville
Hickory
High Point
Hillsborough
Hildebran
Holly Springs
Hope mills
Hudson
Huntersville
Indian Trail
Jacksonville
Jamestown
Kannapolis
Kernersville
King
Knightdale
Kure Beach
Lake Park
Landis
Laurel Park
Leland
Lewisville
Long View
Lenoir
Lowell
Maiden
Marvin
Matthews
McAdenville
Mebane
Mint Hill
Monroe
Montreat
Morganton
Morrisville
Mount Holly
Nashville
Newton
Navassa
Oak Ridge
Pineville
Pleasant Garden
Ranlo
Red Oak
Rhodhiss
Rolesville
Rocky Mount
Rural Hall
Rutherford College
Salisbury
Sawmills
Simpson
Spencer Mountain
Spring Lake
Stallings
Stanley
Summerfield
Swepsonville
Thomasville
Tobaccoville
Trinity
Valdese
Wake Forest
Walkertown
Waynesville
Weaverville
Weddington
Wesley Chapel
Wilmington
Winterville
Woodfin
Wrightsville Beach
Youngsville

FEDERALLY DESIGNATED PHASE II COUNTIES IN NORTH CAROLINA (NPDES PERMIT REQUIRED FOR STORM SEWER SYSTEMS OWNED AND OPERATED BY THE COUNTY IN UNINCORPORATED AREAS)

Alamance
Alexander
Brunswick
Buncombe
Burke
Cabarrus
Caldwell
Chatham
Catawba
Davidson
Davie
Durham
Edgecombe
Forsyth
Franklin
Gaston
Guilford
Harnett
Haywood
Henderson
Hoke
Mecklenburg
Nash
New Hanover
Onslow
Orange
Pitt
Randolph
Rowan
Stokes
Union
Wake
Wayne

Stormwater Management Regulations

Background Discussion

February 6, 2004

Federal NPDES Program

- 1987 Clean Water Act Reauthorization
  - Stormwater regulated under NPDES
- 1990 – Phase I Stormwater Regulation
- 1999 – Phase II Stormwater Regulation

Federal Program Design

- Recognize stormwater impacts to water quality
- Build on lessons learned
- Focus on urbanizing areas
- Establish a seamless program
- Designed for typical state

State Implementation

- Delegated federal program
- Federal rules adopted by reference
- Rules required on state level – designation, petitioning, administration.
- Approach to achieve evenhanded program envisioned in 214.7

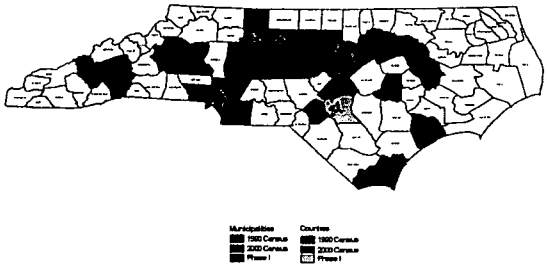
Development Process

- Workshops on federal rules – 1999
- Stakeholder Process & Education Efforts – 2000
- Rule Concept Workshops & Comment – 2001
- EMC Stakeholder Process & Temporary Rule Hearings – 2002
- Permanent Rule Hearings - 2003

Municipal NPDES Coverage

- Automatically Designated - *Urbanized Areas*
- State Designated Public Entities
- Petitioned Entities That Are State Designated

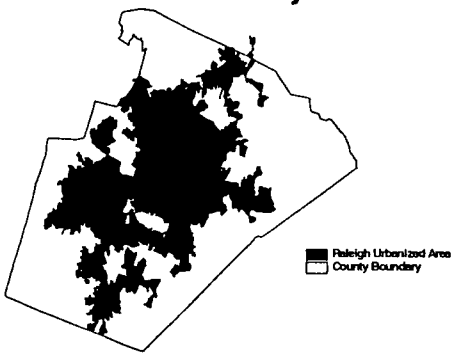
North Carolina - NPDES Stormwater Program
Automatic Designation



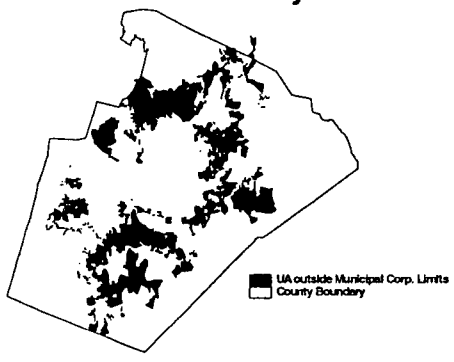
Minimum Control Elements

- Public Education and Outreach
- Public Involvement/Participation
- Illicit Discharge Detection & Elimination
- Construction Site Runoff Control
- Post-construction Stormwater Management
- Pollution Prevention/Good Housekeeping

Wake County



Wake County



Information Sources

Division of Water Quality
Stormwater and General Permits Unit
http://h2o.enr.state.nc.us/su/stormwater.html

Environmental Protection Agency
http://cfpub.epa.gov/npdes/

Phase 2 Stormwater Management Program
Chronology of EMC/DENR Actions

Since 1999 the Environmental Management Commission (EMC) and the Department of Environment and Natural Resources (DENR) Division of Water Quality (DWQ) have undertaken extensive efforts in developing North Carolina's response to implementation of the federal phase 2 stormwater management requirements. This document summarizes major actions taken in this response. In addition to the numerous specific actions noted in the table below, Division staff has participated in sixty (60) or more presentations and workshops across the state related to the phase 2 stormwater program since 1999. The Division also worked with a Department wide team on this effort and presented information to the Water Quality Committee and EMC on a routine basis over the last few years.

EMC/DENR Action	**Timeframe**
Meetings with NCLM, APWA to develop workshop materials on draft federal rules	Early 1999
Phase 2 Site Visits – Brunswick Co, Wrightsville Beach, Hickory, Boone, Woodfin	03/1999
DWQ SW Workshop – Raleigh	05/18/1999
DWQ SW Workshop – Wilmington	06/02/1999
APWA,NCLM,DWQ Phase 2 Workshops – six total around the state	July – Sept. 1999
Presentation to WQC and EMC on proposed Federal Rules	09/08/1999
Urban Stormwater Conference and Symposium	11/01/1999
Final Federal Rules Published	12/06/1999
Federal Rules Become Effective	02/07/2000
EMC Starts Statewide Stormwater Stakeholder Process (lasts 6 months)	03/09/2000
Seven Stakeholder education meetings around the state to prepare for stakeholder process – meetings for environmental groups, local govs and developers	March & April 2000
Stormwater Stakeholder Meetings (12 days of facilitated meetings)	April – Sept. 2000
Stakeholder Report	10/01/2000
Stakeholder work session w/EMC	12/13/2000
Seven Workshops on components of Phase 2 Program held for public input in developing concept for rules	Aug 2000 – March 2001
EMC Approves Phase 2 Concept Document for statewide public meetings	04/12/2001
Seven phase 2 Concept Workshops held around state	May 2001
Draft rules available for review and comment by EMC and interest groups – number of versions	Oct 2001 – March 2002
EMC reconvenes Stakeholders group for work sessions on draft rules – EMC members participate these three days of meetings	Jan. 2002

Phase 2 Stormwater Management Program
Chronology of EMC/DENR Actions

EMC/DENR Action	**Timeframe**
EMC Approves Temporary Rule for Public Notice	04/11/2002
Temp Rules appear in NC Register	05/15/2002
Five Temp Rule Public Hearings around state	June 2002
Temporary Rules Approved by the EMC	10/10/2002
Temporary Rules Become Effective	11/01/2002
Temporary Rules in NC Register	11/15/2002
EMC Approves Permanent Rule for Public Notice	02/13/2003
Application Deadline for Automatically Designated MS4s	03/10/2003
Permanent Rules Noticed in NC Register	03/17/2003
Five Permanent Rule Public Hearings around state	April 2003
Perm. Rule Approved	07/10/2003
RRC Review of Permanent Rules	08/21/2003
EMC Amends Rule in response to RRC	09/11/2003
RRC Review of Rule – object	10/16/2003
EMC Amends Rule in response to RRC objections	12/11/2003

TO: Environmental Review Commission

FROM: Robin W. Smith, Assistant Secretary
Planning and Policy

RE: Phase II Stormwater

DATE: February 6, 2004

FEDERAL REQUIREMENTS

Beginning in 1990, EPA required large municipalities to get an NPDES permit (a permit for discharge of pollutants to surface waters) for stormwater discharges from municipal storm sewer systems --the Phase I stormwater program. In 1999, EPA adopted rules extending NPDES stormwater permitting requirements to the next tier of small and medium sized communities--Phase II. The basic requirement is that "municipal storm sewer systems" must have NPDES permits – this would include any system owned or operated by a city, county, or other state or federal entity. Cities and counties subject to Phase II were required to apply for those permits by March 10, 2003. NPDES permits are enforceable by EPA, by the State (as the delegated permitting agency) and by any person through the filing of a citizen suit.

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· **Post-construction stormwater management for new development and redevelopment – which really means establishing design standards to be applied to new development for purposes of stormwater management.** Other than the requirement for construction-phase runoff controls, this is the only measure that potentially affects private development activities. It affects only future development or redevelopment; there is no requirement for installation of stormwater controls at existing development. **Under federal rules, the local government's post-construction stormwater program must control stormwater "to the maximum extent practicable" and protect water quality standards.**

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The proposed State rules: 1. establish the criteria for state designations of additional communities; 2. create a process for consideration of third-party petitions; and 3. Provide performance standards for post-construction runoff controls that can be approved as controlling stormwater pollution "to the maximum extent practicable" and protecting water quality standards.

LOCAL GOVERNMENTS AFFECTED

In North Carolina, 123 cities and 33 counties have been identified by EPA as potentially needing Phase II permits. (The EPA designations basically covered cities and counties that are "urbanized" under the federal census definition of that term.) The State can identify additional State and local government entities as needing a Phase II permit because of their potential contribution to stormwater pollution. No State designations have been made; the proposed rules would set up the criteria for making State designations in the future. A citizen, group, or another government entity may also petition the State to require a local government or an individual discharge to get a Phase II permit.

Counties

Based on the 1990 census, EPA specifically designated 33 North Carolina counties as jurisdictions subject to the federal Phase II rules. Only public entities that actually "own or operate" a municipal storm sewer system need a Phase II NPDES permit, however. In unincorporated areas (outside any city's extraterritorial jurisdiction), the most extensive stormwater system is associated with the public road system. In other states, county designation will generally lead to a county-wide Phase II stormwater permit based on the county's responsibility for the road drainage system. In North Carolina, all public roads and associated road drainage systems in unincorporated areas are maintained by the State Department of Transportation (NCDOT) (which already has a Phase I stormwater permit). As a result, North Carolina counties will require a Phase II NPDES stormwater permit only for any discrete storm sewer system actually owned or operated by county. An example would be a stormwater drainage system associated with a county facility – such as a park or large complex of government buildings.

North Carolina's unique situation left a potential gap in stormwater coverage unanticipated by the federal rules (which were drafted under the assumption that counties would be owners and operators of county-wide stormwater systems). NCDOT, as the owner or operator of the primary stormwater system in the unincorporated areas, has a Phase I NPDES stormwater permit for the entire State road system. Under the federal Clean Water Act, NCDOT is responsible for the water quality impacts of any discharges from that system -- although the DOT drainage system receives stormwater runoff from many private developments. Recognizing that it would be very difficult for NCDOT to manage new stormwater discharges to its drainage system, the Environmental Management Commission initially looked to the counties to set stormwater management standards for new development in the unincorporated areas – as the federal Phase II rules anticipated. The counties, rather than NCDOT, had the authority to adopt zoning and subdivision regulations needed to implement that part of the stormwater program.

The EMC proposed to address the problem by requiring the urbanized counties designated by EPA under the federal Phase II rules to get a state stormwater permit that would be identical to the NPDES stormwater permits issued to municipalities. Like the

cities, the designated counties would have been required to develop a stormwater management program. The last version of the EMC's rules (modified in response to a Rules Review Commission objection), dropped the requirement that the designated counties implement a stormwater program and instead proposed that DENR implement the stormwater program for the unincorporated areas and allow for voluntary delegation of the program to counties. The minimum stormwater management standards applied to new development in the designated cities and counties remained the same.

Impact on Private Development

With the exception of permits required for construction site runoff, the federal Phase II program did not directly apply to private entities. Instead, it required local governments to use their planning and regulatory powers to get stormwater management measures incorporated into new development proposals. For example, a subdivision with private streets would generally not be required to get a Phase II NPDES permit for its storm sewer system. But the owner or operator of the "municipal" storm sewer system that serves the subdivision (which could be a city, county, state or federal government entity) would have a Phase II NPDES permit and be required under that permit to insure that new subdivisions incorporate stormwater controls. Under the proposed State rules, permitting would work exactly that way for municipal storm sewer systems that require NPDES permits; in the unincorporated areas – where the State (NCDOT) rather than the counties "own or operate" the storm sewer system -- the State would directly require stormwater controls for new development. In that case, the State regulations simply take the place of county planning ordinances.

Phase II also has no direct impact on existing development. The program focuses on stormwater management for development that occurs after the owner/operator of the storm sewer system has a stormwater management program in place. There are no new stormwater controls required for existing development.

The federal and State Phase II rules affect future development by setting minimum standards for stormwater programs. The program must include stormwater controls for future development that are sufficient to control stormwater to the maximum extent practicable and to protect water quality standards. Those are the review standards established in federal law. The state rules set performance standards as a guide to the types of controls that will be adequate to meet those very broad federal standards.

CONTENT OF STATE RULES

The State rules:

1. Identify a level of development that would require no stormwater controls. Generally, stormwater controls would not be required for new development falling below a threshold of 24% built-upon area so long as the development used grassed swales to carry stormwater as much as possible and any built-on area was setback 30 feet

landward of any surface waters. The threshold for stormwater controls is lower (12% built-upon area) for areas draining to shellfish waters because those waters have much stricter water quality standards for bacterial contamination in order to protect the public from disease potentially transmitted by eating infected shellfish. NOTE: These are thresholds above which stormwater control measures must be incorporated into the project design and not density caps.

2. Establish minimum stormwater control measures required for new development that exceeds the threshold level:

    •stormwater controls capable of controlling or treating the excess runoff (compared to pre-development conditions) from a 1 year, 24-hour storm;
    •structural stormwater systems designed to remove an average of 85% of total suspended solids;
    •location of all built-on area at least 30 feet landward of surface waters;
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Many of these control measures are specifically identified in EPA guidance as appropriate measures to address urban stormwater.

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Application of the proposed State rules to counties identified as needing Phase II permits.

Under rule 2H.0126, the 33 designated counties must get a federal Phase II NPDES stormwater permit for any storm sewer system that the county actually owns or operates. The Phase II permit would cover only the jurisdictional area of the storm sewer system.

The EMC adopted a separate set of state stormwater rules to fill the gap in the NPDES program coverage with respect to the designated Phase II counties. For the areas outside of county-owned storm sewer systems (which would receive an NPDES permit under 2H.0126), DENR would implement the stormwater management program under the same standards that apply to local government jurisdictions requiring an NPDES stormwater permit.

Reply to:
James C. Gulick or
Mary Penny Thompson
Environmental Division
Tel: (919) 716-6600
Fax: (919) 716-6766

January 11, 2002

Coleen Sullins, Water Quality Section Chief
Bradley Bennett, Stormwater and General Permits Unit Supervisor
Division of Water Quality
1617 Mail Service Center
Raleigh, NC 27699-1617

Re: **Advisory Opinion:** Application of the NPDES Storm Water Phase II Program to Local Governments; N.C. Gen. Stat. § 214.7; N.C. Admin. Code tit. 15A, r. 2H.0126; 33 U.S.C. § 1342(p); 40 C.F.R. §§ 122.26, 122.32, 123.35

Dear Coleen and Bradley:

You requested written advice on two questions concerning the State implementation of the federal National Pollutant Discharge Elimination System ("NPDES") Storm Water Phase II Program as it relates to local governments. The questions arose from a request by the North Carolina Association of County Commissioners to review the federal rule and determine whether State implementation would require a county to obtain a permit, notwithstanding the county does not own or directly operate the largest storm water conveyance system in its jurisdiction, i.e., the State road system and its associated drainageways.[1] In particular, you asked (1) whether a county may be required to obtain a NPDES Storm Water Phase II permit for the storm water conveyances within its jurisdiction notwithstanding that it does not own or operate roads and associated drainageways; and (2) if a county is required to obtain a permit, what permitting avenues would be available.

In regard to the first Issue our answer is "yes;" we conclude that there are four scenarios under which a county may be required by DENR to obtain a Phase II permit, notwithstanding that it does not own or operate roads and associated drainageways. The four scenarios arise when: (a) the county owns or operates a municipal separate storm sewer system ("MS4")[2] in an

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[1] Letter from Ed Regan, Deputy Director of the North Carolina Association of County Commissioners to Bradley Bennett of the North Carolina Department of Environment and Natural Resources' Division of Water Quality dated September 27, 2000.

[2] Under either phase, "municipal separate storm sewer" means a conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains owned by a public body designed or used for collecting or conveying storm water which is not a combined sewer or publicly owned treatment works. 40 C.F.R. § 122.26(b)(8).

urbanized area which discharges directly to receiving waters; (b) the county owns or operates a storm water conveyance in an urbanized area which is interconnected with a permitted MS4, but retains the authority to implement a measure of the program; (c) the State designates a county's MS4 as needing a permit, regardless of location; or (d) a third party successfully petitions the State to require county permitting. In response to the second Issue, if required to obtain a Phase II permit, a county may obtain a general permit, an individual permit or arrange to be co-permittees with existing or new permittees.

Issue 1. The NPDES storm water permitting program has two phases, Phase I for large and medium MS4s[3] and Phase II for smaller MS4s[4]. Phase II permits require implementation of a storm water management program which is composed of six minimum measures. The minimum measures consist of (1) public education; (2) public notice; (3) illicit discharge detection and elimination; (4) construction controls; (5) post-construction controls; and (6) pollution prevention. In certain instances, only the county may be able to implement one or more of these six minimum measures. One such example of municipal control over a minimum measure is the requirement of post-construction controls, i.e., requiring maintenance of installed best management practices after construction is complete. To this end, a county may exercise control over its jurisdiction through the land use authorities granted to it by statute. Counties have broad authority to regulate and restrict the size of buildings; the percentage of lots occupied, the size of open spaces; the density of population; the location and use of buildings, structures, and land for trade, industry, residence or other purposes; and provide density credits or severable development rights for dedicated rights-of-way. N.C. Gen. Stat. § 153A-340. Counties may adopt zoning regulations designed to facilitate the adequate provision of water, sewerage and other public requirements. N.C. Gen. Stat. § 153A-341. Counties also regulate subdivisions by ordinance. N.C. Gen. Stat. § 153A-330 *et seq.*

North Carolina is one of the few states in which roads and adjoining drainageways are owned and operated by the state's department of transportation[5] rather than by counties. Apparently for this reason, the Association of County Commissioners has questioned whether a county may be required to obtain a Phase II permit when a county does not own or operate the majority of storm water conveyances, namely road drainageways, in its municipal jurisdiction, despite their ability to implement the minimum measures contemplated under Phase II. However, it is our opinion that North Carolina counties may be required by DENR to obtain a permit under at least four scenarios, notwithstanding that they do not own or operate the majority of MS4s in their jurisdiction.

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[3] Phase I covered discharges from MS4s serving populations of 100,000 or more. 33 U.S.C. § 1342(p)(2).

[4] Phase II covers discharges from MS4s serving populations of less than 100,000.

[5] North Carolina currently regulates NC DOT storm water under a statewide NPDES Stormwater Phase I permit (NPDES Permit No. NCS000250).

First, a county may be required by DENR to obtain a permit for any discrete system which it owns or operates in an urbanized area.[6] Road drainageways are not the only MS4s in a county. Counties own or operate jail facilities, hospital complexes, municipal buildings, maintenance facilities and parks which contain catch basins, ditches, storm drains and other features of storm drainage which discharge directly to waters of the State without passing through another storm system such as NC DOT's road system. These MS4 point sources must obtain Phase II permits to discharge storm water directly to waters of the State.

Second, a county may be required by DENR to obtain a permit when its storm water devices are interconnected in an urbanized area with a permitted MS4 and the county retains authority to implement one or more of Phase II's six minimum measures. Under Phase I, the permitting agency could include storm water conveyances that did not themselves constitute a large or medium MS4 under the permit for a large or medium MS4 due to the interrelationship between the discharges of the smaller system and the MS4, including the physical interconnections between the storm sewers and other factors. 40 C.F.R. §§ 122.26(b)(4) and (7). DENR issued a statewide NPDES Phase I permit to the NC DOT for its roadways, but did not require counties to be permitted at that time. Without the county as a co-permittee, NC DOT's Phase I permit fails to provide program coverage outside of the right-of-way although those areas contain storm water conveyances that drain to the right-of-way.

Third, a county may be required by DENR to obtain a permit when the State permitting authority designates it for coverage, even if it falls outside of an urbanized area. 40 C.F.R. §§ 122.32(a)(2) and 123.35(b). The rule's preamble discusses this extended coverage by indicating that "Permitting authorities may also decide to designate all MS4s within a county or township, if they believe it necessary to protect water quality." 64 Fed. Reg. 68751. As the NPDES permitting authority, DENR is required to develop a process, as well as criteria, to designate small MS4s outside of the urbanized area which have the potential to result in exceedances of water quality standards or other significant water quality impacts. 40 C.F.R. § 123.35(b). Other significant water quality impact criteria may consist of discharge to sensitive waters, high growth or growth potential, high population density, contiguity to an urbanized area, significant contributor of pollutants to waters, and ineffective protection of water quality by other programs. 40 C.F.R. § 123.35(b)(1)(ii). DENR may also designate any small MS4 that contributes substantially to the pollutant loadings of a physically interconnected MS4 that is regulated by the NPDES storm water program. 40 C.F.R. § 123.35(b)(4). Therefore, even if a county lies outside an urbanized area or is only physically interconnected with another regulated MS4, it may be required to obtain a Phase II permit through the State's own designation process.

Fourth, a county may be required by DENR to obtain a permit when it is subject to a successful third party petition. Even if DENR itself does not designate a county as needing a

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[6] The Bureau of Census determines urbanized areas based upon the latest decennial census data. Appendix 6 of the Phase II rule lists 25 counties which are partially or fully located within an urbanized area.

Phase II permit, third parties may petition the permitting agency to do so. 40 C.F.R. §§ 122.26(f)(4) and 122.32(b). Under the petition process, ***any operator*** of a permitted MS4 may petition DENR to require a separate NPDES permit for a discharge entering the operator's MS4. 40 C.F.R. § 122.26(f)(1)(emphasis added). Moreover, ***any person*** may petition DENR to require a county to obtain an NPDES permit for a storm water discharge which contributes to a violation of a water quality standard or is a significant contributor of pollutants to receiving waters. 40 C.F.R. §§ 122.26(f)(2) (emphasis added).

The Phase II rule generally focuses on discharges from MS4s which, by definition, requires the county to own or operate the MS4.[7] However, the language of the rule addressing the Phase II petition process addresses "any discharge into [an MS4]."[8] This change in language creates some ambiguity as to the scope of coverage. In particular, it might be argued by the petitioning operator of a permitted MS4 that he must only show that the discharge reaches its system, not that the discharge comes from another MS4. The petition process also addresses "[any] discharge which is composed entirely of storm water which contributes to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States."[9] In this instance, it might be contended that the third party must show that the discharge negatively affects water quality, without a requirement that the third party must show that the discharge emanates from an MS4.

It may be contended that the general intent of the statute would support such a construction. The structure of the CWA and its history indicate that all point sources should be permitted. *See Natural Resources Defense Council (NRDC) v. Train, 396 F. Supp. 1393 (D.D.C. 1975), affirmed, NRDC v. Costle*, 568 F.2d 1369 (D.C. Cir. 1977). With the adoption of the Water Quality Act of 1987, Congress amended the CWA and added section 402(p), which established the priorities, deadlines and permit requirements for storm water point sources, including MS4s. 33 U.S.C. § 1342(p).

The Phase II rule implements the Clean Water Act goal by seeking to provide comprehensive coverage of storm water control and to eliminate gaps in storm water coverage. As the rule's preamble states, "'Donut holes' are gaps in program coverage where a small unregulated MS4 is located next to or within a regulated larger MS4 that is subject to an NPDES permit under the Phase I NPDES storm water program. The existence of such 'donut holes' creates an equity problem because similar discharges may remain unregulated even though they cause or contribute to the same adverse water quality impacts. Using NPDES permits to regulate the unregulated discharges in these areas is intended to facilitate the development of a seamless

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[7] *See* 40 C.F.R. §§ 122.26(b)(4), (7), (8), and (16).

[8] *See* 40 C.F.R. §§ 122.26(f)(1).

[9] *See* 40 C.F.R. § 122.26(f)(2). *Also see* 33 U.S.C. § 1342(p)(2)(E).

regulatory program for the mitigation and control of contaminated storm water discharges in an urbanized area." 64 Fed. Reg. 68739. The rule's preamble dedicates an entire subsection, Section II.H., to describing the municipal role in Phase II. 64 Fed. Reg. 68748 through 68771. The rule's appendix goes on to identify twenty-five North Carolina counties as being fully or partially located within an urbanized area. 64 Fed. Reg. 68822. It appears that EPA anticipated that North Carolina counties would be covered by the Phase II program and did not anticipate that whole areas would be left out simply because NC DOT rather than local government maintained the road system. Thus, the petition process may extend county coverage to county storm water discharges regardless of whether the discharge emanates from a conveyance that is owned and operated by the county and otherwise meets the definition of a small MS4.

Issue 2. If a county is required to obtain a NPDES permit under Phase II, it has several permitting options. It may request a general permit for all systems and components within the county boundaries. The Phase II program encourages the use of general permits on a system-wide or jurisdiction-wide basis. Under Phase I, NC DOT received a system-wide permit for its road system. Under Phase II, a county could receive a jurisdiction-wide permit for the systems within the county. In this regards, an NPDES general permit can cover a category of dischargers within a defined geographic area which may be defined broadly to include political boundaries, e.g., an entire county. 64 Fed. Reg. 68739. For the storm water systems which interconnect with NC DOT road systems, a county could join NC DOT as a co-permittee in its Phase I permit which would have to be modified to include the Phase II minimum measures. The Phase II rule allows a newly regulated MS4 to join as a "limited" co-permittee with a regulated MS4 by referencing a common storm water management program. 64 Fed. Reg. 68739. A "limited" co-permittee is only responsible for the measures not covered by the already-existing permit. Alternatively, a county could obtain its own Phase II permit for the systems that interconnect with NC DOT. Finally, a county may obtain or require individual permits for each system within its geographical area.

We trust this analysis proves helpful. If you have any questions or wish to discuss this matter further, please do not hesitate to contact us. With best wishes, we are

Very truly yours,

James C. Gulick
Senior Deputy Attorney General

Mary Penny Thompson
Assistant Attorney General

EP/51803-3/wp6.1

February 6, 2004 ERC Meeting
EXHIBIT I

NORTH CAROLINA RULES REVIEW COMMISSION
1307 Glenwood Avenue, Suite 159
Raleigh, NC 27605
(919) 733-2721 • FAX (919) 733-9415

SENATE
Jim R. Funderburk
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Robert Saunders
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HOUSE
Jennie J. Hayman, Chairman
Graham Bell
Dana Simpson
John Tart

Staff Attorneys
Joseph J. DeLuca, Jr.
Robert A. Bryan, Jr.

February 5, 2004

Ms. Dedra Alston
Environmental Management Commission
1601 Mail Service Center
Raleigh, North Carolina 27699-1601

Re: 15A NCAC 2H .0126, .0150 - .0156, and .1014 - .1019

Dear Ms. Alston:

At its January 15, 2004 meeting the Rules Review Commission voted to return the above rules to the Environmental Management Commission for failure to adopt the rules in accordance with Part 2 of Article 2A, Chapter 150B. The new rulemaking was conducted without compliance with Part 2 of Article 2A, Chapter 150B, and is returnable under N.C. Gen. Stat. § 150B-21.9(a) (2001), or objectionable under N.C. Gen. Stat. § 150B-21.9(a)(4)(2003), since the non-responsive rulemaking was concluded after October 1, 2003.

In addition, the Rules Review Commission objected to Rules .0126 and .0150 - .0156 on the basis of lack of statutory authority (N.C. Gen. Stat. § 150B-21.9(a)(1)), for failure to appropriately respond to the objection made at the RRC's October 16, 2003 meeting; and ambiguity (N.C. Gen. Stat. § 150B-21.9(a)(2)), for failure to appropriately respond to the objection made at the RRC's October 16th meeting. The RRC also objected to Rules .1014 - .1019 on the basis of lack of statutory authority (N.C. Gen. Stat. § 150B-21.9(a)(1)), for failure to appropriately respond to the objection made at the RRC's October 16th meeting; and ambiguity (N.C. Gen. Stat. § 150B-21.9(a)(2)), for failure to appropriately respond to the objection made at the RRC's October 16th meeting.

The changes to Rules .1014 - .1019 made by the EMC are not responsive to an objection by the RRC because the objection was to a lack of statutory authority to compel a local government to adopt ordinances and to require a local government which was not an owner or operator of a MS4 to adopt ordinances or obtain a permit. The responsive EMC change was to make application for a storm water permit optional for a local government which was not the owner or operator of a MS4. The EMC's changes went beyond this to require permits from

dischargers of storm water located within the counties from which the EMC had purported to require permits. Creation of a permit obligation for entities which are not owners or operators of MS4s and not governmental bodies is not responsive to the objection; it was new rulemaking designed to accomplish a comparable substantive result.

Sincerely,

Joseph J. DeLuca, Jr.
Staff Director

JJD:lj
cc: Marc Basnight, President Pro Tem of the Senate
Jim Black, Democrat Speaker of the House
Richard Morgan, Republican Speaker of the House
Julian Mann, III, Director, OAH
Karen Brown, Legislative Research

DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
February 24, 2004

The Environmental Review Commission (ERC) met on Tuesday 24 February 2004 at 9:30 a.m. in Room 643 of the Legislative Office Building.

Representative Daniel McComas and Senator Charlie Albertson presided over the 24 February 2004 meeting. The following members were present: Senators Albertson, Dorsett, Forrester, Horton, Kinnaird, Swindell and Weinstein, and Representatives Fox, Gibson, Hackney, Justice, LaRoque, McComas, Weiss and Williams. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Jennifer McGinnis, Assistant Commission Counsel, Tim Dodge, Research Assistant, and Mary Watson, Commission Clerk were also present.

On 17 February 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Representative McComas called the meeting to order and called on co-chairs for their remarks.

George Givens, Commission Counsel, was asked to explain the agenda.

Mr. Givens said that he had distributed to each member, copies of read only reports that are required by law to be made to the Commission. These reports are listed as **Exhibit D**.

Mr. Givens called to member's attention two additional handouts. One is a memorandum on leaking underground storage tanks. In 1998, at the request of various members, DENR took a look at all low risk sites and we have been receiving monthly and weekly reports on their progress over the last five plus years. This memo states that all of the low risk reviews have been completed and this is the final report. The second item is a spreadsheet prepared by the fiscal research division, which shows all the funds that have been transferred from various special funds within DENR to the General Fund to balance the budget for the past four fiscal years. These two items are listed as **Exhibit E**.

Mr. Givens said he was prompted to provide members with this information because of one particular fund, the Title V Fund. This is the only one for which funds had been returned to their source and not from the General Fund. The reason is that the federal law, which requires there to be a

Title V assessment, requires that those funds be used only for the Title V Air Quality Program.

Mr. Givens noted that the staff, planning meeting for this meeting was held on Tuesday 10 February 2004.

Mr. Givens said that the next meeting of the ERC is planned for Thursday 25 March 2004 and Friday 26 March 2004. He said that an option for a field trip, based on interest, would be to use the Friday date to tour Belews Creek Steam Power Plant, the first plant to be refitted under the Clean Smokestacks Acts.

Mr. Givens said that items for March focus on solid waste, surface water, animal waste issues and other water quality issues. More detail about this will be published in the next meeting notice.

Mr. Givens asked for feed back from members as to their interest in a field trip in March to Belews Creek. He also said that it had been proposed by the conservation groups that the April meeting should include a field trip to either Dupont State Forest in Brevard or in the Pittsboro area to some properties acquired by the Nature Conservancy. Either of these trips would not allow adequate business meeting time and therefore an additional meeting would be held in April, specifically on Tuesday morning, 20 April 2004.

Representative Gibson expressed concern that, before we arrange any field trips, we need to make sure we cover the issues that need to be addressed before the short session begins.

Representative McComas proposed that we proceed with the plans for a field trip to Belews Creek in March and that a trip to Dupont Forest be discussed at the March meeting. He asked Mr. Givens to make sure that each member received e-mail to that effect.

Mr. Givens asked members to sign the visitor registration forms and asked members to sign and send forward their reimbursement forms.

Dr. David H. Moreau, Chairman, Environmental Management Commission, presented a quarterly report by the Environmental Management Commission (EMC) as to its operations, activities, programs, and progress during 2003. A copy of the quarterly report is listed as **Exhibit F**.

Dr. Moreau acknowledged that there are 19 members of the EMC who have each given 16-20 days of service to the State of North Carolina in the past year. The Commission has considered at last 20 contested cases operating in a quasi-judicial process. Each of those cases carries with it reams of record that have to be read. In addition, there are probably 200 requests for civil penalty remissions that have been heard. All of this service is given without compensation and the citizens of North Carolina have been well served by the members of this Commission.

Dr. Moreau said that several other issues the EMC dealt with were the emission limits on hot mix asphalt plants. That rule was withdrawn to allow for extended comment period to account for additional information.

Dr. Moreau said that the EMC heard reports on mercury emissions and carbon dioxide emissions from coal-fired electric power boilers, those required under the Clean Smokestacks bill.

Dr. Moreau said that a set of rules has been enacted to implement the toxic air quality rules under Section 112j of the Clean Air Act. Those were sent out for notice and had to be re-noticed because of a settlement agreement with EPA that changed the language of the rules.

Dr. Moreau said that with regard to water quality they have maintained a schedule of preparation and public review of the various river basin water quality plans. They have been spending a great deal of time with the stormwater rules and approved a local ordinance for stormwater management in the Tar Pamlico basin and approved the agricultural accounting rule for the Tar Pamlico.

Dr. Moreau said that the EMC has sent to public hearing a request for reclassification for portions of Rocky River in Chatham County requested by Siler City for expansion of its public water supply. They have adopted the permanent rule for the Catawba River Basin and approved the temporary rule for reclassification of portions of Sandy Creek and Swift Creek with compliance with House Bill 566.

Dr. Moreau said there has been very little activity in the groundwater area over the past year; only one major action of granting a variance.

Representative McComas asked Dr. Moreau to explain the Municipal Waste Combustor Rule (MWC).

Dr. Moreau called on Mr. Keith Overcash to explain the rule.

Mr. Overcash explained that the MWC rule change in the rule to get it back into line with the federal requirements.

Representative McComas asked Mr. Overcash if this was the one that specifically applied in New Hanover County.

Mr. Overcash answered in the affirmative.

Dr. Moreau added that this is the only facility that was affected.

Senator Horton asked Dr. Moreau to address the Weyerhaeuser situation in the Roanoke River with regard to mercury emissions.

Dr. Moreau said that he believed it was related to the hydrogen sulfide.

Senator Horton asked Dr. Moreau to address the high content of mercury in the fish and the warning issued by the Department of Health and Human Services.

Senator Horton also asked Dr. Moreau to address the asphalt industry where a plant had dangerous levels of hydrogen sulfide emissions with a high degree of suicide rate in the area.

Dr. Moreau said that he had heard nothing about the latter case. However, the issue on the Weyerhaeuser was one in common with other pulp and paper mills in the state. There was a revised health guideline on hydrogen sulfide. There is some dispute over the exact level acceptable.

Dr. Moreau added that the proposal that went was to delay any action on those facilities until they gathered more information. So the rule was to exempt the waste lagoons at the pulp and paper mills until February 2007. In the meantime, the companies would be required to gather additional information through monitoring to determine what those ambient levels were.

Senator Horton said that 2007 seemed a long way off if we need to address these health problems and asked Dr. Moreau how 2007 was selected as the date at which they would revisit the problem.

Dr. Moreau said there was considerable uncertainty as to what the nature of the health risk is. They do not have the evidence to suggest that these facilities are, in fact, violating the guidelines.

Senator Horton asked if it would take three years to find out.

Dr. Moreau said that it would take at least that to get the preliminary information.

Representative McComas noted that there would be discussion on this issue further on the agenda.

Dr. Moreau said that others would speak to the stormwater issue but he wanted to explain what the EMC's response was to the Rules Review Commission on this subject.

Dr. Moreau said that urban stormwater runoff is not a new problem. One of the first studies done in the country that received widespread attention was a study done by Professor Ed Brown at Duke in the 1960's. The evidence was sufficient by the time the Clean Water Act passed in 1972 for Congress to identify urban stormwater runoff as one of those areas of pollution that needed attention. What Congress couldn't figure out then was what to do about it.

Dr. Moreau said that it took 15 years before the amendments of 1987 that directed EPA to bring the urban stormwater runoff under the discharge permit program. The EMC is operating in response to the federal directive.

Dr. Moreau said that the adoption of a stormwater program is not an option. If we don't adopt it, all permittees will have to deal with U.S. EPA through the regional office in Atlanta. By failure to adopt a set of regulations, we leave a number of municipalities in North Carolina open to a technical violation of federal law and open to third party lawsuits.

Dr. Moreau said that the rules were developed over a period of three years with extensive consultation with affected parties. The rules were rejected by the RRC and the EMC's response asked counsel to seek judicial review of that decision on any or all-appropriate grounds. Several members of the EMC had strong opinions about what those grounds ought to be but they used good judgment in leaving that to the attorneys to decide what was the best approach.

Dr. Moreau said that the EMC has agreed with the Department to adopt a general permit that would cover those entities, particularly the municipalities that are subject to the federal rule so that they are not left out there hanging. The content of that general permit will reflect what was in the rules that were adopted.

Dr. Moreau said another issue the EMC dealt with was what to do with those developments, which are outside of municipal boundaries, particularly those that drain into the systems of the DOT.

Dr. Moreau said that the EMC has urged the Department to reissue the Phase I permit to DOT, making it clear that DOT will be responsible for water quality that is drained from its right of way, including the effects of any off-site development that may drain to its right of way.

Dr. Moreau asked that the ERC give consideration to the development of a comprehensive state storm water policy. Our current situation is that we have at least nine different sets of stormwater regulations now in effect.

Dr. Moreau said that in regard to air quality, in the next few weeks, the EPA will make a final decision on what counties or portions of counties will be designated in non-compliance with the new ground level ozone standard. At least 17 counties in the state will be affected.

Dr. Moreau said that as part of the maintenance and attainment plan for those areas, and part of the SIP call as part of the Clean Smokestacks Bill, the EMC has adopted a set of numerical limits on nitrogen oxide emission caps for the designated areas and for other parts of the state. These caps set numerical limits as to how much nitrogen oxide emissions are allowable. Even if we project compliance to meet the letter of the federal regulations, there will not be much room left under those caps to accommodate growth.

Dr. Moreau said that the question arises as to how much reserve do we have, what steps should we take now to ensure we have opportunities for offsets when the need arises, who is going to decide who gets the offsets, and what criteria are they going to use in making those decisions.

Dr. Moreau said there is no comparable training program at the state level for nitrogen oxide emissions and the characteristics of the sources from air pollutant emissions are quite different than those in the area of air quality. There are a very small number of corporations that hold substantial pieces of the nitrogen pie.

Dr. Moreau said that as we continue to pursue large manufacturing operations to provide jobs for the citizens, we should be prepared in advance to deal with the issues of nitrogen oxides.

Senator Albertson asked Dr. Moreau about changes in MTBE, chromium and arsenic and how those changes will track what the federal government requires.

Dr. Moreau said that those issues have come up and there is a revised health guideline for those issues. The EMC was faced with the issue of whether or not to issue temporary rules to address those issues and chose not to issue any temporary rule. It is clear that those substances are harmful but the question is whether to adopt a temporary rule invoking emergency powers or to wait and go through the regular rulemaking process. They were not presented with any requests or evidence that the citizens of North Carolina were facing an emergency situation being exposed to those chemicals. Without that information, they chose to follow the regular rulemaking path.

Senator Albertson asked Dr. Moreau if it had to do more with process than changing the standard itself.

Dr. Moreau said there was a change in the federal standard and the EMC is responding to part in that change in the federal standard.

Senator Albertson said he had read where the federal government was relaxing the standard for MTBE and asked Dr. Moreau if this was correct.

Dr. Moreau said he was not aware of this.

Senator Kinnaird asked Dr. Moreau if there is any hope if we put more resources into Greenpower it might mitigate some of these really serious problems.

Dr. Moreau said that he was not an expert on energy policy and believes we can make some strides in that area and an aggressive program in that direction might provide some benefit.

Dr. Moreau said that he believed we would have to rely on cleaner vehicles and one of the questions would be to just follow the federal standards on that or consider an option of a program such as the one in California for acceleration of clean vehicles.

Mr. Givens said that there has been some discussion at the federal level about providing some liability immunity to the petroleum companies who use MTBE in their products.

Senator Kinnaird asked Mr. Givens if we have ever had MTBE in the State of North Carolina.

Mr. Givens said that we have had MTBE and we do have some contaminated sites.

Senator Albertson asked if MTBE was one of the big holdups we have with regard to underground storage tank cleanups.

Mr. Givens said that the release of MTBE complicates the cleanup because it is harder to clean up than some of the other petroleum constituents.

Ms. Robin Smith, Assistant Secretary for Policy and Planning, DENR, gave an update on issues related to the Phase II stormwater rules.

Ms. Smith said that the Department has been working with the Attorney General's office on developing the appropriate appeal of the RRC decision. The EMC also asked the Department to go back to the RRC and ask them to stay its own decision while the appeal was pending. One of the reasons they were looking at a stay was once the permanent Phase II rules were disapproved and returned to the agency that causes the temporary rule to also expire and it carries with it direction to both state and local governments as to how certain decision will be made and what criteria will be used on things like designation of additional communities on Phase II permitting and responses to third party petitions for designation of additional communities.

Ms. Smith said that with regard to development of general permits, one of the issues the Department had recommended to the EMC was that while the rules were in a state of uncertainty the Department felt it would be a good idea to go ahead and development a general Phase II stormwater permit that would allow municipalities that require NPDES coverage to come in and get coverage under a general permit. The intent was to develop a general permit that would incorporate the same minimum requirements and standards as those that appear in the rule that was proposed and disapproved by the RRC.

Ms. Smith said that the Department has exisiting authority both by statute and by the EMC's rules to implement the NPDES permitting program in North Carolina.

Ms. Smith said that option that local governments would have if they need the NPDES they can chose to get coverage under the general permit if they are willing to meet all of the standards described in the permit. If they elect to do a program that does not meet those standards, they can apply for an individual NPDES permit. The Department will review the application and a decision to issue a permit would be made on a case-by-case basis.

Representative Hackney asked Ms. Smith to remind the Commission of the coverage to which these rules apply.

Ms. Smith said that the rules apply to any public entity located in specific cities and counties in North Carolina. If you are a public entity that owns and operates a separate storm sewer system, you must have the NPDES permit.

Representative Fox asked Ms. Smith what criteria is used to determine those areas.

Ms. Smith said that the areas were listed by name in the original federal rules based on the 1990 Census definition of what an urbanized area is. There is a second set of communities in North Carolina that because they grew in population and increased in density between 1990 and 2000 fall under the federal designations.

Mr. James C. Gulick, Senior Deputy Attorney General, Environmental Division, North Carolina Department of Justice, gave a report on the status of petitions to the Administrator of the United States Environmental Protection Agency (EPA) that may be filed by North Carolina under Section 126 of the federal Clean Air Act for purposes of reducing interstate transport of ozone and its precursors. Handouts accompanying his presentation are listed as **Exhibit G**.

Mr. Gulick said that Section 126 petitions refer to Section 126 of the federal Clean Air Act which authorizes states to petition the EPA for relief with respect to specific sources or groups of sources of air pollutants in upwind states outside of their own jurisdiction which are significantly contributing to non attainment of a national air quality standard or are interfering with maintenance of national air quality standards in the petitioning state.

Mr. Gulick added that the Clean Smokestacks Act, specifically in Section 10, authorized and directed state officials to seek a variety of methods to seek similar reductions in air pollutants, particularly SO2 (sulfur dioxide) and oxides of nitrogen in other states on a similar schedule. There have been efforts by DENR, the Governor's office and the AG's office to engage other states to seek those things. There has been activity in other states but there have not been the kinds of reductions assured that the AG's office would like to see.

Mr. Gulick gave an example as the State of Virginia who has a bill introduced that is very much like our Clean Smokestacks Act; however, it was recently learned that their bill will be held up and not enacted this year.

Mr. Gulick said that the AG's office, in conjunction with DENR's Air Quality Division, is actively preparing to file petitions under Section 126 of the Clean Air Act. This process is well underway and will be filed in the near future in several upwind states.

Senator Horton asked Mr. Gulick if he was speaking of the Tennessee Valley Authority (TVA).

Mr. Gulick said that the TVA is certainly one of the ones mentioned specifically as well as those in other states. He added that they have a list of states they are working with but declined to disclose the names until petitions have been filed.

Representative Gibson asked Mr. Gulick if we are headed in the right direction with the Clean Smokestacks bill and is it giving the AG's office the juice to make other states stop polluting us upwind.

Mr. Gulick said that it would have that effect. Similar legislation has been proposed in the State of Virginia and there are proponents of such legislation in other states, so the Clean Smokestack legislation is giving it a boost.

Mr. Gulick said that his colleague, Mr. Bernstein, will be addressing the ERC shortly on a transport rule that has been proposed by the EPA which would address similar issues in the eastern half of the state. Whether that rule will eventually be adopted is an open question. It said it was fair to say there was a variety of ways to accomplish the same results but the time has come to ask for the transport rule method as another method of achieving that result of reductions in upwind states that affect us.

Representative Gibson asked Mr. Gulick if EPA is looking favorably on the Clean Smokestacks legislation and are we headed in the right way.

Mr. Gulick said that was absolutely true. Mr. Bernstein said the EPA is looking to requiring similar levels of reduction in those pollutants in the eastern half of the country.

Representative Gibson asked if the Ohio Valley had made any efforts in this area.

Mr. Gulick said the AG's office recently had letters from both Ohio and West Virginia which were not encouraging that voluntary actions was going to be taken in those states.

Mr. Gulick said there were two new source review rules and Mr. Keith Overcash would be addressing the earlier rule also known as the December rule.

Mr. Gulick said that he would give a brief description of the later rule, also known as the Labor Day rule, and its current status.

Mr. Gulick said that in August 2003, the EPA issued a final rule, which indicates what activities at coal fired plants would be treated as routine maintenance for purposes under the Clean Air Act.

Mr. Gulick said that at the time of the Clean Air Act and new source review provisions, old facilities were grandfathered in. And, if provision was made that if they made changes in the process or in their plant or facility, physical or otherwise that resulted in an increase in emissions, they would

have to go into new source review, which could result in their having to install the large scale and expensive up to date pollution control systems. There have been a lot of complaints by industry and others about the case-by-case nature of the routine maintenance exception that had been adopted for dominimous increases by the EPA. This rule was designed to resolve those issues.

Mr. Gulick explained that under the rule, any equipment replacement activity, will automatically be excluded from new source review requirements if it involves replacement of any existing component of a process unit with an identical or functional equivalent component, the fixed capital cost of the replacement component plus the cost of repair does not exceed twenty percent of the replacement value of the entire process unit and the replacement does not change the specific design parameters of the unit.

Mr. Gulick added that EPA says this would not cause the unit to exceed the emissions requirements. This is a very controversial contention. Opponents argue that this will permit the reconstructions of these old units without their having to adopt or install up to date pollution controls. It also argues that they would be allowed to retain their life indefinitely. This rule has been challenged in the District of Columbia Circuit Court of Appeals. In December, shortly before it became effective, the DC Court of Appeals did several things with respect to this rule and the earlier new source review rule, which Mr. Overcash will describe.

The DC Court of Appeals denied a request to consolidate the two rules for argument, they granted a request that the same panel of the district court hear both cases, they granted the request of the opponents of the routine maintenance rule, they granted request to stay the effectiveness of that rule, pending their final decision. They stated their reasons that irreparable harm and likelihood of success on the merits required for the issuance of this stay and hearing of this case would be expedited.

Mr. Gulick said that since the request is stayed, unlike the earlier NSR rule, DAQ will not be under any obligation to start deciding what kind of rules they would need to adopt in order to deal with that new EPA rule. This would not happen unless the ruling is upheld.

Mr. Givens asked Mr. Gulick if the Labor Day rule is the one the State of North Carolina declined to join with other states in that lawsuit.

Mr. Gulick said that the State did not join in either litigation.

Mr. B. Keith Overcash, Director of Air Quality, DENR, gave a report on where the state is in the rulemaking process for the December rule, the new source review rule that was made final by EPA in December 2002. A handout accompanying Mr. Overcash's presentation, containing his comments, is listed as **Exhibit H**.

Mr. Givens asked Mr. Overcash what the consequences would be for failure to meet the March 2006 deadline.

Mr. Overcash said that EPA could file an action against DENR saying their program was deficient and step in to run the program.

Representative McComas asked how often has EPA been known to do that in the past.

Mr. Overcash said he was not aware that EPA had ever filed such action in the past. Actually, there are states in the northeast, called delegated states, which had to start using the rule on the effective date in 2003. Some of those states have filed litigation against EPA on the rule. He added that he is not sure whether or not EPA has stepped in and started issuing permits in those states but believes they have.

Mr. Marc D. Bernstein, Assistant Attorney General, Environmental Division, North Carolina Department of Justice, gave a report on the regulations proposed by EPA to reduce interstate transport of fine particulate matter and ozone.

Mr. Bernstein told members he had been asked to speak on the Interstate Air Quality (IAQR) rule and the Utility Mercury Rule (UMR) proposed by the EPA.

Mr. Bernstein said that the IAQR was signed by the Administrator for EPA in December 2003 and published in the federal register in January 2004. The EPA has set forth an approximate schedule for finalizing this rule sometime between December 2004 and June 2005. So far, they have only published a preamble to the rule, which is the description of the legal basis for the rule, the general design parameters and some of the discussion of the technical backdrop of the rule. EPA has not shown the rule language but will put this forth in a supplemental federal register note later this year.

Mr. Bernstein said the schedule for the rule shows that the comment deadline for this rule is March 30, 2004 and hearings will be held this month. What this rule deals with is the interstate transport of precursors of ground level ozone and fine particulate matter, also known as (PM2.5). The basis for these rules generally was the fact that new federal ambient air quality standards were promulgated for these particular pollutants. In the late 1990's, there was some litigation surrounding those national ambient air quality standards but the U.S. Supreme Court eventually upheld them.

Mr. Bernstein said that the issue surrounding these particular national ambient air quality standards is the fact that they are generally not formed at the source but can be formed by sources that emit precursors to these pollutants. In the case of ozone, the primary precursor that EPA is looking at is nitrogen oxide. In the case of PM2.5, the general precursors are SO2 and nitrogen oxides. There are other precursors to the pollutants but are not for regulation at this point.

Mr. Bernstein said that this rule deals with transport of SO2 and NOx in the eastern part of the United States where transport is generally a problem.

EPA has defined the eastern part of the state to include states from Louisiana up to Minnesota and all states east of that line. The exceptions to this are the states of Maine, New Hampshire and Vermont. The states that influence North Carolina are the Atlantic Seaboard states and West Virginia and Ohio.

Mr. Bernstein said that essentially this rule is targeted at electric generating units. EPA looked at all sources of pollution when developing this rule and determined that all sources upwind contribute to non-attainment or interfere with maintenance of attainment of the national ambient air quality standards. Downwind they are focusing their attention on electric generating units. This does not mean that the state needs to regulate electric generating units but the states can use their flexibility of the Clean Air Act to regulate other entities if they so desire. It is likely that most states under this rule, if it becomes final, will target their SIP processes at electric generating units.

Mr. Bernstein said that the methodology behind this rule, in general, follows the same structure as the NOx SIP call, which was promulgated back in the late 1990s. The NOx SIP call rule dealt with ozone pollution of the old ozone standard in the northeast and under that rule it was found that states in the southeast and Midwest were contributing to ozone pollution in the northeast. This rule is generally the same thing except it deals with a broader spectrum of pollutants in a broader spectrum of states.

Mr. Bernstein said that in general, what the EPA did was take the NOx SIP call methodology and applied it to this situation. They identified a basic threshold level of contribution that upwind states made to downwind states and all states that met that threshold level of contribution were included within the scope of the rule. EPA then determined what cost effective pollution control measures would apply to sources within those states and then developed emissions limitations budgets based on the application of presumed cost-effective controls in electric generating units (EGUs).

Mr. Bernstein added that what EPA ended up with was NOx and SO2 budgets for all the states that are included in the rule and these budgets are based on particular formulas. There are two budgets developed for SO2, one for the year 2010 and one for 2015. For SO2, EPA is looking for a budget that is 50 percent of the SO2 emissions limit under the current Title IV acid rain program under the Clean Federal Air Act. For 2015, each state's budget is going to be 35 percent of the total SO2 emissions limit under the acid rain program.

Mr. Bernstein said that with regard to NOx, the budgets are being calculated differently. They are based on heat input to electric generating units. For NOx in 2010, the budget was developed using an assumed control efficiency of emissions level of 1.5 pounds of NOx per million BTU's of heat input into these electric generating units. In 2015, it will be ratcheted down to 1.25 pounds. The State will have to comply with this SIP call by developing a SIP to meet those requirements and then submitting those SIPs to EPA for approval and then implementing the SIP.

Mr. Bernstein added that this rule in some ways relates to the Section 126 procedures that Mr. Gulick discussed earlier. The findings that EPA has made with regard to the IAQR SIP call are the very same findings that EPA would need to make under a 126 petition. Therefore, EPA has stated in the proposed IAQR that if the record for the 126 petitions is the same for the IAQR, EPA will presumably default to the same remedy.

Mr. Bernstein said that the IAQR budgets have already been published and are comparable to those under the Clean Smokestacks Act.

Senator Horton asked how interstate transport of fine particulate matter and ozone affect the citizens of North Carolina.

Mr. Bernstein said the health effects are what are documented when the rules for particulate matter and ozone were promulgated in the late 1990s. EPA did a great deal of work to identify the impacts of those particular pollutants on the health.

Senator Horton asked Mr. Bernstein if it caused people to fall down in fits or lose their eyesight or go crazy or just what.

Mr. Bernstein said that the effects are not that severe. The health effects generally range from increased incidences of asthma and respiratory disease in older adults and children.

Senator Horton asked Mr. Bernstein if what these rules do would be to limit upwind generators of pollutants from reaching North Carolina.

Mr. Bernstein said this is correct but is only a proposed rule at this time. They would like to see it finalized in some form.

Mr. Bernstein then spoke on the Utility Mercury Reductions Rule (UMRR). He said this rule has a similar time path as the IAQR, although it has a very different history.

Mr. Bernstein explained that the UMRR is based on different sections of the Clean Air Act but the final rule has not been developed. Section 112 of the Clean Air Act regulates what are called hazardous air pollutants and the standard is the Maximum Achievable Control Technology (MACT). The other option that has been set forth by the EPA is regulation under Section 111 more commonly referred to as the New Source Performance Standards, which allows for prescription of performance standards that carries over to existing sources.

Mr. Bernstein said that the genesis of this rule comes from a consent agree that was reached back in the mid 1990s. Under that consent agree, EPA was told that by December 2000 it had to determine whether regulation of hazardous air pollutants from EGUs was appropriate under Section 112.

Mr. Bernstein said that EPA determined in December 2000 that regulation was necessary and appropriate, was the technical determination

that it needed to make, and started moving forward with the a hazardous air pollutant regulation. The consent agree told EPA that by December 2003, it needed to propose regulations. So, in December 2003, at the same time that the IAQR was signed, EPA signed a proposal with regard to mercury emissions from EGUs. EPA proposed to rescind its finding of necessary inappropriate under Section 112, thus relieving it of the obligation to impose a maximum achievable control technology standard on these sources. EPA has proposed regulation under Section 112 as well as Section 111 regulations. The standard for a MACT under Section 112 is that the control standard has to match the control rate achieved by the best performing 12 percent of sources in a given category, which is a EGU.

Mr. Bernstein said that the alternative proposal is under Section 111, which is a cap in trade program. This program would have two phases, an initial phase in the year 2010, and a nationwide cap of 34 tons. The 34 tons is essentially the co-benefit that would be created by the implementation of the IAQR. The second phase would take effect in the year 2015 and would ratchet nationwide emissions to 15 tons.

Mr. Bernstein said the schedule for the mercury rule is December 2004. If EPA rescinds the necessary appropriate finding, they will then be required to finalize the rule.

Senator Kinnaird asked if the hearing tomorrow would be held at RDU.

Mr. Bernstein said he believed they were being held at RTP.

Representative Hackney asked Mr. Bernstein if our roughly 50 percent reductions under the Clean Smokestacks Act, will we meet either one of these proposed rules.

Mr. Bernstein said that the Section 112 rule is estimated to take the nationwide level down to 34 tons. The first phase of the Section 111 rule would bring total emissions down to approximately the same level. With regard to North Carolina's place and our co-benefit from Clean Smokestacks, he does not have the technical information to be able to answer Representative Hackney's question.

Mr. Givens asked Mr. Bernstein if the State of North Carolina was submitting comments on either of these rules at the hearing tomorrow.

Mr. Bernstein said that there may be some people from the State testifying with regard to the IAQR but he wasn't sure about the mercury rule.

Mr. Givens asked Ms. Smith to respond to his question.

Ms. Smith had stepped out of the room and Mr. Brock Nicholson stepped forward to answer the question.

Mr. Nicholson, Division of Air Quality, said that the State intended to submit written comments to both rules.

Representative Hackney asked Mr. Nicholson if the State is submitting comments on the mercury rule.

Mr. Nicholson said that the State is planning to submit written comments on both rules by the March 30, 2004 deadline, but not planning to present oral comments on either rule tomorrow.

Representative Hackney asked Mr. Nicholson to explain in a word what the comments say, does the State support the rules or not.

Mr. Nicholson said they are yet to develop those comments. A number of the concerns that Mr. Bernstein indicated are also concerns shared by the State.

Senator Kinnaird asked Mr. Nicholson what the State was going to say about the rules.

Mr. Nicholson said that the State would not be submitting oral comments tomorrow but are instead developing more detailed written comments by the March 30, 2004 due date for those comments.

Senator Kinnaird asked again what the State is going to say.

Mr. Bernstein said that the AG's office is yet to develop these comments. They are working in tandem with the Division of Air Quality to develop their record for the 126 petitions and those will dovetail with the comments of the Air Quality Division. Once they are able to finalize their litigation position with regard to 126, they will start to move forward with the comments. The technical work they are doing to support the 126 petitions will form the basis for their comments.

Representative McComas asked Mr. Bernstein and Mr. Nicholson to submit copies of their comments, once they are developed, to members of the ERC.

Representative Weiss asked Mr. Bernstein about cap in trade with regard to mercury. She said she is concerned about the health impact with the cap in trade program with other states.

Mr. Bernstein said that there are always arguments under cap in trade programs that hot spots will develop. There is research to show that hot spots did not develop under the acid rain program but acid rain is not the acute toxic that mercury is. So, there has been a heightened level of concern with regard to a cap in trade program with mercury.

Senator Kinnaird asked Mr. Bernstein if North Carolina is potentially a hot spot.

Mr. Bernstein said he would leave the answer to this question to the technical folks.

Mr. Nicholson answered by saying that they are concerned because we do have numerous fish advisories in place in North Carolina and mercury from our utilities. One thing we are blessed with is that we burn bituminous coal and will realize the greatest co-benefit of mercury reduction with our SO2 and NOx reduction in the Clean Smokestacks Act. A provision of that Act requires that we report to the legislature on the technical issues surrounding mercury control. Presently the calculations are a 66 percent total reduction in all mercury from all utilities from the Clean Smokestacks Act as it currently exists.

Mr. Givens added that the first of those mercury reports that Mr. Nicholson referred to are in the read only packet distributed to members today in Exhibit D.

Dr. Luanne Williams, Toxicologist with the North Carolina Department of Health and Human Services came forward to say that she would be presenting tomorrow-oral comments in opposition to the UMRR that the EPA is proposing. Her reasons for opposition are the type of coal our coal-fired power plants use in this state have a lot of chloride in it which releases me curate chloride. If we do have a cap in trade, the coal-fired power plants in North Carolina could potentially release a higher amount of mercury than those plants in Tennessee and it would all be acceptable to EPA. So, Tennessee's fish would be okay but North Carolina's fish would not be okay.

Dr. Williams added that there is data with DWQ that shows that just through rainwater deposition alone, the mercury levels are very high in our state. They are five time higher in the rain than what you would want statewide to protect the majority of our sunfish and less than 50 percent of our bass. The level in water in our state that we would want to protect 95 percent of our sunfish and less than 50 percent of our large mouth bass, we would want .1 across our state in water. The rainwater level is .5. So, if WQ controlled permit for everyone to meet the .1, the mercury levels in the rainwater would be five times higher than they should be and we would have elevated levels of mercury in our sunfish and bass.

Representative McComas asked Dr. Williams that once she had finalized her comments, would she share them with the ERC.

Dr. Williams said she would be happy to do so.

Mr. Givens asked Dr. Williams if she was with the Department of Health and Human Services.

Dr. Williams said this was correct.

Mr. Givens asked if the comments she was submitting tomorrow were on behalf of the Department.

Dr. Williams answered in the affirmative.

Mr. Givens said that there seem to be two different departments going in different directions with their comments. He was asking who would be speaking on behalf of the State.

Senator Kinnaird said she was glad to hear the comments of Dr. Williams and was disappointed that DENR did not share the same concerns.

Representative Gibson said it thought it was necessary to hear the expertise of all three divisions of the State at the appropriate time. He urged all interested parties to take their time and present their positions when they felt they are ready to do so because this is an expensive and important issue that we don't need to rush.

Mr. Nicholson said he would like to emphasize that tomorrow is a public hearing where people can give limited oral comments on both rules. The detailed comments are not due until March 30, 2004 and they think it is a lot more appropriate to present very careful and detailed comments at that time.

Representative McComas asked Mr. Nicholson if he would give the ERC members the time and location of the public hearings.

Mr. Nicholson said it was his understanding that they would be at the Holiday Inn near the Airport, just off of I-40, tomorrow and run for two days. The starting time is 8:00 a.m.

Mr. Givens followed up on comments from Representative Gibson and Mr. Bernstein regarding the filing of the 126 petitions. These petitions have not been filed and therefore the State is not going to tip its hand in advance of the filing of those petitions. What they will say in the petitions and what they will say in their comments are closely interlocked. So, as a matter of timing, it is to the benefit of the State from a litigation strategy point of view to wait and submit in more extensive written comments by the March 30, 2004 deadline by which time something will have happened on the 126 petitions. He asked Mr. Bernstein if this was a fair assessment.

Mr. Bernstein said this was a fair assessment but he could not guarantee that something will have happened with regard to 126, but they should be far enough along to make substantial comments on the rule at that point. They are working very closely with the Division of Air Quality to develop the legal position and the record that is needed to support that position. They will also be consulting on the health issues.

Senator Kinnaird asked Mr. Bernstein if the 126 petitions have to do with other states in the airstreams but have nothing to do with the caps on mercury. So, she cannot understand what his earlier explanation was about.

Mr. Bernstein said that the mercury process and the interstate NOx and SOx processes are interrelated because there may be substantial cost savings to industry by going forward with them in a coordinated manner, but from a legal prospective, they are somewhat diverse.

Representative Weiss said it would be helpful to hear from Dr. Williams on the public health aspect of this issue. We have been hearing a lot of technical and legal language and she feels it is critical that we hear the health aspects and the cost issues with regard to high mercury levels.

Dr. Williams said that she reviews all of the fish tissue sampling data for the State and determines if a fish advisory should be issued. She said that we now have a mercury fish advisory for two-thirds of the State, south and east of Interstate 85 with large mouth bass, bowfin and chain pickerel. It has been recommended that women of childbearing age and children not eat these three types of freshwater fish. In addition to these three freshwater fish, women of childbearing age are urged not to eat shark, swordfish, king mackerel and tilefish. They have sampling data to show that very high levels of methyl mercury can be found in these seven types of fish and the predominant concern is for the developing child.

Dr. Williams said that a fish advisory is issued in our state when the tissue concentration, in a given species in a given water body is around .3 milligram per kilogram.

Senator Albertson asked Dr. Williams to provide a copy of her report to the ERC.

Representative Williams asked Dr. Williams what the number reading was of the level of mercury in the Ferrells Island study.

Dr. Williams said the readings were greater than 1 mg. per kg. in the pilot whale and those are similar to the levels we are seeing in our fish in North Carolina waters.

Representative Williams asked if our readings are .3 and the Ferrells Island study reading was .1.

Dr. Williams said we would like to see our target level in fish where we don't issue advisories as .3.

Mr. Brock M. Nicholson, Deputy Director, Division of Air Quality, DENR, gave a report on the process and status of designation of non attainment areas to comply with the revised national ambient air quality standard (NAAQS) for fine particulate matter (PM2.5). Two handouts, which accompanied his presentation, are listed as **Exhibit I**.

Representative Hackney asked Mr. Nicholson about New Source Review before he began his presentation. Why is it necessary for us to change our rules if they are stricter than the ones that EPA is putting into effect.

Mr. Nicholson said this was a fair questions asked by a number of other states and a good answer has not come out of EPA to answer this.

Mr. Nicholson said there are some features of that rule that are attractive but they feel like need some modification from the EPA version. For instance, the plant-wide applicability level is a concept where you place a cap on a plant. Under that cap, the plant has some flexibility to change operations or increase operations as long as they stay under a cap that has been preset through an analysis of its acceptability. The State does not presently provide for that in our rules.

Mr. Nicholson said that another area of difference is the baseline calculations in our rules do not tie down the issue like EPA does. So, there are several reasons why they are looking at modifications to the State's rules. Another simple reason is that the signals they have gotten from EPA would indicate there could be a fight.

Representative Hackney said that sometimes you have to fight with EPA.

Mr. Nicholson covered the bullet points in his handout Exhibit I. He said that the designation is a federal rulemaking action, not a state action. Presently North Carolina is designated for attainment for all the previous ambient air quality standards. This is a requirement of the Federal Clean Air Act.

Mr. Nicholson said that the standards are particulate matter or PM fine, very small particles that get deep into the lungs and cause health effects, some of which are quite severe. Fine particles have been attributed to causing premature death and are a respiratory as well as a heart issue. Typically they are secondarily formed particles and in the eastern U.S. is usually ammonium sulfate, hence the reason to control sulfur dioxide from power plants. There is ammonium nitrate, which comes from NOx, so NOx control also helps fine particle reductions. There are also organic particles from various organic aerosols, and there are directly emitted fine particles from diesels.

Mr. Nicholson said that PM fine is a very serious issue from a health standpoint as is ozone. Ozone is formed secondarily typically from volatile organic compounds or VOCs and NOx, one of the major pollutants the Clean Smokestacks Act is focusing on.

Mr. Nicholson said the state's role in designations is to make recommendations to the US EPA. It is recommendations on the boundaries of the areas to be designated.

Mr. Nicholson said the recommended action on PM fine is due to EPA by December 21, 2004. For ozone the recommendations were presented July 15, 2003 and the final rulemaking is due by EPA by April 15, 2004. These recommendations submitted by the State were made on behalf of the Governor. Secretary Ross submitted those in consultation with DOT, Commerce and Agriculture.

Mr. Nicholson said the requirements for setting boundaries is areas with a measured violation and the areas contributing to the violation. We monitor more locations than many states.

Mr. Nicholson said that EPA's presumption is that all Metropolitan Statistical Areas (MSA)s and all counties of MSA and whole counties be measured. Areas smaller than EPA's presumption can be measured based on EPA's published guidance.

Mr. Nicholson said that the basis for North Carolina's recommendations came from urban versus rural, contributing to problem or not, whether existing controls were there. His Department did not fully recommend the full areas as EPA has as their presumption. For Ozone they are recommending 12 full counties and 24 partial counties as opposed to the sum of that in whole counties.

Mr. Nicholson said that North Carolina supports areas less than EPA's presumption through extensive technical analysis and documentation, existing measures put into place, and air quality forecasting. North Carolina can control emissions without designation of non-attainment.

Mr. Nicholson said that no additional control strategy requirements are expected and attainment should be fulfilled by 2007 except for a couple of monitors near Charlotte and those will be in attainment by 2010.

Mr. Nicholson said that the issue EPA has with NC's ozone and PM fine recommendations is the size of the designated area. North Carolina followed the process of public meetings, meetings with local officials, consulted and concurred with DOT, and the Departments of Commerce and Agriculture.

Mr. Nicholson said the consequences for areas designated as non-attainment are that of new source review (NSR) for major new or modified industry, best control technology, offset emissions, conformity analysis required; implication for Federal highway funds, both transportation and general, and an impact on economic development.

Mr. Nicholson said that the basis for EPA's rejection of North Carolina's recommendations is primarily the desire to be uniform across the country and secondary growth issues. Letters are being written and meetings are being held to try to change EPA's mind.

Mr. Nicholson said there are currently only two sites in the state that are violating the standard—Hickory and Lexington. They are trying to be consistent with the ozone recommendation and received input from local government officials in those areas.

Mr. Nicholson said that the basis for limiting the monitoring to those areas is the fact that they are the only counties in non-attainment

Mr. Nicholson continued by saying that attainment has been met in Asheville and some of the higher elevations.

Senator Swindell said that he is pleased with the way DENR is working with Nash and Edgecombe counties. Nothing can be controlled with what happens on Interstate 95, and at the same, when you look at what has happened and why the Atlanta office of EPA has chosen to come back and target Leggett as a monitoring station, is very unfortunate because there are some things being done right down there.

Mr. Nicholson agreed with Senator Swindell.

Representative Gibson asked Mr. Nicholson if there is an argument with DENR and EPA over this.

Mr. Nicholson said there is a very big argument.

Representative Gibson asked Mr. Nicholson if any other states are in this predicament and are joining our argument with EPA.

Mr. Nicholson said there are a few other states and we are one of the few states that took advantage of the guidance issued by EPA to look at partial counties. Georgia did propose a number of counties but whole counties be admitted from the Atlanta MSA. EPA approved some partial counties in Maine but the argument there is OMB, who determines metropolitan statistical areas, defines an MSA by townships, not by county boundaries.

Mr. Nicholson said that we went to townships for our exclusion, townships being a legal fraction of a county, and did whole townships other than Leggett and Taylorsville. There are a few other states, Tennessee, South Carolina, North Carolina, Georgia and Arizona who are in the same boat.

Mr. Nicholson said that one of the reasons EPA said they are reluctant to let us have what we have requested in our recommendations is if we get it they will also have to address Pennsylvania's and Ohio's request to reduce some of the sizes of their counties.

Representative Gibson asked if Pennsylvania and Ohio have the same number of monitoring stations that we have and can they do what we have done here.

Mr. Nicholson said he could not answer for those states, but he said they have the minimum sufficient monitors. Georgia has fewer monitors than we have for half the population per geographic area. So, in a sense, we are being penalized for trying to do the modeling on the ozone.

Mr. Givens asked Mr. Nicholson if the EPA doesn't move substantially in the direction that the State has recommended, what are our options.

Mr. Nicholson said that perhaps this would open it up for litigation if this is the course the State wants to follow.

Mr. Bernstein was asked to respond to this. He said the action the EPA takes to finally designate those areas would open them up to a challenge under Section 307 of the Clean Air Act.

Senator Kinnaird asked Mr. Nicholson what we are doing to take a global look at the economic consequences and what is being done to regulate small trucks and the large 18-wheelers.

Mr. Nicholson said that the 2007 heavy-duty diesel truck standards will be very crucial for North Carolina. The State is very supportive of the federal rule on this and has been for quite a while. This will make a huge difference in lowering NOx emissions. The SUV's will be coming under a tighter regulation under the new federal standards. As far as the health costs, our state plan to achieve the standards in this short timeframe is taking this into account because we are going to obtain the health based standards.

Representative Weiss asked Mr. Nicholson what the impact of hybrid vehicles and alternative fuels will have on this problem.

Mr. Nicholson said that anything that gets us to lower emissions the better off we will be. One thing we need to be very careful about with alternative fuels is which choice of fuel we use because not all alternative fuels are necessarily cleaner. Gasoline powered cars are very clean. The IM program is necessary to make sure those cars are kept very clean and function properly.

Mr. A. Preston Howard, Jr., P.E., President, Manufacturers and Chemical Industry Council of North Carolina, gave his remarks to the Commission. A copy of Mr. Howard's remarks is listed as **Exhibit J**.

Mr. J. David Farren, Senior Attorney, Southern Environmental Law Center gave his remarks on Ozone non-attainment.

Mr. Farren said that on behalf of the environmental community and citizen groups in North Carolina and other states in the southeast, he would like to address this boundary issue from a slightly different perspective. This is a major public health issue in North Carolina where we have three of the twenty-five most ozone metropolitan polluted areas in the United States. Charlotte, for example, is the ten worst metropolitan polluted area in the U.S.

Mr. Farren said that ozone is a lung-scarring irritant and results in multiple asthma attacks across the state per year. It is also a quality of life issue, which ultimately will affect economic recruitment just as much as some of the factors that have already been discussed.

Mr. Farren said that when you look at the public health cost in North Carolina, the cost of complying with air pollution control requirements is much less than the public health costs. For example, the OMB report that President

Bush put out last year, the cost of cleaning up air pollution problems is roughly one-fifth to one-seventh the cost of the health effects. So, having air pollution controls in place saves our economy about $150 billion. In North Carolina, this is about a $5 billion savings.

Mr. Farren said that ozone is a little different than some of the other pollutants in that it is a very pervasive pollutant that spreads across wide areas. This is because ozone comes from a number of sources: power plants, other industry, automobiles, machinery equipment and is a very pervasive problem.

Mr. Farren said it is very important that the entire metro areas be included as part of the solution to clean up the ozone problem.

Mr. Farren said the submission by North Carolina, in some cases, left out some of these rapidly growing areas, it left out areas with power plants and other facilities that clearly contribute to ozone pollution and contribute to the problem across the state.

Mr. Farren said that another problem with narrow boundaries is that areas outside the boundaries will not have any incentive to be part of the solution. In addition to EPA's recommendation, it is interesting to not that the early impact program referred to earlier that the Triad is participating in, for their ozone abatement plan, they are looking at whole counties.

Mr. Farren said that if we don't comply with EPA by these deadlines, we are going to be facing more severe sanctions and penalties than what we are going to have to do with the non-attainment areas.

Mr. Farren concluded by saying that EPA's position on this is well within reason and taking any other approach would be shortsighted both for public health and economic development for the future of North Carolina.

Senator Kinnaird said she would like to see someone do another study on jobs versus environmental regulation.

Senator Horton asked what other fast growing areas should be included in the delineation.

Mr. Farren said that most of the counties around Charlotte, in the Triad area and in the Triangle where the State recommended partial counties, they are fast growing areas and have a number of commuters.

Senator Horton asked if this includes Caswell and Person counties.

Mr. Farren said that portions of those counties fit the demographics.

Senator Swindell asked Mr. Farren if it would be fair to say that maybe most of North Carolina should be within the ozone non-attainment areas.

Mr. Farren said no. If you apply EPA's guidance faithfully, what EPA came back with on November 2, 2003 is a reasonable compromise.

Senator Swindell said that the reason he says this is because Edgecombe County has a monitor set up by choice but it is puzzling to see that other counties within the Raleigh-Durham area and the Piedmont that should be included.

Mr. Farren said that anywhere you have a monitor showing non-attainment; you have an indication that there is a public health problem.

Mr. Overcash was called back to present a report on proposed modification of the rule setting out the acceptable ambient level (AAL) for hydrogen sulfide under rules adopted by the Environmental Management Commission (EMC) that govern the emission of toxic air pollutants. A handout accompanying Mr. Overcash's presentation is listed as **Exhibit K**.

Mr. Overcash said that he would be speaking about a process that was underway to adopt a new standard in North Carolina for hydrogen sulfide. There is currently an air toxics program in North Carolina that regulates 105 different compounds, one of which is hydrogen sulfide. The current standard was put into place in 1990 based on short term effects of high level exposure and set at 15 parts per billion.

Mr. Overcash said that in 2001, the Division did some studies and found there was some hydrogen sulfide in areas that had not previously had a problem. The Secretary's Scientific Advisory Board (SAB) was asked to look at the literature and see if there was new literature available to readjust that standard. They discovered new literature and came up with recommendations for the Division on new standards.

Mr. Overcash said that all of the numbers in the new standards are more stringent than the one in place today. The EMC had given directions to have number they could chose from when a change was made in the acceptable ambient levels.

Mr. Overcash said that in early 2003, the EMC was given information provided by the SAB and emission sources that would be affected by any changes to the AAL. In May, those options were taken to the EMC, which added some additional options to be taken to hearing. Also, as part of the changes to the rule and due to some potentially high costs of new controls of certain facilities, there were some options included in the proposed rule to give a waiver to some facilities on their wastewater treatment plant emissions.

Mr. Overcash said that in late October and early November 2003, two public hearings were held in North Carolina to the proposed H2S standard, one in Winterville and one in Asheville. Numerous comments have been received on the changes to the rule. From November 2003 until recently, hearing officers have been reviewing those comments and are preparing to bring a final recommendation to the EMC in March for a vote to decide what the new standard will be.

Mr. Overcash said that if the EMC approves the option in March for a new rule, the new rule would be taken to the RRC in April 2004. If the RRC approves the rule and there are less than 10 objections, they plan to make the rule effective in May 2004.

Senator Albertson asked Mr. Overcash who the effected facilities are.

Mr. Overcash said there are five pulp and paper plants affected and one fertilizer manufacturing facility.

Senator Albertson asked Mr. Overcash what the cost would be for the companies to do these upgrades with the new rules.

Mr. Overcash said that they are in the tens of million of dollars.

Senator Forrester asked Mr. Overcash if there is any public health problem associated with hydrogen sulfide emissions as with ozone or is it a quality of life issue with odor from that product.

Mr. Overcash said that H2S is a toxic pollutant that does affect people if they breathe it at very high levels and can be fatal.

Senator Forrester asked if the communities around the pulp and paper mills were affected by exposure to H2S or would it more likely be people who worked with it in a laboratory setting.

Mr. Overcash said he is speaking of exposures at plant level.

Representative Fox asked Mr. Overcash how we find out if the findings recommended from studies done in 1990 are correct or the findings we have today.

Mr. Overcash said there was quite a bit of literature available on H2S on the studies done in 1990 and there are some new studies that have come out since then that indicates that the number ought to be quite a bit lower than what it is. He said he believes that North Carolina has the highest number than any other state that is currently regulating H2S.

Representative Fox asked Mr. Overcash what the average other states are currently using for their standard.

Mr. Overcash said he did not know the average but if we took the lowest number that has been recommended, we would most stringent as any other state.

Representative Fox said it would be helpful if we could see the numbers from other states.

Representative McComas asked Mr. Overcash to put together a chart that would show this information for members of the committee.

Mr. Givens asked Mr. Overcash about the charts in his handout and what the asterisks stood for.

Mr. Overcash said the charts were copied directly out of the rule, so he could not tell him what the asterisks stand for, but told Mr. Givens he would get this information for him.

Mr. Givens asked Mr. Overcash to tell what the pros and cons are and the basis for exempting paper mills and wastewater treatment systems because of the cost and do paper mills emit hydrogen sulfide from sources other than their wastewater treatment system.

Mr. Overcash said that paper mills do emit hydrogen sulfide from sources other than their wastewater treatment systems. There is an economic analysis portion in the current rules. They can look at individual sources. Once a rule is put into place, a facility can plead a hardship demonstration to show it is not economically feasible to comply with the rule. In this case, they ask for economic information up front because they realize in the early process that some of these facilities would have to do some drastic reductions and would need to know what it would cost them. Therefore, they would need to get the cost information up front and is part of the reason that there are proposed waivers in the rule for these facilities.

Mr. Overcash said there are different options, also. One of the options is for that exemption to run out in 2007 and the other is open-ended. Part of what the new rule will require the facilities to do is to verify what their emission numbers are and provide more information on how they can treat their wastewater in a cost effective manner.

Representative Weiss said it would be helpful to know what percentages of the H2S are caused by pulp and paper mill emissions.

Mr. Overcash said that of the five facilities he referred to earlier, it is about 99 percent of the H2S inventory in the State from regulated, permitted facilities.

Representative Weiss commented that if we know it is a public health risk and that a large percent is coming from one place, we should also look at the health impact before we go exempting these industries.

Mr. Givens asked Mr. Overcash if any of these options provide for a phase in time for existing facilities.

Mr. Overcash said that there are different ways to trigger into the program. For existing facilities, if they have already triggered into the program for H2S, that new standard would become effective immediately and they would have to make a demonstration next time they took action on their permit. If a facility has never been triggered in before, the first time they make a modification that increases those emissions; they would have to make a demonstration of compliance. Other ways are if a facility has been required to

comply with their last MACT that triggers them into the toxic program. A new facility would have to demonstrate compliance upon issuance of a permit.

Mr. Givens asked Mr. Overcash of these five or six facilities that constitute 99 percent of the emissions, are they disbursed around the state or all in one geographic area.

Mr. Overcash said that five of the six are in the eastern part of the state and one is in the Asheville region.

Mr. Givens asked Mr. Overcash if, based on his experience in the public comment, are there any of the six options that are likely to draw less than ten objections or would be supported by the regulated industries.

Mr. Overcash said it was his understanding that regulating community would be happy with the higher number and some allowance for exemption.

Mr. Givens asked if this was reflected in any of the existing options.

Mr. Overcash said it was reflected in the existing options.

Mr. Givens said that if we go according to schedule, these rules would be subject to legislative review in the Short Session. If that is the case, it would seem advisable to come back at another meeting and spend more time with this and look at the fiscal note and have a more detailed explanation of the options under the question of what other state's standards are and to hear from representatives of interested parties.

Mr. Overcash said that the EMC will hopefully make a decision on this rule in March.

Senator Albertson said if he was a facility that had to spend million of dollars to comply, he might be resentful if he had to pay and someone else was exempt. He asked someone on staff or from DENR if there were any other areas where we require some people to pay and some are exempt because of the high cost associated with meeting the regulations.

Mr. Overcash said there is a provision in our temporary toxic rule to allow a facility to come and make an economic feasibility demonstration in compliance and there is a possibility for a facility not to comply to the letter of the law based on that showing.

Senator Forrester asked if industry was in favor of the higher numbers and not the lower numbers.

Mr. Overcash said that industry would be in favor of the higher concentration, 83 parts per billion. He referred members to the front page of Exhibit K for clarification.

Senator Horton asked Mr. Overcash how many North Carolina workers have had their health affected by this.

Mr. Overcash said he could not answer the question.

Senator Horton asked if there was anyone present at the meeting who could answer the question.

Mr. Givens said he thought this was an issue we should address at a later time.

Senator Dorsett referred to the back page of Exhibit K and asked if any attempt is made to evaluate objections made to the rule and determine the seriousness of those objections.

Mr. Overcash said that is the way the EPA process is set up and is state law.

Mr. Givens said this is a change made in the APA in 2003 in an effort to streamline the rulemaking process. Under the old process, no rule could become effective until the 31st legislative day in order to give any single member an opportunity to file a bill to object. That part of the process still exists however the rule can become effective if there are less than ten written objections from any person in the state.

Mr. Givens said that he believed there would be more than 10 objections. He asked Mr. Overcash if the numbers on the front and back of Exhibit K were the same numbers.

Mr. Overcash said that they were.

Representative Weiss said it was important to take a look at this more carefully and hoped that DHHS would respond to this as to what they believe is an acceptable level.

Representative McComas said that this issue would be revisited by the ERC at a later date.

Mr. Donnie Redmond, Jr., Assistant Chief, Planning Section, Division of Quality (DAQ), DENR, gave an update on the implementation of the inspection and maintenance program. A copy of a handout accompanying his presentation is listed as **Exhibit L**.

Mr. Redmond said there was legislation back in 1999 and 2000 that directed DAQ to change the test procedures used and to expand the program from nine counties to 48 counties.

Mr. Redmond said that the new test procedure is called on board diagnostics or OBD2, a new way to determine if a car is meeting the standards it should meet. On 1996 or newer cars, built with a special computer system and monitors, if the car itself determines that something is out of spec, it will put a code on the computer to tell what is wrong the car. If that malfunction would cause the emissions to be 1.5 times the emissions

standard, a light would come on to alert the owner that the car is emitting higher emissions than it should.

Mr. Redmond the first OBD test was performed in North Carolina in July 2002 and currently over 5,000 of these tests are being daily. The program is still in expansion and by the time it is complete, those numbers will double for performing the OBD test.

Mr. Redmond reported that there has been a very position reaction to the new OBD test. The inspectors like it because it is fast and easy. It also helps the technicians with the diagnosis of the car. The failure rate for the test is four percent compared with less than one percent with the old test.

Mr. Redmond said that our fail rate is consistent with that of other states.

Mr. Redmond said that the expansion from nine to 48 counties was in the statute. To date, there are 23 counties doing the OBD2 test and the next expansion is on July 1, 2004 for Buncombe, Cleveland, Granville, Harnett and Rockingham counties. On January 1, 2005 there will be another expansion.

Mr. Redmond said that on January 1, 2006 the expansion would be complete.

Mr. Redmond said that a lot of advance preparation had been done to lay the groundwork for this test and make citizens aware of the test and why it is being done.

Mr. Redmond said that DMV is busy licensing new stations and inspectors to perform this test and they are working closely with community colleges to train both the inspectors and repair technicians. The stations do have to buy their test equipment with six different vendors available to sell this equipment.

Mr. Redmond said that both DMV and DAQ have been doing a lot public outreach with radio ads and car care clinics to try to get the word out as to what to expect.

Mr. Redmond concluded by saying that the OBD2 introduction and inspection program is going well. The fail rates have been what has been expected and response has been good.

Senator Swindell asked Mr. Redmond if the equipment on the cars is going to change with the 2005 models and the testing equipment would then be obsolete.

Mr. Redmond said there are communication protocols for the emissions analyzers and with the newer model years, EPA is putting new communication software in them, which will require stations to do a software upgrade to their equipment, but the equipment would not be obsolete.

Senator Swindell said that he had heard the equipment was very costly and that it could not be converted over to the changes.

Mr. Redmond said that this was incorrect information and that they were working closely with industry association on their changes. The software updates are included in the price of the machine. Later, if changes are made to the statutes, software charges would have to be incurred.

Senator Weinstein asked Mr. Redmond what the cost to the consumer is for the new OBD2 test.

Mr. Redmond said the cost was about $6,000 for the OBD2 inspection machine. If extra diagnostic equipment or service contract is purchased, it could cost more, but the average cost is around $5,000.

Senator Weinstein asked Mr. Redmond what the customer is charged to do the test.

Mr. Redmond said the fee is set in the statute and is anywhere from $6.50 to $30.00, whatever they want to charge.

Senator Kinnaird asked if the shade tree mechanic is out of business.

Mr. Redmond said that there are waivers to protect people from this.

Representative McComas asked Mr. Redmond why the owner of the automobile has to take the time to go for an inspection when the onboard computer will do the job.

Mr. Redmond said that OBD3 will have a transponder that will call into the state with the problems but there is a lot of legal ramification concerning this. One of the reasons for inspection is that if the light comes on, a person may or may not get the car repaired. Inspection forces this.

Representative McComas asked if one of the hoses with the error emissions should break or one of the sensors should fail, and the car stopped running, why would you need to have an inspection.

Mr. Redmond said that with computerization some cars would still be drivable although the emissions would not be operating properly.

Senator Dorsett asked what criteria were used to determine which counties to expand the test to.

Mr. Redmond said that the counties were listed in the statute as part of the bill. A number of factors were used including anticipated population growth, degree of traffic involved and commuting patterns.

Mr. Givens said that the counties and sequence were enacted as recommended by DAQ when the bill passed in 1999 and there is a provision

in the statute that after 2006, the EMC can adopt rules to add additional counties. The same criteria will be used to determine this.

Mr. Givens also added that the equipment cost for the new OBD testing device at $6,000 is contrasted with the old testing equipment priced at $20,000 to $30,000.

Representative Gibson asked Mr. Redmond how the phone call issues are currently working out with the equipment calling into the state system.

Mr. Redmond said he is not aware of any current problems with that.

Ms. Charlotte V. Jesneck, Head, Inactive Hazardous Sites Branch, Superfund Section, Division of Waste Management, DENR, gave a status report on the Inactive Hazardous Sites Program. A copy of this report is listed as **Exhibit M**.

The Inactive Hazardous Sites program was established by the legislature to identify, control and correct property contaminated with hazardous substances. To date, 1816 sites have been catalogued, 416 sites have all work complete and are now closed. There are 95 sites currently undergoing program assessment and cleanups being conducted by owners and responsible parties, and 33 sites have been identified without responsible parties. These sites also have higher priorities such as being residential or have drinking water supplies threatened. These 33 sites require various levels of work.

Ms. Jesneck reported that at these sites, three cleanups have been completed using IHS funds. These sites include a battery disposable with lead contamination at a residential area in Concord, some lead contamination from another battery dump on agricultural land in Chadbourn in Columbus County where crops had to be banned from the market because of lead content, contamination from pesticide disposal on church property in Nashville in Nash County. Funds have also been spent to abate immediate risk posed to the City of Fayetteville's drinking water supply. Groundwater contamination at the bankrupt Tex Five facility in Fayetteville has migrated across the property lines onto the City of Fayetteville's water plant property and has come in contact with their below ground finished drinking water holding tank.

Ms. Jesneck went on to say that the contamination not only threatens the drinking water supply by coming in contact with the tank, but is also in close proximity to their drinking water intake on the Cape Fear River.

Ms. Jesneck said that some of the cleanup funds were used to construct a below ground barrier to divert the contaminated water from moving toward the tank and installed extraction wells to remove contaminated groundwater around the tank and have been successful in significantly reducing contamination around the tank.

Ms. Jesneck said that monies have also been used from the Fund to assess the extent of the source of contamination on the Tex Five property.

There is hope of obtaining funds from a bankruptcy settlement. However, except for a minor amount of money left in the cleanup fund dedicated towards a contract for monitoring the city's drinking water and groundwater in that situation, while they are waiting on monies from the bankruptcy settlement, the IHSF is now deplete of revenue.

Ms. Jesneck said they are currently aware of 35 to 50 sites where there are no responsible parties. Many of these are residential areas. There are also widespread areas such as Paw Creek in Charlotte and several areas in and around Gastonia that have numerous drinking water wells but numerous sources of contamination.

Ms. Jesneck said that in addition to the chemical spills and disposals, about 750 old unlined landfills have been catalogued and need attention. Based on data from USEPA and from other sources, the majority of these are expected to have groundwater contamination with hazardous substances.

Ms. Jesneck said, that with the limited information and funds available, research was being done to search the locations to determine their use. And, based on data from 39 counties completed so far, 72 percent either have a residence, school, daycare, church, or private drinking water well within 1000 feet of the landfill. Particular statistics are that in each of Duplin, Harnett, and Nash counties there is a drinking water well within 1000 feet of the landfills. Fifty percent of the same landfills have a residence, school, daycare or church within 1000 feet, and all three sites in Pender County have a well within 1000 feet.

Ms. Jesneck said that while evaluation and some creative use solutions to solve some of the exposure concerns is being done, it is likely that many of the sites will require some special abatement measures to come up with a final public health measure of protection. All immediate concerns are being referred to the US EPA Federal Superfund Program for review.

Ms. Jesneck said that most of these landfills will not be considered a serious enough threat to a large enough number of people to get EPA's attention for sampling.

Ms. Jesneck said that federal funds have been obtained to fund one full-time position to help locate and determine the use of these old landfills in the other 61 counties. At the level of funding currently available, the work is expected to be complete within five years. This position would also be tasked with developing safe redevelopment options, possibly as Green space.

Ms. Jesneck concluded by saying that sampling would only be done at those sites that are the most threatening. To get more done, efficiencies are being sought in the program with the use of private environmental consulting firms to do the state's oversight role at lower priority voluntary cleanups. The legislature has authorized the use of such firms in the past.

Representative Gibson said that he would defer his questions to staff.

Mr. David J. Lown, Head, Federal Remediation Branch, Superfund Section, Division of Waste Management, DENR, gave a report of Superfund cost share fund expenditures for cleanup of sites on the National Priorities List (NPL). A copy of fund expenditures for North Carolina's 10 Percent Share for July 2003 and January 2004 are listed as **Exhibit N**.

Mr. Lown said that there are 29 NPL sites in North Carolina, 13 without responsible parties that can be cleaned up using the federal Superfund. If these funds are used for cleanup, EPA pays 90 percent of the cleanup cost and the state's cost share fund pays 10 percent.

Mr. Lown said that whenever payment is made from the cost share fund to EPA, a report to the ERC is required.

Mr. Lown said that $87.5 million is being used for cleanup of 250,000 cubic yards of contaminated soil and over 300 million gallons of contaminated groundwater. The cost share fund amount pays out $8.7 million.

Mr. Lown listed some examples of cleanup sites: $7.5 million for cleanup of the North Belmont PCE site in Gaston County, $3.9 million for the Davis Park Road TCE site, also in Gaston County. The cleanup involves connecting Groundwater users to city water lines and treating and monitoring contaminated groundwater. In Gaston County, for site cleanups estimated over $10 million, the cost share fund commits a little over $1 million.

Mr. Lown said the present Fund balance is over $5 million. Most of this balance is committed to cleanups now underway. Presently there is $1.7 million available for new cleanups.

Mr. Lown said that there are also possible new cleanups, sites eligible for the new federal Superfund that are being investigated with cleanup options being considered. Barber Orchard, in Haywood County, is a residential area where the soil and groundwater are contaminated with pesticides. EPA and the Division of Waste Management are presently considering cleanup options for this site and the cost is estimated to be between $22 and $36 million. This would require $2.2 to $3.6 million from the cost share fund.

Mr. Lown listed other sites that are being considered for cleanup which are: Reason Chemical in New Hanover County, Ward Transformer Site in Wake County and RAM Leather site in Charlotte. The cost for cleanup of these sites should be around $2 million with cost share funds being responsible for $100,000 to $200,000 per site.

Mr. Lown said that according to superfund law, ten years after a groundwater remediation system is declared operational and functional, the cost share fund must take over 100 percent of the operation and maintenance (O and M) costs. Presently the operation and maintenance costs are estimated between $200,000 and $250,000 per site.

Mr. Lown concluded by saying that the first O and M site would be transferred to the state in 2008 with other being transferred in following years.

Annual O and M costs in 2008 are $200,000. Based on present commitments, the total of $9.5 million of o and m costs will be required through 2020.

Representative McComas asked Mr. Lown if the owners of the super fund sites were still responsible for the cleanup.

Mr. Lown said this was correct.

Senator Horton asked Mr. Lown to what extent are these sites remediated.

Mr. Lown said that EPA does a risk assessment and the guidelines set out by EPA are used to clean sites to 10 of the minus six risk levels.

Senator Horton asked Mr. Lown if this found as standard through the nation.

Mr. Lown said that in North Carolina, a compromise would be done with what the state requirements are and those of EPA.

Senator Horton asked if the orphan sites would get a higher degree of cleanup than the negotiated sites.

Mr. Lown said it would be the same negotiation done on every site.

Mr. Bruce Nicholson, Manager, Brownfields Program, Division of Waste Management, DENR, gave a report on the effectiveness of the Brownfields Property Reuse Act. A copy of Mr. Nicholson's remarks, a copy of the annual report and list of site locations for the Brownfields Program are listed as **Exhibit O**.

Senator Horton asked Mr. Nicholson if only 15 sites were licensed in 2003.

Mr. Nicholson said this was correct.

Senator Horton asked Mr. Nicholson how many people were employed in the Brownfields Program.

Mr. Nicholson said that there is three technical staff positions held in the Brownfields Program, including him.

Senator Horton asked Mr. Nicholson what the reason for the delay is in issuing Brownfields permits.

Mr. Nicholson said he was not aware it was taking so long for these agreements to be issued. A process of start to finish takes approximately six months to one year.

Representative McComas asked Mr. Nicholson if the negotiated fees covered the cost of staff running the program.

Mr. Nicholson said the program has not had to rely on increasing fees or fees greater than $2,000 in the state statute largely because they have been able to work with EPA and grant monies used for funding.

Representative McComas asked Mr. Nicholson if North Carolina is one of the few states that have taken the course of not releasing liability to owners of Brownfields properties and therefore slows down the process.

Mr. Nicholson said that our process in North Carolina is unique in that we treat prospective developers who did not cause the contamination differently than a polluter. In the Brownfield agreement, the only entity eligible under our state statutes are entities that did not cause or contribute to the contamination. These entities can receive a liability protection.

Mr. Givens said that nobody is providing a complete release from liability of responsible parties in Brownfields agreements. There are some options for release of liability.

Mr. Dexter R. Matthews, Director, Division of Waste Management, DENR, gave a report on the options as to the future direction of Brownfields and other remediation programs.

Mr. Matthews said that with responsible parties, both inactive hazardous sites and cost share programs have been successful in getting cleanups. Where there has not been a responsible party, state resources have been used to address those sites.

Mr. Matthews said that the HIS fund is deplete of funds and the NPL fund will be deplete by the end of 2004.

Mr. Matthews said that we are seeing a very successful program with the Brownfields.

Mr. Matthews said that in September 2002, a letter was sent out to all local health departments across the state, that site new private wells, to alert them to the issue of contaminated sites across the State.

Mr. Matthews said that the Division has established goals for active remediation that would involve programs in hazardous waste, solid waste, the underground storage tank program, the dry cleaning solvent cleanup program and also the inactive sites in the NPL.

Mr. Matthews said that one-year and five-year goals for the cleanup of 11,535 sites currently on inventory. In the one-year goal, they are looking for 408 sites to be cleaned up and the five-year goal, 2,027 sites. Those goals are part of a strategic plan for the Department as well.

Mr. Matthews said that the Brownfields program has also been reorganized. This program was previously in the Superfund section and dealt only with inactive sites. The Brownfields program was brought to the Division of Waste Management level and look at other remediation programs to expand what the Brownfield successes had been.

Mr. Matthews said that they had been successful in gaining federal funding for the underground storage tank cleanup program in conjunction with the Brownfields program.

Mr. Matthews said the two primary challenges in moving these programs forward is brining clarity and consistency in state law for liability of innocent property owners and potential purchasers and to provide a funding source for emergency actions and cleanup of those sites where no viable and responsible party exists.

Mr. Matthews said that Senate Bill 908 provides an avenue to begin meeting these challenges.

Mr. Matthews said that the DWM is currently working with Senator Hartsell on language in the bill to further cleanups and redevelopment of cleanup of these sites.

Mr. Matthews said SB908 provides mitigation payments that must be paid by a person that is responsible for groundwater contamination until the site is remediated. The Department may use the fees for such purposes as the extension of water lines to those sites with contaminated water supplies, emergency removal actions and cleanup of sites where the responsible party does not exist or is not financially capable of cleanup. The bill further seeks to bring clarity to the issue of liability for someone purchasing property that is contaminated.

Mr. Matthews said that SB908 would also allow UST sites to come under the Brownfields program.

Mr. Matthews added that there is currently a question as to whether the mitigation payments in the current bill are a fee and are therefore eligible in the short session.

Mr. Matthews said that DWM might have to come back to the ERC for draft legislation.

Mr. John N. Morris, Director, Division of Water Resources, DENR gave a report on water conservation measures being implemented in the State and incentive programs and other voluntary programs that can help foster water conservation and reuse. A copy of his report is listed as **Exhibit P**.

Mr. Morris said there are two kinds of water conservation. The first kind of water conservation is those things that are needed on a short-term emergency basis. The other kind of water conservation is water use efficiency.

Mr. Morris said that Section 5 of House Bill 1215 asked DWR to report on voluntary and incentive measures that could bring about greater water use efficiency. A list of representatives of all types of water users was developed and a workshop was conducted. This was followed up with e-mail messages to gather further information.

Mr. Morris said another source of information was the water supply plans developed by 600 local governments.

Mr. Morris said that in Exhibit P list most of the cost effective water efficiency measures that have been adopted.

Mr. Morris said that water use efficiency is a very practical issue for North Carolina. If we start to use water more efficiently, we can extend our existing water supply and make water available for healthy economic growth.

Mr. Morris added that by being more efficient with water use, we lower our impact on the environment.

Mr. Morris said that in his report, he had tried to recommend what would be the most practical approaches at achieving water use efficiency. What they are recommending the representatives of industry, agriculture and municipalities to review their recommendations and to work together toward a consensus of what the most practical and realistic approaches are to take in North Carolina.

Mr. Morris said the input would be compiled into another report to bring before the ERC.

Mr. Morris said that another aspect of HB 1215 is Section 3. Section 3 deals with the short-term emergency response water conservation. This part of the bill directs the EMC to adopt an administrative rule that would set minimum standards of water conservation during a drought. This applies to all kinds of water users.

Mr. Morris said that the legislative motivation was during the 2002 drought with the lack of the way communities approached the drought. They are currently working with an advisory committee to get their input and come up with the most effective way to handle emergency water conservation.

Mr. Morris then gave a report on water supply planning. A copy of the status of water supply planning for October 1, 2002 through August 31, 2003 and a report on What North Carolina Needs to Do to Provide Water Supplies for Future Needs is listed as **Exhibit Q**.

Mr. Morris said that water supply planning needs to be put in context. What we need in North Carolina is the right combination of three things. First, we need the right kind of monitoring of our water resources. We need good data on the ability of water and good data on how much water we are using

and withdrawing from streams and rivers or groundwater and how that use of water is impacting the resource.

Mr. Morris said that secondly, we need good planning. Planning builds on the good data and projects our need of water into the future and seeks the best solution to provide those future water needs.

Mr. Morris said that the third aspect is regulation. Regulation is needed to assure that everyone has fair access to water resources and to allocate water among users if there is a shortage.

Mr. Morris said that with regard to monitoring groundwater, there has to be an understanding of the nature of the underground formations. Underground there are layers of various types of geological material that has been deposited over time. Each of these layers has its own distinctive ability to store and transmit water. Data is taken from over 500 monitoring wells over the state to tell the status of our groundwater.

Mr. Morris said that of the three components for water supply planning, planning is the one that is on the most critical path right now. We have an excellent plan authorized by the actions of the General Assembly. For example, HB 1215 was passed and the Drought Management Council was formed. This council pulls together all of the interest groups in water supply planning to monitor the drought and get good information out as to what to expect and what actions need to be taken to protect water supplies.

Mr. Morris said that under our legislation in North Carolina, local governments are required to do local water supply plans. There are about 600 local governments who do this. The plans are updated every five years.

Mr. Morris said that the way the process works, guidelines are provided to local governments, workshops are held and assistance is provided in preparing the plans.

Mr. Morris added that they are reviewed and approved by the Division of Water Resources and local governments adopt plans. This information is posted on a website.

Mr. Morris said that the planning process and the data that results from it are unmatched in any other state.

Mr. Morris said that plans have been completed for the Cape Fear River Basin and are posted on a website which is listed in the handout. The Yadkin and Catawba basins will be the next plans completed.

Mr. Morris concluded by saying that we need to take water supply planning to the next level to assure that we are doing what we need to do to have sustainable water supplies for the future. If we do it right, we can make sure that water supply is not a restraint to having a healthy economy in the future.

Senator Albertson commended Mr. Morris on the efforts of the Department in their planning for any future problems that we may encounter.

Mr. Givens thanked members for their attendance.

Representative Gibson asked members to read their reports and to come forward with any questions they may have. He urged members to continue their good attendance at the meetings.

Mr. Givens said that he would be polling members as to their interest in a field trip to the Belews Creek steam facility on Friday 26 March 2004, their interest in a field trip for the 22 and 23 April 2004 to either Brevard and Dupont Forest or to the Chatham County region, and whether they would be available to meet on Tuesday 20 April 2004 for a business meeting.

Representative McComas suggested to Mr. Givens if we should schedule an official meeting to take up some more items on the agenda, especially regarding air quality.

Mr. Givens said that if we do have a field trip on 22 and 23 April, there would be a business meeting for at least two hours to cover land conservation and a half-day business meeting on Tuesday 20 April 2004.

The meeting was adjourned at 3:20 p.m.

Representative Daniel McComas
Presiding Co-Chair

Mary R. Watson
Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Reports that are required by law to be made to the Commission – read only
EXHIBIT E:	Spreadsheet prepared by the fiscal research division, which shows all the funds that have been transferred from various special funds within DENR to the General Fund to balance the budget for the past four fiscal years
EXHIBIT F:	Quarterly report by the Environmental Management Commission (EMC) as to its operations, activities, programs, and progress during 2003
EXHIBIT G:	Report on the status of petitions to the Administrator of the United States Environmental Protection Agency (EPA) that may be filed by North Carolina under Section 126 of the federal Clean Air Act for purposes of reducing interstate transport of ozone and its precursors
EXHIBIT H:	Report on where the state is in the rulemaking process for the December rule, the new source review rule that was made final by EPA in December 2002
EXHIBIT I:	Report on the process and status of designation of non attainment areas to comply with the revised national ambient air quality standard (NAAQS) for fine particulate matter (PM2.5)
EXHIBIT J:	Comments by Preston Howard on behalf of MCIC on the process and status of designation of non attainment areas to comply with the revised national ambient air quality standard (NAAQS) for fine particulate matter (PM2.5)
EXHIBIT K:	Report on proposed modification of the rule setting out the acceptable ambient level (AAL) for hydrogen sulfide under rules adopted by the Environmental Management Commission (EMC) that govern the emission of toxic air pollutants
EXHIBIT L:	Presentation by Donnie Redmond on update on the implementation of the inspection and maintenance program

EXHIBIT M:	Status report on the Inactive Hazardous Sites Program Presented by Charlotte Jesneck
EXHIBIT N:	Handout: Fund expenditures for North Carolina's 10 Percent Share for July 2003 and January 2004
EXHIBIT O:	Three handout: Mr. Nicholson's remarks, a copy of the annual report and list of site locations for the Brownfields Program
EXHIBIT P:	Interim Report on Implementation of House Bill 1215 presented by John Morris and Report on Water Conservation and Water Use Efficiency
EXHIBIT Q:	Report on the Water Supply Planning Program and a Report on What North Carolina Needs to Do to provide Water Supplies for Future Needs – John Morris

February 24, 2004 ERC Meeting
EXHIBIT A

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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17 February 2004

TO: Interested Parties – Environmental Review Commission

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meeting; Additional Information**

COMMISSION MEETING:

After evaluating the number of agenda items that are appropriate for presentation in February, the Environmental Review Commission meeting will be held on one day rather than two. **Accordingly, the Environmental Review Commission meeting will be held at 9:30 a.m. Tuesday 24 February 2004 in Room 643 of the Legislative Office Building in Raleigh**. Please be prepared to meet until late afternoon. The Commission will not meet on Wednesday 25 February 2004.

At this meeting, the Commission will hear reports from State agencies, consider studies for which the Commission is responsible, discuss topics to be considered at future meetings, and attend to other matters. Listed below are anticipated agenda topics for this meeting.

1) Report on the activities of the Environmental Management Commission (G.S. 143B-282(b)

2) Continuation of the discussion of development and implementation of rules and programs to control stormwater runoff

3) Discussion of current State and federal air quality issues

4) Report on the progress in implementing the motor vehicle inspection and maintenance (I/M) program

5) Annual report on the Inactive Hazardous Sites Program (G.S. 130A-310.10)

6) Report of Superfund cost share fund expenditures for cleanup of sites on the National Priorities List (S.L. 1999-237(15.6)(b))

7) Annual report on the Effectiveness of the Brownfields Property Reuse Act (G.S. 130A-310.40))

8) Discussion of the future direction of the brownfields and other remediation programs

9) Interim report on water conservation measures being implemented in the State and incentive programs and other voluntary programs that can help foster water conservation and reuse (S.L. 2002-167, Sec. 5)

10) Annual report on the progress of water supply planning (G.S. 143-355(n))

11) Any other matters that were listed in the meeting notice of 6 February 2004 or that were discussed during the staff planning meeting held on 10 February 2004

SCHEDULE OF FUTURE MEETINGS:

Below is a schedule of meetings of the Commission for March through May 2004. Please note the following:

1. This schedule provides for two-day meetings in March and April. In some months it may be desirable to have a two-day meeting to accommodate the workload. This also allows for the possibility of one or more out of town meetings that could include field trips. Thus this schedule is tentative and subject to adjustment. For planning purposes, however, please reserve these dates.

2. Meetings normally begin at 9:30 a.m., include a lunch break, and run until mid-afternoon. Please plan on meeting from 9:30 a.m. until 3:30 p.m.

3. To facilitate development of the agenda for meetings of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel holds informal planning meetings for staff and interested parties. Commission members are not expected to attend these meetings.

4. The 2004 Regular Session is scheduled to begin at 12:00 noon on Monday 10 May. The Commission normally meets shortly after the beginning of the session to complete work on legislative proposals prior to the commission/committee bill request deadline, which in 2004 is 4:00 p.m. Wednesday 12 May. The Tuesday 11 May meeting date is tentatively scheduled for this purpose.

Commission Meeting	Staff Planning Meeting
9:30 a.m. Thursday and Friday 25 and 26 March	10:00 a.m. Friday 12 March
9:30 a.m. Thursday and Friday 22 and 23 April	10:00 a.m. Tuesday 13 April
9:30 a.m. Wednesday 5 May	
2:30 p.m. Tuesday 11 May	

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Chronic Rainfall Working Group
2:00 p.m. Monday 9 February 2004 – 605 Legislative Office Building

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. Friday 27 February 2004 – 605 Legislative Office Building

Stormwater Management Working Group
10:00 a.m. Friday 5 March 2004 – 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel at (919) 733-2578.

February 24, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 2-24-04

Name of Committee — Date

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
ZEB ALLEY	ALLEY ASSOCIATES
KEN MELTON	" "
Doug Cassiter	NC Septic Tank Assoc
Eddie Caldwell	Hafer + Caldwell, P.A.
Cam Cover	BPMHL
Rick Zechini	NC Assoc. of REALTORS
Lisa Martin	NC Home Builders Assn.
David Meredith	NC State Grange
Tommy Stevens	NC Pork Coun.
Manag Thompson	MCIC
Pricey Harrison	self

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 2-24-04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Preston Howard	NCIC
Beth Warren	AG's Office
David Jerose	Enrisco PO Box 548 Wake Forest 27588
Kim Hibbard	NC League of Municipalities
Anita Watkins	"
Dave Moreau	EMC
FRED LAMAR	NC AG's OFFICE
JERI GRAY	WRRI
Ross M. Smith	PCS PHOSPHATE
Warren Plonk	OSBM
Paul Stock	NC Beaches Assn.

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 2-24-04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
JAMES HAVEN	GLOBAL WARMING INITIATIVES 1017 MAIN CAMPUS DR. SUITE 3100 RALEIGH, NC, 27606
JACK Floyd	NC Utilities Commission - Public Staff Raleigh, NC
DAVID BARNES	Progress Energy Carolinas
Sharon Matthews	DOT - DMV
TAD BOGGS	NCDENR - ECOSYSTEM ENHANCEMENT PROGRAM
Gordy McCallie	NC Conservation Network
Keita Overcash	NC Div of Air Quality
Brock Nicholson	NC Div. of Air Quality
Dan Oakley	NCDENR
Jim Gulick	NC DOJ (AGO)
MARC BERNSTEIN	"

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION
Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Ken Pickle	DWQ
MIKE RANDALL	DWQ
Doug Lewis	DENR - BPA
Luanne K. Williams	NC DHHS
LINDA BIMER	US EPA
Linda Culpepper	DENR DWM
Mary Penny Thompson	DENR
Bradley Bennett	DENR - DWQ
Boyd DeJone	DENR-DWQ
T REEDER	"
DONNIE REDMOND	DENR DAQ
Gary Harris	NC Petroleum Czars
Doug Howey	" " "

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION
Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Sheila Holman	NCDENR
John Saydowski	Moore + Van Allen
Alan Klimek	NCDENR
Nancy Rees	SELC
John Morris	DENR
Robin Smith	DENR
Matt Beason	Capitol Group
Tom Beason	NC Environmental Defense
Elizabeth Ouzts	NCPIRG
Christine Wunsche	NCPIRG
David Mickey	BREAL

VISITOR REGISTRATION SHEET

DATE _____

ENVIRONMENTAL REVIEW COMMISSION ~~PLANNING SESSION~~

VISITOR: Please sign below and return to the clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Tommy Harrelson	Harnett Co.	893-9374
Paul Meyer	NCACC	715 2893
Carol Lawler	EGHS	810-1401
Jack Butler	Waste Mgm't.	733-2801
Charlotte Jesneck	DENR	733-2801
Sharon Johnson	DENR	715-6509
Keyes McGee	DENR	733-4398
Marshall Phillips	citizen	

February 24, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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AGENDA
9:30 a.m. Tuesday 24 February 2004
Room 643 – Legislative Office Building

1. Call to order
   Representative Daniel F. McComas, Presiding

2. Introductory remarks by Cochairs
   Representative Daniel F. McComas
   Representative Pryor A. Gibson
   Senator Daniel G. Clodfelter
   Senator Charles W. Albertson

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Quarterly reports by the Environmental Management Commission (EMC) as to its operations, activities, programs, and progress during 2003 (G.S. 143B-282(b)); Annual report on progress in developing and implementing basinwide water quality management plans (G.S. 143-215.8B(d))
   Dr. David H. Moreau, Chairman
   Environmental Management Commission

5. Update on issues related to the Phase II stormwater rules
   Robin W. Smith, Assistant Secretary for Policy and Planning
   DENR

Discussion of current State and federal air quality issues

6a. **Section 126 petitions** -- Status of petitions to the Administrator of the United States Environmental Protection Agency (EPA) that may be filed by North Carolina under Section 126 of the federal Clean Air Act for purposes of reducing interstate transport of ozone and its precursors
   James C. Gulick, Senior Deputy Attorney General
   Environmental Division, North Carolina Department of Justice

6b. **New Source Review** -- Proposed modification of rules governing Prevention of Significant Deterioration (PSD) and Non-Attainment New Source Review (NSR)

Equipment Replacement provision of the Routine Maintenance, Repair, and Replacement Exclusion as a result of the modification of federal air quality regulations by EPA that became effective 26 December 2003 (**the "Labor Day rule"**)

James C. Gulick, Senior Deputy Attorney General
Environmental Division, North Carolina Department of Justice

Baseline emissions determination, actual-to-future-actual methodology, plantwide applicability limitations, clean units, and pollution control projects as a result of the modification of federal air quality regulations by EPA that became effective 3 March 2003 (**the "December rule"**)

B. Keith Overcash, Director
Division of Air Quality, DENR

6c. **Interstate Air Quality Rule** -- Regulations proposed by EPA to reduce interstate transport of fine particulate matter and ozone

Marc D. Bernstein, Assistant Attorney General
Environmental Division, North Carolina Department of Justice

6d. **Utility Mercury Reductions Rule** -- Regulations proposed by EPA to modify national emission standards for hazardous air pollutants (NESHAP) for mercury

Marc D. Bernstein, Assistant Attorney General
Environmental Division, North Carolina Department of Justice

6e. **Fine particulate nonattainment** -- Process and status of designation of nonattainment areas to comply with the revised national ambient air quality standard (NAAQS) for fine particulate matter ($PM_{2.5}$)

Brock M. Nicholson, Deputy Director
Division of Air Quality, DENR

6f. **Ozone nonattainment** -- Process and status of designation of nonattainment areas to comply with the revised national ambient air quality standard (NAAQS) for ozone (the 8-hour standard)

Brock M. Nicholson, Deputy Director
Division of Air Quality, DENR

A. Preston Howard, Jr., P.E., President
Manufacturers and Chemical Industry Council of North Carolina

J. David Farren, Senior Attorney
Southern Environmental Law Center

6g. **Hydrogen sulfide** -- Proposed modification of the rule setting out the acceptable ambient level (AAL) for hydrogen sulfide under rules adopted by the Environmental Management Commission that govern the emission of toxic air pollutants

B. Keith Overcash, Director
Division of Air Quality, DENR

6h. **Motor vehicle emissions** -- Report on progress in implementing the motor vehicle inspection and maintenance program

Brian C. Phillips, Acting Supervisor
Mobile Source Compliance Branch, Technical Services Section, Division of Air Quality, DENR

LUNCH BREAK – Estimated for 12:30 p.m. to 1:15 p.m.

7. Annual report on the Inactive Hazardous Sites Program (G.S. 130A-310.10)

Charlotte V. Jesneck, Head
Inactive Hazardous Sites Branch, Superfund Section, Division of Waste Management, DENR

8. Report of Superfund cost share fund expenditures for cleanup of sites on the National Priorities List (S.L. 1999-237(15.6)(b))

David J. Lown, Head
Federal Remediation Branch, Superfund Section, Division of Waste Management, DENR

9. Annual report on the effectiveness of the Brownfields Property Reuse Act (G.S. 130A-310.40))

Bruce I. Nicholson, Manager
Brownfields Program, Division of Waste Management, DENR

10. Discussion of options as to the future direction of brownfields and other remediation programs

Dexter R. Matthews, Director
Division of Waste Management, DENR

11. Interim report on water conservation measures being implemented in the State and incentive programs and other voluntary programs that can help foster water conservation and reuse (S.L. 2002-167, Sec. 5)

John N. Morris, Director
Division of Water Resources, DENR

12. Annual report on the progress of water supply planning (G.S. 143-355(n))

John N. Morris, Director
Division of Water Resources, DENR

13. Commission discussion and announcements

14. Adjourn

SCHEDULE OF FUTURE MEETINGS:

Below is a schedule of meetings of the Commission for March through May 2004. This schedule provides for two-day meetings in March, and April. Two days have been reserved in these months because it may be necessary or desirable to have a two-day meeting to accommodate the workload.

This also allows for the possibility of one or more out of town meetings that could include field trips on one of the two days. Thus this schedule is tentative and subject to adjustment.

To facilitate development of the agenda for meetings of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel holds informal planning meetings for staff and interested parties. The schedule of these public Commission Staff Planning Meetings is also set out below.

Thursday 25 March 2004
Location: 643 Legislative Office Building
Staff Planning Meeting: 10:00 a.m. Friday 12 March 2004 – 605 Legislative Office Building

Friday 26 March 2004
Location: Possible field trip to Belews Creek Steam Station (Stokes County)
Staff Planning Meeting: 10:00 a.m. Friday 12 March 2004 – 605 Legislative Office Building

Thursday 22 April and Friday 23 April 2004
Location: To be determined
Staff Planning Meeting: 10:00 a.m. Tuesday 13 April 2004 – 605 Legislative Office Building (This meeting will also serve as the public Commission Staff Planning Meeting for the Commission meetings scheduled for 5 May 2004 and 11 May 2004.)

Wednesday 5 May 2004
Location: 643 Legislative Office Building

Tuesday 11 May 2004
Location: 643 Legislative Office Building

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. 27 February 2004 – 605 Legislative Office Building

Stormwater Management Working Group
10:00 a.m. Friday 5 March 2004 – 605 Legislative Office Building

Chronic Rainfall Working Group
2:00 p.m. Monday 15 March 2004 – 605 Legislative Office Building

February 24, 2004 ERC Meeting
EXHIBIT D

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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24 February 2004

MEMORANDUM

To: Members of the Environmental Review Commission
From: Tim Dodge, Research Assistant for Environmental Issues
Re: Reports distribution – 24 February 2004

Attached to this memorandum are copies of the following reports submitted to the Environmental Review Commission that are not scheduled to be presented orally at the 24 February 2004 Commission meeting.

Air Quality:

1) *Annual Report on implementation of S.L. 2002-4 (Clean Smokestacks Act).* DENR and the North Carolina Utilities Commission. 30 May 2003. Statutory Authority: S.L. 2002-4, Sec. 14.

2) *Annual Report on issues related to the development and implementation of standards and plans to implement programs to control emissions of mercury and carbon dioxide from coal-fired generating units and other stationary sources of air pollution.* Division of Air Quality, DENR. 1 September 2003. Statutory Authority: S.L. 2002-4, Sec. 12-13.

General:

3) *Annual report on the resolution of submerged lands claims.* DENR. 2 October 2003. Statutory Authority: G.S. 113-206(f).

Water Quality:

4) *Annual report on fish kills within the preceding year.* DENR. 13 January 2004. Statutory Authority: G.S. 143B-279.7(c).

5) *Annual report on the effectiveness of projects funded under the Agricultural Cost Share Program for Nonpoint Source Pollution Control.* Division of Soil and Water Conservation, DENR. 25 November 2003. Statutory Authority: G.S. 143-215.74(e).

Please contact George Givens, Jeff Hudson, Jennifer McGinnis, Susan Iddings, or Tim Dodge at (919) 733-2578 if you have any questions or comments.

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

May 30, 2003

George Givens, Esq.
Commission Counsel to the Environmental Review Commission
Suite 545, Legislative Office Building
300 N. Salisbury St.
Raleigh, NC 27603-5925

Subject: Report on "Implementation of the Clean Smokestacks Act"

Dear Mr. Givens,

Enclosed is the report entitled "Implementation of the Clean Smokestacks Act." This report is to both the Environmental Review Commission and the Joint Legislative Utility Review Committee. It has been prepared and is submitted jointly by the department and the N.C. Utilities Commission. We are submitting it pursuant to the requirement of Section 14 of Session Law 2002-04, Senate Bill 1078, enacted on June 20, 2002.

I have included 30 copies for all Environmental Review Commission members in addition to the two original, signed copies for the commission chairs. Robert Bennink, General Counsel to the N.C. Utilities Commission, will provide copies to the Joint Legislative Utility Review Committee.

Please feel free to contact me with any questions at (919) 733-4984.

Sincerely,

Bill Ross

William G. Ross, Jr.

enclosures

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR

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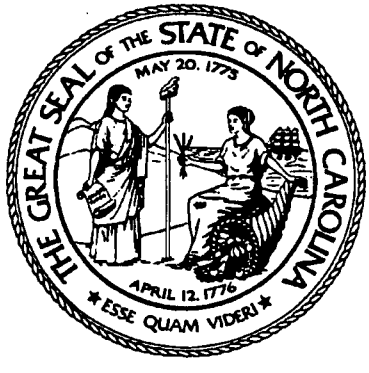
Implementation of the "Clean Smokestacks Act"

A Report to The Environmental Review Commission and The Joint Legislative Utility Review Committee

Submitted by The North Carolina Department of Environment and Natural Resources and The North Carolina Utilities Commission



May 30, 2003

Implementation of the "Clean Smokestacks Act"

A Report to the Environmental Review Commission and the Joint Legislative Utility Review Committee

Submitted by the North Carolina Department of Environment and Natural Resources and the North Carolina Utilities Commission

This report is submitted pursuant to the requirement of Section 14 of Session Law 2002-4, Senate Bill 1078 enacted June 20, 2002. The actions taken to date by Progress Energy Carolinas, Inc. and Duke Power, a Division of Duke Energy Corporation, appear to be in accordance with the provisions and requirements of the Clean Smokestacks Act.

Signed: William G. Ross, Jr.

William G. Ross, Jr., Secretary
Department of Environment and Natural Resources

Signed: Jo Anne Sanford

Jo Anne Sanford, Chair
North Carolina Utilities Commission

May 30, 2003

Implementation of the "Clean Smokestacks Act"

A Report to the
Environmental Review Commission and the Joint Legislative Utility Review Committee

May 30, 2003

The General Assembly of North Carolina, Session 2001, passed Session Law 2002-4 also known as Senate Bill 1078. This legislation is titled "*An Act to Improve Air Quality in the State by Imposing Limits on the Emission of Certain Pollutants from Certain Facilities that Burn Coal to Generate Electricity and to Provide for Recovery by Electric Utilities of the Costs of Achieving Compliance with Those Limits*" ("the Clean Smokestacks Act" or "the Act"). The Clean Smokestacks Act, in Section 14, requires the Department of Environment and Natural Resources (DENR) and the Utilities Commission ("Commission") to report annually, i.e., by June 1 of each year, on the implementation of the Act to the Environmental Review Commission and the Joint Legislative Utility Review Committee.

This report is presented to meet this requirement of the Act and is submitted jointly by DENR and the Commission. The report is structured to address the various actions that have occurred pursuant to the provisions of Sections 9, 10, 12 and 13 of this Act. Reports of actions under these Sections describe the extent of implementation of the Act to this date.

I. Section 9(c) of the Act, Codified as Section 62-133.6(c) of the North Carolina General Statutes

G.S. 62-133.6(c) provides: *The investor-owned public utilities shall file their compliance plans, including initial cost estimates, with the Commission and the Department of Environment and Natural Resources not later than 10 days after the date on which this section becomes effective. The Commission shall consult with the Secretary of Environment and Natural Resources and shall consider the advice of the Secretary as to whether an investor-owned public utility's proposed compliance plan is adequate to achieve the emissions limitations set out in G.S. 143-215.107D.*

Status: North Carolina's investor-owned electric utilities, Progress Energy Carolinas, Inc. (Progress Energy) and Duke Power, a division of Duke Energy Corporation (Duke Energy), filed their initial compliance plans as required in June and July of 2002, in accordance with G.S. 62-133.6(c), Section 9(c) of S.L. 2002-4, the Clean Smokestacks Act. DENR reviewed this information and determined that the submittals comply with the Act and, as proposed, appear adequate to achieve the emission limitations set out in G.S. 143-215.107D.

II. Section 9(i) of the Act, Codified as Section 62-133.6(i) of the North Carolina General Statutes

G.S. 62-133.6(i) provides: *An investor-owned public utility that is subject to the emissions limitations set out in G.S. 143-215.107D shall submit to the Commission and to the Department of Environment and Natural Resources on or before 1 April of each year a verified statement that contains all of the following [specified information]:*

The following are the eleven subsections of G.S. 62-133.6(i) and the related responses from Progress Energy and Duke Energy for each subsection:

1. **G.S. 62-133.6(i)(1) requires:** *A detailed report on the investor-owned public utility's plans for meeting the emissions limitations set out in G.S. 143-215.107D.*

Progress Energy Response: "The plan for Progress Energy Carolinas, Inc. was originally submitted on July 29, 2002. Appendix A (of the attached Progress submittal dated April 1, 2003) contains an updated version of this plan, effective April 1, 2003."

Duke Energy Response: "Exhibits A and B (of the attached Duke submittal dated March 31, 2003) outline the technology selections by facility and unit, projected operational dates, expected emission rates, and the corresponding tons of emissions that demonstrate compliance with G.S. 143-215.107D."

2. **G.S. 62-133.6(i)(2) requires:** *The actual environmental compliance costs incurred by the investor-owned public utility in the previous calendar year, including a description of the construction undertaken and completed during that year.*

Summary of Progress Energy Report: The actual environmental compliance costs incurred by Progress Energy in calendar year 2002 were $830,000. The Company reported that no construction was undertaken in 2002. Progress Energy further advised that the costs incurred were related primarily to preliminary engineering and planning activities.

Summary of Duke Energy Report: The actual environmental compliance costs incurred by Duke Energy in calendar years 2001 and 2002 were $800,000 and $3.6 million, respectively. The Company reported that such costs were incurred for such things as a variety of project studies and investigations, engineering, equipment specifications development, equipment layout, contracting related costs, and logistics.

3. **G.S. 62-133.6(i)(3) requires:** *The amount of the investor-owned public utility's environmental compliance cost amortized in the previous calendar year.*

Summary of Progress Energy and Duke Energy Reports: Neither Progress Energy nor Duke Energy amortized any environmental compliance costs in calendar year 2002.

4. **G.S. 62-133.6(i)(4) requires:** *An estimate of the investor-owned public utility's environmental compliance costs and the basis for any revisions of those estimates when compared to the estimates submitted during the previous year.*

Summary of Progress Energy Report: Progress Energy reported that, while some unit total and annual costs have changed, the total project cost in future dollars remains at $813 million. The Company observed that changes at the unit level were due to additional project scope definition and refinement of project schedules.

Summary of Duke Energy Report: Duke Energy reported that its expected costs are not significantly different than the estimates provided in 2002 in its initial filing, and the technologies expected to be required to support compliance have not changed. The Company further stated that the minor adjustments to the estimates at the project level are the result of additional project scope definition and refinement of project schedules only. Duke Energy continues to estimate its total program costs, in future dollars, to be in the range of $1.5 billion.

5. **G.S. 62-133.6(i)(5) requires:** *A description of all permits required in order to comply with the provisions of G.S. 143-215.107D for which the investor-owned public utility has applied and the status of those permits or permit applications.*

Progress Energy Response: "As of April 1, 2003, Progress Energy Carolinas, Inc. had not yet applied for any permits associated with compliance with G.S. 143-215.107D. A description of the anticipated permit applications is presented in the response to item 7 below." (See Section 7)

Duke Energy Response:
"Allen Steam Station SNCR, Unit 1

- Air Permit Application completed and final permit received for temporary trial
- NPDES Permit Modification completed and permit modification received for temporary trial
- Air Permit Application completed and final permit received for permanent equipment installation

Marshall Steam Station SNCR, Unit 4

- Air Permit Application completed and final permit received for temporary trial
- NPDES Permit Modification completed and permit modification received for temporary trial"

6. **G.S. 62-133.6(i)(6) requires:** *A description of the construction related to compliance with the provisions of G.S. 143-215.107D that is anticipated during the following year.*

Progress Energy Response: See Appendix C of the attached letter from Progress Energy dated April 1, 2003, for details of construction and installation of equipment.

Duke Energy Response: See attached letter from Duke Energy dated March 31, 2003, for details of construction anticipated for the next year for:

- Allen Steam Station Scrubbers
- Belews Creek Steam Station Scrubbers
- Cliffside Steam Station Scrubbers
- Marshall Steam Station Scrubbers
- Allen Steam Station SNCR, Unit 1

7. **G.S. 62-133.6(i)(7) requires:** *A description of the applications for permits required in order to comply with the provisions of G.S. 143-215.107D that are anticipated during the following year.*

Progress Energy Response: "Permit applications for the construction and operation of scrubbers for SO2 control for Asheville Plants Units 1 and 2 and for Roxboro Plant Units 2 and 3 are planned for submittal in the spring of 2003. These permit applications will be for:

- Air construction and operation permit
- Erosion and sediment control permit
- Treatment and processing permit for storage of scrubber by-product
- Wastewater permit to construct for treatment of scrubber blowdown
- A potential permit application for constructed wetlands (not yet determined)"

Duke Energy Response:

"Marshall Steam Station Scrubbers, Units 3 & 4

- Landfill Site Suitability Application - Plan to submit 6/6/03
- Sedimentation and Erosion Control - Plan to submit 6/9/03
- Air permit application - Plan to submit 8/22/03
- NPDES Permit Modification - Plan to submit 3/31/04
- Landfill Construction Permit Application - Plan to submit 11/17/04

Allen Steam Station SNCR, Units 2, 3, 4, and 5

- Air Permit application - Plan to submit 10/22/04
- Sedimentation and Erosion control (if needed) - Plan to submit 11/5/04
- NPDES Permit Modification (if needed) - Plan to submit 11/5/04"

8. **G.S. 62-133.6(i)(8) requires:** *The results of equipment testing related to compliance with G.S. 143-215.107D.*

Progress Energy Response: "No equipment testing related to compliance with G.S. 143-215.107D occurred in 2002."

Duke Energy Response:

"Allen Steam Station SNCR, Unit 1

- Technology demonstration in December, 2001 (one week test)
  - Nominal 30% reduction in NOx with ammonia slip of 5 to 10 ppm at full load
  - Average NOx outlet rate of 0.15 #/MMBTU for the test period

Marshall Steam Station SNCR, Unit 4

- Technology demonstration in October - November, 2002 (one month test)
  - Average 24% - 25% reduction in NOx with ammonia slip of 5 to 10 ppm at full load
  - Average NOx outlet rate of 0.163 #/MMBTU for the test period "

9. **G.S. 62-133.6(i)(9) requires:** *The number of tons of oxides of nitrogen (NOx) and sulfur dioxide (SO2) emitted during the previous calendar year from the coal-fired generating units that are subject to the emissions limitations set out in G.S. 143-215.107D.*

Progress Energy Response: The total calendar year 2002 emissions from the affected coal-fired Progress Energy Carolinas units were:

- NOx - 58,793 tons
- SO2 - 195,734 tons

Duke Energy Response: In the 2002 calendar year, the following were emitted from the North Carolina based Duke Energy coal-fired units:

- NOx - 81,896 tons
- SO2 - 263,909 tons

10. **G.S. 62-133.6(i)(10) requires:** *The emissions allowances described in G.S. 143-215.107D(i) that are acquired by the investor-owned public utility that result from compliance with the emissions limitations set out in G.S. 143-215.107D.*

Progress Energy Response: "No emissions allowances resulting from compliance with G.S. 143-215.107D were acquired in 2002."

Duke Energy Response: "No emissions allowances have been acquired by Duke Power Company resulting from compliance with the limitations set out in G.S. 143-215.107D."

11. **G.S. 62-133.6(i)(11) requires:** *Any other information requested by the Commission or the Department of Environment and Natural Resources.*

Summary of Commission Request: The Commission submitted data requests to Progress Energy and Duke Energy on April 29 and May 16, 2003. The information requested concerned projected amortization schedules over the entire seven-year

accelerated cost recovery period, whether certain costs deferred in calendar years 2001 and 2002 represented portions of compliance costs that would be amortized over the accelerated cost recovery period, and matters related to how the Companies proposed to account for the present costs.

Progress Energy Response: Progress Energy responded that it currently expects to amortize the compliance costs as follows: 2003 - $100 million; 2004 - $106.5 million; 2005 – $113.5 million; 2006 - $121 million; 2007 – $129 million; 2008 - $121.5 million; and 2009 - $121.5 million.

Duke Energy Response: Duke Energy responded that it currently expects to amortize the compliance costs as follows: 2003 - $70 million; 2004 - $158 million; 2005 – $281 million; 2006 - $281 million; 2007 – $281 million; 2008 - $214 million; and 2009 - $214 million.

Attached, and made part of this report, are the statements from Duke Energy and Progress Energy dated March 31, 2003, and April 1, 2003, respectively, which were submitted by the Companies to meet the requirements of G.S. 62-133.6(i).

In addition, the Secretary of DENR wrote the Commission on May 13, 2003, as follows:

"North Carolina's investor owned electric utilities, Duke Energy and Progress Energy, have filed their compliance plan annual updates for 2003 in accordance with N.C.G.S. 62-133.6(i), Section 9(i) of S.L. 2002-4, known as the 'Clean Smokestacks Act'. Pursuant to N.C.G.S. 62-133.6(j), the Department of Environment and Natural Resources has reviewed this information, and the submittals comply with the Act and the initial plans, as proposed, appear adequate to achieve the emission limitations set out in N.C.G.S. 143-215.107D."

III. Section 10 of the Act provides: *It is the intent of the General Assembly that the State use all available resources and means, including negotiation, participation in interstate compacts and multistate and interagency agreements, petitions pursuant to 42 U.S.C. § 7426, and litigation to induce other states and entities, including the Tennessee Valley Authority, to achieve reductions in emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) comparable to those required by G.S. 143-215.107D, as enacted by Section 1 of this act, on a comparable schedule. The State shall give particular attention to those states and other entities whose emissions negatively impact air quality in North Carolina or whose failure to achieve comparable reductions would place the economy of North Carolina at a competitive disadvantage.*

DENR and Division of Air Quality (DAQ) Activities to implement this Section:

- The Governor, the Attorney General, the Secretary of DENR, and the Director of DAQ have all sent letters to their counterparts in other States in the region urging similar emissions controls in those States and requesting information in order to evaluate the impacts of upwind sources on North Carolina's air quality.

- DAQ is continuing to identify sources of air pollution problems, including out-of-state contributions. DAQ and the Attorney General's Office are evaluating strategies to achieve compliance with upcoming federal mandates regarding particulate matter and ozone (including visibility), which will improve air quality and alleviate the adverse health and welfare impacts facing North Carolina. The western part of the State will especially benefit from these emission reductions.

- A meeting was held between DENR/DAQ and the Tennessee Valley Authority (TVA) and the Tennessee air program officials in August 2002, to discuss actions planned by TVA that would be comparable to the Clean Smokestacks Act. TVA presented their plans to add five additional SO2 scrubbers to power plants primarily in the eastern portion of the TVA system. These new scrubbers should benefit North Carolina most. TVA plans to complete installation of the new facilities by 2010 and the first plant, Paradise, will be installed by 2006. Regarding NOx control, TVA is on schedule to have the first 8 of its selective catalytic reduction (SCR) systems in place. TVA plans to have 25 boiler units controlled by 2005 at a cost of $1.3 billion which will reduce ozone season NOx by 75 percent.

- Through DENR's efforts, the Clean Smokestacks Act is achieving notoriety nationally and is being touted in other States as a model for State action. The Secretary of DENR and the Chief of Planning of DAQ made presentations about the Clean Smokestacks Act at two national state environmental organization meetings in the fall of 2002. The Chief of Planning of DAQ testified in 2002, at a U.S. Senate Environment and Public Works Committee Hearing on the features and benefits of North Carolina's Clean Smokestacks Act. The Deputy Director of DAQ participates on a national dialogue workgroup addressing ideal features of national multi-pollutant legislation for coal-fired utility boilers. The Clean Smokestacks Act is held up as an ideal example.

- The State also has been active in maintaining federal standards. In an April 2003 letter to EPA Administrator Whitman, Governor Easley urged the Administration to ensure that the federal Clear Skies bill not override State initiatives such as the Clean Smokestacks Act. The Governor also indicated the State's opposition to bill text that would extinguish the statutory rights of States regarding interstate pollution abatement. DAQ and the Attorney General commented last month in opposition to a proposed federal rule that would

weaken the federal New Source Review program and potentially result in significant new upwind emissions.

IV. Section 12 of the Act provides: *The General Assembly anticipates that measures implemented to achieve the reductions in emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) required by G.S. 143-215.107D, as enacted by Section 1 of this act, will also result in significant reductions in the emissions of mercury from coal-fired generating units. The Division of Air Quality of the Department of Environment and Natural Resources shall study issues related to monitoring emissions of mercury and the development and implementation of standards and plans to implement programs to control emissions of mercury from coal-fired generating units. The Division shall evaluate available control technologies and shall estimate the benefits and costs of alternative strategies to reduce emissions of mercury. The Division shall annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003. The Division shall report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than 1 September 2005. The costs of implementing any air quality standards and plans to reduce the emission of mercury from coal-fired generating units below the standards in effect on the date this act becomes effective, except to the extent that the emission of mercury is reduced as a result of the reductions in the emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) required to achieve the emissions limitations set out in G.S. 143-215.107D, as enacted by Section 1 of this act, shall not be recoverable pursuant to G.S. 62-133.6, as enacted by Section 9 of this act.*

DAQ Actions to Implement this Section: The DAQ is presently developing a draft report for presentation by September 1, 2003, as required by this section. The first report will primarily focus on the "state of knowledge" of the co-benefit of mercury control that will result from the control of NOx and SO2 from coal-fired utility boilers. Also, there will be preliminary estimates made for this co-benefit for the North Carolina utility boilers based on the initial plans submitted by Progress Energy and Duke Energy. Two public workshops are planned for June and July 2003, to meet with all interested stakeholders to begin review of the draft DAQ report.

V. Section 13 of the Act provides: *The Division of Air Quality of the Department of Environment and Natural Resources shall study issues related to the development and implementation of standards and plans to implement programs to control emissions of carbon dioxide (CO2) from coal-fired generating units and other stationary sources of air pollution. The Division shall evaluate available control technologies and shall estimate the benefits and costs of alternative strategies to reduce emissions of carbon dioxide (CO2). The Division shall annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003. The Division shall*

report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than 1 September 2005. The costs of implementing any air quality standards and plans to reduce the emission of carbon dioxide (CO2) from coal-fired generating units below the standards in effect on the date this act becomes effective, except to the extent that the emission of carbon dioxide (CO2) is reduced as a result of the reductions in the emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) required to achieve the emissions limitations set out in G.S. 143-215.107D, as enacted by Section 1 of this act, shall not be recoverable pursuant to G.S. 62-133.6, as enacted by Section 9 of this act.

DAQ Actions to Implement this Section: The DAQ is presently developing a draft report for presentation by September 1, 2003, as required by this section. The first report will primarily focus on the "state of knowledge" and actions being taken or planned elsewhere regarding CO2 control from coal-fired utility boilers. Two public workshops are planned for June and July 2003, to meet with all interested stakeholders to begin review of the draft DAQ report.

VI. Supplementary Information: The Public Staff – North Carolina Utilities Commission (Public Staff) will audit the books and records of Progress Energy and Duke Energy in regard to the costs incurred and amortized by the Companies concerning their compliance with the provisions of the Clean Smokestacks Act. The audits are to be of a nature such that they will be on-going, continuing throughout completion of the accelerated cost recovery process and beyond as circumstances and events may require. The Public Staff expects to begin the audits later this calendar year.

CONCLUSION

Actions taken to date by Progress Energy and Duke Energy appear to be in accordance with the provisions and requirements of the Clean Smokestacks Act.

ATTACHMENTS

Attachment A: Clean Smokestacks Act Compliance Plan Annual Update dated March 31, 2003, Submitted by Duke Power, a Division of Duke Energy Corporation

Attachment B: Annual North Carolina Clean Smokestacks Act Compliance Report dated April 1, 2003, Submitted by Progress Energy Carolinas, Inc.

Duke Power
526 South Church Street
P.O. Box 1006
Charlotte, NC 28201-1006

Duke Power
A Duke Energy Company

OFFICIAL COPY

March 31, 2003

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APR 07 2003
Clerk's Office
N.C. Utilities Commission

Chairman's Office
APR 07 2003

Ms. Jo Anne Sanford, Chair
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, NC 27699-4325

Subject: Senate Bill 1078

Duke Power Compliance Plan Annual Update

Record No. NC CAP 002
Certified: 7002 0860 0006 5842 6314

E-7 SUB 718

Dear Ms. Sanford:

As required by Senate Bill 1078, Duke Power is required to file information on or before 1 April of each year to update the Commission on progress to date, upcoming activities and expected strategies to achieve the emissions limitations set out in G.S. 143-215.107D.

The current plan to meet the emission requirements for NO_x and SO_2 continues to include:

NO_x Control – The installation of Selective Catalytic Reduction (SCR) on Cliffside Steam Station Unit 5 and Belews Creek Steam Station Units 1&2; the installation of Selective Non Catalytic Reduction (SNCR) with Low-NO_x burners on the 24 remaining units.

SO_2 Control – The installation of wet scrubbers on our largest twelve generating units.

Exhibits A and B outline the unit specific technology selections, projected operational dates, expected emission rates, and the corresponding tons of emissions that demonstrate compliance with the legislative requirements. The projected 'environmental compliance costs' for these pollution control projects are included in Exhibit C.

Duke Power will continue to optimize the technology selection, implementation schedule and cost, and will provide annual updates to the NC Utilities Commission as required. If you have questions regarding any aspect of our plan, please do not hesitate to contact my office at 704-373-4363.

Sincerely,

George T. Everett

George T. Everett, Ph.D.
Vice President, Environmental Affairs
Duke Power

Enclosure(s)

cc w/ attachments: Robert P. Gruber
Executive Director – Public Staff
1641 Mail Service Center
Raleigh, NC 27699-4326

Nothing Confidential in filing per G. Everett

Duke Power Company

General Assembly of North Carolina Session 2001
Senate Bill 1078 – Improve Air Quality/Electric Utilities (NC Clean Air Legislation)
Annual Data Submittal

1. **A detailed report on the investor-owned public utility's plans for meeting the emissions limitations set out in G.S. 143-215.107D.**

   Exhibits A and B outline the technology selections by facility and unit, projected operational dates, expected emission rates, and the corresponding tons of emissions that demonstrate compliance with the provisions of G.S. 143-215.107D.

2. **The actual environmental compliance costs incurred by the investor-owned public utility in the previous calendar year, including a description of the construction undertaken and completed during that year.**

   In the 2002 calendar year, Duke Power Company spent $3,622,600 on activities in support of compliance with the provisions of G.S. 143-215.107D. Exact amounts associated with each project are provided in Exhibit C, and a description of the associated activities is provided below:

   Allen Steam Station Scrubbers
   - Project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics initiated

   Belews Creek Steam Station Scrubbers
   - Project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics initiated

   Cliffside Steam Station Scrubbers
   - Project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics initiated

   Marshall Steam Station Scrubbers
   - Project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics initiated

   Allen Steam Station SNCR, Unit 1
   - Project study, scope development and equipment specifications completed
   - Engineering, Procurement and Construction (EPC) contract awarded

   Marshall Steam Station SNCR, Unit 4
   - Project study and technology demonstration/testing completed

Dan River Steam Station Burners, Unit 3

- Project study and boiler modeling completed
- Electrical and mechanical design continued and specification issued
- CO and O_2 Analyzers installed within scheduled unit outage

Riverbend Steam Station Burners, Units 5&6

- Project study and boiler modeling completed
- Engineering design work completed and specification issued
- CO and O_2 Analyzers installed within scheduled unit outages

3. **The amount of the investor-owned public utility's environmental compliance costs amortized in the previous calendar year.**

In the 2002 calendar year, **$0** was amortized related to construction work activity in support of compliance with the provisions of G.S. 143-215.107D.

4. **An estimate of the investor-owned public utility's environmental compliance costs and the basis for any revisions of those estimates when compared to the estimates submitted during the previous year.**

The estimated 'environmental compliance costs' as defined in G.S. 143-215.107D are provided in Exhibit C.

These expected costs are not significantly different than the estimates provided in 2002 in the initial filing, and the technologies expected to be required to support compliance have not changed. The minor adjustments to the estimates at the project level are the result of additional project scope definition and refinement of project schedules only.

5. **A description of all permits required in order to comply with the provisions of G.S. 143-215.107D for which the investor-owned public utility has applied and the status of those permits or permit applications.**

Allen Steam Station SNCR, Unit 1

- Air Permit Application completed and final permit received for temporary trial
- NPDES Permit Modification completed and permit modification received for temporary trial
- Air Permit Application completed and final permit received for permanent equipment installation

Marshall Steam Station SNCR, Unit 4

- Air Permit Application completed and final permit received for temporary trial
- NPDES Permit Modification completed and permit modification received for temporary trial

6. A description of the construction related to compliance with the provisions of G.S. 143-215.107D that is anticipated during the following year.

Allen Steam Station Scrubbers

- Continuation of project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics throughout year

Belews Creek Steam Station Scrubbers

- Continuation of project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics throughout year

Cliffside Steam Station Scrubbers

- Continuation of project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics throughout year

Marshall Steam Station Scrubbers

- Continuation of project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics throughout year
- EPC contract expected to be awarded in 4th Quarter of 2003
- Earthwork expected to begin in the latter part of 2003
- Site mobilization expected to begin in the latter part of 2003
- Stack foundation work expected to begin in January, 2004
- Underground piping, grounding, duct bank and foundation work expected to begin in the 1st Quarter of 2004
- Fencing, lighting, roadwork and drainage construction expected to begin in the 1st Quarter of 2004

Allen Steam Station SNCR, Unit 1

- Equipment installation expected to be completed in spring 2003
- Equipment testing expected in 2nd and 3rd Quarters of 2003

7. A description of the applications for permits required in order to comply with the provisions of G.S. 143-215.107D that are anticipated during the following year.

Marshall Steam Station Scrubbers, Units 3&4

- Landfill Site Suitability Application – Plan to submit 6/6/03
- Sedimentation and Erosion Control – Plan to submit 6/9/03
- Air Permit Application – Plan to submit 8/22/03
- NPDES Permit Modification – Plan to submit 3/31/04
- Landfill Construction Permit Application – Plan to submit 11/17/04

Allen Steam Station SNCR, Units 2 - 5

- Air Permit Application – Plan to submit 10/22/04
- Sedimentation and Erosion Control (if needed) – Plan to submit 11/5/04
- NPDES Permit Modification (if needed) – Plan to submit 11/5/04

8. The results of equipment testing related to compliance with G.S. 143-215.107D.

Allen Steam Station SNCR, Unit 1

- Technology demonstration in December, 2001 (one week test)
  - ➢ Nominal 30% reduction in NO_x with ammonia slip of 5 to 10 ppm at full load
  - ➢ Average NO_x outlet rate of 0.15 #/MMBTU for the test period

Marshall Steam Station SNCR, Unit 4

- Technology demonstration in October - November, 2002 (one month test)
  - ➢ Average 24% - 25% reduction in NO_x with ammonia slip of 5 to 10 ppm at full load
  - ➢ Average NO_x outlet rate of 0.163 #/MMBTU for the test period

Note: Actual short term test results do not necessarily guarantee long term results. Expected annual emission rates are provided in Exhibit A.

9. The number of tons of oxides of nitrogen (NO_x) and sulfur dioxide (SO_2) emitted during the previous calendar year from the coal-fired generating units that are subject to the emissions limitations set out in G.S. 143-215.107D.

In the 2002 calendar year, 81,896 tons of NO_x and 263,909 tons of SO_2 were emitted from the North Carolina based Duke Power Company coal-fired units.

10. The emissions allowances described in G.S. 143-215.107D(i) that are acquired by the investor-owned public utility that result from compliance with the emissions limitations set out in G.S. 143-215.107D.

No emissions allowances have been acquired by Duke Power Company resulting from compliance with the emissions limitations set out in G.S. 143-215.107D.

11. Any other information requested by the Commission or Department of Environment and Natural Resources.

No additional information has been requested as of this date.

Expected Duke Power Company Compliance Plan for NC Clean Air Plan
(Exhibit A)

NO_x							
				2007 Compliance		2009 Compliance	
Facility	Unit	Technology	Operational Date	Expected Rate #/MMBTUs	Tons	Expected Rate #/MMBTUs	Tons
Allen	1	SNCR	2003	0.17	684	0.17	780
Allen	2	SNCR	2007	0.17	836	0.17	872
Allen	3	SNCR	2005	0.17	1,230	0.17	950
Allen	4	SNCR	2006	0.17	991	0.17	1,399
Allen	5	SNCR	2006	0.17	1,063	0.17	1,508
Belews Creek	1	SCR	2003	0.09	2,996	0.09	2,957
Belews Creek	2	SCR&Burners	2004	0.09	2,962	0.09	3,001
Buck	3	SNCR	2009	0.35	502	0.25	392
Buck	4	SNCR	2008	0.35	290	0.25	234
Buck	5	SNCR	2006	0.17	604	0.17	500
Buck	6	SNCR	2007	0.19	651	0.17	583
Cliffside	1	SNCR	2009	0.35	256	0.25	205
Cliffside	2	SNCR	2009	0.35	256	0.25	205
Cliffside	3	SNCR	2008	0.35	481	0.25	382
Cliffside	4	SNCR	2008	0.35	492	0.25	374
Cliffside	5	SCR	2002	0.07	1,250	0.07	1,298
Dan River	1	SNCR	2009	0.35	500	0.25	383
Dan River	2	SNCR	2009	0.35	544	0.25	413
Dan River	3	SNCR&Burners	2007	0.19	744	0.17	591
Marshall	1	SNCR	2007	0.19	2,159	0.17	1,957
Marshall	2	SNCR	2008	0.22	2,352	0.17	1,921
Marshall	3	SNCR	2008	0.24	5,123	0.19	3,381
Marshall	4	SNCR	2008	0.24	4,847	0.19	4,084
Riverbend	4	SNCR	2007	0.19	469	0.17	464
Riverbend	5	SNCR&Burners	2008	0.40	969	0.17	450
Riverbend	6	SNCR&Burners	2008	0.22	815	0.17	550
Riverbend	7	SNCR	2007	0.17	640	0.17	630
		Expected Total:			**34,706**		**30,464**
		Compliance Limit:			**35,000**		**31,000**

Technology
SNCR - Selective Non Catalytic Reduction.
SCR - Selective Catalytic Reduction

Expected Duke Power Company Compliance Plan for NC Clean Air Plan (Exhibit B)

SO_2							
				2009 Compliance		2013 Compliance	
Facility	Unit	Technology	Operational Date	Expected Rate #/MMBTUs	Tons	Expected Rate #/MMBTUs	Tons
Allen	**1**	**Scrubber**	**2011**	1.60	7,342	0.15	688
Allen	**2**	**Scrubber**	**2011**	1.60	8,207	0.15	769
Allen	**3**	**Scrubber**	**2011**	1.60	8,944	0.15	838
Allen	**4**	**Scrubber**	**2012**	1.60	13,165	0.15	1,234
Allen	**5**	**Scrubber**	**2012**	1.60	14,195	0.15	1,331
Belews Creek	**1**	**Scrubber**	**2008**	0.15	4,928	0.15	4,928
Belews Creek	**2**	**Scrubber**	**2008**	0.15	5,002	0.15	5,002
Buck	**3**			1.60	2,558	1.60	2,558
Buck	**4**			1.60	1,530	1.60	1,530
Buck	**5**			1.60	4,710	1.60	4,710
Buck	**6**			1.60	5,485	1.60	5,485
Cliffside	**1**			1.60	1,337	1.60	1,337
Cliffside	**2**			1.60	1,337	1.60	1,337
Cliffside	**3**			1.60	2,493	1.60	2,493
Cliffside	**4**			1.60	2,445	1.60	2,445
Cliffside	**5**	**Scrubber**	**2009**	0.40	7,416	0.15	2,781
Dan River	**1**			1.60	2,499	1.60	2,499
Dan River	**2**			1.60	2,696	1.60	2,696
Dan River	**3**			1.60	5,559	1.60	5,559
Marshall	**1**	**Scrubber**	**2007**	0.15	1,727	0.15	1,727
Marshall	**2**	**Scrubber**	**2007**	0.15	1,695	0.15	1,695
Marshall	**3**	**Scrubber**	**2006**	0.15	2,641	0.15	2,641
Marshall	**4**	**Scrubber**	**2006**	0.15	3,191	0.15	3,191
Riverbend	**4**			1.60	4,368	1.60	4,368
Riverbend	**5**			1.60	4,234	1.60	4,234
Riverbend	**6**			1.60	5,177	1.60	5,177
Riverbend	**7**			1.60	5,927	1.60	5,927
		Expected Total:			**130,809**		**79,181**
		Compliance Limit:			**150,000**		**80,000**

Expected Duke Power Company Compliance Plan for NC Clean Air Plan
(Exhibit C)

Expected Costs							
				Spent to Date		Remaining	
Facility	Unit	Technology	Operational Date	2001 ($000)	2002 ($000)	2003 - 2013 ($000)	Project Total ($000)
Allen	1	SNCR	2003	$179	$160	$3,057	$3,397
Allen	1	Scrubber	2011			$68,370	$68,370
Allen	2	SNCR	2007			$2,504	$2,504
Allen	2	Scrubber	2011			$68,370	$68,370
Allen	3	SNCR	2005			$6,218	$6,218
Allen	3	Scrubber	2011			$68,370	$68,370
Allen	4	SNCR	2006			$3,677	$3,677
Allen	4	Scrubber	2012	$16	$429	$72,704	$73,149
Allen	5	SNCR	2006			$3,782	$3,782
Allen	5	Scrubber	2012			$71,825	$71,825
Belews Creek	1	Catalyst Add				$4,636	$4,636
Belews Creek	1	Scrubber	2008	$7	$502	$202,891	$203,400
Belews Creek	2	Catalyst Add				$4,752	$4,752
Belews Creek	2	Scrubber	2008			$205,949	$205,949
Buck	3	SNCR	2009			$2,789	$2,789
Buck	4	SNCR	2008			$1,408	$1,408
Buck	5	SNCR	2006			$3,041	$3,041
Buck	6	SNCR	2007			$1,658	$1,658
Cliffside	1	SNCR	2009			$2,422	$2,422
Cliffside	2	SNCR	2009			$1,314	$1,314
Cliffside	3	SNCR	2008			$2,147	$2,147
Cliffside	4	SNCR	2008			$1,325	$1,325
Cliffside	5	Catalyst Add				$2,751	$2,751
Cliffside	5	Scrubber	2009	$4	$529	$183,533	$184,067
Dan River	1	SNCR	2009			$1,694	$1,694
Dan River	2	SNCR	2009			$1,420	$1,420
Dan River	3	SNCR&Burners	2007	$8	$162	$6,648	$6,818
Marshall	1	SNCR	2007			$3,443	$3,443
Marshall	1	Scrubber	2007			$82,728	$82,728
Marshall	2	SNCR	2008			$5,073	$5,073
Marshall	2	Scrubber	2007			$82,728	$82,728
Marshall	3	SNCR	2008			$3,257	$3,257
Marshall	3	Scrubber	2006	$76	$521	$140,559	$141,156
Marshall	4	SNCR	2008		$622	$4,496	$5,118
Marshall	4	Scrubber	2006			$137,237	$137,237
Riverbend	4	SNCR	2007			$1,965	$1,965
Riverbend	5	SNCR&Burners	2008	$365	$282	$5,283	$5,930
Riverbend	6	SNCR&Burners	2008	$145	$415	$5,720	$6,280
Riverbend	7	SNCR	2007			$2,607	$2,607
			Subtotals:	**$800**	**$3,623**	**$1,474,350**	
			Program Total:			**$1,478,772**	

Progress Energy

FILED
APR 01 2003
Clerk's Office
N.C. Utilities Commission

April 1, 2003

OFFICIAL COPY

E-2, Sub 815

Mrs. Geneva S. Thigpen
Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, NC 27699-4325

Re: Annual NC Clean Smokestacks Legislation Compliance Report

Dear Mrs. Thigpen:

Progress Energy Carolinas, Inc. submits the attached report for calendar year 2002 regarding the status of compliance with the provisions of the North Carolina Clean Smokestacks legislation. Section 9(i) of the legislation requires that an annual report of compliance progress be submitted to the Commission by April 1 of each year for the previous calendar year.

Very truly yours,

Len S. Anthony
Manager - Regulatory Affairs

LSA:at

Attachment

201419

Progress Energy Service Company, LLC
P.O. Box 1551
Raleigh, NC 27602

Progress Energy Carolinas, Inc.
Senate Bill 1078 – Clean Smokestacks Law
Calendar Year 2002 Progress Report

On June 20, 2002, North Carolina Senate Bill 1078, also known as the "Clean Smokestacks Law," was signed into effect. This law requires significant reductions in the emissions of nitrogen oxides (NOx) and sulfur dioxide (SO_2) from utility owned coal-fired power plants located in North Carolina. Section 9(i) of the bill, which is now incorporated as Section 62-133.6(i) of the North Carolina General Statutes, requires that an annual progress report regarding compliance with the Clean Smokestacks Law be submitted on or before April 1 of each year. The report must contain the following elements, taken verbatim from the statute:

1. A detailed report on the investor-owned public utility's plans for meeting the emissions limitations set out in G.S. 143-215.107D.
2. The actual environmental compliance costs incurred by the investor-owned public utility in the previous calendar year, including a description of the construction undertaken and completed that year.
3. The amount of the investor-owned public utility's environmental compliance costs amortized in the previous calendar year.
4. An estimate of the investor-owned public utility's environmental compliance costs and the basis for any revisions of those estimates when compared to the estimates submitted during the previous year.
5. A description of all permits required in order to comply with the provisions of G.S. 143-215.107D for which the investor-owned public utility has applied and the status of those permits or permit applications.
6. A description of the construction related to compliance with the provisions of G.S. 143-215.107D that is anticipated during the following year.
7. A description of the applications for permits required in order to comply with the provisions of G.S. 143-215.107D that are anticipated during the following year.
8. The results of equipment testing related to compliance with G.S. 143-215.107D.
9. The number of tons of oxides of nitrogen (NOx) and sulfur dioxide (SO_2) emitted during the previous calendar year from the coal-fired generating units that are subject to the emissions limitations set out in G.S. 143-215.107D.
10. The emissions allowances described in G.S. 143-215.107D(i) that are acquired by the investor-owned public utility that result from compliance with the emissions limitations set out in G.S. 143-215.107D.
11. Any other information requested by the Commission or the Department of Environment and Natural Resources.

Information responsive to each of these report elements follows. The responses are given by item number in the order in which they are presented above.

1. **A detailed report on the investor-owned public utility's plans for meeting the emissions limitations set out in G.S. 143-215.107D.**

The plan for Progress Energy Carolinas, Inc. was originally submitted on July 29, 2002. Appendix A contains an updated version of this plan, effective April 1, 2003.

2. **The actual environmental compliance costs incurred by the investor-owned public utility in the previous calendar year, including a description of the construction undertaken and completed that year.**

Appendix B contains the costs incurred toward compliance with G.S. 143-215.107D in 2002 and the projected costs for future years through 2013. No construction was undertaken in 2002.

3. **The amount of the investor-owned public utility's environmental compliance costs amortized in the previous calendar year.**

No costs associated with compliance with G.S. 143-215.107D were amortized in 2002.

4. **An estimate of the investor-owned public utility's environmental compliance costs and the basis for any revisions of those estimates when compared to the estimates submitted during the previous year.**

Appendix B contains the costs incurred toward compliance with G.S. 143-215.107D in 2002 and the projected costs for future years through 2013. While some unit total and annual costs have changed, the total project cost in escalated dollars remains $813M.

5. **A description of all permits required in order to comply with the provisions of G.S. 143-215.107D for which the investor-owned public utility has applied and the status of those permits or permit applications.**

As of April 1, 2003, Progress Energy Carolinas, Inc. had not yet applied for any permits associated with compliance with G.S. 143-215.107D. A description of the anticipated permit applications is presented in the response to Item 7 below.

6. **A description of the construction related to compliance with the provisions of G.S. 143-215.107D that is anticipated during the following year.**

Appendix C presents the planned construction schedule for compliance with G.S. 143-215.107D. Note that this is a projected schedule of construction activity through 2013 that will be subject to modification. The schedule will be updated as part of this report each year.

7. **A description of the applications for permits required in order to comply with the provisions of G.S. 143-215.107D that are anticipated during the following year.**

Permit applications for the construction and operation of scrubbers for the removal of sulfur dioxide are planned for submittal in the spring of 2003. The scrubbers are planned for Asheville Plant Units 1 and 2 and for Roxboro Plant Units 2 and 3. The following permit applications are anticipated to be submitted to the Department of Environment and Natural Resources (DENR) for review and approval:

- Air construction and operation permit
- Erosion and sediment control permit
- Treatment and processing permit for storage of scrubber by-product
- Wastewater permit to construct for treatment of scrubber blowdown
- A potential permit application for constructed wetlands (not yet determined)

Progress Energy Carolinas, Inc. will work with DENR in order to ensure that all applicable permits are obtained in order to support the planned scrubber construction and operation.

8. The results of equipment testing related to compliance with G.S. 143-215.107D.

No equipment testing related to compliance with G.S. 143-215.107D occurred in 2002.

9. The number of tons of oxides of nitrogen (NOx) and sulfur dioxide (SO_2) emitted during the previous calendar year from the coal-fired generating units that are subject to the emissions limitations set out in G.S. 143-215.107D.

The total calendar year 2002 emissions from the affected coal-fired Progress Energy Carolinas units are:

NOx 58,793
SO_2 195,734

10. The emissions allowances described in G.S. 143-215.107D(i) that are acquired by the investor-owned public utility that result from compliance with the emissions limitations set out in G.S. 143-215.107D.

No emissions allowances resulting from compliance with G.S. 143-215.107D were acquired in 2002.

11. Any other information requested by the Commission or the Department of Environment and Natural Resources.

As of April 1, 2003, no additional information has been requested by the Commission or the Department of Environment and Natural Resources.

Appendix A

Progress Energy's Air Quality Improvement Plan Supplement
April 1, 2003

On June 20, 2002 Governor Easley signed into law SB1078 which caps emissions of nitrogen oxides (NOx) and sulfur dioxide (SO_2) from utility owned coal-fired power plants located in North Carolina. Progress Energy's annual NOx emissions must be less than 25,000 tons beginning in 2007 and annual SO_2 emissions must be less than 100,000 tons beginning in 2009 and less than 50,000 tons beginning in 2013. The emissions caps are cumulative for all coal-fired units in North Carolina. These caps represent a 56% reduction in NOx emissions from 2001 levels and a 74% reduction in SO_2 from 2001 levels for Progress Energy.

Progress Energy owns and operates 18 coal-fired units at seven plants in North Carolina. The locations of these plants are shown on Attachment 1.

Nitrogen Oxides Emissions Control Plan

Progress Energy has been evaluating and installing NOx emissions controls on its coal-fired power plants since 1995 in order to comply with Title IV of the Clean Air Act and the NOx SIP Call rule adopted by the Environmental Management Commission (EMC). Substantial NOx emissions reductions have already been achieved (59,000 tons of NOx in 2002 compared with 112,000 tons in 1997) and further reductions will ensure compliance with the SB1078 target of 25,000 tons in calendar year 2007. This target will be achieved with a mix of combustion controls (which minimize the formation of NOx) such as low NOx burners and over fire air technologies, and post-combustion controls (which reduce NOx produced during the combustion of fossil fuel to molecular nitrogen) such as selective catalytic reduction and selective non-catalytic reduction technologies. Attachment 2 details Progress Energy's North Carolina coal-fired electric generating units, their name plate generation capacity, and identifies the control technologies already installed and planned for installation. As technologies evolve or other circumstances change, a different mix of controls may be selected. Attachment 2 also projects the NOx emissions on a unit by unit basis based on the energy demand forecast and expected efficiencies of the NOx emissions controls employed. This information is provided only to show how compliance may be achieved and is not intended in any way to suggest unit specific emission limits. Actual emissions for each unit may be substantially different in 2007.

Flue Gas Desulfurization (FGD)

Progress Energy is completing FGD screening studies on its coal-fired units. Babcock and Wilcox has been selected as the equipment supplier. Specific SO_2 control technologies have not yet been finally determined but a combination of wet scrubbers

(limestone forced oxidation) and dry scrubbers (spray absorbers) will likely be selected. Both are proven technologies and provide greater than 90% SO_2 removal efficiencies.

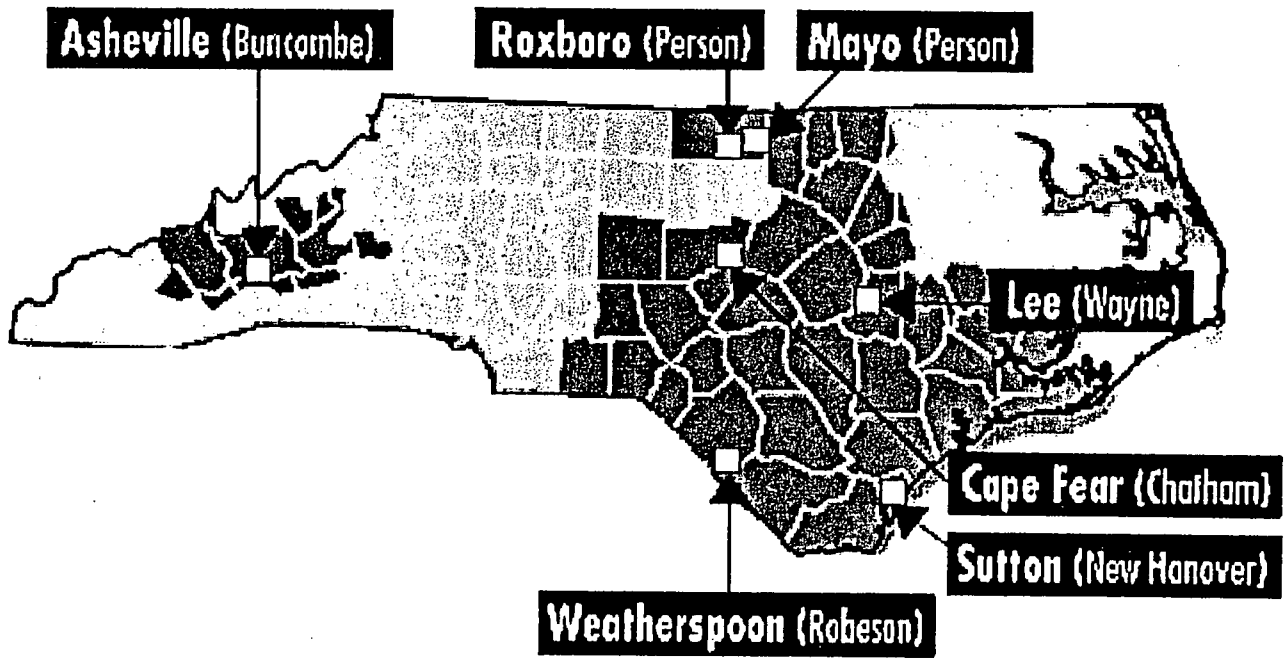
Wet scrubbers and dry scrubbers produce unique waste and by-product streams. Issues related to wastewater permitting and disposal must be addressed for each site. Discussions with various permitting divisions within DENR have begun and a permit application submittal schedule will be provided.

Specific units are listed on Attachment 3 with data on projected schedules and projected annual emissions for 2009 and 2013. These projections are based on a 92% SO_2 removal efficiency and on forecasted energy demand. Note that these are projected schedules and will be subject to revision. Individual FGD in-service dates may occur later than shown.

During 2002, FGD studies were completed for Asheville , Roxboro , and Mayo Plants. Design activities have begun for Asheville 1 and 2, and Roxboro 2, with construction work anticipated to begin in the fourth quarter of 2003 or first quarter of 2004.

Particular units controlled and control technologies utilized are subject to change depending on future developments in SO_2 removal technologies, energy demand, and other circumstances which may produce a more optimal plan for meeting the SO_2 emissions limits in 2009 and 2013. DENR will be advised as changing circumstances dictate.

Attachment 1: Location of Progress Energy's Coal-Fired Power Plants in North Carolina



Attachment 2: Progress Energy NOx Control Plan for North Carolina (July, 2002)

Unit	MW Rating	Control Technology	Operation Date[1]	Projected NOx Tons, 2007[2]
Asheville 1	198	LNB/AEFLGR/SCR	2009	1,804
Asheville 2	194	LNB/OFA/SCR		481
Cape Fear 5	143	ROFA/ROTAMIX		670
Cape Fear 6	173	ROFA/ROTAMIX		878
Lee 1	79	WIR		685
Lee 2	76	ROFA	2007	619
Lee 3	252	LNB/OFA/SCR	2010	2,444
Mayo 1	745	LNB/OFA/SCR		2,140
Roxboro 1	385	LNB/OFA/SCR		1,136
Roxboro 2	670	TFS2000/SCR		1,924
Roxboro 3	707	LNB/OFA/SCR		1,803
Roxboro 4	700	LNB/OFA/SCR		2,123
Sutton 1	97	SAS		411
Sutton 2	106	ROFA	2010	1,765
Sutton 3	410	LNB/ROFA		3,048
Wspn 1	49			598
Wspn 2	49			648
Wspn 3	78	WIR		673
Total	5,111			23,800

AEFLGR – Amine-Enhanced Flue Lean Gas Reburn
LNB = Low NOx Burner
SNCR = Selective Non-Catalytic Reduction
OFA = Overfire Air
ROFA = Rotating Opposed-fired Air
ROTAMIX = Injection of Ammonia to further reduce NOx (used in combination with ROFA)
WIR = Underfire Air
TFS2000 = Combination Low-NOx Burner/Overfire Air
SAS = Separated Air Staging

[1] Note: This is the operation date for the control technology installed to comply with the North Carolina Improve Air Quality/Electric Utilities Act only (shown in bold).
[2] Unit by unit emissions are illustrative only and specific emissions limits should not be inferred. Actual emissions in 2007 may be different from unit to unit.

Attachment 3: Progress Energy SO_2 Control Plan for North Carolina (July, 2002)

Unit	MW Rating	Technology	Operation Date	Projected SO_2 Tons, 2009[1]	Projected SO_2 Tons, 2013[1]
Asheville 1	198	Scrubber	2005	786	857
Asheville 2	194	Scrubber	2006	759	704
Cape Fear 5	143	Scrubber	2012	7,635	630
Cape Fear 6	173	Scrubber	2011	7,966	762
Lee 1	79			3,514	4,725
Lee 2	76			3,384	4,645
Lee 3	252	Scrubber	2010	11,147	978
Mayo 1	745	Scrubber	2007	3,257	3,417
Roxboro 1	385	Scrubber	2009	1,469	1,696
Roxboro 2	670	Scrubber	2005	2,865	2,957
Roxboro 3	707	Scrubber	2008	3,249	3,296
Roxboro 4	700	Scrubber	2007	3,280	3,311
Sutton 1	97			3,292	4,415
Sutton 2	106			5,103	6,204
Sutton 3	410	Scrubber	2013	18,245	1,635
Wspn 1	49			1,422	1,584
Wspn 2	49			1,507	1,839
Wspn 3	78			3,607	4,613
Total	5,111			82,500	48,300

[1] Unit by unit emissions are illustrative only and specific emissions limits should not be inferred. Actual emissions in 2009 and 2013 may be different from unit to unit.

Appendix B

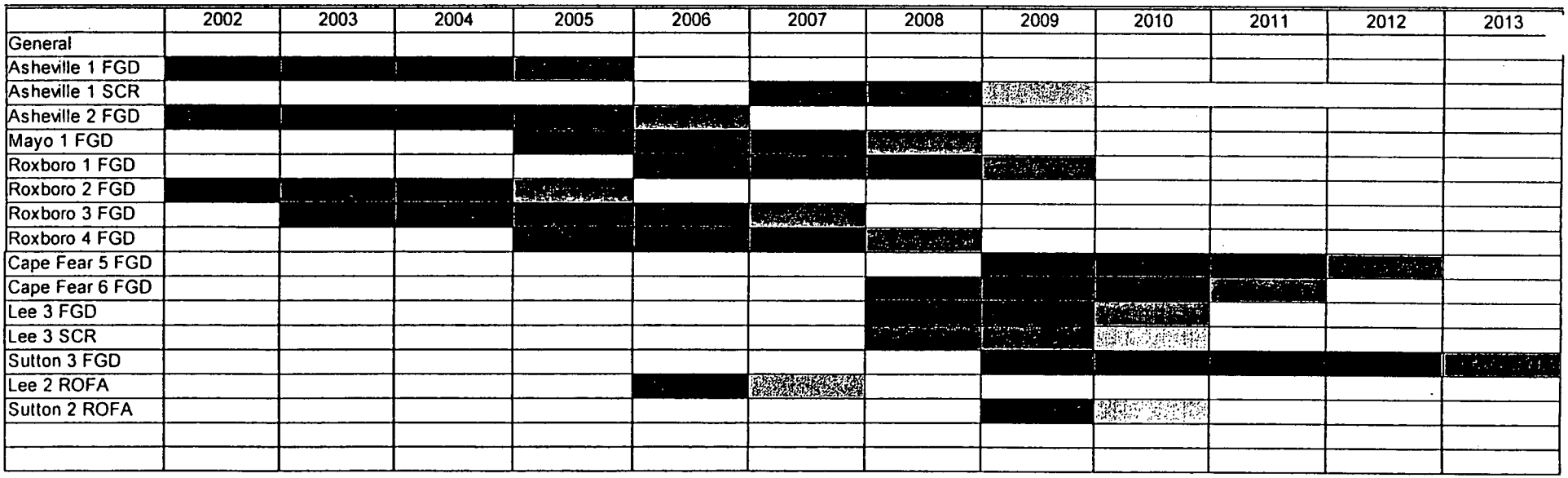
Actual 2002 Costs and Projected Costs Through 2013

	Planned Outage	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
General														
Asheville 1 FGD	F2004	$100,000	$6,653,280	$29,974,881	$23,814,287	$2,208,162	$0	$0	$0	$0	$0	$0	$0	$62,750,610
Asheville 1 SCR	S2012	$0	$0	$0	$0	$0	$4,504,650	$10,338,171	$107,544,934	$0	$0	$0	$0	$25,387,755
Asheville 2 FGD	F2005	$100,000	$5,260,328	$14,990,624	$29,225,668	$13,248,970	$578,478	$0	$0	$0	$0	$0	$0	$63,404,068
Asheville FGD common		$175,887	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
Mayo 1 FGD	S2007	$144,637	$0	$0	$5,444,417	$31,468,732	$34,458,261	$17,332,978	$0	$0	$0	$0	$0	$88,849,025
Roxboro FGD common		$189,028	$0	$15,828,607	$12,499,494	$10,624,570	$5,418,530	$5,526,901	$1,127,488	$0	$0	$0	$0	$51,214,618
Roxboro 1 FGD	S2009	$0	$0	$0	$0	$5,520,404	$16,892,436	$22,973,713	$5,858,297	$0	$0	$0	$0	$51,244,851
Roxboro 2 FGD	S2005	$120,000	$10,000,000	$26,530,200	$27,060,804	$11,040,808	$2,252,325	$0	$0	$0	$0	$0	$0	$77,004,137
Roxboro 3 FGD	F2006	$0	$500,000	$10,612,080	$16,236,482	$16,561,212	$16,892,436	$11,486,857	$0	$0	$0	$0	$0	$72,289,067
Roxboro 4 FGD	S2008	$0	$0	$0	$4,711,827	$19,704,861	$14,706,555	$20,000,915	$5,100,233	$0	$0	$0	$0	$64,224,392
Cape Fear 5 FGD	S2012	$0	$0	$0	$0	$0	$0	$0	$585,830	$10,755,833	$18,894,414	$11,190,369	$0	$41,426,445
Cape Fear 6 FGD	S2011	$0	$0	$0	$0	$0	$0	$574,343	$10,544,934	$19,121,481	$9,873,855	$0	$0	$40,114,613
Lee 3 FGD	F2009	$0	$0	$0	$0	$0	$563,081	$14,013,965	$24,136,183	$14,580,129	$0	$0	$0	$53,[illegible]59
Lee 3 SCR	F2009	$0	$0	$0	$0	$0	$0	$5,743,428	$17,574,891	$11,950,926	$0	$0	$0	$35,2[illegible]45
Sutton 3 FGD	F2012	$0	$0	$0	$0	$0	$0	$0	$585,830	$20,316,574	$35,350,838	$18,028,927	$3,170,604	$77,452,773
Lee 2 ROFA	F2007	$0	$0	$0	$0	$2,208,162	$2,252,325	$0	$0	$0	$0	$0	$0	$4,460,486
Sutton 2 ROFA	S2010	$0	$0	$0	$0	$0	$0	$0	$2,343,319	$2,390,185	$0	$0	$0	$4,733,504
Total (w/o esc)		$829,552	$22,413,608	$97,936,392	$118,992,980	$112,585,880	$98,519,078	$107,991,271	$78,401,939	$79,115,128	$64,119,106	$29,219,296	$3,170,604	$813,118,948

Scrubber Design and Construction
Scrubber in service
NOx Controls Design and Construction
NOx Controls in service

Full Cost (Actual @ 2001$)	$746,264,857
Total escalated cost	$813,118,948

Appendix C
NC Clean Air Bill Compliance Plan



Scrubber Design and Construction
Scrubber in service
NOx Controls Design and Construction
NOx Controls in service

Progress Energy

NORTH CAROLINA

WAKE COUNTY

VERIFICATION

Mike Williams, having been first duly sworn, deposes and says that he is Senior Vice President in Power Operations at Carolina Power & Light Company d/b/a Progress Energy Carolinas, Inc.; that he has read the foregoing North Carolina Clean Smokestacks Legislation Compliance Report and knows its contents; that the same is true of his own personal knowledge, except for those matters alleged on information and belief, and as to those matters, he is informed and believes them to be true.

This is the 1st day of April, 2003.

E. M. Williams

Mike Williams

Sworn to and subscribed before
me this the 1st day of April, 2003.

Betty Jean Young

Notary Public

BETTY JEAN YOUNG NOTARY PUBLIC WAKE COUNTY, N. C.

My Commission Expires:

Oct 30, 2005

201437

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: Senator Marc Basnight, Co-chair
Joint Legislative Commission on Governmental Operations

Representative James Black, Co-chair
Joint Legislative Commission on Governmental Operations

Representative Richard Morgan, Co-chair
Joint Legislative Commission on Governmental Operations

FROM: William G. Ross, Jr.

DATE: October 2, 2003

RE: Report on Submerged Lands Claim Resolution

Pursuant to G.S. 113-206(f), I am transmitting a report on the resolution of submerged lands claims. This report covers the preceding year's progress in resolving private claims to ownership of submerged lands in North Carolina's twenty-five coastal counties.

The report was prepared by DENR's Division of Marine Fisheries, with assistance from the Department of Justice. If you have any questions or would like additional information, please contact Preston Pate at (252) 726-7021.

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR

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REPORT
TO THE
JOINT LEGISLATIVE COMMISSION ON
GOVERNMENTAL OPERATIONS

ON

SUBMERGED LANDS CLAIM RESOLUTION

OCTOBER 1, 2003

BY

Secretary William G. Ross, Jr.
Department of Environment and Natural Resources

INTRODUCTION

General Statute (G.S.) 113-206(f) requires the Secretary of the Department of Environment and Natural Resources (DENR) to submit an annual report concerning resolution of submerged lands claims to the Joint Legislative Commission on Governmental Operations on October 1 of each year. This report covers the preceding year's progress in resolving private claims to ownership of submerged lands in North Carolina's twenty-five coastal counties. This report was prepared by the Division of Marine Fisheries (DMF), DENR, with assistance from the Department of Justice (DOJ).

BACKGROUND

As a general rule of law, the State owns all lands below the mean high water mark of its "navigable" waters in trust for the use and benefit of all its citizens. This principle of law dates from Roman times, was firmly established in English Common Law, and has been recognized in American law since independence was declared from Great Britain. The North Carolina Supreme Court most recently reaffirmed this rule of law in Gwathmey v. State, 342 NC 287, 464 S.E.2d 674 (1995). The decision in RJR Technical Co. v. Pratt 339 N.C. 588, 453 S.E.2d 147 (1995) also reaffirmed that exclusive or several fishery rights to fish in navigable waters has never been authorized under North Carolina law. In the Gwathmey decision, the Supreme Court defined "navigable" waters as those waters which are navigable in-fact in their natural condition by "useful vessels," including "small craft used for pleasure."

Since Colonial times there have been a number of infringements on this public trust area. Grants and franchises for fishing purposes and shellfish cultivation were issued, as well as wharf and pier rights. Deeds for fee title to marshlands and open waters were issued by various state agencies, principally the State Board of Education. Lands once submerged were filled and became uplands. Various other sales, leases, and easements have been made by the Department of Administration, State Property Office. Since the early nineteenth century, the State's courts have been required to adjudicate competing claims and protect public rights of navigation, fishing, hunting, and recreation.

In order to equitably resolve these questions of ownership and public rights, the General Assembly in 1965 enacted legislation (G.S. 113-205 and 113-206) requiring registration of private claims to lands beneath navigable waters, in 25 coastal counties. Some 3,263 files were opened in response to the January 1, 1970 deadline for registration. After preliminary review of the files, it was estimated that there would be approximately 10,000 individual claims.

Between 1970 and 1974 preliminary maps of the claims were prepared. During 1983-1985, preliminary legal analysis of the claims was conducted, and in 1985 the General Assembly, following the report of a special legislative research commission, enacted five bills to clarify the claims resolution process and facilitate completion of the process by 31 December 1990. The 1985 report reflected limited claim resolution, with emphasis on planning, staffing, equipping and organizing the new program within the Division of Coastal Management. During the years covered by reports in 1986 and 1987, emphases included adoption of departmental regulations following public hearings, personnel training, basic claim analysis, development of computer support systems, and claims resolution.

As the program moved into the phase of updating and investigating the estimated 10,000 claims, it became increasingly evident that very extensive claimant contact and work in the coastal courthouses would be required. To meet this need, the program was transferred from the Division of Coastal Management in Raleigh to the Division of Marine Fisheries in Morehead City in late 1987.

An additional significant change in operating procedures occurred as a result of the North Carolina Supreme Court's June 1988 decision in State v. Credle, 322 N.C. 522, 369 S.E.2d 825 (1988). That decision held, most significantly, that grants of fee title under the entry and grant laws to submerged lands, before or after July 4, 1776, are void, and that fee title or other rights to lands covered by public trust waters cannot be gained by adverse possession or prescriptive use. The Court's holdings in State v. Credle clarified resolution of many pending submerged lands claims.

During investigations of Board of Education claims, we have found that many people thought they had an exclusive shellfish right and, in fact, have been cultivating shellfish on those sites. It is the State's position that Board of Education deeds did not convey an exclusive shellfish right. Consequently, the General Assembly ratified Senate Bill 428 in 1989, which allows the Secretary to grant a shellfish cultivation lease to those persons who have been cultivating shellfish on lands described in their Board of Education deeds. The passage of this bill recognized the time and money spent by those who were cultivating shellfish on properties described in their Board of Education deeds and G.S. 113-205 claims. This amendment, codified as G.S. 113-206(a1), provides an equitable resolution for those who have been cultivating shellfish under the assumption that they had an exclusive shellfish right under the Board of Education deeds.

On 9 July 1990, the General Assembly ratified Senate Bill 1496, which amended G.S. 113-205(e) and (f) and G.S. 105-151.12(e). Due to increased complexity of the remaining files, it was necessary to request an extension of the deadline to resolve the claims for an additional four years. On 7 July 1994, the General Assembly ratified Senate Bill 1437, which amended G.S. 113-205(a1), (e), and (f), and G.S. 105-

151.12(e). On 8 October 1998, the General Assembly ratified House Bill 1490, which extended G.S. 113-205(e) and (f). In addition, it amended G.S. 105-151.12(e), which extended the North Carolina Conservation Tax Credit Program for donations of marshland. The passage of this bill recognized the program accomplishments, and the extension of time reiterated that the best interest of the public and the State would be served by continuing the program.

On 18 July 1990, the General Assembly enacted G.S. 113-202.2 authorizing the issuance of water column aquaculture leases within duly recognized shellfish franchises. The successful incorporation of perpetual franchises into the Shellfish Leasing Program should facilitate continued production and management of franchises and improve their management.

The Public Trust/Submerged Lands Director retired effective 1 December 1999. The DMF was not able to fill the position during the 1999-2000 Fiscal Year because of the requirement to revert 30% of the funds allocated to that position, which reduced the salary below the minimum rate for that position. In the 2000-2001 Fiscal year, DMF was able to fully fund the position, post it and conduct interviews. However, the position was frozen before it could be filled. Since that date, the 2001-2002 Budget removed funding for the vacant position, and it has been eliminated. However, Session Law 2001-424, Sec. 19.9 required the Secretary "to designate from existing staff within the Department, a staff position to be responsible for managing the Submerged Lands Program." The Director of the Division of Marine Fisheries has been so designated. Responsibility for notification of claimants, tracking the resolution process by computer database, and other necessary tasks was delegated to DMF's Habitat Protection Section.

Three state agencies are involved in the processing of submerged lands claims with overall guidance provided by a memorandum of agreement among the agencies.

1. The Habitat Protection Section of the Division of Marine Fisheries, Department of Environment and Natural Resources, is responsible for coordinating the entire program, including notification of each claimant in order to bring their claim to the point of resolution and rendering a final departmental decision for each claim.

2. The Air and Natural Resources Section of the Environmental Division of the Department of Justice is responsible for advising DENR on legal issues and the validity of specific claims. They handle all court actions concerning claims to enforce the state's policy to conserve and protect its lands and waters for the benefit of all its citizens, consistent with the Public Trust Doctrine.

3. The State Property Office of the Department of Administration is responsible for all title issues involving land above the high water mark which arise from

the claims. All files which contain islands or questionable high ground are forwarded to the State Property Office for review.

PROGRESS REPORT

Resolution of existing claims continued throughout the 2002-03 reporting period.

1. During the reporting period, we processed 99 original files and 190 files that were in the "NOT SUBMERGED" category, leading to the resolution of 414 claims. As of the date of this report, the Division of Marine Fisheries has 82 files opened and in progress. In addition, 56 files will be resolved by publication as described in paragraph 2 below.

2. In order to achieve the resolution of all claims by the end of this year, we have reviewed and categorized all remaining claims. Those that are consistent with State law will be recognized; those that are not consistent will be denied. DMF will then undertake a certified mail notification to each claimant. For those claimants who cannot be notified by certified mail, DMF will follow-up with a newspaper notification, in at least four (4) papers having general circulation along the coast. The notifications will advise the claimants of their appeal rights.

3. Pursuant to the authority delegated to the Director of the Division of Marine Fisheries, in accordance with G.S. 143B-10, the Habitat Protection Section reviewed and commented on permit applications submitted to the State agencies which affect public trust areas and resources pursuant to G.S. 113-131. As needed, support was also provided to the Marine Patrol when seeking removal of unlawful encroachments upon or other violations of the public trust rights of the people of the State of North Carolina, or legal rights of access to such public trust areas, pursuant to G.S. 76-40 and G.S. 113-131.

4. Claims that were submitted pursuant to G.S. 113-205 which were located outside the 25 coastal counties are being held until resolution of those claims within the 25 coastal counties. After review of the 189 non-coastal files which need to be addressed, it was determined that there are an additional 502 claims (tracts of land) which need to be resolved. (See Attachment 1).

5. Due to the complexity of the remaining files, it is often necessary to meet with individual claimants to prevent misunderstandings and avoid additional court action. The remaining files have multiple claims as well as multiple tracts of lands, many of which are now subdivisions. This situation results in an

increase of the number of claimant files which need to be opened. Public trust issues may arise from these claims, which require additional research time to provide answers to claimants and other inquiring citizens.

6. Throughout the reporting period, in addition to assisting DMF with reviewing and updating remaining claims, paralegals in the Air & Natural Resources Section also supported requests for assistance from the Division of Marine Fisheries and other Divisions of the Department of Environment and Natural Resources, the Wildlife Resources Commission, the Department of Administration, and attorneys in the Environmental Division of the Department of Justice. These projects included determination of the responsible parties for leaking underground storage tanks; assisting other agencies such as the Division of Coastal Management (CAMA), the Division of Land Quality, and Division of Water Quality, as well as providing litigation support in significant cases such as Giampa, et al. v. Currituck County, et al. (Currituck Co., No. 98 CVS 153), which challenges the right of the public to use the ocean beaches between the dunes and the mean high water line, and PCS Phosphate, Inc. v. State of North Carolina, et al, (Beaufort Co., No. 03 CVS 75), which contests the navigability of, and State title to certain tributaries of the Pamlico River and South Creek.

7. During the reporting period the Habitat Protection Section was managed the Division of Marine Fisheries Habitat Alteration Permit Review Program, under authority of G. S. 113-131. The Section provided 1,075.5 man-hours to ensure Division comments on habitat alteration permit applications were provided to the appropriate state and federal agencies for CAMA major permits, NPDES permits, Section 401 certifications, U. S. Army Corps of Engineers notices, numerous environmental assessments, environmental impact statements, and other documents.

   The Habitat Protection Section devoted most of its resources to the Coastal Habitat Protection Plan program, as provided in G. S. 143B-279.8. Section staff, working with staff of several other DENR agencies, is writing the Coastal Habitat Protection Plan (CHPP) to achieve the legislative goal of enhancing the coastal fisheries associated with each habitat. Several plan chapters are drafted; technical reviews are underway. Two members each of the Environmental Management, Marine Fisheries, and Coastal Resources commissions serve on the Intercommission Review Committee (IRC). The IRC is reviewing the technical drafts, and they will develop the actual management recommendations to include in the CHPP, which is to be adopted by the three commissions by 31 December 2004.

The accomplishments made this year have been the result of the continued aggressive action on the part of the Public Trust/Submerged Lands staff within the Habitat Protection Section of the Division of Marine Fisheries and the attorneys and staff of the Air and Natural Resource Section of the Environmental Division of the Department of Justice.

The cumulative accomplishments made by the Public Trust/Submerged Lands staff are as follows:

1. Original files opened by 1 January 1970 totaled 3,263 Of these, 189 files were for claims outside the 25 coastal counties, leaving a total of 3,074 files. As of the date of this report, 82 original files asserting private rights in state owned submerged lands remain to be resolved. All claims will be resolved by 31 December 2003.

2. Each file may contain multiple claims. Claims handled and entered into the computer system now total 14,499. Of these, 4,825 were original claimants, and 9,674 are current claimants. Current claimant figures do not include original claimants whose claim was resolved as a result of a deed conveying their interest or by an estate filing. Consequently, to date, we have resolved 12,287 claims.

3. The attached charts in Attachment 2 show the distribution of claims by counties, categories, and disposition. Chart 1 shows the number of claims processed by county. Additionally, Chart 1 shows the type of claims processed by county, and cumulative numbers by category (right hand column). Lastly, Chart 2 shows the disposition of files processed by county and cumulatively (right hand column).

4. We continued to pursue donations pursuant to G.S. 105-151.12, the North Carolina Conservation Tax Credit Program. Since 1988, we have been successful in resolving claims through the State Tax Credit Program and donations of lands to conservation groups. The total acreage donated to date is approximately 12,372.83 acres, with two donations pending, consisting of 52 acres.

OBJECTIVES FOR 2003-2004

1. We intend to attain successfully the goal of resolving all remaining claims asserting private rights in State-owned submerged lands prior to 31 December 2003. However, the Division has other duties and obligations under G.S. 113-205 and -206 which do not end as of December 31, 2003.

For example, G.S. 113-206(a) imposes upon the Secretary the duty to chart the claims. This is a significant requirement. A final map is essential to meet the ultimate goal of the statute, and will constitute a lasting record identifying submerged lands in which private rights have been recognized. This will not only benefit the State agencies responsible for management of those submerged lands, but will provide accurate notice of them to the public. The Division is presently developing a plan to map the recognized claims using DMF's existing Geographic Information System (GIS) capabilities. In addition, a claimant who is unsatisfied may continue to negotiate the resolution of the claim during the running of the three-year statute of limitations, or file a lawsuit contesting the resolution of his claim. Litigation may result from the resolution of some claims.

2. After meeting the 31 December 2003 deadline, personnel which have been supporting the resolution process will be able to devote additional needed resources to assist the Division of Marine Fisheries, other DENR Divisions, the Wildlife Resources Commission, the Department of Administration, and attorneys in the Environmental Division of the Department of Justice.

3. Continue to review permit applications submitted to State agencies as they pertain to public trust resources pursuant to G.S. 113-131, upon request.

4. Continue to support the Marine Fisheries Law Enforcement Officers in identifying and seeking removal of signs and other obstacles unlawfully placed in navigable waters pursuant to G.S. 76-40 and G.S. 113-131.

5. Continue to provide personnel and clerical support for Fisheries Reform Act of 1997 and House Bill 1448 of the 1998 Fisheries Reform Act amendments, as assigned by the Fisheries Director.

ANNUAL REPORTING REQUIREMENTS

G.S. 113-206(f) requires that on or before October 1 of each year, the Secretary shall report to the Joint Legislative Commission on Governmental Operations stating the following:

1. The number of claims registered pursuant to G.S. 113-205 that were resolved during the preceding year: Between 30 September 2002 and 1 October 2003, 414 claims were resolved.

2. The cost of resolving these claims: The cost of resolving claims during fiscal year 2002-03 period was:

AGENCY	EXPENSES	SALARIES	TOTAL
DENR	$ 5,416.21	$ 24,562.18	$ 29,978.39
DOJ	$ 7,125.38	$ 190,813.33	$197,938.71
TOTAL	**$ 12,541.59**	**$ 215,375.51**	**$227,917.10**

NOTE: The salaries have been prorated for time devoted to submerged lands claim resolution.

3. The number of unresolved claims:

Approximately 304 tracts of submerged lands claims to State-owned submerged lands (contained in about 82 original claim files) remain to be resolved. Using the rationale that there will be at least three current claimants to each tract of land unresolved, the estimated number of submerged lands claims to be resolved is 912. These will all be resolved as of 31 December 2003, either by certified mail or publication.

4. Payments made to acquire claims by condemnation:

No payments have been made for condemnation acquisitions.

DEFINITIONS

1. **ABANDONED (AC):** Issued when a claimant has failed to respond to the letter of inquiry or no requested supporting documentation is received with the established time following service of the letter or request.

2. **BOARD OF EDUCATION (BOE):** The claim is premised upon a deed issued by the State Board of Education.

3. **CONDEMNATION PROCEEDINGS (CP):** The property is now owned by the State of North Carolina or the U.S. Government.

4. **COURT JUDGMENT (CJ):** The property is now owned by the State of North Carolina or the U.S. Government.

5. **CURRENT CLAIM:** Each tract or lot in a subdivision is a claim.

6. **CURRENT CLAIMANT:** The person who now owns an interest in a tract of land.

7. **DENIAL (LD):** Sent to those claimants whose claims have been determined not to have any validity to the land being claimed.

8. **DONATIONS (DO):** Property donated to the State by a claimant.

9. **EXCLUSIVE FISHERY (EF):** The claim is to exclusive finfishing rights (as opposed to shellfishing), usually a form of net fishing, premised upon custom and usage, or a seine fishery grant.

10. **INLAND POCOSIN (IP):** The property is a swamp in an inland coastal region.

11. **INTEREST TERMINATED (IT):** Original claimant has conveyed all of this interest or passed interest by will or intestate succession.

12. **LATE FILING (LF):** The claim was filed after January 1, 1970. If the claim was postmarked on January 2, 1970 or before, it should be considered timely filed, unless contrary information appears in the file.

13. **LEASE (LE):** Perpetual franchise converted to a lease; i.e. a lease in lieu of a perpetual franchise.

14. **LIMITED PURPOSE (LP):** Such rights of use; i.e., piers for access or mooring, shellfish cultivation, duck blinds, etc.

15. **LOW WATER (LW)**: The claimant asserts that his property line extends to the low water mark. In New Hanover County, such claims are premised on Chapter 757 of the 1903 Sessions Laws.

16. **MARSH NOT BOE (MS):** The claimant asserts title to flooded marshland, (i.e.; below the high water mark) not conveyed by the Board of Education. Irregularly flooded marshland, (i.e.; above the high water mark) may initially be included in the category where the file lacks sufficient information to determine whether the marshland is flooded.

17. **MUNICIPALITIES (MU):** Property now owned by incorporated cities, towns, and villages.

18. **NON-205 (N2):** The property claimed does not lie within one of the 25 coastal counties covered by General Statute 113-205.

19. **NOT SUBMERGED (NS)**: The claimant's deeds and maps did not describe an interest in lands beneath navigable waters or below the mean high water line.

20. **NULL & VOID (NV):** Failure by a claimant to provide evidence to the Division within 90 days which results in a reversal of the initial determination shall render the claim null and void.

21. **OPEN WATER (OW):** The claim describes lands submerged by open water, claiming the lands in fee simple. There are three possible types:
    1. Navigable water body: Waters which are subject to the influx of salt water or are navigable-in-fact.
    2. Non-navigable water body: Waters which are neither subject to the influx of salt water nor are navigable-in-fact.
    3. Supported by deed: Generally, the claimant submitted a deed describing lands which are "Not Submerged", but extends his/her property line into navigable waters.

22. **ORIGINAL CLAIM:** Each tract of land is a separate claim.

23. **ORIGINAL CLAIMANT (OC):** Each person who has an interest in a tract of land is a claimant.

24. **ORIGINAL FILE:** File that was opened when claim was received between 1965 and 1970. File includes multiple claimants (persons) and tracts.

25. **PRIVATELY OWNED BED (PO):** The beds of water bodies created by the excavation of lands above the high water mark.

26. **PRIVATELY OWNED BED/DENIAL (PD):** Recognizes beds of water bodies created by the excavation of lands above the high water mark; denial of any natural bed covered by water which is superjacent to the excavated lands.

27. **PRIVATELY OWNED LAKE (PK):** An inland body of water or basin, either natural or man-made, being permanent in nature, surrounded by land, and not fed by navigable waters of the State, privately owned.

28. **RELINQUISHED CLAIM (RC)**: Is issued when a claimant answers our letter requesting a chain of title. Requires a letter from the current claimant or his/her attorney stating that they do not want to assert their claim or words to that affect.

29. **SHELLFISH (SF):** The claim is to exclusive shellfishing rights. These are variously called "deeded bottoms," "oyster bottoms," "oyster gardens" and the like. They are usually premised on perpetual franchises, clerk of court issued licenses, or long and continuous usage.

30. **STATE PROPERTY (SP):** Property conveyed to the State by whatever means.

31. **TRUST LAND (TR):** Property conveyed to North Carolina Land Trusts, National Audubon Society, or other authorized conservation trusts.

32. **U.S. GOVERNMENT OWNED (US):** Property conveyed to the U.S. Government by whatever means.

33. **WHARF EASEMENT (WE):** The claim is based on a wharf grant issued to the riparian owner.

COUNTIES

BEA - BEAUFORT

BER - BERTIE

BLA - BLADEN

BRU - BRUNSWICK

CAM - CAMDEN

CAR - CARTERET

CHO - CHOWAN

COL - COLUMBUS

CRA - CRAVEN

CUR - CURRITUCK

DAR - DARE

GAT - GATES

HAL - HALIFAX

HER - HERTFORD

HYD - HYDE

MAR - MARTIN

NEW - NEW HANOVER

NOR - NORTHAMPTON

ONS - ONSLOW

PAM - PAMLICO

PAS - PASQUOTANK

PEN - PENDER

PER - PERQUIMANS

TYR - TYRRELL

WAS - WASHINGTON

North Carolina Division of Water Quality
Annual Report of Fish Kill Events
2003

Water Quality Section
Environmental Science
Branch
Raleigh, NC
December 2003

Introduction

The investigation of fish kill activity across North Carolina currently involves protocols established by the North Carolina Division of Water Quality (DWQ) in 1996. The protocols were developed with assistance from DWQ Regional Office staff, North Carolina Wildlife Resources Commission biologists, and Division of Marine Fisheries personnel as a means to improve the tracking and reporting of fish kill events throughout the state. Fish kill and fish health investigation data are recorded on a standardized form and sent to the Division's Environmental Sciences Branch (ESB) where the data are reviewed and compiled. Data from fish kill investigation forms, laboratory test results and supplemental information sent to the ESB are entered into a central database where the information can be managed, queried and reported. The procedure also requires the notification of appropriate state officials and scientists associated with the investigation of such events. In addition, reported kill information is updated weekly on the ESB website at: **www.esb.enr.state.nc.us/Fishkill/fishkillmain.htm**.

DWQ fish kill protocols have proven successful in standardizing the methods for investigations and improving the quality and quantity of information reported from the scene of a kill event. Meaningful conclusions about where and why fish kills occur across North Carolina demand accurate and timely data. It is the intent of DWQ to generate this information through the current investigation process.

This document is a summary of fish kill events reported to the DWQ from January to mid December, 2003. The report is mandated under Section 4 of Chapter 633 of the 1995 North Carolina General Assembly Session Laws.

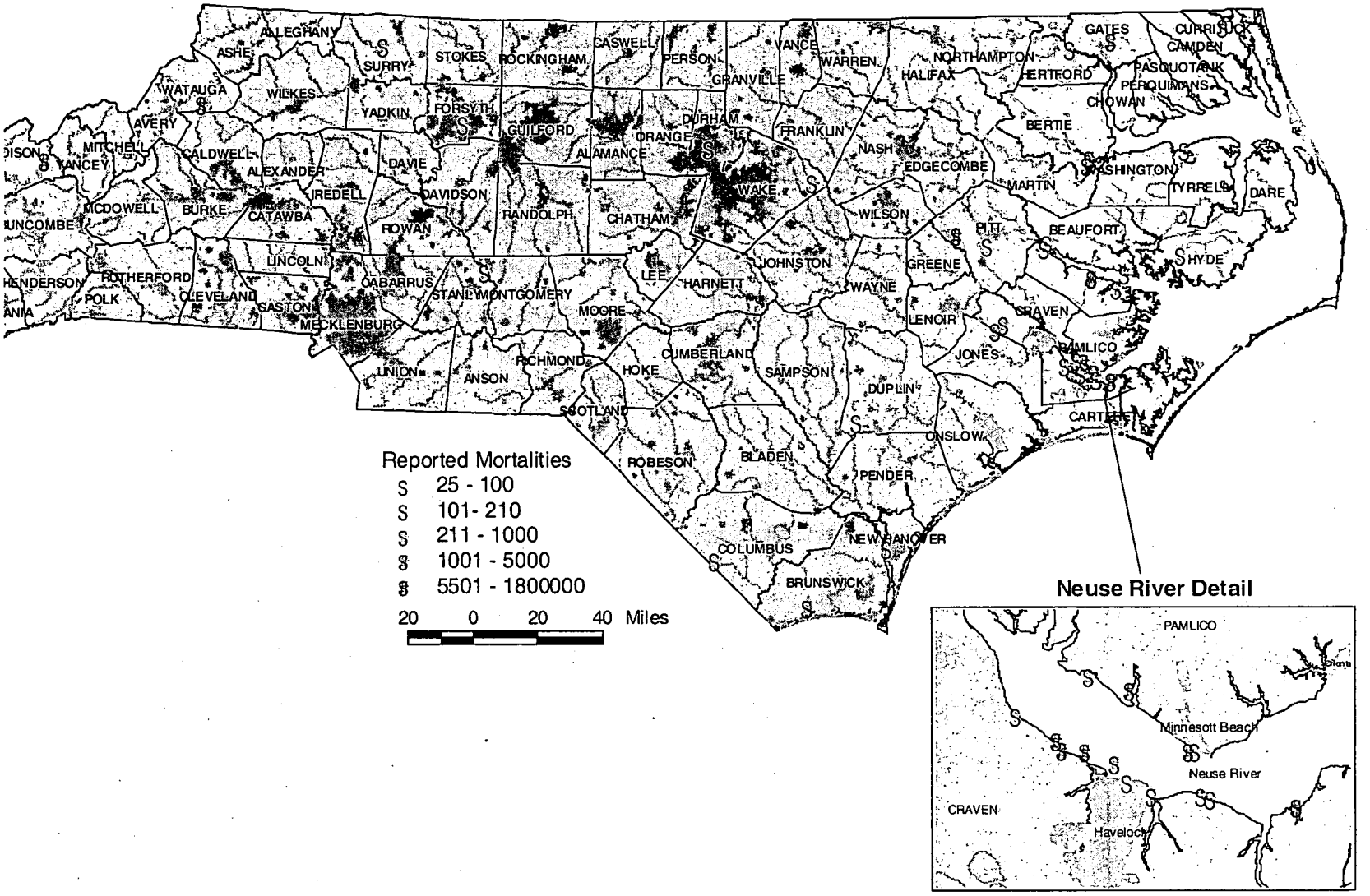
2003 Fish Kill Summary

Field investigators reported 43 fish kill events from January to December, 2003. Kill events were reported from coastal estuarine waters westward as far as Madison County. Kill activity was documented during the year in 10 of the state's 17 major river basins. The ESB tracks fish kill events when at least 25 fish are affected and the event is confirmed by investigators.

The cumulative fish mortality for all 2003 reports was over 3.6 million. This represents a significant increase over the 2002 total and is the highest mortality total since systematic fish kill reporting began in 1996. It is important to note that 3.1 million (86%) of the 2003 total was reported from just two large events on the Neuse River (See Notable Events below). Mortality totals for individual events ranged from 50 to 1.8 million with a median mortality of 1400. Reported activity was evenly divided between freshwater and estuarine waters although the largest events occurred in the estuaries. No reports were received from the Atlantic Ocean.

• **Total Kill Events for 2003**	**43**
• **Cumulative Mortality for 2003**	**3,694,053**
▪ *Estuarine*	*3,450,250*
▪ *Freshwater*	*243,803*
• **Report Mortality Range**	**50 to 1.8 million**
• **Report Median Mortality**	**1400**
• **Basins with Activity**	**10 (of 17)**
• **Freshwater Kills**	**22**
• **Estuarine Kills**	**21**
• **Ocean Kills**	**None**

Figure 1 : Fish Kill Events Reported to NCDWQ During 2003



Basin Activity

Investigators reported fish kill events in 10 of the state's 17 major river basins during 2003 (Figure 1, Table 1). Nearly half of the year's kills occurred in the Neuse Basin with activity being especially heavy below New Bern in the Neuse River estuary. A total of 15 kills were reported in the area of the Neuse stretching from New Bern to Long Creek. This area has been plagued by environmental factors such as low dissolved oxygen, high water temperatures, and fluctuating salinities. Activity in other river basins across North Carolina was relatively light although a number of severe fish kills were observed in the Chowan, Pasquotank and Roanoke basins following Hurricane Isabel in September (see Notable Events below). No fish kill reports were received from the Broad, Catawba, and White Oak basins in 2003. Since 1996 annual totals of statewide events peaked in 2001 with 77 reports but continued to decreased in 2003 to only 43, the lowest total for this time period. Most reports were received during the months of July, September, and October.

Table 1: Fish kill reports by basin, 1996 – 2003

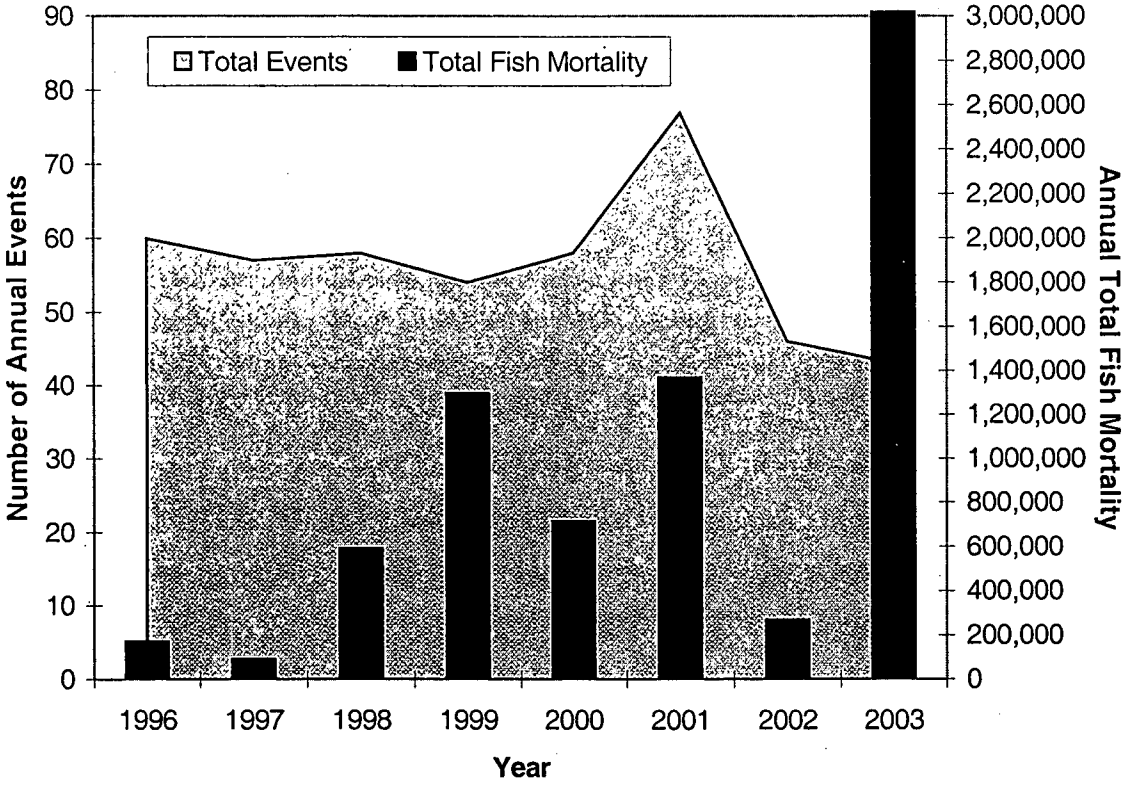
	YEAR							
River Basin *	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Broad	None	None	None	1	None	None	None	None
Cape Fear	21	16	23	14	12	5	8	3
Catawba	None	3	1	3	2	4	1	None
Chowan	2	2	1	1	None	1	2	2
French Broad	None	2	3	1	None	None	1	1
Neuse	14	12	8	16	23	37	9	21
Lumber	4	3	5	None	2	None	None	2
Pasquotank	10	2	8	2	None	1	6	2
Roanoke	2	None	1	None	None	None	None	2
Tar/Pamlico	3	6	5	11	14	23	8	6
New/Watauga	None	None	None	1	None	None	None	2
White Oak	3	3	1	3	3	3	3	None
Yadkin	1	10	2	1	2	3	8	2
Yearly Totals	**60**	**57**	**58**	**54**	**58**	**77**	**46**	**43**

** No fish kill reports have been received from the Hiwassee, Little Tennessee., and Savannah basins since 1996.*

Fish Mortality

Although 2003 produced the lowest number of fish kill events since 1996, the cumulative fish mortality for 2003 was the highest reported in the last eight years (Figure 2). Investigators reported a total of over 3.6 million fish killed for the year. The majority of the year's total (3.1 million) was reported from just two large events in the lower Neuse River near Carolina Pines. Fish mortality figures on 2003 reports ranged from 50 to 1.8 million with a median mortality of 1400 fish.

Figure 2: Reported annual fish kill events and mortality, 1996 to 2003

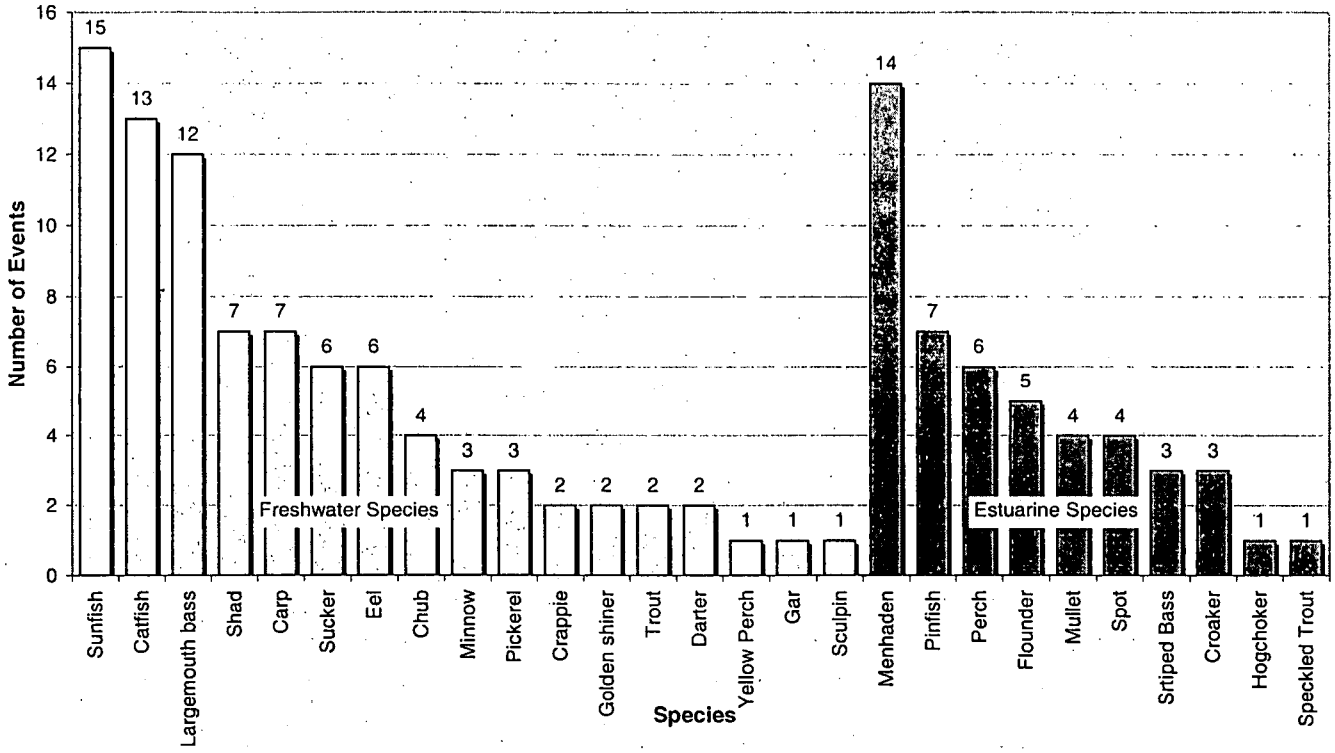


Fish and Other Species Reported

Fish kill events in 2003 involved 27 different species of fish in both estuarine and fresh waters (Figure 3). Freshwater species most commonly identified during investigations included sunfishes, catfishes, and largemouth bass. Estuarine species most commonly reported included menhaden, pinfish, and perch. Atlantic menhaden have historically been involved in a majority of estuarine kill events and have exhibited stress and disease in conjunction with fish kills. Menhaden often display gross or microscopic lesions along with chronic symptoms and fungal infections consistent with ulcerative mycosis described by Noga, et al (1993).

Other non-fish species were also cited on 13 reports. Freshwater species included aquatic insects, salamanders, frogs, turtles, snakes, and crayfish. Estuarine reports included two kills of *Macoma* clams in Beaufort County during June and July. Several reports also noted kills of blue crab in addition to finfish species.

Figure 3: Finfish observed during 2003 fish kill events

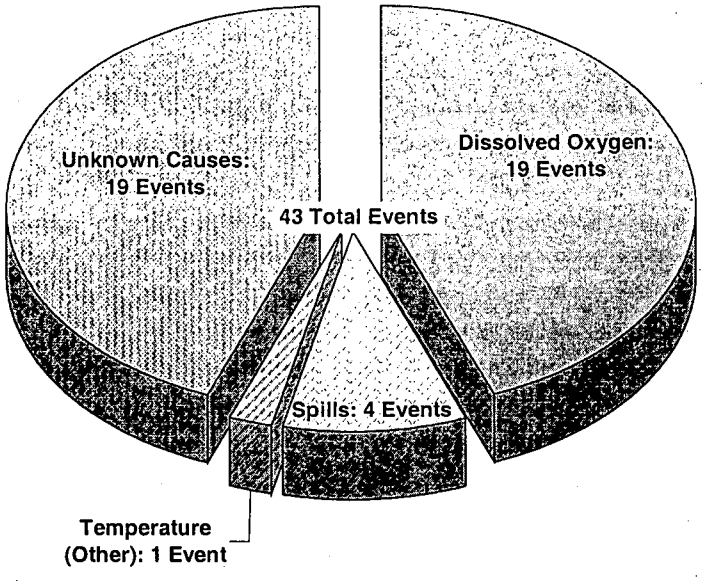


Suspected Causes of 2003 Events

Specific causes of fish kill events may or may not be obvious to investigators depending on a host of factors. Many causes are identified, but others remain unconfirmed or unclear due to an investigation occurring hours or days after the actual event. Kill events often result from many environmental conditions, and sorting out the major reason(s) why a fish kill occurs is frequently a difficult and often subjective task. Investigators are encouraged to submit suspected causes on reports along with supporting information as part of DWQ fish kill investigation protocols. Suspected cause reports aid in evaluating potential water quality trends and problems, and assist scientists and decision-makers with formulating future courses of action. Suspected causes on reports should not be viewed as a definitive label for a particular event.

Reported causes of 2003 kill events are summarized into four categories –dissolved oxygen (DO) induced events, spills, and other (miscellaneous) causes. Those events where no specific causes could be determined were assigned as "unknown" (Figure 4).

Figure 4: Reported Causes for 2003 Fish Kill Events



Dissolved Oxygen Depletion: Poor dissolved oxygen (DO) was cited as a factor in 19 kill events during 2003. DO depletion was also reported as a factor in the years largest fish kills observed in the lower Neuse estuary during August and September (see Notable Events). Events in the lower Neuse were associated with upwelling of hypoxic water from the river bottom or depletion of DO in warm shallow areas. Hypoxic conditions have historically occurred in North Carolina's estuaries as nutrient and organic loading coupled with water column stratification deplete DO levels during the summer months. Several large fish kills in the Chowan/Pasquotank and Roanoke river basins were also attributed to DO depletion following Hurricane Isabel. Severe runoff, flooding of agricultural areas, and flushing of swamps and backwaters resulted in high inputs of oxygen demanding organic material into the northeastern North Carolina waters. The hurricane effects resulted in a DO level of 0.5 mg/L or less in portions of the Chowan and Roanoke rivers for a period of weeks. DO kills on several freshwater impoundments were associated with high water temperatures and heavy infestation of decomposing vegetation/algae.

Spills: Toxic spills may deplete DO levels in receiving streams or induce kills outright through physical or chemical toxicity. Spills were reported as a cause in four kill events during 2003 (Table 2).

Table 2: Spill-induced fish kills during 2003.

Date Investigated	Waterbody	County	Mortality	Comments
1/7/2003	California Creek	Madison	83000	Kill caused by a tanker truck spill of propionic acid directly into California Creek.
4/23/2003	Core Creek	Craven	1200	Kill likely caused by spill of chlorpyrifos. Analyses showed levels as high as 5.1 ppb in water samples.
5/3/2003	Grape Creek	Craven	2000	The kill was reported by a local citizen after noticing a white substance in a pile in the stream. The substance was toxic to aquatic organisms killing all aquatic fauna in the affected area. Three organophosphates were identified : chlorpyrifos, fenamiphos, and malathion.
10/15/2003	Middle Fork South Fork New River	Watauga	14300	Fish kill was the result of a 3000 gallon spill of sodium hydroxide from the town of Blowing Rocks water filtration plant. The spill caused a kill extending at least 5.8 miles below the plant. The pH of the stream below the spill was measured at 11.5. DWQ issued a notice of violation to the town.

Unknown Causes: Causes for kill events are reported as unknown when investigators fail to cite specific reasons for an event. Investigations may not provide definitive causes when they are conducted too long after an event and no clear factors are determined, or when causes are suspected but not confirmed. Investigators failed to cite or confirm causes for 19 of the year's reports. Reports with unknown causes were received from both estuarine and fresh waters. Many of the reports with unknown factors involved atlantic menhaden in coastal estuaries with a high incidence of lesions.

Other: Investigators reported a kill of at least 2000 speckled trout on the Pamlico River during the month of January. Fish were seen dying over a broad area stretching from Blount's Creek downstream to the Pungo Creek area. Investigators cited extremely low water temperatures as a cause for the event. Reports of cold weather events or "winter kill" are not uncommon in North Carolina. Records show the events usually occur in the months of January and February following periods of extreme cold.

ESB Examinations for Harmful Algae: During 2003, the ESB staff routinely examined water samples associated with estuarine fish kills for the presence of *Pfiesteria* and *Pfiesteria*-like organisms. ESB examinations were performed using light and epifluorescent microscopy. Suspect samples warranting further confirmation for toxic *Pfiesteria* species were also forwarded to UNC-Greensboro and the NCSU Center for Applied Aquatic Ecology for further tests. These tests include fish bioassays, scanning electron microscopy, and an RNA probe that can discern the presence of actual *Pfiesteria* cells. *Pfiesteria*-like cells examined by ESB staff during 2003 appeared as nontoxic obligate autotrophs and not forms historically associated with fish health events. At the time of this report, all confirmatory tests results have been reported as negative and all involved laboratories have reported that toxic *Pfiesteria* was not a causal factor in any of the 2003 events.

ESB staff members identified a number of dense algal blooms in the White Oak, Tar/Pamlico, and Neuse River basins. Some of these blooms were associated with fish kill events (occurring around the time of the event) but could not be determined as a cause. Notable were elevated levels of the algal flagellate *Heterosigma akashiwo*. The alga can produce brevetoxin and facilitate the growth of bacteria in fish. *H. akashiwo* has been associated with fish kills in other regions of the world but has yet to be linked to events in North Carolina. ESB staff members will continue to monitor the occurrence of the species.

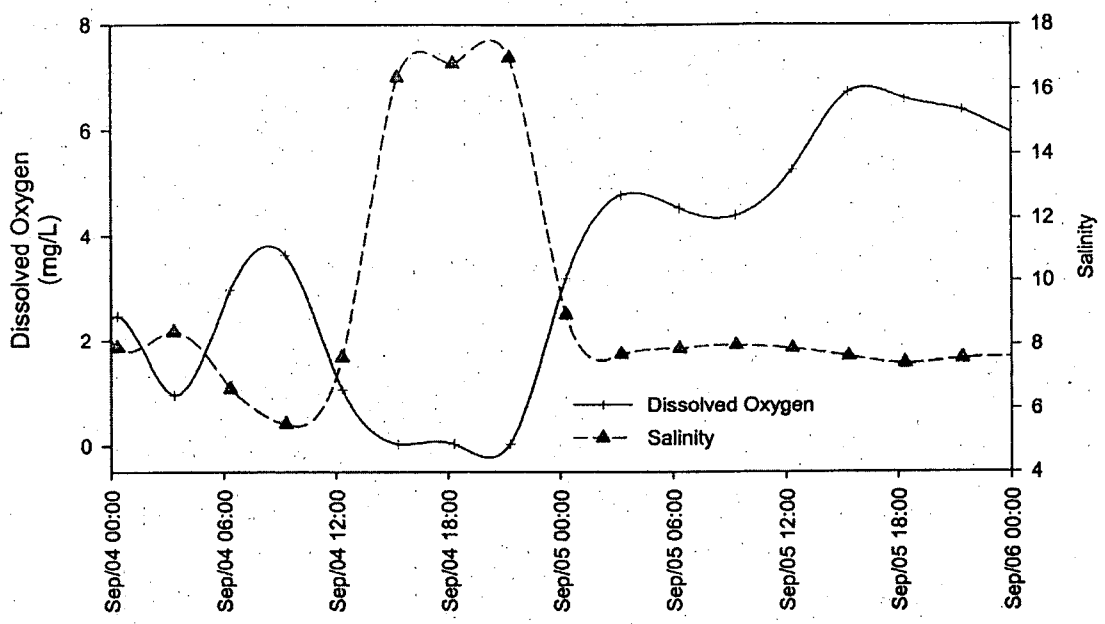
Notable Events

Pesticide Spills, Core Creek and Grape Creek, April and May, 2003: During the Spring of 2003 investigators reported fish kills on Core and Grape creeks near Cove City (Craven County) as a result of pesticide spills. The Core Creek event occurred in April apparently as a result of a spill of chlorpyrifos (Dursban), a broad range insecticide that poses acute toxicity risks to aquatic life. A second pesticide event occurred on Grape Creek, a tributary to Core Creek in early May. Water samples collected in the wake of both events showed chlorpyrifos levels as high as 5.1 ug/l in addition to the presence of fenamiphos (a highly toxic organophosphate) and malathion. The subsequent concern over the risk from dermal exposure and consumption of fish exposed to fenamiphos and the other organophosphates resulted in the Craven County Health Department temporarily posting a human health advisory in Core and Grape Creeks for swimming and fishing. During this time the DWQ perfomed fish tissue sampling in Core Creek to assess pesticide contamination. Fish tissue (as well as previous water samples) were delivered to Dr. Damian Shea of the North Carolina State University Department of Environmental and Molecular Toxicology for analyses. Dr. Shea reported no detectable levels of the target pesticides in fish tissue. Further water sampling throughout June showed chlorpyrifos, fenamiphos and other organophosphate levels had decreased below recommended levels of concern for ingestion and dermal exposure. The Craven County Health Department lifted the advisory for Core and Grape creeks in July.

Large Fish Kill Events, Neuse River near Carolina Pines, August And September 2003: The section of the lower Neuse River between New Bern and Minnesott Beach has historically been a trouble spot for fish kill activity. Fish kills in the area were especially prevalent during 2003 with 15 events reported. During late August and early September the Neuse River Response Team (NRRT) investigated two very large kill events near Carolina Pines (Craven County). Together the events involved at least 3.1 million individuals comprised of menhaden and other estuarine species. Data from US Geological Survey and North Carolina State University monitoring equipment indicated that mixing or upwelling of hypoxic water from stratified layers in the river was largely responsible for the kills. Instruments recorded a severe drop in DO levels in adjacent areas of the Neuse prior to both events (Figure 4). DO depletion matched an increase in wind speed that likely caused the mixing events. ESB staff analyses of phytoplankton samples collected during the events showed a very diverse mix of algal species commonly seen in the Neuse that may have also contributed to the fish kills. Pfiesteria-

like dinoflagellates were absent in phytoplankton samples or present at insignificant levels. NRRT reported few fish exhibiting lesions in either event.

Figure 4: NCSU Neuse River monitoring data near Carolina Pines showing depletion of dissolved oxygen and changes in salinity prior to fish kill – September 5, 2003



Hurricane Isabel Fish Kill Events, September 2003: On September 18 Hurricane Isabel came ashore on the Outer Banks as a category two storm and passed over the northeast region of North Carolina roughly from Ocracoke to Roanoke Rapids. The storm dumped from three to eight inches of rain in its path causing severe flooding in the Chowan/Pasquotank, Roanoke, Tar/Pamlico and Neuse drainages. Heavy rains flushed swamps and backwaters washing large quantities of oxygen demanding organic matter into rivers and estuaries. Investigators reported seven fish kill events directly related to Isabel. In addition, there were as many as twenty anecdotal reports of dying fish that could not be confirmed by response teams or agency staff.

Conditions were the worst in the Chowan and Roanoke rivers. DO levels on the Chowan were depressed for a period of weeks after the storm to as low as 0.2 to 0.3 mg/L from Tunis to 10.5 miles below Holiday Island. A kill was reported at Tuscarora Beach (400 fish), but reports of dispersed fish, dead and in distress, were numerous. Anecdotal reports suggest massive kills occurred throughout the Chowan in weeks following Isabel that were not recorded. The Roanoke River also suffered intense kill activity following Isabel. Approximately 21 river miles were affected from just above Jamesville to the river mouth below Plymouth. Over 93,000 dead fish were found in this stretch and thousands more were distressed. DO levels were at or below 0.42 mg/l throughout the entire zone.

2003 Summary

Investigators reported fish kill events in 10 of the state's 17 major river basins during 2003 with nearly half of the year's events occurring in the Neuse Basin. The number of fish kills reported across North Carolina during 2003 decreased from previous yearly figures to 43. This is the lowest number of reports since the DWQ began systematically tracking fish kill activity in 1996. Reported fish mortality, however reached the highest level since 1996 with over 3.6 million fish killed. Nearly half of the 2003 reports indicated DO depletion as a causal factor. Other reported causes included spills of toxic substances and winter kill.

Several notable events occurred during the year resulting in significant fish kills in eastern North Carolina. Pesticide spills in Grape and Core creeks in Craven County resulted in the Craven County Health Department posting a temporary advisory for the waterbodies. DO depletion in the Neuse River near Carolina Pines caused the year's two largest events that affected nearly 3.1 million fish. Hurricane Isabel caused severe flooding in the northeast corner of the state and subsequent fish kills on the Roanoke and Chowan rivers.

REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION AND FISCAL RESEARCH DIVISION OF THE NORTH CAROLINA GENERAL ASSEMBLY
ON
WATER QUALITY ACCOUNTABILITY FOR THE AGRICULTURE COST SHARE PROGRAM FISCAL YEAR 2002

INTRODUCTION

In 1983 the North Carolina Agriculture Cost Share Program (ACSP) was authorized by the General Assembly to improve water quality associated with agriculture in three nutrient sensitive areas of the state covering 16 counties. It was expanded in 1990 to include all 96 Soil and Water Conservation Districts covering all 100 counties.

While the Soil and Water Conservation Commission (Commission) has the statutory responsibility to create, implement and supervise the Cost Share program, it is delivered at the local level by 492 elected and appointed soil and water conservation district supervisors who are assisted by their staff and partners in natural resource conservation. These partners include technical and professional employees of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), the District or county, the Division of Soil and Water Conservation (Division), the Cooperative Extension Service, and the North Carolina Department of Agriculture and Consumer Services.

In this very popular program, participating farmers receive up to 75 percent of the average cost of an installed best management practice (BMP) with the remaining 25 percent paid by the farmer directly or through in-kind contributions (e.g., labor). When complete cost information is not available, the farmer is required to submit invoices and is paid at 75 percent of actual cost rather than average cost. Cost Share payments cannot exceed $75,000 per year per applicant.

The Commission continues to adapt the program to respond to changing needs and technology. For Program Year 2002, there were 44 approved BMPs grouped under 26 definitions in the ACSP. BMPs include both short-term and

long-term practices. The definitions of approved BMPs for the Cost Share program are provided in the Detailed Implementation Plan (Attachment A).

For a BMP to be approved by the Commission for the ACSP, there must be 1) an NRCS technical standard addressing that BMP, and 2) sufficient cost information to determine the appropriate cost share amount. Occasionally, BMPs are approved on a limited scale for evaluation purposes (District BMPs).

For most practices, the amount provided in cost share is based on 75% of a predetermined average cost for the practice. However, some practices are cost shared on 75% of actual cost due to the variable nature of the practice. (In the 2003-04 Budget Bill, the General Assembly approved a special budget provision that modified N.C.G.S 143-215.74(b) to allow beginning farmers and limited resource farmers to receive up to 90% cost share beginning in the 2004 program year.) The Commission conducts a wholesale review of its cost rates every three years, but it can make necessary mid-course corrections when presented with information that one of its predetermined costs is inaccurate.

Districts spot check a minimum of 5% of randomly selected active contracts each year to ensure that practices are being maintained properly. Further Division and NRCS also spot check contracts as part of regular reviews of district office implementation of the ACSP. Spot checks have shown excellent compliance with maintenance requirements by participating farmers. When practices are discovered to need additional maintenance, the district is usually able to assist the cooperator to restore the practice.

PROGRAM ACCOMPLISHMENTS

Since the first Cost Share contracts were issued in 1984, there have been 32,559 contracts for installing BMPs (through the end of program year 2002, which ended on June 30, 2002). Most BMPs have a life expectancy of ten years, which is how long participating farmers must agree to maintain the practices.

Early in the program, the major factor used for determining success was tons of soil saved because the program funded predominantly sediment and erosion control practices. It is estimated that an average of 5.54 million tons of soil have been saved annually during the life of the program. Since the mid-1990s, while continuing its attention on minimizing soil loss and erosion, the program has increased its attention on reducing and managing nutrients from cropland and livestock production. Part of the impetus for this new attention was the promulgation of the 15A NCAC 2H.0200 animal waste management rules and the nutrient sensitive waters strategies for the Neuse and Tar-Pamlico River Basins.

Highlights of additional accomplishments include the following:

- Over 100,000 acres of marginal or environmentally sensitive cropland have been converted to trees, grass, or wildlife habitat
- 2,029 waste management structures have been constructed to properly store and manage dry and wet animal waste
- 3,570 water control structures have been installed improving water management on and reducing nutrient loss from approximately 288,000 acres
- Over 820 miles of fencing have been erected, in combination with other practices (e.g., watering sources) to exclude livestock from streams
- Over 550,000 acres of cropland acres have been converted to no-till or conservation tillage to reduce sediment loss associated with traditional practices
- Over 80 miles of forested riparian buffer have been established
- 80 structures have been built for the proper handling and storage of agricultural chemicals (pesticides and fertilizers)

REPORTING REQUIREMENTS

Projects Receiving State Funds

Participating farmers have up to three years to complete the work included in ACSP contracts. Therefore, cost share payments made each year may be for contracts written in the current fiscal year or in the two previous fiscal years. For this reason the fund balance for the program may appear higher than expected, but it is important to remember that the vast majority of cost share funds are encumbered to contracts with cooperating producers.

Each contract is considered a "project." Each project may include only one BMP or a system of practices that include several BMPs. Cost share payments are made only when installation of the BMP is completed and certified to be in accordance with current NRCS or Commission standards.

Cost Share payments were applied to **1,845** projects between July 1, 2001 and June 30, 2002. These contracts received total payments of **$6,855,250**. A list of individual contracts to which Cost Share funds were applied in Program Year 2002 is available upon request.

New Contracts for Fiscal Year 2002

For Fiscal Year 2002 soil and water conservation districts requested **$23,920,210** to address identified water quality needs. The General Assembly appropriated **$5,669,897** in recurring general funds for BMP installation. Current funding levels give the ACSP the potential to serve less than one out of every four producers requesting financial assistance for installing BMPs to protect water quality in North Carolina.

For Fiscal Year 2002, the Commission allocated $10,450,228 to districts, from 2002 appropriations, from funds that were not encumbered to contracts in 2001, and from funds recovered from completed and expired contracts from Program Year 1999. (As noted in the 2001 Annual Report, there was a budget-related temporary freeze on program funds in 2001 that resulted in districts not being able to fully contract program funds in 2001.) The allocation included $1,000,000 earmarked by the Commission for installing BMPs in watersheds of streams on the state list of impaired waters due to sediment from agricultural sources. It also included a $500,000 earmark to be used for installing riparian buffers, which provides a portion of the state match for the Conservation Reserve Enhancement Program.

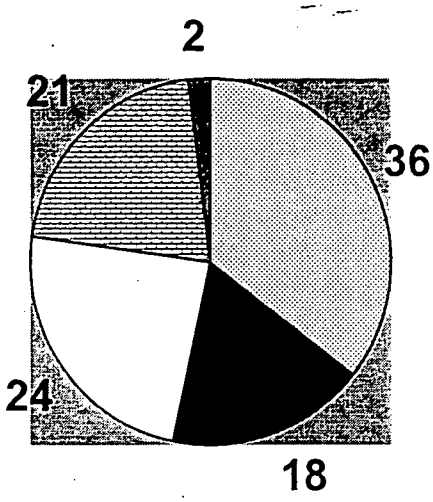
In Fiscal Year 2002 districts obligated **$8,582,513** to **1,937** new contracts with farmers.

Due to delays imposed related to the FY-2002 budget process, the Commission was not able to allocate ACSP funds to districts until its November 2001 meeting, which limited the ability of districts to write contracts to utilize all of the funds allocated by the Commission in 2002. Other districts experienced extended vacancies in technical assistance positions that are essential to working with farmers to develop and implement conservation plans, which also limited their ability to contract all funds available in 2002. Tight budgets at both the state and local level affected implementation of the program.

As shown in Figure 1, 35% of the 2002 funds were directed toward erosion and nutrient-reducing BMPs (e.g., conservation tillage, cropland conversion to grass or trees), 24% were directed toward stream protection systems (e.g., livestock exclusion from streams), 21% were directed toward animal operations for waste management BMPs (e.g., poultry litter storage structures, closure of inactive lagoons, livestock feeding/waste storage structures), 18% were directed toward sediment and nutrient-reducing BMPs (e.g., riparian buffers, field borders, grassed waterways), and 2% were directed toward agrichemical pollution prevention practices (e.g., agrichemical handling facilities).

Attachment B is a chart displaying a summary of contracts initiated during the 2002 program year (July 1, 2001 - June 30, 2002). This chart shows the planned as well as installed BMPs. The most-used single BMP from a financial and acres affected standpoint (nearly $1.7 million affecting over 18,000 acres) was the 3-year conservation tillage incentive. Attachment C presents the number and value of 2002 contracts by soil and water conservation district and each district's allocation of cost share funds for 2003.

Figure 1: Breakdown of 2002 ACSP Contracts by BMP Type



- Erosion/ Nutrient Reduction
- Sediment/ Nutrient Reduction
- Stream Protection
- Waste Management
- Agrichemical Pollution Prevention

Estimated Water Quality Benefits of ACSP Contracts Initiated in 2002

N.C.G.S 143-215.74(b)(7) requires that each project's benefits to water quality be estimated before funding is awarded. To meet this requirement, the Commission chose three indicators of water quality benefits: tons of soil saved, pounds of nitrogen saved or managed, and pounds of phosphorus saved or managed. Soil savings estimates have been required on all Cost Share contracts since the beginning of the program. Beginning with the 1997 program year, estimates of nitrogen and phosphorus savings were required to be reported. The Division continues to work with the Division of Water Quality, NRCS, and North Carolina State University to improve and refine our method to estimate and account for nutrient reductions.

These estimates have been very useful to help track progress by agriculture relative to the nutrient reduction requirements in the Neuse and Tar-Pamlico Nutrient Reduction Rules for agriculture. The ACSP is playing a key role in helping farmers achieve the 30% nutrient reduction required in these rules.

Local soil and water conservation districts determine which projects are eligible for funding in their districts according to a required priority ranking process, tailored to each district's water quality concerns. The water quality evaluations on each project are carried out at the district level, and the water quality benefit estimates are provided to the Division on each contract form. The data are entered from the contract form into the Division's cost share database and tracked by Division staff. The estimated sediment and nutrient reduction benefits for program years 2000-2002 are summarized in Table 1.

Some BMPs standing alone will not directly result in sediment or erosion reductions or nitrogen or phosphorus savings, but are used in conjunction with other practices. These BMPs are called "facilitating practices" and are necessary to facilitate and ensure that other practices in the BMP system are effective at reducing nutrient or sediment loading to a water resource. Therefore, their reduction credit is linked to the facilitated practice. An example of a facilitating practice is a water tank, which must be installed for livestock drinking water purposes before fencing can be put up to keep livestock out of a stream.

Table 1: Sediment and Nutrient Reduction Benefits for Program Years 2000 through 2002.

	2000	2001	2002
Number of Contracts	2,226	2,060	1,937
Acres Affected	121,854 acres	112,377 acres	82,543 acres
Soil Saved	373,915 tons	377,713 tons	263,256 tons
Nitrogen Saved	2,673,321 pounds	2,092,966 pounds	1,744,041 pounds
Phosphorus Saved	879,323 pounds	253,392 pounds	405,078 pounds
Waste Nitrogen Managed	5,478,403 pounds	6,530,669 pounds	4,710,852 pounds
Waste Phosphorus Managed	6,162,512 pounds	6,689,546 pounds	3,973,017 pounds

Effectiveness of Each Project to Accomplish Its Primary Purpose

The statutory purpose of the program and each project is to reduce the input of agricultural non-point source pollution into the water courses of the state, which is for water quality improvement. Each BMP approved for the Cost Share program is designed for one of five major purposes to protect the water resources of the state:

1) sediment/nutrient delivery reduction through reduction of applied nutrients, reduction of soil loss, or interception of nutrients from fields;

2) erosion reduction/nutrient loss reduction in fields through reduction of applied nutrients or prevention of soil detachment;
3) prevention of agricultural chemical pollution of ground or surface water from improper handling or accidents;
4) reduction of nutrient loading through proper management of animal waste; and
5) stream protection measures to reduce the delivery of sediment and nutrients by animals and stabilize streambanks to minimize further erosion and sediment contribution.

Attachment D is a chart showing the approved BMPs in these categories and their relationship to water quality improvement.

Staff of the Division, soil and water conservation districts, and NRCS has verified every project for which program year 2002 funds have been expended to have been installed in accordance with program standards and to be accomplishing its primary purpose.

TARGETING ACSP FUNDS TO WATERSHEDS OF IMPAIRED WATERS

The Commission continues to exercise leadership in allocating ACSP resources to local districts containing impaired waters and in encouraging district supervisors to use ACSP funds to address impaired waters. This is best illustrated by the fact that the Commission targeted $1,000,000 of funds available in 2002 for the specific purpose of installing erosion- and sediment-reducing best management practices into watersheds of waters listed on the State's 303(d) list of waters as impaired due to sediment from sources including agriculture in sixteen counties.

Historically, about 30% of ACSP funds have been used to implement BMPs in watersheds of impaired waters. Considering that only 3% of North Carolina's stream miles are attributed to being impaired by agricultural sources, this demonstrates that the ACSP funds are being significantly targeted toward improving streams that do not fully meet their uses.

Further, over 25% of funds contracted in Program Year 2002 were contracted with farmers in the Neuse and Tar-Pamlico River Basins, where farmers are required to reduce agricultural nitrogen loading by 30%.

The Commission also earmarked $500,000 of Program Year 2002 funds to seventeen districts to assist with implementation of riparian buffers in nutrient sensitive watersheds under the Conservation Reserve Enhancement Program.

NEW PROGRAM ENHANCEMENTS TO IMPROVE EFFICIENCY

Because of the need to continually improve the program's cost effectiveness, and because of recurring budget reductions in the program's appropriation, the Commission made several enhancements that took effect for the 2002 program year. These enhancements were designed to improve the efficiency by which program funds are used by agricultural cooperators to install best management practices.

One efficiency modification was to adopt a rule to revise the Commission's formula for allocating program funds to each soil and water conservation district. The revised formula improves fairness in allocating funds and will help ensure that districts with the greatest water quality needs and that have a proven track record of successful implementation receive a higher proportion of program funds each year.

Another efficiency improvement was designed to accelerate installation of BMPs under the program's multi-year contracts described earlier. This improvement targets program funds toward cooperators who are prepared to implement best management practices within 12 months of contract approval. If a cooperator fails to complete at least 1/3 of the work included in the cost share contract within 12 months of the contract approval date, then the contract will terminate. Because cooperators sometimes encounter conditions beyond their control, local soil and water conservation districts can grant an extension of up to 6-months to complete at least 1/3 of the work. This improvement was added to establish a better incentive for cooperators to begin work early during the contract period. This will result in fewer contracts terminating after lengthy contract periods, and more efficient use of program funds as cooperators and districts become accustomed to this higher standard. Of course, every attempt is being made to be fair and to work with cooperators who voluntarily participate in the cost share program to get practices installed.

COST-EFFECTIVENESS CONSIDERATIONS

The ACSP is an extremely cost-effective program from both a state expenditure perspective and the farmer's perspective. Without the program, progress under state water quality initiatives would be far less, and many farmers could not afford to implement BMPs (many of which are required by regulations). Because a farmer must invest at least 25% of the cost for BMPs, the farmer has ownership in the practice and is more likely to maintain it. The education value of local farmers participating the program is substantial in helping to change local practices.

The program has been effective in leveraging federal and local funds for conservation and nonpoint source pollution control efforts. Whenever possible,

the districts use the ACSP in conjunction with other programs, such as the federal Environmental Quality Initiative Program and the Conservation Reserve Enhancement Program, to stretch scarce resources as far as possible, and partner to meet the needs of cooperating producers and landowners.

Many districts also use program funds to leverage other grant funds (e.g., EPA 319, CWMTF) to maximize service to local farmers and local benefits for water quality.

Attachment E is an overview of the funding and compliance process used for implementing the Agriculture Cost Share Program.

This program is delivered locally by 492 elected and appointed volunteer Soil and Water Conservation District Supervisors. They receive no state salary, yet are responsible for seeing that state funds are spent where they are needed to improve water quality. District supervisors are required to develop a prioritization ranking system for administering the Cost Share Program in their respective district to maximize the water quality benefits of the program. Applications to each district are judged and prioritized according to this system. District supervisors also must inspect at least five percent of all Cost Share contracts in their District every year to ensure the BMPs are properly maintained.

The ACSP is also heavily dependent on the technical resources of the local soil and water conservation districts and the NRCS. District and federal employees develop conservation plans, design BMPs, and provide engineering assistance for water quality improvements at no cost to the farmers whose applications are accepted for Cost Share assistance. These staff also assist farmers and other landowners in implementing water quality projects using other funding sources such as the USDA's Environmental Quality Incentives Program and Conservation Reserve Enhancement Program, the U.S. Environmental Protection Agency's Section 319 Non-Point Source Program, and North Carolina's Clean Water Management Trust Fund.

A portion of the General Assembly's appropriation for the program is used to provide a state match for salaries of these district technical employees and for operating expenses to carry out the Cost Share program. For 2002, the General Assembly appropriated $1,875,000 in recurring funds for cost sharing technical assistance positions in local districts, and directed DENR to transfer $240,000 from BMP assistance to support technical assistance. County commissions provide 50% match, office space, and administrative support. In program year 2002 the cost share technical assistance program cost shared on 124 technical positions (118.94 FTEs) in 89 counties to assist farmers in designing and installing BMPs. These state match funds help to sustain local county support and funding for local delivery of the program.

NRCS engineers and conservation specialists are also available to each District. These federal employees carry out a portion of the Cost Share work support without cost to the state, and they provide additional technical resources and expertise to ensure that cost-shared practices are properly installed and maintained for the expected life of the practice.

In addition, NRCS permits district staff to use federal vehicles for use on state Cost Share work. NRCS also provides computers and sophisticated natural resources materials and computer software in all 100 county field offices, and develops the technical standards for most of the BMPs used in the Cost Share program. This state program leverages an equal or greater amount of federal funding for water quality improvements in North Carolina.

PROGRAM MANAGEMENT

A Division program staff of four FTEs (one position was eliminated in the 2002 budget) reviews approximately 2,000 contracts annually and processes about 3,000 requests for payment each year. The Division also maintains the ACSP Manual, trains local personnel, provides daily technical assistance to the districts, and conducts oversight through district program reviews in at least 24 Districts per year to ensure proper record keeping and BMP maintenance for continued water quality protection. In 1998 the Division requested a financial audit of the program by the State Auditor so that further improvements, if needed, can be implemented. A 1997 performance audit by a team of Duke University graduate students found the Agriculture Cost Share Program to function effectively, but it included some recommendations for improving the marketing, targeting, and accountability of the program, many of which have been or are being implemented.

Because the state specifies that the purpose of the program is to assist agricultural operations in addressing an existing water quality problem, the program does not assist new operations to go into business. It is the policy of the Commission that new producers or companies constructing new agricultural operations should be aware of the existing environmental requirements and technical standards and should be prepared to meet them without state funding assistance. This is especially important when existing operations are struggling to comply with new requirements that were not in place when they began operating. Therefore, the Commission has restricted eligibility for Cost Share funds to those operations already in existence as of May 1992 (the date that the .0200 rules were proposed) that need help to meet new regulations designed to protect ground and surface water. Operations that were not in existence as of May 1992 may still be eligible for cost-share if changes in environmental statutes or regulations (e.g., SB 1217 in June 1996) create new requirements that could,

without assistance, make the facility out of compliance. These exceptions require Commission approval.

IMPACT OF BUDGET REDUCTIONS IN 2001 AND 2002

For Fiscal Year 2001 the Department was directed to transfer $240,000 appropriated for BMP assistance to overcome a projected shortfall of funds for cost sharing for essential technical assistance staff in local soil and water conservation districts. This transfer represented a 3.4 percent reduction in the funding available for assisting farmers with costs to install best management practices for Fiscal Year 2002.

The 2002 budget bill made the transfer for technical assistance permanent. Further, for 2002 the recurring appropriation for the Agriculture Cost Share Program was reduced by another $1,000,000. The net effect of the reduction and diversion is that for Fiscal Year 2002 the funding available for assisting farmers to install best management practices was reduced by $1,240,000 (17.9%) relative to the Fiscal Year 2000 funding level.

This recurring loss of funds for the ACSP has had several negative consequences. These include:

- Reduction in the number of agricultural producers assisted, turning away an estimated 200-250 additional producers per year.
- Threatened the state's ability to provide the required 20% match for the $221 million in federal funds for the Conservation Reserve Enhancement Program (CREP). The non-federal match for CREP relies on $8.84 million of ACSP funds over 5 years used to establish riparian buffers on agricultural land enrolled in CREP. DENR may be forced to seek additional legislative appropriations or other non-federal revenue sources (e.g., Tobacco Trust Fund) or risk loss of federal funds through termination of the State's CREP agreement by USDA.
- Significant reduction in the financial assistance available to assist agricultural producers in the Neuse and Tar-Pamlico river basins to implement BMPs and achieve 30% nutrient reduction requirements.
- Reduction in financial assistance available to assist livestock and poultry producers to respond to new phosphorus management requirements resulting from modification to the NRCS Nutrient Management Standard and NPDES permitting requirements. These changes are creating enormous new demands on ACSP, even in advance of approaching federal regulation deadlines, as producers try to prepare to meet new requirements.
- Reduction in funds available for installing BMPs in watersheds of streams impaired by sediment from agricultural sources. The Agricultural

Sediment Initiative is a priority for the Soil and Water Conservation Commission and the Sediment Control Commission.

- Reduction in available funding for installing new riparian buffers and protecting streams from impacts from livestock and cropland. DENR wants to rely on voluntary approaches to establish and protect buffers, but ACSP is primary state program for this purpose.
- Perhaps the most significant consequence has been the danger of diminishing the local impact of the ACSP to the point that it may weaken and undermine local governments' support (match) for soil and water conservation district technicians who provide technical assistance (BMP design and installation oversight) to agricultural producers. The Soil and Water Conservation Commission has worked diligently with a reduced program appropriation over a number of years to build and maintain local support for district technical assistance. A reduction in local support will seriously jeopardize the state's ability to maintain a local technical support workforce for conservation programs. For example, if local county match for technical assistance funding is reduced or eliminated because BMP funds are reduced to a point of diminishing returns, local technical positions will be lost permanently, regardless of availability of state funds for match.

CONCLUSION

Based on the above considerations, the Commission believes the ACSP is being administered very cost-effectively and that considerable water quality benefits are being realized for the investment made with state funds. The program aids agricultural operations in making essential water quality improvements, the cost of which cannot be passed on to the consumer in the price of the food or fiber product, and thereby contributes both to water quality and to sustaining a strong state agricultural economy. The Commission continues to emphasize prioritizing, targeting, accountability, leveraging, and adaptability in managing these public funds to further improve the water quality benefits intended by the General Assembly.

The Commission believes that budget reductions have impacted the program's effectiveness and local support to a serious degree. However, the Commission also believes that actions taken to improve program efficiencies can help to partly offset these impacts. The ACSP plays a vital role in assisting farmers and ranchers with voluntary water quality protection and with compliance with state and federal regulatory requirements. The program is our state's cornerstone in efforts to support private lands stewardship for the benefit of water quality and all the citizens of North Carolina.

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Definition of Practices

(1) An agrichemical handling facility means a permanent structure that provides an environmentally safe means of mixing agrichemicals and filling tanks with agrichemicals for application and storage to improve water quality. Benefits may include prevention of accidental degradation of surface and ground water.

(2) A conservation tillage system means any tillage and planting system in which at least (60) sixty percent of the soil surface is covered by plant residue to improve water quality. Benefits may include reduction of soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

A. An annual conservation tillage for small grain system means a one year tillage and planting system using a small grain crop.

B. A three-year conservation tillage system means a tillage and planting system using the same fields for three consecutive years.

(3) A critical area planting means an area of highly erodible land that cannot be stabilized by ordinary conservation treatment on which permanent perennial vegetative cover is established and protected to improve water quality. Benefits may include reduced soil erosion and sedimentation.

(4) A cropland conversion practice means to establish and maintain a conservation cover of grasses, trees, or wildlife plantings on fields previously used for crop production to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(5) A diversion means a channel constructed across a slope with a supporting ridge on the lower side to control drainage by diverting excess water from an area to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(6) A field border means a strip of perennial vegetation established at the edge of the field that provides a stabilized outlet for row water to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(7) A filter strip means an area of permanent perennial vegetation for removing sediment, organic matter, and other pollutants from runoff and waste water to improve water quality. Benefits may include reduced soil erosion, sedimentation, pathogen contamination and pollution from dissolved, particulate, and sediment-attached substances.

(8) A grade stabilization structure means a structure (earth embankment, mechanical spillway, detention-type, etc.) used to control the grade and head cutting in natural or artificial channels to improve water quality. Benefits may include reduced soil erosion and sedimentation.

(9) A grassed waterway means a natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(10) A heavy use area protection means an area used frequently and intensively by animals, which must be stabilized by surfacing with suitable materials to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved, particulate, and sediment-attached substances.

(11) A livestock exclusion system means a system of permanent fencing (board or barbed, high tensile or electric wire) installed to exclude livestock from streams and critical areas not intended for grazing to improve water quality. Benefits may include reduced soil erosion, sedimentation, pathogen contamination and pollution from dissolved, particulate, and sediment-attached substances.

(12) A long term no-till practice means planting all crops for five consecutive years with at least 80 percent plant residue from preceding crops to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(13) A pastureland conversion practice means establishing trees or perennial wildlife plantings on excessively eroding land with a visible sediment delivery problem to the waters of the state used for pasture that is too steep to mow or maintain with conventional equipment to improve water quality. Benefits may include reduced soil erosion and sedimentation.

(14) A nutrient management practice means a definitive plan to manage the amount, form, placement, and timing of applications of nutrients to minimize entry of nutrients to surface and groundwater and improve water quality.

(15) A rock-lined outlet means a waterway having an erosion-resistant lining of concrete, stone or other permanent material where an unlined or grassed waterway would be inadequate to improve water quality. Benefits may include safe disposal of runoff, reduced erosion and sedimentation.

(16) A sediment basin means a basin constructed to trap and store waterborne sediment where physical conditions or land ownership preclude treatment of a sediment source by the installation of other erosion control measures to improve water quality.

(17) A sod-based rotation practice means an adapted sequence of crops, grasses and legumes or a mixture thereof established and maintained for a definite number of years as part of a conservation cropping system which is designed to provide adequate organic residue for maintenance or improvement of soil tilth to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(18) A stock trail or walkway means to provide a stable area used frequently and intensively for livestock movement by surfacing with suitable material to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved, particulate, and sediment-attached substances.

(19) A stream protection system means a planned system for protecting streams and stream banks that eliminates the need for livestock to be in streams by providing an alternative-watering source for livestock to improve water quality. Benefits may include reduced soil erosion, sedimentation, pathogen contamination, and pollution from dissolved, particulate and sediment-attached substances. System components may include:

(A) A spring development means improving springs and seeps by excavating, cleaning, capping or providing collection and storage facilities.

(B) A trough or tank means devices installed to provide drinking water for livestock at a stabilized location.

(C) A well means constructing a drilled, driven or dug well to supply water from an underground source.

(D) A windmill means erecting or constructing a mill operated by the wind's rotation of large vanes and is used as a source of power for pumping water.

(E) A stream crossing means a trail constructed across a stream to allow livestock to cross without disturbing the bottom or causing soil erosion on the banks.

(20) A stripcropping practice means to grow crops and sod in a systematic arrangement of alternating strips or bands on the contour to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop, fallow, or no-till crop, or a strip of grass is alternated with a close-growing crop.

(21) A terrace means an earth embankment, a channel, or a combination ridge and channel constructed across the slope to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(22) A waste management system means a planned system in which all necessary components are installed for managing liquid and solid waste to prevent or minimize degradation of soil and ground and surface water resources. System components may include:

(A) A waste storage pond means an impoundment made by excavation or earthfill for temporary storage of animal waste, waste water and polluted runoff.

(B) A drystack means a fabricated structure for temporary storage of animal waste.

(C) A livestock mortality management system means a facility for managing livestock mortalities such as to minimize water quality impacts or to produce a material that can be recycled as a soil amendment and fertilizer substitute. Cost sharable

mortality management system components include: composter, mortality freezer, and mortality incinerator.

(D) A waste treatment lagoon means an impoundment made by excavation or earthfill for biological treatment and storage of animal waste.

(E) A waste application system means an environmentally safe system (such as solid set, dry hydrant, mobile irrigation equipment, etc.) for the conveyance and distribution of animal wastes from waste treatment and storage structures to agricultural fields as part of an irrigation and waste utilization plan.

(F) A constructed wetlands for land application practice means an artificial wetland area into which liquid animal waste from a waste storage pond or lagoon is dispersed over time to lower the nutrient content of the liquid animal waste.

(G) A controlled livestock lounging area means a planned, stabilized and vegetated area in which livestock are kept for a short duration.

(H) A closure of abandoned waste treatment lagoons and waste storage ponds means the safe removal of existing waste and waste water and the application of this waste on land in an environmentally safe manner.

(I) A storm water management system means a system of collection and diversion practices (guttering, collection boxes, diversions, etc.) to prevent unpolluted storm water from flowing across concentrated waste areas on animal operations.

(J) An offsite or an alternative poultry dry litter waste utilization means applying, processing and/or transporting poultry dry litter such that it is properly utilized to reduce nutrient impacts.

(K) A feed/waste storage structure means a fabricated structure for the temporary storage of animal waste.

(23) A water control structure means a permanent structure placed in farm canals and ditches which provides control of surface and subsurface drainage to improve water quality. The primary benefit is to reduce nutrient pollution. Other benefits may include reduced pollution from other dissolved and sediment-attached substances, reduced sedimentation and reduced stormwater surges of fresh water into estuarine areas.

(24) An insect control system means a practice or combination of practices (planting windbreaks, pre-charging structures, incorporation of waste into soil, etc.) which manages or controls insects from confined animal operations, waste treatment and storage structures, and waste applied to agricultural land.

(25) A riparian buffer means an area adjacent to solid blue line streams as shown on 7.5 minute USGS maps where a permanent, long-lived vegetative cover (sod, shrubs, trees, or a combination of vegetation types) is established to improve water quality. Benefits may include reduced soil erosion, sedimentation, pathogen

contamination and pollution from dissolved, particulate and sediment-attached substances.

(26) An odor control management system means a practice or combination of practices (planting windbreaks, pre-charging structures, incorporation of waste into soil, etc.) which manages or controls odors from confined animal operations, waste treatment and storage structures and waste applied to agricultural land.

(27) A streambank stabilization system means the use of bio-engineering practices, native material revetments, channel stability structures, and/or the restoration or management of riparian corridors in order to protect upland BMPs, restore the natural function of the stream corridor and improve water quality by reducing sedimentation to streams from streambank erosion and decreasing the delivery of nitrogen, phosphorous and other pollutants to the stream from adjacent pasture or cropland.

(28) A backflow prevention system means a system for preventing backflow of fertilizers or chemicals from contaminating water sources in fertigation and or chemigation applications. It can include retrofitting or installing injection equipment, check valves, gauges, drains, and vacuum breakers. It does not include items unrelated to backflow prevention (e.g., tanks, mixers, or filters).

(29) A wetland restoration system means a system of practices designed to restore the natural hydrology of an area that had been drained and cropped.

(30) A precision land leveling practice means reshaping the surface of agricultural land to planned grades for the purpose of improving water quality.

*To be used in conjunction with the most recent version of the APA Rules for the North Carolina Agriculture Cost Share Program for Nonpoint Source Pollution Control and the NC-ACSP Manual.

BEST MANAGEMENT PRACTICES ELIGIBLE FOR COST SHARE PAYMENTS

(1) Best Management Practices eligible for cost sharing include the practices listed in Table 1 and any approved District BMPs. District BMPs shall be reviewed by the Division for technical merit in achieving the goals of this program. Upon approval by the Division, the District BMPs will be eligible to receive cost share funding.

Table 1

Practice	Minimum Life Expectancy (years)
Agrichemical Handling Facility	10
Backflow Prevention System	10
Conservation Tillage System :	
Annual for small grain	1
Three year	3
Critical Area Planting	10
Cropland Conversion	10
Diversion	10
Field Border	10
Filter Strip	10
Grade Stabilization Structure	10
Grassed Waterway	10
Heavy Use Area Protection	10
Livestock Exclusion	10
Long Term No-Till	5
Pastureland Conversion	10
Nutrient Reduction Management System	3
Precision Land Leveling	5
Rock-lined Waterway or Outlet	10
Sediment Control Structure	10
Sod-based Rotation	4 or 5
Stock Trail and Walkway	10
Storm Water Management	10
Stream Protection System	
Spring Development	10
Trough or Tank	10
Well	10
Windmills	10
Stream Crossing	10
Streambank Stabilization	10
Stripcropping	5
Riparian Buffer	10
Terrace	10
Waste Management System:	
Waste Storage Pond	10
Waste Storage Structure	10
Waste Treatment Lagoon	10
Farm Mortality Management System	10

System for Land Application of Animal Waste	10
Wetlands Development for Land Application	10
Controlled Livestock Lounging Area	10
To-Be-Abandoned or Abandoned Confined Animal Operation (CAO)	5
Insect Control	5
Odor Control	1 to 10
Offsite or Alternative Poultry Dry Litter Waste Utilization Incentive	1
Water Control Structure	10
Wetlands Restoration System	10

(2) The minimum life expectancy of the BMPs shall be that listed in Table 1. Practices designated by a District shall meet the life expectancy requirement established by the Division for that District BMP.

(3) The list of BMPs eligible for cost sharing may be revised by the Commission as deemed appropriate in order to meet program purpose and goals.

8/22/2003

NC Agriculture Cost Share Program
Practice Log Summary

Year : 2002

[redacted]

Best Management Practice	Planned Units	Msr.	Cost	Implemented Units	Msr.	Cost
Erosion/Nutrient Reduction						
Conservation Tillage	3,827.67	Acre	$141,651	3,662.84	Acre	$138,915
Conservation Tillage (3 Yr.)	18,402.66	Acre	$1,699,540	17,105.78	Acre	$1,611,746
Terraces	53,728.20	Feet	$48,824	35,135.20	Feet	$30,808
Critical Area Planting	63.60	Acre	$93,539	35.31	Acre	$28,897
Diversion	34,373.40	Feet	$34,698	19,861.30	Feet	$19,445
Sod-Based Rotation	1,651.70	Acre	$131,580	1,280.26	Acre	$99,559
Stripcropping	48.65	Acre	$1,622	22.25	Acre	$913
Cropland Conversion - Grass	2,430.52	Acre	$295,946	1,708.52	Acre	$222,021
Cropland Conversion - Trees	1,918.81	Acre	$167,167	1,655.07	Acre	$126,323
Cropland Conversion - Wildlife	48.90	Acre	$4,392	21.20	Acre	$908
Cropland Conversion - Christmas Trees	126.50	Acre	$12,418	95.00	Acre	$8,052
Long Term No-Till	6,227.84	Acre	$602,334	4,753.88	Acre	$513,625
Land Smoothing	244.90	Acre	$10,701	52.00	Acre	$2,892
Sediment/Nutrient Reduction						
Filter Strip	113.37	Acre	$62,897	65.34	Acre	$16,100
Field Border	375.96	Acre	$411,908	179.62	Acre	$222,981
Grassed Waterway	888.83	Acre	$456,569	723.66	Acre	$233,387
Water Control Structure	82.00	Units	$110,292	27.00	Units	$42,826
[redacted]nt Management	5,715.94	Acre	$102,347	4,031.34	Acre	$72,024
[redacted]an Buffer	1,397.23	Acre	$157,910	1,302.93	Acre	$131,622
Streambank Stabilization	955.00	Feet	$32,816	0.00	Feet	$0
Grade Stabilization Structure	32.00	Units	$43,474	25.00	Units	$37,173
Rock-Lined Outlet	13.00	Units	$65,397	7.00	Units	$29,094
Wetlands Restoration System	78.00	Units	$159,207	77.00	Units	$136,028
Stream Protection						
Spring Development	113.00	Units	$107,416	1,369.00	Units	$76,800
Stock Trail	1,178.00	Units	$192,037	23.00	Units	$82,913
Stream Crossing	559.00	Units	$106,559	28.00	Units	$33,630
Trough Or Tank	2,824.00	Units	$781,899	285.00	Units	$407,682
Livestock Exclusion	415,975.40	Feet	$397,439	168,703.00	Feet	$151,525
Well	109.00	Units	$273,336	58.00	Units	$145,146
Windmill	1.00	Units	$2,000	1.00	Units	$2,000
Heavy Use Area Protection	10,898.20	Units	$290,662	1,189.00	Units	$154,687
Waste Management						
Solid Set	3.00	Units	$31,810	2.00	Units	$16,871
Hydrants	1.00	Units	$5,877	1.00	Units	$5,877
Mobile Irrigation	29.00	Units	$214,754	24.00	Units	$176,132
Waste Storage Pond	3.00	Units	$18,748	2.00	Units	$8,687
Dry Stack	46.00	Units	$643,718	28.00	Units	$419,629
Pads	5.00	Units	$4,066	5.00	Units	$4,066
Composter	6.00	Units	$38,341	4.00	Units	$26,987
Litter Storage	7.00	Units	$121,787	4.00	Units	$49,608
[redacted]on Cao	22.00	Units	$268,188	15.00	Units	$172,174
[redacted]t	2.00	Units	$27,979	2.00	Units	$27,979
Storm Water Management	10.00	Units	$8,464	2.00	Units	$669
Incinerator	46.00	Units	$182,335	25.00	Units	$94,374
Feed/Waste Storage	17.00	Units	$215,034	5.00	Units	$58,439
Agri-Chemical Pollution Prevention						

NC Agriculture Cost Share Program
Practice Log Summary

Year : 2002

Best Management Practice	Units	Planned Msr.	Planned Cost	Implemented Units	Implemented Msr.	Implemented Cost
Agri-Chemical Handling Facility	7.00	Units	$115,691	1.00	Units	$20,999
Chemigation	1.00	Units	$202	1.00	Units	$202
Contracts: 1,937	0200 0	Total:	$8,895,571		Total:	$5,862,415

	Value	Expended
Contract $:	$8,582,513	$5,684,076
Non-ACSP $	$279,702	$204,062
Total $:	$8,862,215	$5,888,138

Dairy	6,374
Beef	18,601
Hogs	50,136
Horses	239
Broilers	6,659,310
Layers	266,500
Turkeys	167,500
Poultry	842,140
Sheep	353
Goats	309

Acres Affected	Acre	82,542.59
Soil Saved	Tons	263,256.09
Nitrogen Saved	Pounds	1,744,040.57
Phosphorus Saved	Pounds	405,077.80
Waste-N Managed	Pounds	4,710,852.08
Waste-P Managed	Pounds	3,973,017.42

Attachment C: Agriculture Cost Share Program 2002 contracts and 2003 Allocation by County

County	Number of 2002 Contracts	Amount	2003 Allocation
Alamance	33	$ 161,426	$ 111,164
Alexander	7	$ 68,444	$ 89,781
Alleghany	21	$ 90,288	$ 94,849
Anson	12	$ 42,788	$ 82,958
Ashe	14	$ 143,927	$ 122,447
Avery	15	$ 75,197	$ 45,840
Beaufort	21	$ 116,936	$ 189,957
Bertie	17	$ 110,769	$ 95,986
Bladen	24	$ 85,713	$ 93,032
Brunswick	15	$ 50,448	$ 74,178
Buncombe	11	$ 97,002	$ 106,926
Burke	3	$ 66,889	$ 72,607
Cabarrus	9	$ 50,932	$ 74,427
Caldwell	6	$ 51,197	$ 49,332
Camden	5	$ 32,664	$ 50,300
Carteret	3	$ 25,514	$ 50,000
Caswell	52	$ 120,633	$ 92,550
Catawba	17	$ 78,899	$ 70,394
Chatham	19	$ 135,142	$ 121,876
Cherokee	24	$ 92,447	$ 65,764
Chowan	11	$ 76,377	$ 96,628
Clay	11	$ 83,338	$ 67,816
Cleveland	10	$ 14,011	$ 52,165
Columbus	37	$ 139,960	$ 101,939
Craven	14	$ 54,479	$ 100,039
Cumberland	21	$ 86,558	$ 95,026
Currituck	4	$ 33,369	$ 57,000
Davidson	25	$ 83,998	$ 69,416
Davie	11	$ 30,330	$ 59,850
Duplin	15	$ 173,081	$ 164,288
Durham	10	$ 20,112	$ 45,000
Edgecombe	77	$ 150,241	$ 150,553
Forsyth	12	$ 32,514	$ 61,710
Franklin	25	$ 89,226	$ 110,327
Gaston	8	$ 42,041	$ 68,000
Gates	30	$ 97,609	$ 99,465
Graham	3	$ 7,594	$ 40,655
Granville	33	$ 70,263	$ 87,000
Greene	30	$ 82,950	$ 171,105
Guilford	49	$ 162,872	$ 167,498
Halifax	42	$ 208,142	$ 280,379
Harnett	37	$ 93,214	$ 89,407
Haywood	12	$ 117,505	$ 105,222
Henderson	17	$ 85,507	$ 95,222
Hertford	25	$ 107,128	$ 132,223
Hoke	11	$ 76,258	$ 61,667
Hyde	31	$ 143,459	$ 152,902
Iredell	18	$ 165,571	$ 170,710
Jackson	2	$ 16,484	$ 39,016
Johnston	37	$ 124,711	$ 166,641
Jones	7	$ 69,000	$ 120,219
Lee	18	$ 46,110	$ 59,710
Lenoir	42	$ 152,345	$ 130,825
Lincoln	9	$ 34,476	$ 83,734
Macon	5	$ 55,000	$ 44,071
Madison	12	$ 70,100	$ 58,064
Martin	31	$ 88,508	$ 104,226
McDowell	11	$ 63,677	$ 59,027
Mecklenburg	2	$ 8,513	$ 45,179
Mitchell	14	$ 78,551	$ 108,611
Montgomery	6	$ 92,282	$ 92,401
Moore	23	$ 130,470	$ 154,012
Nash	19	$ 112,781	$ 151,925
New Hanover	1	$ 18,359	$ 35,391
Northampton	63	$ 129,192	$ 124,856
Onslow	12	$ 101,863	$ 90,002
Orange	34	$ 85,508	$ 87,938
Pamlico	15	$ 98,121	$ 106,064
Pasquotank	10	$ 59,631	$ 55,336
Pender	14	$ 50,813	$ 85,008
Perquimans	15	$ 127,096	$ 103,585
Person	21	$ 53,373	$ 64,036
Pitt	43	$ 226,711	$ 253,692
Polk	6	$ 33,697	$ 47,639
Randolph	13	$ 115,764	$ 95,544
Richmond	13	$ 93,706	$ 89,544
Robeson	33	$ 128,100	$ 118,983
Rockingham	43	$ 100,435	$ 92,000
Rowan	13	$ 54,155	$ 89,470
Rutherford	23	$ 123,839	$ 95,322
Sampson	16	$ 116,986	$ 97,702
Scotland	19	$ 109,440	$ 113,639
Stanly	18	$ 90,309	$ 75,741
Stokes	6	$ 54,346	$ 83,535
Surry	49	$ 283,546	$ 216,935
Swain	1	$ 4,441	$ 35,509
Transylvania	12	$ 37,365	$ 42,439
Tyrrell	9	$ 86,054	$ 79,998
Union	13	$ 112,393	$ 121,362
Vance	25	$ 56,394	$ 45,229
Wake	44	$ 112,902	$ 167,233
Warren	47	$ 71,506	$ 110,842
Washington	8	$ 54,950	$ 93,032
Watauga	10	$ 29,881	$ 75,286
Wayne	23	$ 147,625	$ 224,858
Wilkes	18	$ 116,165	$ 119,440
Wilson	20	$ 108,227	$ 152,008
Yadkin	15	$ 97,841	$ 101,372
Yancey	17	$ 95,253	$ 84,305

ATTACHMENT D: NC AGRICULTURE COST SHARE PROGRAM
WATER QUALITY IMPROVEMENT PURPOSES OF APPROVED BMPs

Purpose: Sediment/Nutrient Delivery Reduction From Fields

BMP	Reduction of applied nutrient	Reduction of soil loss	Nutrient interception	Facilitating BMP	Life of BMP (yrs)
Field Border	-	√	√	-	10
Filter Strip	-	√	√	-	10
Grade Stabiliz. Structure	-	-	-	√	10
Grassed Waterway	-	√	√	-	10
Nutrient Mgmt.	√	-	-	-	3
Riparian Buffer	-	√	√	-	10
Rock-lined Outlet	-	-	-	√	10
Sediment Control Basin	-	-	√	-	10
Water Control Structure	-	√	√	-	10
Streambank Stabilization	-	√	√	-	10

Purpose: Erosion Reduction/Nutrient Loss Reduction in Fields

BMP	Reduction of applied nutrient	Reduction of soil loss	Life of BMP (yrs.)
Annual Conservation Tillage			1
Conservation Tillage 3-yr	-	√	3
Critical Area Planting	-	√	10
Cropland Conversion	√	√	10
Water Diversion	-	√	10
Land Smoothing			10
Long Term No-till	-	√	5
Pastureland Conversion	√	√	10
Sod-based Rotation	√	√	4 or 5
Stripcropping	√	√	5
Terraces	-	√	10
Wetlands Restoration			10

Purpose: Agricultural Chemical Pollution Prevention

BMP	Interception of chemicals	Life of BMP (yrs.)
Agri-chemical Handling Facility	√	10
Back Flow Prevention		10

Purpose: Proper Animal Waste Management

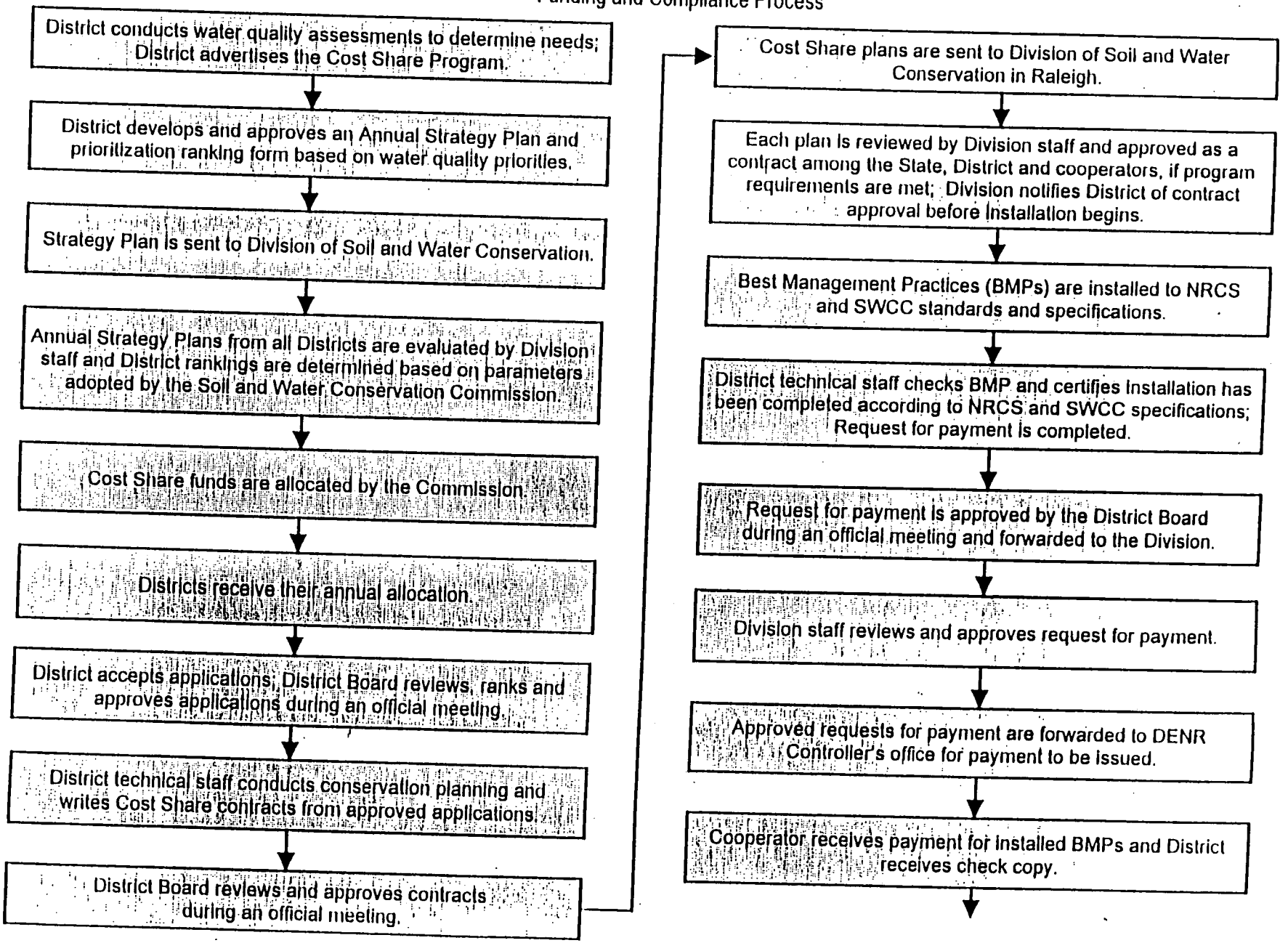
BMP	Proper mgmt. of nutrients	Reduction of soil loss	Nutrient interception	Facilitating BMP	Life of BMP (yrs.)
Animal Waste Lagoon Closure	√	-	-	-	5
Constructed wetlands	√	-	√	-	10
Controlled Livestock Lounging Area	-	√	-	√	10
Dry Manure Stack	√	-	-	-	10
Feeding/Waste Storage					10
Heavy Use Area Protection	-	√	-	-	10
Insect Control	-	-	-	-	5
Odor Control	-	-	-	-	1-10
Storm Water Management	√	-	-	-	10
Waste Treatment Lagoon/Storage Pond	√	-	-	-	10
Mortality Management System	√	-	-	-	10
Waste Application System	√	-	-	√	10
Offsite/Alternative Dry Litter Incentive	√	-	-	-	1

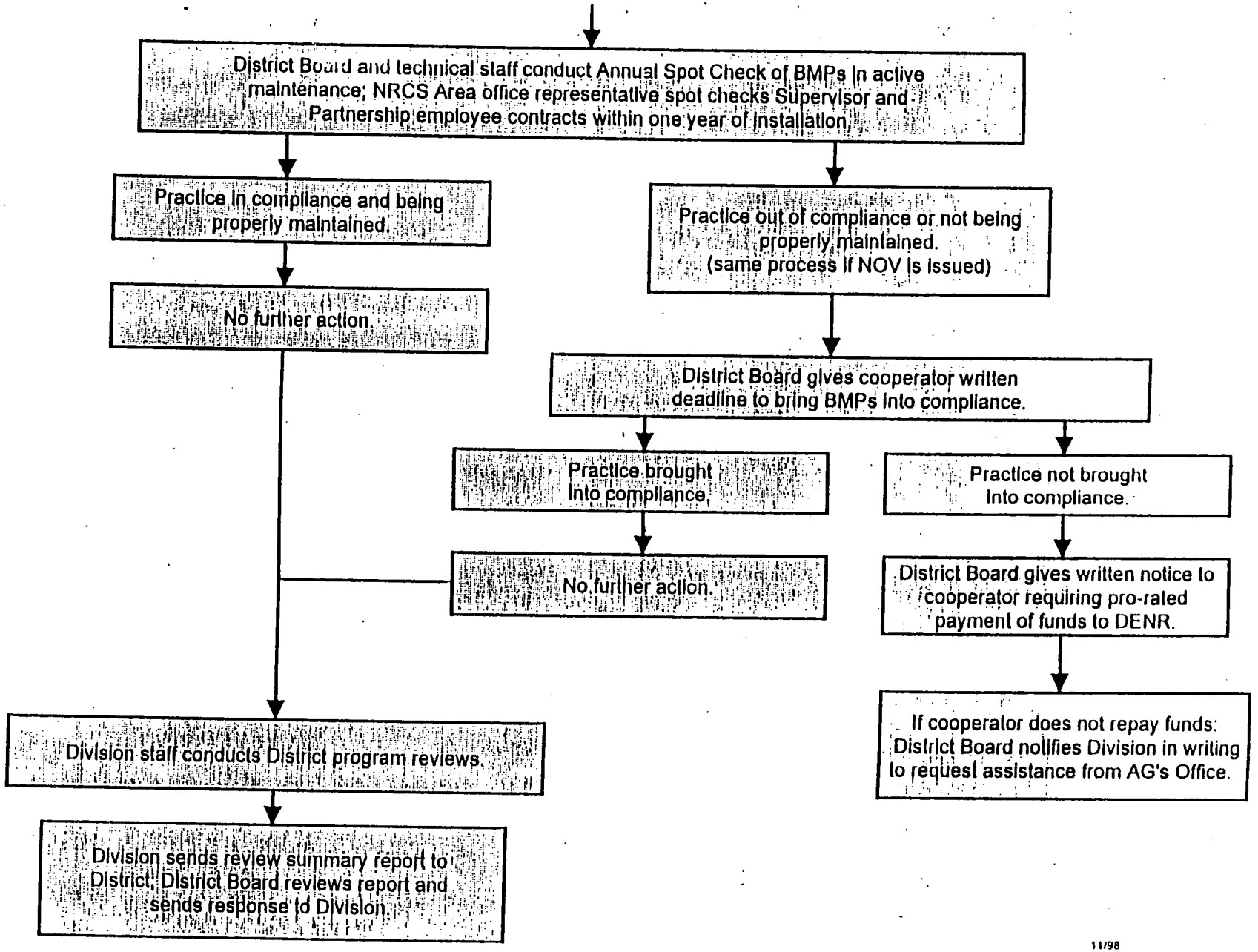
Purpose: Stream Protection from Animals

BMP	Reduction of applied nutrient	Reduction of soil loss	Facilitating BMP	Life of BMP (yrs.)
Heavy Use Area Protection	-	√	-	10
Livestock Exclusion System	√	√	-	10
Spring Development	-	-		10
Stock Trail	-	√	-	10
Stream Crossing		√	-	10
Trough or Tank	-	-	√	10
Well	-	-	√	10
Windmill	-	-	√	10

NC Agriculture Cost Share Program

Funding and Compliance Process




District Board and technical staff conduct Annual Spot Check of BMPs in active maintenance; NRCS Area office representative spot checks Supervisor and Partnership employee contracts within one year of installation.
Practice in compliance and being properly maintained.
No further action.
Practice out of compliance or not being properly maintained. (same process if NOV is issued)
District Board gives cooperator written deadline to bring BMPs into compliance.
Practice brought into compliance.
No further action.
Practice not brought into compliance.
District Board gives written notice to cooperator requiring pro-rated payment of funds to DENR.
If cooperator does not repay funds: District Board notifies Division in writing to request assistance from AG's Office.
Division staff conducts District program reviews.
Division sends review summary report to District. District Board reviews report and sends response to Division.

11/98

North Carolina
Department of Environment and Natural Resources

Division of Waste Management

Michael F. Easley, Governor
William G. Ross Jr., Secretary
Dexter R. Matthews, Director

UST SECTION

February 13, 2004

RECEIVED
FEB 20 2004
RESEARCH DIVISION

TO: George Givens, NC General Assembly

FROM: Grover Nicholson, Section Chief
Underground Storage Tank (UST) Section

Subject: Review of Leaking Underground Storage Tank (UST) Sites

The following is an update of the UST Section's review of default low-risk (formerly "CDE") leaking underground storage tank sites. We are reviewing these sites to determine if they can be closed in accordance with the risk-based corrective action rule.

In the month of January 2004, we reviewed 67 low-risk sites and were not able to issue a Notice of No Further Action to any site. A total of 9,368 sites have been reviewed and 3,010 (approximately 32.1 %) issued a Notice of No Further Action since August 1, 1998, when we began counting the review of low-risk sites. Since the risk-based corrective action (RBCA) rule went into effect on January 2, 1998 a total of 3,437 sites have been issued a Notice of No Further Action. **We have completed all of our low risk reviews.** This will be the final report.

If you have any additional questions, please call me at (919) 733-1300.

cc: Senator Hamilton C. Horton, Jr., NC General Assembly
Tim Dodge, NC General Assembly
Robin Smith, Department of Environment and Natural Resources
Dexter Matthews, Division of Waste Management
Doug Howey, Petroleum Marketers Association
Regional Supervisors, UST Section
Jane Comer, UST Section
Rob Krebs, UST Section
George Matthis, UST Section

North Carolina Department of Environment and Natural Resources
Division of Air Quality

Michael F. Easley, Governor

William G. Ross, Jr., Secretary
B. Keith Overcash, P.E., Director

September 1, 2003

MEMORANDUM

TO: George Givens, Environmental Review Commission Counsel

FROM: for Brock M. Nicholson Keith Overcash

SUBJECT: Reports on Mercury and CO_2 Pursuant to Clean Smokestacks Act Requirements

The **Clean Smokestacks Act (CSA)** Sections 12 and 13 require the Division of Air Quality (DAQ) to provide the Environmental Review Commission and the Environmental Management Commission with reports and recommendations annually by September 1 relative to controls for mercury and CO_2. The attached reports constitute the first interim reports in fulfillment of these requirements.

These first interim reports are intended to provide an initial summary of the "state of knowledge" on the emissions and controls for these two substances. Mercury is designated as Hazardous Air Pollutant (HAP) and a Toxic Air Pollutant (TAP) under the federal and state programs, respectively. However, CO_2 is not currently clearly classified as an air pollutant in the historic definitions and interpretation of federal and state statutes and regulations/rules.

Significant activities are underway at the federal level and state levels (NC, as well as many other states) for both substances and these are addressed in the reports. Federal actions and decisions will likely be forthcoming shortly, making North Carolina's decisions particularly critical. The nature of these pending actions constrains the ability of DAQ to make specific recommendations at this time. Finals reports, due before September 2005, are planned to provide the Division's and Department's more specific conclusions and recommendations.

If you desire DAQ to provide any presentations, or otherwise discuss these reports, we will gladly comply. Any reactions and specific guidance for future reports would be helpful.

BKO/jhs

attachments: Mercury Report (Volumes 1 and 2)
CO_2 Report

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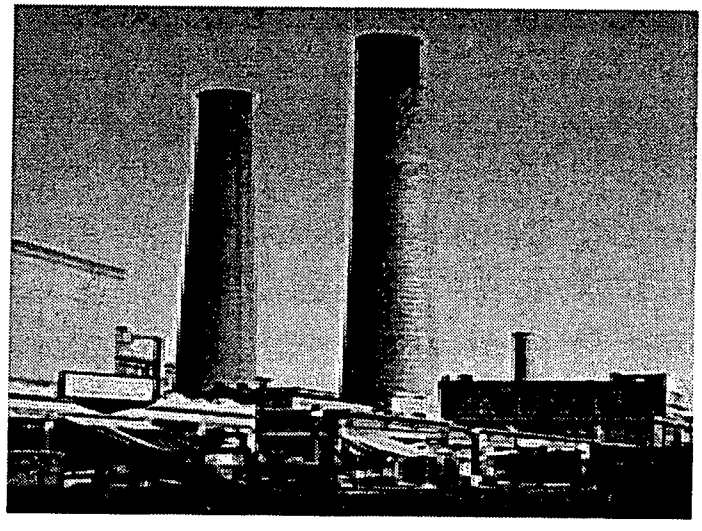
First Interim Report



Mercury Emissions and Mercury Controls For Coal-fired Electrical Utility Boilers

Volume One Of Two
September 1, 2003

NCDENR

North Carolina
Department of Environment and Natural Resources
Division of Air Quality

Requirement For This Report

Excerpted from the *North Carolina Clean Smokestacks Act*

[**Title**: An Act to Improve Air Quality in the State by Imposing Limits on the Emission of Certain Pollutants from Certain Facilities that Burn Coal to Generate Electricity and to Provide for Recovery by Electric Utilities of the Costs of Achieving Compliance with Those Limits]

SECTION 12. The General Assembly anticipates that measures implemented to achieve the reductions in emissions of oxides of nitrogen (NO_x) and sulfur dioxide (SO2) required by G.S. 143-215.107D, as enacted by Section 1 of this act, will also result in significant reductions in the emissions of mercury from coal-fired generating units. The Division of Air Quality of the Department of Environment and Natural Resources shall study issues related to monitoring emissions of mercury and the development and implementation of standards and plans to implement programs to control emissions of mercury from coal-fired generating units. The Division shall evaluate available control technologies and shall estimate the benefits and costs of alternative strategies to reduce emissions of mercury. The Division shall annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003. The Division shall report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than 1 September 2005. The costs of implementing any air quality standards and plans to reduce the emission of mercury from coal-fired generating units below the standards in effect on the date this act becomes effective, except to the extent that the emission of mercury is reduced as a result of the reductions in the emissions of oxides of nitrogen (NO_x) and sulfur dioxide (SO2) required to achieve the emissions limitations set out in G.S. 143-215.107D, as enacted by Section 1 of this act, shall not be recoverable pursuant to G.S. 62-133.6, as enacted by Section 9 of this act.

GENERAL ASSEMBLY OF NORTH CAROLINA - SESSION 2001 – (SENATE BILL 1078)
Ratified the 19th day of June 2002. (Ch. SL 2002-4 S.13)
Marc Basnight - President Pro Tempore of the Senate
James B. Black - Speaker of the House of Representatives
Michael F. Easley- Governor

Mercury Emissions and Mercury Controls For Coal-fired Electrical Utility Boilers

Volume One of Two

First Interim Report

North Carolina
Department of Environment and Natural Resources

Division of Air Quality
1641 Mail Service Center
Raleigh, North Carolina 27699-1641

Comments may be sent to the above address or by email to
NCCSA_Hg@ncmail.net

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross, Jr., Secretary

September 1, 2003

TO: Environmental Review Commission
Environmental Management Commission

FROM: William G. Ross, Jr. WGR/

SUBJECT: Mercury and CO_2 Reports Required by Clean Smokestacks Act

When the North Carolina General Assembly passed, and Governor Easley signed the Clean Smokestacks Act in June of 2002, our State took two crucial steps toward addressing several of the most pressing environmental and public health issues of our time. One step was highly visible, the other less so.

The visible step was to attack the problems of ozone, smog and pollution from fine particles by requiring North Carolina's fourteen coal-fired power plants to make deep cuts in sulfur dioxide and nitrogen oxides, and to do so quickly. The utility companies swung into action and are on schedule to achieve the required reductions.

The less visible, but nonetheless crucial, steps that North Carolina took under the leadership of the General Assembly and Governor Easley was to call for our state to address the issues related to the emissions of carbon dioxide from coal-fired power plants and other stationary sources also related to the emissions of mercury from power plants. Under the new law, our department, through our Division of Air Quality, will study and make findings and recommendations on both subjects in reports due in September 2003, 2004 and 2005. We are this week issuing the 2003 reports on CO_2 and mercury.

Why is it crucial that North Carolina address emissions of CO_2 and mercury? In my view it is crucial that we focus on the biggest problems facing us, and mercury and carbon dioxide emissions seem clearly to be among our biggest problems. With mercury, there is a growing concern about its impacts on public health. With carbon dioxide, there is the concern that we are changing the climate in a manner and pace that are unprecedented.

In his 2002 book, The Earth Remains Forever, Professor Rob Jackson of Duke University frames the question this way:

> "Based on current scientific evidence, I believe that by the end of the twenty-first century:
>
> I. There will be at least nine billion people on earth.
> II. Annual global energy use will be at least fifty percent higher per capita than at the end of the twentieth century, and total energy consumption will triple.

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III. Atmospheric carbon dioxide concentrations will be more than five hundred parts per million, double the pre-industrial levels and higher than at any time in the past forty million years. In consequence, the average temperature of the earth will be at least 5° F warmer.
IV. Thousands, perhaps millions, of species will be extinct.
V. The demographic and economic momentum behind these changes is immense." (p 129)

"Most of all, I want to know that we did our best, that we tried everything we could to preserve the quality of life for people today and tomorrow and saved as much room as possible for the rest of life on earth. Who doesn't want this? The moral, the practical, the ultimate question is what we do about it, what we will give up today so that we and our descendants and the rest of life on earth may have their tomorrow." (p.132)

Thanks to the leadership of the General Assembly and Governor Easley, our state is a national leader in reducing emissions of SO_2 and NOx from coal-fired power plants. To answer Professor Jackson's question, we are doing our best as a state on these two issues.

What will we do about mercury and carbon dioxide? Thanks again to our legislators and the Governor, we also have a chance to answer Professor Jackson's question, this time for mercury and carbon dioxide in a similar, positive way.

We appreciate your attention to these two reports. We look forward to your comments and questions about them.

Thank you.

Preface

This report has been produced by a working group within the North Carolina Division of Air Quality. Stakeholders from industry, environmental and other organizations were also invited to provide their insights, comments and other input. The Division appreciates the efforts of all the stakeholders and other individuals who committed their time and effort to the development of this preliminary report. This open process will continue in the development of subsequent and final reports on this topic.

Many portions of this document were taken directly from other government (non-copyrighted) documents in the interest of time and completeness. Some of these sections may have only minor wording changes from the original documents. Quotations are not strictly used to identify these parts, but a strong effort has been made to reference these documents and acknowledge them. The purpose has not been to claim credit for original work of others, but to provide as much detail and accuracy as possible within a limited time.

This report consists of two volumes. Volume One includes technical information that has been condensed and summarized from technical reports and Volume Two contains background information. The objective of this first interim report is to provide a technical background and provide results or summaries of investigations and studies

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List of Acronyms Used in This Report

BAF – Bioaccumulation factors
CAA – Clean Air Act – Primary federal clean air statute
CAPA – Clean Air Planning Act – Carper Bill
CEM – Continuous Emission Measurement
CPA – Clean Power Act – Jeffords-Waxman Bill
CSI – Clear Skies Initiative – Proposal for revised CAA legislation by the Bush Administration (also recently referred to as Clean Skies Act, though not yet an actual Act)
CSA – NC Clean Smokestacks Act
DAQ – NC Division of Air Quality
DEHNR – Former NC Department of Environment, Health, and Natural Resources, now DENR and DHHS
DENR – NC Department of Environment and Natural Resources
DENOX – A selective catalytic named DENOX®
DHHS – NC Department of Health and Human Services
DMF – Division of Marine Fisheries
DWQ – Division of Water Quality
EMC – NC Environmental Management Commission
EPA – US Environmental Protection Agency
EPRI – EPRI Journal Online
FGD – flue gas desulfurization
Hg^0 – elemental mercury
Hg^+ – inorganic mercury compounds (e.g., mercuric chloride)
Hg^{++} – organic mercury compounds (primarily methylmercury)
Hg^P – elemental mercury attached to particulate
HAP – hazardous air pollutant
HCl – hydrochloric acid
$HgCl_2$ – mercury chloride
HgS – mercuric sulfide
MACT – Maximum Achievable Control Technology
MDN – Mercury Deposition Network
N_2 – nitrogen
NAAQS – National Ambient Air Quality Standards
NAS – National Academy of Science
NC – North Carolina
NCSU – North Carolina State University
NHANES –National Health and Nutrition Examination Survey
NO – nitric oxide
NO_x – Oxides of Nitrogen, including NO_2, the primary nitrogen species from combustion.
OH – The Canadian Ontario-Hydro (OH) utility company
RELMAP – the Regional Lagrangian Model of Air Pollution
RGM – Reactive Gaseous Mercury
SCR – Selective Catalytic Reduction

SIP – State Implementation Plan
SNCR – Selective Non-Catalytic Reduction
SO_2 – Sulfur Dioxide
SO_3 – Sulfur Trioxide
SO_x – Oxides of Sulfur, including SO_2, the primary combustion product of sulfur
TGM – Total Gaseous Mercury
TMDL – Total Maximum Daily Load
TRI – Toxic Release Inventory

CHAPTER 1 - EXECUTIVE SUMMARY

SUMMARY OF STATUTE

The *Clean Smokestacks Act* (CSA) directs the Department of Environment and Natural Resources, Division of Air Quality (DENR-DAQ) to:

- ✓ study issues related to monitoring emissions of mercury and the development and implementation of standards and plans to implement programs to control emissions of mercury from coal-fired generating units,
- ✓ evaluate available control technologies,
- ✓ estimate the benefits and costs of alternative strategies to reduce emissions of mercury,
- ✓ annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003, and
- ✓ report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than 1 September 2005.

SCOPE & OBJECTIVES

Purpose of the Report

This report provides a background understanding of the properties of mercury and its compounds, health effects of methylmercury, mercury emissions, the effects of various air pollution control devices on mercury emissions, and estimated reductions of mercury emissions in North Carolina as a result of controls to be installed for other pollutants under requirements of the CSA. Information presented herein is largely a result of a literature search and summary of several pertinent and recent publications of the U.S. Environmental Protection Agency (EPA), U.S. Department of Energy (DOE), and other similar documents and their supporting scientific studies.

Expectations For Future Reports

This 2003 report will be supplemented each year for the next two years to include more technical detail gained over time, results of related federal and state regulations, and recommendations for any new standards based on further

knowledge and implementation of standards resulting from the CSA and other legislation.

Summary of Scope of Problem

Mercury has been found in fish tissue, primarily in Eastern North Carolina, and fish advisories have been in effect for some time. Determination of the sources and routes by which mercury may reach this food chain are thus of concern. In North Carolina, coal-fired power plants are one of the likely suspects. Other suspects for large contributions have been a now closed chlor-alkali plant in southeastern NC and many smaller emission sources. Many localized sources (e.g., incineration, mercury battery disposal, fluorescent tube disposal, etc.) are much smaller in terms of emission quantity, but they may have a significant impact on their immediate surroundings. The focus of this report is coal-fired power plants, as directed by the CSA.

Mercury is a naturally occurring metallic mineral contaminant in coal. Air emissions of mercury result from burning coal in coal-fired electric power generating units. Elemental mercury is the only form of this metal found in the actual boiler firebox exhaust. Inorganic mercury compounds are formed when the stack gases begin to cool in the presence of chlorine and fly ash. After these transitions, the only forms of mercury at the exit of the smoke stack remain elemental mercury and inorganic mercury compounds. Although these compounds can represent a health risk if directly ingested, adsorbed through the skin, or inhaled as fine particulate, their impact potential is minimal compared to methylmercury, which is the harmful form of mercury.

Methylmercury (an organic or carbon-containing compound) does not form until inorganic mercury compounds are deposited in water, and soil (with subsequent physical transport to water bodies) and exposed to waterborne bacteria. Methylmercury compounds can then bioaccumulate in the food chain of fish, animals and eventually humans. Human exposure to methylmercury comes primarily from consumption of contaminated fish. Methylmercury has a relatively long biological half-life in humans; estimates ranging from 44 to 80 days before one half of the intake of this compound is exhausted from the human body. Methylmercury compounds break down readily when exposed to the atmosphere. They then may undergo complex chemical reactions, many of which are believed to be reversible in typical environments.

The United States Environmental Protection Agency (EPA) and DENR information indicate that approximately 1.5 tons/year of inorganic mercury are emitted to the air of NC from coal-fired power plants in NC. A recently closed chlor-alkali plant in the eastern part of the state is strongly implicated as a significant contributor to localized mercury emissions and residues. Some unknown portion of this atmospheric mercury is deposited on the land and waters of North Carolina. The deposits that occur on land are fairly fixed to the

deposit site (non-transient), but some can be washed into the waters where they can combine with those deposited in the water and be converted to methylmercury. At the same time, a large quantity of mercury exists in the "global" air that enters North Carolina, from both natural and man-made sources. Some small portion (again, not well quantified or quantifiable) of this mercury is likely deposited within the state boundaries. A portion of the deposited mercury from all these sources is likely to again be re-emitted into the air. Thus, the quantified realities are complex and elusive. If one makes a gross assumption that *all* (probably at least a factor of 10 to 100 too high) of the 1.5 tons per year is deposited within the state and equally spread throughout the 53,821 square miles of the state, this would equate to roughly 0.0569 pounds per square mile per year, or about 0.000000002 pounds/ft^2.

Actions Currently Being Taken In NC

Coal-fired generating units currently account for approximately 75 percent of mercury emissions estimated to be emitted into the air in North Carolina. Emission control equipment planned and proposed for installation to meet the *North Carolina Clean Smokestacks Act* (CSA) is estimated to capture about 55 percent of current mercury emissions from coal-fired generating units in North Carolina. Though the Act does not prescribe mercury-specific controls, these substantial mercury emission reductions are achieved as a secondary benefit. The proposed addition of wet scrubbers to control sulfur oxides (SO_x) is expected to reduce total mercury emissions from coal-fired electrical generating units from an estimated 3,052 pounds per year (ppy) to about 1,363 ppy.

Actions Currently Being Taken By The Federal Government

The EPA has already regulated mercury emissions from sources other than utilities combustion sources. EPA has proposed a regulation to limit mercury emissions from industrial boilers, which must be finalized by early 2004, under the terms of a consent decree. Also under the terms of a settlement agreement EPA has agreed to propose a standard for utility boilers by December 15, 2003, and to finalize it by December 15, 2004. Maximum Achievable Control Technology (MACT) requirements will have major impact and implications regarding the ultimate recommendations regarding mercury under Section 12 of the CSA. These MACT standards, consistent with other schedules under CSA, are currently scheduled to be met by December 15, 2007.

Nationally, mercury from industrial sources, municipal waste combustors and medical waste incinerators has been reduced by 90 percent from 1995 levels. Additionally, the intentional use of mercury in commercial products in the United States has declined by more than 75 percent from 1988 to 1996. This national finding is believed to be an accurate description of reductions in North Carolina also.

PRELIMINARY FINDINGS AND ANTICIPATED FUTURE ACTION

From studies to date, several basic findings can be made on emissions, effects, and control of mercury:

- Mercury is a potential threat to human health and well-being.
- Coal-fired power plants release both elemental and inorganic mercury compounds, but not methylmercury. Coal-fired power plants emit approximately 66 percent of the mercury that is omitted to the sky from NC sources.
- There are numerous ongoing studies of the impact of mercury emissions from the various sources, both natural and anthropogenic (created by human activity).
- Scientific study is underway to establish a quantitative relationship between reduced mercury emissions into the air in North Carolina and reduced methylmercury levels in fish tissues.
- Various types of air pollution controls on coal-fired power plants that are added primarily to control other pollutants (e.g., sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) –pursuant to the *North Carolina Clean Smokestacks Act*) are expected to also reduce mercury emissions by approximately 55 percent.
- Mercury compounds reach the proper conditions (pH, sulfur concentrations, biological activity, etc.) in a water body, methylmercury forms.

In light of these basic findings, DAQ believes it important to pursue the following steps:

- ✓ Study the issues as directed by the CSA.
- ✓ Refine the estimated effects on mercury emissions of projected SO_2 and NO_x controls on electric utility emissions, and refine the estimates of levels and fate of mercury emissions that remain.
- ✓ Monitor changes in plans for application of control devices by the utility companies and adjust emission estimates and analysis accordingly.

- ✓ Monitor and evaluate outside influences and regulatory developments at the federal level, and with other states involved in similar efforts.

- ✓ Provide support for efforts to refine health effects and trends of mercury levels in fish and other potential routes of exposure.

- ✓ Determine funding needs to identify and study more closely the distribution of humans who are at risk of fish contaminated fish.

- ✓ Evaluate whether and to what extent global reductions in mercury emissions are causing changes in mercury depositions in NC.

- ✓ Evaluate and refine information on other potential sources of mercury in North Carolina.

- ✓ Address and respond to specific questions generated by this 2003 report.

- ✓ Assemble economic data and models to reflect multiple risk scenarios and costs of implementation of further controls.

CHAPTER 2 - MERCURY PROBLEMS

The species of mercury (elemental and inorganic mercury) and their ratio in coal-fired boiler emissions are important when devising capture and control techniques. The chemical species of mercury emitted from utility boilers vary significantly from one plant to another. Removal effectiveness depends on the species of mercury present. Elemental mercury passes through control devices. Capture efficiency is dependent on converting elemental mercury into inorganic mercury. To date, no single control technology has been identified that removes any elemental mercury and all inorganic mercury.

Elemental mercury passes readily through the body. Inorganic mercury compounds take several days to transit out of the body. Organic mercury (primarily methylmercury) has a strong propensity to be stored in the body (fatty tissues such as the brain) and is slowly removed from the body over a period of months. Methylmercury exposure to humans is dependent on the amount of fish consumed and the methylmercury concentration in the fish. Groups susceptible to the effects of methylmercury are children up to the age of six (developing neurological systems), women of child-bearing age, sports fishermen, and subsistence fishermen.

Mercury cycles through the environment as a result of both natural and human activity. Most of the mercury in the atmosphere is elemental mercury vapor, that circulates in the atmosphere for up to a year, and can be transported thousands of miles from the source. Mercury that is deposited to soil and terrestrial vegetation does not result in exposures likely to be detrimental to health.

CHEMICAL AND PHYSICAL ATTRIBUTES OF MERCURY

Elemental mercury is a heavy (weighing 13.53 times as much as water per unit volume) silver-white metal with an atomic weight of 200.59 grams per mole. By comparison, the atomic weight of iron is 55.847. At room temperature, mercury is a liquid and has a vapor pressure of 0.002 mm mercury at 25 degrees Centigrade (0.038 psi at 77 degrees Fahrenheit).[1]

Mercury is used widely in industrial applications. It conducts electricity, responds to temperature and pressure changes, and forms an alloy with almost all metals. In the electrical industry, mercury is used in florescent lights, in switches as part of wiring devices, and with instruments that measure temperatures and pressures. It is also a component of dental amalgams used in restoring teeth. In addition to its use in specific products, mercury is used in numerous industrial processes. The largest manufacturing use of mercury in

[1] Ref. 1, page 2.

the United States is associated with the production of chlorine and caustic soda by mercury-cell 'chlor-alkali' plants. Mercury has also been used in amalgamation with other metals (e.g., gold) and as an antifungal agent in vaccines and wood preserving.[2] Many of these uses have shrunk in recent years due to concerns over human exposures to mercury, and in many cases, due to regulations that did not previously exist.

ELEMENTAL MERCURY, INORGANIC MERCURY, AND METHYLMERCURY

The elemental and inorganic mercury that exits the smoke stack becomes part of the global pool of mercury in the atmosphere or falling on land or water. Elemental and inorganic mercury are not health hazards. However, when waterborne bacteria modify inorganic mercury, an organic mercury molecule is produced. Organic mercury, primarily methylmercury, accumulates in long-lived animals. Predatory fish at the top of the food chain accumulate increasing concentrations of methylmercury in their body tissues (i.e., bioaccumulation), which is a health threat to humans who eat quantities of these fish.

Mercury exists in three forms (species): elemental mercury (Hg^0), inorganic mercury compounds (Hg^+) (e.g., mercuric chloride), and organic mercury (Hg^{++}) compounds (primarily methylmercury).[3] Organic species of mercury (methylmercury) are harmful to humans. Elemental mercury passes rapidly through the body. Inorganic mercury compounds may take several days to transit out of the body, but like elemental mercury, causes no harm. Organic mercury has a strong propensity to be stored in the body's fatty tissues, such as the brain, but does slowly leave the body over a period of months.

Speciation is a term used to denote the relative amounts of elemental mercury, oxidized mercury, and mercury attached to particulate in flue gas. No methylmercury is emitted from the stacks of coal-fired boilers. The rate of conversion of the gaseous mercury is dependent on temperature, flue gas composition, and the amount and properties of entrained particles (fly ash and sorbents). Mercury speciation is a particularly important variable for flue gas cleaning as it directly impacts the capture of mercury. For example, mercury chloride ($HgCl_2$) is water-soluble and readily reacts with alkali metal oxides in an acid-base reaction; therefore, conventional acid gas scrubbers used for sulfur dioxide (SO_2) control are effective in controlling $HgCl_2$. However, elemental mercury Hg^0 is insoluble water and must be adsorbed onto a sorbent or converted to a soluble form that can be collected in a wet scrubber. In coal-fired combustion units, where concentrations of chlorine are low and SO_2 is present, mercury may remain predominantly in the elemental form.[4]

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[2] Ref. 2, page 8.
[3] Ref. 1, Chapter 0, page 1.
[4] Ref. 2, page 5.

General Assumptions And Efforts To Date

Mercury moves about the environment because of both natural and human activity. Most mercury in the atmosphere is elemental mercury vapor, which circulates in the atmosphere for up to a year, and hence can be transported thousands of miles from the source.[5] Recent modeling indicates that the rate of oxidation of elemental mercury in the atmosphere may be occurring twice as fast as previously thought (half-life of six months instead of one year). If substantiated, this means that either there are unknown sources of elemental mercury contributing mercury to the global pool or the calculated release of elemental mercury vapor as a result of natural and human activity is understated by a factor of two.

Mercury modeling efforts initially made an assumption that all inorganic mercury compounds that settled on the ground would eventually enter the surface water drainage system and accumulate in rivers, streams, and lakes. Contrary to that assumption, inorganic mercury compounds have a strong propensity to attach to and remain on leafy vegetation and soil particles. The majority of inorganic mercury compounds found in water bodies arrived by way of atmospheric transport. However, mercury that is deposited to soil and terrestrial vegetation does not result in exposures likely to be detrimental to health through terrestrial exposure pathways.[6]

Mercury in the atmosphere comes both from natural resources and from human activities. Scientists continue to work to define the total and contributory amounts. Studies by Nriagu and Pacyna (1988) estimate global natural emissions at 3,000 tons per year (tpy) and the medium for global emissions from human activities at 3,560 tpy. A more recent critical review by Jackson (1997) estimates that 2,000 tpy from natural resources, while 4,000 tpy are emitted from sources attributed to human activities e.g., combustion of fossil fuel and solid waste.[7]

Anthropogenic mercury released directly to land or water bodies, or deposited on them from the atmosphere, undergoes transformations that are not fully understood. The amount of mercury transformed to methylmercury varies greatly from one water body to another. According to Krabbenholf, et al., (1999), many factors influence methylmercury production beyond mercury loading. These factors include environmental setting (e.g., climate, geology,

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[5] Ref. 3, page 1.
[6] Ref. 7, page 18.
[7] Ref. 2, page 5.

land use, land cover), water chemistry, and wetland density. The latter is the most important basin-scale factor controlling methylmercury production.[8]

PATH FROM COAL-FIRED BOILERS TO BIOACCUMULATION OF METHYLMERCURY

Nearly all mercury that accumulates in fish tissue is methylmercury (an organic mercury compound). The EPA has found a plausible link between anthropogenic releases of mercury and methylmercury in fish tissue.[9] To transition from mercury in coal to methylmercury in fish, is a complex path.

To be converted to organic mercury, elemental mercury must combine with another element (such as sulfur, chlorine or oxygen) or combine with other compounds to form inorganic mercury compounds. Either a living organism must act on this inorganic mercury compound or an organic compound must react with it to obtain organic mercury. Coal-fired electric utility boilers produce no organic mercury compounds directly. Mercury that is deposited to soil and terrestrial vegetation does not result in exposures likely to be detrimental to health through terrestrial exposure pathways.[10]

The main pathway of introducing methylated mercury forms into aquatic systems is via *in situ* (natural) production, mediated by sulfate-reducing bacteria. Recent investigations suggest that a substantial portion of what is often considered "dissolved" mercury is actually mercury associated with macromolecular colloidal organic matter (submicroscopic particles that do not settle out). Focusing predominately on loading or abundance of inorganic mercury as the dominant controlling factor is often given excessive weight in assessing methylmercury concentrations and production in aquatic systems. While the amount of inorganic mercury is indeed an important factor, it is not the only important factor; nor is it necessarily the controlling factor. A number of parameters have been identified as important in influencing the production and abundance of methylmercury in aquatic systems. They include mercury loading, the chemical form of mercury (chemical speciation), temperature, the availability of organic substrate for sulfate-reducing bacteria (i.e., a food source), mercury de-methylation activity (by bacteria), natural reduction-oxidation conditions, and in some cases photo-demethylation (light induced).[11] To complicate the issue further, many of these parameters vary temporally and spatially in aquatic systems. Any of these parameters can potentially limit the abundance of bio-available methylmercury in an aquatic system.[12]

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[8] Ref. 2, page 9.
[9] Ref. 7, page 15.
[10] Ref. 7, page 18.
[11] Ref. 4, page 1.
[12] Ref. 4, page 1.

Other Uncertainty Factors

Additional factors influence the bioaccumulation of mercury in aquatic biota. They include the acidity (pH) of the water, length of the aquatic food chain, temperature, and dissolved organic material. Physical and chemical characteristics of a watershed, such as soil type and erosion or proportion of area that is wetlands, can affect the amount of mercury that is transported from soils to water bodies. Interrelationships among these factors are poorly understood and are likely to be site-specific. No single factor (including pH) has been correlated with extent of mercury bioaccumulation in all cases examined. Two lakes that are similar biologically, physically, and chemically can have different methylmercury concentrations in water, fish, and other aquatic organisms.[13]

Benoit, Gilmour, Mason, and colleagues have recently proposed that sulfide levels in aquatic systems can be very important in controlling methylmercury production by sulfate-reducing bacteria. This influence arises from the strong interaction between inorganic mercury and sulfide to form mercury-sulfide complexes and the bioavailability of these complexes to sulfate-reducing bacteria. They hypothesize that only neutrally charged mercury complexes (e.g., elemental mercury, mercuric sulfide [HgS^0] or mercuric chloride [$HgCl_2^0$]) are capable of readily passing bacterial membranes for intra-cellular mercury methylation. Hence, the in situ chemical speciation of mercury is very important in controlling mercury methylation.[14] If this proposal is proven correct, then waters with high sulfide levels and low oxygen will have low methylmercury levels.

Not all mercury compounds entering an aquatic ecosystem are methylated (converted to methylmercury). Demethylation reactions (conversion of methylmercury into mercury compounds), as well as volatilization of dimethylmercury, decrease the amount of methylmercury available in the aquatic environment. In other words, physical and chemical forces are in action at various rates to deduce methylmercury concentrations in aquatic ecosystems. There is substantial scientific certainty regarding the rate at which these reactions take place.[15]

Additionally, scientific understanding of the environmental fate and transport of mercury is limited. Quantifying the contribution of United States anthropogenic emissions relative to other sources of mercury, including natural sources and re-emissions from the global pool (natural and anthropogenic), on methylmercury levels in fish consumed by the U.S. population is not possible at this time. Mercury methylation and subsequent uptake in fish is complex

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[13] Ref. 5, Chapter 2, page 6.
[14] Ref. 4, page 1.
[15] Ref. 3, Chapter 2, page 5.

and not yet well understood. As a result, a change in total mercury emissions cannot be firmly established as being linearly related to any resulting change in methylmercury in fish. The time over which these changes will occur is also uncertain. This is an area of ongoing study.[16]

MERCURY IN WATER

Mercury In Drinking Water and Scrubber Blow Down

The EPA drinking water standard is 0.002 mg/liter for mercury. While this is on the basis of total mercury (elemental mercury and mercury compounds), it is not specific to or limited to methylmercury, which would not exist in scrubber blow down. Levels of mercury in scrubber blow down from coal fired utility boilers would likely be many times over the drinking water standard. Obviously, it would be ill advised to remove mercury from stack exhaust and then allow these emissions to be discharged into surface or other drinking water sources (where it could potentially interact with the biological mechanisms to form methylmercury). At time this document was prepared, insufficient information had been collected by DAQ to enable a reasonable determination of what the industry norm and expectations would be for collection and treatment of the blow down water to prevent it from being a water quality problem. This is an important potential issue and will be researched and addressed in the next subsequent report update.

Additional detailed discussions of mercury in North Carolina's waters are presented in Chapter 3 and Volume 2 of this report.

MERCURY IN SOIL

Mercury dispersion simulation modeling efforts initially followed an assumption that all inorganic mercury compounds that settled on the ground would eventually enter the surface water drainage system and accumulate in rivers, streams, and lakes. Contrary to that assumption, inorganic mercury compounds have a strong propensity to attach to leafy vegetation and soil particles. The majority of inorganic mercury compounds found in water bodies are believed to have arrived by way of atmospheric transport and not from local drainage.

One study shows the estimated release of mercury vapors from 200,000 tons of fly ash per year has a maximum potential release of 0.0044 pounds, or 2 grams of mercury per year.[17] Therefore, land disposal of fly ash does not appear to be a significant source of mercury contamination or emission.

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[16] Ref. 3, Chapter 4, page 1.
[17] Ref. 15, page 1.

MERCURY IN AIR

Mercury in the atmosphere comes both from natural sources and from global emissions from human activities. Most of the mercury in the atmosphere is elemental mercury vapor, which may circulate in the atmosphere for years ("global pool") in a dynamic deposition/re-emission state of flux, and hence, can be transported thousand of miles from the source.[18] Modeling studies recently have suggested that the rate of oxidation of elemental mercury in the atmosphere may be occurring twice as fast (half-life of six months instead of one year) as previously believed. If true, either undefined sources of elemental mercury exist or the release of elemental mercury vapor because of natural and human activity may be in error by a factor of two, meaning total annual mercury emission rates might be up to two times greater than currently estimated.

However, recent experiments using plume chemistry in a static plume dilution chamber, developed by the Electric Power Research Institute, may change the interpretation of chemistry used to calculate percentages of elemental mercury and oxidized (inorganic) mercury transported in the plume. [19] This study suggests that oxidized mercury rapidly converts to elemental mercury near the stack. This finding may explain measurements made near a large coal-fired power plant in Georgia. Based on mercury concentrations in coal burned at the plant, scientists predicted that the stack gases would contain 60 percent oxidized mercury and 40 percent elemental mercury. Mercury measured in air 15 miles downwind was found to be 9 percent oxidized mercury and 91 percent elemental mercury.[19]

These two concepts - (that the oxidation of mercury occurs twice as fast as previously believed, and that oxidized mercury rapidly converts to elemental mercury near the stack) conflict and further demonstrate the need to further understand the science of mercury speciation in the atmosphere.

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[18] Ref. 3, page 1.
[19] Ref. 18

CHAPTER 3 - MERCURY CONCERNS SPECIFIC TO NC

HISTORY: MERCURY IN NORTH CAROLINA

Biologists suspected for many years that freshwater fish in the black water systems of eastern North Carolina would be prone to mercury contamination as found in other parts of the country sharing similar environmental conditions. In 1970 the Federal Water Quality Administration issued a report on mercury pollution that mentioned mercury contamination found in fish caught in the lower Cape Fear River basin. Industrial discharges of mercury to local waterways and mercurial pesticide use were scrutinized at that time, but no study was made of atmospheric contributions. Past studies of mercury levels in eastern North Carolina peat deposits discussed the possible contribution of atmospheric deposition of mercury to local waterways. However, no information was available on atmospheric mercury trends in the areas surrounding eastern North Carolina's sensitive waterways

Mercury in Fish Tissue

The rate and degree to which methylmercury bioaccumulates within a system is dependent on a number of factors. The most significant of these includes the water's pH, food chain length and composition (productivity), water temperature, water body chemistry, and the form and structure of the organisms present. Methyl mercury, the toxic and most bioaccumulative form of mercury in fish, can be concentrated in top predator species.

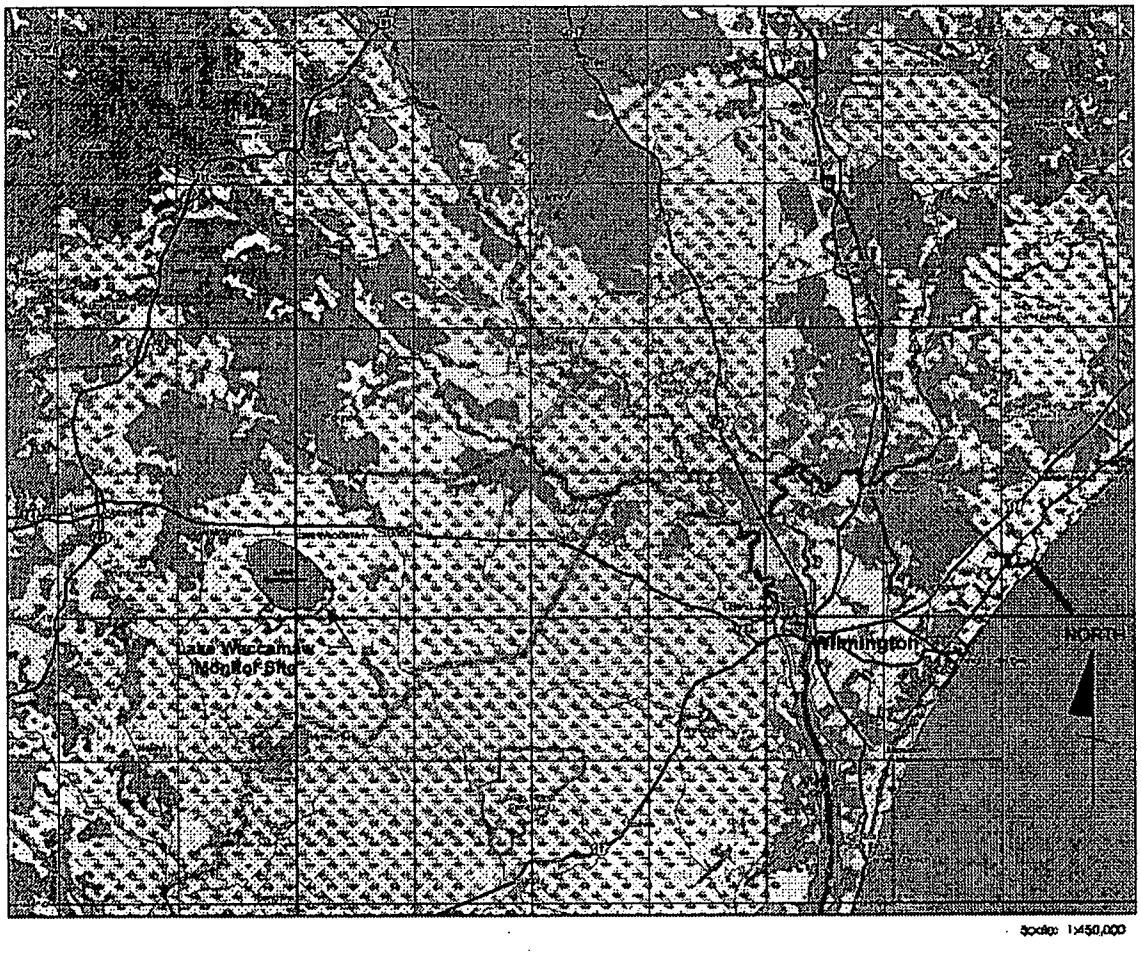
The Environmental Sciences Branch (fisheries programs) of the North Carolina Division of Water Quality (DWQ) conducts fish community assessments, fish tissue monitoring, fish kill data assessment, and supports special projects. In 1992, the DWQ conducted an intensive fish mercury survey in the vicinity of Lake Waccamaw, situated in the Lumber River Basin of southeastern North Carolina (Figure 3-1). In that study, 60 percent of largemouth bass samples from Big Creek and the Waccamaw River were found to contain mercury levels above one part per million (ppm), the threshold level for issuance of fish consumption NCDEHNR advisories at that time.

The DWQ's efforts from 1995 to 1999 consisted of monitoring for mercury and other contaminants under basin-wide assessments, sampling statewide, verification of the high levels of mercury in eastern piscivores (fish-eaters), and the king mackerel mercury survey (1998-1999) with the Division of Marine Fisheries (DMF). From 1998 to 1999, DWQ assisted with

Figure 3-1

Southeastern North Carolina

Including Lake Waccamaw and Surrounding Environs



the analyses of 112 king mackerel and Spanish mackerel samples that were collected by the DMF from recreational and commercial sources. The fish tissues were collected from a range of fish sizes and seasonal populations.

The Spanish mackerel samples contained low mercury levels. However, regression models using king mackerel tissue data demonstrates a strong relationship exists between king mackerel size and mercury concentration. From these regression curves, a mercury level over 1ppm is predicted for king mackerel over 13 pounds or 37 inches.

Human Mercury Burden

Mercury compounds can be converted in some aquatic environments into a more toxic form, methylmercury. The NC Department of Health and Human Services (DHHS) found that this is the form of mercury that is incorporated into the food chain. Fish consumption is the primary way that both humans and wildlife are exposed to methylmercury. Methylmercury can accumulate to harmful concentrations in predatory fish.

In North Carolina, high levels of methylmercury (levels at 0.4 mg/kg or greater) have been found in ocean fish like shark, swordfish, king mackerel, and tilefish, and in freshwater fish like largemouth bass, bowfin, and chain pickerel south and east of Interstate 85 (see Figures 3-2 and 3-3). Women of childbearing age and children have been notified through advisories to not eat the four ocean fish and the three freshwater fish south and east of Interstate 85. These advisories have been issued to protect the most sensitive population, the developing child. The developing human nervous system is particularly sensitive to methylmercury. Several studies have reported increasing effects on the developing nervous system of an unborn child with increasing maternal methylmercury exposure from routine fish and whale consumption. Neurological processes in the areas of language, attention, and memory have been most affected.

The NC DHHS is seeking funding from the Centers for Disease Control and Prevention to conduct biomonitoring in seven counties including Columbus, Brunswick, Bladen, Moore, Scotland, Duplin, and Martin Counties. The largemouth bass and bowfin in these counties have some of the highest methylmercury fish tissue concentrations in the state. Based on consultation with local residents from these counties and with the NC Wildlife Resources Commission, there are recreational and subsistence fishermen in these counties. The potential for exposure to high levels of methylmercury exists for individuals living in these counties. Even though there are advisories in these areas, the people may not be aware of the advisories or may choose to ignore them.

An epidemiological study consisting of blood and hair methylmercury analysis was completed in 1990 after discovering elevated fish tissue levels in largemouth bass and bowfin for Columbus and Brunswick Counties. Some of the highest levels of methylmercury in human hair and blood ever recorded in the United States have been identified among residents living in Columbus and Brunswick Counties. The purpose of this study was to determine if the subsistence fishermen in these counties had elevated methylmercury blood or hair levels. A total of 64 blood samples and 77 hair samples were collected for 81 residents living in these two counties. There was a positive correlation between residents with high rates of fish consumption from the waters under

advisory and elevated methylmercury hair and blood levels. The blood levels ranged from non detect to 141 ug/L (well above 5 percent effect level of 58 ug/L associated with abnormal neurodevelopmental scores above background). The hair levels ranged from non detect to 33.5 mg/kg (well above 5 percent effect level of 10 mg/kg associated with abnormal neurodevelopmental scores above background).

Additional biomonitoring is needed to prevent illness and improve public health through the following:

- To determine awareness of the fish advisories pertaining to methylmercury and to also communicate the fish advisories.
- To modify and/or expand approach for communicating fish advisories if decreased awareness or individuals are not following advice.
- To determine methylmercury body burden levels among women of childbearing age and children within the counties that have some of the highest methylmercury fish tissue levels in the state and to recommend low methylmercury fish choices.
- To determine methylmercury body burden levels among women of childbearing age and children within the counties that have some of the highest methylmercury fish tissue levels in the state and to recommend low methylmercury fish choices.

The results of the study will benefit women of childbearing age and their offspring. The program will obtain information about the proportion of women who are aware of the advisory and how to successfully distribute advisory information to women who are not getting the message. By increasing the proportion of women who are aware of the advisory, the program will decrease methylmercury exposure to the women and their offspring. In addition, the intervention design will be shared with other states so that their advisory information will be distributed successfully to this subpopulation. The end result is to ensure that women of childbearing age are getting the advisory information so that they will limit their exposure to methylmercury and other contaminants through consumption of fish.

Estimated Risk to Newborns in North Carolina

The potential number of newborns in North Carolina at risk from maternal exposure to methylmercury is calculated using data from the 1999 National Health and Nutrition Examination Survey (NHANES). This survey reported blood and hair methylmercury sample results for women ages 16 to

49. Approximately 10 percent of the women surveyed had hair methylmercury levels above the EPA-recommended hair level of 1 mg/kg to protect developing fetuses (corresponds to reference dose of 0.1 ug/kg-day). According to the Centers for Disease Control and Prevention, this indicates a narrow margin of safety for some fetuses. [20] EPA estimates that at or below the reference dose of 0.1 ug/kg-day or maternal hair level of 1 mg/kg, chronic non-cancer health effects are not likely to occur. But as the exposure dose increases above the EPA reference dose, the probability of adverse health effects also increases.

Using this information, one may extrapolate to find the number of newborn infants in North Carolina that may potentially be at risk. This extrapolation assumes that the NHANES population surveyed is representative of a cross section of North Carolina and that women in North Carolina have methylmercury levels similar to levels found in the NHANES survey.

Based on the 1995 national fecundity rates for women ages 15 to 44 and the population data for North Carolina, it is estimated that there are 1,105,045 fertile women in North Carolina. [21] Using the North Carolina fertility rate of live births of 67.5 per 1,000 fertile women for 1999, one can expect 74,590 live births.[22] If one assumes that 10 percent of the maternal hair levels for the 74,590 births are greater than 1 mg/kg as reported in the national survey, then 7,459 North Carolina fetuses annually may be at a dose higher than that recommended by EPA. EPA estimates that chronic non-cancer health effects are not likely to occur at or below the reference dose. But as the exposure dose increases above the EPA reference dose, the probability of adverse health effects also increases.

HEALTH EFFECTS

Human methylmercury contamination occurs primarily through diet. Fish and fish products are the predominate source.[23] Consumption of fish and marine birds and mammals represent 95 percent of the human intake of methylmercury. Within the United States, individual consumption of fish and seafood is highly variable. Approximately one to two percent of the U.S. population report eating fish daily, whereas about 10 percent rarely consume fish.[24]

Susceptible populations include people consuming above average amounts (greater than ten grams) of methylmercury contaminated fish on a

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[20] Blood and Hair Methylmercury Levels in Young Children and Women of Childbearing Age–United States, 1999. 1999 National Health and Nutrition Examination Survey, *MMWR* March 02, 2001 /50 (08);140-3.

[21] National Center for Health Statistics, http://www.cdc.gov/nchs/data/series/sr_23/sr23_19.pdf

[22] Center for Health Informatics and Statistics, http://sdc.state.nc.us

[23] Ref. 1, page 2.

[24] Ref. 2, page 41.

regular basis. Ten grams per day is equivalent to 8 pounds of fish per year. Higher than average consumption of fish and other seafood is found among people of Asian and American Indian ethnicity and recreational anglers and their families. People who are subsistence fishers may be particularly important population with respect to methylmercury contamination. Methylmercury contamination depends on the amount of fish consumed and on the methylmercury concentrations in the fish.[25]

Methylmercury adversely affects the developing nervous system at lower exposure than it affects adult neurological functioning. Consequently, women of childbearing age, maternal and fetal pairs, nursing mother and infant pairs, and young children (up to age six) are all susceptible populations.[26] An analysis of dietary surveys led the EPA to conclude that between one and three percent of women of childbearing age (i.e., between 15 and 44) eat significant amounts of fish to be at risk from mercury exposure.[27]

The EPA has found mercury residuals in fish in 92 percent of 374 surface water bodies tested in the U.S. Eighty-five percent of the sites were found to have 0.0 to 0.5 ppm mercury levels. Mercury levels above 1 ppm were found in at least one fish at two percent of the sites surveyed, and above 0.5 ppm were found in at least one fish at 15 percent of the sites. The national average for freshwater fish is 0.3 ppm.[28] In humans, methylmercury has an estimated biological half-life of between 44 and 80 days.[29] Inorganic mercury, which is less efficiently absorbed and more readily eliminated from the body than methylmercury, does not tend to bioaccumulate.[30]

Findings By The NC Department of Health and Human Services

Consumption of fish can be beneficial for both pregnant and breastfeeding women, and their developing children. The developing retina and nervous system of an unborn child may benefit from maternal consumption of fish during pregnancy. Additionally, fish consumption has been associated with a decreased risk of heart attack and coronary artery disease in adults.[31,32,33] However, a form of mercury known as methylmercury can accumulate to

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[25] Ref. 2, page 45
[26] Ref. 2, page 45.
[27] Ref. 6, Chapter 3, page 42.
[28] Ref. 6, Chapter 3, page 33.
[29] Ref. 6, Chapter 3, page 23.
[30] Ref. 6, page 1.
[31] (Neuringer, M., S. Reisbick, and J. Janowsky, 1994
[32] The Role Of N-3 Fatty Acids In Visual And Cognitive Development: Current Evidence And Methods Of Assessment. J. Pediatr. 125:S39-47. Toxicology Excellence for Risk Assessment TERA, 1999.
[33] Comparative Dietary Risks: Balancing the Risks and Benefits of Fish Consumption. Results of a Cooperative Agreement between US. Environmental Protection Agency and Toxicology Excellence for Risk Assessment Final)

harmful concentrations in predatory fish.[34] Consumption of these fish by pregnant and/or nursing women and by children poses a health risk to children and fetuses.

The developing human nervous system is particularly sensitive to methylmercury. Several studies have reported increasing effects on the developing nervous system of an unborn child with increasing maternal methylmercury exposure from routine fish and whale consumption. Neurological processes in the areas of language, attention, and memory were most affected. According to the National Academy of Sciences, studies conducted in the New Zealand and Faroe Islands show that the deficits observed can be considered predictive of problems in cognitive and academic performance associated with methylmercury exposure, or can affect the way the children may think, learn, and problem solve. These studies have shown the developing fetus to be at least three times more sensitive than adults.[35]

Routine consumption of fish containing concentrations of 0.4 mg/kg or greater of methylmercury poses an increased risk of neuro-developmental effects for the developing fetus and children under 15 years of age.[36] The EPA reference dose for methylmercury is 0.1 ug/kg-day (corresponds to maternal hair level of 1 mg/kg and blood level of 5.8 ug/L). This is the dose that is not likely to be associated with health effects for the developing fetus and child. Routine consumption of fish containing 0.4 mg/kg of methylmercury can result in exceedances of the US EPA reference dose for methylmercury.

To derive the reference dose of 0.1 ug/kg-day, EPA calculated benchmark doses (BMD) or doses associated with a 5 percent incremental risk above background (background associated with 5 percent risk) of having abnormal neuropsychological test scores for children from the Faroe Islands located in the North Sea between Scotland and Iceland. These test scores provide a measure of the way children learn, think, and problem solve. The mothers of these children consumed three fish meals per week and less than one pilot whale meal per month.

The benchmark dose, based on EPA and National Academy of Science review was 85 ppb in cord blood, corresponds to 15 mg/kg in hair. At these

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[34] Environmental Protection Agency EPA, 1997. Summary. Vol. 1. In: Environmental Protection Agency (US). Methylmercury Study Report to Congress. Washington: EPA. Pub. No.EPA-452/R-97-001.

[35] NRC National Research Council 2000. Toxicological Effects of Methylmercury. Committee on the Toxicological Effects of Methylmercury, Board on environmental Studies and Toxicology, Commission on Life Sciences, National Research Council. Washington, DC: National Academy Press.

[36] US EPA Water Quality Criterion for the Protection of Human Health: Methylmercury, Final. Office of Science and Technology, Office of Water, Washington, DC. EPA-823-R-01-001. January 2001.

blood and hair levels, there is an estimated 5 percent incremental risk above background of having abnormal neuropsychological test scores. EPA determined the 95 percent confidence interval or the range of doses that would be expected to be associated with a total 10 percent risk of having abnormal scores or 5 percent incremental risk above background. The lowest dose of this interval was 58 ppb in cord blood or 10 mg/kg in maternal hair and is designated as the Benchmark Dose Limit (BMDL). This corresponds to an intake of 1.081 ug/kg-day. An uncertainty factor of 10 was applied to the 1.081 ug/kg-day to account for variability in susceptibility within the study cohort, variability in pharmacokinetic parameters for methylmercury, and lack of data on long term sequelae of in utero exposure. The resulting reference dose is 0.1 ug/kg-day or 0.0001 mg/kg-day corresponding to hair level of 1.0 mg/kg.[37]

The Center for Disease Control and Prevention's 1999 National Health and Nutrition Examination Survey (NHANES) reported blood and hair methylmercury sample results for women ages 16 to 49. Approximately 10 percent of the women surveyed had hair methylmercury levels above the EPA-recommended hair level of 1 mg/kg to protect developing fetuses (corresponds to reference dose of 0.1 ug/kg-day). According to the Centers for Disease Control and Prevention, this indicates a narrow margin of safety for some fetuses.[38] EPA estimates that at or below the reference dose of 0.1 ug/kg-day or maternal hair level of 1 mg/kg, chronic non-cancer health effects are not likely to occur. But as the exposure dose increases above the EPA reference dose, the probability of adverse health effects also increases.

North Carolina Safe Fish Eating Guidelines

The most recent safe fish eating guidelines issued by DHHS were prepared by the Medical Evaluation and Risk Assessment Unit (MERAU) and dated August 29, 2001. Women of childbearing age (15-44 years), pregnant women, nursing women, and children under 15 years may eat two meals per week of fish low in methylmercury, like farm-raised fish, canned tuna and other canned fish, fish sticks, shrimp, crab, lobster, clams, oysters, scallops, salmon, trout, cod, whitefish, pollock, mahi-mahi, ocean perch, halibut, haddock, flounder, croaker, herring, crappie, sunfish, white perch, yellow perch, and bream.[39] They should not eat shark, swordfish, tilefish, or king

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[37] Reference dose of 0.0001 mg/kg-day supported by the National Academy of Sciences as referenced in the Toxicological Effects of Methylmercury, National Research Council, National Academy Press, Washington, DC 2000.

[38] Blood and Hair Methylmercury Levels in Young Children and Women of Childbearing Age–United States, 1999. 1999 National Health and Nutrition Examination Survey, *MMWR* March 02, 2001 /50 (08);140-3

[39] All fish and shellfish should be properly prepared and cooked.

mackerel.[40] Also, they should not eat bowfin (blackfish), chain pickerel (jack fish) or largemouth bass caught in North Carolina waters south and east of Interstate 85.

Other women, men, and children over 15 years may eat four meals per week of fish low in methylmercury, like farm-raised fish, canned tuna and other canned fish, fish sticks, shrimp, crab, lobster, clams, oysters, scallops, salmon, trout, cod, whitefish, pollock, mahi-mahi, ocean perch, halibut, haddock, flounder, croaker, herring, crappie, sunfish, white perch, yellow perch, and bream.[41] They should eat no more than one meal per week of shark, swordfish, tilefish, or king mackerel. Also, they should eat no more than one meal per week of bowfin (blackfish), chain pickerel (jack fish), or largemouth bass caught in North Carolina waters south and east of Interstate 85 see Figures 3-2 and 3-3).

MONITORING FOR ATMOSPHERIC MERCURY

The following discussion on monitoring North Carolina atmosphere and water mercury concentrations represents a condensed version of highlights from major scientific studies that are available for review in Volume 2 of this report.

Historical Data on Atmospheric Mercury in North Carolina

Very little historical data are available describing typical atmospheric mercury levels in North Carolina. Stopford anecdotally reported levels between 1.7 and 8.9 ng/m^3 in Durham, NC in 1978, with a short-term peak of approximately 400 ng/m^3 during a plume fumigation event arising from a nearby coal-fired power plant. Between 1998 and 2001, periodic measurements of TGM taken at a site in Research Triangle Park, NC indicated that levels rarely exceeded 2 ng/m^3, with values typically in a range between 1.4 - 1.7 ng/m^3.[41] TGM was measured over a 3-month period between June and August of 1996 at Phelps Lake, a remote site in northeastern North Carolina; 15-minute readings were consistently between 1 and 2 ng/m^3 and never exceeded 6 ng/m^3.

Mercury, in its various forms, is transported into and out of the atmosphere by several different means. Mercury can be absorbed by cloud formations and deposited to the earth's surface in rainwater or as dew. This is known as "wet deposition". Mercury can also adhere to particulate matter and settle out onto vegetation and the earth's surface. This mechanism is known as

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[40] On January 12, 2001 EPA and FDA issued national fish consumption advisories due to high levels of mercury in some marine fish. These advisories recommend that women of childbearing age and children should not eat shark, swordfish, king mackerel or tilefish.

[41] Stevens

Figure 3-2

Contaminated Largemouth Bass

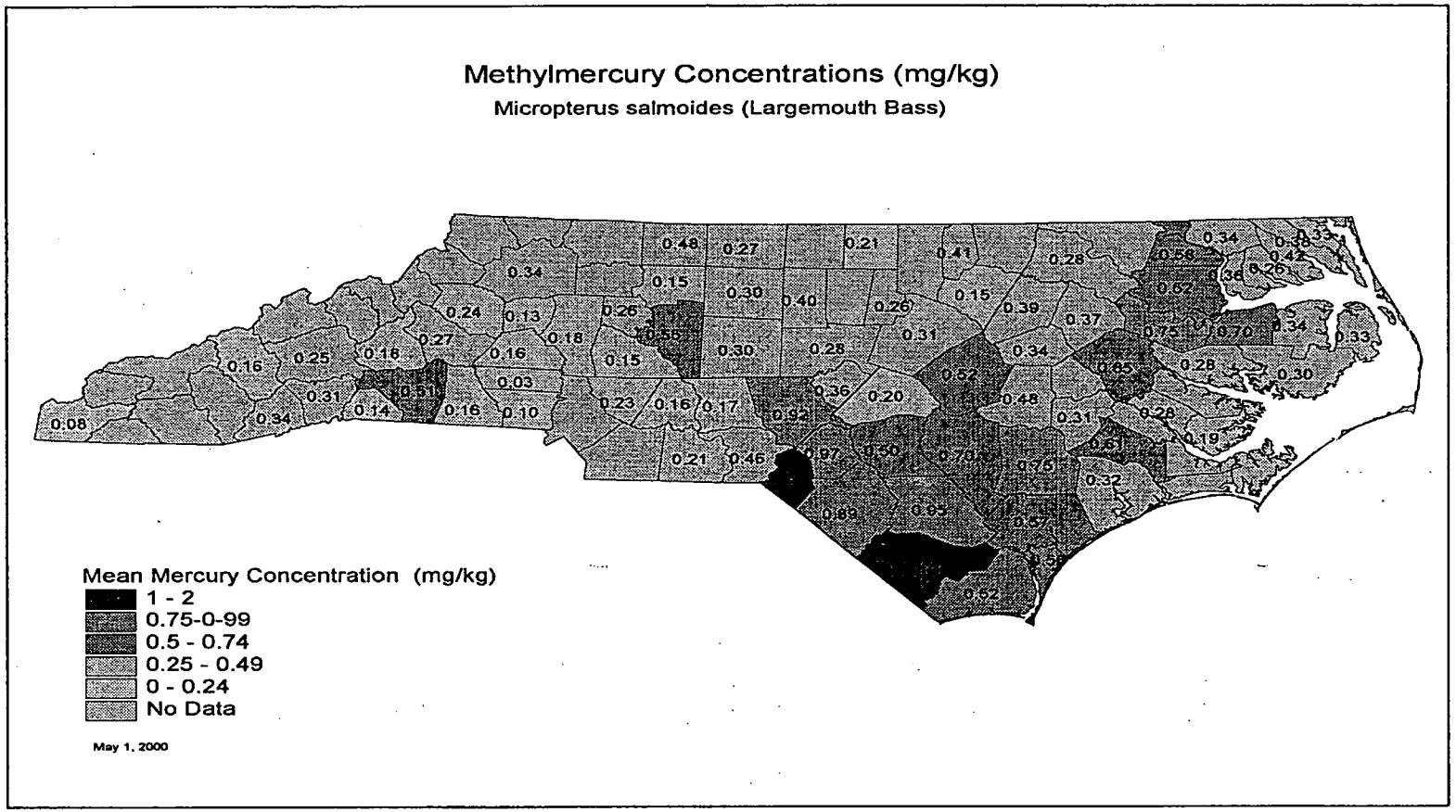
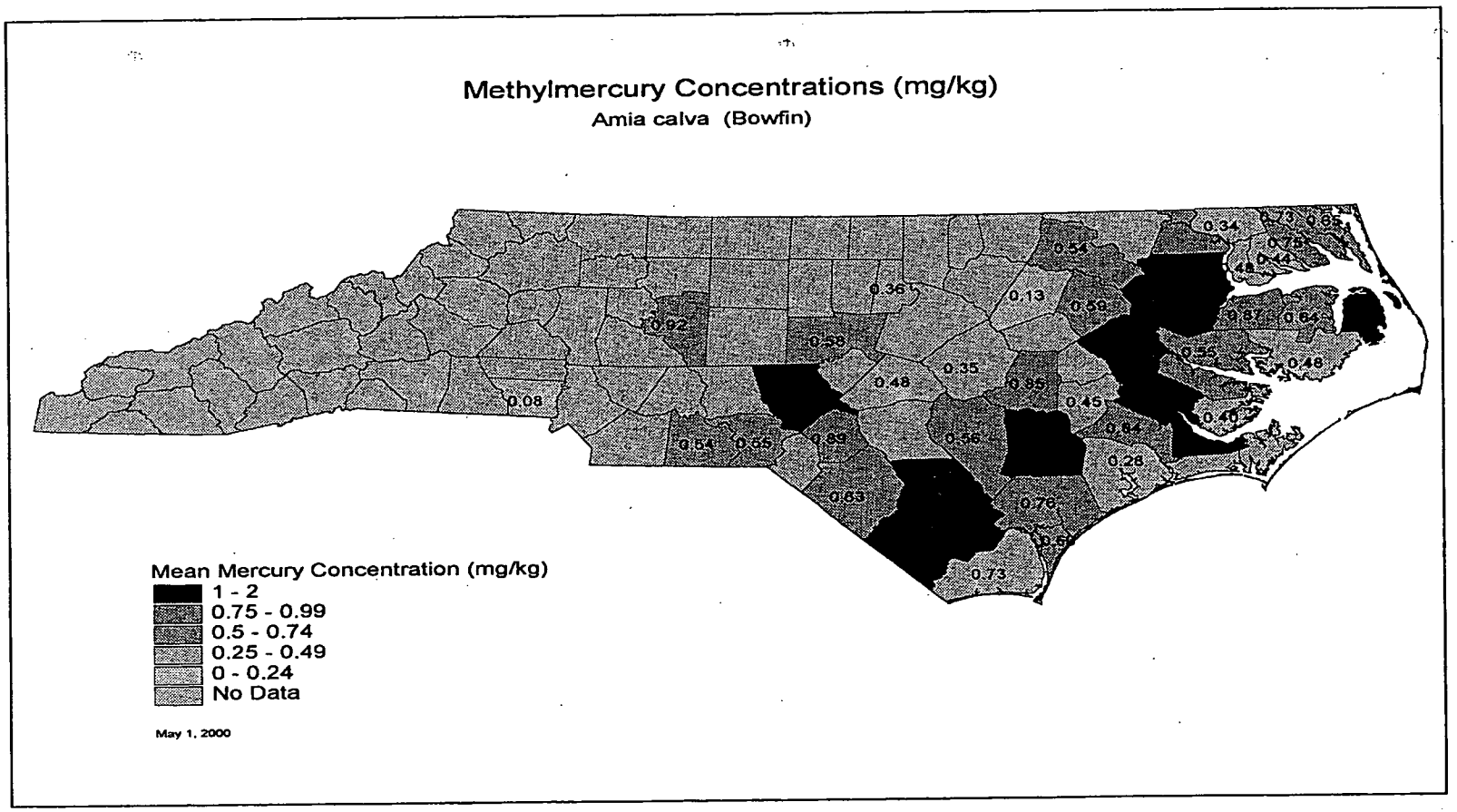


Figure 3-3

Contaminated Bowfin



"dry deposition". Levels of mercury in rainwater and adhered to particulate matter can both be measured. North Carolina has been measuring mercury in rainwater since 1996. Mercury that is not deposited out of the atmosphere remains suspended in the ambient air and exists either in its elemental form, *elemental mercury*, or its reactive form, which is referred to as reactive gaseous mercury (RGM). Together, elemental mercury and RGM comprise what is referred to as Total Gaseous Mercury (TGM). North Carolina has the ability to measure these two forms of mercury while still suspended in the air and can distinguish one from the other.

MERCURY WET DEPOSITION

Mercury wet deposition involves the transfer of mercury from the atmosphere to land or surface waters in precipitation or condensation of water vapor. Water-soluble species of gaseous or particulate mercury may be scavenged from the atmosphere by cloud water, rain, snowfall or water vapor. For many surface waters, atmospheric deposition is the most significant route of mercury loading. Dry deposition of particulate mercury or RGM also contributes to the overall rate of atmospheric deposition. Together, these phenomena contribute to raise methylmercury levels in fish residing in mercury-sensitive waters.

Mercury Wet Deposition Sites

Shortly after the discovery of widespread mercury contamination in Lumber River basin fish, the Division of Air Quality (DAQ) stationed air monitoring instruments at Lake Waccamaw and Pettigrew State Parks to measure mercury levels in rainfall. Measurement of mercury in rainwater can provide an estimated rate of atmospheric deposition and loading to local waters. The Waccamaw and Pettigrew stations were among the earliest sites in the National Atmospheric Deposition Network's Mercury Deposition Network (MDN). Composite rainwater samples were collected and analyzed weekly for total mercury content beginning in late 1995.

Recent data from both sites during 1999 and 2000 suggested that mercury levels in precipitation may be declining in these areas. The most dramatic drop occurred between 1998 and 1999 at Lake Waccamaw State Park, when levels declined to values typical of the more remote location at Pettigrew State Park. Since 1998 however, the levels have crept back up. The current theory of cause and effect for mercury levels increasing may be cleanup activities at the closed chlor-alkali facility.

There was a reduction in mercury deposition (a 30 percent drop compared to the previous three year average) at the Waccamaw site starting in 1999. This reduction coincides with the closure of the HoltraChem mercury cell chlor-alkali plant. However, concentrations increased in 2000 and 2001,

possibly due to plant clean-up efforts at the closed plant. The weighted concentration levels in 2000 and 2001 do not reach the magnitude of pre-1999 concentrations. Data from the Pettigrew site generally follow the same curve, but with lower weighted concentrations.

The Mercury Deposition Network

The National Atmospheric Deposition Program's Mercury Deposition Network (MDN) was designed to identify geographical and temporal trends in mercury deposition across North America. As of 2002 more than 50 sites were operating in more than 20 states and Canadian provinces. Precipitation levels, total mercury concentration, and mercury wet deposition rate are reported weekly. Volume-weighted mercury concentration is calculated on a quarterly and annual basis.

Ambient Gaseous Mercury

In recent years, ultra-sensitive techniques have been developed to measure and speciate mercury in ambient air and rainwater, allowing for the determination of temporal and spatial trends in atmospheric mercury. Mercury vapor analyzers are not dependent on precipitation events. They collect and record mercury concentrations 24-hours per day. The vast majority of these readings showed total gaseous mercury levels at or below 2 ng/m^3, which is in the range of concentrations considered "background" for this type of site. However, fluctuations of mercury vapor concentrations, up to twice background values, were periodically seen. Mercury data were matched to concurrent wind direction data to illustrate an association between elevated total gaseous mercury and winds originating from the east-northeast. This evidence suggested a fixed upwind source might be impacting atmospheric mercury levels at Lake Waccamaw State Park.

Atmospheric monitoring for total gaseous mercury was carried out concurrently at the Riegelwood and Lake Waccamaw locations during 1999 and 2000. The study, known as the Waccamaw Atmospheric Mercury Study, also involved chemical speciation of elemental and reactive gaseous mercury during 2000 at one of the Riegelwood sites.

Total Gaseous Mercury Summary

This section presents summation information on total atmospheric mercury levels collected over a three-year period between 1997 and 2000. Findings include:

- Data collected during 1998 at Lake Waccamaw State Park suggested that periodic spikes of total gaseous mercury exceeding 50 ng/m^3 were typical for this area during this time, but atypical for such a remote/rural location.

- On-site meteorology identified a relationship between elevations in total gaseous mercury and winds originating from the east-northeast.

- Beginning in early 1999, levels of atmospheric mercury at Lake Waccamaw state park returned to typical "background" levels (1.5 – 2.0 ng/m^3).

- Reduced atmospheric levels of total gaseous mercury were observed simultaneous with the cessation of chlorine production at a mercury cell chlor-alkali plant located approximately 25 kilometers to the east-northeast of Lake Waccamaw State Park.

- In Riegelwood, NC, measurements of atmospheric mercury included periodic spikes in total gaseous mercury throughout 1999 and 2000.

- Quarterly average total gaseous mercury levels during 1999 and 2000 were up to 166 percent higher at the Riegelwood monitoring locations versus coincident readings from Lake Waccamaw State Park. However, average values appeared to decline in Riegelwood over the course of this study and at one site decreased by roughly 40 percent between 1999 and 2000.

- Total gaseous mercury levels did not exceed 300 ng/m^3 (NC Acceptable Ambient Level and EPA inhalation reference concentration) at the Riegelwood sites for an extended period of time, suggesting that health risks from non-occupational inhalation of mercury were minimal for local citizens during the study period.

- Long-term continuous measurement of atmospheric mercury can be successfully achieved, even at the low levels found in the atmosphere. Data from these types of studies can be used in combination with on-site meteorological data to identify possible source-receptor relationships.

Reactive Gaseous Mercury Findings

Meaningful findings for reactive gaseous mercury include:

- Levels of atmospheric reactive gaseous mercury fluctuated significantly in the Riegelwood area throughout the last half of 2000.

- Short-term increases in reactive gaseous mercury frequently occurred in tandem with increases in elemental mercury when the monitoring site was downwind of the chlor-alkali plant and pulp and paper mill, suggesting that mercury emissions included both elemental and reactive gaseous mercury.

- In addition to source-related increases in reactive gaseous mercury, smaller scale increases also frequently occurred during afternoon hours, particularly on low humidity days, suggesting a natural diurnal cycle for reactive gaseous mercury.

- Meteorological conditions such as wind direction, precipitation, humidity and temperature appear to affect ambient air reactive gaseous mercury levels.

- New methods to measure and distinguish reactive gaseous mercury and elemental mercury performed well over extended periods of time; however, some modifications to the instrument assembly may be needed to maintain gold trap integrity over extended sampling periods.

Future DAQ Monitoring Efforts

The MDN sites at Lake Waccamaw and Pettigrew State Park will continue to collect data. If improvements in source emissions and total gaseous mercury at Lake Waccamaw in fact are related to declining mercury levels in regional precipitation, then rainwater data from this site should be comparable to results from Pettigrew State Park in future years. More data, collected over several years is needed to determine whether trends seen over the past three years support evidence for a relationship between regional anthropogenic activities and total gaseous mercury levels, or instead represent normal year-to-year variability in mercury wet deposition.

MONITORING MERCURY IN WATER

Waters affected by fish advisories by the DHHS are considered to be impaired by the DWQ. Therefore, DWQ is required to perform Total Maximum Daily Load (TMDL) studies. The TMDL is the amount of a given pollutant that a waterbody can assimilate while maintaining its designated uses (the current water quality standard for mercury of 0.12 ug/L). This allowable pollutant load must be allocated to the various point and area sources within the watershed. To establish a TMDL, the current level of contamination must be determined.

The DWQ has identified 4 major goals for this study. They are:

1. To determine levels of ambient mercury in the surface water system.

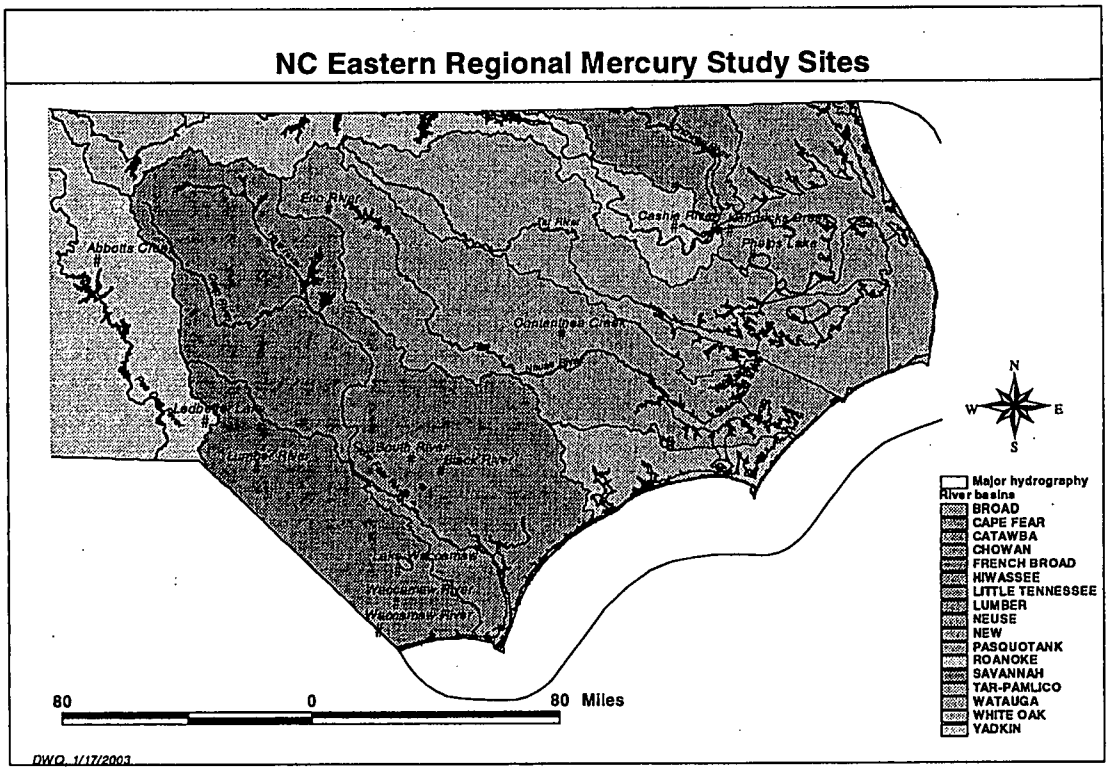
2. To estimate site-specific total mercury methylmercury translators to evaluate water quality criteria.

3. To develop site-specific water to fish bioaccumulation factors (BAFs).

4. To determine levels of mercury in treatment plant effluent.

Figure 3-4

Location of Water Study Areas



Future DWQ Monitoring Efforts

The DWQ will continue to monitor mercury in fish across North Carolina and has several studies in the works:

- Continue low-level waterborne mercury study in eastern NC.
- Monitor tissue analysis in marine species after removal of known atmospheric source.
- Operate six stations around the defunct Riegelwood chlor-alkali plant (begun in 2001 and will continue as resources allow for the foreseeable future).
- Monitor 12 sites for low-level ambient mercury.
- Determine ambient levels of mercury in surface water.
- Develop site specific BAF's with fish.
- Continue methylmercury analysis of marine species (Spot, Croaker, Speckled Trout, and Bluefish, with more species as resources allow) jointly with the DAQ, DHHS, and DMF.

CHAPTER 4 - NC MERCURY EMISSIONS RESULTING FROM PLANNED SO_2 AND NO_X CONTROLS

The two main North Carolina electrical utility companies are mandated to significantly reduce NO_x and SO_2 emissions by the amounts and schedule stated in the North Carolina. *Clean Smokestacks Act* (CSA). Each of the two major utility companies has submitted their plans identifying the boilers getting retrofitted with NO_x and SO_2 control technologies and the corresponding retrofit schedules. In contrast to the definitive CSA provisions and the definitive NO_x and SO_2 technology choices already made by the utilities, the new State law does not contain any specific requirements and technology choices for mercury emission reductions. Instead, mercury emission reductions are expected as side benefits to the specific reductions of NO_x and SO_2 emissions.

Coal-fired utility boilers produce the largest share of mercury emissions. The CSA is estimated to reduce current mercury emissions of 3,052 pounds to 1,363 pounds per year, based on the utilities initial compliance plans for NO_x and SO_2.

STATE-WIDE MERCURY EMISSION SOURCES

In 1998, sources in North Carolina reported a cumulative total mercury emission of 4,626 pounds. The 500 sources represent an estimated 95 percent of statewide mercury emissions. Table 4-1 displays the industrial categories of mercury source as a percent of total mercury emissions in North Carolina. The primary sources of mercury emissions in North Carolina are coal-fired electric utility boilers.

Table 4-1

Cumulative North Carolina Mercury Emissions

Industrial Category	Percent of NC Mercury Emissions
Manufacturing Processes	1
Municipal Waste Combustion	8
Medical/Hazardous Waste Incineration	11
Industrial Boilers	18
Electric Utility	62

Source: 1998-99 DAQ and Local Program Emissions Inventories, 1999 EPA Information Collection Request.

According to the EPA's 1997 *Mercury Study Report to Congress*, coal-fired electric utilities are the largest source of human-caused mercury air emissions in the United States. Nationally, utilities are followed by municipal waste combustors (19 percent), medical waste incinerators (ten percent), and hazardous waste combustors (four plus percent). The largest remaining identified source of mercury emissions are from coal-fired utility boilers.[42] Additionally, the intentional use of mercury in commercial products in the United States declined by more than 75 percent from 1988 to 1996.[43]

Coal-fired Utilities Boilers

In 1999, the U.S. Environmental Protection Agency (EPA) conducted the Electric Utility Steam Generating Unit Mercury Information Collection Effort (EU/ICE) to gather information about mercury emissions from the coal-fired electric utility industry. This effort led to the collection of stack test and coal mercury content reports on 80 furnace or boiler units. Information collected during the stack testing included operating control device configurations. Research Triangle Institute used this collected data to build the tool "Electric Power", "*EUCFF*" (Version 3.0.1). The tool was developed in June 2001 for estimating mercury emissions from coal combustion at electrical utilities in the United States.

Electric Power allows permitting authorities and others to evaluate the impact on mercury emissions if certain parameters including type of coal, boiler, or pollution control device are changed.[44] This program, does not account for any additional mercury capture if selective catalytic reduction (SCR) equipment is installed in the flue gas stream. Therefore, if an SCR is installed, the actual mercury emissions may be lower (more captured) than emissions reported in Table 4-2.

Table 4-2 shows three estimated mercury annual emission rates from each coal-fired electric utility boiler: mercury emissions based on mercury content in coal, current mercury emissions (total of 3,052 pounds per year), and the estimated mercury emissions after additional air pollution controls are operational to meet the NO_x and SO_2 emissions pollutant caps of the CSA.

The mercury emission data presented in Chapter 4 are characterized as *preliminary estimates*. This caveat was used because there is a limited database of speciated mercury emission measurements not only nationwide, but also here in NC. The emission data presented in this report was not based on individual measurements made on each NC boiler, but rather on correlations statistically.

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[42] Ref. 3, page 3.
[43] Ref. 2, page 8.
[44] Ref. 21

Table 4-2

Mercury Emissions from Coal Fired Electrical Utility Boilers

Comparison of Estimated Mercury Emissions

Before and After the Clean Stacks Act

North Carolina Coal-fired Electrical Utility Facilities			Total Mercury In Coal [a]	Existing Mercury Emissions		Clean Stacks Mercury Emissions	
Plant	Unit	Location	lbs/year	Percent Reduced	lbs/ year	Percent Reduced	lbs/ year
Duke Energy							
Allen	1	Belmont	43.42	29.1	30.77	77.7	9.67
Allen	2	Belmont	20.01	29.1	14.18	77.7	4.46
Allen	3	Belmont	79.64	29.1	56.44	77.7	17.74
Allen	4	Belmont	82.42	29.1	58.41	77.7	18.36
Allen	5	Belmont	82.16	29.1	58.22	77.7	18.3
		TOTAL	**307.65**		**218.02**		**68.53**
Belews Creek	1	Walnut Cove	419.95	29.1	297.6	77.9	93.55
Belews Creek	2	Walnut Cove	313.66	29.1	222.28	77.9	69.87
		TOTAL	**733.61**		**519.88**		**163.42**
Buck**	3	Salisbury	5.68	10.7	5.23	0.0	5.23
Buck	4	Salisbury	7.06	10.7	7.06	0.0	7.06
Buck	5	Salisbury	42.54	10.7	38.01	0.0	38.01
Buck	6	Salisbury	43.28	10.7	38.67	0.0	38.67
		TOTAL	**98.56**		**88.97**		**88.97**
Cliffside	1	Cliffside	3.22	10.7	2.88	0.0	2.88
Cliffside	2	Cliffside	3.4	10.7	3.04	0.0	3.04
Cliffside	3	Cliffside	6.52	10.7	5.83	0.0	5.83
Cliffside	4	Cliffside	7.24	10.7	6.47	0.0	6.47
Cliffside	5	Cliffside	120.91	29.1	85.69	77.7	26.93
		TOTAL	**141.29**		**103.91**		**45.15**
Dan River	1	Eden	9.12	10.7	8.15	0.0	8.15
Dan River	2	Eden	9.44	10.7	8.43	0.0	8.43
Dan River	3	Eden	22.38	29.1	15.86	0.0	15.86
		TOTAL	**40.94**		**32.44**		**32.44**
Marshall	1	Terrell	18.65	29.1	84.08	77.7	26.43
Marshall	2	Terrell	131.65	29.1	93.29	77.7	29.33
Marshall	3	Terrell	172.41	29.1	122.18	77.7	38.41

North Carolina Coal-fired Electrical Utility Facilities			Total Mercury In Coal [a]	Existing Mercury Emissions		Clean Stacks Mercury Emissions	
Plant	Unit	Location	lbs/year	Percent Reduced	lbs/ year	Percent Reduced	lbs/ year
Marshall	4	Terrell	219.02	29.1	155.21	77.7	48.79
		TOTAL	**541.73**		**454.76**		**142.96**
Riverbend	4	Mount Holly	31.66	10.7	28.29	0.0	28.29
Riverbend	5	Mount Holly	11.04	10.7	9.87	0.0	9.87
Riverbend	6	Mount Holly	11.36	10.7	10.15	0.0	10.15
Riverbend	7	Mount Holly	30.29	10.7	27.07	0.0	27.07
		TOTAL	**84.35**		**75.38**		**75.38**
Progress Energy							
Ashville	1	Arden	91.27	29.1	64.68	77.7	20.33
Ashville	2	Arden	104.52	29.1	74.07	77.7	23.28
		TOTAL	**195.79**		**138.75**		**43.61**
Cape Fear	5	Moncure	53.24	29.1	37.73	77.7	11.86
Cape Fear	6	Moncure	72.51	29.1	51.38	77.7	16.15
		TOTAL	**125.75**		**89.11**		**28.01**
Lee	1	Goldsboro	25.27	29.1	17.91	0.0	17.91
Lee	2	Goldsboro	23.66	10.7	21.14	0.0	21.14
Lee	3	Goldsboro	88.67	29.1	62.84	77.7	62.84
		TOTAL	**137.6**		**101.89**		**101.89**
Mayo	1A	Roxboro	128.31	10.7	114.67	77.7	28.58
Mayo	1B	Roxboro	128.31	10.7	114.64	39.2	78.03
		TOTAL	**256.62**		**229.31**		**106.61**
Roxborro	1	Semora	171.03	29.1	121.2	77.7	38.2
Roxborro	2	Semora	295.73	29.1	209.58	77.7	65.88
Roxborro	3A	Semora	162.62	29.1	115.24	77.7	36.22
Roxborro	3B	Semora	162.62	29.1	115.24	77.7	36.22
Roxborro	4A	Semora	131.9	10.7	117.85	39.2	80.21
Roxborro	4B	Semora	131.9	10.7	117.85	39.2	80.21
		TOTAL	**1055.8**		**796.96**		**336.94**
L V Sutton	1	Wilmington	33.08	10.7	29.55	0.0	29.55
L V Sutton	2	Wilmington	30.98	10.7	27.68	0.0	27.68
L V Sutton	3	Wilmington	152.08	29.1	107.78	77.7	33.88
		TOTAL	**216.14**		**165.01**		**91.11**
Weatherspoon	1	Lumberton	15.07	29.1	10.68	0.0	10.68
Weatherspoon	2	Lumberton	15.29	29.1	10.84	0.0	10.84

North Carolina Coal-fired Electrical Utility Facilities			Total Mercury In Coal [a]	Existing Mercury Emissions		Clean Stacks Mercury Emissions	
Plant	Unit	Location	lbs/year	Percent Reduced	lbs/ year	Percent Reduced	lbs/ year
Weatherspoon	3	Lumberton	22.53	29.1	15.97	0.0	15.97
		TOTAL	52.89		37.49		37.49
		State Totals lbs/year	3,989		3,052		1,363

[a] This numerical value represents the mercury in coal that is burned. However, a percentage of the mercury is converted from elemental to oxidized mercury, and a percentage of the oxidized mercury attaches to fly ash and is removed from the exhaust gas by electrostatic precipitators as it captures the fly ash.

derived from the available national database on speciated mercury emissions, largely stemming from the EU/ICR emission data.

Other Point Sources

Chlor-Alkali Plant

The only chlor-alkali plant operating in North Carolina has been shut down for approximately three years. Since the plant discontinued production, area air and water sampling are showing reduced mercury concentrations.

Medical And Municipal Waste

The EPA already has taken action to reduce mercury emissions from three significant industrial sources. In 1995, EPA issued final regulations cutting mercury emissions from municipal waste combustors, and in 1998, from medical waste incinerators. The same year, the EPA announced a final rule to reduce mercury emissions from hazardous waste combustion. These actions, once fully implemented, will reduce mercury emissions caused by human activities by over 50 percent of the 1990 levels.[45]

Nucor Steel

A new source in North Carolina that recently started full-scale operations is Nucor Steel in Cofield, North Carolina. This facility is basically a steel making facility that uses primarily scrap steel to recycle into new steel products. Recently, the facility was required to do some stack tests to determine

[45] Ref. 17, page 1.

levels of a number of pollutants as a result of their permit. The tests resulted in unexpectedly high levels of mercury being measured. These emissions, along with the refinement and lowering of emissions from several coal-fired utility units has given Nucor Steel the distinction of reporting the most mercury emissions from a single facility in the state for Calendar Year 2001. This came as a surprise to the company and to the DAQ. There is a strong possibility that mercury emissions originate from mercury switches that remained intact during automobile shredding as scrap.

These results have reportedly started a new, industry-wide reevaluation as to why the emissions were so high and whether the data are valid. More work continues on this and the situation will be watched very closely, but for now there is reason to believe these high mercury emission test results and estimates may be valid.

General Background for Emission Controls

Because the ratio of the two chemical species of mercury emitted from boilers varies from plant to plant, no single control technology removes all mercury.[46] Elemental mercury passes through control equipment. When elemental mercury is changed to inorganic mercury compounds, control equipment can capture the mercury. The ratio of the chemical species of mercury emissions also varies from boiler to boiler due to boiler design, power plant configuration (including controls), and the type and source of the coal burned. These variables affect flue gas chemical and particulate properties, increasing or reducing the percentage of inorganic mercury compounds.

Recent field tests indicate that significant mercury capture is being achieved at coal-fired electric utility boilers through inherent fly ash sorption and collection in existing particulate matter (PM) collectors. These data also show that even more substantial capture occurs for systems using sulfur dioxide (SO_2) scrubbers and post-combustion nitrogen oxide (NO_x) controls. Even greater mercury reductions will be achieved through implementation of advanced controls and strategies for compliance with fine PM, ozone non-attainment, regional haze, and new source review requirements.

The country's first full-scale program to test advanced mercury control technologies was completed in early 2002 by the Department of Energy (DOE) at Unit 3 of Alabama Power's Gaston plant. Testing results demonstrated that mercury can be removed at rates between 80 and 90 percent when activated carbon is injected ahead of the existing bag house ash collection system. Unit 3 is unusual in that it burns low sulfur bituminous coal and controls particulate with an electrostatic precipitator and a baghouse in series.[47]

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[46] Ref. 3, page 3.
[47] Ref. 11, page 1.

Generally, the most important conclusions from the assessment of flue gas treatment technologies include:

1. Control devices operating at relatively low temperatures (300 to 400 ° Fahrenheit).

2. The presence of an effective mercury sorbent and a method to collect the sorbent (e.g., high levels of carbon in the fly ash enhance mercury sorption onto particulate matter, which is subsequently removed by the particulate control device).

3. Hydrogen chloride (HCl) presence in the flue gas stream, which can result in the formation of mercury chloride ($HgCl_2$), is readily adsorbed onto carbon-containing particulate matter, or can be efficiently scrubbed.

4. Conversely, sulfur dioxide (SO_2) in flue gas can act as a reducing agent to convert oxidized mercury into elemental mercury, which is more difficult to capture.[48]

All mercury leaving the furnace (before the preheater and controls) is elemental mercury (Hg^0), and its subsequent oxidation under typical exhaust-flue conditions is kinetically limited, so the abundance of oxidized mercury expected under thermo-chemical equilibrium does not materialize in the actual exhaust system. However, the predominate oxidized species, mercury chloride ($HgCl_2$), is water-soluble and, therefore, dissolves in scrubber solutions, whereas Hg^0 is insoluble and passes through the scrubber. In total, 102 elementary chemical reactions are included in the homogeneous Hg^0 oxidation mechanism.[49]

Over the last 22 years in the Netherlands, the behavior of mercury in coal-fired power plants has been studied extensively. On average, the fate of mercury entering the power station in the coal was as follows: less than 1 percent in the bottom ash, 49 percent in the pulverized fuel ash (ash collected by the electrostatic precipitator (ESP), 16.6 percent in the wet flue gas desulfurization (FGD) gypsum, 9 percent in the sludge of the wastewater treatment plant, 0.04 percent in the effluent of the wastewater treatment plant, 0.07 percent in the fly dust (leaving the stack), and greater than 24 percent as gaseous mercury in the flue gas and emitted into the air. DENOX® selective catalytic reduction (SCR) favors the formation of oxidized mercury (influencing oxidation of 2 to 12 percent of elemental mercury). Dutch electrostatic precipitators (ESPs) are operated at lower temperatures (lower temperatures

[48] Ref. 6, Chapter 4, page 7.
[49] Ref. 12, page 894.

encourage mercury oxidation) than in the United State because of lower sulfur concentrations in the Dutch coal. Higher concentrations of coal sulfur creates more sulfur dioxide (SO_2) in flue gas, which can act as a reducing agent to convert oxidized mercury back into elemental mercury. Additionally, higher concentrations of coal sulfur in the United States requires American ESPs to be operated at higher stack exhaust temperatures to prevent the condensation of sulfuric acid (H_2SO_4).[50]

Results show that some commercial SCR catalysts are capable of oxidizing elemental mercury in flue gas.[51] Recent results indicate that up to 60 percent of elemental mercury present in flue gas may be oxidized across an SCR.[52] Mercury oxidation by an SCR catalyst decreases as flue gas temperature increases from 650 to 800 °F. The addition of ammonia to the flue gas immediately upstream of the catalyst tends to decrease mercury oxidation.[53] However, when no absorber is present downstream from an SCR, increased levels of oxidized mercury may be emitted from the plant, creating a localized mercury deposition problem.[54]

Demonstrations of activated carbon injection for utility boilers have been conducted in the United States. Based on limited testing, using activated carbon injection to control of mercury for utility boilers varies greatly. The same technology might capture 20 percent of mercury at one plant and 80 percent at another. The addition of activated carbon to utility flue gas for mercury control would significantly increase the amount of particulate matter requiring disposal.[55]

The most important factors affecting mercury control on utility boilers include:[56]

1. flue gas volume,
2. flue gas temperature,
3. chloride content,
4. the mercury concentration, and
5. the mercury chemical form.

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[50] Ref. 14, page 912.
[51] Ref. 16, page 141.
[52] Ref. 16, page 142.
[53] Ref. 16, Chapter 4, page 947.
[54] Ref. 16, page 142.
[55] Ref. 6, Chapter 4, page 8.
[56] Ref. 6, Chapter 4, page 8.

CONTROLLING COAL-FIRED UTILITIES MERCURY EMISSIONS

The issue of cost-effective control of mercury emissions from coal-fired utilities is indeed complex and in need of greater understanding. The issue facing the utility industry, its federal and state regulators, and the public is not merely the simple question of what is the single best add-on mercury emission control technology industry wide, but rather a multifaceted set of questions on what are the best candidate technologies for each boiler individually, including:

1. How much of each species of mercury is emitted from the existing boiler combustion process?

2. How much control of each mercury species is achieved by existing air pollution control equipment?

3. How much control of each mercury species will be achieved by installing new air pollution control equipment for NO_x, and the similar question for SO_2?

4. Is additional mercury control warranted to protect human health and the environment, and if so, how much further control is needed, what are the costs and level of control for each option, and can the cost/benefit of the selected option be justified?

5. What and when will the new federal standards be set for mercury?

An example of a multi-pollutant emission issue was experienced in the late 1970s / early 1980s when many utilities switched to low sulfur coal in order to reduce SO_2 emissions. What some utilities discovered was that while lowering SO_2 emissions, the low sulfur coal switch inadvertently increased particulate emissions on many cold-side ESPs due to high resistivity hard-to-collect flyash. To restore previous particulate emission levels, utilities had to further invest in enlarging their ESPs, installing flue gas conditioning systems to lower resistivity, reconfiguring their cold-side ESPs-to become hot-side units, or replacing their ESPs with fabric filters.

EXISTING MERCURY CONTROLS AND CONTROL PERFORMANCE

Certain fly ashes have been shown to promote oxidation of elemental gaseous mercury more than others. The difference in oxidation appears to be attributable to fly ash composition and flue gas composition. Trace levels of iron in the fly ash and the surface area of fly ash are also indicated to influence oxidation levels. Given this complexity of mercury speciation and behavior, the science of understanding how to best capture mercury with existing emission control equipment and emerging control technologies is actually in its early

stages. The following discussion is an attempt to present engineering material on the details and characteristics of mercury emission control performance, with emphasis given to parameters and conditions specific to NC coal-fired utility boilers.

Table 4-3 presents characteristics of each coal-fired utility boiler and its corresponding emission control equipment currently operating in NC. As shown, NC has approximately 50 coal-fired utility boilers burning eastern bituminous low sulfur (at or below 1 percent sulfur) coal belonging to two utility companies. Duke Power owns and operates 27 boilers and Progress Energy owns and operates 18 boilers for a combined total generating capacity of 13,308 megawatts (MW). Currently there are primarily two types of stand-alone particulate air pollution control systems on the Duke Power and Progress Energy NC utility boilers: Cold-side electrostatic precipitators (ESPs), and Hot-side ESPs. Other smaller industrial and utilities own and operate 4 cogeneration facilities with a total capacity of 465 MW, or 3 percent of the electricity produced in NC (Dwayne Collier Battle in Battleboro, Tobaccoville Plant in Tobaccoville, and Westmoreland-LG&E Partners Roanoke Valley I and II in Weldon). The cogeneration boiler facilities are controlled with spray dryer / fabric filters and a stand-alone fabric filter. The allocation of air pollution control systems in NC is not dissimilar from the national average, where ESPs are installed on 84 percent of the boilers nationwide (with most being stand-alone cold-side ESPs) and spray dryer / fabric filters are installed on just 4 percent of the units.

Table 4-4 is intended to show that the majority of the state's utility generating capacity will have NO_x and SO_2 emission controls installed. Table 4-4 summarizes each utility's generating capacity with controls and their percent of generating capacity with controls for NO_x and SO_2. The percent controlled is the percent of the utility's mega watt generating capacity, not the percent of controlled NO_x and SO_2.

Table 4-3

Boiler and Emission Control System Characteristics and Plans

For NC Coal Fired Electrical Utility Boilers

NC Coal-fired Electrical Utility Facilities			Boiler Rating	Existing Particulate Control	NO_x Control Plan		SO_2 Control Plan	
Plant	Unit		MW	Technology	Technology	Year	Technology	Year
Duke Energy								
Allen	1		165	ESP-CS	SNCR / LNB	2003	Wet scrubber	2013
Allen	2		165	ESP-CS	SNCR / LNB	2007	Wet scrubber	2013
Allen	3		275	ESP-CS	SNCR / LNB	2006	Wet scrubber	2009
Allen	4		275	ESP-CS	SNCR / LNB	2005	Wet scrubber	2010
Allen	5		275	ESP-CS	SNCR / LNB	2006	Wet scrubber	2011
		Subtotal	**1155**					
Belews Creek	1		1246	ESP-CS	SCR	2004	Wet scrubber	2008
Belews Creek	2		1246	ESP-CS	SCR / LNB	2004	Wet scrubber	2008
		Subtotal	**2492**					
Buck**	3		40	ESP-HS	SNCR / LNB	2009	None	NA
Buck	4		40	ESP-HS	SNCR / LNB	2008	None	NA
Buck	5		125	ESP-HS	SNCR / LNB	2007	None	NA
Buck	6		125	ESP-HS	SNCR / LNB	2007	None	NA
		Subtotal	**330**					
Cliffside	1		40	ESP-HS	SNCR / LNB	2008	None	NA
Cliffside	2		40	ESP-HS	SNCR / LNB	2008	None	NA
Cliffside	3		65	ESP-HS	SNCR / LNB	2009	None	NA
Cliffside	4		65	ESP-HS	SNCR / LNB	2009	None	NA

NC Coal-fired Electrical Utility Facilities			Boiler Rating	Existing Particulate Control	NO_x Control Plan		SO_2 Control Plan	
Plant	Unit		MW	Technology	Technology	Year	Technology	Year
Cliffside	5		571	ESP-CS	SCR	2002	Wet scrubber	2009
		Subtotal	781					
Dan River	1		70	ESP-HS	SNCR / LNB	2009	None	NA
Dan River	2		70	ESP-HS	SNCR / LNB	2009	None	NA
Dan River	3		326	ESP-CS	SNCR / LNB	2007	None	NA
		Subtotal	466					
Marshall	1		350	ESP-CS	SNCR / LNB	2007	Wet scrubber	2007
Marshall	2		350	ESP-CS	SNCR / LNB	2008	Wet scrubber	2007
Marshall	3		648	ESP-CS	SNCR / LNB	2008	Wet scrubber	2006
Marshall	4		648	ESP-CS	SNCR / LNB	2008	Wet scrubber	2006
		Subtotal	1996					
Riverbend	4		220	ESP-HS	SNCR / LNB	2007	None	NA
Riverbend	5		220	ESP-HS	SNCR / LNB	2008	None	NA
Riverbend	6		266	ESP-HS	SNCR / LNB	2008	None	NA
Riverbend	7		266	ESP-HS	SNCR / LNB	2007	None	NA
		Subtotal	972					
Duke Energy		TOTAL	8,192					
Progress Energy								
Asheville	1		198	ESP-CS	LNB/AEFLGR/ SCR	2012	Wet or dry scrubber	2005
Asheville	2		194	ESP-CS	LNB/OFA/SCR		Wet or dry scrubber	2006
		Subtotal	392					
Cape Fear	5		143	ESP-CS	ROFA/ROTAM IX		Wet or dry scrubber	2012

NC Coal-fired Electrical Utility Facilities			Boiler Rating	Existing Particulate Control	NO_x Control Plan		SO_2 Control Plan	
Plant	Unit		MW	Technology	Technology	Year	Technology	Year
Cape Fear	6		173	ESP-CS	ROFA/ROTAMIX		Wet or dry scrubber	2011
		Subtotal	316					
Lee	1		79	ESP-CS	WIR		None	NA
Lee	2		76	ESP-HS	ROFA	2007	None	NA
Lee	3		252	ESP-CS	LNB/OFA/SCR	2010	Wet or dry scrubber	2010
		Subtotal	407					
Mayo	1A		375	ESP-HS	LNB/OFA/SCR		Wet or dry scrubber	2007
Mayo	1B		375	ESP-HS	LNB/OFA/SCR		Wet or dry scrubber	2007
		Subtotal	750					
Roxboro	1		385	ESP-CS	LNB/OFA/SCR		Wet or dry scrubber	2009
Roxboro	2		670	ESP-CS	TFS2000/SCR		Wet or dry scrubber	2005
Roxboro	3A		354	ESP-CS	LNB/OFA/SCR		Wet or dry scrubber	2007
Roxboro	3B		353	ESP-CS	LNB/OFA/SCR		Wet or dry scrubber	2007
Roxboro	4A		350	ESP-HS	LNB/OFA/SCR		Wet or dry scrubber	2008
Roxboro	4B		350	ESP-HS	LNB/OFA/SCR		Wet or dry scrubber	2008
		Subtotal	2462					
L V Sutton	1		97	ESP-HS	SAS			
L V Sutton	2		106	ESP-HS	ROFA	2010	None	NA

NC Coal-fired Electrical Utility Facilities			Boiler Rating	Existing Particulate Control	NO_x Control Plan		SO_2 Control Plan	
Plant	Unit		MW	Technology	Technology	Year	Technology	Year
L V Sutton	3		410	ESP-CS	LNB/ROFA		Wet or dry scrubber	2013
		Subtotal	613					
Weatherspoon	1		49	ESP-CS			None	NA
Weatherspoon	2		49	ESP-CS			None	NA
Weatherspoon	3		78	ESP-CS	WIR		None	NA
		Subtotal	176					
Progress Energy		TOTAL	5,116					
Cogeneration Facilities								
Dwayne Collier	1, 2, 3, and 4		150 total	FF	SC		Dry scrubber	Existing
Tobaccoville	1 and 2		80 total	FF	LNB		None	NA
Westmoreland	1		183	FF	LNB/OFA		Dry scrubber	Existing
Westmoreland	2		52	FF	LNB/OFA/SNCR		Dry scrubber	Existing
Total Cogeneration		Subtotal	465					
NC Statewide		TOTAL	13,773					

Particulate controls acronyms
ESP-CS = Cold side ESP
ESP-HS = Hot side ESP
FF = Fabric filter
SD = Spray dryer (dry scrubber)

NOx controls acronyms
AEFLGR = Amine enhanced flue gas reburn
LNB = Low NOx burners

NOx controls acronyms (continued)
ROFA = Rotating opposed-fired air
Rotamix = Ammonia injection to further reduce NOx (used with ROFA)
SC = Staged combustion
SCR = Selective catalytic reduction
SNCR = Selective non-catalytic reduction
WIR = Underfire air
TFS2000 = Combination Low-NOx burner / Overfire air
SAS = Separated air staging and OFA = Overfire air

Table 4-4

Total Generating Capacity and Percent Capacity with Control of NO_x and SO_2 For NC Coal Fired Electrical Utility Boilers

Utility	NO_x Control	Generating Capacity and Percent Capacity with NO_x Control	SO_2 Control	Generating Capacity and Percent Capacity with SO_2 Control
Duke Energy Statistics	Total MW with SCR, SNCR, or NH3 injection	8192 MW	Total MW with Scrubbers	6,214 MW
	Percent MW with SCR, SNCR, or NH3 injection	100 Percent	Percent MW with Scrubbers	76 Percent
Progress Energy Statistics	Total MW with SCR, SNCR, or NH3 injection	4512 MW	Total MW with Scrubbers	4,582 MW
	Percent MW with SCR, SNCR, or NH3 injection	88 Percent	Percent MW with Scrubbers	90 Percent
Cogeneration Statistics	Total MW with SCR, SNCR, or NH3 injection	52 MW	Total MW with Scrubbers	385 MW
	Percent MW with SCR, SNCR, or NH3 injection	11 Percent	Percent MW with Scrubbers	83 Percent
Statewide Statistics	Total MW with SCR, SNCR, or NH3 injection	12756 MW	Total MW with Scrubbers	11,181 MW
	Percent MW with SCR, SNCR, or NH3 injection	93 Percent	Percent MW with Scrubbers	81 Percent

Electrostatic Precipitators

Electrostatic Precipitators (ESPs) are very effective particulate emission control devices. While they remove a large percentage (98-99 percent) of fly ash and other particulate from the boiler combustion exhaust gas stream, they are ineffective in removing any gas phase pollutants, such as SO_2, NO_x, or gaseous elemental mercury. ESPs use high voltages on the order of 30,000 volts applied to wires or tubes to electrically charge particles that will cause them to be attracted to ESP collection plates. Periodic rapping removes the particles from the collection plates into hoppers located below where the dust is conveyed and either disposed of in an acceptable manner or recycled into useful products, such as cement or road material.

Typical "cold side ESPs" generally operate in the temperature range of 280 - 320 °F; the term cold side denotes the ESP is installed downstream (on the colder-side) of the air pre-heater. An air pre-heater is a heat exchange device downstream of the boiler furnace where thermal energy is extracted from the flue gas. The air preheater transfers thermal heat from the boiler exhaust gas stream at a temperature near 750 °F to preheat relatively cool combustion (ambient) air entering the boiler firebox. Preheating combustion air saves fuel and makes the boiler more efficient. The acronym for a cold side ESP is ESP-CS. For this study, cold-side ESPs treating bituminous coal-fired boilers remove 29.1 percent of the total mercury emissions entrained in the boiler exhaust gas stream. In comparison to other air pollution controls in use at utility boilers, cold-side ESPs exhibit mediocre efficiencies for mercury removal, as its temperature favor the mercury being in both the ionic and elemental gaseous forms. This allows the ionic mercury fraction to be absorbed onto the particulate for subsequent removal by the cold-side ESP. [EPRI 2000, p. 3-21 & 22] Roughly 60 percent of the state's utility boilers are controlled with cold-side ESPs.

A "hot side ESP" normally operates in the 700 - 800 °F temperature range; the term hot side denotes the ESP is installed upstream (on the hot-side) from the air pre-heater. Hot-side ESPs were intended to be an alternative solution to cold-side ESPs treating flue gas from boilers burning low sulfur coal producing high resistivity hard-to-collect flyash. The acronym for a hot side ESP is ESP-HS. For this study it is assumed that hot-side ESPs treating bituminous coal-fired boilers remove only 10.7 percent of the total mercury emissions contained in the boiler exhaust. In comparison to other air pollution controls, hot-side ESPs are among the least efficient mercury-removal air pollution control devices in use at utility boilers, as the high temperature favors mercury being in the elemental gaseous mercury, a form uncollectable by ESPs.

[EPRI 2000, p. 3-21] Nearly 40 percent of the state's utility boilers are controlled with hot-side ESPs.

Fabric filters

Fabric filters have similar collection and operating concepts to household vacuum cleaners, except they are a great deal bigger, use industrial strength bag materials, and have automatic bag cleaning mechanisms to remove collected dust. Fabric filters normally operate in the low 300 °F temperature range and are very efficient in particulate removal, usually at or above 99 percent for well designed and operated units. Like ESPs, as stand-alone devices they are primarily designed for particulate removal and usually ineffective in removing gaseous pollutants. However, when used in combination with sorbent injection systems, fabric filters become effective in removing gaseous pollutants as these pollutants come into close contact with the dust / sorbent collected on the bag surface and absorbed onto the sorbent. The average removal performance by existing fabric filters tested on bituminous coal-fired boilers in the EU/ICR was 90 percent of total mercury emissions. Fabric filters are installed on only 9 percent of utility boilers nationwide, and 16 percent of NC utility boilers. Average mercury capture by spray dryers / fabric filters was 98 percent. Relative to other air pollution controls, spray dryers and fabric filters show excellent mercury removal performance because of the additional gas–particle contact afforded by the filter dust cake along with its low temperature and oxidizing conditions favoring mercury speciation in the oxidized form. (EU/ICR data)

Spray Dryer and Fabric filters

Spray dryers use an alkaline (typically lime) solution that is atomized into small droplets when sprayed into the boiler exhaust gas stream for SO_2 control. They are also referred to as dry scrubbers or dry flue gas desulfurization (FGD) scrubbers. The hot gas stream vaporizes the droplets into small particles that are then collected downstream in a fabric filter. The alkaline droplets / particles absorb SO_2 while being transported in the ducting. Fabric filters offer an advantage because additional SO_2 is collected on the fabric filter bags, making fabric filters the particulate air pollution control method of choice with sprayed or injected sorbents. Spray dryer / fabric filters normally achieve a SO_2 control efficiency of 90+ percent. The average mercury capture by existing spray dryers / fabric filters tested on bituminous coal boilers in the EU/ICR was 98 percent of total mercury emissions. One major spray dryer manufacturer cites as one if its benefits is "inherent oxidized mercury emission reductions." [B&W Dry FGD brochure] Spray dryers are installed on less than 5 percent of utility boilers nationwide and on 6 percent of the NC boilers, with all of the NC units operating on the relatively small co-generation plants. (EU/ICR data)

Fabric filters downstream of spray dryers are designed and operated similar to stand-alone fabric filters. The biggest difference is that the particulate loading is roughly twice as much due to the increase in entrained solids produced from the spray dryer. The average mercury capture by existing spray dryers / fabric filters was 98 percent. Relative to other air pollution controls, spray dryers / fabric filters show excellent mercury removal performance because of the additional gas–particle contact afforded by the filter dust cake along with its low temperature and oxidizing conditions favoring mercury speciation and collection in the oxidized form. (EU/ICR data)

In summary, the EU/ICR data show that existing controls to meet particulate emission standards do capture some of the mercury emissions. However, the controls currently used at most NC power plants are not highly effective in capturing mercury. While fabric filters and spray dryer adsorbers remove 90 percent or more of the mercury released by burning coal in NC, Table 4-1 shows that these two systems only control 3.4 percent of the states generating capacity. The remaining 96+ percent of the states electrical generating capacity is controlled by less effective mercury control technologies: cold-side ESPs with about 30 percent removal and hot-side ESPs with only 10 percent removal. The last column in Table 4-1 provides a mass balance of the mercury released from NC coal-fired utility boilers, showing that roughly:

- four percent is collected by stand-alone hot-side ESPs,
- 17 percent is collected by stand-alone cold-side ESPs,
- 0.5 percent is collected by stand-alone fabric filters,
- three percent is collected by spray dryer / fabric filters,
- a total of 24 percent is collected by all the above control systems, and
- 76 percent is emitted to the atmosphere.

PLANNED SO_2 AND NO_x CONTROLS AND MERCURY CONTROL PERFORMANCE

In response to the Clean Smokestack Act of 2002, the utility companies are required to reduce their NO_x emissions 78 percent by 2009 and their SO_2 emissions 73 percent by 2013. In order to achieve these requirements, Duke Energy and Progress Energy plan to install flue gas desulfurization (FGD) wet and/or dry scrubbers to reduce SO_2 emissions, and combustion controls and post-combustion controls to lower NO_x emissions.

Wet SO_2 Scrubbers

Wet scrubbers are similar to dry scrubbers in that both use an alkaline solution to collect SO_2 and both are located downstream of a particulate air pollution control. However, wet scrubbers saturate the flue gas stream with water, as the complete scrubbing process, including by-products, remains liquid or in a slurry form. They are also referred to as wet FGD scrubbers and normally achieve a SO_2 control efficiency of 90+ percent. In this study it was estimated that wet scrubbers downstream of cold-side ESPs would remove almost 80 percent of total mercury emissions and wet scrubbers downstream of hot-side ESPs would remove nearly 40 percent of total mercury emissions. This decrease in mercury control performance in hot-side ESP is due to the relatively lower amount of mercury oxidized at elevated temperatures. Relative to other air pollution controls, wet scrubbers downstream of cold-ESPs show higher mercury removal performance because the gas temperature favors more oxidized mercury, with the oxidized fraction being more effectively removed in the scrubber. The challenge to improve performance of mercury capture in wet FGD is to find a way to oxidize the elemental mercury vapor before it reaches the scrubber or to modify the liquid phase of the scrubber to cause oxidation to occur. Wet FGD scrubbers are installed on about 15 percent of utility boilers nationwide, most of which are on the larger boilers, as these scrubbers control roughly 25 percent of the US power generating capacity. No wet FGDs are currently installed on any NC boilers. (EU/ICR data)

Consistent with this national profile, both NC utility companies plan to install 23 wet and dry FGD scrubbers on their largest units in response to the CSA requirements of reducing SO_2 emissions by 73 percent by 2013. Duke Energy is preparing to install wet scrubbers on its 12 largest boilers, representing 75 percent of its generating capacity. All of Duke Energy scrubber will be located downstream of cold-side ESPs. Progress Energy plans to install a combination of wet and dry FGD scrubbers on their 11 largest units, as both are proven technologies and provide greater than 90 percent SO_2 removal efficiencies. The Progress Energy scrubbers will control 90 percent of its generating capacity. However, FGDs will be installed on two of Progress Energy's largest units downstream of hot-side ESPs (700 MW or more at Mayo 1

and Roxboro 4); the remaining eleven FGDs will be installed on other large units downstream of cold-side ESPs.

Progress Energy recently contracted with McDermott Technologies / Babcock Wilcox to supply wet and dry FGDs on its NC coal-fired boilers. Two sets of experiments on a 10 MW test facility representative of utility boilers indicated 80+ percent mercury control with a McDermott proprietary reagent added to the FGD scrubber slurry; cost prediction for such a reagent is less than 5 percent of normal FGD cost. Another test on this 10 MW – FGD test facility showed an increase in the oxidized mercury species across a SCR, suggesting that improved mercury control would occur for FGDs and particulate control systems downstream of a SCR. Follow-up tests at full-scale utility boilers are scheduled on enhanced mercury control with FGD and SCR. (Reference: "Wet FGD Enhanced Mercury Control for Coal-Fired boilers" by M.G. Milobowski, B&W, et al with McDermott Technologies.)

Nitrogen Oxides Controls

Cost effective control techniques to reduce nitrogen oxides (NO_x) formation are typically accomplished by combustion and post-combustion control measures. Combustion measures consist of operating and equipment modifications that reduce the peak temperature and excess air in the boiler furnace. These modification / control practices generally consist of improvements known as low NO_x burners, overfire air, underfire air, rotating opposed-fired air, staged combustion, and various forms of gas reburn usually with natural gas. Low NO_x burners can lower NO_x emissions by about 25 – 55 percent. Overfire air can reduce NO_x emissions by about 15 – 50 percent. In combination, reductions up to 60 percent may result. The actual reduction achieved with a given combustion control measure can vary with boiler and fuel characteristics. Almost 60 percent of the US boilers were equipped with some form of combustion modification / controls to reduce NO_x emissions, according to the 1999 EU/ICR database. Combustion controls typically reduce coal-fired boiler NO_x emissions from uncontrolled levels near 0.7 – 0.8 down to 0.2 – 0.3 lb/MMBtu.

In order to achieve further reductions greater than 60 percent and below 0.2 – 0.3 lb/MMBtu (as is the case for NC CSA requirements), post-combustion controls for coal-fired utility boilers are necessary. The two predominant post-combustion control technologies are selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR). With both of these methods, a reducing agent such as ammonia (NH_3) or urea is injected into the duct to reduce NO_x to nitrogen (N_2). While the application of post-combustion NO_x controls is becoming more prevalent, less than four percent of boilers nationwide used either SCR or SNCR systems in 1999.

Selective Catalytic Reduction

The SCR process uses a catalyst with ammonia gas to reduce the nitric oxide (NO) and NO_2 in the flue gas to molecular nitrogen and water. Ammonia gas is diluted with air or steam, and this mixture is injected into the flue gas stream upstream of a metallic catalyst bed composed of vanadium, titanium, platinum, or zeolite. In the reactor, the reduction reactions occur at the catalytic surface. The SCR catalyst bed reactor is usually located between the economizer outlet and the air heater inlet, where temperatures range from 450 – 750 °F. Recent data suggests that SCRs tend to promote additional mercury oxidation, thereby enhancing mercury removal with most existing and emerging particulate / SO_2 control technologies.

Selective Non-Catalytic Reduction

The SNCR process is based on the same basic chemistry as SCR but does not require the use of a catalyst to produce the reactions. Instead, the reducing agent is injected into the flue gas stream at a point where the flue gas temperature is maintained with a specific temperature range. In the two most common SNCR processes, either ammonia or aqueous urea is injected upstream of the economizer where the temperature is in the range of 1600 – 2000 °F. If the flue gas temperature at the injection location gets above this range, the ammonia will oxidize and form more NO_x; if the temperature drops below this range, the effectiveness of the process drops significantly.

In summary, the estimated data in Table 4-3 show that the planned controls to meet the new SO_2 and NO_x emission requirements are expected to also significantly reduce mercury emissions. More than 50 percent of the statewide utility mercury emissions are estimated to be controlled by cold-side ESP / FGD configuration. Each of the remaining five types of emission control configurations is expected to account for nominal reductions individually (less than 5 percent). However, collectively it is expected that at least 63 percent of the potential mercury emissions will be captured by the planned and unchanged existing controls. This means that the coincidental reductions in mercury emissions approach the CSA required reduction levels of 73 percent and 77 percent for SO_2 and NO_x, respectively. This fact demonstrates the rationale and benefits of applying a multi-pollutant contained in the Bush administration proposed Clear Skies Bill and the other bills under consideration by the US Congress. Selection and deployment of new SO_2, NO_x, and fine particulate controls, which also control or contribute to the control of gaseous mercury in coal combustion, may reduce or eliminate the need for mercury-specific controls.

The last column in Table 4-3 depicts a mass balance of the mercury released from NC coal-fired utility boilers, showing that roughly:

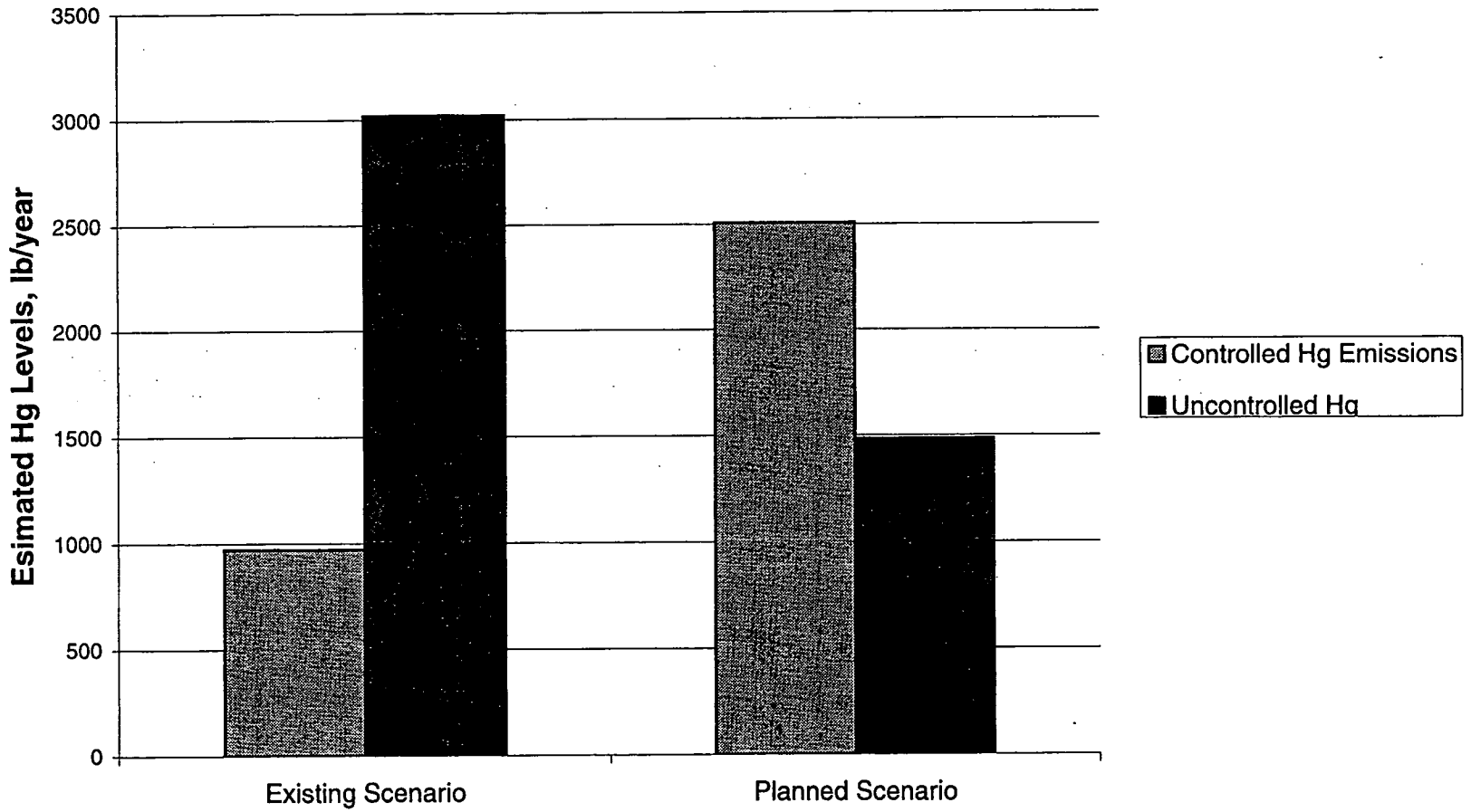
- 1.5 percent collected by stand-alone hot-side ESPs,
- 1.2 percent collected by stand-alone cold-side ESPs,
- 0.5 percent collected by stand-alone fabric filters,
- three percent collected by spray dryer / fabric filters,
- 53 percent collected by cold-side ESPs / FGD,
- three percent collected by hot-side ESPs / FGD,
- a sum of 63 percent collected by all the above control systems, and
- 37 percent emitted to the atmosphere.

Figure 4-1 presents statewide data for the existing and planned scenarios, comparing the uncontrolled (released to the atmosphere) mercury emission levels before and after adding FGD scrubbers to the 26 largest boilers statewide. This figure illustrates that the majority of estimated mercury emissions are emitted prior to the installation of FGD scrubbers. The majority of the mercury will be controlled after the installation FGD scrubbers.

Note it is possible that further mercury emission reductions could be realized from the planned SO_2 / NO_x controls than what is presented above. There are two mercury control enhancements suggested by certain testing that have not been considered in the above calculations because of the lack of hard data. These possible enhancements are:

1. Additional oxidation of gaseous elemental mercury afforded by SCRs for NO_x controls that could elevate mercury capture in the downstream new SO_2 controls and/or the existing particulate controls; certain data indicate that 90+ percent of the total mercury from bituminous coal-fired boilers is oxidized by SCRs. And
2. 78 percent level currently estimated in this report. Likewise, it is possible that levels above the 40 percent assumption are achievable by wet FGDs following hot-side ESPs.
3. Additional capture by wet FGD downstream of cold-side ESPs and/or hot-side ESPs; certain data indicate that 90+ percent mercury control is achievable by wet FGD following cold-side ESPs, notably above the 40 percent assumption are achievable by wet FGDs following hot-side ESPs.

Figure 4-1. Existing vs Planned Hg Control Scenario for NC Coal-Fired Utility Boilers



POTENTIAL RETROFIT MERCURY CONTROL TECHNOLOGIES

In the event that additional mercury control is found warranted on any NC coal-fired boiler, it is worthwhile to identify and study the performance and cost of potential cost-effective retrofit mercury control technologies. Most retrofit controls are a modification of, or distinct from, the existing and planned controls already discussed in this section.

Reducing Mercury In Coal

A data collection effort by the EPA showed that mercury levels could vary appreciably from one coal type to another, as well as within a particular coal type. Further, mercury levels in coal from the same coal seam at a mine can vary.[57]

Data are available from pilot and lab studies on the mercury concentrations in raw coal and cleaned coal and on the percent reduction of mercury reduction achieved by cleaning. These data, which includes a number of different coal seams in four states (Illinois, Pennsylvania, Kentucky, and Alabama), show that mercury reductions from 0 to 64 percent, with an overall average reduction of 21 percent. Conventional cleaning and column froth floatation (bench-scale) reduced mercury concentrations from raw coal by 40 to over 57 percent, with an average of 55 percent. Conventional cleaning and selective agglomeration (bench-scale) reduced mercury concentrations from the raw coal by 63 percent to 82 percent, with an average of 68 percent. In a second bench-scale study, in which three types of coal were cleaned with a heavy media cyclone (a conventional cleaning methods), followed by a water only cyclone and a floatation system, mercury concentrations in the raw coal were reduced by as much as 63 to 65 percent. The DOE is also carrying out bench-scale testing to investigate the use of naturally occurring microbes to reduce mercury (and other trace elements) from coal. Approximately 77 percent of the eastern and midwestern bituminous coal shipments are cleaned in order to meet customer specifications for heating, ash content, and sulfur content, but not for mercury reduction.[58]

Parallel to switching to low sulfur coal for SO_2 emission reductions, some may consider it a viable candidate control strategy to switch to a lower mercury coal. While coal type is a dominant factor for FGD and all other secondary mercury controls, changing suppliers of the low sulfur eastern bituminous coal burned in NC utility boilers appears to offer limited benefit. First, bituminous coal affords the best mercury capture fly ash properties relative to the other two common US coal types, sub-bituminous and lignite coals. Second, the NC utility boilers were designed for bituminous coal and, as

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[57] Reference 10, page 1

[58] Ref. 6, Chapter 4, page 5.

a result of over 30 years of operating experience, their operation and maintenance has been maximized for bituminous coal. Third, from a near-term perspective, some reduction of the mercury content in certain coals burning at existing utility boilers can be achieved by physical coal cleaning processes. However, there is no easily identifiable coal deposits or coal types that will reliably benefit from cleaning with respect to reducing mercury content. In addition, even with use of widespread coal cleaning for mercury emission control, significant quantities of mercury will remain in the coal after cleaning, and thus require other control technologies be used to achieve additional mercury emission reductions.

Consideration for retrofitting controls to further improve mercury emission reduction would include several site specific factors, including coal properties, age and size of the boilers, condition and type of existing emission control configuration, facility's geographic location, state regulatory requirements, and preferences of the facility owner or operator. Additionally, there are other *caveats* and complicating factors to be considered, including:

1. The relative novelty of the various options encompassing mercury specific control technologies and modifications should be measured; the status and progress of each of these 'emerging' technologies or modifications should be monitored carefully; such inexperience should be cautiously addressed.

2. The identified options may not be technically feasible or economically practical to install and operate at all facilities. Networking among utilities is being practiced to share information on success and failure.

Control discussion is not necessarily in order of applicability, cost-effectiveness, or least-capital requirement

Cold-Side ESP Retrofit Options

Add Flue Gas Cooling

Lowering the flue gas temperature entering the ESP assists natural fly ash sorption of mercury, improves the performance of any sorbents injected upstream for mercury control, and inherently enhances particulate control performance by reducing gas velocity and lengthening residence time. However, the acid dew point temperature limits the extent of gas cooling when the flue gas has significant formation potential of hydrochloric acid or sulfuric acid.

Add Sorbent Injection

Gaseous mercury can be converted to particle–bound mercury by adsorption onto solid particles in the flue gas. Injecting suitable sorbents into the flue gas upstream of the ESP increases the amount of mercury captured. This modification may also require additional ducting between the injection location and the ESP inlet, and adding a gas absorber / humidifier upstream of the ESP. This approach may be limited to ESPs with a wide compliance margin, as boilers with marginally performing ESPs may have difficulty meeting existing particulate-related emission requirements due to the increased loading and likely high resistivity levels.

Add Downstream Fabric Filter with Sorbent Injection

Installing a fabric filter after the ESP allows most of the native collected fly ash in the ESP without reacted sorbent and enhances overall particulate control for marginally performing ESPs. Furthermore, due to the low particulate loading, the filter dust cake porosity is reduced, allowing use of a smaller, less expensive fabric filter with long cleaning cycles and high sorbent and bag life performance.

COHPAC Option

There is a patented variation of adding a downstream fabric filter (baghouse) to a cold- or hot-side ESP known as COHPAC (Compact Hybrid Particulate Collector) developed by the Electric Power Research Institute. It involves retrofitting a baghouse either in the space of the last field (or section) of an ESP or in a separate housing downstream of an ESP with a precharger located immediately upstream of the baghouse. In either case, the residual or induced charge on the particulate produces a marked effect in lowering the porosity of the filter dust cake. Such an arrangement allows use of a much smaller, less expensive fabric filter with long cleaning cycles and high sorbent and bag life performance. For example, COHPAC units are designed with filtration velocities of 8-12 feet per minute (fpm) as compared to the filtration velocities of 3-5 fpm typically used for pulse-jet fabric filters on coal-fired utility boilers.

Hot-side ESP Retrofit Option.

This entails conversion of a hot-side ESP to a cold-side ESP, and could then include any of the other cold-side ESP retrofit options mentioned above. Several hot-side ESPs in the US, including a few in NC (such as Duke Energy Allen Units 3-5), have been converted to cold-sides to improve particulate collection performance and ESP reliability. Depending on plant layout and design, this may be possible by reconfiguring the ducting, retuning the ESP to operate at lower temperatures, and perhaps installing a SO_3 or NH_3 gas conditioning system to restore performance.

Wet FGD Scrubber Retrofit Options

Previous research has shown that much of the mercury released during coal combustion is either removed with the flyash or can be absorbed in FGD units, if it is in the oxidized form. Oxidation of the gaseous elemental mercury is more readily captured by wet FGDs than gaseous elemental mercury. Several flue gas additives and scrubbing liquid additives are being developed to oxidize more of the gaseous elemental mercury and to prevent any re-conversion of oxidized mercury to gaseous elemental mercury. However, there is the caution that increasing oxidants in the flue gas or in the scrubbing liquid may also oxidize other species such as SO_2 and NO_x to sulfuric acid and nitric acid aerosols. Other options under development include use of oxidizing catalysts upstream of scrubbers, higher scrubber liquid-to-gas ratios, and scrubber tower design changes.

Dry Sorbent Injection.

For boilers with dry air pollution controls without FGD, injection of dry sorbents (such as powdered activated carbon [PAC] or less costly alternatives) offer a candidate control technology. Because of the added contact on the filter dust cake, it is estimated that FFs would require 1/10 of the sorbent rate as ESPs. Full scale tests with a small FF downstream of a hot-side ESP showed 90 percent mercury control with PAC injection. Such performance was achieved with a significant increase in bag cleaning frequency (a reliable surrogate indicator for a decrease in bag life and increase in bag replacement cost) with the suggestion of rather high overall cost for the PAC injection system. Further full scale tests have been performed at a Wisconsin electric utility. [Reference: "Full Scale Evaluation of Mercury Control with Sorbent Injection and COHPAC..."] Other tests have/ are being performed with Darco FGD™ carbon injection upstream of ESPs. Results with low sulfur bituminous coal show total mercury capture vary from 20 – 80 percent depending on ESP operating temperature ranging from 220 – 275 °F.

Sorbent collection performance for mercury is expected to depend on 5 key parameters, including sorbent size, sorbent capacity, residence time, type of dry air pollution control, and mercury level. Predicted costs for PAC using representative values for these parameters range from $4-12 million/year for ESPs and from $4-6 million/year for FFs for a 500 MW boiler. (Since these levels are considered prohibitive by some, many other candidate technologies target cost levels as ¼ to ½ of PAC costs.). Title: "Predicted Cost of Mercury Control at Electric Utilities Using Sorbent Injection"

Calcium-based Sorbent Injection

An alternative to PAC is calcium-based sorbent, such as limestone. EPA laboratory tests indicated that injection of calcium-based sorbents into flue gas could result in significant mercury removal and a small amount of SO_2 and SO_3 removal. Further testing by McDermott Technology, Inc. produced results slightly above 50 percent mercury capture. Comparison of these results with PAC results indicate that while PAC is a more effective sorbent than limestone on a mass basis, limestone is a more effective sorbent than PAC on a cost basis.

In summary, there are several emerging potential retrofit mercury control technologies at various stages of investigation and development. Further efforts to study and validate full-scale performance are underway, but it appears premature to obtain a complete set of definitive cost data for performing a robust cost analysis for many/most of the competing mercury control technologies.

Flue Gas Measurement Method For Speciated Mercury

Accurate measurements of the various forms of mercury present in coal combustion flue gas are important:

- To determine and characterize facility and/or fuel-type emissions,
- to understand the behavior of mercury in combustion processes and equipment configurations, and
- to evaluate the removal efficiency of mercury control technologies.

Generally, EPA develops manual reference test methods as a formal, accurate means of determining source emissions over a few-hour time period providing a "snap-shot" of emissions. Manual methods typically consist of a probe and nozzle inserted into the stack for extracting a representative sample, a filter to collect the particulate, and series of impingers with pollutant-specific liquid solutions to capture gaseous pollutants. In the case of speciated mercury, separate impinger solutions are used to collect the gaseous oxidized mercury fraction and the gaseous elemental mercury.

Formal manual reference methods are well established for measuring total mercury emissions from combustion systems. The EPA Method 101A and Method 29 were developed and validated to measure total mercury emissions (particulate phase and gas phase) for coal and waste combustors. These reference methods were developed and used to support total mercury

regulatory needs. A reference method for speciated mercury measurements does not currently exist because there are no regulations requiring speciated mercury emission measurements. However, a valid methodology was needed to characterize coal combustion speciated mercury emissions to better understand the performance variability in emission controls as well as to better assess the risk from this industry's contribution.

The Canadian Ontario-Hydro (OH) utility company developed a manual method known as the OH Method that is the manual test method currently designated as the method of choice by the EPA and the utility industry for the collection of speciated mercury emission data from coal combustion. The EPA first endorsed it in 1999, just prior to the start of their EU/ICR testing program. The OH Method has been submitted to the American Society for Testing and Materials (ASTM) for acceptance as a standard reference method. Since data collected with other methods are not considered valid and the OH Method has only been recently approved, there is limited database on valid, speciated mercury flue gas measurements on coal-fired boilers.

The precision of the OH Method has been recently demonstrated by paired train measurements at a DOE hazardous waste incinerator. In this evaluation consisting of 18 runs, correlation of the paired OH Method train measurements showed acceptable relative standard deviation (RSD) results, including:

- six percent RSD for elemental mercury in range of 0.2-180 ug/dscm,
- 21 percent RSD for oxidized mercury in range of 0.2-15 ug/dscm,
- five percent RSD for total mercury in range of 0.4-200 ug/dscm, and
- in relation to an target 20 percent RSD specification.

Such a high degree of precision across wide ranges in mercury concentration increases the confidence, and tends to rule out significant errors, in OH Method measurements.[59]

Continuous emission monitors (CEMs) are preferred because they have advantages over manual methods. A CEM can produce real-time or near real-time emission data over long periods of time. CEMs produce data that illustrates any short- and long-term emission variability, which in turn provides the opportunity to evaluate and gain insight on the effects of variations in process operating conditions, fuel properties, etc. Ultimately, the use of CEMs leads to a better understanding on how to minimize emissions.

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[59] Dunn, J.E. et al., "Evaluation of Mercury Continuous Emission Monitors at the U.S. DOE TSCA Incinerator," National AWMA Conference, San Diego, CA, June 2003.

Given the benefits, EPA, DOE, and the utility industry are supporting the development of mercury CEMs.

A limited number of CEMs exist and are currently undergoing evaluation for the measurement of *total* gas-phase mercury and, to a lesser extent, *speciated* gas-phase mercury. Recent EPA and DOE sponsored mercury CEMS tests at the Progress Energy Cape Fear Power Plant and at the U.S. DOE TSCA Incinerator showed mixed results. Out of 5 mercury CEMS at the Cape Fear Plant, only one produced data meeting EPA CEMS data quality standards. However, at the TSCA Incinerator, 3 of 6 mercury CEMS produced data meeting EPA data quality standards. While experts use mercury CEMs as a research tool, mercury CEMs are not currently suitable for routine use on US power plants.

As an mercury CEMS alternative, the Electric Power Research Institute is in the process of developing a semi-continuous method known as the "Quick CEMS." This method collects a low-flow rate continuous sample into an activated carbon tube that can be removed intermittently (e.g., after a day or week) and then analyzed. The sponsor believes that this method would be suitable as a backup system when a mercury CEMS is not working or as the primary compliance method for smaller boilers operating only during peak demand periods.

Note that the mercury emission data presented in this section is characterized as *preliminary estimates*. This caveat was used because there is a limited database of speciated mercury emission measurements not only nationwide, but also here in NC. The emission data presented in this report was not based on individual measurements made on each NC boiler, but rather on correlations statistically derived from the available national database on speciated mercury emissions, largely stemming from the EU/ICR emission data. The known speciated mercury emission measurement database for NC coal-fired utility boilers consists of the following three plants:

1. Two plants were randomly selected by US EPA for the EU/ICR testing:

    a. Duke Energy's Cliffside facility with its hot-side ESPs, and

    b. Dwayne Collier Battle Cogeneration Facility with its spray dyer / fabric filter.

2. Progress Energy's Cape Fear facility with its cold-side ESPs hosted a several-month US EPA-sponsored mercury CEMS demonstration in 2002, including several sets of paired OH Method tests to evaluate the accuracy and reliability of five candidate mercury CEMs.

Preliminary estimate of mercury capture by *existing* controls for NC coal-fired utility boilers is shown in Table 4-5. For a comparison, Table 4-6 shows preliminary estimates of mercury capture for *planned* controls for NC coal-fired utility boilers.

Table 4-5

Preliminary Estimate of Mercury Capture by Existing Controls For NC Coal-Fired Utility Boilers[60]

Existing Controls	Control Configuration	Percent of NC Utility Boilers	Estimated Total Hg Capture	Percent of NC Utility Hg Emissions
PM Control Only	Hot-side ESP	38.6	10.7[a]	4.1 % captured
	Cold-side ESP	58	29.1[a]	16.9 % captured
	Fabric filter (FF)	0.6	90[b]	0.5 % captured
PM and Dry FGD	Spray dryer adsorber and FF	2.8	98[b]	2.7 % captured
Totals		100		24.3 % captured
				75.7% emitted

a. Based on modeling performed by Research Triangle Institute for DAQ using best available data; note that estimates are subject to change.
b. Reference: US EPA, "Control of Mercury Emissions from Coal-Fired Electric Utility Boilers: Interim Report," April 2002, EPA-600/R-01-109, Research Triangle Park, NC,

[60] http://www.epa.gov/ordntrnt/ORD/NRMRL/Pubs/600R01109/600R01109.pdf.

Table 4-6

Preliminary Estimates of Mercury Capture for Planned Controls For NC Coal-Fired Utility Boilers[61]

Planned Controls	Control Configuration	Percent of NC Generating Capacity (MW basis)	Estimated Total Hg Percent Capture	Estimated Percent of NC Utility Hg Emissions (Percent Captured)
PM Control Only	Hot-side ESP	14.0	27	1.5
	Cold-side ESP	4.2	46-48[a]	1.2
	Fabric filter (FF)	0.6	≥90 %[b]	0.5
PM and FGD	Spray dryer adsorber + FF	2.8	>90[b]	2.7
	Cold-side ESP + FGD	67.9	65-70[a]	52.7
	Hot-side ESP + FGD	10.5	65[a]	4.1
Totals		100		**62.8 Captured**
				37.2 Emitted

a. Based on modeling performed by Research Triangle Institute for DAQ using best available data; note that estimates are subject to change.

b. Reference: US EPA, "Control of Mercury Emissions from Coal-Fired Electric Utility Boilers: Interim Report," April 2002, EPA-600/R-01-109, Research Triangle Park, NC,

[61] http://www.epa.gov/ordntrnt/ORD/NRMRL/Pubs/600R01109/600R01109.pdf.

CHAPTER 5 - STATE AND NATIONAL LEGISLATION AND REGULATION

CLEAN AIR ACT REPORT TO CONGRESS

The Act required the EPA to address the toxic air pollutants from utilities. This report indicates that the vast majority of coal-fired plants (424 of the 426 plants) in the United States were likely to pose lifetime cancer risks (i.e., increased probability of an exposed person getting cancer during a lifetime) of less than one in a million due to inhalation exposure to utility hazardous air pollutant (HAP) emissions (which includes mercury). However, when the EPA conducted long-range transport analysis, using the Regional Lagrangian Model of Air Pollution (RELMAP) (a computer simulation of long-range transport of emissions), the results show that a significant percentage of the population exposure exists outside a 50 km radius. The EPA's 1997 Mercury Study Report to Congress suggests that approximately 52 tons of the 158 tons per year (tpy) of U.S. anthropogenic (human activities) emissions are deposited within the lower 48 states. The remaining two-thirds (107 tons) are transported outside of U.S. borders where they diffuse into the global reservoir. Additionally, the computer simulation suggests that another 35 tons of mercury from the global pool are deposited for a total deposition of roughly 87 tpy in the U.S. This type of modeling has a high level of uncertainty, but additional emissions to air will certainly contribute to levels in the global reservoir and increase deposition into water bodies.[62]

Furthermore, this study suggested an increased cancer incidence to be up to 1.3 cases per year. Thus, these efforts indicate that both local and distant sources, through long-range transport, contribute to increases in incidence of cancer. Mercury was included in the local (50 km) study, but was not included with arsenic, cadmium, chromium, and nickel in the RELMAP study.[63]

NORTH CAROLINA STATE REGULATION AND LEGISLATION

NC Clean Smokestacks Act

The CSA requires a 77 percent reduction in NO_x and a 73 percent reduction in SO_2, but does not specify any limits or specific control devices on specific plants. That management and trade off process is left to the utility to determined, based on technologies, costs and other plant specific factors. The plants do have to keep DENR informed and will have to apply for specific permit changes in each case. Both companies in NC that are affected by the requirements have provided lists of general types of devices that they are

[62] Ref. 7, page 17.
[63] Ref. 7, page 7.

considering that will provide initial plans regarding which units will receive certain control devices. Their planning maybe subject to revisions over time as design, cost and other factors become more specific and final decisions are made.

North Carolina's NO_X State Implementation Plan

On October 27, 1998, the EPA promulgated rules requiring certain states, which included North Carolina, to adopt rules to control the emissions of nitrogen oxides (NO_X) from large stationary combustion sources. These rules cover (1) fossil fuel-fired stationary boilers, combustion turbines, and combined cycle systems serving a generator with a nameplate capacity greater than 25 megawatts electrical and selling any amount of electricity, (2) fossil fuel-fired stationary boilers, combustion turbines, and combined cycle systems having a maximum design heat input greater than 250 million Btu per hour, and (3) reciprocating stationary internal combustion engines rated at equal or greater than 2400 brake horsepower (3000 brake horsepower for diesel engines and 4400 brake horsepower for dual fuel engines).

The EPA promulgated this requirement because it found that controls for NO_X emissions from large combustion sources in North Carolina and other states were not adequate to prohibit these sources and other activities from emitting NO_X in amounts that contribute significantly to nonattainment in one or more other states with respect to the one-hour ozone national ambient air quality standard. It also found controls for NO_X in North Carolina were not adequate to prohibit these sources and other activities from emitting NO_X in amounts that contribute significantly to nonattainment in one or more other states with respect to the eight-hour ozone national ambient air quality standard.

The EPA rules established a NO_X budget for sources in North Carolina and other states. The budgets were later revised and published in the March 2, 2000 Federal Register. North Carolina has a Phase II budget of 165,022 tons per ozone season. The EPA rules require continuous emission monitors to be used and allows compliance to be achieved through interstate trading.

Besides amending existing NO_X rules and adopting new NO_X rules specifically to address the EPA NO_X state implementation plan (SIP) call, the North Carolina rules also require new sources to control emissions of NO_X. The objective of this requirement is (1) to aid in meeting the NO_X budget for North Carolina for minor sources and (2) to aid in attaining and maintaining the ambient air quality standard for ozone in North Carolina.

The amended and new rules are in Section 15A NCAC 2D .1400, Nitrogen Oxide. Rules in this Section cover three types of programs. They are:

1. contingency plan for the three ozone maintenance areas,

2. the NO_x SIP call in 40 CFR Part 51, Subpart G, and

3. new sources of nitrogen oxides not covered under the NO_x SIP call.

The Environmental Management Commission (EMC) approved taking permanent rules to public hearing to satisfy the EPA's NO_x SIP call. After the EPA reviewed the submittal, it recommended several changes to the rules submitted. These recommended changes were incorporated in the rules taken to public hearing. Additionally, as a result of stakeholders meetings, several more changes have been included in the rules. Some important changes are:

1. specific allocations of NO_x for the boilers at the CP&L and Duke plants;

2. requiring all sources covered under the NO_x SIP call to use Part 75 continuous emission monitor systems;

3. changing emission allocations for 2004 from May 1 through September to May 31 through September 30 and reducing the 2004 allowable allocations to 80% of that allowed by the EPA for this period (thus, creating more than 8000 tons credit to be used in 2005);

4. extending full compliance for non-utility electric generating units (EGU), affected non-EGU, and internal combustion engines (ICE) from 2005 to 2006;

5. clarifying that if a source is replaced, the new source receives the old source's allocations;

6. adding criteria for the EMC to consider when deciding whether to reallocate emission allocations;

7. revising the reallocation calculation procedures to give credit to lower emitting sources; and

8. revising the procedures for allocating emission allocation from the new source set aside pool (a pro rata method is used instead of the first-come-first-receive approach in current rule).

In addition to the North Carolina's CSA and the NC NO_x SIP, the EPA (CAA) will propose the *Utility MACT*. Additionally, there are at least three federal legislative proposals that could affect coal-fired electric utility plants if one or more are passed. They are on parallel courses and have not been enacted (i.e., discussions, review, and proposed legislative activities continue).

EPA's Utility MACT

The *Utility MACT*, with the proposal of emission standards to be announced on or before December 15, 2003, and promulgation by December 15, 2004. The EPA has announced its finding that regulation of HAP emissions from oil- and coal-fired electric utility steam generating units is necessary and appropriate. This finding is based on the mandate given to EPA by Congress in Section (112)(n)(1)(A) of the CCA, that the EPA perform a study of the hazards to the public health reasonably anticipated to occur as a result of HAP emissions by electric utility steam generating units. The study was performed using data collected from power plants across the country, including those in North Carolina. The results of the study were released in a Report to Congress on February 24, 1998. The EPA was also required to determine whether, based on the results of the study and any other applicable information, regulation of HAP emissions from the industry was appropriate and necessary. On December 14, 2000, the EPA announced that it had found that such regulation is warranted. A project to develop emission regulations under section 112 consequentially is underway.

Since the determination to regulate utility boilers, EPA has conducted a series of public meetings of the Mercury MACT Workgroup, a Federal Advisory Committee under the Clean Air Act Advisory Committee. This workgroup included stakeholders from industry, states and the environmental community. The group evaluate data collected by EPA to determine the best performing plants, the most appropriate monitoring methods, etc. While no consensus was reached among the stakeholders, a variety of options (proposing 73-90 percent control of mercury) were presented to EPA for regulating emissions from utility boilers.

EPA is currently in the process of developing a draft regulation for proposal in December 2003. It is impossible to know at this time what form the standard will take, but the CAA requires that MACT standards "require the maximum degree of reduction in emissions" and shall not be less stringent than the average emission limitation achieved by the best performing 12 percent of existing sources. Once promulgated, sources will have three years to comply with the requirements of the MACT standard. This standard is expected to apply to every major source in the United States with a coal-fired electric utility

steam-generating unit, presumable to include units not currently being affected by the CSA.

Bush Administration's Initiative *Clear Skies Act*

A potential legislature impact on control of mercury emissions from coal-fired electric utility plants comes from the proposed *Clear Skies Act* (CSA), which has been drafted by the Bush Administration. This act proposes to amend Title IV of the CAA to establish new "cap-and trade" programs and reducing SO_2, NO_x, and mercury emissions. However, Some analyses indicate net reductions, but the predominant analyses indicate that this proposal would result in reduced control pressures on mercury emissions. The act calls for the specific reductions from electric generating facilities of:

1. SO_2 emissions by 73 percent, from year 2000 emissions of 11 million tons to a cap of 4.5 million tons in 2010 and to a cap of 3 million tons in 2018;

2. NO_x emissions by 67 percent, from year 2000 emissions of 5 million tons to a cap of 2.1 million tons in 2008 and to a cap of 1.7 million tons in 2018; and

3. reduce mercury emissions by 69 percent - the first-ever national cap on mercury emissions. Emissions would be cut from 1999 emissions of 48 tons to a cap of 26 tons in 2010 and to a cap of 15 tons in 2018.

Other Federal Initiatives

Other legislative initiatives have been proposed in both the US House and in the Senate. There has been debate as to whether any legislation would be three pollutants (SO_x, NO_x and Mercury) or four pollutants (add CO_2). All contain provisions for mercury control. The main legislative initiatives to date, in addition to the Clear Skies Act (CSA), are the Jeffords-Waxman Bills and the Carper Clean Air Planning Act (CAPA - S3135). Neither of the bills introduced to date has made significant progress toward full consideration by the Senate and House. Debate and behind the scene efforts remain quite active, however. The discussion below is not intended to encompass all actions and discussions underway, but to provide some major points.

Jeffords-Waxman Bills

The Senate Environment and Public Works Committee has held several hearings to date, and in June of 2002 narrowly passed the "Clean Power Act" (S.556, aka "CPA") proposed by Sen. James Jeffords. The House companion, Henry Waxman's "Clean Smokestacks Act" (H.R. 1256), has not been passed in committee or on the House floor. The final CPA, if passed generally as

proposed, would establish new controls on power plant emissions of SO_2, NO_x, mercury and CO_2. It would limit, by 2009, national emissions from all electricity generating facilities to not more than 2,250,000 tons of sulfur dioxide, 1,510,000 tons of nitrogen oxides, 2,050,000,000 tons of carbon dioxide, and reduce by 2008, the annual national emissions of mercury from electricity generating facilities to not more than 5 tons. Opponents say that these bills would abandon that common-sense approach and attempt to reduce pollution indirectly, by suppressing energy use.

Carper Bill

The Carper Bill, or CAPA, was introduced by Senator Thomas Carper during the last days of the 107th Congress. Primarily, it appeared because the CSA and CPA were so far apart. The proposal was a bipartisan effort, has not yet received full consideration in neither Committee nor the full Senate.

Legislative impacts could be influenced by information currently in a DOE report titled *Analysis Of Emissions Reduction Options For The Electric Power Industry*, March 1999 (Report#:SR/OIAF/2000-05).[64] This report is a continuation of multiple pollutant analysis for the electric power industry and is considered the basis for possible future actions. It proposes that if control of multiple pollutants is planned concurrently, the control cost tends to be less than if separately planning for the individual control of pollutants.

ACTIONS TAKEN BY OTHER STATE

Almost every state has mercury rules of some sort. However, most all of them relate to municipal or medical waste incinerators, battery and fluorescent bulb recycling, limits for disposal or mercury content in products. Many states seem to have taken the "wait and see" attitude for coal fired power plants, knowing that federal actions (whether from MACT or new legislation) are eminent. The potential for inconsistent overlapping requirements or confusion from different approaches is a concern. However, a limited few have taken individual action. This section is not intended to be complete nor to represent the activities in all other states, but as examples of what has happened in some selected states where information is readily available.

Connecticut

The Senate and House of Representatives passed a new law in Connecticut on June 3, 2003 in their General Assembly. This may be the only law specific to mercury from coal-fired power plants, of which the state has only one. This Act is aimed entirely at coal-fired utilities (any unit that generates electricity in the state and combusts coal in an amount greater than

[64] www.eia.doe.gov/oiaf/servicerpt/powerplants/appendixes.html#rpt

ten percent of its total heat input on a rolling twelve-month basis) mercury emissions and contains the main points listed below:

- "Mercury" means mercury and mercury compounds in either a gaseous or particulate form.

- On and after July 1, 2008, the owner or operator of an affected unit or units must meet an emissions rate of equal to or less than 0. 6 pounds of mercury per TBtu, or meet a mercury emissions rate equal to a ninety per cent reduction of mercury from the measured inlet conditions for the affected unit, whichever is more readily achievable.

- Interim alternative limits (with quarterly testing of emissions) are allowed and to be established by the Commissioner of Environmental Protection if the initial technology fails to perform to expectation, no later than April 1, 2010.

- Thereafter, upon any application for renewal of such Title V permit, the Commissioner of Environmental Protection shall conduct a review of such affected unit's alternative emissions limit and may impose a more stringent alternative emissions limit based upon any new data regarding the demonstrated control capabilities of the type of control technology installed and operated at such affected unit.

- Stack tests used to demonstrate compliance with the mercury emissions rate requirements or used in the establishment or compliance with an alternative emissions limit - based on the average of the stack tests conducted during the two most recent calendar quarters for an affected unit and conducted on a calendar quarter basis in accordance with the EPA Method 29 for the determination of metal emissions from stationary sources, as set forth in 40 CFR 60, Appendix A, as amended from time to time, or any other alternative method approved by the EPA or the Commissioner of Environmental Protection. Such stack tests must be conducted while combusting coal or coal blends that are representative of the coal or coal blends combusted at such affected unit during the calendar quarter represented by such stack test. CEMS may be allowed under approved situations.

- On or before July 1, 2012, the Commissioner of Environmental Protection must conduct a review of the mercury emission limits applicable to all affected units in the state and may adopt

regulations imposing mercury emission limits that are more stringent the initial requirements established in the beginning.

Title: AN ACT CONCERNING MERCURY EMISSIONS FROM COAL-FIRED ELECTRICITY GENERATORS – passed into law June 3, 2003.[65]

New Hampshire

The New Hampshire legislation is more typical of several states, which may also have other acts or rules within the same state for other components. The law for municipal combustors was passed May 15, 2002. This act set time frames within which certain municipal waste combustors must comply with mercury emission limits, and provides alternate compliance provisions, and extends the reporting date of an ash landfill study to May 30, 2002. The addresses mercury air emissions, but not from coal fired power plants. Title: CHAPTER 172 HB 253-FN - FINAL VERSION 4/10/02 3246s 2002 SESSION 01-035 08/10 HOUSE BILL 253-FN.[66]

Oregon

The Oregon Environmental Council (OEC) has petitioned Oregon to regulate mercury. The petition calls for Oregon DEQ to monitor mercury air emissions and set permit limits for mercury from any facility that discharges more than a pound of mercury in a year. In addition to the petition, OEC is also asking the Commission to take three other specific steps to reduce the discharge of mercury and other persistent pollutants, including:

1) The adoption of specific mercury reduction goals as a matter of state policy,

2) Directing DEQ to use its storm water rules to limit the discharge of mercury and other persistent pollutants, and

3) Eliminating "mixing zones" for persistent pollutants.

Reference: Oregon Environmental Council Petitions State to Regulate Mercury Pollution; *OEC Calls on Environmental Quality Commission to Take "Leadership Role"*[67]

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[65] http://www.cga.state.ct.us/asp/CGABillStatus/CGAbillstatus.asp?selBillType=Bill&bill_num=HB6048

[66] http://www.gencourt.state.nh.us/legislation/2002/HB0253.html

[67] http://www.orcouncil.org/Press%20Releases/7.10.02%20EQC%20Petition%20Release.PDF

Wisconsin

Wisconsin may be more typical of states that has activity and may pass legislation, but it has not been accomplished, yet. A petition in 2000 was circulated trying to get state to control mercury from utilities. In response, in order to reduce the amount of mercury entering the environment, the WDNR proposed new mercury emission limits on coal-fueled power plants and other large sources in Wisconsin. Following this proposal, the Public Service Commission of Wisconsin (PSCW) began investigating the potential rule impacts on electric reliability, cost and fuel impacts.

Also, the state has an agreement with the utilities known as the "Multi Emission Cooperative Agreement: Commitments"-This agreement was signed on September 30, 2002 for the Wisconsin coal-fueled electric generation fleet. The utilities agreed to meet all legislative provisions of the Environmental Cooperation Pilot Program. The 10 year agreement commits them to invest $400 million to $600 million in environmental improvements to reduce sulfur dioxide, nitrogen oxide and mercury from their power plants by 45-50, 60-65 and 50 percent, respectively.[68]

[68] http://www.jsonline.com/news/state/dec00/mercury07120600.asp

CHAPTER 6 - ECONOMIC IMPACTS

COST OF ADDITIONAL CONTROLS

An approximation of control costs for controlling mercury emissions from utility boilers is reported in *Performance and Costs of Mercury Emission Control Technology Applications On Electrical Utility Boilers*, EPA-600/R-00-083, September 2000.[69] However, costs are base on limited data and the results of pilot projects. Stated assumptions are clear, but they are not yet scientifically documented. Therefore, in light of uncertainty and broad cost ranges, capital and operational control cost discussions will be addressed later.

Recently, the Department of Energy estimated that reducing mercury emissions by 90 percent could add $5 billion to $8 billion a year to the nation's utility bill.[70]

The EPA estimates that the implementation of the new fine particle standard for ambient air quality through regional control strategy that significantly reduces sulfur dioxide (SO_2) below the requirements of Title IV of the federal Clean Air Act can indirectly lower forecasted mercury emissions in 2010 by about 11 tons from power generation by units burning fossil fuel.[71] However, Duke Energy and Progress Energy's planned air pollution control equipment to meet the CSA should reduce North Carolina's mercury emissions by 55 percent instead of the 21 percent estimated by the EPA for the rest of the country.

There are no published studies, specific to North Carolina, which provides information on costs of implementing further mercury controls. However, work is being done at the EPA in regard to the mercury MACT that are due to be released in the near future. Additionally, the air agency in New York has studies underway that promise to provide substantial economic information that may be transferable to North Carolina. This report cannot as yet address this issue. However, efforts to develop such information are being undertaken within DAQ.

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[69] Ref. 2, page *X*.
[70] Ref. 11, page 1.
[71] Ref. 6, Chapter 4, page 7.

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3. U.S. EPA, Mercury Study Report To Congress, Volume 1, EPA-452/R-97-003, December 1997.

4. Dr. Gary Gill, Texas A&M University, Galveston, Chemistry of Mercury to Methylmercury, paper presented at Mercury Forum Meeting, May 2002.

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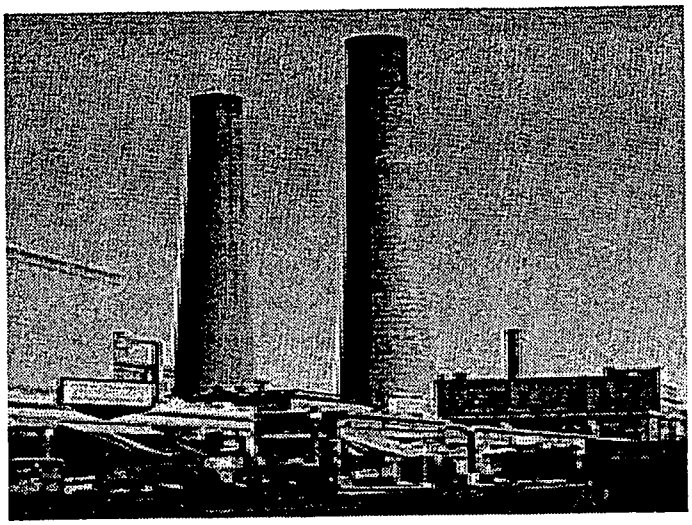
First Interim Report



Mercury Emissions and Mercury Controls For Coal-fired Electrical Utility Boilers

Volume Two Of Two
September 1, 2003

NCDENR

North Carolina
Department of Environment and Natural Resources
Division of Air Quality

Requirement For This Report

Excerpted from the *North Carolina Clean Smokestacks Act*

[Title: An Act to Improve Air Quality in the State by Imposing Limits on the Emission of Certain Pollutants from Certain Facilities that Burn Coal to Generate Electricity and to Provide for Recovery by Electric Utilities of the Costs of Achieving Compliance with Those Limits]

SECTION 12. The General Assembly anticipates that measures implemented to achieve the reductions in emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) required by G.S. 143-215.107D, as enacted by Section 1 of this act, will also result in significant reductions in the emissions of mercury from coal-fired generating units. The Division of Air Quality of the Department of Environment and Natural Resources shall study issues related to monitoring emissions of mercury and the development and implementation of standards and plans to implement programs to control emissions of mercury from coal-fired generating units. The Division shall evaluate available control technologies and shall estimate the benefits and costs of alternative strategies to reduce emissions of mercury. The Division shall annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003. The Division shall report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than 1 September 2005. The costs of implementing any air quality standards and plans to reduce the emission of mercury from coal-fired generating units below the standards in effect on the date this act becomes effective, except to the extent that the emission of mercury is reduced as a result of the reductions in the emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) required to achieve the emissions limitations set out in G.S. 143-215.107D, as enacted by Section 1 of this act, shall not be recoverable pursuant to G.S. 62-133.6, as enacted by Section 9 of this act.

GENERAL ASSEMBLY OF NORTH CAROLINA - SESSION 2001 – (SENATE BILL 1078)
Ratified the 19th day of June 2002. (Ch. SL 2002-4 S.13)
Marc Basnight - President Pro Tempore of the Senate
James B. Black - Speaker of the House of Representatives
Michael F. Easley- Governor

Mercury Emissions and Mercury Controls For Coal-fired Electrical Utility Boilers

First Interim Report

Volume Two of Two

North Carolina
Department of Environment and Natural Resources

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NCCSSA_Hg@ncmail.net

Preface

This report has been produced by a working group within the North Carolina Division of Air Quality. Stakeholders from industry, environmental and other organizations were also invited to provide their insights, comments and other input. The Division appreciates the efforts of all the stakeholders and other individuals who committed their time and effort to the development of this preliminary report. This open process will continue in the development of subsequent and final reports on this topic.

Many portions of this document were taken directly from other government (non-copyrighted) documents in the interest of time and completeness. Some of these sections may have only minor wording changes from the original documents. Quotations are not strictly used to identify these parts, but a strong effort has been made to reference these documents and acknowledge them. The purpose has not been to claim credit for original work of others, but to provide as much detail and accuracy as possible within a limited time.

This report consists of two volumes. Volume Two includes technical and scientific reports with background information. Volume One contains broader and more general information about mercury emissions and potential air pollution control devices.

The objective of this first interim report is to provide a technical background and to define the scope of efforts to address and respond to the legislative requirement. The purpose of this report is not to defend or promote particular conclusions regarding the consequences of emissions of mercury to the atmosphere, but to provide results or summaries of investigations and information as defined by the Clean Smokestacks Act. The underlying presumption is that it is prudent to undertake efforts to reduce these emissions, with the extent of reductions to be determined later based on the information to be provided.

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List of Acronyms Used in This Report

BAF – Bioaccumulation factors
CAPA – Clean Air Planning Act – Carper Bill
DAQ – NC Division of Air Quality
DEHNR – Former NC Department of Environment, Health, and Natural Resources, now DENR and DHHS
DENR – NC Department of Environment and Natural Resources
DHHS – NC Department of Health and Human Services
DMF – Division of Marine Fisheries
DWQ – Division of Water Quality
EPA – US Environmental Protection Agency
Hg(0) – elemental mercury
Hg(2+) – reactive mercury
$HgCl_2$ – mercury chloride
MDN – Mercury Deposition Network
MERAU – Medical Evaluation and Risk Assessment Unit
NC – North Carolina
NHANES –National Health and Nutrition Examination Survey
NOx – Oxides of Nitrogen, including NO_2, the primary nitrogen species from combustion.
RGM – Reactive Gaseous Mercury
SO_2 – Sulfur Dioxide
TGM – Total Gaseous Mercury
TMDL – Total Maximum Daily Load

CHAPTER 1 - MERCURY CONCERNS SPECIFIC TO NC

HISTORY: MERCURY IN NORTH CAROLINA

Biologists suspected for many years that freshwater fish in the black water systems of eastern North Carolina would be prone to mercury contamination as found in other parts of the country sharing similar environmental conditions. In 1970 the Federal Water Quality Administration issued a report on mercury pollution that mentioned mercury contamination found in fish caught in the lower Cape Fear River basin. Industrial discharges of mercury to local waterways and mercurial pesticide use were scrutinized at that time, but no mention was made of atmospheric contributions. Past studies of mercury levels in eastern North Carolina peat deposits discussed the possible contribution of atmospheric deposition of mercury to local waterways. However, no information was available on atmospheric mercury trends in the areas surrounding eastern North Carolina's sensitive waterways

Mercury in Fish Tissue

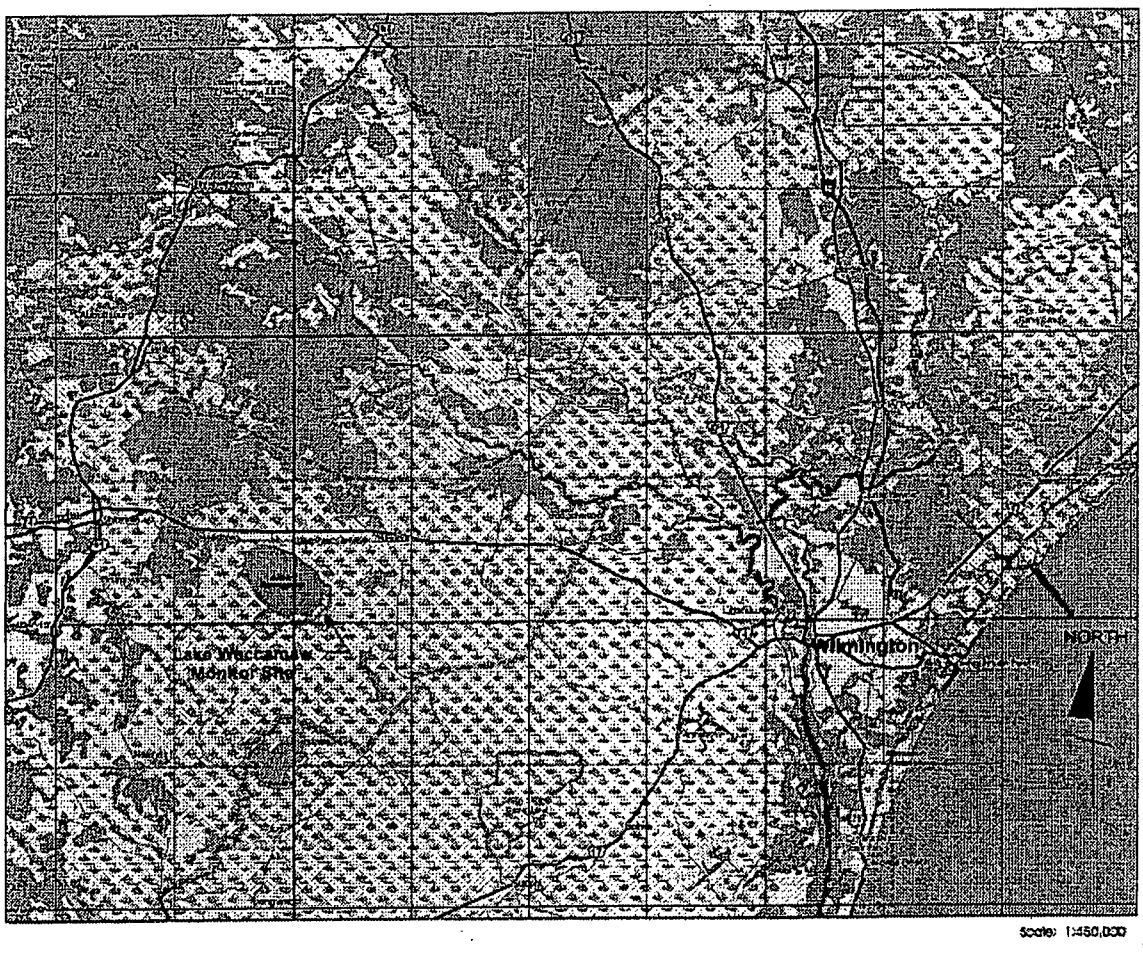
The rate and degree to which mercury bioaccumulates within a system is dependent on a number of factors. The most significant of these includes the water's pH, food chain length and composition (productivity), water temperature, water body chemistry, and the form and structure of the organisms present. Methyl mercury, the toxic and most bioaccumulative form of mercury in fish, can be concentrated in top predator species.

The Environmental Sciences Branch (fisheries programs) of the North Carolina Division of Water Quality (DWQ) conducts fish community assessments, fish tissue monitoring, fish kill data assessment, and supports special projects. In the early 1990s, DWQ division fell under the North Carolina Department of Environment, Health, and Natural Resources (NCDEHNR). In 1992, the DWQ conducted an intensive fish mercury survey in the vicinity of Lake Waccamaw, situated in the Lumber River Basin of southeastern North Carolina (Figure 1-1). In that study, 60% of largemouth bass samples from Big Creek and the Waccamaw River were found to contain mercury levels above 1 ppm, the threshold level for issuance of fish consumption advisories at that time by NCDEHNR.

Figure 1-1

Southeastern North Carolina

Including Lake Waccamaw and Surrounding Environs



The DWQ's efforts from 1995 to 1999 consisted of monitoring for mercury and other contaminants under basin-wide assessments, sampling statewide, verification of the high levels of mercury in eastern piscivores (fish-eaters), and the king mackerel mercury survey (1998-1999) with the Department of Marine Fisheries (DMF). From 1998 to 1999, DWQ assisted with the analyses of 112 king mackerel and Spanish mackerel samples that were collected by the DMF from recreational and commercial sources. The fish tissues were collected from a range of fish sizes and seasonal populations.

The Spanish mackerel samples contained low mercury levels. However, regression models using king mackerel tissue data demonstrates a strong relationship exists between king mackerel size and mercury concentration. From these regression curves, a mercury level over 1ppm is predicted for king mackerel over 13 pounds or 37 inches.

After characterizing the mercury problems in fish in North Carolina for about seven years, DWQ was forced to remove mercury assessment from routine statewide sampling due to budget limitations. Basin-wide surveys of mercury in fish tissue were discontinued in 1999 due to limited resources in "clean" watersheds. Present surveys target mercury trouble spots, such as the coastal plain, requests for surveys by regions and agencies, and sites where data are absent or suspect.

Since 1992, results of mercury concentrations in fish sampled have been shared with the Department of Health and Human Services (DHHS). In turn, DHHS posted site or basin specific advisories based on 1.0 ppm standard. They also posted the first North Carolina ocean advisory for king mackerel.

In 2001, the DHHS revaluated their methylmercury advisory protocols and decided to establish statewide fish eating guidelines based on 0.4 ppm level of concern. The new methylmercury guideline of 0.4 ppm from 1.0 ppm guideline was based on recent federal recommendations and also a need for consistency with our bordering states, which were already using the 0.4 ppm guideline.

DHHS currently recommends that women of childbearing age (15-44 years), pregnant or nursing women, and children under 15 not eat shark, swordfish, tilefish, king mackerel, blackfish (bowfin), largemouth bass, jack fish (chain pickerel) caught in North Carolina waters south and east of Interstate 85. Other women, men, and children 15 years and older are advised to eat no more than one meal per week of shark, swordfish, tilefish, or king mackerel; or blackfish (bowfin), largemouth bass, or jack fish (chain pickerel) caught in North Carolina waters south and east of Interstate 85. A meal is considered to be 6 ounces of cooked fish for adults, or 2 ounces of cooked fish for children under 15.

More information regarding fish advisories can be found on the web at this address:

http://www.schs.state.nc.us/epi/fish/

Human Mercury Burden

The 1992 fish mercury survey findings sparked interest in determining the extent of ongoing exposure to local fish consumers. In 1993, the NC DEHNR Environmental Epidemiology Section, in conjunction with Brunswick and Columbus County Health Departments, conducted a study to determine body burdens of mercury in individuals residing in Brunswick and Columbus Counties near the Waccamaw River. The data revealed a direct relationship between the extent of consumption of local fish and mercury body burdens. The more fish consumed, the greater the chance of human samples indicating a mercury burden. The average hair mercury level of 3.4 parts per million (ppm)

for consumers of freshwater fish was over ten times the average level of 0.3 ppm for those that did not eat freshwater fish. In addition, a wide distribution of hair and blood mercury concentration levels, with values as high as 33.5 ppm in hair, suggested that both elevated fish consumption rates and elevated fish tissue mercury levels were present in this study population.

Monitoring For Atmospheric Mercury

Mercury, in it's various forms, is transported into and out of the atmosphere by several different means. Mercury can be absorbed by cloud formations and deposited to the earth's surface in rainwater or as dew. This is known as "wet deposition". Mercury can also adhere to particulate matter and settle out onto vegetation and the earth's surface. This mechanism is known as "dry deposition". Levels of mercury in rainwater and adhered to particulate matter can both be measured. North Carolina has been measuring mercury in rainwater since 1996. However, the State has never had, nor does it does currently have the capability to measure particulate mercury. Mercury that is not deposited out of the atmosphere remains suspended in the ambient air and exists either in its elemental form, Hg(0), or its reactive form, Hg(2+), which is referred to as Reactive Gaseous Mercury, or RGM. Together these two forms of mercury comprise what is referred to as Total Gaseous Mercury, or TGM. North Carolina has the ability to measure these two forms of mercury while still suspended in the air and can distinguish one from the other.

Mercury Wet Deposition

Mercury wet deposition involves the transfer of mercury from the atmosphere to land or surface waters in precipitation or condensation of water vapor. Water-soluble species of gaseous or particulate mercury may be scavenged from the atmosphere by cloud water, rain, snowfall or water vapor. For many surface waters, atmospheric deposition is the most significant route of mercury loading. Dry deposition of particulate mercury or RGM also contributes to the overall rate of atmospheric deposition, although wet deposition is believed to play a larger role in the eastern United States where precipitation rates are higher than in arid western states. Together, these phenomena contribute to raise methylmercury levels in fish residing in mercury-sensitive waters.

Wet deposition is most strongly influenced by two factors: the amount of precipitation received and the concentration of mercury in the rainwater when it reaches the earth's surface. In areas impacted by high levels of atmospheric gaseous or particulate mercury, wet deposition rates would be higher than comparable areas with lower levels of atmospheric mercury. Areas that experience relatively higher rates of precipitation would also experience higher rates of mercury wet deposition than more arid environments if atmospheric mercury levels were comparable between sites. In reality, the relationship

between precipitation and wet deposition is much more complex. In arid environments, infrequent precipitation may allow gaseous mercury species to build up in the atmosphere, resulting in much higher mercury concentrations in subsequent precipitation events. Alternately, prolonged or frequent precipitation events may result in low rainwater mercury concentrations as the atmosphere is cleansed of water-soluble mercury species.

Other factors that affect rainwater mercury levels are not completely understood. They could include local source emissions, unique meteorology, terrain features or the presence of additional atmospheric pollutants. Areas influenced by local or regional emissions of particulate mercury or RGM might be expected to record higher average rainwater mercury levels. Additionally, the existence of high levels of oxidative pollutants such as ozone and reactive chlorine species in air or cloud water could contribute to the oxidation of elemental mercury into RGM, which would subsequently increase local deposition rates (Lin and Pehkonen). Monitoring sites located in heavily polluted areas might exhibit the effect of these considerations.

Meteorological phenomena, including temperature, humidity, and cloud formations, may influence wet deposition rates. Temperature could play a role in facilitating oxidation reactions that form water-soluble RGM species. Similarly, the amount and intensity of sunlight could also affect mercury deposition by facilitating photochemical reactions. Cloud formation and cloud chemistry are also recognized as important factors in mercury deposition. Many of the most plausible atmospheric reactions involving mercury are believed to take place in the aqueous phase; that is in cloud water or precipitation. Dvonch, et al. speculated that the tall, cumulonimbus clouds of south Florida would be more effective at scrubbing atmospheric mercury from a larger area, possibly explaining the relatively high wet depositions rates in these environments. The aforementioned variables all contribute to significant geographical variability in both the concentration of mercury in rainwater and cumulative wet deposition rates.

The Mercury Deposition Network

The National Atmospheric Deposition Program's Mercury Deposition Network (MDN) was designed to identify geographical and temporal trends in mercury deposition across North America. As of 2002 more than 50 sites were operating in more than 20 states and Canadian provinces (Figure 1-2). At all sites, precipitation samples are collected weekly and sent to a contract laboratory for analysis of total mercury content. Precipitation levels, total mercury concentration, and mercury wet deposition rate are reported weekly. Volume-weighted mercury concentration is calculated on a quarterly and annual basis.

Mercury Wet Deposition Sites

Shortly after the discovery of widespread mercury contamination in Lumber River basin fish, the Division of Air Quality (DAQ) stationed air monitoring instruments at Lake Waccamaw and Pettigrew State Parks to measure mercury levels in rainfall. Measurement of mercury in rainwater can provide an estimated rate of atmospheric deposition and loading to local waters. Lake Waccamaw is situated approximately 50 kilometers (31 miles) to the west of Wilmington, NC and 50 kilometers southeast of Lumberton, NC. This site was chosen to represent general atmospheric conditions in the lower Lumber River Basin. The area surrounding Lake Waccamaw is typical of the region: flat terrain with ubiquitous wetlands and waterways. Very little commercial or industrial activity takes place in the area surrounding the park. The population density is relatively low and roadways are lightly traveled. The nearest town is Whiteville, NC, located approximately 15 kilometers (9 miles) to the west-northwest of Lake Waccamaw.

Pettigrew State Park is in northeastern North Carolina, just south of the Albemarle Sound. The area immediately surrounding this site is similar to the environment around Lake Waccamaw: very lightly populated and devoid of significant industrial activities with flat terrain primarily used for agricultural purposes. On the basis of population density, commercial and industrial activity and distance to urban activities, Pettigrew qualifies as a more remote site than Lake Waccamaw.

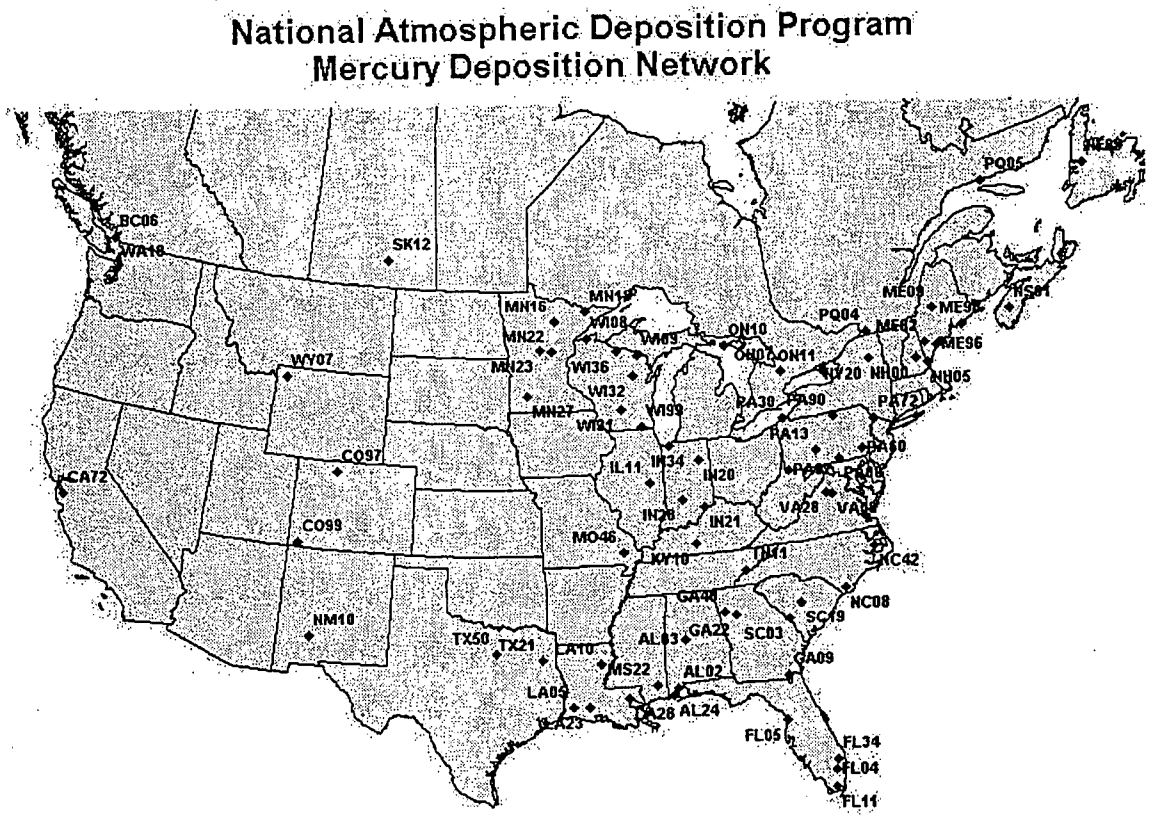
The Waccamaw and Pettigrew stations were amongst the earliest sites in the National Atmospheric Deposition Network's Mercury Deposition Network (MDN) (Figure 1-2). Composite rainwater samples were collected and analyzed weekly for total mercury content beginning in late 1995.

Mercury levels in samples of rainwater in eastern North Carolina vary greatly from week to week but are comparable to MDN data from sites across the United States. However, volume-weighted average levels of mercury in rainwater are consistently higher at Lake Waccamaw than at Pettigrew State Park, which is 150 miles north.

Figure 1-2

Map Of Current MDN Sites

(NC-08 corresponds to the Lake Waccamaw site)
(NC-42 corresponds to the Pettigrew State Park (Phelps) site)



Recent data from both sites during 1999 and 2000 suggested that mercury levels in precipitation may be declining in these areas. The most dramatic drop occurred between 1998 and 1999 at Lake Waccamaw State Park, when levels declined to values typical of the more remote location at Pettigrew State Park. Since 1998 however, the levels have crept back up. The current theory of cause and effect for mercury levels increasing may be cleanup activities at the closed chlor-alkali facility. Operations during the cleanup may have generated a considerable amount of fugitive emissions. It is possible these "cleanup" emissions are to blame for the rise in mercury levels following the drop that was observed after the plant shut down in 1999, as cleanup activities were not initiated immediately after plant closure. Continued sampling throughout the cleanup process and beyond should help to answer that question.

Results from wet deposition monitoring at the North Carolina sites are presented in Table 1-1, and Figures 1-3 and 1-4. Data recovery between 1996

and 1999 for both sites was greater than 98 percent. Sample handling problems and system blanks were the main causes of data loss, which occurred twice at Lake Waccamaw during 1996 and twice at Pettigrew State Park during 1996 and 1997. During 2000, some difficulties were encountered at both sites related to inconsistencies between the tipping rain gage and bucket precipitation samplers. A site audit performed during December of 1999 found that the tipping rain gage at the Lake Waccamaw site was prone to underreporting precipitation amount. However, subsequent estimates of rainwater mercury levels were based on the volume of rainwater collected in the volumetric flask; thus, estimated mercury levels were not consistently biased by erroneous information on rainwater amount. Improvements to the site instruments were made in June of 2000.

Table 1-1 shows a reduction in mercury deposition (a 30 percent drop compared to the previous three year average) at the Waccamaw site starting in 1999 (this reduction coincides with the closure of the HoltraChem mercury cell chlor-alkali plant). However, concentrations increase in 2000 and 2001. The weighted concentration levels in 2000 and 2001 do not reach the magnitude of pre-1999 concentrations. Data from the Pettigrew site generally follow the same curve, but with lower weighted concentrations. Figure 1-3 compares the annual amount of mercury in rainwater over a finite area (per square meter [m^2] in one millionth of a gram (microgram [µg]) increments each year). For example, in 1998, 18.7 $\mu g/m^2$ was captured. Figure 4-4 graphically compares the annual volume-weighted concentration (an average concentration) of mercury in billionth of a gram per liter (nanograms per liter = ng/L).

Discussion of NC Mercury Wet Deposition Network Data

Annual wet deposition rates in North Carolina are generally near the upper end of the range for all mercury wet deposition network (MDN) sites while annual volume-weighted mercury concentrations are close to the median value. Grasping the meaning of site-to-site variability in these parameters is difficult because the factors that influence mercury wet deposition are not completely understood. In general, the network sites that experienced the greatest rates of annual wet deposition also experienced higher annual precipitation rates. These sites are also primarily situated in the southern reaches of the network. The relatively lower rates of annual wet deposition in northern states could be due in part to the decreased scavenging efficiency of snow during winter months.

Table 1-1

Annual wet deposition of mercury at Pettigrew and Waccamaw State Parks

1996 – 2001

Year	Cumulative Wet Deposition ($ng/m^2/yr$)	Precipitation (mm/yr)	Volume-weighted concentration (mercury, ng/L)
Waccamaw			
1996	12821	1087.6	11.8
1997	10429	996.0	10.5
1998	18655	1265.7	11.7
1999	17205	1854.5	7.8
2000	12083	1337.8	9.6
2001	9197	884.2	10.4
Pettigrew			
1996	12361	1336.0	9.3
1997	9321	985.6	9.5
1998	9943	1395.5	7.1
1999	7907	1139.7	6.6
2000	10829	1302.7	8.2
2001	6114	770.8	7.9

Eastern North Carolina has moderate precipitation rates, and during winter months, precipitation is primarily in the form of rain. On the other hand, winter temperatures are significantly lower than those experienced in south Florida. If lower temperatures act to suppress atmospheric conversion of elemental mercury to water-soluble RGM, then lower rates of deposition might be expected in colder environments. This relationship is supported by seasonal trends in mercury deposition. If the North Carolina data are split into summer months (April to September) and winter months (October to March), mercury levels are clearly lower in winter versus summer months (see Fig 1-5). This phenomenon has been documented at many MDN sites, including those at lower latitudes where snow is not encountered and wintertime temperatures

Figure 1-3

Annual Cumulative Wet Deposition Of Mercury 1996 – 2001

Recorded At Lake Waccamaw And Pettigrew (Phelps) State Parks

Reported In Millionth of a Gram per Square Meter ($\mu g/M^2$)

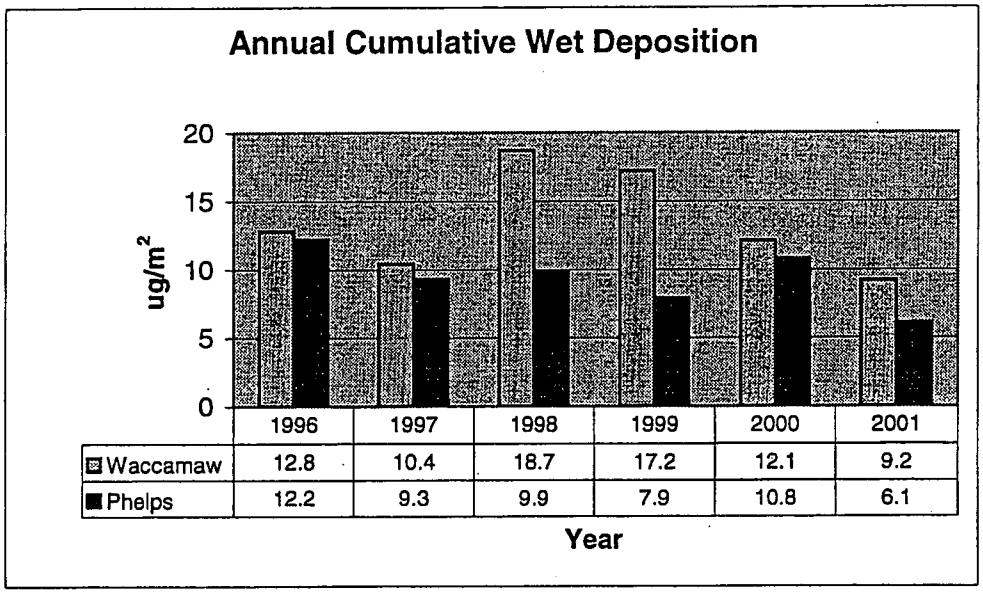
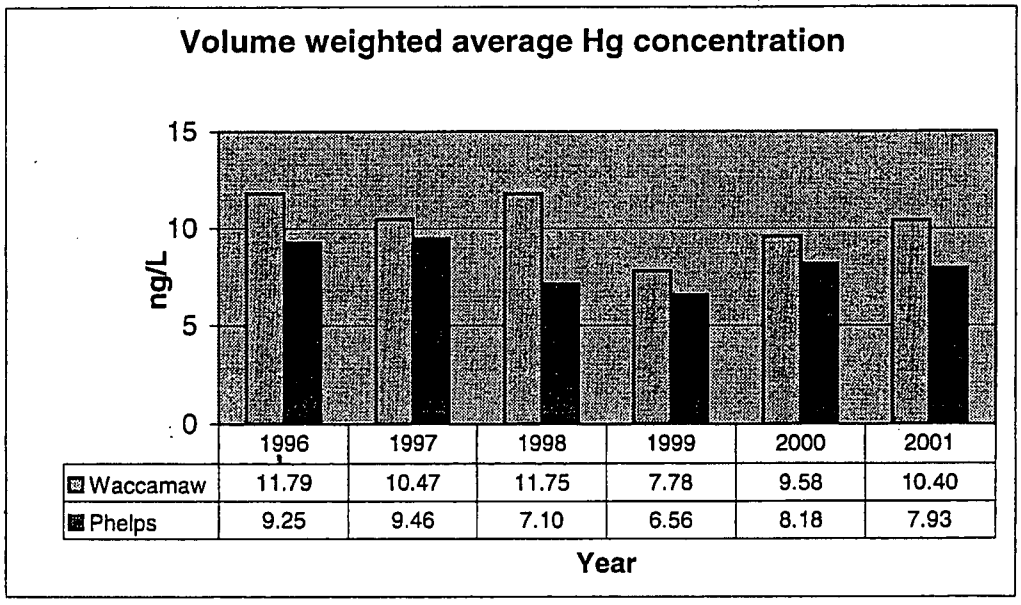


Figure 1-4

Annual Volume-Weighted Concentration Of Mercury 1996 – 2001

Recorded At Waccamaw And Pettigrew (Phelps) State Parks

Reported In Billionth of a Gram per Liter (ng/L)



are relatively warm. Other potential causes for the seasonal disparity might include air mass movement, which would tend to be northerly during the winter and southwesterly during the summer; cloud formation dynamics; and the amount and intensity of sunlight. Clearly, seasonal and regional meteorological patterns are critical factors affecting mercury wet deposition.

Additional factors affecting mercury deposition include local mercury emissions, unique terrain features, and the presence of additional atmospheric pollutants. Although MDN citing characteristics are meant to minimize the influence of emissions from local sources, invariably some network sites will be impacted. Sites influenced by local or regional emissions of RGM might be expected to record higher average levels of mercury in rainwater. Similarly, the existence of high levels of oxidative pollutants such as ozone and reactive chlorine species in air or cloud water could contribute to the oxidation of elemental mercury into RGM, which would subsequently increase local rainwater concentration and deposition rates.

While the aforementioned variables would clearly play a large role in the variability between national MDN sites located in diverse environments, they seem to serve as less plausible explanations for the differences seen between North Carolina's two MDN sites. As mentioned previously, surrounding features are very similar and the sites are only 200 kilometers apart. Annual precipitation rates between sites were similar between 1996 and 2000, with the exception of 1999 when the Waccamaw site experienced a disproportionately greater quantity of rainfall as a result of Hurricane Floyd. Other meteorological phenomena including temperature, prevailing winds and sunlight intensity should be similar.

Despite the overwhelmingly similar characteristics at the two sites, some consistent differences in mercury deposition patterns have been noted between them. Wet deposition rates have been higher at Waccamaw every year of sampling. This difference is primarily a reflection of different mercury concentration in rainwater because annual precipitation rates are comparable between sites. The magnitude of difference ranged from 10 percent during 1997 (11.5 ng/L vs. 10.5 ng/L) to over 60 percent during 1998 (11.6 ng/L vs. 7.1 ng/L). This relationship could also be observed if weekly data from each site were examined (Figure 1-6).

The consistency of this pattern suggests an additional influence on rainwater mercury levels. One important variable is regional levels of atmospheric mercury. Only limited information is available on atmospheric total gaseous mercury vapor levels in the vicinity of Pettigrew State Park, but those data indicated background conditions were present.[1] In stark contrast, total gaseous mercury levels at Lake Waccamaw were shown to fluctuate wildly

[1] Data on total gaseous mercury are from a 4-month period during the summer of 1996.

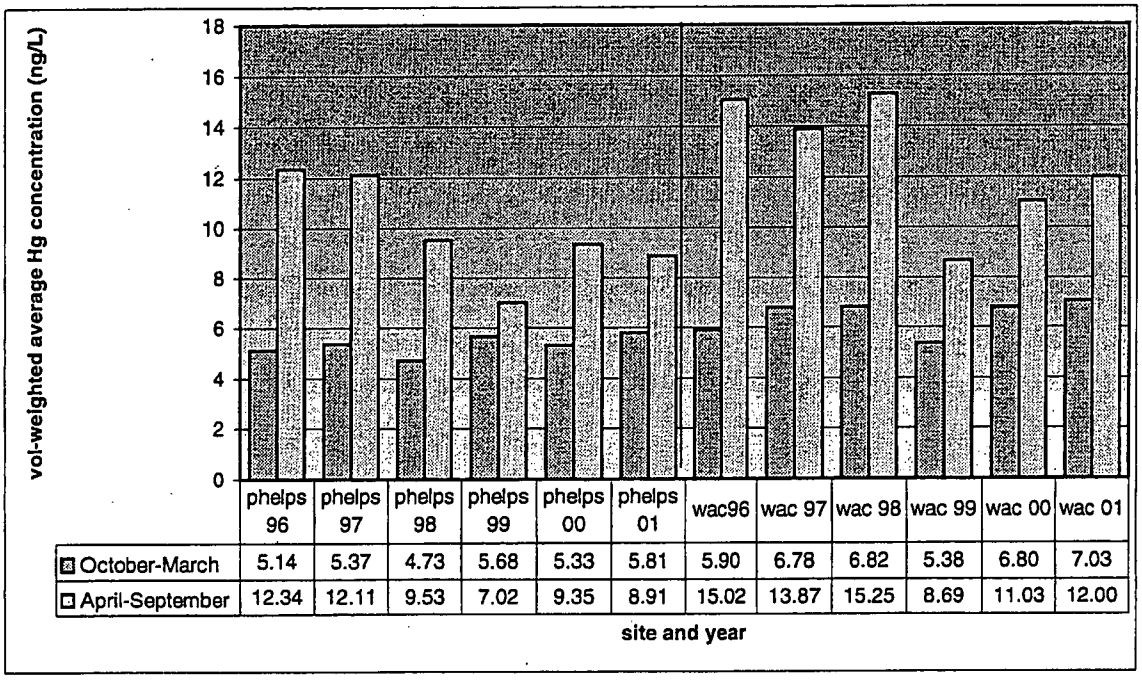
during and before 1998, which suggests that local air masses may have contained higher mercury levels (Figure 1-8). Higher atmospheric mercury levels could contribute to higher mercury levels in precipitation if significant atmospheric scavenging of water-soluble mercury species is taking place.

A substantial decrease in mercury concentration in rainwater between 1998 and 1999 at the Lake Waccamaw site occurred at the same time as a sudden decrease in atmospheric mercury levels at this site. The decrease in total gaseous mercury between 1998 and 1999 (28 percent) was somewhat less than the decrease in rainwater mercury concentration over that same time (45 percent). Additional influences, such as the unusually high precipitation rate during 1999, could also have acted to decrease average mercury levels in rainwater through dilution.

Figure 1-5 Mercury Wet Deposition

(Expressed as volume-weighted average mercury concentration (ng/L)

and separated by season, site and year)

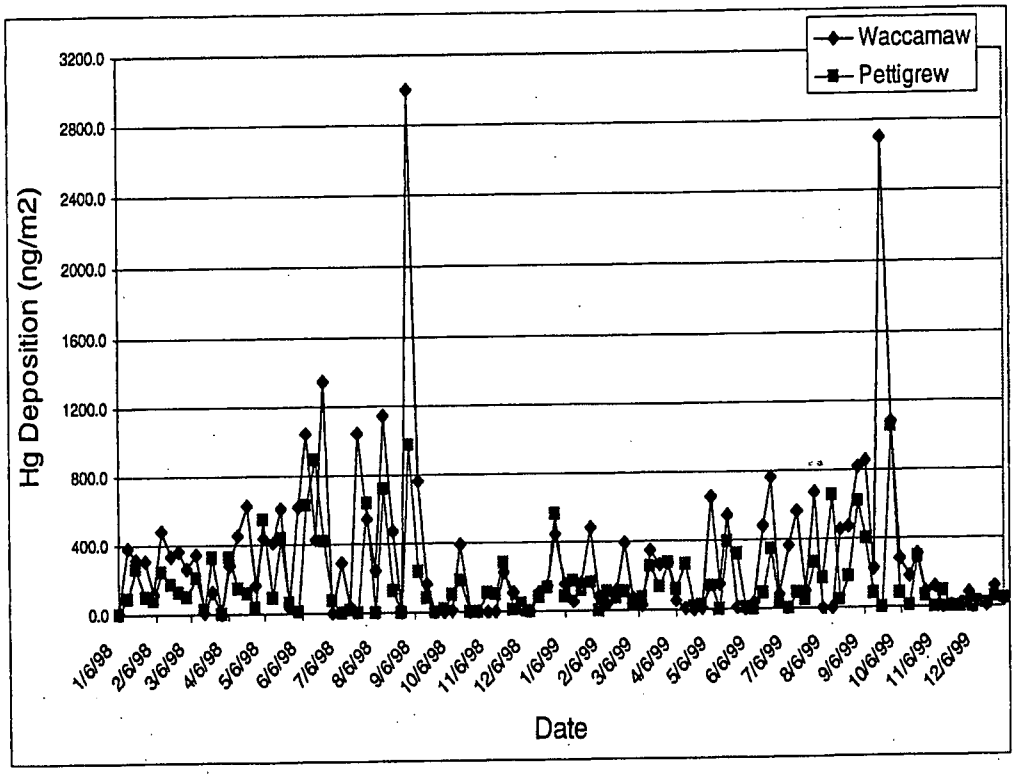


	phelps 96	phelps 97	phelps 98	phelps 99	phelps 00	phelps 01	wac96	wac 97	wac 98	wac 99	wac 00	wac 01
October-March	5.14	5.37	4.73	5.68	5.33	5.81	5.90	6.78	6.82	5.38	6.80	7.03
April-September	12.34	12.11	9.53	7.02	9.35	8.91	15.02	13.87	15.25	8.69	11.03	12.00

Figure 1-6

Coincident Weekly Deposition Data

From Waccamaw And Pettigrew State Parks, 1998 - 1999



Mercury in Ambient Air

Mercury is a naturally occurring substance that is present at very low levels in ambient air as a result of both natural and anthropogenic processes. In recent years, ultra-sensitive techniques have been developed to measure and speciate mercury in ambient air and rainwater, allowing for the determination of temporal and spatial trends in atmospheric mercury. Beginning in 1997, an automated mercury vapor analyzer was added to the Lake Waccamaw monitoring site. This instrument measured and recorded TGM levels in ambient air in 15-minute increments. Mercury vapor analyzers are not dependent on precipitation events. They collect and record mercury concentrations 24-hours per day. The vast majority of these readings showed total gaseous mercury levels at or below 2 ng/m^3, which is in the range of concentrations considered "background" for this type of site. However, fluctuations of mercury vapor concentrations, up to twice background values, were periodically seen. Mercury data were matched to concurrent wind direction data to illustrate an association between elevated total gaseous mercury and winds originating from the east-northeast. This evidence

suggested a fixed upwind source might be impacting atmospheric mercury levels at Lake Waccamaw State Park.

In 1999 DAQ expanded its monitoring study to understand better the factors affecting atmospheric mercury levels and the relationship between mercury emissions and air quality in southeastern North Carolina. With assistance from the EPA, two additional sites were established in Riegelwood, NC, an industrial area located approximately 25 kilometers to the east-northeast of Lake Waccamaw and home to several mercury emission sources including a large pulp and paper operation and a mercury cell chlor-alkali plant.

The operation of a chlor-alkali plant is heavily dependent on the availability of huge quantities of direct-current electrical power, usually obtained from a high voltage source of alternating current. Chlor-alkali plants produce sodium hydroxide (caustic soda), chlorine, sodium carbonate (soda ash), potassium hydroxide (caustic potash), and hydrochloric acid. The process requires the electrolysis of sodium or potassium chloride. Mercury cells use a pool of mercury at the bottom of the cell to act as the cathode. Mercury is pumped into the cell during the process as an amalgam of sodium mercury and then is pumped out to a decomposer where the mercury is purified and recycled back to the cell. Hydrogen gas from mercury cell operation contains significant amounts of mercury, which is removed by scrubbing with sodium hypochlorite or sodium persulfate.[2]

Mercury cells were the original process equipment used throughout the country. However, two newer processes (the diaphragm cell and the membrane cell) have replaced the mercury cell process. These new process use less electrical power during the electrolysis (mercury cell requires 7 to 10 kilo-amperes per square meter (kA/m^2) while the diaphragm cell requires 1.5 to 4 kA/m^2).

By far the largest source of mercury emissions was the HoltraChem mercury cell chlor-alkali operation located in Riegelwood, NC, which was approximately 25 kilometers (16 miles) east-northeast of Lake Waccamaw. The facility reported almost 1,300 pounds of mercury emissions in 1998, over three times the amount of the second largest source, the New Hanover Waste-to-Energy municipal waste incinerator near Wilmington (1998 emissions: 362 pounds). The location and quantity of mercury released suggested that the HoltraChem plant in Riegelwood was significantly influencing regional levels of atmospheric mercury, and caused dramatic changes even at a distance of 25 kilometers from the source. However, with only the Lake Waccamaw data, other regional emission sources could not be ruled out as contributors.

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[2] Ref. 19, pages 59-63

Atmospheric monitoring for total gaseous mercury was carried out concurrently at the Riegelwood and Lake Waccamaw locations during 1999 and 2000. The study, known as the Waccamaw Atmospheric Mercury Study, also involved chemical speciation of elemental and reactive gaseous mercury during 2000 at one of the Riegelwood sites. In addition, mercury was measured in weekly rainwater samples collected from Lake Waccamaw and a second location in northeastern North Carolina, in support of the national Mercury Deposition Network.

As previously mentioned, historical data on total gaseous mercury from Lake Waccamaw strongly suggested regional source impacts. If the relationship between regional atmospheric total gaseous mercury levels and levels of mercury in rainwater are true, then it raises the possibility that local source mercury emissions are having an identifiable impact on regional mercury wet deposition rates. To properly analyze this relationship, rain event-based sampling would have to occur concurrently with analysis of trace signature pollutants and an analysis of micrometeorological conditions. The sampling method used in the MDN network blends together multiple precipitation events into one weekly composite sample, making it impossible to distinguish single precipitation events arising from different weather systems. Precipitation occurring at the sampling site after passing over an upwind emission source cannot be distinguished from other precipitation events that contribute to that week's sample. Despite these limitations, the local and regional MDN data does provide a useful accompaniment to data on atmospheric mercury and a possible indicator of the effect of anthropogenic releases of mercury.

WACCAMAW ATMOSPHERIC MERCURY STUDY:

This study was successful in identifying long-term trends in atmospheric mercury in a rural/remote environment that is home to several mercury emission sources. All lines of evidence seem to suggest that significant improvements in regional ambient air mercury levels were most closely associated with the closing of a mercury cell chlor-alkali operation in Riegelwood, North Carolina. Conditions at Lake Waccamaw State Park appeared to represent typical mid-latitude northern hemisphere terrestrial "background" conditions for total gaseous mercury upon the conclusion of this study. Conditions in the industrial area of Riegelwood, NC, had also improved substantially but continued to show periodic elevations in both elemental and reactive gaseous mercury that suggested ongoing mercury emissions to the air, and increased atmospheric loading of mercury to local waterways.

STUDY DESIGN AND PURPOSE

To better define the cause of spikes in atmospheric mercury at the Lake Waccamaw State Park site, the DAQ proposed to expand its study to include several additional monitoring locations in the Cape Fear River Basin. The

objective was to generate data from these sites that would help to better define the role of multiple sources and determine the magnitude of effect at shorter distances from a major source of mercury emissions.

In 1998 the chlor-alkali plant reported plans to convert its mercury cell chlorine production process to a membrane process. The membrane process is preferable because it is more energy efficient and eliminates the use of mercury (USEPA, 1997b). Representatives from the DAQ and the North Carolina Department of Health and Human Services (DHHS) contacted plant representatives to request permission to situate mercury vapor monitors on facility property during the conversion process. DHHS representatives were concerned that the processing and removal of immense quantities of mercury might lead to releases of mercury vapor sufficient to cause toxic exposures for

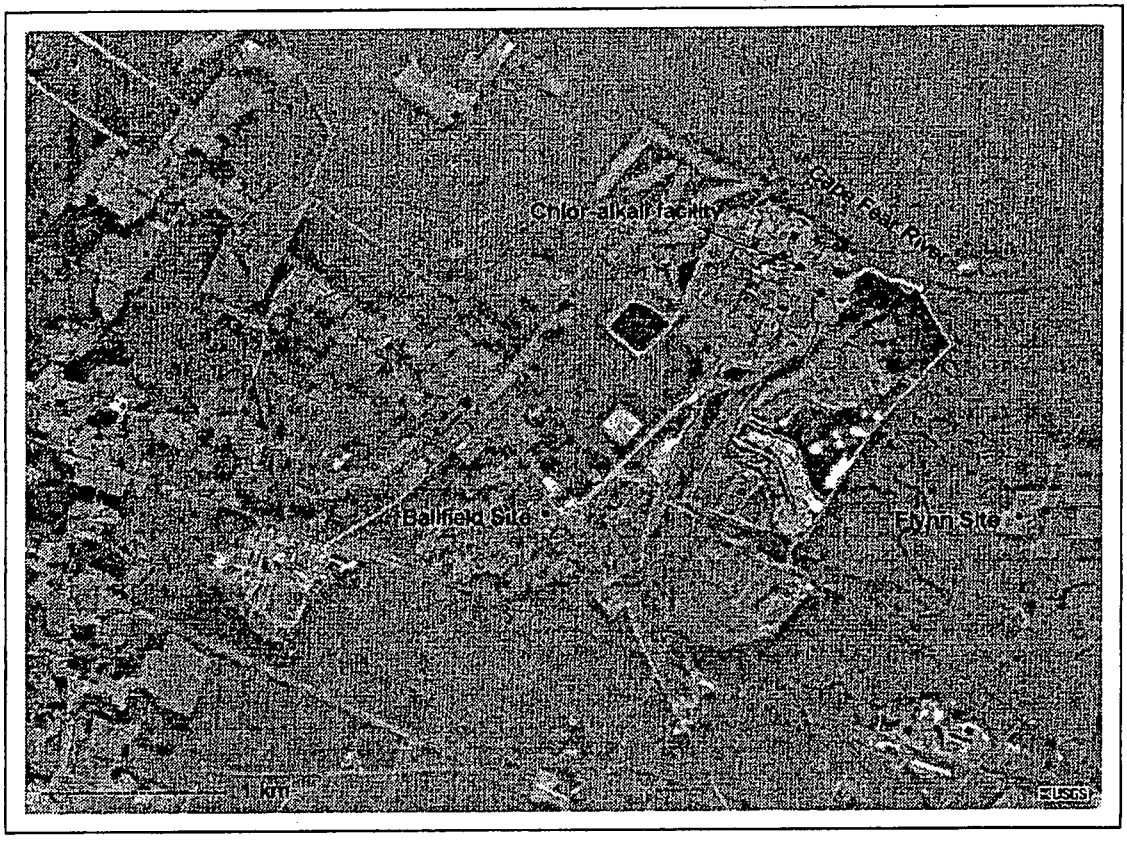


Figure 1-7: *Aerial photograph of Riegelwood, North Carolina*

workers or nearby residents. Plant officials declined to allow monitoring instruments on-site but the DAQ subsequently identified suitable monitoring locations in the immediate vicinity of the chlor-alkali and pulp and paper mill industrial complex, and in early 1999 set up two monitoring stations within one mile to the southeast and southwest of the chlor-alkali plant (Fig 1-7). Despite the close proximity, the sites differed substantially. The Riegelwood Ballpark site was located in a clearing at the edge of a county park, just beyond the right-field fence of a baseball field at the intersection of NC 87 and

Riegelwood Plant Road. The site was located directly across from the main entrance to the pulp and paper mill and provided a relatively unimpeded view to the industrial complex. To the east, west and south of this area are residential and open spaces. Some commercial structures were located near the site at the same intersection, including a gas station across NC Highway 87. Traffic near the site was moderate to heavy and continuous. The Riegelwood Flynn site was placed in a fallow plot of agricultural land, surrounded by open space and a thick stand of trees 100 meters to the north, west and south. The surrounding area is rural and very sparsely populated. Access to the site was provided by a dirt road that received little or no daily traffic. No view of the industrial complex was provided due to the trees surrounding this site.

The instruments stationed at the Riegelwood sites were identical to the instrument at Lake Waccamaw and were capable of providing continuous monitoring of TGM. Both sites were also equipped with sufficient instrumentation to provide on-site meteorological information including wind speed and direction, temperature and humidity. The original mercury vapor monitor at the Riegelwood Flynn site was provided on loan from USEPA Region 4 but had to be returned in January of 2000, leaving only one Riegelwood site operational. In late 1999 the DAQ petitioned the USEPA for funding under the Persistent Bioaccumulative and Toxic (PBT) Chemical Program to help support a long-term study of atmospheric and fish mercury trends in the Lumber River Basin. In May of 2000, the EPA committed $47,900 in PBT funds to allow for procurement of atmospheric monitoring instrumentation and supplies for air and fish monitoring. This allowed for reinstatement of total gaseous monitoring at the Riegelwood Flynn site in the third quarter of 2000 and freed up Department funds for the purchase of an annular denuder-based mercury speciation unit to be stationed at Riegelwood Ballpark. The speciation system allowed for continuous concurrent monitoring of both Hg(0) and RGM, providing important information on the speciation of mercury during both "background" and highly elevated readings. This type of information could then be used to assess the extent to which spikes in TGM could be contributing to off-site deposition of mercury into the surrounding environment.

DAQ's objectives for the expanded study included: 1) assuring that the public was not being exposed to dangerously high levels of mercury in ambient air, 2) determining the impact of the conversion process on local atmospheric conditions, and 3) determining whether the chlor-alkali operation or another source was responsible for atmospheric mercury fluctuations in the Lumber River Basin. It was envisioned that this effort would last throughout the chlor-alkali conversion process. The DAQ also committed to maintain mercury vapor monitoring at Lake Waccamaw for the duration of this study. The continued collection of data from this site was deemed critical to gain a full understanding of the "before and after" effect of the conversion process at the chlor-alkali plant. If in fact that facility was responsible for the historical peaks in TGM at

Lake Waccamaw then halting the active use of mercury might result in a return to background conditions at this site. Alternatively, if another source was primarily responsible or if documented levels represented normal variability for this region, then those conditions might be expected to persist.

Additionally, the DAQ committed to continue rainwater measurements at both North Carolina MDN sites. Data from previous years showed that rainwater mercury levels at Lake Waccamaw were consistently higher than at Pettigrew State Park. It is plausible that some of the same phenomena that had been contributing to significant fluctuations in gaseous mercury at Lake Waccamaw could also be contributing to greater concentrations of mercury in local rainwater. If so, changes that might result in decreased atmospheric levels of mercury might also contribute to decreased levels in rainfall.

This section presents information on atmospheric mercury levels collected over a three-year period between 1997 and 2000. Parameters include: 1) continuous measurement of TGM at Lake Waccamaw between 1997 and 2000, 2) measurement of TGM at both Riegelwood monitoring locations during extended periods of both 1999 and 2000, and 3) speciation of atmospheric mercury at the Ballpark site during 2000. Many of the monitoring instruments chosen for this study are cutting edge and as such a considerable amount of time and effort was spent refining methods to improve instrument performance. We will discuss these methods and their bearing on future studies. In addition, we provide observations on the behavior of atmospheric mercury, including the relationship between elemental and reactive gaseous mercury species. Finally, we present the results of an analysis of regional mercury emission patterns that explores possible relationships between industrial activities and regional atmospheric mercury levels. Meaningful findings include:

Total Gaseous Mercury:

- Data collected during 1998 at Lake Waccamaw State Park suggested that periodic spikes of total gaseous mercury exceeding 50 ng/m^3 were typical for this area during this time, but atypical for such a remote/rural location.
- On-site meteorology identified a relationship between elevations in total gaseous mercury and winds originating from the east-northeast.
- Beginning in early 1999, levels of atmospheric mercury at Lake Waccamaw State Park returned to typical "background" levels (1.5 – 2.0 ng/m^3).
- Reduced atmospheric levels of total gaseous mercury were observed simultaneous with the cessation of chlorine production at a mercury cell chlor-alkali plant located approximately 25 kilometers to the east-northeast of Lake Waccamaw State Park.

- In Riegelwood, NC, measurements of atmospheric mercury included periodic spikes in total gaseous mercury throughout 1999 and 2000.
- Quarterly average total gaseous mercury levels during 1999 and 2000 were up to 166% higher at the Riegelwood monitoring locations versus coincident readings from Lake Waccamaw State Park. However, average values appeared to decline in Riegelwood over the course of this study and at one site decreased by roughly 40% between 1999 and 2000.
- Total gaseous mercury levels did not exceed 300 ng/m^3 (NC Acceptable Ambient Level and EPA inhalation RfC) at the Riegelwood sites for an extended period of time, suggesting that health risks from non-occupational inhalation of mercury were minimal for local citizens during the study period.
- Long-term continuous measurement of atmospheric mercury can be successfully achieved, even at the exquisitely low levels found in the atmosphere. Data from these types of studies can be used in combination with on-site meteorological data to identify possible source-receptor relationships.

Reactive Gaseous Mercury:

- Levels of atmospheric reactive gaseous mercury fluctuated significantly in the Riegelwood area throughout the last half of 2000.
- Short-term increases in reactive gaseous mercury frequently occurred in tandem with increases in elemental mercury when the monitoring site was downwind of the chlor-alkali plant and pulp and paper mill, suggesting that mercury emissions included both elemental and reactive gaseous mercury.
- In addition to source-related increases in reactive gaseous mercury, smaller scale increases also frequently occurred during afternoon hours, particularly on low humidity days, suggesting a natural diel cycle for reactive gaseous mercury.
- Meteorological conditions such as wind direction, precipitation, humidity and temperature appear to affect ambient air reactive gaseous mercury levels.
- New methods to measure and distinguish reactive gaseous mercury and elemental mercury performed well over extended periods of time; however, some modifications to the instrument assembly may be needed to maintain gold trap integrity over extended sampling periods.

WACCAMAW STUDY RESULTS & DISCUSSION

In the following pages we present an enormous database of information on levels of TGM, Hg(0) and RGM along the eastern coastal plain of North Carolina. We then attempt to highlight and explain trends in the data and on occasion speculate as to causative factors behind those trends. There are several areas that deserve additional attention, including the relative influence

of meteorology and local emissions on RGM levels at Riegelwood Ballpark. Many of these questions may be answered through in-depth statistical analysis of existing data.

TOTAL GASEOUS MERCURY: RESULTS

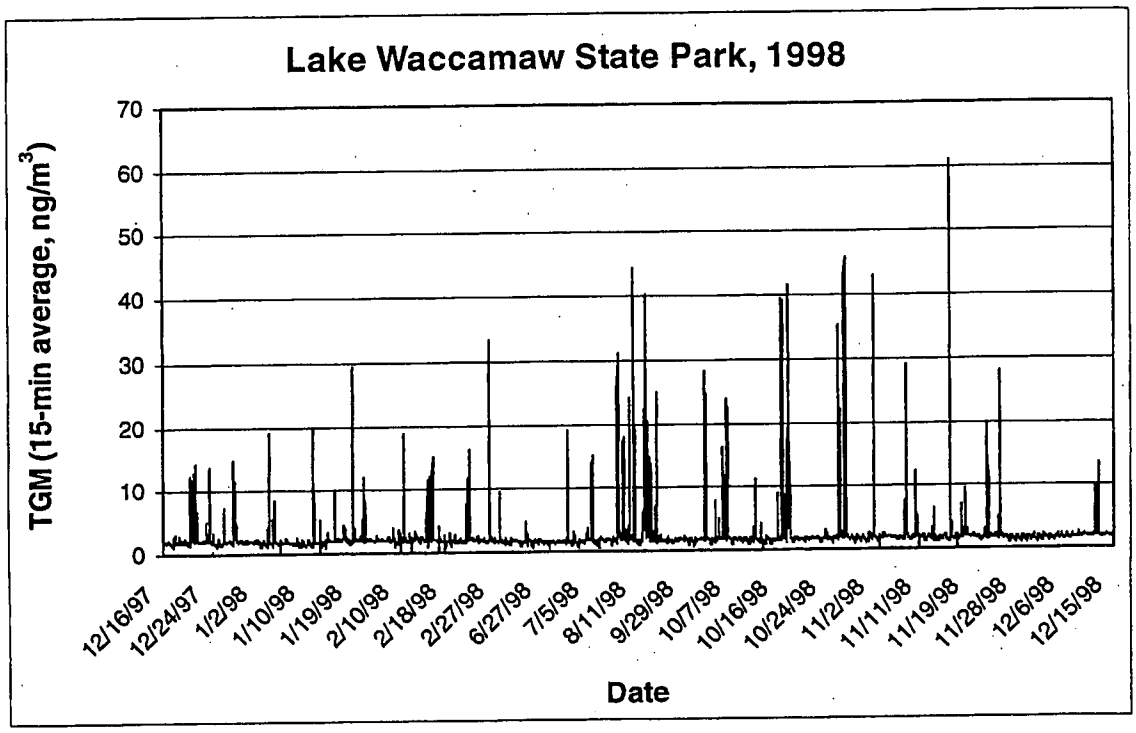
Waccamaw State Park

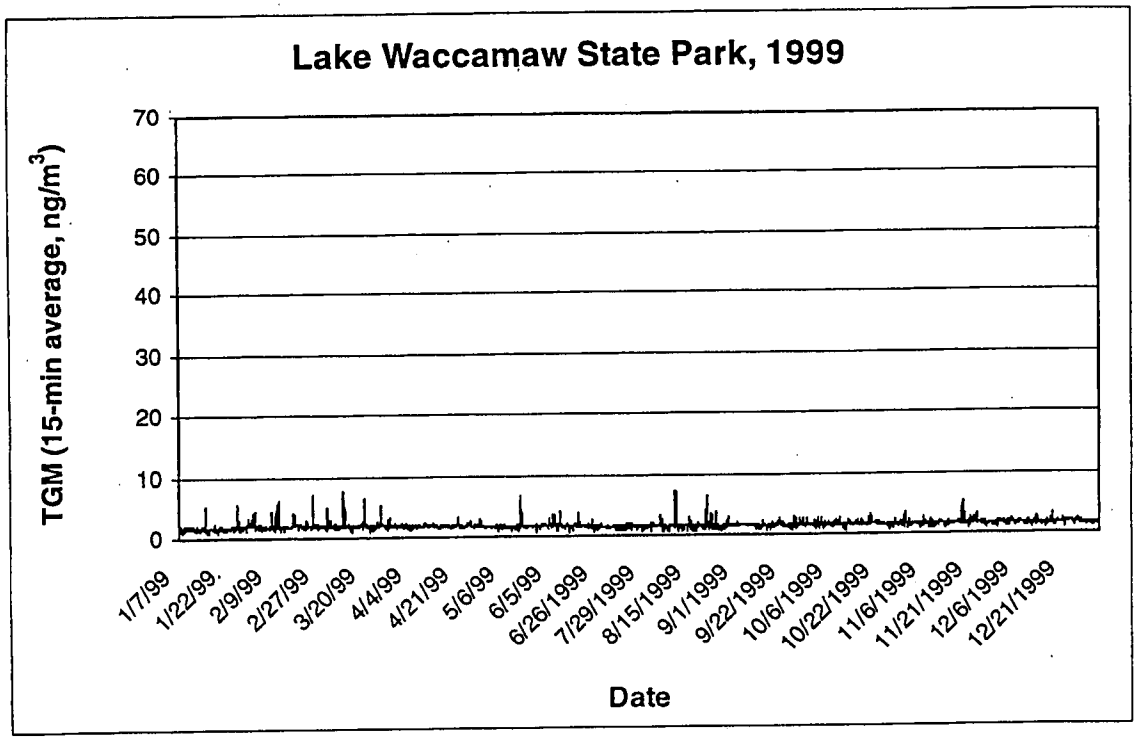
Continuous monitoring for TGM was carried out at Waccamaw State Park from December 1997 through December 2000. All data from this site represent 15-minute average TGM concentration (ng/m^3) except for a brief period between July 17 and August 1, 2000 when measurements were made on a 5-minute basis. Monitoring data are summarized in Table 1-2 and presented graphically in Figure 1-8.

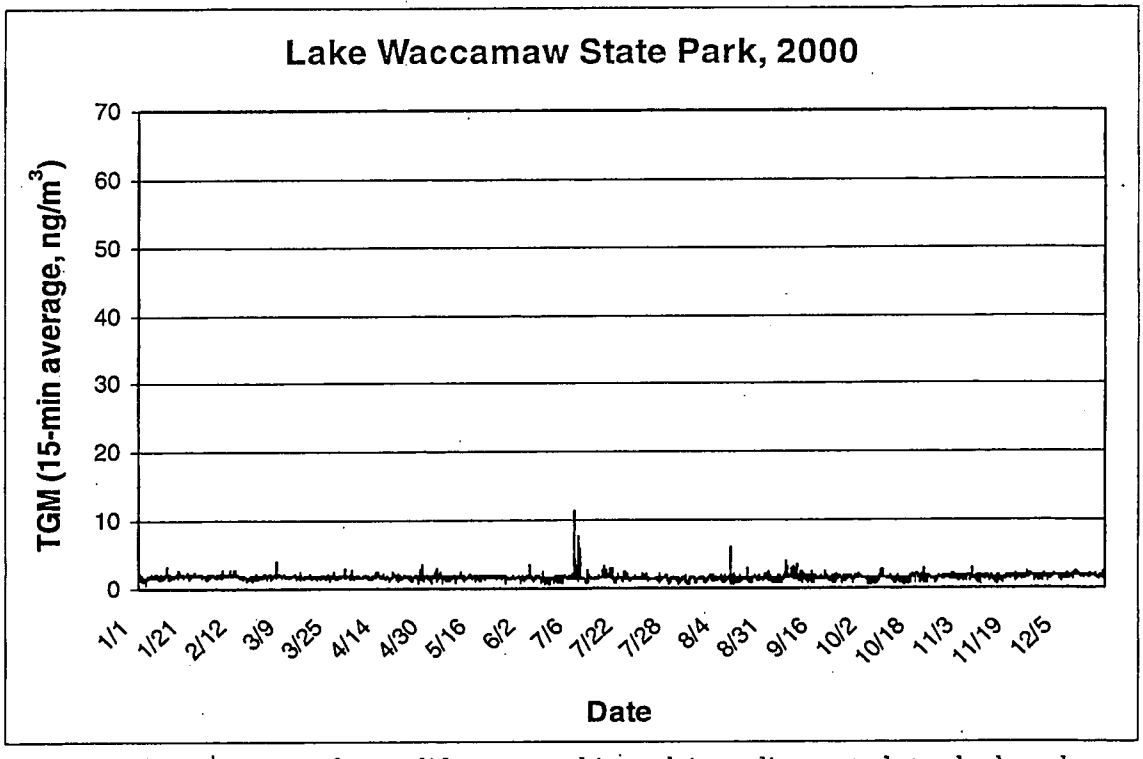
Table 1-2: *Quarterly statistics for ambient air TGM measured at Lake Waccamaw S.P. Values were calculated using 15-minute average TGM concentrations. All values in ng/m^3.*

Lake Waccamaw (TGM)	1998*			1999				2000			
	st Q	rd Q	th Q	st Q	nd Q	rd Q	th Q	st Q	nd Q	rd Q	th Q
10th percentile	.53	.21	.35	.54	.50	.08	.33	.56	.35	.07	.19
25th percentile	.69	.44	.58	.71	.64	.36	.54	.67	.55	.34	.47
50th percentile (median)	.87	.62	.77	.86	.77	.54	.67	.79	.65	.50	.64
75th percentile	.08	.81	.94	.99	.87	.65	.78	.90	.74	.62	.79
90th percentile	.50	.82	.24	.15	.98	.73	.90	.99	.81	.80	.87
95th percentile	.02	.02	.96	.26	.09	.82	.01	.07	.87	.01	.95
99th percentile	1.47	2.07	1.15	.80	.58	.43	.39	.30	.21	.77	.16
Maximum	3.31	4.42	0.97	.67	.75	.17	.12	.08	.48	1.41	.03
Arithmetic mean	.23	.44	.40	.88	.75	.49	.65	.78	.62	.50	.59
Standard deviation	.85	.66	.53	.42	.29	.35	.26	.2	.24	.46	.29
Count (n)	056	986	102	566	829	351	410	550	727	983	411

Figure 1-8: Total gaseous mercury (TGM) measured at Lake Waccamaw State Park between December 1997 and December 2000.







*Data from the 2nd quarter of 1998 did not meet this study's quality control standards and are not presented.

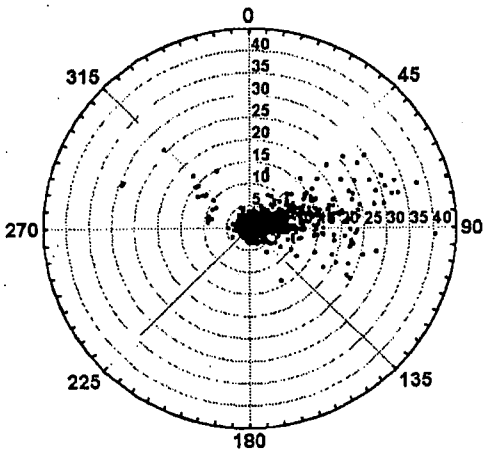
The average mercury level at Lake Waccamaw State Park during the entire study period was 1.84 ng/m^3. The annual average declined between consecutive years, from 2.34 ng/m^3 in 1998 to 1.68 ng/m^3 in 1999 and 1.61 ng/m^3 in 2000. Median mercury levels remained consistent throughout the entire length of the study, as did values in the lower percentile ranges and up through the 90th percentile. It is only in the upper end of the distribution (95th percentile and higher) that levels varied substantially between 1998 and subsequent periods. This is also reflected in quarterly standard deviations, which decreased substantially between 1998 and 1999, reflecting the absence of large deviations in mercury levels beginning in 1999. Over 133,000 individual samples passed QA tests and are presented for the 3-year period, representing over 30,000 hours of data.

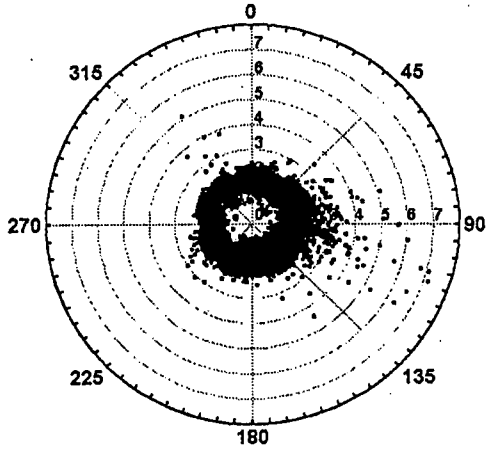
Data recovery for 1998 was approximately 45%.[3] The primary reason for the relatively greater rate of data loss during this time is failed system calibrations. These data were collected before quality assurance and quality control methods described in the Quality Assurance Project Plan were implemented, thus the data have been scrutinized closely resulting in the removal of questionable results. We believe there is no valid reason to reject 1998 data with passing calibrations and remain confident in the results

[3] Missing coverage is calculated by dividing the number of days with missing data by the total number of days during the sampling event. Instrument removal for maintenance or weather is considered lost coverage.

presented here. Data recovery is approximately 90% for calendar years 1999 and 2000. The primary reason for data loss was failed calibrations, channel disagreements and power outages related to severe weather events.

Analysis of mercury data with concurrent information on wind direction unearthed a clear association between wind conditions and elevations in TGM during 1998 (Figure 1-9). With very few exceptions, spikes in TGM were accompanied by winds arriving from the east-northeast. No clear pattern emerged during the remainder of 1999 or during 2000. The diminished events detected during this period were associated with winds arriving from various directions (Figure 1-10).[4]





Figures 1-9 (left) and 1-10 (right): *TGM vs. wind direction, measured at Lake Waccamaw State Park during 1998 (left) and 1999 (right). Radial axis represents wind direction in degrees and X and Y axes represent TGM in ng/m³. Only*

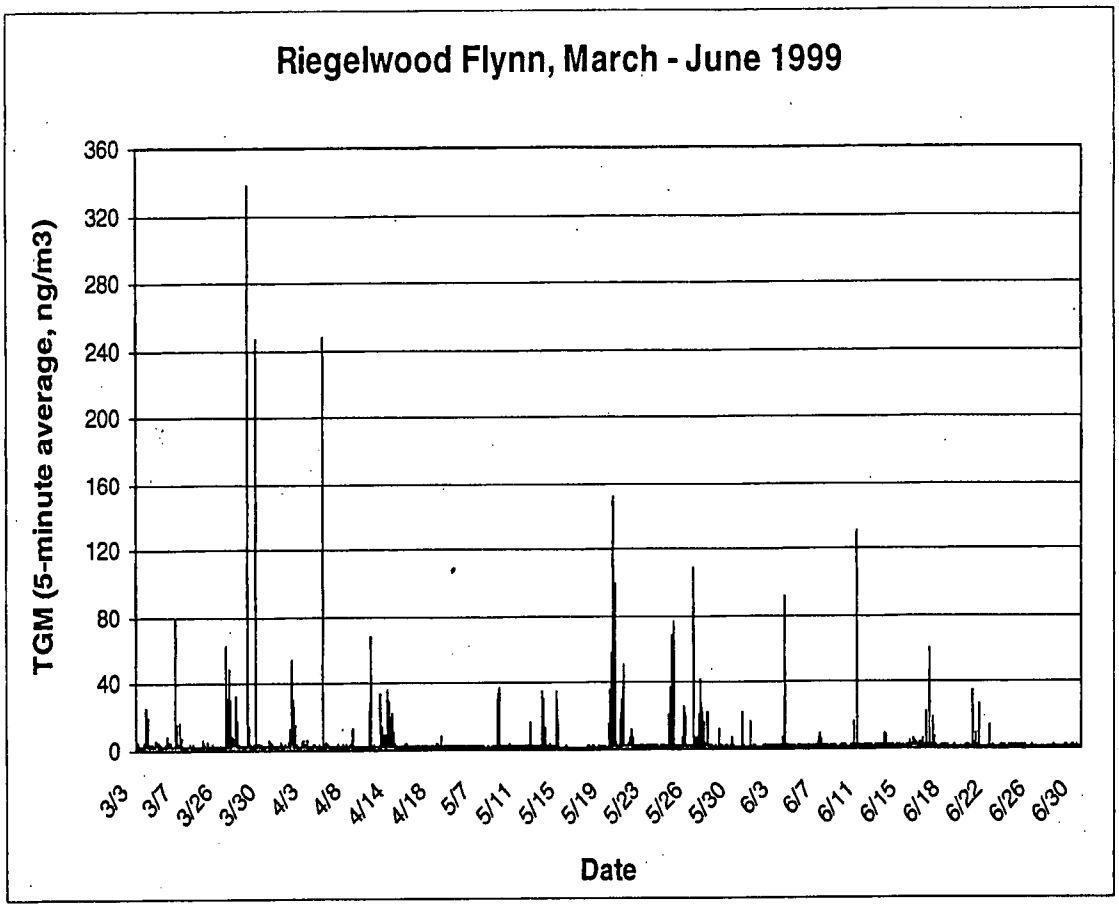
Riegelwood Flynn

The initial phase of TGM measurement began in March 1999 and continued into January 2000. A second phase of monitoring began in August of 2000 and continued through November 2000. All measurements presented in Table 1-3 and Figures 1-11 and 1-12 represent 5-minute average values in ng/m³

[4] Winds less than 3 mph were excluded to minimize the appearance of 15-minute "average" wind directions that are a misleading product of light and variable winds.

Table 1-3: *Quarterly statistics for TGM measured at Riegelwood Flynn site. Values were calculated using 5-minute average TGM concentrations. All values in ng/m³.*

Riegelwood Flynn (TGM)	1999				2000		
	1st Q	**2nd Q**	**3rd Q**	**4th Q**	**1st Q**	**3rd Q**	**4th Q**
10th percentile	1.92	1.51	1.36	1.42	0.85	1.10	1.31
25th percentile	2.08	1.62	1.51	1.55	1.13	1.24	1.45
50th percentile (median)	2.31	1.76	1.65	1.72	1.34	1.40	1.58
75th percentile	2.87	1.98	1.79	2.14	1.48	1.55	1.80
90th percentile	4.43	2.43	2.06	2.40	1.62	1.73	2.86
95th percentile	6.36	3.77	2.75	3.31	1.73	2.16	4.49
99th percentile	28.70	20.83	15.11	15.23	6.96	5.95	13.82
Maximum	338.32	247.29	203.64	60.54	26.76	32.29	111.30
Arithmetic mean	3.76	2.55	2.17	2.23	1.42	1.54	2.16
Standard deviation	10.72	5.94	4.84	2.80	1.09	1.05	3.06
Count (n)	3484	20595	15281	7973	1892	6617	12553


Riegelwood Flynn, March - June 1999
TGM (5-minute average, ng/m3)
360
320
280
240
200
160
120
80
40
0
3/3
3/7
3/26
3/30
4/3
4/8
4/14
4/18
5/7
5/11
5/15
5/19
5/23
5/26
5/30
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6/11
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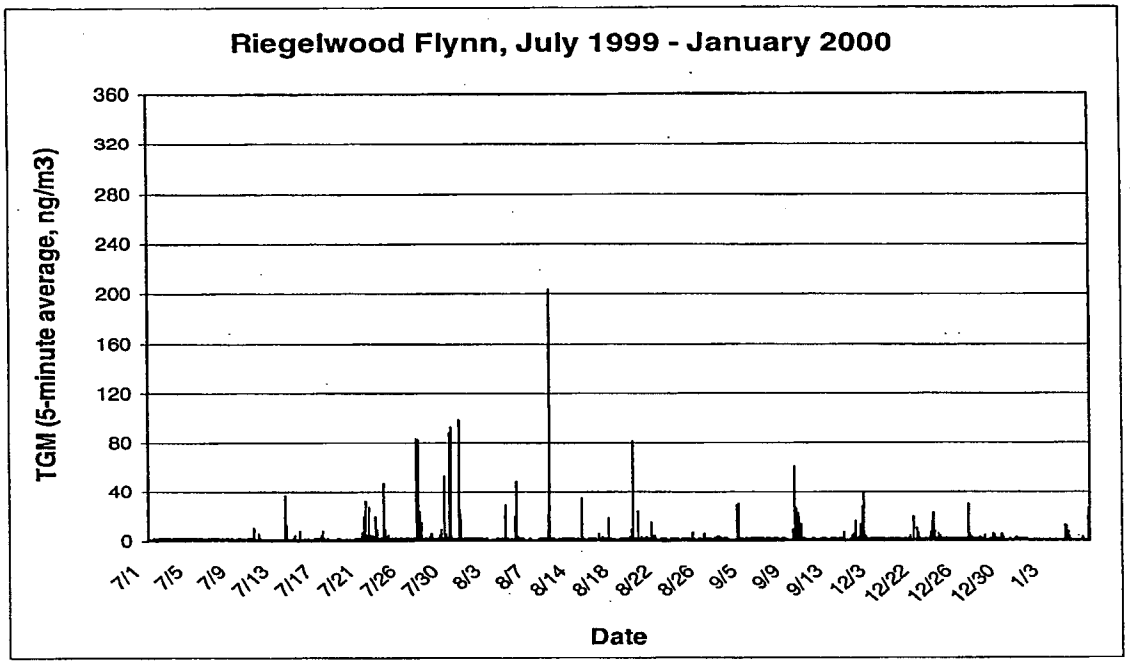
Riegelwood Flynn, July 1999 - January 2000
TGM (5-minute average, ng/m3)
360
320
280
240
200
160
120
80
40
0
7/1
7/5
7/9
7/13
7/17
7/21
7/26
7/30
8/3
8/7
8/14
8/18
8/22
8/26
9/5
9/9
9/13
12/3
12/22
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Date

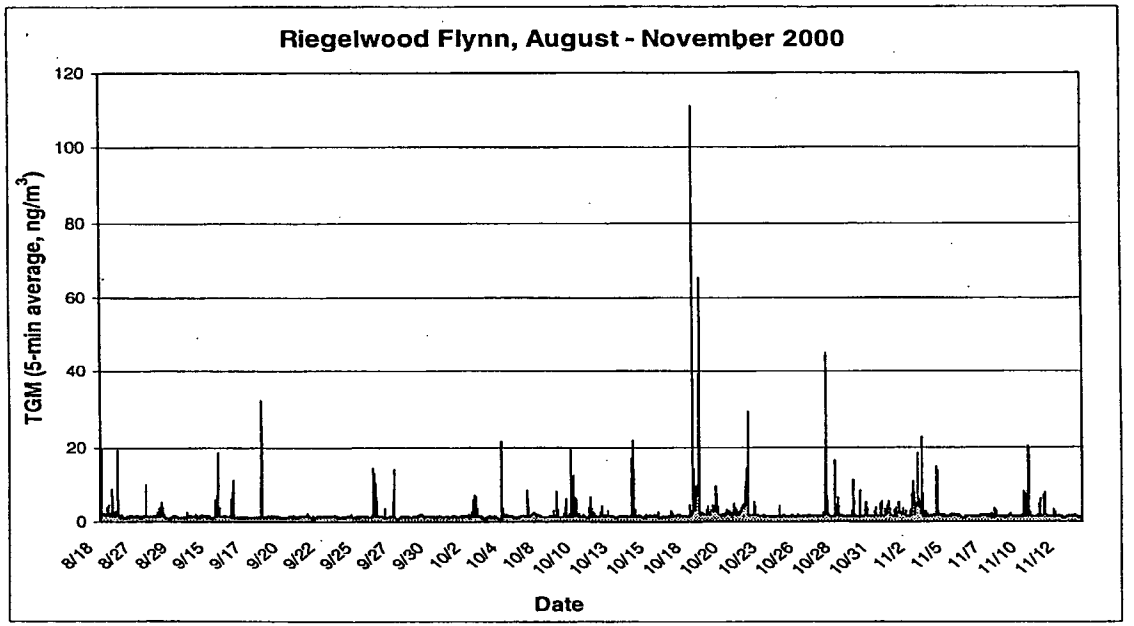

Riegelwood Flynn, August - November 2000
TGM (5-min average, ng/m3)
120
100
80
60
40
20
0
8/18
8/27
8/29
9/15
9/17
9/20
9/22
9/25
9/27
9/30
10/2
10/4
10/8
10/10
10/13
10/15
10/18
10/20
10/23
10/26
10/28
10/31
11/2
11/5
11/7
11/10
11/12
Date

Figure 1-11 (this and previous page): *Total gaseous mercury measured at Riegelwood Flynn during Phase 1 (1999 – 2000, first 2 figures) and Phase 2 (2000, 3rd figure).*

10th percentile	1.92	1.51	1.36	1.42	0.85	1.10	1.31
25th percentile	2.08	1.62	1.51	1.55	1.13	1.24	1.45
50th percentile (median)	2.31	1.76	1.65	1.72	1.34	1.40	1.58
75th percentile	2.87	1.98	1.79	2.14	1.48	1.55	1.80
90th percentile	4.43	2.43	2.06	2.40	1.62	1.73	2.86
95th percentile	6.36	3.77	2.75	3.31	1.73	2.16	4.49
99th percentile	28.70	20.83	15.11	15.23	6.96	5.95	13.82
Maximum	338.32	247.29	203.64	60.54	26.76	32.29	111.30
Arithmetic mean	3.76	2.55	2.17	2.23	1.42	1.54	2.16
Standard deviation	10.72	5.94	4.84	2.80	1.09	1.05	3.06
Count (n)	3484	20595	15281	7973	1892	6617	12553

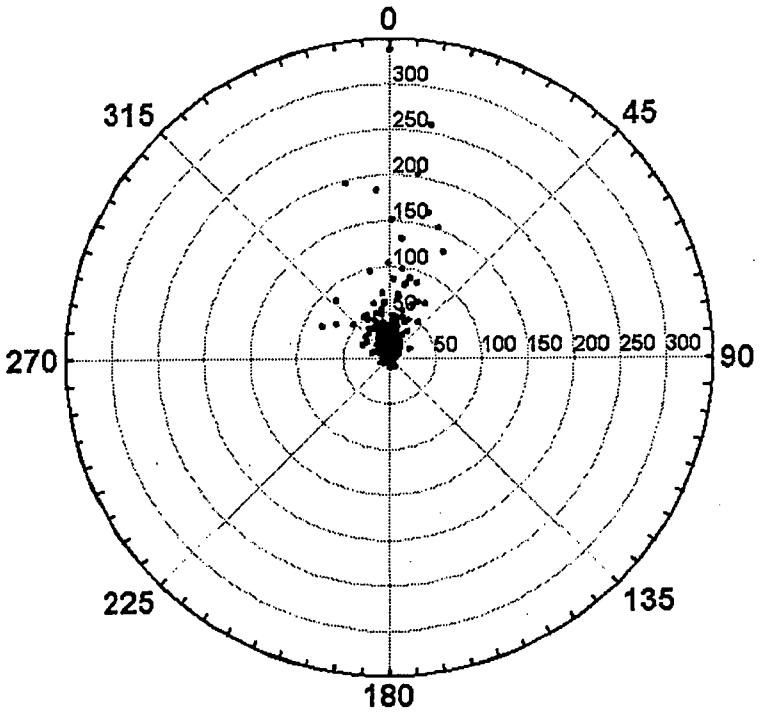


Figure 1-12a:
Riegelwood Flynn, TGM vs wind direction, May – Oct 1999. Radial axis is wind direction in degrees. X and Y axis represent TGM (ng/m³). 5-minute averages. Only includes wind speeds > 3 mph.

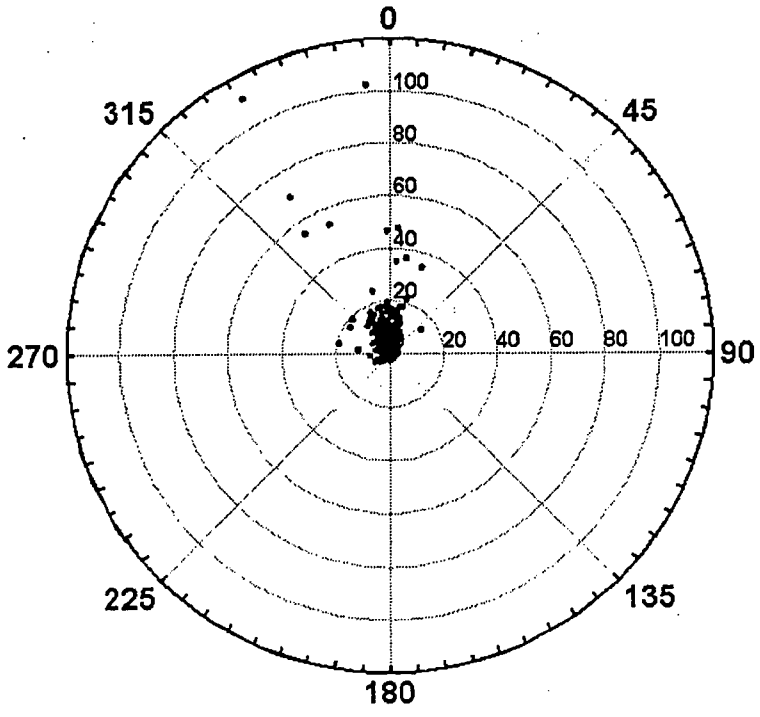


Figure 1-12b:
Riegelwood Flynn, TGM vs wind direction, Aug – Nov 2000. Radial axis is wind direction in degrees. X and Y axis represent TGM (ng/m³). 5-minute averages.

The mean mercury level at this site for the entire duration of the study was 2.29 ng/m^3. The mean levels for the first (3/99 – 1/00) and second (8/00 – 11/00) phases of sampling were 2.42 ng/m^3 and 1.95 ng/m^3, respectively. Quarterly mean values and extreme values declined throughout the first phase of monitoring, reflecting the decreasing frequency and intensity of mercury fluctuations. Similarly, quarterly standard deviations declined between each quarter during the first phase of sampling and remained low during the second phase of sampling. Despite the apparent improvement in conditions at this site, occasional excursions in atmospheric mercury were encountered during all sampling periods. Most measurement statistics including mean and standard deviation were increased slightly between the 3rd and 4th quarter of 2000. Elevated TGM was generally associated with winds arriving from the north-northwest (Figures 1-12a-b).

Approximately 60% data recovery was achieved during the first phase of monitoring at Riegelwood Flynn. Loss of coverage resulted from site start-up problems and lack of closing calibrations during site malfunctions. However, the greatest loss of data occurred during Hurricane Floyd and its aftermath. Damage to this area was catastrophic, severely hindering access to the site during September and October of 1999. Monitoring was reestablished in late November 1999 following repairs to the site. Only two disruptions were encountered during the second phase of sampling, however a 2-week period was lost due to a computer malfunction at the site. Data recovery during this period was approximately 80%. It is not believed that any event leading to loss of data at this site adversely affected those data that were successfully obtained.

Riegelwood Ballpark

Two phases of mercury measurements were carried out at Riegelwood Ballpark. Between May and October of 1999, measurements of TGM were made every 5 minutes using the Tekran 2537A mercury vapor analyzer (Figure 1-13). A second phase of monitoring carried out during 2000 involved measurement and speciation of atmospheric mercury using the Tekran 1130 mercury speciation unit. These analyses, which produced separate measurements of RGM and Hg(0), are discussed in greater detail below in the sections on mercury speciation measurements; however, for comparison purposes we present here the 5-minute data on Hg(0) collected during August through November of 2000. Hg(0) represents greater than 95% of TGM in ambient air in virtually all circumstances, which validates comparisons between TGM data from 1999 using the Tekran 2537A and Hg(0) data from 2000 generated with the Tekran 1130 speciation unit. The comparability of speciated and non-speciated data is discussed further, below.

Table 1-4: *Quarterly statistics for TGM measured at Riegelwood Ballpark site. Values represent 5-minute average concentrations (ng/m³).*

Riegelwood Ballpark (TGM)	1999			2000
	2nd Q	**3rd Q**	**4th Q**	**3rd/4th Q** [5]
10th percentile	2.18	1.86	1.78	1.28
25th percentile	2.56	2.10	1.96	1.40
50th percentile (median)	3.05	2.38	2.16	1.54
75th percentile	4.01	2.74	2.62	1.72
90th percentile	6.47	3.59	6.65	2.32
95th percentile	10.42	6.51	10.61	4.26
99th percentile	31.03	19.73	19.95	12.30
Maximum	240.94	101.35	33.83	52.46
Arithmetic mean	4.66	3.09	3.34	1.99
Standard deviation	2.13	2.18	3.50	2.10
Count (n)	9881	18200	3507	17797

The average TGM concentration throughout the first monitoring phase was 3.61 ng/m³. The most significant fluctuations were encountered during May and June of 1999, with large mercury peaks encountered during several periods lasting up to a week. During subsequent months mercury peak events were generally diminished in magnitude. Elevated mercury measurements encountered during 1999 were related to winds originating from the northeast (Figure 1-14). Data in Table 1-4 are presented as stratified by calendar quarter. However, caution must be used in interpreting these data given that 4th quarter data only represent a 2-week period in October.

[5] Data from August – November of 2000. These statistics are derived from 5-minute Hg(0) data.

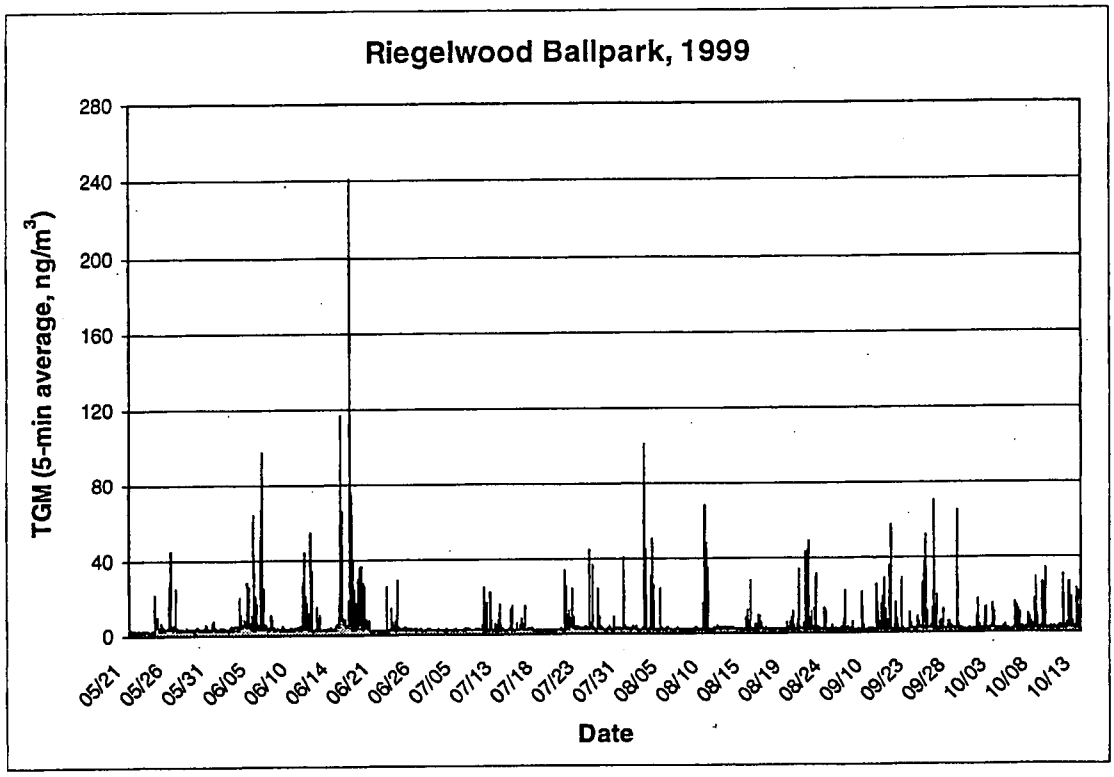


Figure 1-13: *Total gaseous mercury measured at Riegelwood Ballpark, May – October 1999. All values represent 5-minute averages in ng/m³.*

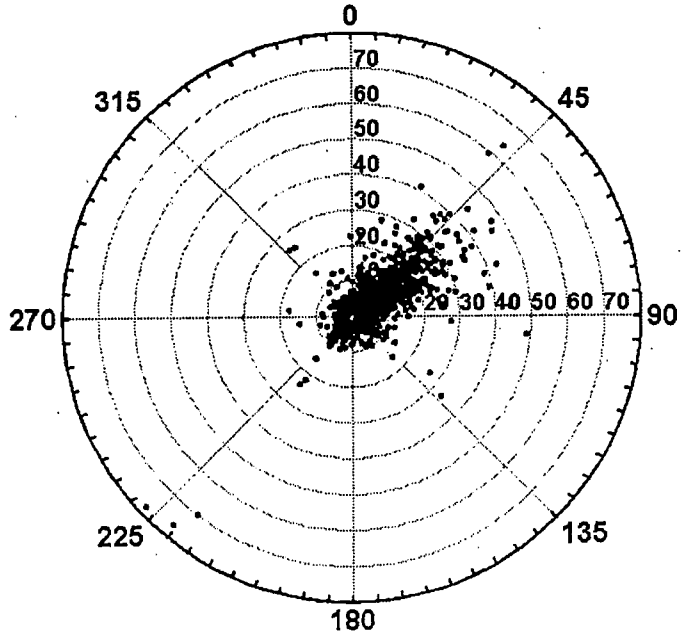


Figure 1-14: *Riegelwood Ballpark, TGM vs. wind direction, 1999. Radial axis is wind direction in degrees. X and Y axes represent TGM (ng/m³). 5-minute averages. Only includes winds > 3 mph.*

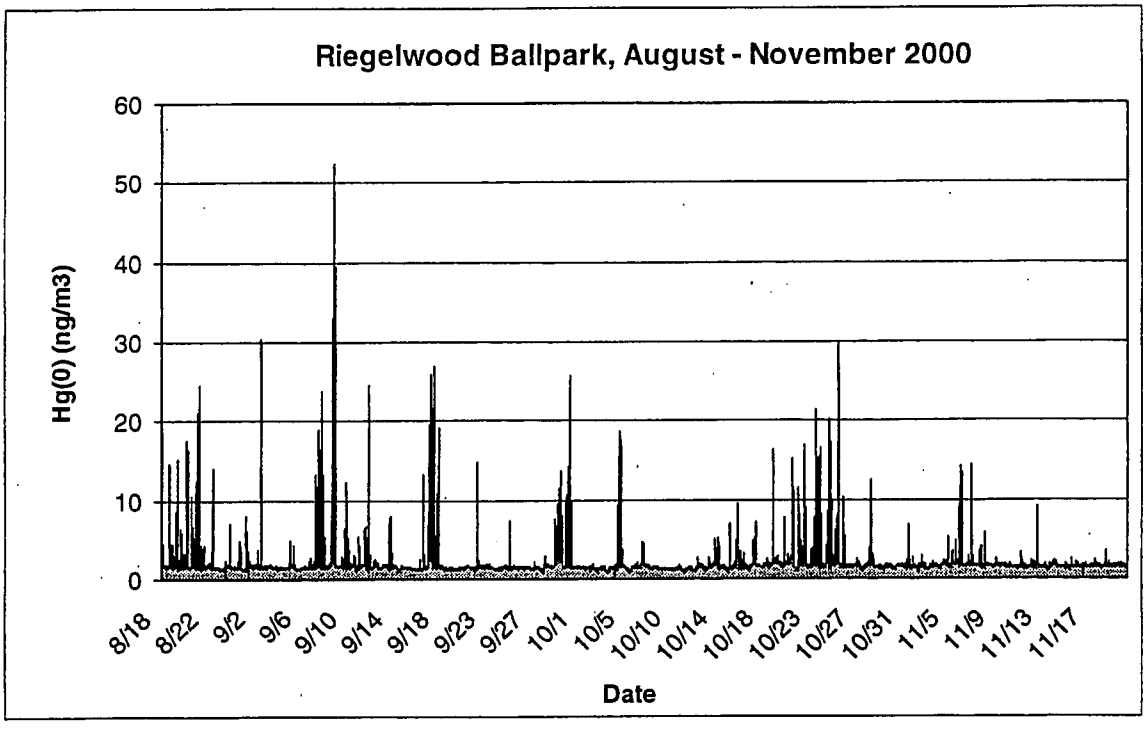


Figure 1-15: *Elemental mercury measured at Riegelwood Ballpark, August – November, 2000. All values represent 5-minute averages in ng/m³.*

showed that the direction was being misreported. The difference was +38.3 degrees at 0 degrees and +26.95 degrees at 90 degrees, indicating that values

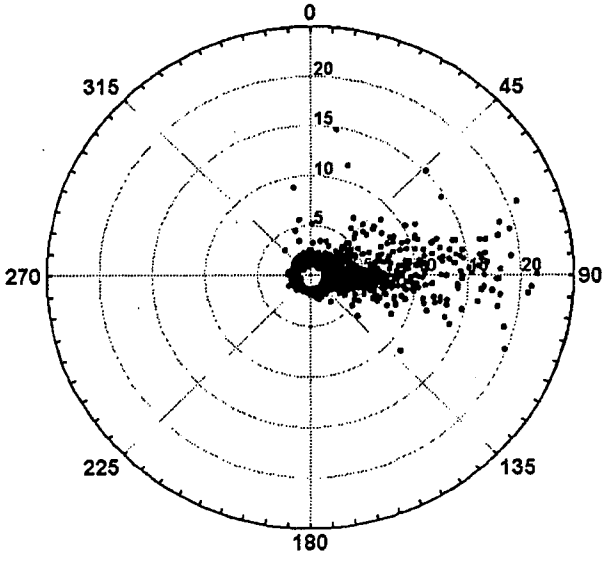


Figure 1-16: *Riegelwood Ballpark, Hg(0) vs wind direction, Aug – Nov 2000. Radial axis is wind direction in degrees. X and Y axis represent Hg(0) in ng/m³. 5-minute averages. Only includes winds > 3 mph. See text note concerning accuracy of wind direction data.*

reported as 90 degrees were in all probability over-reported by between approximately 25 to 40 degrees. Correcting for this inaccuracy would provide a range of directional data very similar to that seen for TGM in Figure 1-14, with elevated TGM primarily associated with winds arriving from the northeast.

Over 30,000 measurements of mercury were taken during 1999 at this site, representing over 2,500 hours of coverage. Gaps in coverage were primarily due to early problems with water contamination of sample lines and resulting effects on sample volumes. Substantial loss of data also occurred during the aftermath of hurricanes Dennis and Floyd during August and September of 1999. Overall, 77% coverage was achieved between May and October of 1999 at this site. Sample recovery during speciation measurements was intermittent. This subject is discussed in more detail in the RGM results and discussion section.

TOTAL GASEOUS MERCURY: DISCUSSION

General Characteristics of Atmospheric Mercury

Mercury is a naturally occurring trace contaminant of ambient air. In rural and remote areas TGM levels typically range between 1.5 and 2.0 ng/m^3 (EPA 1997a). Atmospheric levels may vary substantially depending on the proximity to local anthropogenic emission sources (Lindberg; Keeler - as summarized in EPA 1997a). The USEPA recently chose 1.6 ng/m^3 to represent modern day terrestrial "background" conditions in a multi-media fate and transport model for mercury (EPA 1997a). TGM is almost entirely comprised of vapor phase Hg(0), although much smaller quantities of particulate mercury and RGM are also present in ambient air at pg/m^3 levels. Chemical and photochemical reactions may facilitate conversion between the various forms of mercury, thus affecting atmospheric residence time. Gaseous or aqueous phase oxidation of Hg(0) could lead to production of water-soluble RGM species that may contribute to localized deposition. Alternatively, atmospheric reduction of RGM species could lead to the formation of Hg(0) vapor, and reduced regional wet and dry deposition rates.

Variability in atmospheric TGM may be related to both point source releases and natural causes. Mercury's natural geochemical cycle involves migration between earth, water and air. Mercury that settles to the earth's surface through atmospheric deposition will likely undergo re-evasion to the atmosphere. Natural processes that involve addition of mercury to the air include continuous evasion from mercury-enriched surficial soils and freshwater and marine environments (Schroeder and Munthe). Periodic events such as geothermal venting, forest fires and volcanic eruptions can also result in concerted releases of mercury to the air. In general, natural releases of mercury occur over prolonged periods of time and are comprised predominantly of Hg(0) (Gustin).

Some have also suggested that TGM may be susceptible to a natural diel cycle under certain meteorological conditions (Schroeder and Munthe). Temperature and solar radiation may enhance volatilization from snowpack, surface waters, soils and wetlands, leading to enhanced flux rates during daylight hours (LaLonde, Poissant, Lindberg and Zhang, Lindberg and Meyers). Although this may affect flux rates and measured mercury vapor concentrations at the water:air and soil:air interfaces, it is unclear whether similarly detectable deviations in atmospheric mercury would be expected at heights of a meter or greater above surface level where the air is more well-mixed. Long-term monitoring data collected to date does not support the argument that a natural diurnal pattern exists for TGM. Instead, it has been suggested that point source influences are the predominant cause of both short- and long-term measurable fluctuations in TGM at lower latitude terrestrial sites (Lindberg, Iverfeldt). Some data seem to suggest that seasonal variability in TGM levels is present, with highest levels in March and lowest levels between October and December at northern hemisphere monitoring sites (Iverfeldt). During 2000, a relatively undisturbed period at Lake Waccamaw, we observed our highest background TGM readings during the December through March timeframe and the lowest baseline readings between July and October. Whether this variability relates to natural phenomena or seasonal changes in anthropogenic emissions of mercury has not yet been determined.

Recently, dramatic changes in atmospheric mercury were noted in the Arctic region (Schroeder 1998). Atmospheric mercury was depleted from 1.5 ng/m^3 to 0.2 ng/m^3 just before the polar sunrise and during Arctic snowmelts. It was suggested that the decrease in TGM is due to chemical conversion of Hg(0) to RGM that then undergoes deposition to the earth's surface. The ready availability of reactive halide species could be contributing to this chemical reaction. To date no similar pattern has been described at lower latitudes although some have speculated that similar phenomena may occur to a lesser extent in lower latitude coastal regions (Mason, personal communication).

Historical Data on Atmospheric Mercury in North Carolina

Very few data are available describing typical atmospheric mercury levels in North Carolina. Stopford anecdotally reported levels between 1.7 and 8.9 ng/m^3 in Durham, NC in 1978, with a short-term peak of approximately 400 ng/m^3 during a plume fumigation event arising from a nearby coal-fired power plant (Stopford). Between 1998 and 2001, periodic measurements of TGM taken at a site in Research Triangle Park, NC indicated that levels rarely exceeded 2 ng/m^3, with values typically in a range between 1.4 - 1.7 ng/m^3 (Stevens). TGM was measured over a 3-month period between June and August of 1996 at Phelps Lake, a remote site in northeastern North Carolina; 15-minute readings were consistently between 1 and 2 ng/m^3 and never exceeded 6 ng/m^3.

Total Gaseous Mercury at Lake Waccamaw

At Lake Waccamaw, the vast majority of readings for TGM fell below 2 ng/m^3. Transient spikes in TGM helped raise the annual average concentration to 2.34 ng/m^3 during 1998, somewhat higher than expected for such a remote location but generally lower than levels documented in urban areas or sites immediately adjacent to point sources of mercury emissions. Spikes in TGM occurred on a regular basis and peak values frequently exceeded an order of magnitude above background. This trend remained in place throughout 1998. Beginning in spring of 1999, mercury readings stabilized below 2 ng/m^3. This pattern persisted throughout 1999 and 2000. Annual average mercury levels were approximately 28% and 31% lower than 1998 values, respectively.

Total Gaseous Mercury at Riegelwood, NC

Qualitatively, results from Riegelwood, NC appear very similar to early data from Lake Waccamaw. The majority of readings were below 2 ng/m^3 but transient spikes would occasionally reach levels exceeding 300 ng/m^3. This pattern was seen at both sites, throughout 1999 and 2000.

Long-term average TGM levels at Riegelwood Flynn declined between 1999 and 2000. The highest individual readings were encountered during the first several weeks of monitoring; however, peaks did continue to appear during subsequent months, suggesting the possibility of continued local source impacts. While mercury levels declined throughout 1999, they appeared to remain relatively stable during the latter half of 2000. A comparison between 4^{th} quarter data from 1999 and 2000 shows that mercury levels remained relatively consistent in terms of both average levels (2.23 ng/m^3 vs. 2.16 ng/m^3) and the magnitude and frequency of mercury spikes. This may suggest a "leveling-off" of atmospheric mercury levels in this area.

The profile for TGM at the Ballpark site was very similar to that encountered at Riegelwood Flynn. Baseline conditions were punctuated with periodic elevations as high as 240 ng/m^3 TGM. Monitoring was not initiated until mid-May 1999; thus measurements were not made during normal mercury cell chlor-alkali operating conditions. Although the quarterly statistics presented in Table 1-4 seem to suggest that average values declined between the 2^{nd} quarter and subsequent quarters, conditions actually appear to have remained relatively stable. Data from the entire sampling period (May - October) illustrates consistent, but highly variable, atmospheric mercury levels at this site.

It should be noted that values encountered at the lower end of the range (10^{th} - 50^{th} percentiles) were consistently higher at this site relative to similar

data from the Flynn and Waccamaw sites. This could reflect higher baseline levels of TGM due to site contamination or it could reflect an effect of instrument configuration. The Ballpark site provides a relatively unobstructed view of the nearby industrial complex and might be more susceptible to downwind migration of mercury from on-site waste ponds. However, this factor seems an unlikely explanation given the variability in wind direction. Alternatively, enhanced historical deposition of mercury to local soils could lead to greater rates of Hg(0) volatilization. If true, intraday variability might be expected with higher readings associated with elevated temperatures and solar radiation. Another possible explanation is performance of the mercury vapor monitor. Instrument configuration and operating conditions were identical to those at the other two sites, and the inlet to the sample line was positioned at a similar height. The instrument at Ballpark was housed in a mobile trailer rather than a freestanding shelter, but conditions inside the structures were similarly maintained. None of these factors is a satisfactory explanation for the higher baseline readings of TGM observed at this site. This observation could warrant further study.

During 2000, the Ballpark instrument was modified to include a denuder assembly for speciation of gaseous mercury. Estimates for TGM can be generated by combining 2-hour average values for Hg(0) and RGM or by using Hg(0) alone as a surrogate measurement. The former calculation would theoretically be a more accurate representation of atmospheric TGM but would present data on a completely different time frame than those collected during 1999 and would "smooth over" short-term elevations in atmospheric mercury. Comparing 5-minute Hg(0) measurements to historical TGM data avoids this conflict but introduces additional complicating factors. First, dedicated measurement of TGM is a nearly continuous process with a single interruption for instrument calibration only taking place over 40 minutes once every 25 hours. By contrast, measurement of Hg(0) during mercury speciation is interrupted every 2 hours for a 40-minute denuder desorption and analysis cycle. While data were closely scrutinized to assure that the desorption/analysis cycle had no effect on flanking measurements of Hg(0) it could be argued that the loss of such a substantial fraction of daily coverage might limit the effectiveness of this type of comparison by excluding such a substantial portion of the sampling time. However given the large volume of measurements and the random nature of the timing on the desorption/analysis cycles it is doubtful that these periodic interruptions would contribute to any meaningful or consistent bias in the measurement of atmospheric mercury. A more challenging question concerns the comparability of Hg(0) and TGM readings, as Hg(0) is only one component of TGM. The Tekran 2537A is described as an instrument that "performs continuous measurement of TGM in ambient air" (Tekran). However, given that the instrument configuration involves several convoluted sample lines and filter assemblies it could be argued that the RGM component is lost through adherence to the instrument parts before it can reach the gold cartridge traps. If this assumption is true then

Tekran 2537A data on "total gaseous mercury" may in fact represent only Hg(0). In fact, the point is nearly made moot by the fact that RGM appears to be a very small component of TGM in ambient air. During the course of this study RGM levels were less than 1% of TGM levels in over 90% of speciated mercury measurements and even in the most extreme situation did not exceed 7% of TGM. As evidenced in Table 1-5, a statistical comparison of Hg(0) and TGM shows that ambient levels are nearly identical. We believe that these data support the conclusion that a meaningful comparison can be made between measurements of TGM from 1999 and measurements of Hg(0) from 2000.

Using this technique, it appears that atmospheric mercury levels declined substantially between 1999 and 2000 at the Ballpark site. The average level for Hg(0) measured between August 24 and October 13 of 2000 was 1.9 ng/m^3, compared to 3.2 ng/m^3 for TGM during the period in 1999 – a 40% reduction. This reflects, in part, a reduction in the intensity of short-term elevations in atmospheric mercury, but mercury levels also appear to have fallen throughout the entire distribution of values. During 1999 even the values in the low end of the range were predominantly above 2.0 ppm while low-end readings in 2000 were generally below 1.5 ng/m^3. It is not immediately clear why baseline conditions at this site would have improved during this period.

Table 1-5: *Comparative statistics for TGM and Hg(0) at the Riegelwood Ballpark site, Aug 24 – Oct 13, 1999 vs. 2000. All values are 5-minute readings in ng/m^3.*

	1999 TGM	2000 Hg(0)
10th percentile	1.66	1.24
25th percentile	1.91	1.36
50th percentile (median)	2.14	1.48
75th percentile	2.48	1.65
90th percentile	5.46	2.15
95th percentile	9.77	4.01
99th percentile	22.58	12.93
max	70.78	52.46
mean	3.24	1.94
n	8539	9113

In general, all monitoring sites provide a similar picture for atmospheric TGM in this region of southeastern North Carolina. TGM levels appear to be declining at both Riegelwood and Lake Waccamaw. At Lake Waccamaw the dramatic improvement in atmospheric conditions beginning in early 1999 and lasting throughout the duration of this study are consistent with rural or remote readings for TGM. Improvements were also noted at both Riegelwood sites, although periodic fluctuations in TGM continue to be detected in this area, and may warrant further study.

Concurrent measurements from all three sites illustrate geographic variability in TGM. Overlapping measurements are available between May and September of 1999 and August and November of 2000 (Table 1-6). These data illustrate a reduction in long-term mercury levels at both Riegelwood sites but also illustrate that TGM levels remain higher at these sites relative to corresponding data from Lake Waccamaw.

Table 1-6: *Concurrent total gaseous mercury levels measured at all three study monitoring sites during 1999 and 2000 (mean, ng/m^3)*

Period	Lake Waccamaw	Riegelwood Flynn[6]	Riegelwood Ballpark
May 21 - Sept 14, 1999	1.52 ng/m^3	2.21 ng/m^3	3.67 ng/m^3
Aug 18 - Nov 20, 2000	1.52 ng/m^3	1.94 ng/m^3	1.99 ng/m^3

Total Gaseous Mercury and Wind Direction

Establishment of a relationship between TGM levels and wind direction may help to identify potential fixed sources of TGM emissions. This relationship was examined in the present study using data from on-site meteorological equipment. Regional wind characteristics are illustrated in Figure 1-17 using a 5-year wind rose diagram with data collected at Wilmington, NC. Winds in this area are predominantly southwesterly during the summer months and north to northeasterly during the winter months.

Data from 1998 suggested a positive relationship between elevated mercury levels at Lake Waccamaw and winds arriving from the east-northeast. During 1999, elevated mercury at Riegelwood Flynn was associated with winds arriving from the northwest while winds from the north and northeast were most strongly associated with elevated mercury at Riegelwood Ballpark.

[6] Data from 2000 only goes through November 14.

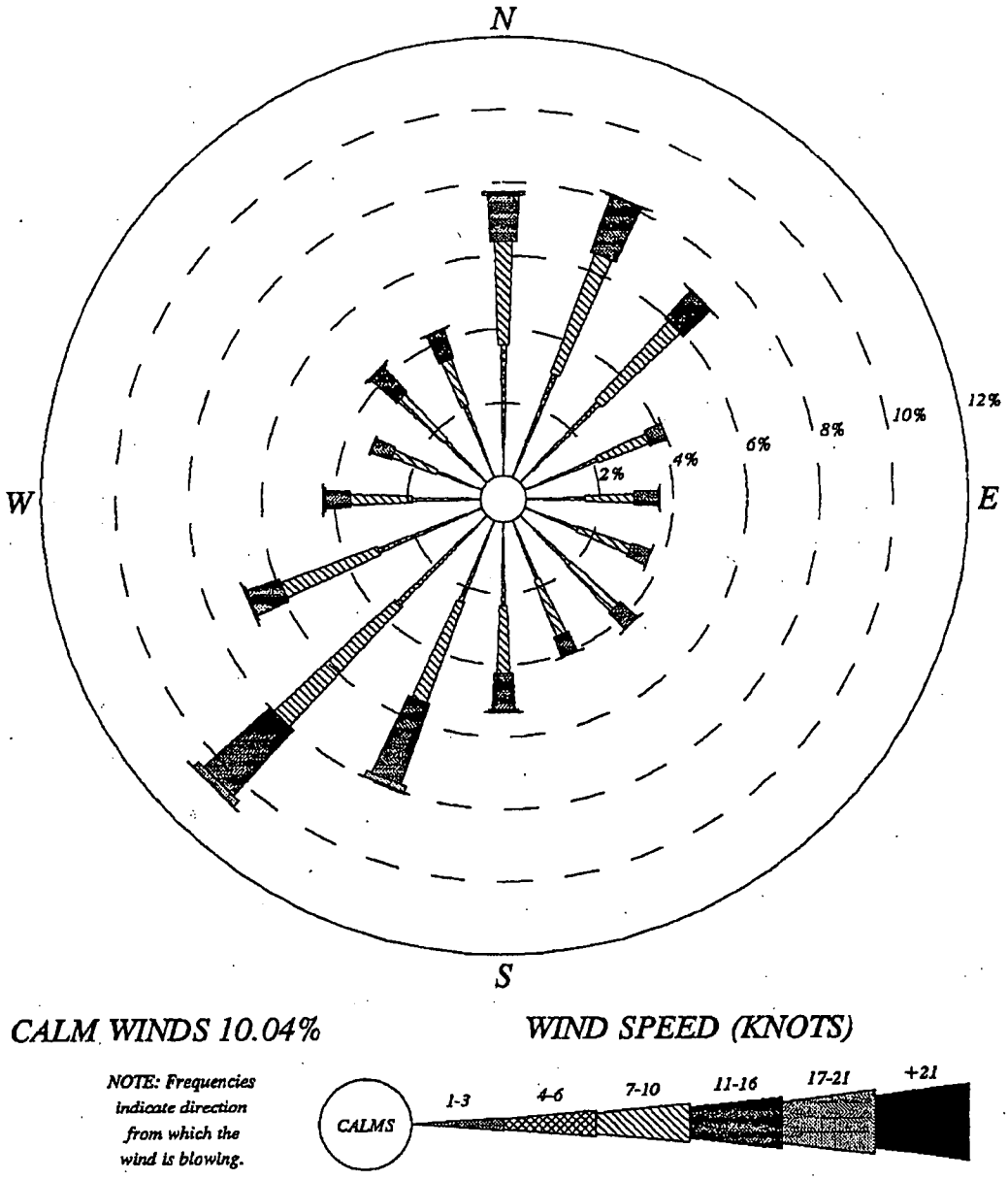


Figure 1-17: *Regional wind pattern for Wilmington, NC, 1986 – 1990.*

The combined data from all three sites provide an opportunity for "triangulation" of wind and mercury data. Early data from Lake Waccamaw was insufficient for distinguishing the most likely responsible source because several sources of mercury emissions lay to the east of this site. However, subsequent data from the Flynn site suggested that sources to the east of Riegelwood (i.e. in the vicinity of Wilmington, NC) played little role in affecting ground-level TGM in the Riegelwood area during the study period.

In our analyses, we removed data associated with wind speeds below 3 miles per hour. Wind direction data collected during periods of light and variable winds tends to be scattered and rarely provided meaningful information on relationships between mercury levels and wind direction. In addition, the calculation of an "average" 5-minute value for wind direction

under these conditions might be misleading since it would represent the product of highly variable, shifting winds. Elevated mercury readings were more frequently associated with calm winds at the Riegelwood sites as compared to Lake Waccamaw data from 1998. This phenomenon could be related to slow outward ground-level migration of a pollution plume from a nearby source as might be encountered during calm conditions. The magnitude and frequency of this type of phenomenon should be greater if ground-level monitoring stations are positioned immediately adjacent to pollution sources, thus minimizing dispersion of the pollution plume. Data from the Riegelwood sites, as such, might be suggestive of a nearby mercury emissions source.

Total Gaseous Mercury and Other Meteorological Variables

Determining a relationship between TGM levels and other meteorological parameters including temperature and humidity was complicated by the apparent influence on TGM levels by local sources; however, data from Lake Waccamaw during 2000 appear to exhibit minimal source influence and were thus analyzed closely. No clear relationship between TGM levels and temperature or humidity was identified, though possible seasonal differences were unearthed. The average TGM level during December through March was 1.8 ng/m^3, while during the warmer months levels typically averaged 1.5 ng/m^3. A diel pattern was seen during the course of the day with a bottoming out of mercury levels in pre-dawn hours followed by a rapid rise to maximal daily concentrations by late morning and a gradual descent in levels throughout the day (Fig 1-18). We are not aware of this relationship having been previously identified but believe it may warrant further examination. Possible explanations for this pattern could include photochemical reactions resulting in reduction of surficial Hg(2+) to Hg(0) and subsequent volatilization to the atmosphere. Several groups have identified enhanced flux rates from surface waters and contaminated soils following sunrise; however, the likelihood that this effect would be detectable at a 3 to 4 meter elevation seems small since atmospheric mixing is normally very efficient. Atmospheric turbulence, as represented by average wind speed, follows a similar diurnal pattern. The mid-morning rise in TGM occurs at approximately the same time of day that the wind speeds pick up and decreases to its lowest levels around nightfall. This turbulence could help to facilitate movement of deposited mercury or mixing with air masses that contain higher concentrations of gaseous mercury. It may be worth noting that virtually all mercury readings in the lowest 10th percentile of values were confined to periods when the average wind speed was less than 5 mph. Figure 14 also illustrates the apparent seasonal effect on TGM levels, as the entire spectrum of 1st quarter (Jan – Mar) readings are obviously elevated above 3rd quarter (July - September) values. It has been speculated that this pattern might be related to wintertime atmospheric phenomena such as lower mixing heights, seasonal changes in energy demand or variable rates of atmospheric oxidation of Hg(0) which might relate to ambient temperature or sunlight intensity (Sheu and Mason).

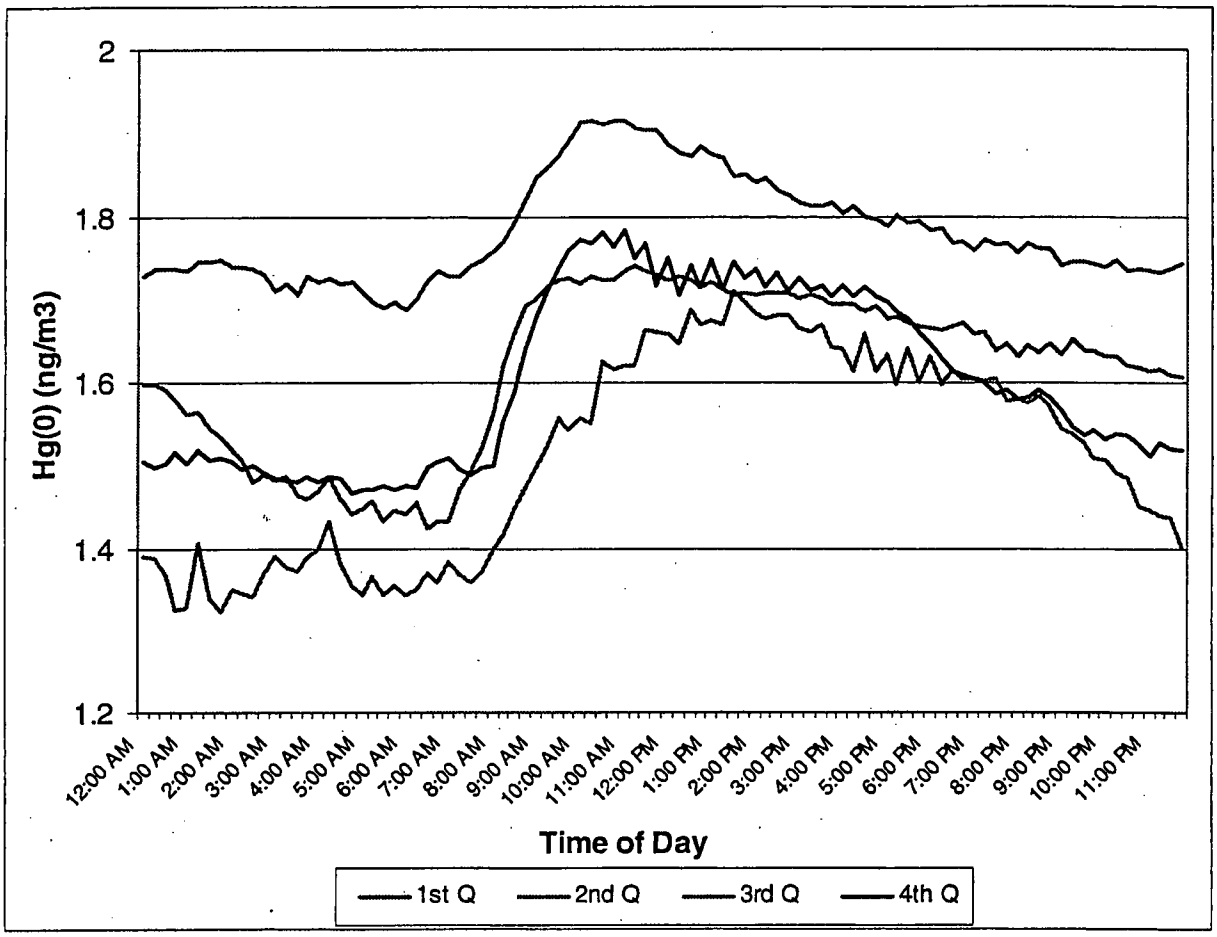


***Figure 1-18**: Stratification of TGM measurements by time of day, Lake Waccamaw State Park, 1st through 4th quarters, 2000.*

If the diel pattern for TGM at Lake Waccamaw is a true atmospheric phenomenon and not an artifact of instrument design or operator error, then an obvious question arises concerning the fate of the depleted TGM during the late evening and early morning hours. Oxidation of Hg(0) to Hg(2+) might serve to explain a daily depletion event but atmospheric mercury speciation studies conducted to date have not shown a diel pattern for Hg(2+) that is consistent with this phenomenon. Another explanation could include adsorption of Hg(0) onto particulate matter and subsequent dry deposition, with revolatilization to the lower atmosphere during the subsequent day's warming period.

Sources of Measurement Bias

Data loss was significant during several study periods but spread out randomly during 1999 and 2000. The most frequent reason for data loss, a lack or failure of instrument calibration, was randomly encountered and should not impart any consistent bias on the data. On several other occasions, data from all sites were lost due to weather phenomena such as hurricanes. These events tended to be seasonal and occurred most frequently during late summer and early fall. Data from Lake Waccamaw are missing for significant periods during 1998 including an extended period between March 4 and June 22. These patterns of missing data could bias comparisons of annualized mercury data if significant seasonal variability exists in the data; however, the data do not support the existence of this type of relationship. We noted no seasonal trends in the available data from the Riegelwood sites and visually, the fluctuations in atmospheric mercury encountered during 1998 at Lake Waccamaw appear evenly spread out across the year. Quarterly statistics are consistent between the 1st, 3rd and 4th quarters of 1998. However, because of the previously noted relationship between mercury and wind direction, bias could be introduced through the exclusion of extended periods from one portion of the year. Winds during the fall and spring tend to be variable and unpredictable, shifting between southwesterly and northerly or northwesterly (C Buckler, DAQ meteorologist, personal communication). Because of the significant variability in wind direction and the relative lack of comparable data, it is nearly impossible to assess the nature or magnitude of the bias introduced by missing data.

Another elusive potential source of bias is the relationship between catastrophic weather events and the likely disruption of industrial activities during this time. If industrial activity was interrupted during these periods, and those activities were associated with spikes in atmospheric mercury, then monitoring data from these periods may be influenced by the lack of source impacts.

SPECIATION OF ATMOSPHERIC MERCURY: RESULTS AND DISCUSSION

Our attempt at long-term speciation of atmospheric mercury was a challenging experience. At the time we initiated this study, there were no published studies documenting experiences with newly developed denuder methods for speciation of atmospheric mercury. Unexpected challenges in the field led to the loss of a large amount of data collected during the first few months of sampling. These initial failures led to the removal of the speciation instruments from the Riegelwood Ballpark site for laboratory method development. Subsequently, modifications to the analytical system were made and a successful second phase of sampling was carried out in fall of 2000.

During the second monitoring phase we were able to distinguish trends in RGM that at times mimicked changes in Hg(0) and at other times seem to behave independently. Much more data will be needed under a variety of conditions to better understand the meaning of the data we present here. It remains uncertain whether ambient fluctuations of RGM represent pollution plume impacts or normal environmental processes. However, these data do improve the understanding of the characteristics of atmospheric mercury adjacent to this contaminated industrial site and improve our understanding of the potential impacts of atmospheric mercury on regional environmental conditions.

All mercury speciation measurements were carried out at the Riegelwood Ballpark site. Two phases of monitoring took place during 2000: the first between March and June and the second beginning in mid-August and ending in mid-November. A two-month period of method development and testing was carried out between monitoring periods.

Phase 1 (March - June) Results

During the first monitoring phase, over 600 two-hour measurements of RGM and over 13,000 five-minute measurements of Hg(0) were made. Visually, the 5-minute data for Hg(0) appear very similar to the data on TGM collected during 1999, with baseline conditions punctuated by periodic spikes exceeding an order of magnitude above background. A considerable degree of variability was also seen in the RGM data. Two-hour measurements ranged from 0 to 96 pg/m^3. Concurrent two-hour measurements of Hg(0) and RGM are presented in Figure 15. Values for Hg(0) were calculated by averaging all 5-minute readings within each 2-hour sampling period.

On many occasions, 5-minute readings for Hg(0) as low as 0 ng/m^3 were seen. This type of pattern was not seen during previous measurements of TGM at any of our sites and is not considered possible given the steady-state background concentration of Hg(0) ($\sim$ 1.6 ng/m^3) that has been consistently documented at terrestrial ambient monitoring locations. It was determined that these depressed reading were most likely caused by contaminants that reduced the instruments collection efficiency. As a result, all data collected during this period have been flagged as questionable. This problem was addressed and solved during the two-month period between sampling phases, allowing for the collection of reliable data during Phase 2.

Phase 2 (Aug - Nov) Results

Between August and November of 2000, over 600 two-hour measurements of RGM and over 13,000 five-minute readings for Hg(0) were collected. Concurrent 2-hour values for Hg(0) and RGM are presented in Figure 1-19, and in Table 1-7. Short-term increases in Hg(0) were relatively common and reached levels as high as 52 ng/m^3 (refer to Table 1-4). The average value for Hg(0) over the entire sampling period was 2.0 ng/m^3. Significant variability in RGM was also seen. Levels were typically very low, with a majority of readings below 1 pg/m^3, but periodic excursions were evident. The average value[7] for RGM over the entire sampling period was 7.81 pg/m^3; the median value was 0.87 pg/m^3.

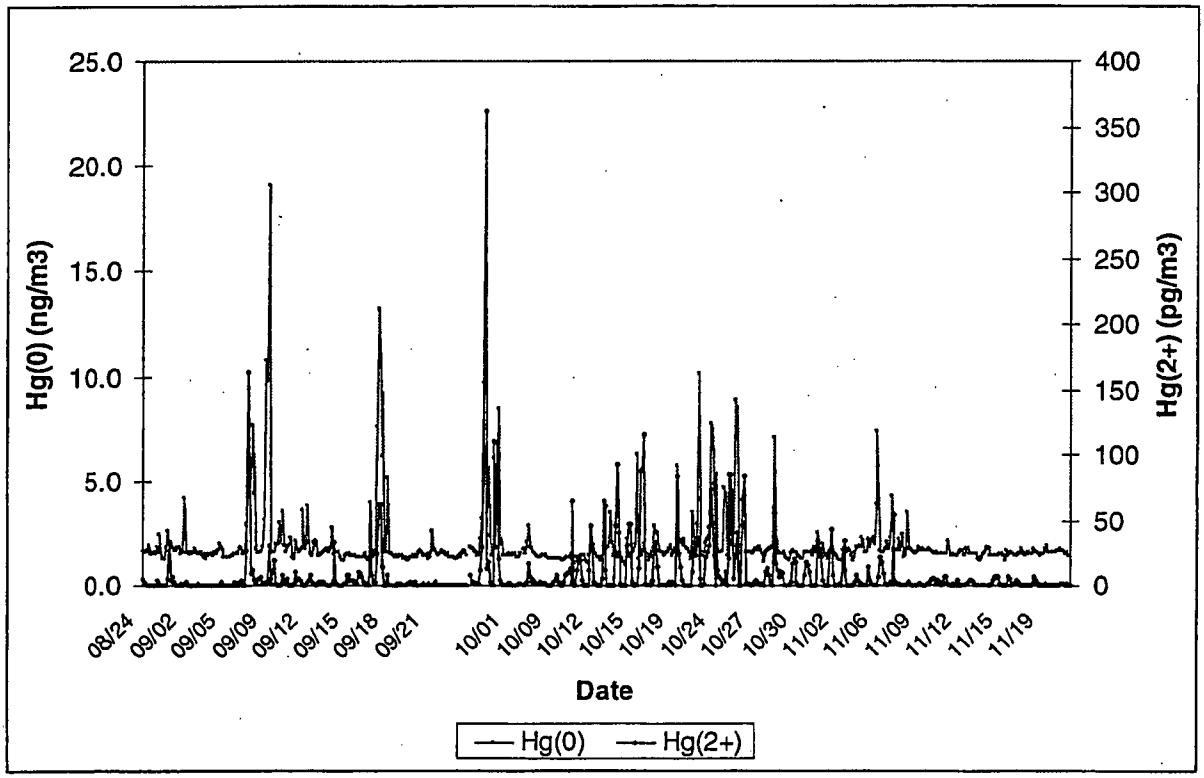


Figure 1-19: *Mercury speciation data, Riegelwood Ballpark, August 24 – November 21, 2000. All points represent 2-hour values for elemental or reactive gaseous mercury.*

Note the difference in scale between the Hg (0) and the Hg(2+).

[7] The average value for RGM during this period was calculated using actual values as reported by the instruments, except that values below 0 ng/m^3 were converted to 0 ng/m^3. An alternate mean value, substituting all values below the LQL (0.4 pg/m^3) as ½ the LQL (0.2 pg/m^3), is 7.86 pg/m^3.

Table 1-7: *Statistics for 2-hour measurements of Hg(0), RGM and TGM from the Riegelwood Ballpark site, Aug 24 – Nov 21, 2000.*

	RGM (pg/m^3)	Hg(0) (ng/m^3)	TGM (ng/m^3)	RGM/Hg(0) (%)
10th percentile	0.00	1.32	1.32	0.00
25th percentile	0.00	1.43	1.44	0.00
50th percentile (median)	0.87	1.57	1.57	0.05
75th percentile	4.20	1.76	1.78	0.23
90th percentile	20.41	2.78	2.80	0.89
95th percentile	39.30	4.90	5.02	1.51
99th percentile	91.76	9.15	9.16	3.90
max	362.40	19.10	19.13	6.70
mean	7.81	1.99	2.00	0.32
standard deviation	23.22	1.56	1.57	0.0078
n	611	611	611	611

The values in the TGM column in Table 1-7 were derived by adding concurrent two-hour readings for Hg(0) and RGM. Data on TGM exhibits a pattern similar to that seen during prior sampling events at this site; however, both average and peak values were diminished relative to earlier results. In over 90% of measurements, RGM was present at less than one-one hundredth the level of TGM, and in fact, RGM never comprised more than 7% of TGM over any 2-hour period. Thus, spikes in TGM were primarily a result of increased levels of Hg(0) rather than RGM.

The behavior of RGM could not always be predicted by changes in Hg(0). In many cases a concordance between short-term increases in Hg(0) and RGM was seen, but at other times Hg(0) and RGM behaved independently.

Several possible relationships between atmospheric mercury levels and variables such as meteorology were identified and explored in further detail:

Mercury and Time of Day

Figure 1-20 presents RGM data by time of collection. Most elevated readings for RGM arose during daylight hours, although some events were scattered throughout nighttime and early morning hours. No obvious pattern was identified for spikes of Hg(0) (Fig 1-21), but examination of 5-minute data sorted by time of day of collection revealed a diel pattern similar to that seen in Figure 14 when non-background values (>2.15 ng/m^3) were removed (data not shown).

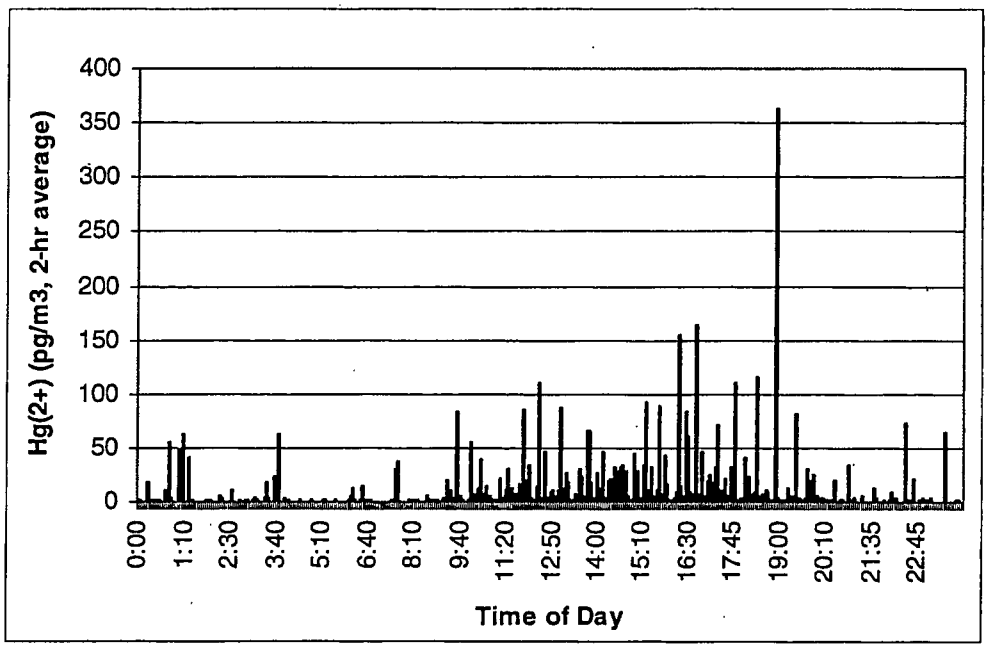


Figure 1-20: *RGM, sorted by time of sample collection. All readings represent RGM levels sampled during the preceding 2½ hours. Aug 24 – Nov 21, 2000.*

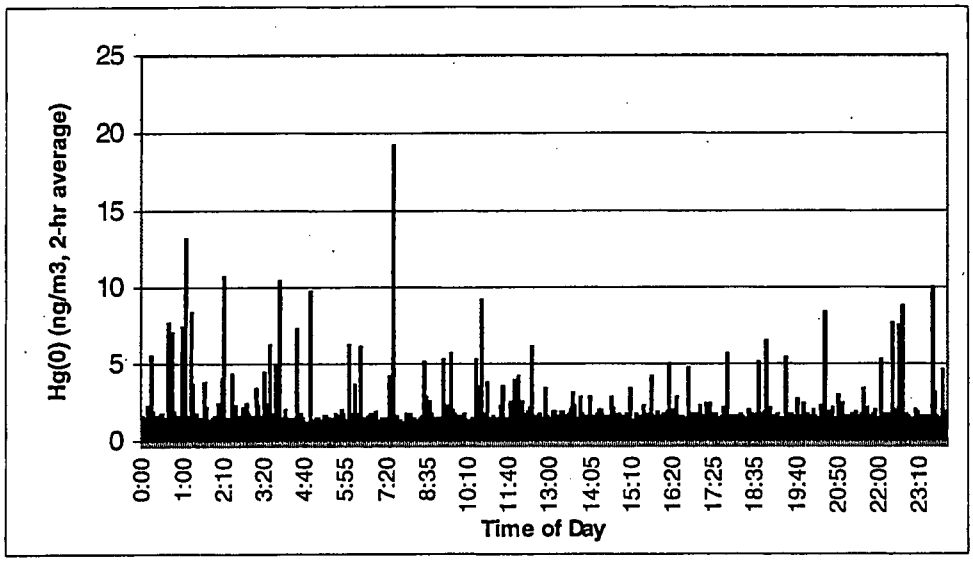


Figure 1-21: *Hg(0), sorted by time of sample collection. All readings represent an average of 24 5-minute Hg(0) measurements taken during the preceding 2 hours. Aug 24 – Nov 21, 2000.*

Mercury and Humidity

Figure 1-22 presents data on humidity levels during quantifiable measurements of RGM. Elevated RGM readings were detected under a wide range of conditions; however, the lowest readings for RGM appear to be confined to highly humid conditions. Most instrument non-detects (< 0.4 pg/m^3) were encountered under highly humid conditions. The average humidity level during instrument non-detects was 92.5% (s.d. = 6.56) vs. 64.2% (s.d. = 20.6) during quantifiable readings. The relationship between Hg(0) and relative humidity is illustrated in Figure 1-23. Most elevated Hg(0) readings occurred under moderate to high humidity conditions. Closer inspection of the data suggests that depressed readings at or below 1 ng/m^3 were almost exclusively affiliated with conditions of extreme humidity.

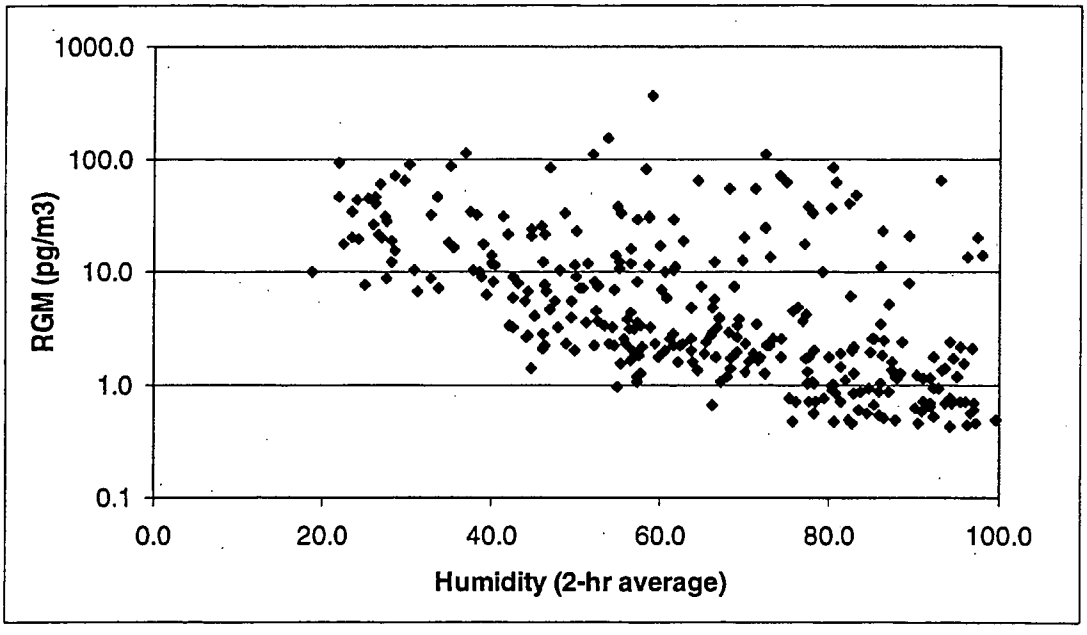


Figure 1-22: *Scatterplot of RGM vs. relative humidity, Aug 24 – Nov 21, 2000. Note semi-log scale.*

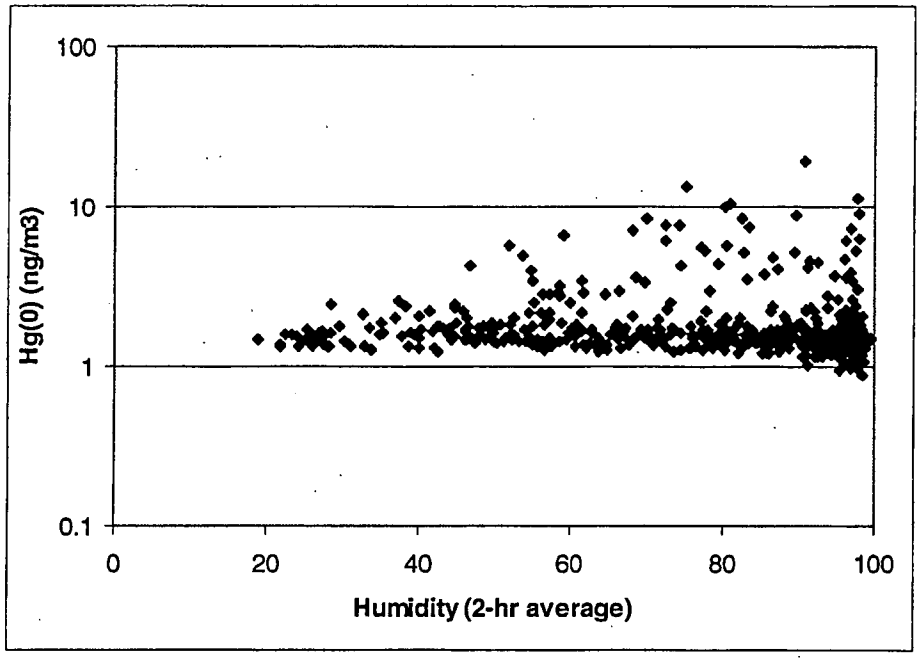


Figure 1-23: *Scatterplot of Hg(0) vs. relative humidity, Aug 24 – Nov 21, 2000. Note semi-log scale.*

Mercury and Temperature

Daily average temperature decreased during this study period with the transition from late summer to fall and early winter. No related trend in the frequency or intensity of mercury spikes was seen during this period. Neither RGM nor Hg(0) appeared to exhibit a consistent relationship with temperature (Figures 1-24 and 1-25).

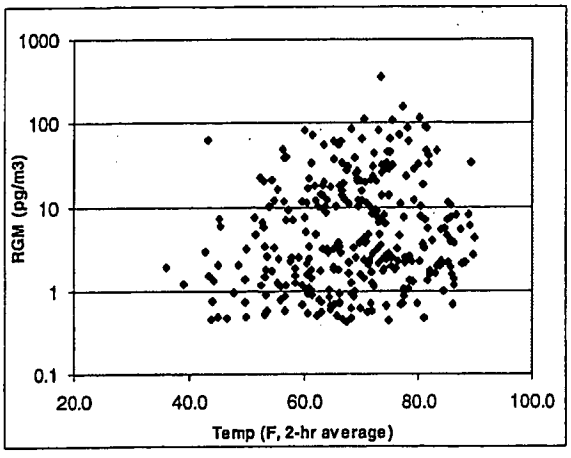


Figure 1-24: *RGM vs. temperature, Sept 1 – Nov 9,*

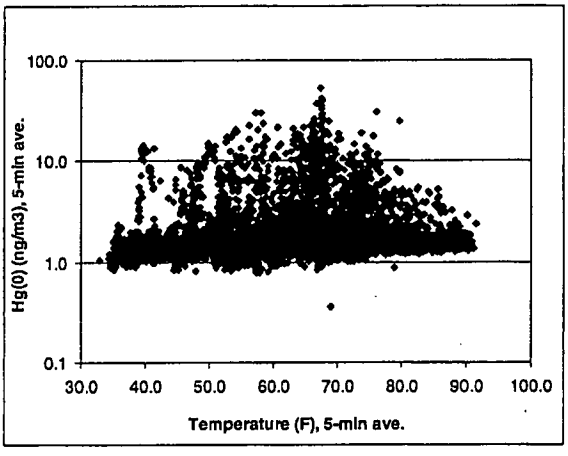


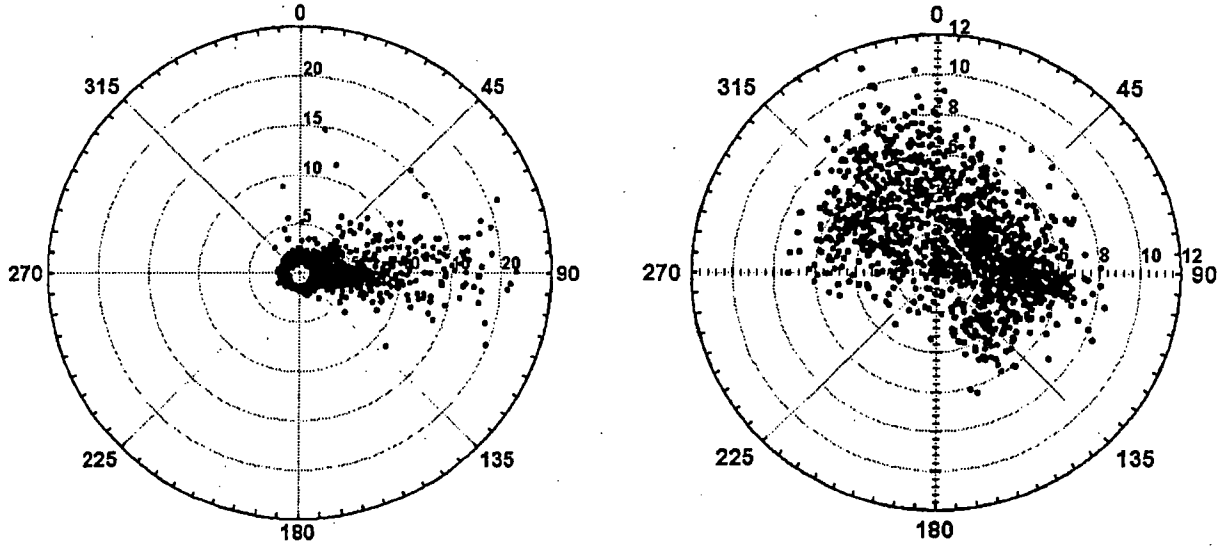
Figure 1-25: *Hg(0) vs. temperature, Sept 1 – Nov 9,*

Mercury and Wind Conditions

Elevated Hg(0) was predominantly associated with winds arriving from the east-northeast. Figure 1-26 illustrates the consistent relationship between Hg(0) level and wind direction. As we noted previously, a closing site audit indicated wind direction was inaccurately measured at this site during this period. Actual wind direction was probably 25 to 40 degrees lower than the data presented in Figure 1-26, but the exact amount of offset is impossible to assess. The weather station at the Riegelwood site was not equipped to calculate average wind direction every 2 hours making it difficult to establish a clear relationship between RGM and wind direction over that time frame. Individual 5-minute data points on wind direction and wind speed correlating to 2-hour periods of elevated RGM are presented in Figure 1-27. It should be noted that variability in wind direction within each 2-hour sample collection period could confound our attempts to identify any relationship between elevated RGM and wind direction, especially if the majority of RGM was brought to the sampler during a fraction of a sampling period with highly variable winds. In the discussion section below we present wind direction data as a range based on individual 5-minute values generated within each 2-hour RGM sample collection period.

Figure 1-26: *Plot of Hg(0) vs. coincident wind direction. The radial axis represents wind direction in degrees while the X and Y axes represent Hg(0) level in ng/m³.*

Figure 1-27: *Plot of wind speed (mph, X/Y axes) and direction (radial axis) during conditions of elevated RGM. All values are 5-minute averages.*



The following table summarizes the observed relationships between Hg(0) and RGM levels and the above mentioned variables:

Table 1-7: *Summary of observed relationships between reactive gaseous mercury, elemental mercury and several measured variables, August – November, 2000.*

Variable	Reactive Gaseous Mercury	Elemental Mercury
Time of Day	Elevated readings primarily confined to daylight hours	No clear pattern, elevated readings occurred during both daylight and nighttime hours
Humidity	High readings encountered under a wide variety of humidity levels, but lowest readings confined to highly humid conditions	Highest readings under moderate to highly humid conditions, depressed readings at extreme humidity levels
Temperature	No apparent relationship	No apparent relationship
Wind Direction	No clear relationship	Highest readings with winds from N-NW to E

Phase 2 (Aug - Nov) Discussion

Instrument Performance

The soda lime system modification appeared to have been successful at reducing or eliminating artificially low readings for TGM. However, on rare occasion 5-minute Hg(0) values below 1 ng/m^3 were encountered. These values were sporadic and generally confined to a 3-week period between September 28 and October 15, 2000.

Hg(0) levels below 1 ng/m^3 were frequently associated with extremely humid conditions. This could suggest that Hg(0) levels are lower during extremely humid conditions or that instrument readings reflect some degree of impairment in the capture or measurement of Hg(0). Hg(0) is not water-soluble and not predicted to undergo significant atmospheric removal during humid conditions or precipitation events. Others have shown that TGM levels do not decrease during or following rain events (Lindberg). Another more speculative theory is that the presence of atmospheric water vapor could enhance the rate or extent of mercury oxidation, resulting in a depletion of Hg(0). Several atmospheric oxidation reactions involving mercury occur most rapidly in the aqueous phase (Lin and Pehkonen). Many of these oxidizing agents are likely to exist at elevated levels in regional ambient air due to nearby industrial emissions. However, the likelihood that this phenomenon would give rise to a measurable change in TGM levels is very small given that only a minute fraction of Hg(0) in the air would be predicted to enter into the aqueous phase where oxidation reactions would take place. The most likely scenario involves interference with instrument performance by water vapor. Water vapor could condense on sample lines or saturate particulate filters, inhibiting the passage of Hg(0). It could also overwhelm the soda lime traps, allowing moisture to reach the gold traps which might affect mercury capture efficiency. Finally, it is also conceivable that other meteorological conditions associated with high humidity (e.g. precipitation, wind or temperature) could be impacting atmospheric mercury levels or instrument performance.

TGM measurements below 1.0 ng/m^3 were not confined to this site during the study. Interestingly, these values appeared periodically during the July through September timeframe at other sites. For example, the lowest 10% of readings for TGM taken at Lake Waccamaw from the third quarter of 1998, 1999 and 2000 were consistently lower than similar values from other periods during the year (Table 1-1). During these periods warm humid air masses arrive from the Gulf of Mexico; unfortunately, concurrent information on humidity and Hg(0) are not available from these sites, preventing the establishment of a similar relationship between humidity and TGM at this site.

Despite the periodic appearance of low values for Hg(0) it does appear that system modifications improved the detection of Hg(0). It remains possible that some recorded values are lower than actual atmospheric levels, especially

during periods of extreme humidity. However, because there were no clear indications of compromised instrument performance during these periods, data on Hg(0) and RGM are included in summary statistics and figures for this sampling period.

Total Gaseous Mercury, RGM and Elemental Mercury

TGM levels fluctuated significantly between August and November of 2000 in a pattern similar to that seen during the previous year. Average levels declined significantly relative to the same time period during 1999, reflecting the decreased frequency and diminished magnitude of spikes in TGM.

Our study confirmed that TGM is comprised overwhelmingly of Hg(0). Although increases in both Hg(0) and RGM were seen on a frequent basis during this study, it was Hg(0) fluctuations that were primarily responsible for changes in TGM. RGM levels were typically two to three orders of magnitude lower than Hg(0). Even in those cases where RGM increased without concurrent changes in Hg(0), levels never exceeded one-tenth those of Hg(0). These data are consistent with findings reported in previous studies (Lindberg, Sheu and Mason).

Our data suggest that RGM and Hg(0) levels may be differentially susceptible to various outside influences. As illustrated in Figure 1-28, changes in one form of gaseous mercury would often, but not always, occur independent of changes in the other mercury species. RGM is comprised of water-soluble species such as mercuric chloride ($HgCl_2$). It is believed that these species undergo atmospheric removal mechanisms involving both wet and dry deposition. It has been shown using continuous monitoring techniques that RGM levels in ambient air fall dramatically following a rain event (Lindberg). Theoretically, these same wet deposition removal mechanisms would be enhanced by the presence of high levels of water vapor in the air, such as might exist during the extremely humid conditions periodically documented during our study. This phenomenon is a likely explanation for the pattern of RGM non-detects during periods of high humidity. During dry periods (humidity < 50%) all readings for RGM were above the instrument limit of detection. However, elevated RGM was detected under conditions of low and high humidity, suggesting that while water vapor might be an effective tool for removing low levels of RGM, its removal efficiency is less than 100% at higher atmospheric concentrations.

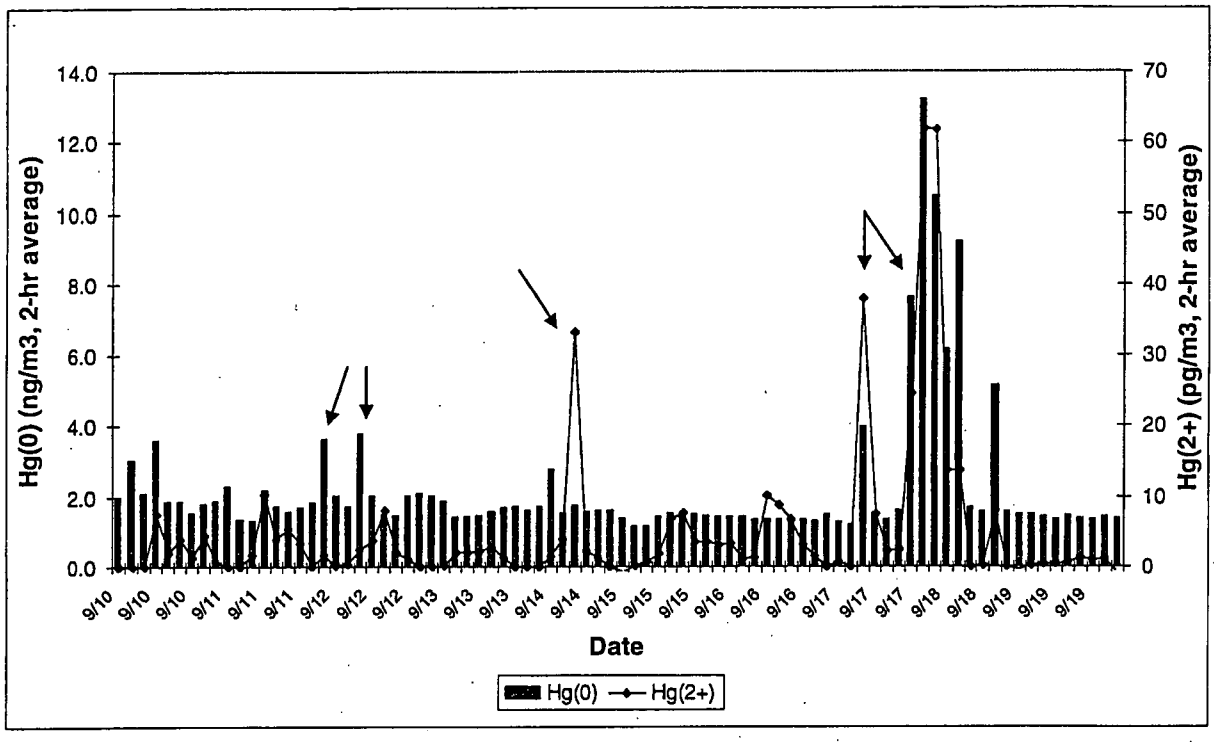


Figure 1-28: *Representative sample of mercury speciation data, September 10 – 19, 2000, illustrating the behavior of elemental and reactive gaseous mercury. Data represent 2-hr coincident readings for each mercury species.*

Except for the lower baseline readings encountered under highly humid conditions, Hg(0) readings did not appear to be dramatically affected by humidity levels. Hg(0) is not water-soluble and thus not predicted to undergo significant atmospheric removal by wet deposition. Measurable changes in Hg(0) concentrations in temperate climates are more likely to be affiliated with impacts from nearby emission sources.

Elevated readings for RGM appeared most frequently during daylight hours.[8] Sunrise and sunset ranged from 5:40 a.m. to 6:48 p.m. EST on August 24 to 6:51 a.m. to 5:04 p.m. EST on November 21. Lindberg and Stratton also reported daytime increases in RGM and speculated that photochemical production might enhance RGM levels during the day while nighttime deposition acts as a removal mechanism, depleting atmospheric RGM trapped below the stable boundary layer (Lindberg). Sheu and Mason reported varying diurnal trends for RGM at a site near the Chesapeake Bay (Sheu and Mason). While nighttime depletion and daytime increases were noted on at least one occasion during a weeklong sampling period, other patterns were also noted. The authors speculated that these increases could be related to source impacts

[8] Time of collection corresponds to sampling conducted over the preceding two hours.

or variability in RGM levels between different air masses moving across their sampling site. During our study some isolated RGM peaks were noted during nighttime and early morning hours, suggesting additional factors may have been impacting RGM levels during these periods (Fig 21). RGM levels were more highly correlated with Hg(0) levels during nighttime rather than daytime hours ($r^2 = 0.63$ vs. $r^2 = 0.54$). Peaks in Hg(0) were seen at all times of day, while background Hg(0) values appeared to conform to a diel pattern similar to that seen in Figure 29, with lowest values in the pre-dawn hours and the highest background values occurring during the middle of the day.

No correlation was identified between Hg(0) or RGM levels and temperature during this study period. Higher ambient temperatures could, in theory, facilitate several of the atmospheric reactions that could affect RGM levels; however, any association may be confounded by several simultaneous variables. During the summer months, warmer air arriving from the Gulf of Mexico is typically very humid, and the negative relationship between humidity and RGM levels may overwhelm any positive association involving temperature. Associations between wind direction and temperature could also hamper the identification of a relationship between temperature and atmospheric mercury levels, especially if mercury emission sources that are upwind during a significant portion of the year become downwind with seasonal shifts in wind direction. A more thorough statistical analysis involving analysis of variance might unearth a relationship between temperature and RGM or Hg(0) levels but is beyond the scope of this report.

The strongest historical indicator of emission source impacts on regional atmospheric mercury levels was illustrated through the consistent relationship between wind direction and elevated TGM readings at the Lake Waccamaw and Riegelwood monitoring sites. During speciation measurements, elevated RGM was most commonly associated with winds arriving from various directions, including the northwest, north and east. A wind rose plot summarizing 5-minute wind data collected in conjunction with elevated RGM shows a significant degree of variability but a notable absence of data points in the third quadrant (i.e. between south and west). Predominating winds during this period would be expected to range between southwesterly during August and September to northerly and northeasterly during October and November. In contrast, elevated readings for Hg(0) were bound to a fairly tight distribution between east-northeast and east-southeast. This suggests that increases in Hg(0) at this site may be related to a fixed upwind mercury emissions source.

Identifying Relationships between RGM and Elemental Mercury

Our data indicate that a variety of factors influenced atmospheric mercury levels at the Riegelwood Ballpark site. The single strongest line of evidence implicating point source effects is the correlation between wind direction and increases in Hg(0). Natural variability is most clearly illustrated

through the relationships between RGM, and humidity and time of day. Although data for Hg(0) and RGM appear very similar - exhibiting a predominance of background or baseline readings punctuated by periodic spikes in concentration for both species – short-term changes were periodically isolated to one species of mercury. To better understand the distinct behaviors of Hg(0) and RGM and the influence of natural variability versus anthropogenic impacts we defined three types of scenarios for further study:

- Scenario A: RGM and Hg(0) increase concurrently.
- Scenario B: RGM increases without simultaneous increase in Hg(0).
- Scenario C: Hg(0) increases without simultaneous increase in RGM.

Figure 1-28 illustrates a brief period during which several of these events appeared.[9] Once these events had been categorized, coincident data on mercury concentration, time period sampled, temperature, humidity, and wind speed and direction were compiled. Wind speed, temperature, humidity and Hg(0) concentrations were calculated by taking the arithmetic average of 24 separate five-minute readings within each 2-hour sampling period. Wind direction data were compiled from 5-minute readings. Summary statistics for temperature, humidity and wind speed are presented in the following table.

Table 1-8: *Observed meteorological conditions during periods of elevated gaseous mercury and during the complete study period, September – November, 2000.*

Scenario	Temperature mean (sd)	Relative Humidity mean (sd)	Wind Speed mean (sd)	# Events
A: Both RGM and Hg(0) increase simultaneously	64.6 (7.6)	74.0 (16.3)	3.44 (1.87)	24
B: RGM increases while Hg(0) remains at baseline	71.3 (9.5)	34.9 (15.1)	4.12 (2.02)	43
C: Hg(0) increases while RGM remains depressed	55.9 (13.6)	92.2 (7.6)	1.33 (1.70)	10
Complete Study Period[10]	*65.7 (12.4)*	*75.7 (21.5)*	*2.80 (2.60)*	

[9] For the purpose of this report, we chose events by visual inspection. In future studies we may attempt to define peaks by statistical parameters.

[10] statistics based on 2-hour average measurements except wind speed which is based on all 5-minute readings obtained between 9/1/00 and 11/9/00. See Appendix 5 for a more complete description of meteorological conditions during Scenarios A, B and C.

Scenarios A and C include elevated readings for Hg(0). We initially suspected that short-term increases in Hg(0) would primarily be due to local or regional industrial emissions. Natural causes of short-term peaks in Hg(0) such as forest fires, volcanic activity or nearby geological deposits of mercury were absent and would not be expected to contribute substantially. Variability in RGM is possibly related to natural phenomena but may also reflect transport of local or regional emissions of RGM. Elevated readings for RGM were encountered under scenarios A and B.

An obvious difference between scenarios A and C is the accompanying humidity level. While atmospheric conditions in the former case very closely mimicked conditions encountered throughout the duration of the study, humidity levels were substantially higher in the latter scenario. High humidity may contribute to the removal of RGM from the air. It is conceivable that the monitoring instrument was measuring the impact of pollution plumes containing mercury during these periods but any RGM that may have been present was scavenged through wet deposition mechanisms as the plume moved away from the source. It is notable that wind speed was also substantially lower in the latter case. Slow winds might further inhibit the lateral movement of RGM and enhance the likelihood of atmospheric removal on short distance scales. If these atmospheric removal mechanisms are in place and are affecting measured RGM levels while leaving Hg(0) levels unchanged, then it is entirely plausible that scenarios A and C represent pollution plume impacts under differing meteorological conditions.[11]

Under scenario B, increases in RGM were unaccompanied by changes in Hg(0). This could arise from several situations including plume impacts from point source releases of RGM, local formation of RGM through oxidation of available Hg(0), RGM releases from natural sources, or variable levels of RGM in different air masses. Wind direction associated with these events was highly variable, decreasing the likelihood of plume impacts from a single point source. Humidity levels were frequently very low, reflecting favorable conditions for the existence of RGM in ambient air. Although we cannot rule out the possibility that increases in RGM without concurrent increases in Hg(0) were caused by point source releases of mercury, there also remains a strong possibility that these peaks in RGM levels reflect a natural diel cycle.

If elevated readings for Hg(0) are used to identify plume fumigation events, then the concurrent presence or absence of RGM appears to be most significantly tied to local atmospheric conditions. Closer examination of the data shows that a negative correlation exists between humidity levels and the ratio of RGM to TGM during plume fumigation events (Table 1-9). During the most highly humid conditions (> 90%) no RGM was measured, despite

[11] We initially suspected that periods of increased Hg(0) and baseline RGM might be indicative of plume fumigation during rain events. However, rainfall data from nearby Lake Waccamaw suggested that nearly all these events occurred in the absence of rainfall.

markedly elevated levels of TGM. This suggests that extremely humid conditions were able to influence the chemical speciation of mercury reaching the monitoring station during plume fumigation events by removing RGM on a very short (< 1 mile) distance scale. The resulting increase in mercury wet deposition over a relatively small area might significantly impact runoff to surrounding surface waters. It is worth noting that on occasion, increases in RGM were seen even under conditions of greater than 90% humidity. However, the ratio of RGM to TGM was low, suggesting some degree of removal may have been taking place.

Table 1-9: *Description of meteorological conditions during suspected plume fumigation events (scenarios A & C), September – November, 2000.* [12,13]

# Events	Rel. Humidity	RGM/TGM	Correlation (RGM/RH)
34	Mean: 79.4% Range: 38% – 98%	Mean: 0.46% Range: 0.00% - 1.45%	-0.812

Although we have used the combined effect of increased Hg(0) and wind direction to highlight suspected local plume fumigation events it also remains possible that pollution impacts are responsible for some of the increases in RGM alone. Lindberg, et al reported several events during which RGM levels increased without concomitant increases in Hg(0) (Lindberg). They were able to present coincident data on SO_2, NO_x and ozone to strengthen their argument that these changes were caused by a plume fumigation event resulting from coal-fired utility boiler emissions. They also presented data suggesting that RGM levels conform to a diel cycle, with highest readings during late morning and afternoon hours. The absence of data on additional pollutants limits our ability to distinguish between natural variability and source influences on RGM levels, however several lines of evidence support the argument for natural variability. Most importantly, these events were almost completely confined to daytime hours - consistent with the diel cycle described above and contrasted with the continuous operating schedules of local mercury emission sources. Secondly, winds during these events were primarily northerly and westerly and likely comprised of cool, dry air - favorable conditions for the existence of RGM. Finally, Hg(0) levels remained at baseline suggesting the absence of plume impacts from ground-level sources in the immediate vicinity of Riegelwood. At present there is no known diel pattern for Hg(0), although some have speculated that such a pattern might exist (Schroeder 1999).

[12] "events" defined as scenarios A and C.

[13] These data were generated using actual instrument readings, including those below 0.4 pg/m^3, the limit of detection for reactive gaseous mercury.

The possible association with northerly winds could provide an argument for long-range regional transport of RGM from emission sources to the north and west of Riegelwood. Major emission sources exist in this direction including coal-fired utility boilers that serve the Charlotte, Fayetteville, Winston-Salem and Raleigh-Durham areas. The closest unit is positioned 95 km to the west-northwest near Lumberton, NC (1998 reported mercury emissions: 90 lbs.). Given these distances and the necessary convergence of emissions and meteorological conditions favoring downward mixing of the plume aloft, it seems improbable that upwind sources are the cause of all short-term fluctuations in RGM. Further study, including co-monitoring of additional pollutants such as SO_2 or trace metals would be needed to determine the extent of source impacts.

The relative impact of natural vs. man-made effects on atmospheric RGM deserves further attention. Many of our highest readings for RGM were obtained under conditions that are most likely to reflect natural variation. These increases were also far more common than events suspected to be due to local source impacts and exhibited considerable variability in magnitude and duration. Measurements at ground-level only tell a small part of the picture since sources with tall stacks are also likely to affect atmospheric mercury levels at much higher elevations. Additional critical measurements would include short-term wet deposition samples or cloud water analysis. We believe our study provides very strong evidence for point source contributions of RGM. However, at this point it would be premature to attempt to use the data from this study to quantitatively define natural vs. man-made impacts. Both are clearly important phenomena and should be factored into the design of future studies.

Regional Anthropogenic Emissions

The preceding data support a possible relationship between man-made mercury emissions and regional levels of mercury in ambient air and precipitation. To further investigate this possibility, we collected information on emission sources proximal to Lake Waccamaw and Pettigrew State Park. We utilized all available information on reported emissions and the most recent estimates on the physicochemical speciation of mercury pollution. In addition, we explored several major changes in regional industrial activities that may have had a significant impact on mercury emissions. The improvements made at several of these sources ultimately may result in reduced quantities of atmospheric mercury reaching the sensitive waterways of eastern North Carolina.

Table 1-10 includes summary information on the most significant sources of anthropogenic mercury emissions surrounding Lake Waccamaw and Pettigrew State Park (Figure 1-3). The data shows that several significant changes occurred between 1998 and 1999. The reported 1999 process

emissions from the chlor-alkali facility are provided. The facility experienced frequent power disruptions during the first few months of 1999 then ceased mercury-cell operations in favor of an alternate non-mercury chlorine production process in April. Reported emissions are most likely related to normal mercury cell chlor-alkali production activity occurring during early 1999. A reduction in mercury emissions between 1998 and 1999 at the adjacent pulp and paper mill may be due in part to the discontinued use of mercury-contaminated products from the adjacent mercury cell chlor-alkali plant. Apparent reductions from the coal-fired electric utility boilers likely resulted from improved emission estimates[14]. Additional reductions in regional mercury emissions are also likely. For example, a carbon injection system was added to the largest stack at the municipal waste incinerator in New Hanover County during late 2000. This modification could reduce mercury emissions from that stack by as much as 90% and facility-wide mercury emissions by 40% (40 CFR Part 60). Mercury emissions from other large sources have remained relatively stable. These emissions generally arise from the combustion of coal in large industrial boilers and may fluctuate depending on facility energy consumption.

All sources reported emissions prior to 1999 as "mercury vapor" or "mercury and compounds," consistent with guidance for applicable emissions inventories. Mercury emissions were not distinguished by chemical or physical characteristics largely because information on these parameters was lacking. However, this information is critical in determining the atmospheric fate of mercury emissions. Emissions of Hg(0) vapor would be prone to long-range transport and could be carried hundreds or even thousands of miles before undergoing processes that would lead to removal from the atmosphere. RGM and particulate mercury could undergo rapid removal from the atmosphere and could thus contribute to local or regional deposition patterns following release to the air.

[14] Data from 1999 was obtained from the USEPA's Information Collection Request (ICR) and is based on actual measurements in coal and stack gas.

Table 1-10: *Mercury emissions near Waccamaw and Pettigrew S.P. Includes estimates of mercury speciation based on 1999 emissions. Refer also to Figure 2.*

	Reported Hg emissions (lbs)[1]		1999 Speciated emissions (est.) [2]		
Source (category)	1998	1999	Hg(0) (lbs, est.)	RGM (lbs, est.)	Hg(p) (lbs, est.)
Holtrachem Manufacturing	1276	328	230	98	0
New Hanover Waste-to-Energy	362	337	67	202	6 7
CP&L Sutton Plant	354	153	45	105	3
PCS Phosphate	266	236	118	71	4 7
International Paper Riegelwood	93	39	20	12	8
CP&L Weatherspoon	90	33	24	9	< 1
Weyerhaeuser	64	68	34	20	1 4
E. I. DuPont Co.	60	53	27	16	1 1
Occidental Chemical Co.	29	26	13	8	5
Weyerhaeuser	12[3]	12	6	4	2

[1]Reported emissions from state air quality permit database, self-reported values or TRI.
[2]Estimates of speciation from EPA Mercury Study Report to Congress.
[3]Reported emissions from 1996 state air quality permit database.

In its 1997 Mercury Study Report to Congress, the USEPA provided estimates of physicochemical speciation of mercury emissions from a variety of anthropogenic sources including industrial boilers, waste incineration units and coal-fired electric utility boilers. The authors based these estimates on limited stack tests and conceded "considerable uncertainty as to the actual speciation." Improved information was collected by the USEPA and major coal-fired electric utility boilers throughout 1999 as part of the ICR program. Advanced methods were used to speciate mercury in exiting stack gases from a handful of large (>25 MW) coal-fired electric utility boilers. Facilities were categorized based on plant configuration and emission control devices. Data from representative utilities were then used to estimate speciated mercury emissions from other similarly configured plants. For this report we utilized ICR data to estimate 1999 speciated mercury emissions from the coal-fired electric utility boilers. For all other sources we relied on the EPA's 1997 report. Our estimates of speciated mercury emissions are provided in Table 1-10, based on 1999 reported emissions.

Plume dispersion factors also play a large role in affecting the environmental fate of mercury emissions. Ground-level releases would be more likely to result in measurable changes at nearby monitoring sites. Pollution

released from an elevated source is more likely to undergo significant dispersion before impacting ambient air at ground level. This effect would broaden the area of impact but would also result in more modest increases in ground level air pollution. Plume rise and dispersion are also enhanced by higher stack gas exit velocities and temperatures, such as those encountered in many high-temperature combustion processes. Meteorological conditions including wind turbulence, temperature, boundary layer mixing and humidity can dramatically enhance or impede plume dispersion. Calm conditions will often result in the formation of an atmospheric inversion, thus trapping mercury emissions near ground level. Finally, surface features such as elevation changes, vegetation, buildings, traffic patterns and waterways will all affect plume dispersion to varying extents.

The variables above will all affect regional fate and transport of atmospheric mercury emissions and influence the likelihood that emissions will lead to measurable changes in ground-level atmospheric mercury. Local ground level emission sources releasing large quantities of Hg(0) at ambient temperatures would be most likely to impact nearby surface measurements of atmospheric TGM. In contrast, distant releases of predominantly particulate mercury or RGM under conditions favorable for plume dispersion would be less likely to result in measurable increases in ground-level TGM. Instead, these emissions would contribute more substantially to regional wet and dry deposition patterns.

The point sources described above possess a wide array of emissions characteristics. The coal-fired electric utility boilers have tall stacks and release Hg(0) and RGM at high temperatures and velocities. These factors would enhance dispersion and possibly give rise to a modest increase in mercury deposition rates over a relatively wide area. The same considerations might affect gaseous mercury released by large coal-fired industrial boilers, such as those found at many of the local chemical manufacturing facilities and pulp and paper mills. Mercury emitted by the New Hanover County municipal waste incinerator is primarily in the form of RGM or particulate mercury. This factor would contribute more directly to localized deposition rather than medium or long-range changes in atmospheric TGM.

The most significant regional source of mercury emissions is the mercury cell chlor-alkali operation in Riegelwood, NC. Mercury cell chlorine production facilities use thousands of pounds of mercury, housed in electrochemical cells. These cells act to provide an electrical charge that forms the products chlorine gas, sodium hydroxide and hydrogen gas from brine. Mercury may be released in the hydrogen gas stream, in cell end box ventilation air or in cell room ventilation air. Spills and maintenance activities involving the opening of cells may add large amounts of mercury vapor to cell room air. Generally, cell rooms are vented directly to the outside air. It is believed that the predominant form of mercury emitted from chlor-alkali

facilities is Hg(0) vapor, however the presence of large quantities of chlorine could act to produce smaller quantities of RGM species such as $HgCl_2$ (USEPA, 1997a). Recent ambient monitoring studies conducted in the vicinity of active mercury cell chlor-alkali plants have shown fluctuations in RGM and Hg(0), both independently and in tandem (Stevens, personal communication).

Chlor-alkali mercury emissions fit many of those characteristics that would increase ground level TGM. Releases of Hg(0) would likely disperse outward from the source, carried by prevailing winds over long distances. The areas surrounding Riegelwood and Lake Waccamaw contain very few terrain features that would significantly disrupt ground-level plume dispersion. Outward migration of RGM might be hindered by adherence to vegetation or ground surfaces or atmospheric scrubbing during precipitation or high humidity events. These factors would decrease atmospheric levels but add to the depositional load in the immediate vicinity of the source.

Ambient monitoring data from Lake Waccamaw seems to bolster the link between chlor-alkali plant activities and regional atmospheric mercury levels. Elevated TGM readings were frequently encountered during 1998, when the facility was in normal operating mode. However, in 1999, when the plant began experiencing manufacturing interruptions and then ceased using the mercury-cell process, measured levels of TGM in ambient air at Lake Waccamaw dropped off and the peaks that were associated with easterly winds disappeared. No other regional emission sources to the east of Lake Waccamaw underwent such dramatic changes in their mercury emissions during this same time frame.

Although several of the mercury emission sources in the vicinity of Wilmington, NC, contribute significant quantities of mercury to the air, they are less likely to contribute to detectable changes in ground-level TGM because they 1) do not release substantially large amounts of mercury, 2) release predominantly RGM, or 3) release their emissions from tall stacks at high temperatures, thereby diluting local ground-level plume impacts. However, the Lake Waccamaw data cannot be used to rule those sources out as potential contributing factors. Fortunately, the positioning of the Riegelwood Flynn site to the east of the chlor-alkali industrial complex allowed us to determine that a continued influence from the east was not present. As evidenced in Figure 8, elevated mercury values were not affiliated with easterly winds. Instead, events were linked to winds arriving from the N and NW, in the direction of the chlor-alkali/pulp and paper mill industrial complex. At the Riegelwood Ballpark site, events were correlated to northeasterly winds – again, consistent with an impact from the nearby industrial complex.

The most obvious remaining question concerns the cause of ongoing fluctuations of TGM in Riegelwood. The patterns observed at these sites were reminiscent of earlier results from Lake Waccamaw and strongly suggestive of

nearby emissions of both Hg(0) and RGM. Although mercury cell chlor-alkali production was terminated in April 1999, several potential sources of mercury emissions remain on site including chlor-alkali plant deconstruction, site cleanup activities, gross site contamination and mercury-laden waste ponds. In addition, combustion of coal and other organic materials at the pulp and paper mill will give rise to mercury emissions that could lead to detectable changes in nearby ground-level atmospheric mercury.

Dismantling of the cell rooms commenced almost immediately following the termination of mercury cell operations in April of 1999. Many of the associated activities could result in significant releases of mercury to the air. For example, the opening of covered mercury cells for product removal exposes a large quantity of mercury to the atmosphere that could lead to significant loss by volatilization. Subsequent transfer of mercury to large shipping containers could lead to spillage and further loss through volatilization. Building washing and other decontamination activities could involve the exposure of mercury contaminated surfaces, further facilitating loss of mercury to the atmosphere.

Between May 26 and June 8, 1999 over 57 tons of mercury was removed from covered cells and shipped offsite. By July 12 another 38 tons of mercury was recovered during continued cell draining and washing activities. Subsequent activities focused on cleaning work areas and removing process components such as scrap aluminum and copper. Disassembly of cell covers began in November 1999 and continued into the first half of 2000. It was reported that residual mercury was contained within the cells. Thus the opening of these cells may have facilitated mercury volatilization. Several interruptions of normal deconstruction activities were documented including a prolonged period during August and September of 1999 when Hurricanes Dennis and Floyd made landfall. Only limited reports are available after August 2000 but it is likely that cleanup efforts continued during the remainder of 2000.

It is difficult to ascertain whether specific mercury removal activities were directly related to increases in atmospheric mercury at either Riegelwood monitoring site. For example, during the May 26 - June 8, 1999 timeframe when over 57 tons of mercury was drained and recovered, several large peaks for TGM were detected at the Flynn site; however, the majority of these were associated with light and variable winds, making a source-receptor relationship difficult to pinpoint. At the Ballpark site the few events that occurred were both associated with winds arriving from the plant as well as winds arriving from other directions. During subsequent weeks, when additional mercury cells were drained and another 27 tons of mercury was recovered, very few large peaks of TGM were seen at the Flynn site. At Ballpark a series of peaks between June 4 and 6 appeared to arrive from the chlor-alkali plant but another series between June 15 and 20 showed only a weak relationship to wind direction. It is also worth noting that inconsistent monitoring results were obtained during

"down times" when little or no mercury cell room activity was taking place. For example, between July 3 and 8, 1999 no cell room activities were reported and no peaks of atmospheric mercury were observed at either Riegelwood site. In contrast, a similar downtime between July 17 and 22, 1999 saw several short-term peaks in atmospheric mercury appear at both sites on July 21 and 22. Further in-depth analysis of ambient monitoring data, à more detailed accounting of decommissioning events and on-site monitoring data would be necessary to fully explore the relationship between specific site activities and off-site mercury measurements.

The chlor-alkali operation also maintained mercury-contaminated waste ponds that could act as a source of mercury emissions. Lindberg and Turner identified residual waste deposits at former mercury cell chlor-alkali facilities as important atmospheric mercury emission sources (Lindberg and Turner). In their study they estimated that approximately 160 pounds of mercury per year (predominantly Hg(0)) would be released to the air from the mercury-containing waste ponds they studied. Although they point out that a well-mixed atmosphere would substantially dilute mercury levels at distances outside of 1.5 kilometers from the source, they were able to measure an increase in mercury levels at distances exceeding 1 kilometer from the source. The authors highlighted a positive relationship between waste pond surface temperature and mercury emission rate with dramatically increased emissions above 20°C. A similar relationship was seen for air temperature.

The mercury contaminated soils and waste ponds at this facility undoubtedly act as a source of mercury emissions. Tremendous variability in emissions would be expected due to water temperature, air temperature, pH or the chemical composition of the pond water and ongoing addition of wastes. As with surface waters, photochemical reactions might enhance volatilization of mercury thus sunlight could also impact emissions from the waste ponds. Our data do not exhibit a relationship between air temperature and mercury levels. However, other site deconstruction activities most likely would confound this relationship.

Although total emissions are relatively insignificant compared to many of the sources discussed above, the pulp and paper mill is less than a mile from monitoring stations in Riegelwood and thus cannot be ruled out as a potential local influence on atmospheric mercury levels. In addition to the pulp and paper mill and chlor-alkali plant, Wright Chemical Corporation, a chemical manufacturer was also active in the Riegelwood area. This facility is located approximately 1 kilometer to the south of Riegelwood Flynn and 2 kilometers to the east-southeast of Riegelwood Ballpark. The primary emissions from this facility include ammonia, formaldehyde and hydrogen chloride resulting from the synthesis of organic chemicals. In 1999, 1.13 pounds of mercury emissions were reported, primarily a result of industrial boiler activity. This represents

less than 0.1% of the level of reported annual emissions from the chlor-alkali facility.

Note: Recently (February, 2002), a site investigation performed by the USEPA and the DENR Division of Waste Management turned up abnormally high readings for atmospheric mercury on Holtrachem plant property. Measurable readings taken with a Jerome mercury vapor analyzer recorded levels in the air between 0.03 and 0.077 mg/m^3 near the mercury cell building and retort pad. Visible contamination of plant structures with liquid mercury was reported during the visit. If this level of site contamination can be confirmed, then it may explain in large part the fluctuations in atmospheric mercury observed at our Riegelwood monitoring sites.

THE CHARLOTTE MERCURY STUDY

Background

Charlotte is the largest urban city in North Carolina. It is surrounded by several significant point sources of mercury emissions including coal-fired electric utility boilers, medical and municipal waste incinerators, and large industrial boilers. Since mercury emitted to the atmosphere is capable of undergoing both short and long-range transport it is probable that emissions from the Charlotte area affect downwind locations, including local aquatic systems and sensitive waterways of eastern North Carolina. Continuous atmospheric monitoring for mercury will help to identify the magnitude and nature of these influences.

Sufficient information is not currently available to determine long-term trends for atmospheric mercury in the Charlotte area. This information is required to better understand relevant trends for atmospheric pollutants in the urban areas, especially in rapidly growing population centers. Monitoring data during this study will help provide a picture of atmospheric mercury trends in and around the Charlotte area. A mobile monitoring unit is providing DAQ information to assess geographical variability in the atmospheric levels.

Project Description

This study proposed to define temporal and geographic trends in atmospheric mercury in the vicinity of Charlotte, North Carolina. To achieve this, two sampling sites are being operated continuously for length of the study, beginning March 2002. The fixed location site is near the center of downtown Charlotte. Continuous data on total gaseous mercury (TGM) and meteorological conditions is generated at this site. This site also houses a variety of other instruments providing data for other DAQ atmospheric monitoring initiatives.

It is anticipated that this data will create a snapshot of "urban" air quality conditions for this area. A mobile monitoring trailer will also be positioned at three other locations on the perimeter of Charlotte over the course of the study. This station will be equipped to monitor for TGM/RGM/Hg(0) with the capability to also monitor for VOCs and carbonyls. This site is designed to capture air quality conditions on the rapidly changing periphery of Charlotte. Sites will be chosen to capture a variety of influences including seasonal upwind/downwind patterns, local major point sources and/or heavy traffic areas.

Meteorological data will be collected at each sampling site. Parameters to be measured include temperature, relative humidity and wind speed and direction.

Sampling Sites

Three mobile sites located around the periphery of Charlotte have been selected. These sites are located to the N, SW and SE of the city center. The first site is located at Smithville Park; approximately 30.5 kilometers north of Charlotte and 0.5 kilometers east of Interstate 77 at the corner of Catawba Avenue and South Ferry St in Cornelius, NC. The park includes a picnic shelter, playground, large soccer field, lighted ball field and another unlighted ball field. The park is surrounded by residential neighborhoods and some small businesses to the northeast.

The second site, referred to as the Matthews site, is located approximately 1 kilometer to the northwest of the Mecklenburg County line and 3 kilometers southeast of Matthews, NC. The closest major thoroughfares are NC Highway 74, 2 kilometers to the east, and I-485, two kilometers to the north and west of the site. The area around the site is hilly, rural and sparsely populated. The site itself is located on a slightly elevated area in the middle of an open field with waist-high natural vegetation. The clearing extends for at least 300 feet in all directions. A small portion of the clearing is maintained for power lines, which traverse the middle of the site. A satellite campus of the Central Piedmont Community College is located approximately ½ mile to the north of the site, across a two lane local road that is 200 feet from the site. A medical waste incinerator is present, approximately 2 kilometers to the west of the site. Although the incinerator operation is not visible from the monitoring site due to a buffer of trees, a steam plume can be seen when the incinerator is operational.

The third site is located at Kennedy Middle School (KMS) in rural southwest Mecklenburg County, near the intersection of Sandy Porter Road and Brown Grier Road. The site is approximately 12 kilometers to the southwest of downtown Charlotte. The nearest significant source of mercury emissions is the Duke Power Allen Steam Plant, located approximately 6 kilometers to the

northwest of KMS. Other significant local features include Charlotte-Douglas International Airport (6 kilometers N) and I-485 (1 kilometer E). Areas to the immediate north, west and south are predominantly rural or sparsely populated. To the east, considerable residential and commercial development exists along the I-485/I-77 corridor.

By providing continuous, multi-site monitoring coverage, we hope to be able to characterize differences between urban and "suburban" Charlotte air and determine the relative influence of major point sources versus mobile or area sources clustered around Charlotte. It is assumed that our chosen monitoring sites will be representative of air typical of this environment. If highly unusual data are retrieved or local point sources completely swamp out other potentially relevant influences on local air quality, repositioning of the mobile sampling site may be considered.

Fluctuations in total gaseous mercury can be indicative of point source influences but lack the specific information to determine the potential for transfer between the air and the earth's surface. By characterizing multiple species of atmospheric mercury, e.g. elemental and RGM, we hope to gain an understanding of the potential for regional movement of those species predisposed to atmospheric deposition and the relationship between fluctuations in TGM and RGM in this urban/suburban environment.

MERCURY IN WATER

Waters affected by fish advisories by the Department of Health and Human Services (DHHS) are considered to be impaired by the DWQ. Therefore, DWQ is required to perform Total Maximum Daily Load (TMDL) studies. The TMDL is the amount of a given pollutant that a waterbody can assimilate while maintaining its designated uses. This allowable pollutant load must be allocated to the various point and area sources within the watershed. To establish a TMDL, the current level of contamination must be determined.

In the past, water samples collected by the DWQ were analyzed according to EPA Method 245.1, which has a method detection limit of 0.2 ug/L. All sample results were reported as being below the method detection limit. The most recent sampling effort by the DWQ, known as the *NC Eastern Regional Mercury Study*, utilizes EPA Method 1631. This method has a detection limit three orders of magnitude lower than EPA Method 245.1 and is also below the current water quality standard for mercury of 0.12 ug/L.

The DWQ has identified 4 major goals for this study. They are:

1. To determine levels of ambient mercury in the surface water system.

2. To estimate site-specific total mercury methylmercury translators to evaluate water quality criteria.

3. To develop site-specific water to fish bioaccumulation factors (BAFs).

4. To determine levels of mercury in treatment plant effluent.

Study plans call for quarterly sampling from twelve sites in selected waterbody systems in the eastern portion of the state where the majority of fish advisories have been issued or are anticipated (Table 1-11).

Table 1-11
Water Study For Mercury Contamination

Mercury study sites

River basin	Waterbody	Area
Cape Fear	Black River	Southern Coastal Plain
	South River	Southern Coastal Plain
Lumber	Lumber River	Southern Coastal Plain
	Lake Waccamaw	Southern Coastal Plain
	Waccamaw River	Southern Coastal Plain
Neuse	Eno River	Piedmont
	Contentnea Creek	Northern Coastal Plain
Pasquotank	Kentricks Creek	Northern Coastal Plain
	Phelps Lake	Northern Coastal Plain
Roanoke	Cashie River	Northern Coastal Plain
Yadkin	Abbotts Creek	Piedmont
	Ledbetter Lake	Southern Coastal Plain

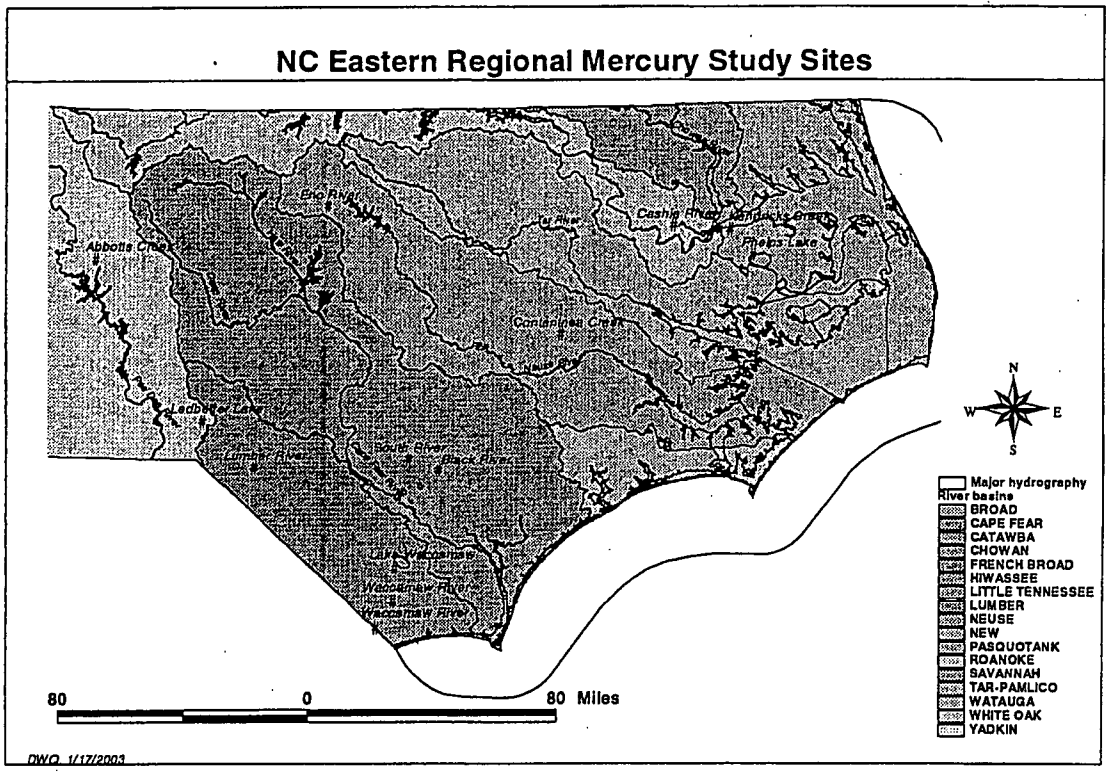
Intensive monitoring at each system on a quarterly basis should reveal seasonal variations in mercury levels and methylmercury percentages, as well as time-variable data for potential model construction.

Surface water will be collected each quarter and analyzed for total mercury (THg), total methylmercury (MeHg), dissolved organic carbon (DOC), and acid volatile sulfides (AVS). Sediment will be collected during the summer and winter quarters and analyzed for THg and MeHg. A comprehensive synoptic look at levels in wastewater treatment plant (WWTP) effluent is also being conducted as part of this project. Effluent from approximately 40 facilities in eastern North Carolina will be sampled and analyzed for total mercury using EPA Method 1631. Figure 1-29 shows the water study area.

Interim Results

The first two quarters of ambient monitoring are complete. This includes two quarters of data for surface water, and winter data for sediment. The monitoring of WWTP effluent is underway. Ambient monitoring results are plotted against United State Geological Survey (USGS) 2000 data collected in *National Ambient Water Quality Assessment* river basins. The Santee River Basin includes the Catawba and Broad River Basins in North and South Carolina.

Figure 1-29
Location of Water Study Areas



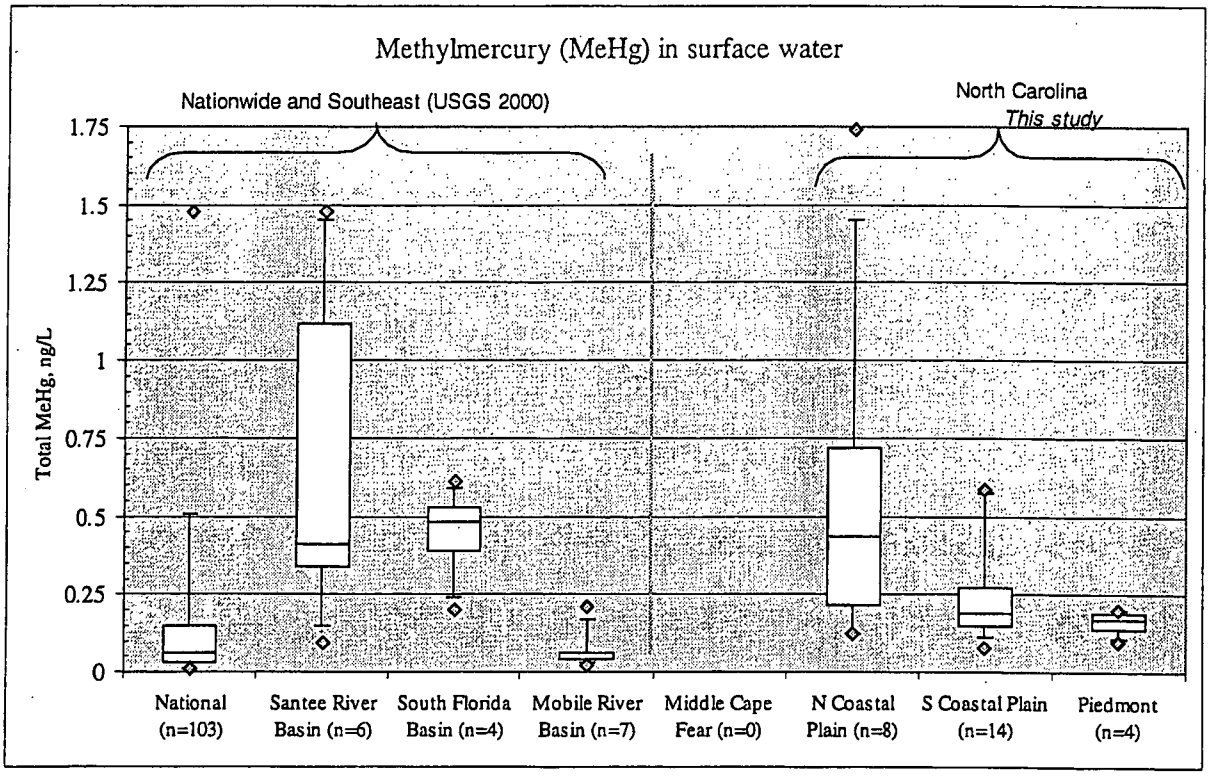
It is difficult to compare actual results with the USGS data with only two quarters of non-summer data collected. However, using the USGS data as a base, total mercury and methylmercury concentrations in North Carolina waters do not appear to be significantly different than those observed in other areas of EPA Region IV. The total mercury chart includes data the Middle Cape Fear River Basin Association collected in 1999 and 2000.

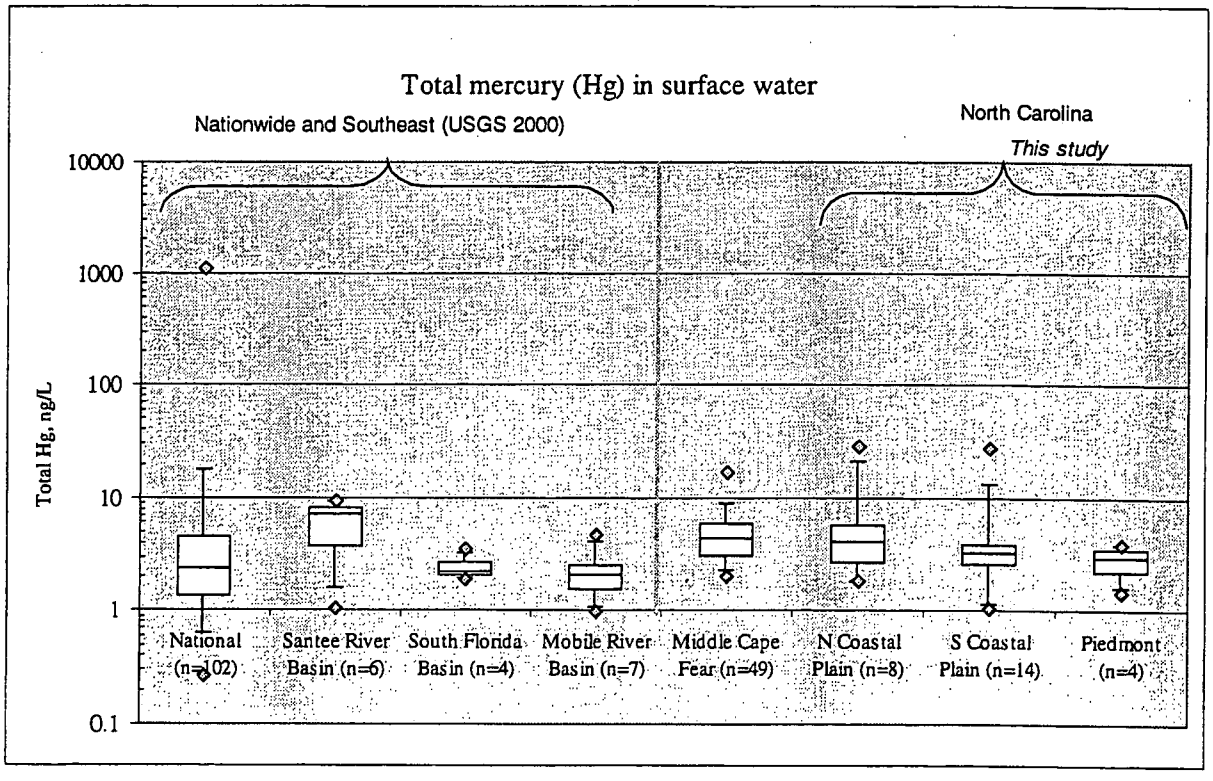
CURRENT AND FUTURE MERCURY MONITORING EFFORTS

The MDN sites at Lake Waccamaw and Pettigrew State Park continue to collect data. If improvements in source emissions and total gaseous mercury at Lake Waccamaw in fact are related to declining mercury levels in regional precipitation, then rainwater data from this site should be comparable to results from Pettigrew State Park in future years. Atmospheric total gaseous mercury remained stable at baseline conditions during 2000 at Lake Waccamaw. Mercury levels in rainwater during this period rose slightly relative to the previous year but remained lower than results from 1996 to 1998. This could be partly a reflection of lower precipitation rates, which declined by approximately 40 percent between 1999 and 2000. Mercury levels in rainwater at Lake Waccamaw were slightly higher than levels at Pettigrew State Park during the same period, but they were comparable to historical data from that site. Mercury levels in rainwater levels rose again at Lake Waccamaw between 2000 and 2001. Again this rise could reflect lower precipitation rates, which fell an additional 30 percent between 2000 and 2001. Or the increase could be due to cleanup efforts at the defunct chlor-alkali facility. More data, collected over several years is needed to determine whether trends seen over the past two to three years support evidence for a relationship between regional anthropogenic activities and total gaseous mercury levels, or instead represent normal year-to-year variability in mercury wet deposition.

The DWQ will continue to monitor mercury in fish across North Carolina and has several studies in the works:

- Continue low-level waterborne mercury study in eastern NC.
- Monitor tissue analysis in marine species after removal of known atmospheric source.
- Operate six stations around the defunct Riegelwood chlor-alkali plant (begun in 2001 and will continue as resources allow for the foreseeable future).
- Monitor 12 sites for low-level ambient mercury.
- Determine ambient levels of mercury in surface water.
- Develop site specific BAF's with fish.
- Continue methylmercury analysis of marine species (Spot, Croaker, Speckled Trout, and Bluefish, with more species as resources allow) jointly with the DWQ, DHHS, and DMF.


Methylmercury (MeHg) in surface water
Nationwide and Southeast (USGS 2000)
North Carolina
This study
Total MeHg, ng/L
1.75
1.5
1.25
1
0.75
0.5
0.25
0
National (n=103)
Santee River Basin (n=6)
South Florida Basin (n=4)
Mobile River Basin (n=7)
Middle Cape Fear (n=0)
N Coastal Plain (n=8)
S Coastal Plain (n=14)
Piedmont (n=4)


Total mercury (Hg) in surface water
Nationwide and Southeast (USGS 2000)
North Carolina
This study
Total Hg, ng/L
10000
1000
100
10
1
0.1
National (n=102)
Santee River Basin (n=6)
South Florida Basin (n=4)
Mobile River Basin (n=7)
Middle Cape Fear (n=49)
N Coastal Plain (n=8)
S Coastal Plain (n=14)
Piedmont (n=4)

CHAPTER 2 - DATA MANAGEMENT

Mercury Vapor Analyzers

Analytical data from the Tekran 2537A unit was stored in ASCII text files and saved on a computer hard drive located at the sampling sites. Information stored included identification of sampling date and time, sample type, channel, peak status, units factor, adsorption time, sample volume, baseline voltage, baseline deviation voltage, maximum voltage, peak area, and average mercury vapor concentration. TGM concentration was calculated and presented based on area values and total sample volume. Periodic calibration outputs (conducted every 25 hours) performed on zero air and permeation source air also appeared on data outputs (Fig 2-1).

Data files were copied onto floppy diskette and labeled with time, date and sampling site by the field operator and returned to the laboratory. Here, the weekly data were converted to worksheet form using Microsoft Excel and transferred to a master file containing data from previous weeks' sampling during that quarter. Data were color-coded to delineate calibration data from actual sampling data. Data preceding or following an unsuccessful calibration exercise were coded as rejected data and were not considered valid.

Validated, quality-coded meteorological and analytical data were posted by the Data Manager on the DAQ network drive weekly. The original data files were not manipulated by anyone other than the Data Manager. A second study participant reviewed the converted data to assure proper data handling. Weekly analytical data was kept in its raw unconverted form, in addition to the final color-coded form. This allowed the data manager to back-check data to confirm integrity through the conversion process.

Data in this report are presented using outputs from Microsoft Excel and Harvard Graphics. All statistical evaluations were carried out using Microsoft Excel.

Mercury Speciation Unit

Data are stored at the site on a computer hard drive and handled as described above for the mercury vapor analyzers. The same data evaluation procedures were used to verify or reject data based on QA/QC parameters. However, in addition to 5-minute continuous data on Hg(0) levels the instrument outputs data on clean and analysis cycles for RGM. Data on the zero air (flush) runs were inspected closely to assure that sufficient cleaning of the sample lines was taking place prior to the

Date	Time	Type	h	tat	dTim	ol	l	lDev	axV	rea	g^{0} (ng/m^3)	g^{2+} (pg/m^3)	g^{2+} (pg/m^3)
0 9/08/2000	1 6:20:00	ONT		K	00	.00	.200	.152	.219	7659	.657		
0 9/08/2000	1 6:25:00	ONT		K	00	.00	.200	.209	.218	1781	.580		
0 9/08/2000	1 6:30:00	ONT		K	00	.00	.199	.132	.217	2944	.556		
0 9/08/2000	1 6:35:00	ONT		2	00	.00	.200	.219	.217	6310	.459		
0 9/08/2000	1 6:40:00	ONT		K	00	.00	.199	.138	.218	3622	.570		
0 9/08/2000	1 6:45:00	ONT		K	00	.00	.200	.207	.218	2991	.606		
0 9/08/2000	1 6:50:00	ONT		K	00	.00	.200	.157	.218	4503	.589		
0 9/08/2000	1 6:55:00	ONT		K	00	.00	.199	.118	.216	6370	.461		
0 9/08/2000	1 7:00:00	ONT		K	00	.00	.200	.108	.218	3332	.564		
0 9/08/2000	1 7:05:00	ONT		K	00	.00	.199	.114	.218	3392	.615		
0 9/08/2000	1 7:10:00	ONT		2	00	.00	.200	.137	.220	1701	.742		
0 9/08/2000	1 7:15:00	ONT		K	00	.00	.199	.129	.217	3538	.618		
0 9/08/2000	1 7:20:00	ONT		K	00	.00	.200	.143	.218	1773	.531		
0 9/08/2000	1 7:25:00	ONT		K	00	.00	.199	.141	.216	7088	.476		
0 9/08/2000	1 7:30:00	ONT		K	00	.00	.200	.197	.218	2734	.551		
0 9/08/2000	1 7:35:00	ONT		K	00	.00	.199	.174	.216	1503	.573		
0 9/08/2000	1 7:40:00	ONT		K	00	.00	.200	.171	.218	4882	.597		
0 9/08/2000	1 7:45:00	ONT		K	00	.00	.199	.153	.217	9695	.534		
0 9/08/2000	1 7:50:00	ONT		K	00	.00	.201	.137	.218	0776	.509		
0 9/08/2000	1 7:55:00	ONT		K	00	.00	.200	.142	.217	1144	.566		
0 9/08/2000	1 8:00:00	ONT		K	00	.00	.200	.148	.219	7876	.661		
0 9/08/2000	1 8:05:00	ONT		K	00	.00	.199	.154	.218	7338	.702		
0 9/08/2000	1 8:10:00	ONT		K	00	.00	.200	.162	.219	4281	.584		
0 9/08/2000	1 8:15:00	ONT		K	00	.00	.199	.191	.217	8970	.518		
0 9/08/2000	*1 8:20:00*	*ONT*		*KF*	*00*	*.01*	*.200*	*.182*	*.203*	*825*		*.695*	
0 9/08/2000	*1 8:25:00*	*ONT*		*KF*	*00*	*.00*	*.199*	*.104*	*.201*	*090*		*.192*	
0 9/08/2000	*1 8:30:00*	*ONT*		*KF*	*00*	*.00*	*.199*	*.177*	*.200*	*471*		*.397*	
0 9/08/2000	***1 8:35:00***	***ONT***		***KF***	***00***	***.00***	***.199***	***.179***	***.220***	***3317***			***.640***
0 9/08/2000	***1 8:40:00***	***ONT***		***PF***	***00***	***.00***	***.200***	***.128***	***.000***				***.000***
0 9/08/2000	***1 8:45:00***	***ONT***		***PF***	***00***	***.00***	***.199***	***.213***	***.000***				***.000***
0 9/08/2000	*1 8:50:00*	*ONT*		*KF*	*00*	*.00*	*.200*	*.155*	*.201*	*70*		*.086*	

Figure 2-1: *Tekran 1130 Data Printout (system flush and clean data are in italics and RGM data are in bold italics).*

0	1								
9/08/2000	*8:55:00*	*ONT*	*PF*	*00*	*.00*	*.200*	*.138*	*.000*	*.000*

desorption and analysis cycle for RGM. Ideally the final zero air run should read 0.000 ng/m^3. In addition, readings for RGM were scrutinized to assure that sequential values declined over each of the three readings. This ensures that proper displacement of RGM from the denuder surface is taking place during the desorption and analysis cycle. In theory, almost all captured RGM should arrive at the gold traps within the first 5-minute sampling period. Suspect samples were flagged and removed from all subsequent analyses of the RGM data.

Generally data for both reactive gaseous and Hg(0) are presented as simultaneous 2-hour averages. RGM values are calculated by summing the first two analysis values and subtracting two times the final system flush reading.[15] A limit of detection of 0.4 pg/m^3 was calculated for RGM based on the reported 0.1 ng/m^3 limit of detection for TGM (see calculation, below). All RGM readings less than 0.4 pg/m^3 have been reported as non-detect.

Average[16] Span value (AUC) per ng/m^3 Hg(0) = 44268.4

Area at 0.1 ng/m^3 Hg(0), reported minimum level of detection = 4426.8

Average AUC value per pg/m^3 Hg(2+) = 10494.9

Level of Hg(2+) at 4426.8 AUC minimum level of detection = **0.4 pg/m^3**

Meteorology

All data from meteorological stations were stored electronically and downloaded weekly from Climatronics CR-10 and CR-10x data loggers onto laptop computer hard drives. At the laboratory, data was converted from its raw text form to tabular form in Microsoft Excel and was reviewed closely by the data manager to ensure reasonable values had been recorded. Meteorological data included sampling interval, average wind speed, average and standard deviation of wind direction, and temperature. Additionally, information on

[15] For example, the reading for RGM taken from the example in Figure 4-25 would be calculated as (7.640 + 0.000) – 2*(0.397) = 7.243 ng/m^3.

[16] Average was calculated using SPAN data from 12 separate calibration events occurring at 2-week intervals between September and November, 2000.

relative humidity was available from the Riegelwood Ballpark site during mercury speciation studies. A copy of the raw meteorological data was kept on floppy diskette to allow the data manager to confirm the integrity of the data.

CHAPTER 3 - HEALTH EFFECTS

Consumption of fish can be beneficial for both pregnant and breastfeeding women, and their developing children. The developing retina and nervous system of an unborn child may benefit from maternal consumption of fish during pregnancy. Additionally, fish consumption has been associated with a decreased risk of heart attack and coronary artery disease in adults (Neuringer, M., S. Reisbick, and J. Janowsky, 1994. The role of n-3 fatty acids in visual and cognitive development: current evidence and methods of assessment. J. Pediatr. 125:S39-47. Toxicology Excellence for Risk Assessment TERA, 1999. Comparative Dietary Risks: Balancing the Risks and Benefits of Fish Consumption. Results of a Cooperative Agreement between US. Environmental Protection Agency and Toxicology Excellence for Risk Assessment Final). However, a form of methylmercury known as methylmercury can accumulate to harmful concentrations in predatory fish (Environmental Protection Agency EPA, 1997. Summary. Vol. 1. In: Environmental Protection Agency (US). Methylmercury Study Report to Congress. Washington: EPA. Pub. No.EPA-452/R-97-001). Consumption of these fish by pregnant and/or nursing women and by children poses a health risk to children and fetuses.

The developing human nervous system is particularly sensitive to methylmercury. Several studies have reported increasing effects on the developing nervous system of an unborn child with increasing maternal methylmercury exposure from routine fish and whale consumption. Neurological processes in the areas of language, attention, and memory were most affected. According to the National Academy of Sciences, studies conducted in the New Zealand and Faroe Islands show that the deficits observed can be considered predictive of problems in cognitive and academic performance associated with methylmercury exposure, or can affect the way the children may think, learn, and problem solve. These studies have shown the developing fetus to be at least three times more sensitive than adults (NRC National Research Council 2000. Toxicological Effects of Methylmercury. Committee on the Toxicological Effects of Methylmercury, Board on environmental Studies and Toxicology, Commission on Life Sciences, National Research Council. Washington, DC: National Academy Press).

Routine consumption of fish containing concentrations of 0.4 mg/kg or greater of methylmercury poses an increased risk of neurodevelopmental effects for the developing fetus and children under 15 years of age (US EPA Water Quality Criterion for the Protection of Human Health: Methylmercury, Final. Office of Science and Technology, Office of Water, Washington, DC. EPA-823-R-01-001. January 2001). The US EPA reference dose for methylmercury is 0.1 ug/kg-day (corresponds to maternal hair level of 1 mg/kg and blood level of 5.8 ug/L). This is the dose that is not likely to be associated

with health effects for the developing fetus and child. Routine consumption of fish containing 0.4 mg/kg of methylmercury can result in exceedance of the US EPA reference dose for methylmercury. To derive the reference dose of 0.1 ug/kg-day, EPA calculated benchmark doses (BMD) or doses associated with a 5% incremental risk above background (background associated with 5% risk) of having abnormal neuropsychological test scores for children from the Faroe Islands located in the North Sea between Scotland and Iceland. These test scores provide a measure of the way children learn, think, and problem solve. The mothers of these children consumed three fish meals per week and less than one pilot whale meal per month. The benchmark dose chosen based on EPA and National Academy of Science review was 85 ppb in cord blood which corresponds to 15 mg/kg in hair. At these blood and hair levels, there is an estimated 5% incremental risk above background of having abnormal neuropsychological test scores. EPA determined the 95% confidence interval or the range of doses that would be expected to be associated with a total 10% risk of having abnormal scores or 5% incremental risk above background. The lowest dose of this interval was 58 ppb in cord blood or 10 mg/kg in maternal hair and is designated as the Benchmark Dose Limit (BMDL). This corresponds to an intake of 1.081 ug/kg-day. An uncertainty factor of 10 was applied to the 1.081 ug/kg-day to account for variability in susceptibility within the study cohort, variability in pharmacokinetic parameters for methylmercury, and lack of data on long term sequelae of in utero exposure. The resulting reference dose is 0.1 ug/kg-day or 0.0001 mg/kg-day corresponding to hair level of 1.0 mg/kg. (Reference dose of 0.0001 mg/kg-day supported by the National Academy of Sciences as referenced in the Toxicological Effects of Methylmercury, National Research Council, National Academy Press, Washington, DC 2000.)

The Centers for Disease Control and Prevention's 1999 National Health and Nutrition Examination Survey (NHANES) reported blood and hair methylmercury sample results for women ages 16 to 49. Approximately 10 percent of the women surveyed had hair methylmercury levels above the EPA-recommended hair level of 1 mg/kg to protect developing fetuses (corresponds to reference dose of 0.1 ug/kg-day). According to the Centers for Disease Control and Prevention, this indicates a narrow margin of safety for some fetuses (Blood and Hair Methylmercury Levels in Young Children and Women of Childbearing Age–United States, 1999. 1999 National Health and Nutrition Examination Survey, *MMWR* March 02, 2001 /50 (08);140-3). EPA estimates that at or below the reference dose of 0.1 ug/kg-day or maternal hair level of 1 mg/kg, chronic noncancer health effects are not likely to occur. But as the exposure dose increases above the EPA reference dose, the probability of adverse health effects also increases.

FISH TISSUE SAMPLING LED TO STATE ADVICE

In January 2001, the United States Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA) issued national advisories for fish due to the presence of methylmercury in fish. Some fish like shark, swordfish, king mackerel, and tilefish contain high levels of methylmercury. EPA and FDA are concerned that maternal or child consumption of these fish could cause harm, particularly to the developing brain of the fetus and child. The federal advisories recommend that women of childbearing age and children not eat shark, swordfish, king mackerel, and tilefish. However, federal officials recognize the health benefits of eating fish and are recommending that women of childbearing age and children eat up to two meals a week of other fish including fish sold in stores and restaurants as well as those caught in freshwater and the ocean. The NC Department of Health and Human Services has developed fish consumption advice that supplements the EPA and FDA advisories for sensitive populations which can be found at http://www.epi.state.nc.us/epi/fish/.

This new advice was based on the toxicological review completed by the National Academy of Sciences and the 1990-1999 methylmercury freshwater fish tissue data collected across the state (Toxicological Effects of Methylmercury, National Research Council, National Academy Press, Washington, DC 2000; Booker, J. memo to Williams, L. 2001. Center for Health Informatics and Statistics statistical analyses of North Carolina methylmercury fish tissue data).

The mean and/or median levels for all the basins sampled are compared to the level of concern of 0.4 mg/kg. Based on the statewide basin-by-basin review, the median methylmercury levels for largemouth bass, bowfin, and chain pickerel are equal to or greater than the 0.4 mg/kg in a majority of the basins located south and east of Interstate 85. For largemouth bass, the median methylmercury levels for 10 out of 16 basins sampled were equal to or greater than 0.4 mg/kg. For bowfin, the median methylmercury levels for 11 out of 12 basins sampled were equal to or greater than 0.4 mg/kg. For chain pickerel, the median methylmercury levels for 9 out of 10 basins sampled were equal to or greater than 0.4 mg/kg. In addition, the statewide mean and median methylmercury levels for largemouth bass, bowfin, and chain pickerel are all greater than 0.4 mg/kg. The number of largemouth bass, bowfin, and chain pickerel sampled across the state was 820, 475, and 103, respectively.

Approximately 26 states have issued methylmercury fish consumption advisories for largemouth bass, bowfin, and chain pickerel (http://www.epa.gov/ost/fish).

Based on NC DHHS review of the fish tissue data and risk assessment, three freshwater species have been added to the federal list of fish

recommended for no consumption for sensitive populations. NC DHHS is advising that women of childbearing age – including women who are likely to get pregnant, nursing women, and pregnant women – and children under 15 years of age follow FDA advice and not eat shark, swordfish, king mackerel, and tilefish. According to FDA, the average methylmercury levels for tilefish, swordfish, shark, and king mackerel are 1.45 mg/kg, 1.00 mg/kg, 0.96 mg/kg, and 0.73 mg/kg, respectively. Also, these individuals should not eat bowfin (blackfish), chain pickerel (jack fish) or largemouth bass collected from North Carolina waters south and east of Interstate 85 (areas of concern for these species).

NC DHHS is advising that women of childbearing age and children eat two meals per week of fish low in methylmercury like farm-raised fish, canned tuna and other canned fish, fish sticks, shrimp, crab, lobster, clams, oysters, scallops, salmon, trout, cod, whitefish, pollock, mahi-mahi, ocean perch, halibut, haddock, flounder, croaker, herring, crappie, sunfish, white perch, yellow perch, and bream.

HUMAN METHYLMERCURY BURDEN

Methylmercury is a metal and never degrades or breaks down in the environment to a less toxic form. In fact, methylmercury is often converted in the aquatic environment to a much more toxic form, methylmercury. This is the form of methylmercury that is incorporated into the food chain so efficiently that fish at the top of the aquatic food chain can have concentrations of methylmercury in their muscle tissue that can be one million times higher than the methylmercury concentration in the water. Fish consumption is the primary way that both humans and wildlife are exposed to methylmercury. Methylmercury can accumulate to harmful concentrations in predatory fish. In North Carolina, high levels of methylmercury (levels at 0.4 mg/kg or greater) have been found in ocean fish like shark, swordfish, king mackerel, and tilefish, and in freshwater fish like largemouth bass, bowfin, and chain pickerel south and east of Interstate 85. Women of childbearing age and children have been notified through advisories to not eat the four ocean fish and the three freshwater fish south and east of Interstate 85 (primarily located in the south eastern portion of the state) but have been given recommendations to eat other low methylmercury fish. See attached maps. These advisories have been issued to protect the most sensitive population, the developing child. The developing human nervous system is particularly sensitive to methylmercury. Several studies have reported increasing effects on the developing nervous system of an unborn child with increasing maternal methylmercury exposure from routine fish and whale consumption. Neurological processes in the areas of language, attention, and memory have been most affected.

The NC DHHS is seeking funding from the Centers for Disease Control and Prevention to conduct biomonitoring in seven counties including

Columbus (Co), Brunswick (Br), Bladen (Bl), Moore (Mo), Scotland (Sc), Duplin (Du), and Martin (Ma) Counties. The largemouth bass and bowfin in these counties have some of the highest methylmercury fish tissue concentrations in the state. Based on consultation with local residents from these counties and with the North Carolina Fish and Wildlife, there are recreational and subsistence fishermen in these counties. The potential for exposure to high levels of methylmercury exists for individuals living in these counties. Even though there are advisories in these areas, the people may not be aware of the advisories or may choose to ignore them. An epidemiological study consisting of blood and hair methylmercury analysis was completed in 1990 after discovering elevated fish tissue levels in largemouth bass and bowfin for Columbus and Brunswick Counties. Some of the highest levels of methylmercury in human hair and blood ever recorded in the United States have been identified among residents living in Columbus and Brunswick Counties. The purpose of this study was to determine if the subsistence fishermen in these counties had elevated methylmercury blood or hair levels. A total of 64 blood samples and 77 hair samples were collected for 81 residents living in these two counties. There was a positive correlation between residents with high rates of fish consumption from the waters under advisory and elevated methylmercury hair and blood levels. The blood levels ranged from non detect to 141 ug/L (well above 5 % effect level of 58 ug/L associated with abnormal neurodevelopmental scores above background). The hair levels ranged from non detect to 33.5 mg/kg (well above 5% effect level of 10 mg/kg associated with abnormal neurodevelopmental scores above background).

Additional biomonitoring is needed to prevent illness and improve public health through the following:

- To determine awareness of the fish advisories pertaining to methylmercury and to also communicate the fish advisories.
- To modify and/or expand approach for communicating fish advisories if decreased awareness or individuals are not following advice.
- To determine methylmercury body burden levels among women of childbearing age and children within the counties that have some of the highest methylmercury fish tissue levels in the state and to recommend low methylmercury fish choices.

The results of the study will benefit women of childbearing age and their offspring. The program will obtain information about the proportion of women who are aware of the advisory and how to successfully distribute advisory information to women who are not getting the message. By increasing the proportion of women who are aware of the advisory, the program will decrease methylmercury exposure to the women and their offspring. In addition, the intervention design will be shared with other states so that their advisory information will be distributed successfully to this subpopulation. The end result is to ensure that women of childbearing age are getting the advisory

information so that they will limit their exposure to methylmercury and other contaminants through consumption of fish.

Estimated Risk to Newborns in North Carolina

The potential number of newborns in North Carolina at risk from maternal exposure to methylmercury is calculated using data from the 1999 National Health and Nutrition Examination Survey (NHANES). This survey reported blood and hair methylmercury sample results for women ages 16 to 49. Approximately 10 percent of the women surveyed had hair methylmercury levels above the EPA-recommended hair level of 1 mg/kg to protect developing fetuses (corresponds to reference dose of 0.1 ug/kg-day). According to the Centers for Disease Control and Prevention, this indicates a narrow margin of safety for some fetuses (Blood and Hair Methylmercury Levels in Young Children and Women of Childbearing Age–United States, 1999. 1999 National Health and Nutrition Examination Survey, *MMWR* March 02, 2001 /50 (08);140-3). EPA estimates that at or below the reference dose of 0.1 ug/kg-day or maternal hair level of 1 mg/kg, chronic noncancer health effects are not likely to occur. But as the exposure dose increases above the EPA reference dose, the probability of adverse health effects also increases.

Using this information, one may extrapolate to find the number of newborn infants in North Carolina that may potentially be at risk. This extrapolation assumes that the NHANES population surveyed is representative of a cross section of North Carolina and that women in North Carolina have methylmercury levels similar to levels found in the NHANES survey.

Based on the 1995 national fecundity rates for women ages 15 to 44 and the population data for North Carolina, it is estimated that there are 1,105,045 fertile women in North Carolina (National Center for Health Statistics, http://www.cdc.gov/nchs/data/series/sr_23/sr23_19.pdf). Using the North Carolina fertility rate of live births of 67.5 per 1,000 fertile women for 1999, one can expect 74,590 live births (Center for Health Informatics and Statistics, http://sdc.state.nc.us). If one assumes that 10 percent of the maternal hair levels for the 74,590 births are greater than 1 mg/kg as reported in the national survey, then 7,459 North Carolina fetuses may be at a dose higher than that recommended by EPA. EPA estimates that chronic noncancer health effects are not likely to occur at or below the reference dose. But as the exposure dose increases above the EPA reference dose, the probability of adverse health effects also increases.

Need for Mercury Biomonitoring in North Carolina

Mercury is a metal and never degrades or breaks down in the environment to a less toxic form. In fact, mercury is often converted in the aquatic environment to a much more toxic form, methylmercury. This is the

form of mercury that is incorporated into the food chain so efficiently that fish at the top of the aquatic food chain can have concentrations of methylmercury in their muscle tissue that can be one million times higher than the mercury concentration in the water. Fish consumption is the primary way that both humans and wildlife are exposed to mercury. Methylmercury can accumulate to harmful concentrations in predatory fish. In North Carolina, high levels of methylmercury (levels at 0.4 mg/kg or greater) have been found in ocean fish like shark, swordfish, king mackerel, and tilefish, and in freshwater fish in the south eastern portion of North Carolina like largemouth bass, bowfin, and chain pickerel. Women of childbearing age and children have been advised through advisories to not eat the four ocean fish and the three freshwater fish south and east of Interstate 85 (primarily located in the south eastern portion of the state) but have been given recommendations to eat other low mercury fish. These advisories have been issued to protect the most sensitive population, the developing child. The developing human nervous system is particularly sensitive to mercury. Several studies have reported increasing effects on the developing nervous system of an unborn child with increasing maternal mercury exposure from routine fish and whale consumption. Neurological processes in the areas of language, attention, and memory have been most affected.

As shown in the attached maps, the seven counties considered in the mercury biomonitoring study include Columbus (Co), Brunswick (Br), Bladen (Bl), Moore (Mo), Scotland (Sc), Duplin (Du), and Martin (Ma) Counties which have some of the highest mean methylmercury concentrations reported in the state for largemouth bass and bowfin. Based on consultation with local residents from these counties and with the North Carolina Fish and Wildlife, there are recreational and subsistence fishermen in these counties. The potential for exposure to high levels of methylmercury exists for individuals living these counties. Even though there are advisories in these areas, the people may not be aware of the advisories or may choose to ignore them. Some of the highest levels of mercury in human hair and blood ever recorded in the United States have been identified among residents living Columbus and Brunswick Counties (two counties being considered in the study and have some of the highest methylmercury levels in largemouth bass and bowfin in the state). After finding elevated methylmercury levels in largemouth bass and bowfin, an epidemiological study in 1990 was conducted where 64 blood samples and 77 hair samples were collected for 81 residents living in these two counties. There was a positive correlation between residents with high rates of fish consumption from the waters under advisory and elevated mercury hair and blood levels. The blood levels ranged from non detect to 141 ug/L (well above 5 % effect level of 58 ug/L associated with abnormal neurodevelopmental scores above background). The hair levels ranged from non detect to 33.5 mg/kg (well above 5% effect level of 10 mg/kg associated with abnormal neurodevelopmental scores above background).

Additional biomonitoring is needed to prevent illness and improve public health through the following:

- To determine awareness of the fish advisories pertaining to mercury and to also communicate the fish advisories.
- To modify and/or expand approach for communicating fish advisories if decreased awareness or individuals are not following advice.
- To determine mercury body burden level among women of childbearing age and children within the counties that have some of the highest methylmercury fish tissue levels in the state and to recommend low mercury fish choices.

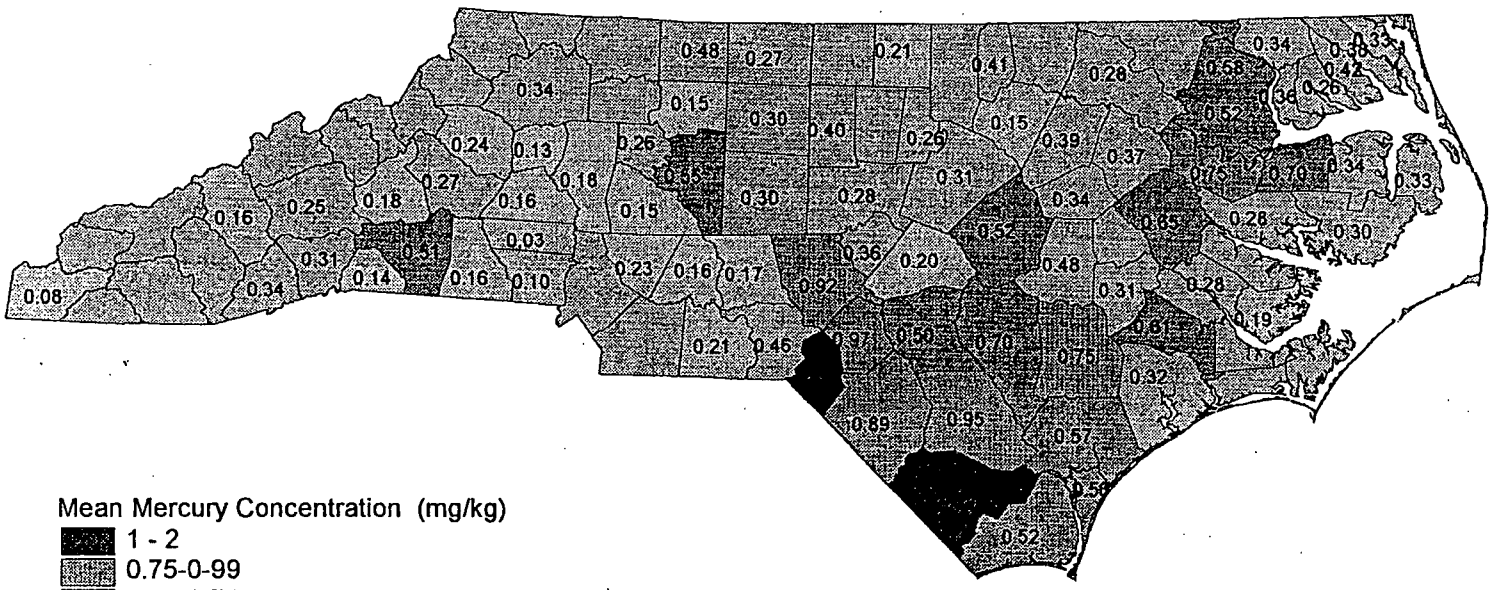
The results of the study will benefit women of childbearing age and their offspring. The program will obtain information about the proportion of women who are aware of the advisory and how to successfully distribute advisory information to women who are not getting the message. By increasing the proportion of women who are aware of the advisory, the program will decrease mercury exposure to the women and their offspring. In addition, the intervention design will be shared with other states so that their advisory information will be distributed successfully to this subpopulation. The end result is to ensure that women of childbearing age are getting the advisory information so that they will limit their exposure to mercury and other contaminants through consumption of sport fish.

References

1. Neuringer, M., S. Reisbick, and J. Janowsky, 1994. The role of n-3 fatty acids in visual and cognitive development: current evidence and methods of assessment. J. Pediatr. 125:S39-47.
2. Toxicology Excellence for Risk Assessment (TERA), 1999. Comparative Dietary Risks: Balancing the Risks and Benefits of Fish Consumption. Results of a Cooperative Agreement between US. Environmental Protection Agency and Toxicology Excellence for Risk Assessment (Final).
3. Environmental Protection Agency (EPA), 1997. Summary. Vol. 1. In: Environmental Protection Agency (US). Mercury Study Report to Congress. Washington: EPA. Pub. No.EPA-452/R-97-001.
4. NRC (National Research Council). 2000. Toxicological effects of methylmercury. Committee on the Toxicological Effects of Methylmercury, Board on environmental Studies and Toxicology, Commission on Life Sciences, National Research Council. Washington, DC: National Academy Press.
5. Booker, J. memo to Williams, L. 2001. Center for Health Informatics and Statistics statistical analyses of North Carolina mercury fish tissue data.

Methylmercury Concentrations (mg/kg)

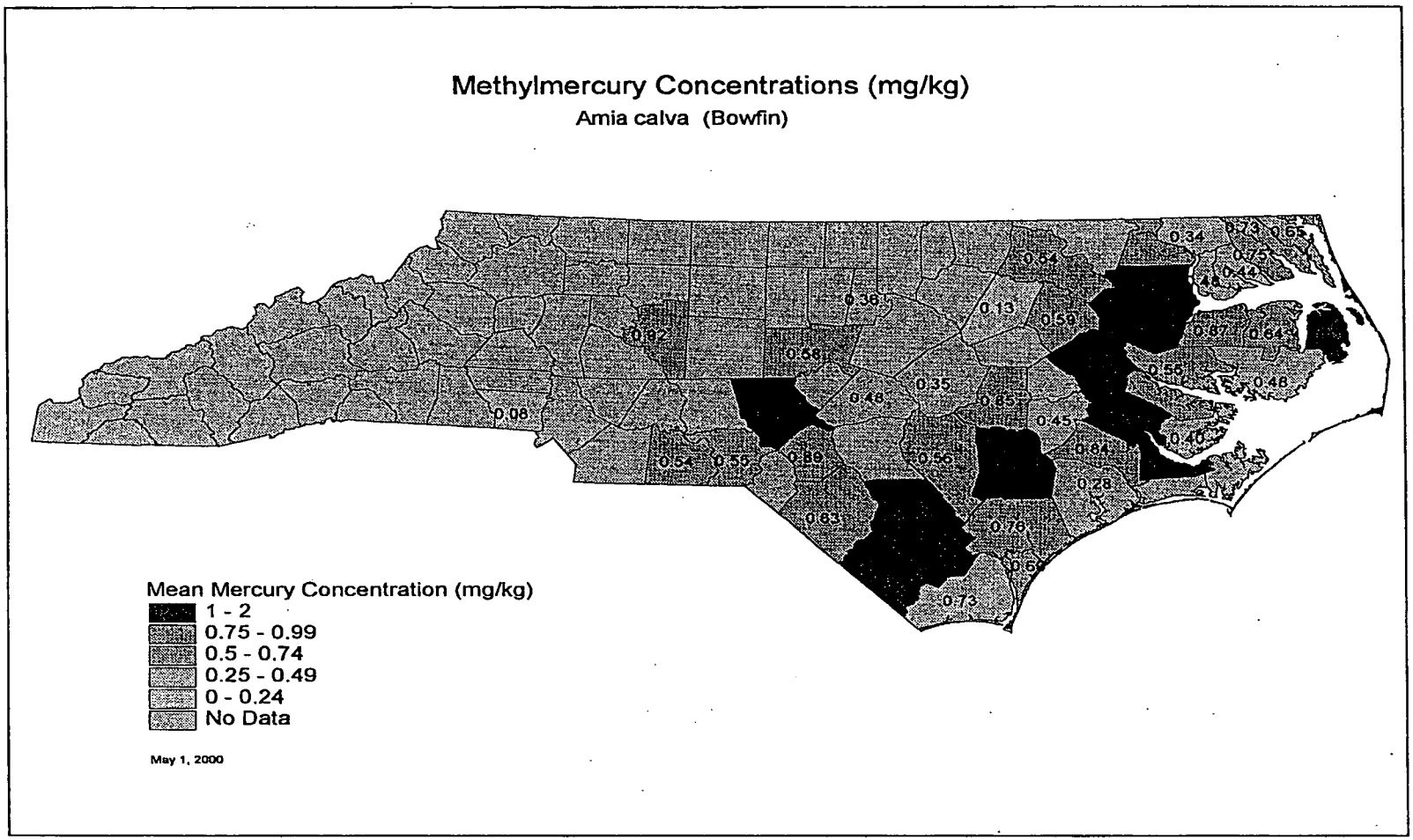
Micropterus salmoides (Largemouth Bass)



Mean Mercury Concentration (mg/kg)

- 1 - 2
- 0.75-0-99
- 0.5 - 0.74
- 0.25 - 0.49
- 0 - 0.24
- No Data

May 1, 2000


Methylmercury Concentrations (mg/kg)
Amia calva (Bowfin)
0.34
0.73
0.65
0.54
0.44
0.38
0.13
0.59
0.92
0.07
0.64
0.58
0.55
0.48
0.35
0.46
0.85
0.45
0.08
0.40
0.54
0.55
0.89
0.56
0.64
0.28
0.83
0.76
0.69
0.73
Mean Mercury Concentration (mg/kg)
1 - 2
0.75 - 0.99
0.5 - 0.74
0.25 - 0.49
0 - 0.24
No Data
May 1, 2000

CHAPTER 4 - NC SAFE FISH EATING GUIDELINES

Prepared by the
Medical Evaluation and Risk Assessment Unit (MERAU)

August 29, 2001

Women of Childbearing Age (15-44 years), Pregnant Women, Nursing Women, and Children Under 15 Years

- **Eat two meals per week of fish low in methylmercury** like farm-raised fish, canned tuna and other canned fish, fish sticks, shrimp, crab, lobster, clams, oysters, scallops, salmon, trout, cod, whitefish, pollock, mahi-mahi, ocean perch, halibut, haddock, flounder, croaker, herring, crappie, sunfish, white perch, yellow perch, and bream.*

- **Do not eat** shark, swordfish, tilefish, or king mackerel.** Also, **do not eat** bowfin (blackfish), chain pickerel (jack fish) or largemouth bass caught in North Carolina waters south and east of Interstate 85.

Other Women, Men, and Children over 15 Years

- **Eat four meals per week of fish low in methylmercury** like farm-raised fish, canned tuna and other canned fish, fish sticks, shrimp, crab, lobster, clams, oysters, scallops, salmon, trout, cod, whitefish, pollock, mahi-mahi, ocean perch, halibut, haddock, flounder, croaker, herring, crappie, sunfish, white perch, yellow perch, and bream.*

- **Eat no more than one meal per week** of shark, swordfish, tilefish, or king mackerel. Also, **eat no more than one meal per week** of bowfin (blackfish), chain pickerel (jack fish), or largemouth bass caught in North Carolina waters south and east of Interstate 85.

*All fish and shellfish should be properly prepared and cooked.

**On January 12, 2001 EPA and FDA issued national fish consumption advisories due to high levels of mercury in some marine fish. These advisories recommend that women of childbearing age and children should not eat shark, swordfish, king mackerel or tilefish. The advisories also recommend that these individuals eat one to two meals a week of other (low-mercury) fish.

DISCUSSION OF NORTH CAROLINA SAFE FISH EATING GUIDELINES
DUE TO METHYLMERCURY IN FISH

August 29, 2001

Medical Evaluation and Risk Assessment Unit (MERAU)

Risk Assessment

Maternal consumption of fish containing methylmercury is associated with adverse fetal neurodevelopmental effects. Fetal exposure to methylmercury may affect the way a child thinks, learns, and problem solves later in life. Children under age 15 are considered to be potentially at risk from consumption of methylmercury in fish, since the neurological systems of children are more likely to be affected by methylmercury exposure than the neurological systems of adults. The risk assessment for methylmercury in fish is in Attachment A. Fish meals per month and week are calculated for women of childbearing age (15 to 44 years), children (under 15 years), and general public (males 15 years and older and women older than 44 years). The reference dose for methylmercury used for women of childbearing age and children is 0.1 ug/kg-day (corresponds to maternal hair level of 1 ppm and cord blood level of 5.8 ppb). The reference dose for methylmercury used for the general public is 0.3 ug/kg-day. Based on the risk assessment and EPA guidance, fish tissue concentrations of 0.4 ppm or greater pose an increased risk of neurodevelopmental effects for the developing fetus and children under 15 years of age (US EPA Water Quality Criterion for the Protection of Human Health: Methylmercury, Final. Office of Science and Technology, Office of Water, Washington, DC. EPA-823-R-01-001. January 2001).

Estimated Risk

The potential number of newborns in North Carolina at risk from maternal exposure to methylmercury is calculated using data from the 1999 National Health and Nutrition Examination Survey (NHANES). This survey reported blood and hair methylmercury sample results for women ages 16 to 49. Approximately 10 percent of the women surveyed had hair methylmercury levels above the EPA-recommended hair level of 1 ppm to protect developing fetuses (corresponds to reference dose of 0.1 ug/kg-day). According to the Centers for Disease Control and Prevention, this indicates a narrow margin of safety for some fetuses (Blood and Hair Methylmercury Levels in Young Children and Women of Childbearing Age–United States, 1999. 1999 National Health and Nutrition Examination Survey, *MMWR* March 02, 2001 /50 (08);140-3). EPA estimates that at or below the reference dose of 0.1 ug/kg-day or maternal hair level of 1 ppm, chronic noncancer health effects are not likely to occur. But as the exposure dose increases above the EPA reference dose, the probability of adverse health effects also increases.

There were no mercury levels greater than the 5 percent effect level of 10 ppm hair and 58 ppb blood, both of which are associated with a 5 percent risk of abnormal neurodevelopmental scores above background. Therefore, the potential risk to the developing fetuses of the women surveyed was reported to be less than 5 percent.

Using this information, one may extrapolate to find the number of newborn infants in North Carolina that may potentially be at risk. This extrapolation assumes that the NHANES population surveyed is representative of a cross section of North Carolina and that women in North Carolina have methylmercury levels similar to levels found in the NHANES survey.

Based on the 1995 national fecundity rates for women ages 15 to 44 and the population data for North Carolina, it is estimated that there are 1,105,045 fertile women in North Carolina (National Center for Health Statistics, http://www.cdc.gov/nchs/data/series/sr_23/sr23_19.pdf). Using the North Carolina fertility rate of live births of 67.5 per 1,000 fertile women for 1999, one can expect 74,590 live births (Center for Health Informatics and Statistics, http://sdc.state.nc.us). If one assumes that 10 percent of the maternal hair levels for the 74,590 births are greater than 1 ppm as reported in the national survey, then 7,459 North Carolina fetuses may be at a dose higher than that recommended by EPA but still be at less than a 5 percent risk of developing abnormal neuropyschological test scores. EPA estimates that chronic noncancer health effects are not likely to occur at or below the reference dose. But as the exposure dose increases above the EPA reference dose, the probability of adverse health effects also increases.

General Comments

MERAU requested that the North Carolina Department of Health and Human Services Center for Health Informatics and Statistics do a statistical analysis of the 1990 to 1999 total mercury fish tissue data collected by the North Carolina Department of Environment and Natural Resources Water Quality Section (see Attachments B and C). The mean and/or median levels for all the basins sampled are compared to the level of concern of 0.4 ppm. Based on the statewide basin-by-basin review, the median methylmercury levels for largemouth bass, bowfin, and chain pickerel are equal to or greater than the 0.4 ppm level of concern south and east of Interstate 85. For largemouth bass, the median methylmercury levels for 10 out of 16 basins sampled were equal to or greater than 0.4 ppm. For bowfin, the median methylmercury levels for 11 out of 12 basins sampled were equal to or greater than 0.4 ppm. For chain pickerel, the median methylmercury levels for 9 out of 10 basins sampled were equal to or greater than 0.4 ppm. In addition, the statewide mean and median mercury levels for largemouth bass, bowfin, and chain pickerel are all greater than 0.4 ppm. The number of largemouth bass, bowfin, and chain pickerel sampled across the state was 820, 475, and 103, respectively.

Fish tissue data are not available for some basins and counties as identified in Attachments B and C. In addition, the sample size per county is small. Because of the limited sample size per county, the mean and/or median for each basin is compared to the action level of 0.4 ppm. Recommendations will be made to the Water Quality Section to continue fish tissue sampling and total mercury fish tissue analysis, particularly in areas not previously sampled.

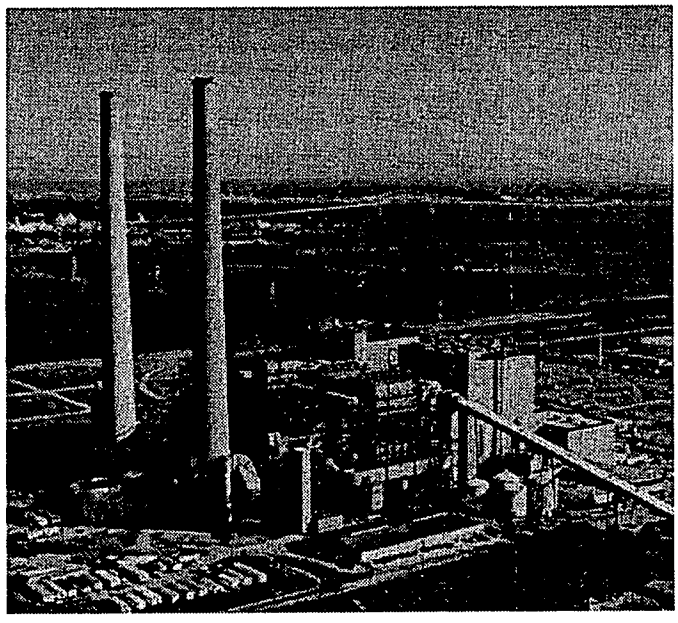
The majority of the basins sampled across the state had median (50th percentile) methylmercury levels of 0.4 ppm or greater for largemouth bass, bowfin, and chain pickerel (63%, 92%, and 90%) as identified in Attachment C. In other words, 50 percent of the largemouth bass, bowfin, and chain pickerel within the majority of basins sampled are at levels of concern. Approximately 26 states have issued mercury fish consumption advisories for largemouth bass, bowfin, and chain pickerel (http://www.epa.gov/ost/fish).

Based on MERAU review of the fish tissue data and risk assessment, MERAU is advising that women of childbearing age – including women who are likely to get pregnant, nursing women, and pregnant women – and children under 15 years of age follow FDA advice and not eat shark, swordfish, king mackerel, and tilefish. According to FDA, the average methylmercury levels for tilefish, swordfish, shark, and king mackerel are 1.45 pm, 1.00 ppm, 0.96 ppm, and 0.73 ppm, respectively. Also, these individuals should not eat bowfin (blackfish), chain pickerel (jack fish) or largemouth bass collected from North Carolina waters south and east of Interstate 85 (areas of most concern for these species).

MERAU is advising that women of childbearing age and children eat two meals per week of fish low in methylmercury like farm-raised fish, canned tuna and other canned fish, fish sticks, shrimp, crab, lobster, clams, oysters, scallops, salmon, trout, cod, whitefish, pollock, mahi-mahi, ocean perch, halibut, haddock, flounder, croaker, herring, crappie, sunfish, white perch, yellow perch, and bream.

MERAU is advising that the general public – all other women, men, and children over 15 years – eat no more than one meal per week of fish that may be high in methylmercury such as shark, swordfish, tilefish, and king mackerel. These individuals should eat only one meal per week of bowfin, chain pickerel, or largemouth bass collected in North Carolina waters south and east of Interstate 85. In addition, the general public should eat 4 meals per week of fish low in methylmercury, like farm-raised fish, canned tuna and other canned fish, fish sticks, shrimp, crab, lobster, clams, oysters, scallops, salmon, trout, cod, whitefish, pollock, mahi-mahi, ocean perch, halibut, haddock, flounder, croaker, herring, crappie, sunfish, white perch, yellow perch, and bream.

MERAU further recommends that all fish and shellfish be properly prepared and cooked.



CO_2 Emission Reduction Options For Coal-fired Electrical Utility Boilers and Other Stationary Sources

First Interim Report

September 1, 2003

NCDENR

North Carolina
Department of Environment and Natural Resources

Division of Air Quality
1641 Mail Service Center
Raleigh, North Carolina 27699-1641

The Requirement: Excerpted from the Clean Smokestacks Act

[**Title**: An Act to Improve Air Quality in the State by Imposing Limits on the Emission of Certain Pollutants from Certain Facilities that Burn Coal to Generate Electricity and to Provide for Recovery by Electric Utilities of the Costs of Achieving Compliance with Those Limits]

SECTION 13. The Division of Air Quality of the Department of Environment and Natural Resources shall study issues related to the development and implementation of standards and plans to implement programs to control emissions of carbon dioxide (CO_2) from coal-fired generating units and other stationary sources of air pollution. The Division shall evaluate available control technologies and shall estimate the benefits and costs of alternative strategies to reduce emissions of carbon dioxide (CO_2). The Division shall annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003. The Division shall report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than 1 September 2005. The costs of implementing any air quality standards and plans to reduce the emission of carbon dioxide (CO_2) from coal-fired generating units below the standards in effect on the date this act becomes effective, except to the extent that the emission of carbon dioxide (CO_2) is reduced as a result of the reductions in the emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO_2) required to achieve the emissions limitations set out in G.S. 143-215.107D, as enacted by Section 1 of this act, shall not be recoverable pursuant to G.S. 62-133.6, as enacted by Section 9 of this act.

GENERAL ASSEMBLY OF NORTH CAROLINA - SESSION 2001 – (SENATE BILL 1078)
Ratified the 19th day of June 2002. (Ch. SL 2002-4 S.13)
Marc Basnight - President Pro Tempore of the Senate
James B. Black - Speaker of the House of Representatives
Michael F. Easley - Governor

CO_2 Emission Reduction Options For Coal-fired Electrical Utility Boilers and Other Stationary Sources

First Interim Report
September 1, 2003

North Carolina
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Division of Air Quality
1641 Mail Service Center
Raleigh, North Carolina 27699-1641

Send comments to the above address or email to
NCCSA_CO2@ncmail.net

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross, Jr., Secretary

September 1, 2003

TO: Environmental Review Commission
Environmental Management Commission

FROM: William G. Ross, Jr. WGR/

SUBJECT: Mercury and CO_2 Reports Required by Clean Smokestacks Act

When the North Carolina General Assembly passed, and Governor Easley signed the Clean Smokestacks Act in June of 2002, our State took two crucial steps toward addressing several of the most pressing environmental and public health issues of our time. One step was highly visible, the other less so.

The visible step was to attack the problems of ozone, smog and pollution from fine particles by requiring North Carolina's fourteen coal-fired power plants to make deep cuts in sulfur dioxide and nitrogen oxides, and to do so quickly. The utility companies swung into action and are on schedule to achieve the required reductions.

The less visible, but nonetheless crucial, steps that North Carolina took under the leadership of the General Assembly and Governor Easley was to call for our state to address the issues related to the emissions of carbon dioxide from coal-fired power plants and other stationary sources also related to the emissions of mercury from power plants. Under the new law, our department, through our Division of Air Quality, will study and make findings and recommendations on both subjects in reports due in September 2003, 2004 and 2005. We are this week issuing the 2003 reports on CO_2 and mercury.

Why is it crucial that North Carolina address emissions of CO_2 and mercury? In my view it is crucial that we focus on the biggest problems facing us, and mercury and carbon dioxide emissions seem clearly to be among our biggest problems. With mercury, there is a growing concern about its impacts on public health. With carbon dioxide, there is the concern that we are changing the climate in a manner and pace that are unprecedented.

In his 2002 book, The Earth Remains Forever, Professor Rob Jackson of Duke University frames the question this way:

> "Based on current scientific evidence, I believe that by the end of the twenty-first century:
>
> I. There will be at least nine billion people on earth.
> II. Annual global energy use will be at least fifty percent higher per capita than at the end of the twentieth century, and total energy consumption will triple.

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III. Atmospheric carbon dioxide concentrations will be more than five hundred parts per million, double the pre-industrial levels and higher than at any time in the past forty million years. In consequence, the average temperature of the earth will be at least 5° F warmer.
IV. Thousands, perhaps millions, of species will be extinct.
V. The demographic and economic momentum behind these changes is immense." (p 129)

"Most of all, I want to know that we did our best, that we tried everything we could to preserve the quality of life for people today and tomorrow and saved as much room as possible for the rest of life on earth. Who doesn't want this? The moral, the practical, the ultimate question is what we do about it, what we will give up today so that we and our descendants and the rest of life on earth may have their tomorrow." (p.132)

Thanks to the leadership of the General Assembly and Governor Easley, our state is a national leader in reducing emissions of SO_2 and NOx from coal-fired power plants. To answer Professor Jackson's question, we are doing our best as a state on these two issues.

What will we do about mercury and carbon dioxide? Thanks again to our legislators and the Governor, we also have a chance to answer Professor Jackson's question, this time for mercury and carbon dioxide in a similar, positive way.

We appreciate your attention to these two reports. We look forward to your comments and questions about them.

Thank you.

Preface

This 2003 report has been produced by a working group within the North Carolina Division of Air Quality (DAQ). Stakeholders from both Duke Energy and Progress Energy, environmental interests (e.g. Environmental Defense Fund, Sierra Club etc.) and other organizations (e.g. NC Utilities Commission, State Energy Office, Global Warming Initiatives, Advanced Energy, Inc., etc.), through an open call, were invited to provide their insights, comments and input. The Division appreciates the efforts of all the stakeholders and other individuals who committed their time and effort to the development of this preliminary report. This open process will continue in the development of subsequent and final reports on this topic.

Many portions of this document were taken directly from other government (non-copyrighted) documents in the interest of time and completeness. Some of these sections may have only minor wording changes from the original documents. Quotations are not strictly used to identify these parts, but a strong effort was made to reference these documents and acknowledge them. The purpose has not been to claim credit for original work of others, but to provide as much detail and accuracy as possible within a limited time.

The objective of the 2003 report is to provide a general background ("state of knowledge") and to define the scope of efforts needed to address and respond to the legislative requirements. This 2003 report is a first step and will be followed with reports in 2004 and 2005 that build on the background contained in this report, on the increasing state of knowledge, on developments in the federal sector and on any courses of action that may follow. The 2003 report is the first step in a three-step process to study issues and make findings and recommendations related to the development and implementation of standards and plans to implement programs to reduce emissions of carbon dioxide from coal-fired power plants and other stationary sources of air pollution.

The 2004 report is due to the Environmental Management Commission and the Environmental Review Commission (of the Legislature) in September 2004. We expect to base that report on input from a proposed workshop (with presentations by DAQ, stakeholders and other state and outside experts) hosted by DAQ, in the spring of 2004, with supplemental information and summaries provided by DAQ staff. A third and final report, the 2005 report, will then be prepared by September 2005 and include findings and recommendations that build upon the 2003 and 2004 reports.

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Acronyms Used in This Report

AEFL - Amine-Enhanced Flue Lean Gas Reburn
CAA – Clean Air Act – Primary federal statute governing clean air requirements
CAPA – Clean Air Planning Act – Carper Bill
CCAR – California Climate Action Registry
CEM – Continuous Emission Measurement
CO_2 – Carbon Dioxide – the major global warming gas
CPA – Clean Power Act p Jeffords-Waxman Bill
CSA – NC Clean Smokestacks Act (Also see CSI, below)
CSI – Clear Skies Initiative – Proposal for revised CAA legislation by the Bush Administration (also recently referred to as Clean Skies Act, though not yet an actual Act)
DAQ – NC Division of Air Quality
DENR – NC Department of Environment and Natural Resources
DOA – Department of Agriculture (US and NC)
DOE – The US Department of Energy
EPA – US Environmental Protection Agency
GHG – Global Warming Gas(s)
GWP – Global Warming Potential
HFC's - Hydroflurocarbons
HVAC – High Volume Air Conditioning
IPCC - Intergovernmental Panel on Climate Change, international authority on climate change
LNB – Low NOx Burner
NAAQS – National Ambient Air Quality Standards
NAS - National Academy of Science
NC – North Carolina
NCSU – North Carolina State University
NESCAUM - Northeast States for Coordinated Air Use Management
NHCPS – New Hampshire Clean Power Strategy
NOx – Oxides of Nitrogen, including NO_2, the primary nitrogen species from combustion
OFA – Overfire Air
PFC's - Perfluorocarbons
ROFA – Rotating Opposed-Fired Air
ROTAMIX – Injection of Ammonia to further reduce NOx (Used in combination with ROFA)
RPS – Renewable Portfolio Standard
SCR – Selective Catalytic Reduction
SCRUB – Wet scrubber for SOx
SEO – State Energy Office of NC
SNCR – Selective Non-Catalytic Reduction
SOx – Oxides of Sulfur, including SO_2, the primary combustion product of sulfur
SUV – Sport Utility Vehicle
TFS2000 – Combination Low-NOx Burner/Overfire Air
UNFCCC - United Nations Framework Convention on Climate Change
WIR - Underfire Air

Super Summary

The NC DENR Division of Air Quality (DAQ) is required to provide three reports to the Environmental Management Commission and the Environmental Review Commission, by September 1, 2003, 2004 and 2005, addressing issues related to the development and implementation of standards and plans to control CO_2 emissions from coal fired utility boilers and other stationary sources of air pollution. This is the first of those three reports.

- The Executive Summary of this report provides a list of the major points determined to date:
  - Global warming/climate change is a real concern. (See background in Appendix)
    - Continually increasing man-made greenhouse gas emissions are an important causal factor in this phenomenon.
    - These conclusions are supported by a broad, but not unanimous, scientific consensus.
    - It is prudent that steps be taken to mitigate these changes.
    - The NC Legislature has recognized the seriousness of the problem and initiated these efforts to help determine ways to mitigate the problem.
    - Other sources of CO_2 and other global warming gases will need to be addressed in the overall solution.
  - CO_2 emissions occur when any carbon-based fuel is burned.
    - Coal fired power plants account for a major portion of the CO_2 emissions in the state.
    - Mobile sources, residential, industrial and commercial buildings and related facilities, agricultural burning and forest fires are also important direct CO_2 sources.
    - Buildings and facilities are also major consumers of electricity and, thus are indirect sources of CO_2.
  - Conventional "end of stack" emission controls applicable to reduction of CO_2 are not currently available, but research continues.
  - Reduction in energy consumption is a prime means for reduction in CO_2 emissions from coal fired power plants and other fossil fuel burners; whether by conservation, efficiency technologies or other means.
  - It is important that any solutions offered for use in NC be such that they can be integrated and synchronized with national/federal (and even international) efforts, particularly as they may apply to companies and other entities that have locations in multiple areas.
  - A number of other states are undertaking CO_2 reduction efforts. These efforts take a variety of forms and are described in Chapter 3.

- Further studies by the DAQ, stakeholders, universities and other interested parties over the next two years should provide valuable insights and recommendations into what is feasible, cost-effective and appropriate for North Carolina utilities and other stationary sources, relative to the best means to control and mitigate CO_2 emissions.

Chapter 1 Executive Summary

Summary of Statute

Chapter 2 The North Carolina (NC) Clean Smokestacks Act (CSA)[1] requires the NC Division of Air Quality (DAQ) of the Department of Environment and Natural Resources (DENR), to study issues related to the development and implementation of standards to control emissions of carbon dioxide (CO_2) from coal-fired generating units and other stationary sources of air pollution. (See the inside front cover for the actual language for the applicable section of the Act.) The NC DAQ is required to evaluate available control technologies and estimate the benefits and costs of alternative strategies to reduce emissions of carbon dioxide (CO_2). The findings of these studies and related recommendations are to be included in three reports to the Environmental Management Commission (EMC) and the Environmental Review Commission (ERC), annually, starting September 1, 2003 and continuing through September 1, 2005.

Emissions of global warming gases (GWG), especially CO_2, have been increasing proportional to man's population and sophistication. Many of these changes have happened almost without notice, just as the frog in the pot of water is not aware of the changes that take place gradually as it is heated to boiling. Though there are ways that CO_2 may be removed from the air ("sinks"), the emission side of the equation has been gaining rapidly in the last several decades, as is reflected in measurements in the ambient air. Forensic air quality scientists, who look at temperature measurements, concentrations in glacial air bubbles, and other means, tell us that atmospheric concentrations have risen almost by a factor of two in just the last century or so.[2] There are many off-setting causes of changes in CO_2 and the average global atmospheric temperature of the Earth, but many of the world's most recognized and respected scientists have declared that global warming/climate change is a real and growing problem that must be addressed soon. Otherwise, we will be like the frog and eventually face a less than desirable result. The challenge is difficult. However, the NC General Assembly has given us the charge to try to find ways to reverse this trend. At the end of the three years, the DAQ hopes to be able to make solid recommendations to assist in achieving this end.

Scope & Objectives of This and Future Reports

This report is intended to provide the background and 'state of the science' information on CO_2 emissions. The purpose is not to establish new scientific findings, but instead to identify and summarize work already accomplished by others and apply it to North Carolina. We hope to present objective analyses and conclusions to help the EMC, the ERC, the General Assembly and our state sort through the facts and issues in order to arrive at reasonable and prudent actions and recommendations for action. The intent is that these recommendations and actions precipitate actions that will conserve and protect our natural resources and maintain a high quality environment for the health and well-being of all North Carolinians.

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[1] SECTION 13, Clean Smokestacks Act; General Assembly of North Carolina - Session 2001 – (SENATE BILL 1078), Ratified the 19th day of June, 2002.

[2] Rob Jackson, The Earth Remains Forever, University of Texas Press, 2002.

The phenomenon of global warming ("**Climate change**") has been widely accepted by the scientific community worldwide. However, technical issues related to the severity of the impacts associated with global warming or climate change can generate extended discussion. The topic of this report is not one to study in isolation. Climate change in North Carolina is not affected by science and conditions that pertain just to this state or just within the state's boundaries. Actions in other states and regions, and on the national and international level, will be required for changes made in North Carolina to realize their full potential to protect the health of our citizens and our environment. However, studies and NC's experiences with other air pollutants have shown that cleaning up at home first provides the most benefits to a state and can lead the way to action on a much broader scale. Eileen Claussen of the Pew Center on Global Climate Change recently summarized the issues current status of climate change understanding and emphasized that the debate has shifted from "whether to do something" to "what to do and when to do it."[1] A background discussion summarizing more of the scientific background and consensus is contained in the Appendix to this report.

Federal Actions and Requirements

There are currently no federal standards for the control of carbon dioxide emissions or for the broader group of Greenhouse Gases (GHG). However, much effort has been expended on this topic within the national and international arenas in the past 25-30 years. During these times various reduction strategies have been developed and promoted, registries have been implemented, and research continues, but no significant and specific federal mandates currently exist to control them in the United States. Efforts to formalize and finalize subscription to international treaties related to international registries and to tracking and reducing GHG have not been (and may not be) completed by the US. However, significant research continues and efforts to refine existing federal registries to allow for reductions in GHG by cap and trade programs appear to be gaining momentum. Significant announcements of efforts to expand the program and provide more uniform and universally interchangeable quantification and certification of such emissions are expected from the US Department of Energy (DOE) soon.

The Kyoto protocol is frequently mentioned in regard to climate change and to track and mitigate emissions. The US has participated in several world conferences dealing with global climate change.[2] In Kyoto, Japan, in 1997, most industrial countries of the world tentatively agreed to undertake efforts to lower their GHG productions to, or below, 1990 levels. Negotiators for the US tentatively proposed to reduce emissions by 7% below 1990 emissions level, and to achieve this target between 2008 and 2012. However, the treaty has not been ratified by the United States. The Bush Administration made significant changes in the U.S. position. These changes would delay or preclude the treaty from being ratified by the U.S. at all.

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[1] Eileen Claussen, "Climate Change: Then and Now," A speech to the Environmental Council of the States (given in Salt Lake City); Pew Center on Global Climate Change, Washington, D.C., August 2003

[2] North Carolina's $ensible Greenhouse Gas Reduction $trategies Executive Summary, Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.

Additionally, in late July 2003, the Administration released a new plan. This plan focuses on additional research in several areas. However, some critics view it as a delay tactic.[1] Thus, the current position does not provide for U.S. support of the Kyoto accord. More on this topic is discussed later in this report.

Provisions of the Clear Skies Initiative (**CSI** - proposed by President George W. Bush - now also known as Clean Skies Act) and several bills that have been introduced into the U.S. Congress contain proposals for mitigation of CO_2. These are also referred to as the "multi-pollutant" bills or other variations of this term. The four pollutants involved are NOx, SOx, mercury and CO_2. Whether federal legislation will be enacted, and if so, whether it will address CO_2 and other GHG is unknown at this time.

Efforts by Other States

Several states have developed their own legislation and regulations, in spite of potential incongruence with proposed efforts at the federal level. Some observers have described the current level of state activity as "striking,"[2] in contrast to the lack of decisive federal actions. The cited Pew Center report discusses nine states with state-level initiatives, including NC. The NC reference is specifically for methane considerations from animal waste operations being researched at NCSU under the Smithfield Agreement. Efforts in these and other states (21 states are discussed individually later in this report) have covered a wide range, but typically, include development of registries, implementation of programs with specific targets, and promotion of the steps necessary for reduction of CO_2 and other GHG.

States often appear to be motivated not only by a sense of urgency to do something about the climate change, but also by the economic, social and environmental benefits that accompany reductions in GHG. These include cleaner air, cost savings from energy efficiency, marketing opportunities for renewable energy and other reasons that may sometimes seem unrelated to climate change. Many of the state programs to address climate change that exist today are part of an economic development strategy designed for the longer term. Renewed efforts toward a unified national and internationally acceptable registry with defensible reduction and tracking programs for these gases could result in less confusion and increased efforts to revamp existing programs. Resulting estimates could then be more universally compatible and be able to be banked and traded in a formal and certified manner. This topic is also discussed later in this report with state-by-state notes summarizing the major activities underway.

In an interesting, and possibly important recent development, attorneys general from the states of Connecticut, Maine and Massachusetts filed suit in federal district court in Connecticut (June 4, 2003) against EPA for its "failure to regulate carbon dioxide (CO_2) under the Clean Air Act." According to the lawsuit[3], EPA has acknowledged both that CO_2 emissions pose a serious

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[1] John Heilprin , "White House Wants More Research on Nature's Role in Global Warming"; Associated Press, Raleigh News and Observer; Raleigh, NC, July 25, 2003.

[2] Barry G. Rabe, Greenhouse & Statehouse: The Evolving State Government Role in Climate Change, University of Michigan and the Pew Center Global on Climate Change, November 2002

[3] Commonwealth of Massachusetts, State of Connecticut and State of Maine, Civil Action v. Christine Todd Whitman, in her capacity as Administrator of the United States Environmental Protection Agency, Defendant, United States District Court, District of Columbia, June 4, 2003.

risk to human health and that it has authority to regulate CO_2 emissions under the Clean Air Act (CAA). Accordingly, the suit claims that EPA has a mandatory duty to regulate CO_2 emissions under the CAA. If the lawsuit succeeded, EPA would have to list CO_2 as a criteria pollutant and develop a national ambient air quality standard for it. Since all health related impacts of the GHG appear to be "indirect," an entire new process would need to be developed to set such standards. Historically, this process has taken 10-15, or more, years to reach implementation.

Since the suit mentioned above and in a separate action, EPA has issued a ruling that CO2 is not an air pollutant subject to listing and regulation as a criteria pollutant under the Clean Air Act. Though the intent or effect may tend to be preemptive, this ruling was not as a result of the separate action still being (to be) considered in the court.

North Carolina Actions to Date

Little has been done from a programmatic or regulatory standpoint to mandate reduction of CO_2 emissions from coal-fired power plants or other sources. An effort by North Carolina to pursue participation in a climate change registry was initiated in 1994-1995 with a program called ***Climate-Wise***, a means to enter emissions into the US DOE registry and bring mitigation options to the attention of the participants, but this program has not included utility units. A number (39) of companies agreed to (and continue to) participate in this effort. However, the formal (financial) state support of this program has been cut. A private non-profit corporation was recently formed to continue the participation of these companies in this effort, on a voluntary basis. Since many of the results of this type of program tend to pay for themselves in cost savings, the state may need to look for ways to resume funding of this program. Other related energy (CO_2 generation) use reduction programs in place in the state are described in more detail later in this report.

In the 2003 North Carolina General Assembly, legislation was introduced, but never acted upon, to rekindle a "voluntary" state registry program for GHG. The bill recognized the possibility that GHG registration might become mandatory later. Coal fired utility boilers are a large contributor to this emission pool. However, these plants are already required to report their CO_2 emissions annually (the only GHG reported) to the EPA Acid Rain Program (Title IV of the Clean Air Act), which then reports these emissions. Other related efforts are underway and proposed regarding energy conservation and a state energy policy/plan. Such efforts are closely correlated to potential reductions of CO_2 in the state. More details are provided in later chapters.

Summary of Preliminary Findings and Plans

In this first report, no new and original scientific or technical findings are presented. (A background summary of what we perceive to be the underlying scientific consensus concerning climate change is included as an Appendix.) Judgments in this report are made using existing information and are based primarily on the work of others. Such judgments and findings will be refined and applied to North Carolina during the preparation of the 2004 and 2005 reports. This document has undergone a brief stakeholder participation process, but it was not subject to public hearings or other such reviews and participation. Future reports will be prepared with participation and input from stakeholders, members of the public, universities and other interested parties.

To date, we have concluded that the following are reliable statements on the issues:

- Leading national and international science authorities have concluded that man-made emissions contribute to climate change and that it is prudent to take steps to reduce those emissions. The accepted science and background information are discussed in more detail in the Appendix.
    - The Intergovernmental Panel on Climate Change's (IPCC) Working Group I has provided several conclusions related to the evidence of climate change phenomena and encourages mitigation actions. The panel concluded "An increasing body of observations gives a collective picture of a warming world and other (man-made) changes in the climate system." [1]
    - The Bush Administration commissioned and supports the conclusions of the National Academy of Science's (NAS) report entitled "Climate Change Science," which restated the IPCC conclusions and encourages reductions of GHG.
    - The Bush Administration's "US Climate Action Report 2002"[2] accepts and supports the conclusions of the above NAS report ("Greenhouse gases are accumulating in Earth's atmosphere as a result of human activities, causing global mean surface air temperature and subsurface ocean temperature to rise.")
    - CO_2 in the atmosphere (as well as other GHG) has continued to increase significantly over the last 100 years, especially in the latter half of the century (1950-2000). [3]
    - Despite the strong and growing scientific consensus, many still debate the severity of impacts from increased GHG, including CO_2[4], and what should be done in response to rising GHG levels.

- The NC General Assembly has directed DENR/DAQ to study issues related to the development and implementation of standards and plans to implement programs to control emissions of carbon dioxide from coal-fired generating units and other stationary sources. Here are some preliminary observations concerning the issue:
    - Climate change is a concern at all levels, from local to global, and must be addressed at local, state, national and international levels, with coordinated leadership contributing to efficient reductions.
    - Though a substantial effect from human activities is accepted, it is also necessary to recognize the Earth's underlying natural cycles of warming and cooling, but not to use this as an excuse for inaction.
    - The Kyoto Protocol has been signed by a majority of producers of GHG but not the United States.

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[1] Climate Change 2001: The Scientific Basis, Intergovernmental Panel on Climate Change (IPCC), 2001

[2] Climate Action Report, http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsUSClimateActionReport.html, US Department of State, Washington, DC, May 2002.

[3] Climate Change: State of Knowledge; Office of Science and Technology Policy; Office of the President, Washington, D.C., October 1997.

[4] Status of the Kyoto Protocol; The United Nations Framework Convention on Climate Change, July 2003.

- Options for reducing GHG emissions include conservation, process changes, development and adoption of new technologies and other approaches at all levels of society.
- CO_2 is only one of several (usually identified as 5 major[1]) greenhouse gases that affect the climate, but the CSA only addresses CO_2.
- The observed rise in CO_2 in the atmosphere is largely attributable to human activity, mainly the burning of fossil and other carbon fuels that release CO_2, though natural sources exist as well. Major anthropogenic sources include:
  - Fossil-fueled (and other carbon-based fuels) utility and other boilers,
  - Carbon-based-fueled internal combustion engines (automobiles, trucks, construction equipment, boats, lawnmowers, etc);
  - Incineration of refuse, prescribed burning, agricultural burning and other forms of combustion; and
  - Many industrial processes, especially those such as the petroleum refining and the petrochemical industry, where large quantities of carbon fuels are used.
- A distinction is normally made between fossil fuel combustion and "renewable" fuels, although combustion of one atom of carbon from any fuel (e.g. wood or alcohol) produces one molecule of carbon dioxide.

- Emission estimates are crucial for the analysis and management of CO_2.
  - CO_2 emissions are relatively easy to quantify (within a reasonable margin of error) by estimation and calculations;
    - However, few facilities are monitored by continuous emission measurement (CEM) instrumentation.
    - Protocols for estimation are not universally adopted which contributes to some imprecision, but the disagreements are generally minor.
  - Title IV of the Clean Air Act (1990 Amendments) requires coal-fired electric utilities to report CO_2 estimates to the US Environmental Protection Agency (EPA) annually;
    - A database of this information is publicly available from the EPA.
  - The emissions of CO_2 in North Carolina from known sources have been quantified by multiple studies.
    - These studies provide data that are acceptable for purposes of problem assessment,
    - However, for emission trading purposes, the protocols and documentation standards required may be inadequate.
  - EPA has compiled emission estimates of GHG for NC as part of a national effort.
    - EPA updates these estimates annually.
    - The initial effort used contract assistance from Appalachian State University.
      - That effort reflected review comments from the DAQ.
  - The US DOE and EPA promote, encourage and maintain registries of CO_2 and other emissions of GHG.
    - These registries are now separate and not identical in participation requirements and calculation standards or protocols.

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[1] Emissions of Greenhouse Gases in the United States 2001, DOE/EIA-0573, US DOE, Energy Information Administration, Washington, DC, December 2002.

        - They have a low probability to be merged into a combined national registry sometime in the future as would be desirable.
    - Several states have established their own registries (and mitigation activities) to address these gases, with 1990 (the baseline date in the Kyoto Protocol) being a common reference year.
    - A program called "***Climate Wise***" was developed by NC's Energy Office to provide a climate change gases registry program in 1994,
        - It was later discontinued due to budget cuts.
        - A "re-born" program is continuing via the private sector with a non-profit organization (Global Warming Initiatives, Inc.).
    - Other energy savings programs exist (and have been proposed) in NC that contribute, or have the potential to contribute, to the reduction of GHG emissions. For example, the proposed **NC Energy Plan** is closely aligned with these and based on similar principles. This report provides more detail in later discussions.

- Currently, reductions in emissions of CO2 are expected to most likely come from energy efficiency improvements and other measures to reduce fuel consumption.
    - When combustion occurs, carbon chemically bonds with oxygen to form CO_2 and releasing useful heat. CO_2 cannot be converted to a more desirable form (i.e. "unburned") without using up energy. Complete removal would require an equal or greater consumption of energy than was generated to burn it in the first place.
    - The recognized most effective way to "control" CO_2 is to refrain from or reduce burning of carbon-based fuels.
    - Many programs have successfully demonstrated the feasibility of increasing energy efficiency and reducing waste in order to burn less with the same product output.
    - Research studies of ways to collect and dispose of CO_2 in an acceptable manner are promising, but such processes would likely be very costly.
    - Scrubbers that control or reduce NOx or SO_2 emissions are not effective in significantly reducing CO_2.
        - Such scrubbers actually add a CO_2 penalty in that the increased power requirements for pumps, blowers, etc., affiliated with these controls reduce the net output of the facility by about 1%.
    - Several DOE (and other) research projects aim to
        - Increase efficiency of utility boilers and,
        - Control the gases by new and innovative methods (such as injection of the stack effluent into deep underground coal seams or brine pools).
        - However, these have not yet been proven successful or economically practical.
    - Policy changes that are under consideration for legislative actions nationally will likely have important impacts on NC efforts.

Therefore, DENR/DAQ expects to pursue the general course below following this initial report. This plan is a combination of several immediate actions and tracking of various efforts by others, in NC and elsewhere. We will build upon this report in the 2004 and 2005 reports. These actions include:

- To continue to recognize CO_2 as the most predominant climate change gas, especially for coal fired utility boilers addressed by the CSA,
- To acknowledge the importance of other climate change gases, such as methane.
- To continue to follow, evaluate and provide updated information regarding any breakthroughs in legislation or control technology research by federal and international organizations, especially those that might be promising for CO_2 reductions from NC sources.
- To continue to evaluate methods and programs (new and existing, such as ***Energy Star Partners***, ***Climate Challenge***, ***Green Power Program***, ***Climate Leaders***, and ***Climate-Wise, as related to the NC Energy Plan)*** - that can lead to reduction of CO_2 by energy efficiency increases, waste reductions, changes in processes (or product characteristics), etc. We expect that DAQ will be able to develop a basis to make other recommendations on ways to adopt and promote such methods and programs in NC, considering the environment and economy.
- To explore further concepts and actions to sequester carbon within the state, including but not limited to planting policies, species selection and other actions as have been initiated by NC State University (NCSU), the NC Department of Agriculture (DOA), DENR/Division of Forest Resources, etc., and make further recommendations as warranted.
- To continue to investigate alternative approaches and make recommendations for NC to take to establish/expand and otherwise participate in a registry of greenhouse gases.
- To explore the feasibility and effectiveness of statewide goals for reduction of GHG.
- To hold a broadly based (NC DAQ, stakeholders, other NC and outside experts) conference on CO_2 and Mercury in the spring of 2004 and use the results of this workshop in preparing the 2004 report.

Chapter 2 North Carolina Emission Sources and Characteristics

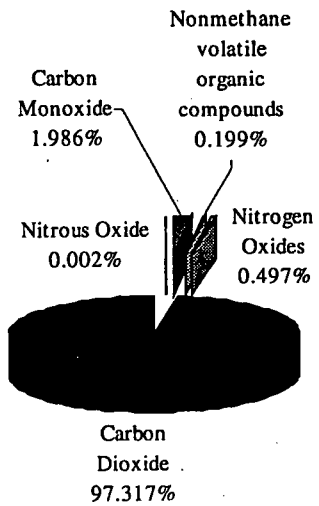
Databases Available and Used

Emissions of CO_2 are generally estimated, not measured. Consequently, there is always some level of uncertainty. However, because fuel use, and thus carbon, relate to operating costs, usage is generally tracked carefully, making estimation a relatively accurate way to determine CO_2 emissions. Several sources of information and data are available for coal fired utilities. The first is the Acid Rain data required by Title IV of the Clean Air Act.[1] These data are reported annually by each coal-fired power plant for each boiler. This information is available from EPA on the Internet. The second source is a series of reports annually published by EPA that use these data and other data to produce state-by-state and national emission estimates for GHG. The first such compilation for North Carolina was compiled for EPA by Appalachian State University[2, 3] in 1996 (for Calendar Year 1990). DAQ provided limited review of these data and we used them in this report.

Fuel Consumption in North Carolina

In NC, emissions from fossil-fuel combustion comprise the majority of GHG emissions. CO_2, resulting from the oxidation of the carbon in the fuel, is the predominant emission, in terms of mass or volume, from combustion processes (See Figure 2.1). Over 97% of the mass of GHG emissions attributable to combustion of fossil fuels is carbon dioxide.

Figure 2.1: Proportion of Greenhouse Gases from Combustion of Fossil Fuel in NC



[1] Clean Air Act; PL 101-549, 101st Congress, Washington, DC, November 15, 1990

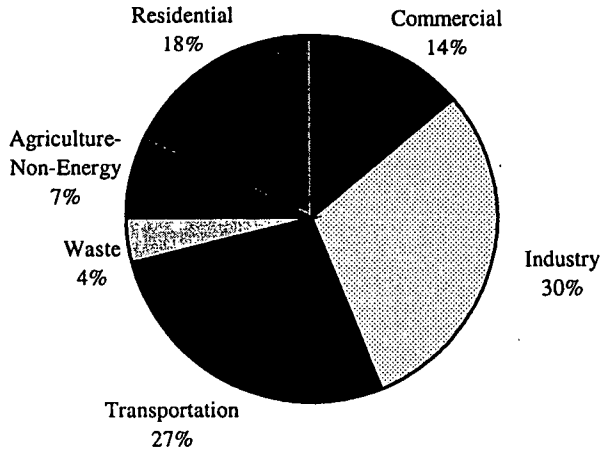
[2] Climate Change and North Carolina; US EPA, Climate and Policy Assessment Division, , EP 236-F-98-007q, September 1998.

[3] North Carolina's $ensible Greenhouse Gas Reduction $trategies Executive Summary; Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.

Emissions from fossil fuel combustion are related directly to the type and amount of fuel consumed, the efficiency with which the fuel is oxidized and the carbon content of the fuel. These relationships depend upon the amount of carbon contained in the fuel per unit of useful energy produced, which varies among different fuel types. For example, coal contains the highest amount of carbon per useful unit of energy, while petroleum and natural gas have about 80% and 55%, respectively, that of coal. In addition, due to inefficiencies in the combustion process, not all carbon in fuel products is oxidized to CO_2. Relatively minor amounts of carbon are incompletely oxidized to CO (carbon monoxide) which eventually is oxidized to CO_2 in the atmosphere or is removed by other sinks.

The Department of Geography and Planning at Appalachian State University generated a 1990 NC GHG emissions inventory.[1,2] Generating the GHG emissions inventory for 1990 was important because it established a baseline (consistent with the Kyoto Protocol) for strategic planning and it also identified areas where emission reductions can be targeted. Furthermore, the base year emissions inventory is integral in projecting future emissions because it serves as a baseline to compare the effectiveness of reduction strategies on future emissions inventories, and provides a sense of what sector of the economy is responsible for the use/emissions. Figure 2.2[3] provides a summary of the 1990 GHG emissions, by use sector, in North Carolina.

Figure 2.2 – North Carolina Greenhouse Gas Emissions in 1990 (with fossil-fueled utility electric generation allocated to sectors of the economy that used the electricity)



[1] North Carolina's $ensible Greenhouse Gas Reduction $trategies; Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.
[2] Climate Change and North Carolina'; EP 236-F-98-007q, EPA, Climate and Policy Assessment Division, September 1998.
[3] Ibid Reference 1

Commercial/Institutional Sector

The commercial/institutional sector includes a variety of buildings used by businesses, organizations, and government agencies, such as office buildings, hotels, multi-story apartments, beauty salons, bookstores, shopping malls, dry cleaners, lumber stores and school buildings. GHG emissions from the commercial/institutional sector come from energy for heating, cooling, lighting, domestic hot water, refrigeration, cooking, electronic equipment, and other similar operations. CO_2 emissions directly produced from combustion in this sector are approximately 49.4 % from natural gas; 42.2% from oil, 7% from coal and 1.5% from biomass.

CO_2 emissions from this sector totaled 3.7 million tons in 1990, only about 3% of the 120.9 million tons of CO_2 emissions that originated from fossil-fuel consumption in the state. Therefore, this sector is not the major (direct) generator of the carbon load being added to the atmosphere in NC, though they are a user of electric power and thus an indirect contributor.

Industrial/Manufacturing Sector

Direct emissions of CO_2 by the industrial/manufacturing sector in 1990 totaled 38.9 million tons from all carbon fuels, some 28.3% of the 137.4 million tons of CO_2 emitted due to combustion of all fuels in North Carolina. On a percentage basis, fuels utilized in the industrial/manufacturing sector are distributed among oil at 27.3%, coal at 19.4% and gas at 13.2%. Other fuels, primarily biomass (wood is commonly used as a fuel for many furniture and wood/paper product facilities), account for over 15 million tons of CO_2; or approximately 40% of the total.

NC Electric Production and Use

In North Carolina, coal, natural gas, light fuel oil, motor gas, diesel fuel, and propane account for nearly all of the CO_2 emissions. In 1990, electricity accounted for 59 million tons of CO_2 emissions. At 0.188 tons of CO_2 per million Btu, electric generation is the most GHG-intensive form of energy used in the state. Generation of electricity emits over twice as much CO_2 per unit of end use energy as gasoline and other petroleum products, and three times as much as the direct use of natural gas. Therefore, the utility sector is a key in any GHG reduction strategy.

The utilities sector produces electricity utilized by other sectors of the economy. As cited in *North Carolina's $ensible Greenhouse Gas Reduction $trategies*[1], the data used for 1990 allocated utility emissions to the end use sectors, specifically, industrial, commercial, residential, and agriculture. To prevent double counting of emissions attributable to the utilities sector, the report totaled the supply-side utilities emissions from the projected 2010 emissions totals, and subtracted the impact of all the electricity demand measures implemented in the end use sectors. Thus, it allows analysis of the impacts of strategies specific to the utilities sector.

North Carolina's energy demand is driven by the rapid growth in all sectors of the economy. The Virginia and Carolina Region of the Southern Electric Reliability Council

[1] North Carolina's $ensible Greenhouse Gas Reduction $trategies Executive Summary Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.

projected[1] peak load growths of 2.3% for both summer and winter peaks for 1995-2004. Furthermore, North Carolina's final electricity consumption in terms of kilowatt-hour (kWh) sales is evenly distributed between the residential (38.5%), commercial (28.3%), and industrial (32%) sectors. The state's electric demand growth is occurring in all three sectors.

In a "business-as-usual" forecast, these studies projected that electricity demand will likely grow to 512 trillion Btu by 2010, 31% higher than its 1990 level. The use of natural gas for power production was just beginning in 1990, but by 2010, it may grow to supply over 10% of the State's power. By 2010, the studies projected petroleum fueled power plants to grow to produce about 5% of the State's power.[2] Thus, electricity has experienced exponential growth.[3]

Figure 2.3:
Energy Use in Utility Sector

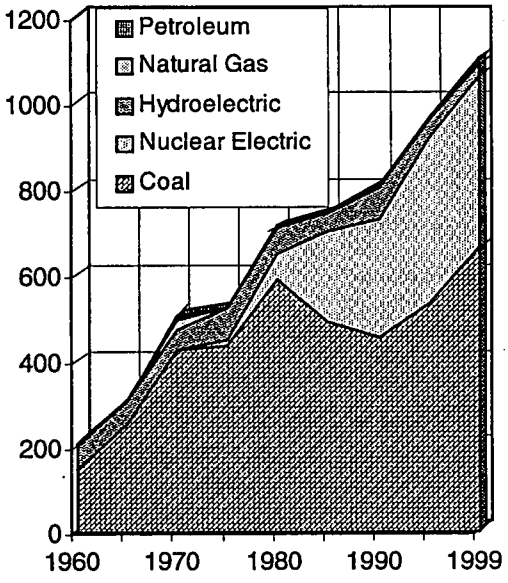


Figure 2.3 shows the trend for energy use in the electric utility sector. Coal has maintained and extended its historical dominance.

As shown in Table 2.1, coal-generated electricity currently provides about 60% of total electricity needs for North Carolina, nuclear power provides about 36%, hydroelectric plants supply 2.5%, and natural gas and petroleum supply 1% or less.

[1] North Carolina's $ensible Greenhouse Gas Reduction $trategies; Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.
[2] Ibid, Reference 1.
[3] The North Carolina Energy Plan (proposed), Chapter 3, http://www.ncenergy.appstate.edu/draft/index.php, June, 2003.

Table 2.1:Percentage of Total Electrical Production

	Coal	Natural Gas	Petroleum	Nuclear	Hydro
1960	71.1%	2.4%	0.2%	0.0%	26.3%
1965	80.7%	1.0%	0.1%	0.0%	18.2%
1970	84.5%	4.3%	2.2%	0.0%	9.1%
1975	82.6%	0.0%	0.4%	3.0%	14.0%
1980	82.4%	0.3%	0.5%	8.8%	8.0%
1985	65.8%	0.1%	0.3%	28.0%	5.7%
1990	56.1%	0.3%	0.3%	34.4%	9.0%
1991	53.5%	0.4%	0.2%	38.5%	7.4%
1992	62.9%	0.4%	0.2%	29.2%	7.3%
1993	64.8%	0.3%	0.2%	28.6%	6.1%
1994	55.7%	0.1%	0.3%	37.6%	6.3%
1995	55.4%	0.3%	0.2%	39.7%	4.3%
1996	60.3%	0.2%	0.3%	34.6%	4.5%
1997	63.0%	0.4%	0.3%	32.3%	4.0%
1998	58.5%	1.1%	0.3%	36.2%	3.7%
1999	60.0%	1.0%	0.3%	36.2%	2.5%

EXISTING COAL FIRED UTILITY CO_2 EMISSIONS

Coal combustion from the utility sector accounted for 45.9 million tons of CO_2 in 1990.[1] The quantities of other GHG emissions by utilities are relatively small. Emissions of carbon dioxide by specific fossil-fired power plants are shown in Table 2.2.

Table 2.2: CO_2 Emissions by Specific (CSA) Coal Fired Unit in North Carolina (tons)

Plant Name	1995	1996	1997	1998	1999	2000	2001
Asheville	2,939,767	3,055,829	2,558,792	2,518,633	2,866,123	3,003,068	2,730,256
Belews Creek	12,350,708	13,617,317	16,482,258	15,599,278	14,444,190	11,727,317	13,148,649
Buck	630,484	1,738,805	2,115,938	1,579,343	1,868,804	1,965,627	1,730,127
Cape Fear	1,599,350	1,873,205	1,681,188	1,813,330	1,681,385	1,664,803	1,535,760
Cliffside	2,784,386	3,847,189	3,746,374	4,341,770	3,827,848	4,167,193	4,049,227
Dan River	477,244	1,079,704	1,102,343	931,356	1,183,270	1,170,227	898,554
G G Allen	3,661,778	5,545,956	6,627,324	4,508,312	5,619,742	5,914,264	5,487,331
L V Sutton	1,971,796	2,731,810	2,416,051	3,090,303	2,937,714	2,911,009	2,678,861
Lee	994,751	1,489,375	1,701,086	1,991,169	2,034,902	2,497,634	2,438,866
Marshall	13,757,769	14,353,025	13,922,689	13,319,829	12,196,762	13,262,502	11,860,117
Mayo	5,035,618	3,953,151	5,529,689	5,156,271	5,105,715	5,827,689	5,211,732
Riverbend	395,414	2,098,651	1,987,603	1,888,967	1,781,849	2,666,624	2,374,459
Roxboro	14,220,431	14,554,168	14,775,907	15,425,770	16,092,702	15,575,045	14,983,859
Weatherspoon	313,653	663,004	777,718	854,583	859,787	939,474	845,393
Total	**61,211,611**	**70,771,537**	**75,645,953**	**73,625,012**	**72,975,847**	**74,058,731**	**70,821,909**

[1] The North Carolina Energy Plan (proposed), http://www.ncenergy.appstate.edu/draft/index.php , June, 2003.

A measure of relative CO_2 emission rate efficiency among power plants is the **CO_2 Emissions Rate** in pounds per Megawatt hour (lbs/MWh). This value for CSA-affected units is shown in Table 2.3, also adapted from the ASU reports previously cited.

Table 2.3: 1995 CO_2 Emissions Rate Data for NC's CSA Fossil Power Plants

Company	Plant Name	CO_2 Emissions Rate (lbs/MWh)
Duke		
	Bellews Creek	2,048
	Buck	2,537
	Cliffside	2,317
	Dan River	2,796
	GG Allen	2,186
	Marshall	2,182
	Riverbend	Not reported
Progress		
	Asheville	2,253
	Cape Fear	2,052
	HG Robinson	2,367
	LV Sutton	2,329
	Lee	2,306
	Mayo	2,479
	Roxboro	2,214
	Weatherspoon	2,498

PROPOSED CLEAN SMOKESTACKS CONTROLS BY PLANT

The CSA requires a level of system-wide controls for NOx and SOx, but does not specify any limits or specific control devices on specific plants. The management of that process is left to the utility to propose, based on technologies available, physical layout, costs and other plant-specific factors. The plants are required to keep DENR informed and will have to apply for specific permit changes in each instance. To date, both companies in NC that are effected by the requirements have provided lists of general types of devices that they are considering that will provide the reductions required (or better). These are still subject to some revisions as design, cost and other factors become more clearly defined and final decisions are made. Table 2.4 lists the proposed controls as of this writing[1], [2] and no major changes are expected. The addition of these controls will not have any significant effect on the collection and removal of CO_2 from the stacks of these units. Other options being researched to provide such controls and sequestration are discussed elsewhere in this report.

One point that should be noted is that the installations of the controls required by the CSA are not without a penalty as far as CO_2 is concerned. The added air moving and liquid

[1] George T. Everett, PhD., Duke Power, Letter to North Carolina Utilities Commission, Raleigh, NC, March 31, 2003.

[2] Len S. Anthony, Progress Energy, Letter to North Carolina Utilities Commission, Raleigh, NC, April 1, 2003.

moving equipment (fans and pumps) that are inherent in the controls to be installed, require energy, which must come from a reduction of the electric output of the unit (generally maximum fuel use and gross output are fixed and can not be increased). The unit cannot overcome these losses without basic process changes that may be discouraged under other current laws and regulations which will reduce the net electrical output of these units by about one percent.[1]

Table 2.4: Proposed Controls for Coal Fired Utility Units for Achieving the CSA Requirements

Company	Plant Name	Proposed Controls[2 3]
Duke		
	Bellews Creek	**Unit 1**: SCR + SCRUB; **Unit 2**: SCR & LNB + SCRUB
	Buck	**Units 3-6**: SNCR
	Cliffside	**Units 1-5**: SNCR + SCRUB on **Unit 5**
	Dan River	**Units 1-2**: SNCR; **Unit 3**: SNCR & LNB
	GG Allen	**Units 1-5:** SNCR + SCRUB
	Marshall	**Units 1-4**: SNCR + SCRUB
	Riverbend	**Units 4 & 7**: SNCR; **Units 5-6**: SNCR & LNB
Progress		
	Asheville	**Unit 1**: LNB/AEFL/SCR+SCRUB; **Unit 2**: LNB/OFA/SCR+SCRUB
	Cape Fear	**Units5-6**: ROFA/ROTAMIX + SCRUB
	HG Robinson	None
	LV Sutton	**Unit 1**: SAS; **Unit 2**: ROFA; **Unit 3**: LNB/ROFA+SCRUB
	Lee	**Unit 1**: WIR; **Unit 2**: LNB/OFA/SCR; **Unit 3**: LNB/OFA/SCR+SCRUB
	Mayo	**Unit 1**: LNB/OFA/SCR+SCRUB
	Roxboro	**Units 1, 3-4**: LNB/OFA/SCR+SCRUB; **Unit 2**: TFS2000/SCR+SCRUB
	Weatherspoon	**Unit 3**: WIR

Terms used in this table are defined below:

AEFL- Amine-Enhanced Flue Lean Gas Reburn
LNB – Low NOx Burner
OFA – Overfire Air
ROFA – Rotating Opposed-Fired Air
ROTAMIX – Injection of Ammonia to further reduce NOx (Used in combination with ROFA)
SCR – Selective Catalytic Reduction
SCRUB – Wet scrubber for SOx
SNCR – Selective Non-Catalytic Reduction
TFS2000 – Combination Low-NOx Burner/Overfire Air
WIR- Underfire Air

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[1] Personal (Oral) Communication from Cheryl Vetter with Progress Energy to James Southerland, NC DAQ, July 11, 2003.
[2] George T. Everett, PhD., Duke Power, Letter to North Carolina Utilities Commission, Raleigh, NC, March 31, 2003.
[3] fLen S. Anthony, Progress Energy, Letter to North Carolina Utilities Commission, Raleigh, NC, April 1, 2003.

Chapter 3 The Regulatory "Climate" Outside North Carolina

The discussions in this chapter are intended to put the North Carolina actions and planning regarding CO_2 emissions and reduction expectations in perspective with international and national actions, plans and uncertainties at the time of the writing of this document, especially with regard to other requirements that may be imposed externally.

Kyoto Treaty and its Predecessors

In an effort to reduce GHG (including CO_2) and mitigate their effects, the US has participated in several world conferences dealing with global climate change.[1] The most noteworthy of these conferences was probably the one held in Kyoto, Japan in 1997. At this meeting, most industrial countries of the world, including the US, agreed to lower their GHG production. Negotiators for the US agreed to reduce emissions by 7% below its 1990 emissions level between 2008 and 2012. However, this treaty was subject to Senate approval. The US Senate has yet to formally ratify or further validate the treaty and the Bush Administration has not been in support of the protocol. Instead, an alternate proposal has been made that provides for the U.S. to commit to a reduction in the rate at which the release of these gases is increasing. This proposal falls far short of the original target. Bush's Clear Skies Initiative (CSI-February 2002, aka Clear Skies Act): proposed to reduce GHG "intensity" by 18% by 2012, where "GHG intensity" is a measure of the ratio of GHG emissions to economic output. This proposal allows total emissions to rise with increasing economic activity, rather than through a cap on emissions as specified in Kyoto.

The text of the protocol to the United Nations Framework Convention on Climate Change (UNFCCC) was adopted at the third session of the Conference of the Parties to the UNFCCC in Kyoto, Japan, on December 11, 1997. The protocol is subject to ratification, acceptance, approval or accession by Parties to the Convention. It was open for signature from March 16, 1998 to March 15, 1999 at United Nations Headquarters in New York. By that date, the protocol had received 84 signatures. Those parties that have not yet signed the Kyoto Protocol may access it at any time at the UN Headquarters in New York. It was determined to enter into force on the ninetieth day after the date on which not less than 55 parties to the Convention signed Annex I. Parties that accounted in total for at least 55% of the total carbon dioxide emissions for 1990 from that group have deposited their instruments of ratification, acceptance, approval or accession. As of July 10, 2003, 84 Parties had signed and 111 Parties had ratified or acceded to the Kyoto Protocol[2], accounting for about 44.2% of the global GHG.

In March 2001, President Bush formally announced opposition to the Kyoto Protocol, and Congress reacted by proposing legislation supporting further positive action in the international negotiations on climate change. A budget resolution for fiscal year 2002 passed, including funds for US participation in further international climate change negotiations.

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[1] North Carolina's $ensible Greenhouse Gas Reduction $trategies; Appalachian State University, Department of Geography and Planning, , Boone, NC, January 2000.

[2] Status of the Kyoto Protocol; The United Nations Framework Convention on Climate Change, http://unfccc.int/resource/convkp.html#kp, New York, NY, July 18, 2003.

Senator John F. Kerry authored and proposed a non-binding resolution urging the US to put forth a proposal to secure US participation in a revised Kyoto Protocol or other future binding climate change agreements. An amended version of the Kerry resolution was included in the energy policy bill passed by the Senate, but have not yet received full Congressional approval.[1]

The President's fiscal year 2003 budget includes $555 million in clean energy tax incentives, as the first part of a $4.5 billion commitment over the next five years ($7.1 billion over the next 10 years) to address climate change. The budget also requests over $3 billion (a $1 billion increase above the baseline) as the first part of a ten-year (2002-2011) commitment to implement and improve the conservation title of the Farm Bill, which will significantly enhance the natural storage of carbon.

In a new policy announcement on July 24, 2003 the President unveiled a new five point plan for increased research.[2] This Climate Change Science Program Strategic Plan's stated primary goal is to identify "natural variability" in climate change. The second is to find better ways of measuring climate effects from burning fossil fuels, industrial production of warming gases and changes in land use. The other goals of this ten year program are to reduce uncertainty in climate forecasting; to better understand how changes in climate affect human, wildlife and plant communities; and to find more exact ways of calculating the risks of global warming. The administration also will ask Congress for a new $103 million, two-year initiative to speed up "high priority" research on carbon pollution, aerosols and oceans and determine the best ways to compile and disseminate information about them.

Current EPA and DOE Approaches & Registries

Since there are currently no federal legislation or standards requiring control of CO_2 emissions or the broader group of GHG, the reduction activities undertaken to date have been somewhat meandering and splintered. EPA has continued to focus on its traditional pollutant-by-pollutant rulemaking scheme, as required under the Clean Air Act (CAA) for other pollutants. The National Ambient Air Quality Standards (NAAQS) required in the CAA are implemented through a health or welfare effects "criteria" determination, with subsequent ambient standards specified. These are then normally implemented by delegation to state programs. There are also parts of the CAA that apply to hazardous air pollutants, which include mercury, but not CO_2. Efforts to implement this part of the CAA have produced drafts and plans on mercury, but no indication that any efforts are likely to require or develop mandatory controls on CO_2/GHG's. The efforts, however, to build the case for reductions have continued; and tools, registries, promotion programs and other similar efforts have generated a large amount of activity and concerns.

Debate over potential limits on emissions has demonstrated conflicting, or at least not fully harmonious, views from the EPA and the DOE.[3] In July 2002, the EPA signaled that it

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[1] Summary of National Climate Change Programs; California Energy Commission; http://www.energy.ca.gov/global_climate_change/summary.html, July 2003.

[2] John Marburger, Climate Change Science Program Strategic Plan Announcement; Office of Science and Technology Policy, Executive Office of the President, Washington, DC, July 24, 2003.

[3] *"US gov't reports set stage for multi-pollutant debate"*; Reuters, http://www.planetark.org/ dailynewsstory.cfm/newsid/12637/story.htm, June 6, 2003.

might replace current regulations with a new cap-and-trade system for NOx, sulfur dioxide and mercury, but this move did not include CO_2. That approach would allow power plants to buy emission rights from cleaner plants. DOE has opposed EPA's actions, presumably because they feel this might hamper US utilities from boosting electricity output.

Section 1605(b) of the Energy Policy Act of 1992 [42 U.S.C. ¤13385] established the **Voluntary Reporting of Greenhouse Gases Program**, which allows and encourages sources to report GHG reductions. Currently, both DOE and EPA have GHG registries. Registries are a first step in reduction strategies and mandatory for banking-and-trading scenarios. The DOE 1605(b) registry is the closest to a US-wide registry. North Carolina has been a leader in the efforts to register (39) industries within the state in that registry. However, EPA also has a registry that promotes the reporting of emissions and the adoption of agreements to reduce emissions. On the other hand, EPA's registry is primarily viewed as a means of tracking its own success in encouraging reductions of emissions only. Currently there is no mechanism, nor does there appear to be significant serious movement, to join or "seamlessly" relate one of these registries to the other. Major announcements from DOE regarding their registry and reporting mechanisms are overdue and expected "any day."

Under the US Senate-passed (only) Energy Policy Act in April of 2002, reporting of GHG emissions would be voluntary, at first. After five years, however, if fewer than 60 percent of the US GHG emissions were not reported under the program, it would become mandatory for the largest emitters. This bill has not become law. Steps to refine existing federal registries to make them more transparent and uniform will be necessary to facilitate reductions in GHG by cap-and-trade programs that appear to be gaining momentum. Ideally, standardized reporting should consolidate these tools and make them more useful for all purposes, including any cap-and-trade programs.

Activity in many of these continues, but remain uncertain. It would appear appropriate for NC to support and encourage, along with other states, a single and clearly defined registry. This would be supported by most other states, emission trading organizations, industry and the international community.

Federal Multi Pollutant Bills

In the past 25-30 years, various reduction strategies have been developed and promoted, registries implemented, and research carried out, but no significant and specific federal mandates currently exist to control CO_2 or other GHG in the United States. Efforts to formalize and finalize subscription to international treaties and agreements related to international registries and tracking of GHG are incomplete. Rumors and speculated intentions continue to appear, but decisive action is slow in coming.

CLEAR SKIES INITIATIVE

The Bush Administration has proposed a CSI,[1] as previously mentioned, that is awaiting Congressional action. In the meanwhile, other bills are active to some degree in both the US

[1] Clear Skies Act of 2003 Fact Sheet: *Cleaner Air, Better Health, Brighter Future;* EPA, Following President George W. Bush, State of the Union, Washington, DC, January 28, 2003.

House and Senate. There has been considerable debate whether any legislation would be three-pollutant (SOx, NOx and Mercury) or four-pollutant (add CO_2). The main legislative initiatives to date, in addition to the CSI, are the Jeffords-Waxman Bills and the Carper Clean Air Planning Act (CAPA - S3135). None of the bills introduced to date have made significant progress toward full consideration by the Senate and House, though committee testimony, debate and behind-the-scene efforts remain quite active. It is reasonable to speculate that actual legislation will not be voted upon until after the next Presidential election. The discussion below does not encompass all actions and discussions underway, but to provide some major points.

JEFFORDS-WAXMAN BILLS

The Senate Environment and Public Works Committee has held several hearings to date, and in June of 2002, narrowly passed the "Clean Power Act"[1] (S.556 or "CPA") proposed by Sen. James Jeffords. The House companion bill, Henry Waxman's "Clean Smokestacks Act" (H.R. 1256), has not passed in committee or on the House floor. As a matter of measure, the Senate rejected the climate change provisions of the 2002 Senate Energy Bill by a margin of 15 to 1. The final CPA, if passed as generally proposed, would establish new controls on power plant emissions of sulfur dioxide (SO_2), nitrogen oxides (NOx), mercury and carbon dioxide (CO_2). The bill would make the Kyoto agenda a central focus of U.S. energy policy. Opponents say that these bills would "abandon that common-sense approach and attempt to reduce pollution indirectly," by suppressing energy use.

CARPER BILL

The Carper Bill, also known as the Clean Air Planning Act [2] (CAPA S.3135) was introduced by Sen. Thomas Carper during the last days of the 107th Congress. Primarily, it was authored because the CSI and CPA were so far apart. Although, the proposal was a bipartisan effort, it has not yet received full consideration in either Committee, much less the full Senate.

Probably these bills will become the subject of debate during upcoming elections and perhaps will wither for the time being and reintroduced after the elections are completed.

Activities in Various States

A majority of the states has initiated some kind of efforts independent of, or in conjunction with, the federal efforts. North Carolina has been primarily involved through the DOE registry and related "**Climate Wise**" program and somewhat indirectly through its actions on the research of ways to convert animal waste into a viable energy source. The summary below was compiled from several state and national web sites and other information sources and may not be complete or entirely up to date. The list of activities covers a wide variety of activities ranging from direct climate change strategies/actions to others that could be better characterized as only indirectly oriented toward climate change.

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[1] Jeffords Introduces Clean Power Act of 2003, U.S. Senate , Washington, D.C., http://www.senate.gov/ ~epw/Releases/ release_02-12-03.htm, and http://epw.senate.gov/maj_pr_062702b.htm, 2003.

[2] Introduction, Clean Air Planning Act; **Congressional Record**, U.S. Senate, http://carper.senate.gov/acrobat%20files/FS101702.pdf ; October 17, 2002.

According to a California DOE summary[1], GHG inventories have been completed in thirty-seven states, with four more in progress. Nineteen states have completed action plans to reduce GHG emissions, with eight more in progress. Twelve states have established renewable portfolio standards. Several states are developing voluntary registries for GHG emissions and the picture is changing rapidly so it is hard to keep exactly up to date.

CALIFORNIA

On July 10, 2002, California passed a bill[2] that requires reductions in automobile tailpipe emissions of carbon dioxide and other greenhouse gases. What this means simply is that they must burn less fuel. The initial California tailpipe emissions proposal was heavily opposed by a coalition led by automakers and their unions that had previously killed higher fuel efficiency standards in the US Congress. This coalition claimed that the bill's purpose was to run SUVs off the roads. The bill's primary sponsor modified the legislation to deal with these arguments, and required that California air regulators balance the benefits of emission reductions with the costs of building more fuel-efficient cars. It prohibits bans on the use of SUVs or any other specific vehicles. More than 80 percent of California residents support global warming pollution cuts, according to a poll by the non-partisan Public Policy Institute of California[3]. This new law (AB 1493) requires the California Air Resources Board to design policies to "achieve the maximum feasible reduction of greenhouse gases" from cars and trucks by 2005. New regulations would first apply to the 2009 vehicle model year. This law prohibits new taxes and provides for legislative review before new regulations go into effect.

California has also been a leader in GHG registries. The **California Climate Action Registry** (the Registry) was established by California statute as a non-profit voluntary registry for GHG emissions. The purpose of the Registry is to help companies and organizations with operations in the state to establish GHG emissions baselines against which any future GHG emission reduction requirements may be applied. The Registry[4] encourages voluntary actions to increase energy efficiency and decrease GHG emissions. Using any year from 1990 forward as a base year, participants can record their GHG emissions inventory. The State of California, in turn, will offer its best efforts to ensure that participants receive appropriate consideration for early actions in the event of any future state, federal or international GHG regulatory scheme. Registry participants include businesses, non-profit organizations, municipalities, state agencies, and other entities. California remains a leader in GHG actions, especially for motor vehicles and GHG registry development.

CONNECTICUT

Connecticut is a participant in the July 2003 coalition of Northeastern states. For more details, see discussion on New York below.

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[1] Summary of National Climate Change Programs; California Energy Commission; http://www.energy.ca.gov/global_climate_change/summary.html, July 2003.

[2] **New Democrat Online**; http://www.ndol.org/ndol_ci.cfm?contentid=250635&kaid=131&subid=192; July 8, 2002.

[3] Natural Resources Defense Council; http://www.nrdc.org/media/pressreleases/020722.asp; July 2003.

[4] California Climate Action Registry; http://198.104.131.213/Default.aspx?tabid=3393&refreshed=true; July 2003.

DELAWARE

Delaware is a participant in the July 2003 coalition of Northeastern states. For more details, see discussion on New York below.

GEORGIA

Georgia has a **No-Tillage Assistance Program**. This program leases "no-till" equipment to farmers, thereby reducing fuel use compared to conventional tilling techniques. Since 1987, the program is credited with saving over 2.7 million gallons of fuel to avoid an estimated 25,000 tons of CO_2.[1]

ILLINOIS

The Illinois' **Clean Energy Community Trust** provides grants, loans, and other financial incentives to develop, improve, and implement energy efficiency and renewable energy projects and programs.[2]

INDIANA

The state's **Public Facility Energy Efficiency Program** provides loans from the Indiana Efficiency Loan Fund to help schools, political subdivisions and public libraries identify and/or implement energy projects. The state also provides grants to businesses, non-profits, and local governments to cover the incremental cost of renewable energy projects. The **Alternative Fuel Vehicle Infrastructure Grant Program** provides grants on a competitive basis to encourage the building of alternative fueling sites.[3]

IOWA

This state's **Building Energy Management Program** (1989) enables Iowa schools, local governments, and hospitals to implement cost-effective energy management programs without incurring up-front costs. In 2001, over 500,000 tons of CO_2 emissions were avoided through the program. Iowa recently developed 2 major wind farms, which together will avoid more than 700,000 tons of CO2 emissions annually. The state's Department of Natural Resources provides support, funding, and information to promote switch grass as a biomass energy crop. Iowa plans to get 10% of its energy from renewable sources by 2015.[4]

KANSAS

Kansas provides income tax credits for the purchase of alternative-fuel vehicles.[5]

MAINE

Maine has adopted renewable portfolio standards (RPS) that set a target for renewable energy as a proportion of the overall electricity fuel mix. They are developing a voluntary

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[1] Summary of National Climate Change Programs; California Energy Commission; http://www.energy.ca.gov/global_climate_change/summary.html, July 2003.

[2] Ibid Reference 2

[3] Summary of National Climate Change Programs; California Energy Commission, http://www.energy.ca.gov/global_climate_change/summary.html; July 2003.

[4] Ibid Reference 1

[5] Ibid Reference 1

registry for GHG emissions. The state is also a participant in the July 2003 coalition of Northeastern states formed for addressing the climate issues. For more details, see discussion on New York below.

MARYLAND

Maryland provides income tax credits for the production and sale of electric power from biomass combustion. They also provide tax incentives for purchases and investments in clean energy technologies and consumer products. The governor has released an **Executive Order** requiring state facilities to purchase a percentage of energy from "green" sources, evaluate energy efficiency in state building design and maintenance, and purchase **Energy Star**-labeled products when available.

MASSACHUSETTS

In April 2001, Massachusetts capped CO_2 emissions from its 6 highest-emitting power plants and created an emission standard that will require CO_2 reductions of about 10% below the current average emission rate. This regulation allows companies to buy carbon credits to meet the reduction requirements[1]. The state is also a participant in the July 2003 coalition of Northeastern states formed for addressing the climate issues. For more details, see discussion on New York below.

MISSOURI

Missouri provides schools and local governments with technology and financial assistance to implement energy-efficient upgrades. In 2000, the program claimed to have reduced CO_2 emissions by about 10,000 tons.

MONTANA

Their **Universal Systems Benefit Program** requires all electric and natural gas utilities within the state to collect funds from their customers, to be redistributed to offer individuals, organizations, and business support for energy efficiency improvements.[2]

NEW HAMPSHIRE

The **New Hampshire Clean Power Strategy (NHCPS)**[3] was developed to address

- Risks to NH's environment and public health associated with power plant emissions
- Opportunities for taking advantage of an integrated approach for control of multiple pollutants SO_2, NOx, mercury, and CO_2 , and
- NH Legislature's expectations for environmental improvement under electric deregulation.

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[1] Ibid Reference 1

[2] Summary of National Climate Change Programs; California Energy Commission; http://www.energy.ca.gov/global_climate_change/summary.html; July 2003.

[3] Danuta Andzelm, The New Hampshire Clean Power Strategy: A Review; http://www3.gov.ab.ca/env/air/emissions_trading/pdf/newhampshire.pdf, Alberta Environment, June 2002.

The **NHCPS** applies to all existing fossil fuel-burning power plants with a capacity of 25 MW or greater, the same applicability threshold used by EPA's NOx SIP Call. The CO_2 emission limit originally included a 7% reduction below 1990 levels. This was modified by the Legislature to equal the 1990 levels due to economic considerations.

The state has also indicated its intention to be a participant in the July 2003 coalition of Northeastern states formed for addressing the climate issues. For more details, see discussion on New York below.

NEW JERSEY

A Governor's **Executive Order** to reduce the state's annual GHG emissions to 3.5% below 1990 levels by 2005 is in place. The state's emissions reduction plan includes a combination of voluntary actions and state initiatives. Their **Sustainability Greenhouse Gas Action Plan (2000)** includes policies and technologies on which the potential emission reductions are based. In addition, a mandatory statewide recycling program is in place, through which the state avoided 8.7 million tons of GHG emissions from 1990 through 1995. The state is also developing a voluntary registry for GHG emissions[1, 2]

The state is also a participant in the July 2003 coalition of Northeastern states formed for addressing the climate issues. For more details, see discussion on New York below.

NEW YORK

New York has developed a **New York GHG Task Force**. This group has studied the means for the state to make reductions and recently made recommendations to reduce GHG in the state. On May 8, 2003, they submitted a report to Governor Pataki with 27 recommendations for reducing GHG emissions. Their recommendations include:

- Establishing a state GHG emission reduction target of 5% below 1990 levels by 2010 and 10% below 1990 levels by 2020;
- Creating a program to limit emissions from electricity generation to levels 25% below 1990 levels by 2010, and making this cap part of a regionally coordinated policy with each state adopting its own cap;
- Redirecting state transportation funds to transit, walking and bicycling;
- Adopting California's GHG motor vehicle emission standards for model year 2009;
- Establishing a comprehensive GHG inventory, with mandatory reporting by major industries and sectors and a voluntary emission reductions registry; and
- Negotiating voluntary reduction agreements with industry.

New York has begun to implement some of the Task Force recommendations[3]. Governor Pataki announced in January 2003 that New York would adopt California's GHG motor vehicle emission standard and a "Renewable Portfolio Standard" so that 25% of electricity purchased in

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[1] NESCAUM State Comparison Matrix; http://www.nescaum.org/Greenhouse/Registry/state_matrix.html, July 2003.

[2] Summary of National Climate Change Programs; California Energy Commission, http://www.energy.ca.gov/global_climate_change/summary.html; July 2003.

[3] Greenhouse Gas State Registry Collaborative; NESCAUM, http://www.nescaum.org/Greenhouse/Registry/state_matrix.html ,July 2003.

the state would come from renewable sources. In June 2003, the New York State Energy Planning Board adopted the Task Force's recommendations for a GHG emission reduction target and to redirect transportation funding.

In **Phase II**, participants will tackle a number of projects aimed at advancing two primary project objectives: (1) public education and outreach and (2) building consensus on broader policy issues. These projects include,

- Expand the case studies to other entities (e.g., state and municipal authorities; hospitals, universities, etc.) and types of sources (e.g. manufacturing, pharmaceuticals, etc.),
- Develop a small-business outreach component that links large private-sector participants with their upstream and downstream business partners to explore untapped emission reduction opportunities and build political support for action within a crucial new stakeholder constituency,
- Examine baseline scenarios for pre-2000 reduction activities, with the aim of developing proposals to ensure baseline protection for entities that act early to reduce GHG emissions,
- Develop a model, regional GHG emission reduction registry that can provide guidance on methodological issues in documenting reductions and bring consistency to individual states' efforts to create early action registries, and
- Review the DOE Energy Information Agency's 1605(b) voluntary registry submissions, assess the "real" reductions represented by these actions taking into account entity-wide emissions, and develop criteria for recognizing early actions in the context of a future regulatory program.

On July 27, 2003, New York announced an additional agreement[1] that brings nine northeast states together to develop a regional strategy of actions on climate change. This coalition of states will work together to develop a market-based emissions trading system to reduce emissions from power plants. The states that have agreed to take part in this initiative include New York, Connecticut, Vermont, New Hampshire, Delaware, Maine, New Jersey, Pennsylvania, Massachusetts, and Rhode Island.

OREGON

Oregon bills its **CO_2 Policy and Legislation** as the first CO_2 regulatory standard in the US.[2] It regulates CO_2 by

- Requiring new power plants and other large energy facilities to avoid or offset a significant portion of their CO_2 emissions
- Encourages the developers to build the most efficient power plant possible,
- Provides Developer Options,
- Creates several methods for meeting the CO_2 standard, including providing funds to an independent trust to implement CO_2 offsets, and

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[1] "Environmental Defense Applauds Pataki Multi-State Climate Effort" (News Release) http://www.environmentaldefense.org/pressrelease.cfm?ContentID=2910 Environmental Defense Fund, Washington, D.C., July 24, 2003.

[2] Mike Burnett, Innovative Policy for Greenfield Greenhouse Gas Emissions; Oregon Climate Trust, http://www.cultural.org/ace/pt/pres/burnett/tsld002.htm, November 1999

- Provides for an Evolving Standard: The Energy Facility Siting Council can reset and tighten the allowable limits over time.

The Legislation Provides that:

- New gas-fired power plant CO_2 emissions rate limits for gas fired plants
- Includes a mechanism for EFSC to tighten the CO_2 standard as power plant efficiency improves
- Standard is tied to a rate of 17% less CO_2 emissions than the most efficient power plant nationwide.

PENNSYLVANIA

Pennsylvania is a participant in the coalition of Northeastern states formed in July 2003 for addressing the climate issues in the northeastern states For more details, see discussion on New York above.

RHODE ISLAND

Rhode Island is a participant in the coalition of Northeastern states formed in July 2003 for addressing the climate issues in the northeastern states For more details, see discussion on New York above.

TEXAS

The **Texas Loan STAR Program** provides energy efficiency project financing for state agencies, institutions of higher education, school districts, and local governments. A new **Renewable Portfolio Standard** requires that all electricity providers obtain renewable energy capacity, finance construction of renewable energy facilities, and develop new renewable energy resources by 2009. Energy producers can meet the standard by developing renewable energy capacity or by purchasing renewable energy credits.[1]

UTAH

Utah actions have resulted in the financing and installation of solar energy and energy efficient technologies in many of its state and national parks and monuments to reduce pollution in pristine areas and educate visitors about clean energy.

VERMONT

Vermont's stated goal is to reduce region wide greenhouse gas emissions, by state government, from the 1990 baseline by: 25% by 2012; 50;% by 2028; and, if practicable using reasonable efforts, 75% percent by 2050. An **Executive Order** signed in August 2002 by Governor Harold Dean MD[2] requires:

- A working group tasked with coordinating, documenting, and encouraging efforts to meet Vermont's greenhouse gas emission reduction goals. It prepares a biennial report

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[1] Summary of National Climate Change Programs; California Energy Commission, http://www.energy.ca.gov/global_climate_change/summary.html; July 2003

[2] Harold Dean MD; Executive Order 11-02; State of Vermont Executive Department; http://www.anr.state.vt.us/dec/wastediv/csc/execorder.pdf; August 2002.

documenting these efforts, identifies future steps, their anticipated impacts, challenges for meeting the goals, and opportunities for expediting greenhouse gas emission reductions.

- Directs all state government agencies, offices, and departments to:
  - Purchase only energy-consuming devices that meet or exceed the **Energy Star®** or comparable standards established by the U.S. federal government;
  - Purchase vehicles that have the highest available fuel efficiency in each respective vehicle class;
  - Develop programs to encourage state employees, through the use of incentives, to use transportation alternatives to a single person in a single motor vehicle for travel;
  - Ensure that every state building reduces its energy consumption to meet the outlined greenhouse gas reductions;
  - The Department of Buildings and General Services must investigate cost-effective opportunities to purchase renewable energy to reduce the state's reliance on fossil fuels; including electricity derived from solar, wind, geothermal, landfill methane gas, or small scale (less than 30 megawatts) hydroelectric projects.
  - The Working Group must prepare a report to the Governor and the General Assembly describing opportunities to initiate a statewide voluntary greenhouse gas emissions registry, and investigate the feasibility of a carbon emissions cap and trading program for the state as a strategy for further reducing region-wide greenhouse gas emissions.
  - The order also requires the establishment of sector-specific baselines, development of an emission tracking protocol, and institution of an emissions trading mechanism.
  - The Group must also recommend further greenhouse gas reduction targets and identify activities to help meet those targets.

The state is also a participant in the July 2003 coalition of Northeastern states formed for addressing the climate issues. For more details, see discussion on New York above.

WASHINGTON

Washington has achieved reductions in electricity use through "demand site management," requiring electric utilities to control electricity demand. In addition, electric generating facilities powered by renewable resources are eligible for certain tax exemptions. Their **Commute Trip Reduction Program** (1991) includes state assistance and requires employers with over 100 employees (in 9 counties) to develop programs to encourage use of mass transit, carpooling, etc.[1]

WISCONSIN

Wisconsin assists one of its largest dairy farms with manure-to-energy technology. The state has developed a voluntary registry for GHG emissions.

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[1] Summary of National Climate Change Programs; California Energy Commission, http://www.energy.ca.gov/global_climate_change/summary.html; July 2003.

WYOMING

Wyoming recently established an advisory committee to implement a carbon sequestration and carbon credit-marketing program[1].

Groups of States and Other Jurisdictions

NESCAUM

The Northeast States for Coordinated Air Use Management (NESCAUM), a planning organization with membership from six New England States plus New York and New Jersey, has been active in the analysis and promotion of many issues related to GHG's. It has initiated a GHG demonstration project, which is now into Phase II. During the first phase of the project, participants quantified the effect of companies' specific GHG-reducing activities and began to explore broader issues related to the eventual treatment of these voluntary actions in the context of a future regulatory regime. Through this process, it demonstrated the availability of cost-effective and quantifiable GHG reduction opportunities in a host of industrial, residential, and transportation applications.

Nine GHG reduction projects were submitted to the **NESCAUM GHG Trading Demonstration Project** during **Phase I**:

- Tumbler front load clothes washers, an energy efficiency project submitted by the Northeast Energy Efficiency Partnership, Inc,
- A power plant fuel switch to natural gas submitted by PG&E Generation,
- Hydroelectric electricity production submitted by Ontario Hydro Generation (CHI Energy, Inc./North American Carbon Inc.),
- Landfill gas energy project submitted by PG&E Generation,
- Residential boiler conversions to natural gas submitted by KeySpan Energy,
- Battery operated shuttle buses submitted by the Northeast Alternative Vehicle Consortium,
    - Fuel cell energy production submitted by KeySpan Energy,
    - A waste heat project submitted by Sunoco, and
    - Biomass fueled electricity production project submitted by PSEG Global.

The NESCAUM web site has more details.[2]

NESCAUM has also begun utilizing new funding for developing a registry. Their stated aim is to "develop a voluntary registry with rigorous reporting and certification standards that could underwrite an emissions crediting and trading system(s) in the future, focusing initially on the power sector, and to have it enter operation within 18 to 24 months of the project's start." They plan to partner with the California Climate Action Registry and with the World Resources Institute, both of which have significant experience and expertise on GHG measurement and reporting. They also plan to make the NE registry compatible with the California registry so that companies can report to both using the same guidelines for quantifying emissions and certifying their reports. They have designed the project to fulfill the directive for a regional registry in the NEG/ECP action plan and to meet the parallel interests of New York and New Jersey under their

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[1] Ibid Reference 1

[2] Overview of the NESCAUM Greenhouse Gas Early Action Demonstration Project: Phase II, http://www.nescaum.org/Greenhouse/index.html, NESCAUM, July 2003.

respective climate change agendas. However, they have also are invited other interested states to participate.[1]

NEW ENGLAND STATES AND EASTERN CANADIAN PROVINCES

In August of 2001, the New England Governors and the Eastern Canadian Premiers (NEG-ECP) signed an agreement for a comprehensive regional **Climate Change Action Plan** to jointly reduce regional GHG emissions. The Plan seeks to reduce regional GHG emissions to 1990 levels by 2010, reduce emissions by 10% below 1990 levels by 2020, and eventually reduce emissions sufficiently to eliminate any dangerous threat to the climate (75-85% below current levels). It also calls for a regional standardized GHG emissions inventory and registry. The plan includes measures to adapt regional economies and infrastructure to the negative impacts predicted to result from climate change[2].

NEW YORK COALITION OF NINE STATES

As indicated in discussions above, on July 27, 2003 New York's Governor announced[3] an agreement that brings nine northeast states together to develop a regional strategy of actions on climate change. This coalition of states will work together to develop a market-based emissions trading system to reduce emissions from power plants. The states that have agreed to take part in this initiative include; New York, Connecticut, Vermont, New Hampshire, Delaware, Maine, New Jersey, Pennsylvania, Massachusetts, and Rhode Island. Together with full implementation of the earlier commitment in New York for mobile sources, a regional cap on power plant emissions is expected to achieve a goal of showing how practical, market-based tools can create a multi-sector solution to climate change.

Northeastern States Suit to List CO_2 as a Criteria Pollutant

Attorneys General from the states of Connecticut, Maine and Massachusetts recently filed suit June 4, 2003 in federal district court in Connecticut against EPA for its "failure to regulate carbon dioxide (CO_2) under the Clean Air Act." According to the lawsuit[4], EPA has acknowledged both that CO_2 emissions pose a serious risk to human health and that it has authority to regulate CO_2 emissions under the Clean Air Act. Accordingly, the suit contends that EPA has a mandatory duty to regulate CO_2 emissions under the Clean Air Act. If the lawsuit is successful, EPA will likely have to list CO_2 as a criteria pollutant and develop a national ambient air quality standard for it. Such a process would no doubt be lengthy (10-20 years before implementation) and would require development of a new process for "indirect" health effects.

Perhaps as a preemptive action, directly as a response to a petition and because of other internal decisions related to 5-year reviews required for criteria pollutants, EPA on August 27,

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[1] Jennifer Weeks, Senior Policy Analyst, NESCAUM, email dated July 21, 2003.

[2] Summary of National Climate Change Programs; California Energy Commission http://www.energy.ca.gov/global_climate_change/summary.html, July 2003.

[3] "Environmental Defense Applauds Pataki Multi-State Climate Effort" (News Release) http://www.environmentaldefense.org/pressrelease.cfm?ContentID=2910 Environmental Defense Fund, Washington, D.C., July 24, 2003.

[4] Commonwealth of Massachusetts, State of Connecticut, and State of Maine, Civil Action v. Christine Todd Whitman; Defendant, in her capacity as Administrator of the United States Environmental Protection Agency, United States District Court, District of Connecticut, June 4, 2003.

2003 announced a ruling[1] in the Federal Register on the status of CO_2 as an air pollutant for purposes of regulating motor vehicles and declared that it was not a criteria air pollutant. The announcement did however, reinforce other continuing climate change programs such as **Climate Leaders, Energy Star, Green Power, Smart Way** and **Best Workplaces for Commuters**. This action is independent of the court actions mentioned above, though there may be a bearing one on the other. It is likely to be a few months before the court rules on this suit.

[1] "EPA Denies Petition to Regulate Greenhouse Gas Emissions from Motor Vehicles," http://www.epa.gov/newsroom/headline_082803.htm; US EPA, Washington, D.C., August 28, 2003.

Chapter 4 Technical and Policy Options for Further Study

Various technical and policy options have been proposed in various studies and reports to provide answers to CO_2 emissions from the utility sector. Some such proposals may turn out to be practical and worthy of implementation and some proposals are continuing to be under development and research or have serious economic downsides that preclude their implementation in the near future. Some such options may have the appearance of providing a cure for the "problem" but with more in depth consideration, may be impractical or impossible.

The purpose of this chapter of the report is to identify some of these candidates for further study and to provide some insights into how future reports and considerations in NC may lead to rejection or eventual adoption of those that are advantageous for the state. Generally, these policies and technologies fall into:

1) Direct utility sector improvements in efficiency or methods of operation that result in more electricity for equal or less fuel,
2) Development and/or implementation of means to remove and directly sequester GHG before they enter the atmosphere,
3) New customer improvements in efficiency and the like to reduce power requirements and subsequently the GHG emissions at the utility plants,
4) New replacement energy generation technologies that generate less (or no) GHG and
5) Means to improve the sequestration and removal of emissions that have already entered the atmosphere.

Direct Utility Sector Improvement Opportunities

In this category, one must consider how to reduce emissions prior to their generation or to collect them after generation. As is often the case, efficiency and economics are key factors. The seriousness of the requirements, the practicality and viability of the solutions and the economic plausibility must be evaluated and traded off with regard to other impacts.

Direct Power Plant Efficiency Improvements

Since the majority of CO_2 emissions from the electric industry (especially in NC) are from coal-fired power plants, attention must be given to evaluating possible methods for reducing emissions directly from these facilities. These options might include:

- Fuel Switching[1]
- Gasified Coal
- Increased Use of Oil and Gas Turbines[2]
- Combustion Modification
- Distributed Generation
- Others

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[1] *Reducing Greenhouse Gases & Air Pollution: A Menu of Harmonized Options;* State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ ALAPCO), Washington, DC, October 1999.

[2] R.W. Smith, et. al.; Advanced Technology Combined Cycles, GER-3936A, GE Power Systems; May 2001.

Potential Options from STAPPA/ALAPCO Study and Caveats

Table 4.1 is adapted from the cited STAPPA/ALAPCO study.[1] It summarizes technology-based options that may be worthy of further analysis during this study. Theoretical merits of these options may be evaluated for application to the NC plant "fleet." However, DAQ recognizes that such analyses must be undertaken in the context of economics and physical practicality and the current complex regulatory scheme. Fluidized-bed combustion, for example is probably an excellent high-efficiency means to improve the overall plant fleet. However, application of this technology would involve a substantially new plant and complication of the regulatory situation that now exists. One must assume that while the utilities in the business to generate electricity, they also need to make a profit and likely have already considered many options to increase efficiency and thus profitability. Evaluation of such barriers encountered in modifications may be worthy of further analysis.

Table 4.1: Summary of Potential Technology-Based Utility Emission Reduction Strategies

Technology-Based Strategy	Description
Combined Heat and Power	The combined heat and power process generates electricity and useful heat or steam in the same process. Cogeneration begins with either electricity or steam production. Excess energy from the first process is the input to the second.
Gas-Fired Combined Cycle	Combined cycle technology uses fossil fuel combustion to drive a combustion turbine. The waste hear from this process is then captured to drive a conventional steam generator with thermal efficiencies to 60% versus "the 30's" for conventional units.
Co-Firing with Biomass and Gas	Co-firing is the simultaneous combustion of coal and biomass or coal and natural gas in a previously coal-fired boiler. The process reduces both SO_2 and CO_2 emissions.
Integrated Gasification Combined Cycle	This process is the combustion of gasified coal in a combined-cycle system. A major benefit of coal gasification is that is allows many of the impurities in coal to be removed, providing considerable reductions in criteria pollutant emissions in relation to conventional coal combustion.
Fluidized-Bed Combustion	Combustion of crushed coal in a suspended mass within the boiler results in increased combustion efficiency and lower combustion temperatures relative to conventional coal boilers.
Fuel Cells	Fuel cells generate electricity and heat in an electrochemical reaction, as opposed to combustion.
Carbon-Sensitive Plant Dispatch	This plan promotes the operation of more low-emitting plants less high-emitting plants.

[1] Reducing Greenhouse Gases & Air Pollution: A Menu of Harmonized Options; State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO), Washington, DC, October 1999.

POLICY-BASED OPTIONS TARGETED AT DIRECT REDUCTIONS

In addition to the aforementioned technology-based strategies to apply directly to coal fired power systems, there are policy-based strategies that should be evaluated and further considered. Such changes would be targeted at direct reductions before the emissions are produced, such as regulation of carbon emissions (carbon tax). Table 4.2 summarizes some policy-based strategies that were suggested in the study and report cited earlier.[1]

Table 4.2: Potential Policy-Based Utility Emission Reduction Strategies

Policy-Based Strategies	Description
Comparable Emission Standards	These standards would require old plants, formerly "grand fathered," to comply with tighter regulatory policies.
Output-Based Emission Standards	This system would establish emission standards in terms of mass per unit of electrical output, rather than per unit of heat output.
Tax Credits	Shift state and federal fiscal policy toward the support of lower-carbon generating technologies (similar to "Green Power Program.")
Environmental Disclosure	Disclosure laws would require all electricity suppliers to identify the environmental impacts of the electricity they are selling.
State-Level Emission Portfolio Standards	This program would require all retail electricity suppliers in a state to acquire power from sources that were at or below designated emission rates.
Anticipating Nuclear Retirements	This plan involves assessing the viability of existing nuclear plants and planning for their retirement or refurbishment.
Interconnection Policy	This policy would improve rules for interconnecting small generators with electricity distribution systems to facilitate interconnection and maintain the safety and reliability of the system.
Carbon Requirements in the Plant Siting Process	This plan would require developers of new power plants to offset future carbon emissions with investments in sequestration projects or the purchase of GHG credits when available.
Emission Trading	Emission trading would allow emission allowances or credits for emission reductions to be traded among market participants.
Carbon Taxes	A tax would be levied on carbon emissions.
Renewable Portfolio Standard [RPS(s)]	All energy suppliers licensed in a state being required to sell energy from renewable sources as a percentage of their total energy sales, with provisions for periodic review to evaluate effectiveness.

Direct Removal and Sequestration of CO_2 Emissions from Utility Boilers

As a basic concept, the removal of CO_2 from a voluminous gas stream is monumental and an unlikely technological accomplishment within low costs. On the principle that "one atom of carbon burned equals one atom of CO_2," the most efficient means to reduce CO_2 emissions may be to reduce combustion through increased energy conversion efficiency and/or conservation practices. Many have targeted reducing CO2 from large stationary combustion systems as a

[1] *Reducing Greenhouse Gases & Air Pollution: A Menu of Harmonized Options,* State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ ALAPCO), Washington, DC, October 1999.

means to reduce greenhouse emissions from fossil fuel combustion systems. Proposals developed for reducing emissions, include fuel switching, efficiency improvements, CO_2 capture from conventional flue gas streams and oxy-fuel[1] fired systems with CO_2 capture.

Research continues at the US DOE and other organizations to further examine the potential for various add-on technologies as well as means to sequester CO_2 emissions in other forms. No conventional methods are yet available to efficiently and economically remove (wash out) significant percentages of CO_2 from the exhaust stream of a coal fired utility boiler. However, methods have been proposed, and are being tested, to accomplish this. Projected cost/power "penalties" for such advanced technologies are expected (by DOE) to range from 9% to 15% of plant generating capacity. Capital costs can also be significant for such reaction and recovery trains to remove the low concentrations of CO_2 in the flue gas.[2]

OXY-FUEL

One proposed way to help overcome some of the problems of collection, according to DOE, is to switch to oxy-fuel combustion. Use of oxygen in place of air creates a much lower volume of flue gas, which enhances thermal efficiency, thereby lowering CO_2 emissions, and resulting in lower quantities to treat. Since much of the flue gas consists of CO_2 and water, separation and purification are thus greatly simplified. These advantages have led several groups to explore oxy-fuel based boilers to enhance the boiler efficiencies and CO_2 recovery. A unit at Progress Energy has shown efficiency improvements from such a process (without recovery).

MOLECULAR SIEVE AND OTHER NOVEL COLLECTION & SEPARATION IDEAS

Another DOE research project is investigating a carbon fiber composite molecular sieve to remove CO_2. Other such projects sponsored by DOE include investigation of methods by which fly ash can be stabilized into conglomerates to be used as road construction or fill material and by which microbial processes could be applied to produce various carbonates by iron-reducing bacteria. Carbonates are produced *in situ* at the surface by photosynthetic algae and at depth by anaerobic carbonate producing bacteria. Microbial activities would convert CO_2 into a stable mineral; waste ash would be converted to a useful product. Leaching of heavy metals from fly ash ponds would be reduced/avoided, and other applications of this technology in agriculture or food processing are possible[3] as well as other novel ideas that are being pursued.

SEPARATION AND DUCTING TO DEEP UNDERGROUND COAL SEAMS

A major research area at DOE involves the collection, separation and "ducting" of CO_2 from the utility exhaust into deep unmineable coal seams to scavenge and/or "generate" methane, which is then forced to the surface for useful consumption. The objective of this project is to

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[1] Advanced Oxyfuel Boilers and Process Heaters for Cost Effective CO2 Capture and Sequestration, US Department of Energy, http://dominoweb2.fossil.energy.gov/domino/apps/fred/fred.nsf, July 2003.

[2] Curt M. White, et. al., Separation and Capture of CO2 from Large Stationary Sources and Sequestration in Geological Formations – Coalbeds and Deep Saline Aquifers, National Energy Technology Laboratory, Pittsburgh, Pennsylvania; **Journal of the Air & Waste Management Association; Volume 53**, June 2003 (Critical Review Presented at the A&WMA Annual Conference, San Diego, Ca, June 2003.

[3] Biomineralization for Carbon Sequestration, U.S. Department of Energy, http://dominoweb2.fossil.energy.gov/domino/apps/fred/fred.nsf/ , July 2003.

provide a wide range of benefits to the industry. The tasks include providing two significant field-demonstration sites that involve collecting or sequestering N_2/CO_2 mixtures, which is similar to power-plant flue gas. This project would also examine the feasibility of CO_2 sequestration in the broad set of conditions (coal types and emission compositions) that are likely to be encountered in the U.S. It would develop screening models to enable industry to quickly evaluate the technical and economic feasibility of CO_2 sequestration in coal beds for project specific conditions.[1]

As one may surmise, these and several other research areas are continuing to show progress. The difficulties of CO_2 removal are high, as will be the likely costs for accomplishing reductions. This is not to say that it is not worthy and necessary to research and develop, if possible, but the results will not likely be accessible for actual practical and economically feasible application within the time span of this effort. These areas must be followed closely and continually assessed.

Customer-Side Emission Reduction Options

The various use sectors (demand side) of electrical output use large quantities of electricity. Thus, many places have been identified for potential efficiency improvements. Much waste can be eliminated and consequently emissions from utility plants reduced, accordingly. A reduction at the customer sector will also translate to approximately 10% recovery of efficiency due to line loses that are not experienced from delivering that quantity of electricity.

Residential And Commercial Buildings Energy Consumption

Residential and commercial buildings consume, both directly and indirectly, over one-third of the fossil-fuel based energy in the US. Combined, these sectors represent the second largest source of GHG emissions in the US. Approximately two-thirds of the emissions from these sectors cause emissions at the electric generating facility. Electricity consumption is a result of lighting, heating, cooling and operating appliances. The remaining emissions occur on-site and result from direct consumption of natural gas and petroleum products used for space heating, water heating, and cooling needs etc.

Residential Energy Use

The residential sector is also a large consumer of fuels on-site and from electric energy generated elsewhere. Direct air emissions come from consumption of natural gas and other petroleum products utilized for space heating, water heating and cooking. In 1997, the residential sector directly consumed approximately 7.21 quadrillion British thermal units (quads) of fuel on-site.[2] See Figure 4.1 and 4.2.

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[1] Geologic Sequestration of CO2 in Deep, Unmineable Coalbeds, US Department of Energy, http://dominoweb2.fossil.energy.gov/domino/apps/fred/fred.nsf/da9d8b7ff8a396df852569ff0049da5a, July 2003.

[2] Biomineralization for Carbon Sequestration, U.S. Department of Energy, http://dominoweb2.fossil.energy.gov/domino/apps/fred/fred.nsf/, July 2003.

Commercial Buildings Energy Use

The commercial sector accounts for 5% of the buildings in the US, but uses 40% of the building energy. In commercial buildings, the five largest end-uses are (1) miscellaneous equipment, (2) space heating, (3) lighting, (4) water heating, and (5) space cooling. In 1996, the commercial sector consumed 3.33 quads of electricity.

Figure 4.1: 1997 US Residential Electricity End Uses

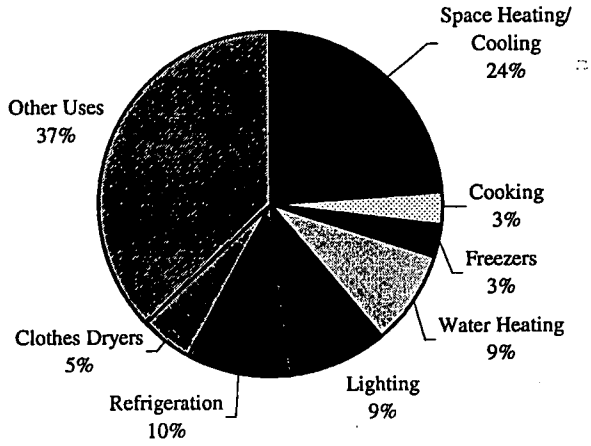


Figure 4.2: 1997 US Residential On-Site Energy Use by Fuel Type

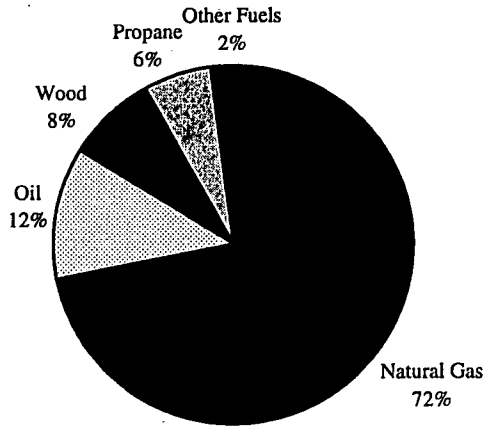
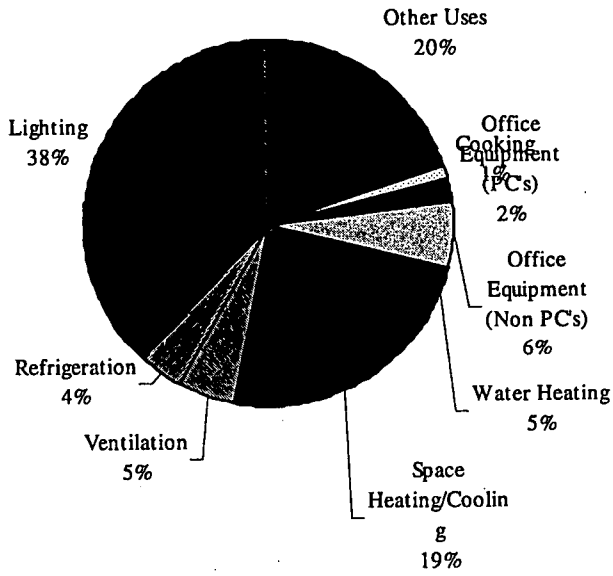


Figure 4.3: 1997 U.S. Commercial Electricity Use



Substantial quantities of emissions come from residential and commercial consumption of natural gas and other petroleum products utilized primarily for space and water heating and to power motors. In 1997, the commercial sector consumed approximately 3.7 quads of fuel on-site, with natural gas representing 91% of the fuel consumed, oil 1% and other fuels 8%. Table 4.3 below illustrates the CO_2 emissions per fuel type for both of the residential and commercial buildings sector.

Table 4.3: 1996 CO_2 Emissions (MMCTE) from On-Site Fossil Fuel Combustion

End-Use Sector	Coal	Natural Gas	Petroleum	Totals
Residential	1.4	77.4	27.2	106.0
Commercial	2.1	47.4	15.3	64.8
Total	**3.5**	**124.8**	**42.5**	**170.8**

POTENTIAL RESIDENTIAL/COMMERCIAL REDUCTION STRATEGIES

Several methods such as efficiency measures, equipment upgrades, and policy options that can be used to improve energy consumption in buildings.

- Thermal Efficiency Increases from Insulation
  - Thicker wall/ceiling
  - Retrofits with foam
- Air Sealing Measures[1]

[1] North Carolina's $ensible Greenhouse Gas Reduction $trategies, Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.

- Light Efficiency Measures
  - More efficient bulbs
  - Better controls to minimize time on
- HVAC Efficiency Measures
  - More efficient heat exchange
  - Better controls to maximize comfort with less energy use
- Hot Water Efficiency Measures
  - More efficient heat recovery
  - Less heat loss to air
- Energy Audits
- Building Code Improvements
  - Increased wall and roof insulation requirements,
  - Increased window insulating values and require shading devices,
  - More stringent requirements for efficient heating and cooling systems,
  - Increased efficiency requirements for lighting systems, and
  - Requirements for better control over all energy-using devices that reduce consumption when the building is not occupied

Summary

The series of tables that follow summarize some of the technology-based and policy-based strategies that can be applied to the residential and commercial buildings sectors to achieve emissions reductions.

Table 4.3: Reduction Opportunities for Residential Emission Sector

Technology-Based Strategy	Description
Residential Sector	
Space Heating	High efficiency furnaces, high efficiency heat pumps and water- and ground-source heat pumps.
Small Appliances	Using energy-efficient designed products such as Energy Star
Water Heating	Use less, set thermostat lower, insulate the heater, and use a more efficient water heater – consider point of use heaters if possible
Lighting	Use compact high-efficiency and fluorescent lamps.

Table 4.4: Reduction Opportunities for Commercial Emission Sector

Commercial Sector	Description
Space Heating	Replace old heating systems with systems that include energy-efficient furnaces, boilers and geothermal heat pumps. Common retrofits are controls, improved chillers and maintenance.
Lighting	Use high intensity/low energy lights and improved controls.
Other Miscellaneous Equipment	Technologies that have significant potential to reduce energy use and emissions are motor drive systems commonly used in systems and processes such as conveyors, fans and pumping systems.

Table 4.5: Policy and Market Based Opportunities for Use/Emission Reductions

Policy-Based Strategy	Description
Voluntary Programs	1) Identify and promote profitable energy-efficient technologies, 2) Assist industry participants in marketing energy-efficiency products and services and 3) Educate the public about the benefits of products and services to stimulate consumer demand.
Building Energy Codes and Standards	More stringent energy requirements in building codes.
Utility Rebates/Incentives	Demand-side management programs to save energy Change building practices to include energy-saving design features through rebates and financial incentives.
Collaborative Efforts of Stakeholders and Consumers	Participate in ENERGY STAR Homes for residents and ENERGY STAR Buildings for commercial and industrial buildings & others.
Tax Credits	Tax policies that favor energy efficiency.
Emission Trading	Emission trading programs allow private entities, under certain circumstances, to buy and sell excess pollution reductions that they achieve.
Public Awareness and Education	Information programs that include advertising, educational campaigns, informational reports, voluntary actions, support for R&D, demonstration projects and technical assistance.

The *North Carolina's $ensible Greenhouse Gas Reduction $trategies*,[1] made several recommendations to achieve reductions and improve energy efficiency of existing and new commercial buildings and improve equipment and lighting. The measures defined would provide significant energy and cost savings. Table 4.6 summarizes these savings.

Table 4.6: Emission Reductions from Mitigation Strategies for the Commercial Sector

Strategy	CO_2 (million tons)	Percent of Total
Existing Buildings: Thermal Efficiency Improvements	1.38	1.3
Existing Buildings: Lighting Efficiency Measures	0.40	0.4
Existing Buildings: HVAC Efficiency Measures	0.23	0.2
Existing Buildings: Domestic Hot Water Efficiency Measures	0.07	0.1
Existing Buildings: Appliance and Office Equipment Measures	0.05	0
Fuel Switching: Solar Water and Space Heating	0.05	0
Fuel Switching: Electric to Natural Gas for Space Heating	0.33	0.3
Fuel Switching: Electric to Natural Gas for Water Heating	0.08	0.1
New Buildings: Improvements in Thermal, Hot Water and HVAC Efficiencies, Alternative Energy Options	2.82	2.7
Sector Total	**5.40**	**5.1**

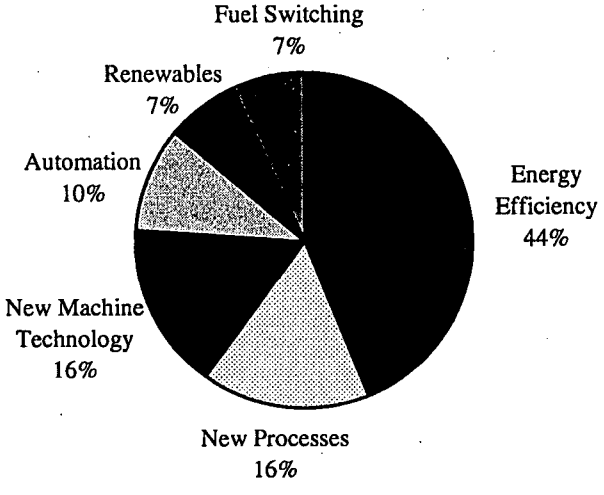
[1] North Carolina's $ensible Greenhouse Gas Reduction $trategies, Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.

INDUSTRIAL SECTOR

The industrial sector in North Carolina ranks first in terms of end use consumption of energy. Estimated final energy demand in the State's industrial sector was 447.3 trillion Btu or almost a third of all energy use in NC in 1997. Strategies to reduce GHG for energy intensive industries must focus more heavily on boilers and direct processes uses such as motors, compressors, and steam systems. Figure 4.4 displays the relative emissions saving from instituting the strategies outlined below.

North Carolina is known for its biotechnology industry, textiles, furniture, tobacco and paper products. This is only a small sample of the overall industrial sector in the state. Figure 4.5 lists the 20 primary Standard Industrial Codes and the number of employing businesses for each respective code type in North Carolina.

Figure 4.4 – Relative Emissions Reduction Contributions from Industrial Strategies



Energy Efficiency Measures

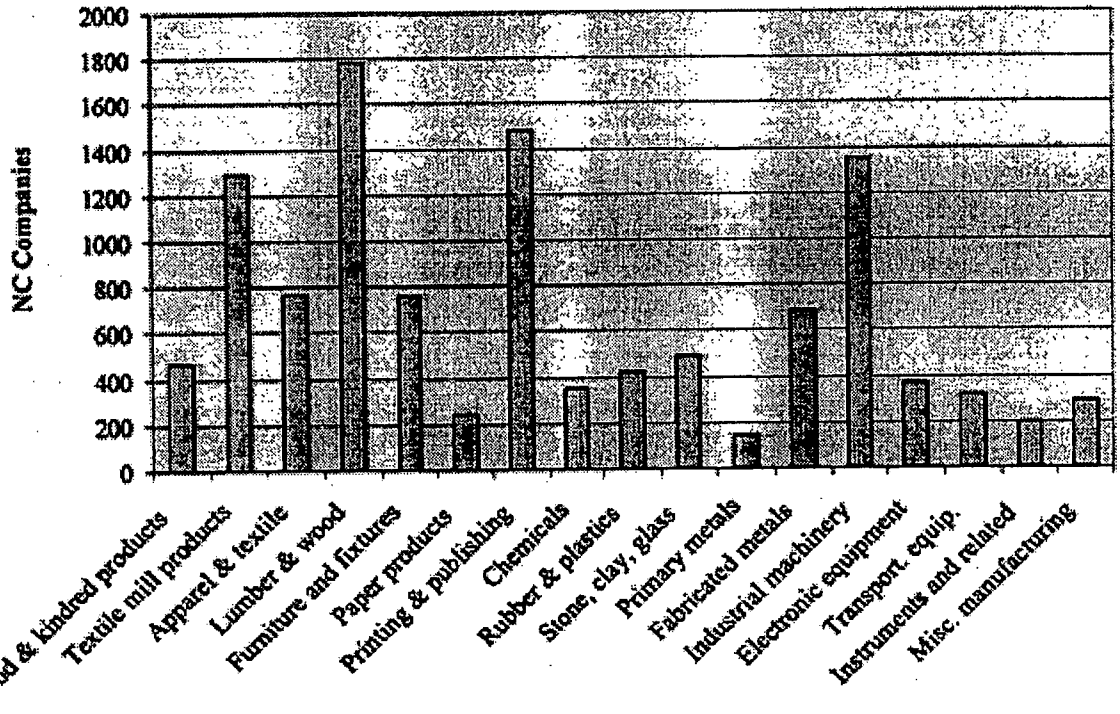
Several common measures were recommended from the ASU study [1] which is referenced herein as a major source document. These include:

- Boilers efficiency improvements evaluated included
  - Fuels used; including coal, wood, natural gas, fuel oil, and other petroleum products
  - Industries using most boilers are furniture, paper products, and chemicals
  - Average savings from efficient boiler measures can 3% of the total facility energy use.
  - Boiler load management

[1] North Carolina's $ensible Greenhouse Gas Reduction $trategies, Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.

        - Size for load
        - Tune-ups, maintenance and adjustment of air/fuel ratios
        - Waste heat recovery
    - Insulation and heat containment
    - Process waste heat recovery
    - Etc.
- Use of Compressed Air Systems
- Cogeneration
- Use of Energy Efficient Motors
- Heating and Air Conditioning Improvements
- Lighting Efficiency and Control Improvements
- Use of New Machine Technologies (more efficient)
- Automation

Figure 4.5 – Number of Companies in North Carolina by Industry Type



Policy Options

Four categories are available for CO_2 reductions in the industrial sector.[1] Table 4.7 highlights the programs under their respective category.

[1] North Carolina's $ensible Greenhouse Gas Reduction $trategies, Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.

Table 4.7– Summary of Policy Options Available for the Industrial Sector

Measure	Program Name
Direct Financial Incentives	Tax incentives for efficiency investments Subsidized loans for efficiency investments Carbon trading allowances
Regulatory Action	Mandated emissions limits Emissions portfolio standards
Recognition Programs	EPA **Energy Star** **Governor's Award** for Industrial Energy Innovation
Technical Assistance and Education	**Climate Wise** for Industry Industrial Assessment Center

Industrial Summary Remarks

The State's dominant industries, tobacco, woodworking, and textiles, are not energy-intensive. These industries generally require more precisely applied quantities of heat and do not produce large quantities of heat. However, a few high-energy intensive industries may provide an earlier pay back. Because of environmental concerns, natural gas and electricity usage will likely increase in this sector while the use of coal will diminish. Table 4.8[1] summarizes the relative emissions savings from instituting the above strategies.

Table 4.8 – Potential CO_2 Industrial Sector Emission Reductions Strategies

Strategy	CO_2 (million tons)	Percent of Total
Energy Efficiency Improvements	7.44	7.1
New Processes (Modernized Manufacturing Processes)	2.57	2.5
New Machine Technology	3.18	3.0
Automation	1.72	1.7
Fuel Switching: Coal to Natural Gas	0.64	0.6
Renewable	1.14	1.1
Total	**16.70**	**15.7**

North Carolina is projected to become more of a commercial and financial center and less of an industrial one. As a result, manufacturing employment is expected to decrease by 0.5% per year. Therefore, the future demand for energy in the industrial sector is predicted to be less than the demand in residential and commercial sectors.

Use of Energy Generation Options That Do Not Produce CO_2

Non-GHG producing energy is being used on site for direct thermal energy and electricity. Numerous promising options and programs exist and are under development to generate electricity or provide energy in a form for direct use. Every watt of such energy generated

[1] North Carolina's $ensible Greenhouse Gas Reduction $trategies, Appalachian State University, Department of Geography and Planning, Boone, NC, January 2000.

replaces a watt of energy that would have been otherwise generated by burning carbon fuels. However, this section only identifies some of the potential options. These will require further study, research, evaluation and discussion before any meaningful and useful recommendations can be made toward the objectives of the needs.

Technologies already identified and available for evaluation include:

- Solar walls - thermal collectors vertically oriented on a south-facing wall to provide space and process air heating
  - Power roofs – concentrating trough thermal systems for commercial roofs
  - Standard flat plate solar hot water collectors - used to produce high temperature water for preheating and processes
- Biomass combustion instead of coal- for example, co-fire wood residues with coal for heat production.
- Energy conservation measures already discussed and such factors as "white" reflective roofs to cut cooling loads (**Cool City Program**),
- Alternate electrical generation systems,
  - Wind turbines
  - Photovoltaic cells and systems
  - Fuel cells
  - Thermal Electric Systems
  - Hydro-power construction or renovation
  - Nuclear

Future versions of this report will address these further as far as they may relate to the scope and objectives of this effort.

Sequestration of CO_2 from the Atmosphere

Forests and other vegetation remove CO_2 from the atmosphere through their regular living and growing processes. Removal of wood and processing into houses and other structures tend to sequester the carbon from the air and make permanent or semi-permanent forms of carbon containing materials that will hold on to the carbon for long periods of time (e.g. until building demolition, burning, etc.). Maintenance of standing timber/forests also retains carbon in a solid form not released into the atmosphere. However, removal and burning of vast forests, such as in the South American rain forests releases large quantities of CO_2. Wild fires and controlled burning for forest management also release considerable CO_2. Burning also removes these sequestering organisms from the sequestering side of the equation and has a detrimental effect on the Earth's capacity to remove CO_2 from the atmosphere. Although research[1] has shown a natural ability of existing vegetation to adapt and take on more CO_2 at a higher rate in higher concentrations, but this is not adequate to make up for the extra carbon burned.

Many potential policies and projects have been initiated and proposed that would result in the planting large quantities of vegetation to take further advantage of the natural sequestration

[1] The Duke Forest FACE facility; FACE Project, Duke University, http://c-h2oecology.env.duke.edu/Duke-FACE/description.cfm, July, 2003.

capabilities of vegetation. Research has also shown that biological modifications may be possible to generate more "CO_2-hungry" forms of vegetation. However, since vast quantities of forest have been cut and large emissions of CO_2 have been emitted from these and fossil fuels, huge quantities of vegetation would need to be grown to capture all the "extra" carbon. This vegetation then will need to remain unburned, to make significant differences in the levels of CO_2 in the atmosphere.

Biotechnology may hold some promise for moderating global warming caused by the greenhouse effect. The type of genetic enhancement possible through biotechnology is not going to change dramatically rates of terrestrial carbon sequestration or bypass the laws of thermodynamics, however. Researchers are focusing on several possible ways biotechnology might help on both fronts. Some crops already being designed to withstand wind could help sequester more carbon into soils, says agronomy professor Charles Rice of Kansas State University[1]. For example, corn that is engineered to grow thicker, woodier stalks uses more carbon. The carbon is needed to make all the woody lignin and cellulose that makes them thicker and stiffer. Lignin and cellulose are slow to decompose in the soil, says Rice, "The more biomass you produce, the more carbon that's put into the soil." The DOE's **Center for Research on Enhancing Carbon Sequestration in Terrestrial Ecosystems (CSiTE)** is studying many grasses, trees and all manner organic and inorganic ways to sequester carbon and enhance carbon capture and long-term sequestration.

Biomass-derived ethanol has been touted as a potential liquid fuel replacement for gasoline. However, finding a substitute for oil, a high-energy-density liquid fuel that has powered the U.S. economy for more than a century, will not be quick or easy. Indeed, it's likely that nothing will replace the convenience and versatility of petroleum until it is forced by unavailability. Ethanol production from corn produces a net energy loss, so research scientists are studying the feasibility of using cellulose feedstock (agricultural and forestry wastes, grasses and certain components of municipal waste) to produce biofuel more efficiently. Producing cellulosic ethanol from trees and grass may be more efficient than using corn, but ultimately, the energy required to mine ore, produce steel, and manufacture tractors and farming equipment; and the amount of fuel, whether ethanol or biodiesel, needed to harvest, transport, and process the biomass is often greater than that contained in the ethanol produced. This has not deterred the push for increasing the production of ethanol.

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[1] Charles Rice, Carbon Sequestration: Top 10 Frequently Asked Questions, http://www.mediarelations.ksu.edu/WEB/News/NewsReleases/questions.pdf, Kansas State University, Manhattan, Kansas, July 2003.

Chapter 5 Existing NC Programs Pertinent to CO_2 Reductions

Several programs in North Carolina already exist that follow the principles required for reduction of carbon energy use and thus the production of CO_2. The list below is only a sampling of them.

NC Climate Wise

Climate Wise[1] is a government-industry partnership designed to help businesses turn energy efficiency and environmental performance into a corporate asset. It is based on a concept that what is good for business is good for the environment. According to Climate Wise Partners and officials, actions to improve energy efficiency and reduce greenhouse gas emissions save money and boost productivity. The base program is jointly sponsored by the US DOE and the EPA. The program is designed to help business and other organizations to be innovative and provides access to technical and financial assistance. The program in North Carolina was funded by the state until the budget problems forced its discontinuation. It has now been "privatized" in the form of a non-profit company called **Global Warming Initiatives** that is run from the NC State Centennial Campus. Thirty-nine companies have participated in the program in previous years and high interest continues.

Climate Leaders

Climate Leaders[2] is an EPA originated voluntary industry- government partnership that encourages companies to develop long-term comprehensive climate change strategies and set GHG emissions reduction goals. The program has just recently been initiated and no statistics have been seen on its success.

The **Climate Leaders** agreement spells out that the company will:

- Develop a company-wide inventory of GHG emissions annually as outlined by **Climate Leaders'** emission protocol's Core Module (direct emissions and emissions from electricity use).
- Report its GHG inventory data annually.
- Enter into discussions with EPA to develop an aggressive corporate-wide GHG reduction goal to be achieved over 5 to 10 years.

Climate Challenge

Climate Challenge began in 1994 as a DOE program. Through a mechanism of **Participation Accords**, Duke Power Company (Duke Power) and DOE agreed to participate in the **Climate Challenge Program** in pursuit of the President's goals for reducing greenhouse gas emissions. The **Climate Challenge** program is a joint, voluntary effort of DOE and the electric utility industry to reduce, avoid or sequester greenhouse gas emissions. The framework of

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[1] GWI Services; http://24.172.16.181/docs/gwi%20services.pdf July 2003.

[2] Climate Leaders Partnership Agreement, http://www.epa.gov/climateleaders/pdf/agreement.pdf, EPA, Washington, DC, July 31, 2003.

Climate Challenge was established in the project's Memorandum of Understanding.[1] The program was developed with the intent of running through 2000. It was to accomplish the following elements under the agreement.

- Financial contributions to assist in promotion and support of the program
- Improve the capacity factor for their nuclear generation
- Realize improvements in hydro capacity, thereby displacing fossil generation
- Increase the utilization of combustion ash
- Reduce system losses on transmission and distribution system
- Conduct a program to increase the efficiency of fossil stations
- Purchase electric vehicles (EVs) and evaluate them
- Maintain efforts to be first in the nation in coal-fired heat rate
- Implement special rates for recharging EVs as an incentive for others to purchase
- Set and meet challenging goals for the corporate recycling of paper, cardboard, aluminum, glass, and other products, and
- Perform energy efficiency audits to implement measures that make economic sense.

Energy Star Partners

Energy efficient homes can be certified to meet the standards of the EPA's **Energy Star®** program[2,3]. The homes meeting these standards help reduce annual energy costs by up to 30 percent; thanks to their high-efficiency heating and cooling equipment and high-quality materials and construction. These standards also result in greater comfort year-round. In some cases, the power supplier provides incentives such as Progress Energy, which takes 5 percent off the customer's total monthly electric bill. The savings over the life of the home are substantial and the benefits include the potential for higher resale value and significant savings on financing. The **Energy Star** standards are assured by a third-party verification process to assures customers and the public that the homes meets these standards and, thus, qualifies it for a discount and other advantages.

The program also extends beyond the residential setting into commercial and other areas. As an example, Food Lion[4] as well as others have been recognized as Energy Star Partners

GreenPower

Green Power is synonymous with renewable energy resources. It denotes that the electricity is "greener" than electricity generated from traditional sources. Such sources can include nuclear, large scale-hydro, photoelectric and others, and results in lower or no air pollution emissions.

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[1] Climate Challenge Participation Accord, http://www.eere.energy.gov/climatechallenge/cc_accordxDUKE.htm, Duke Energy, Charlotte, NC, July 2003.

[2] Energy Star; http://208.254.22.6/index.cfm?c=bldrs_lenders_raters.pt_bldr; USEPA, Washington, DC, July 2003.

[3] Energy Efficient Home Program; http://www.progress-energy.com/custservice/carres/energyhome/index.asp; Progress Energy, Raleigh, NC, July 2003.

[4] Food Lion earns award for exemplary energy efficiency efforts, http://www.foodlion.com/cor_news.asp?parm=216, Salisbury, NC, March 2003.

NC's New GreenPower Program

NC GreenPower is a new program designed to improve the environment by encouraging the development of renewable resources in North Carolina. **NC GreenPower**[1] will provide electric consumers with an opportunity to voluntarily purchase green power at a small premium. The program is a cooperative effort between renewable energy generators, electric utilities, and electric consumers to implement and support green power generation in North Carolina. Under this voluntary program (announced July 28, 2003, but starting full operation in October), customers are provided the option to pay an additional $4 on their electric bills for each block (100 kilowatt-hours) of energy produced from wind, solar or methane sources. Utilities then must get that block of energy from a "green" energy generator. The concept is that for every block of clean energy purchased, one fewer block of power will be produced by fossil fuels.

The program offers two basic options to electric customers: a mass-market product available to everyone and a large volume product available to customers who purchase a minimum of 10,000 kWh or more from the program per month. All qualifying **NC GreenPower** resources will be used to supply the demand for the large volume product.

This program will enable the development of multiple types of renewable energy in NC. Initially, the mix of renewable resources used is expected to emphasize biomass (agricultural and wood waste, energy crops), landfill gas (methane), and small hydro. These sources are available, plentiful and facilities to utilize them can be constructed quickly. Solar and wind are a bit more expensive and will be developed later along with photovoltaic and wind generation sources. The program would benefit from state income tax credits for renewable energy technology deployment and Federal tax incentives.

Renewable Portfolio Standard

Renewable portfolio standards (**RPS**) are required programs somewhat similar to the voluntary **Green Power** programs. They require each utility selling power in an area to use renewable energy generation to generate a certain percent of its electricity. The **RPS** are billed as a flexible and easily verified means to guarantee that renewables grow in the market. The **RPS** are expected to help lower cost and increase the competitiveness of renewable technologies by increasing sales, commercialization, and use of available technologies. Shortcomings of the **RPS** include that it will probably not promote new and emerging technologies, not readily expand beyond existing renewable installations, likely not foster research and development needs or protect low-income consumers.

Public Benefits Fund

A converse option to the RPS employed in some areas, is a **Public Benefits Fund**. This is a charge applied to the sale of non-renewable generated electricity and is similar to the system benefit charge used in some states. The purpose of the fund is to collect and distribute money for investment in actions that are in the public interest, but which would not happen in a regulated or unregulated market. The fund is collected from each ratepayer as a small fraction for each kWh sold. It can support smaller scale renewable energy projects, energy efficiency projects not done by the market place, training, consumer education, low interest loans, and other refinancing

[1] NC GreenPower Is Here; http://www.ncgreenpower.org/ , July 2003.

mechanisms as well as funds for low-income assistance. As a policy tool, the public benefits fund is applicable with or without the restructuring of the utility industry.

In the absence of restructuring legislation, the NC Utilities Commission can establish such a fund. A public benefits fund is also necessary when an **RPS** program is implemented because the **RPS** typically favors economical and established renewable technologies. While supporting the goal of the **RPS**, the public benefits fund will also commercialize newer technologies, provide affordable loans for in-state, smaller scale, renewable and efficiency projects, and create new local jobs and businesses. See the discussions of the proposed **State Energy Plan** that appears below.

Advanced Energy Corporation

Advanced Energy Corporation was previously known as Alternative Energy Corporation, or AEC. They were founded by the NC Utilities Commission in 1980 to explore alternative ways of producing electricity and get more work out of the electricity (especially motors) already available.

Located in Raleigh, North Carolina, **Advanced Energy** is a national resource that focuses on industrial process technologies, motors and drives testing, and applied building science, with state-of-the-art laboratories in which to do testing and applied research. They are a non-profit corporation that creates economic and environmental benefits through innovative approaches to energy. They offer consulting, testing, and training, and strive to develop innovative solutions to energy problems. Their primary mission is to increase efficiency and productivity in industries, businesses, and homes (especially through use of improved efficiency motors) as they transform energy into goods, services, and environmental conditioning. They work with utilities to develop programs and services to benefit their customers. They work with industry to test new equipment, help develop new products, and improve manufacturing processes. For the building industry, they help builders, developers, and mechanical contractors improve homes and small commercial buildings.

Over the last few years as competition has entered the industry, many utilities have cut or eliminated research and development, renewable energy and Demand Side Management programs and funding. This applies to NC investor-owned utilities' where demand side management, and research and development programs have been reduced in recent years from 1993 levels when these funds amounted over $125 million. In NC, a per kWh charge is now used to fund (by legislative statute) the NC Utilities Commission and the Public Staff, and to fund **Advanced Energy Corporation** by voluntary participation of the investor-owned utilities and rural electric cooperatives. For example, **Advanced Energy Corp.**[1] currently collects $0.00003567/kWh (approximately $3.5 million annually).

Waste Reduction Partners

Waste Reduction Partners[2], previously known as the **Waste Reduction and Technology Transfer (WRATT)** program, was established in 1992, through the collaborative

[1] About Advanced Energy; http://www.advancedenergy.org/general/about_us/index.html, July 2003.
[2] Waste Reduction Partners; http://landofsky.fp.skyrunner.net/wrp/About_WRP.htm, July 2003.

efforts of the Tennessee Valley Authority, Land-of-Sky Regional Council, and the North Carolina Division of Pollution Prevention and Environmental Assistance. The program, headquartered in the Asheville area, was formed to assist WNC businesses, industries, institutions, and governmental entities reduce waste and utilize natural resources more efficiently free of charge.

The **Waste Reduction Partners** team conducts on-site assessments and provides technical assistance to businesses and public facilities throughout Western North Carolina. WRP helps organizations improve environmental and energy management through efficiency techniques that save money. The team emphasizes innovative cost-saving strategies and resources that promote environmental excellence and pollution prevention. All work performed is confidential and provided at no cost to the recipient.

High Performance Building Guidelines

DOE has initiated a number of programs[1], which have been picked up by various organizations across the country, that encourage higher efficiency in buildings through improved standards. A high performance commercial building design strategy requires a clear definition of goals and performance benchmarks from the owner and an inter-disciplinary design and construction approach. Design criteria should be based on environmental and energy cost/benefit analyses and attention to "whole-building" and system performance. North Carolina has adopted a set of such standards.

North Carolina's High Performance Guidelines [2]provide a model for the design and construction of energy efficient, cost-effective, durable, and environmentally sound buildings. These programs are supplemented by:

- Energy code assessment and training,
- Energy improvement loan programs,
- And energy efficiency in state construction,
- Center for Energy Research and Technology (CERT), an energy education institute at North Carolina A&T State University,
- University Research focused on energy use and energy efficiency in manufactured housing, solar electricity in public housing, and the development of fuel cells,
- Clean Technology Demonstrations that develop partnerships with North Carolina colleges and universities to demonstrate clean energy technologies, such as fuel cells, biomass, wind, solar, and geothermal,
- Energy Efficiency in State Construction, with projects to demonstrate energy improvements in lighting, boiler controls, HVAC controls, chilled water systems,
- And other energy efficiency measures in state and university buildings,
- Energy for Buildings provides industrial companies with assistance in their efforts to reduce emissions of carbon dioxide and other greenhouse gases that contribute to both global warming and air pollution,
- Provide training and presentations about the High Performance Guidelines that have recently been developed by Triangle J Council of Governments,

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[1] High Performance Buildings; http://landofsky.fp.skyrunner.net/wrp/default.htm. July 2003.
[2] High Performance Guidelines; http://www.doa.state.nc.us/energy/Energy2/build.htm, July 2003.

- Targets policy makers, designers and other professionals who design, build and manage public schools, state and local government buildings, and facilities at universities and community colleges,
- Housing Energy Efficiency program to create a market demand for homes that exceed the North Carolina Energy Code,
- Home energy rating & documentation for a program recognized by the national mortgage industry,
- Provides matching funds for costs associated with increasing the energy efficiency of local government buildings,
- North Carolina Energy Code Assessment and Training to evaluates the effectiveness of residential and commercial building energy codes and enforcement in the state,
- Public School Energy Improvement that provides matching funds for costs associated with increasing the energy efficiency of K-12 public schools (now in Lee County only), and
- Steam Trap Surveys that assist businesses by identifying and reporting the condition of steam traps, specifying those needing repair or replacement.

Overall, this appears to be an extensive and very helpful program contributing to reduced electric requirements, which in turn reduces emissions of CO_2 to the atmosphere.

Leadership in Energy and Environmental Design (LEED)

The **U. S. Green Building Council** (USGBC) is a coalition of members from the building industry who are promoting buildings that are environmentally responsible, profitable and healthy places to live and work. The **LEED** Green Building Rating System is a national consensus-based rating system designed to result in green building practices. It entails the design, construction and certification of these buildings. They provide workshops, accreditation, resources and third-party certification. They also hold a **Greenbuild** conference annually to exchange information within the industry and a Federal Summit to interact with the regulators within the federal arena. They have several committees and sub committees which work on the various aspects of their aims. The efforts of this organization are recognized as being influential toward reduction of GHG's directly and through increased energy efficiencies and subsequent fuel and emission reductions.

NC Energy Plan

NC's General Assembly established the **Energy Policy Council** (EPC) in 1975 to address energy issues and concerns in North Carolina. The **1992 NC Energy Plan** provided the Council's last examination of energy use, energy production, and environmental concerns in the state. Since state and national energy issues have changed during that time, an updated plan was developed. Through development of a proposed new **State Energy Plan,**[1] NC has taken positive action toward reduction of energy waste, which translates directly into reductions in CO_2 emissions. The plan is based on a premise that the state's energy industries continue to provide high quality, reliable electricity and fuels to buildings and industry.

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[1] The (Proposed) North Carolina Energy Plan, Chapter 1; http://www.ncenergy.appstate.edu/index.php, June, 2003

The **Energy Policy Working Group** recorded and organized the input received and, after months of extensive deliberation, provided a draft set of recommended policies and programs to the **Energy Policy Council** in January, 2003. The Council discussed the recommended policies and programs and approved 93 measures, as set forth herein, that meet the plan's objectives. The policies and programs approved by the **Energy Policy Council** primarily addressed the following sectors and issues in the state:

1. Energy, Economics, and the Environment, Fossil and Nuclear Fuels,
2. Electric Utilities and Energy Use,
3. Alternative Fuels from Biomass,
4. Alternative Energy Sources and
   - Energy Use in
     - the Public Sector
     - the Residential Sector
     - the Commercial Sector
     - the Industrial Sector
     - the Transportation Sector,
5. Energy Education and Research and
6. Funding for Energy Policies and Programs

IMMEDIATE ACTION ITEMS

The EPC reviewed the entire list of 93 policies and programs to determine which measures would require action by the Governor, NC General Assembly, NC Utilities Commission, or other regulating or administrative agency. From the entire list, the EPC recommended 15 key legislative, regulatory, and administrative policies for action in 2003 and 2004[1] (these are slightly edited and shortened below from the original text):

Energy, Economic, and Environmental Issues

Exec-1 The NC Department of Commerce (DOC) and the SEO should encourage and support economic development of energy-related enterprises whose products are intended to increase energy efficiency or use renewable resources, such as providers of specialized insulation and window products, heating and air conditioning equipment and controls, distributed generation equipment, solar and wind energy equipment, and fuel cells.

Exec-2 The SEO should communicate the energy research being performed in the state to the NC DOC for its development strategy.

Exec-3 The NC DENR should create a greenhouse gas registry to track emissions of carbon dioxide and other greenhouse gases,

Alternative Fuels from Biomass

Exec-4 NC should support the development of an alternative fuel industry through dedicated funding and grant matching of promising alternative fuel projects (including agricultural waste processing facilities, biodiesel and ethanol). NC should support the development of an alternative fuel industry through dedicated funding and grant. These efforts should include agricultural waste processing facilities, biodiesel and ethanol refineries, fueling stations for alternative-fueled vehicles, production incentives for farmers and refiners, incentives

[1] North Carolina Energy Plan, Executive Summary, http://www.ncenergy.appstate.edu/plan/ , July 2003.

for highly efficient or alternative-fueled vehicles, and education and awareness programs. Insure that all 100 counties in the state have alternative fueling infrastructure by 2007. The EPC supports a program to pay for alternative fuels development via a $1 to $2 fee applied to annual vehicle registration fees.

Exec-5 The NC General Assembly should pursue strategies that convert animal waste into environmentally sound energy sources.

Alternative Energy Sources

Exec-6 The General Assembly should consider adopting net metering for application to all electric utilities in the state.

Exec-7 The General Assembly should evaluate a renewable portfolio standard (**RPS**) that complements the NC **GreenPower** program and fosters the development of a renewable electricity market. This should require that all electric utilities increase the percentage electricity that comes from renewable sources.

Exec-8 The General Assembly should reexamine the Mountain Ridge Protection Act as it pertains to wind energy while still protecting NC's natural beauty.

Exec-9 The SEO should assess and propose incentives and regulatory or administrative measures for development of renewable electricity generation facilities, solar water heating, passive and active solar space heating, and lighting.

Exec-10 The General Assembly should require that all electric utilities in NC provide generation disclosure of fuel mix percentages and emissions statistics on sulfur dioxide, nitrogen oxides, carbon dioxide, and mercury annually by bill insert and via website.

Energy Use in the Public Sector

Exec-11 State agencies and universities, with coordination by the NC Department of Administration, should reduce energy consumption in state buildings by 20% by 2008, 4% per year or more for the next 5 years. The SEO should submit an annual report to the Energy Policy Council, the Governor's Office, the State University System and other major energy users in NC to summarize the source, cost and energy efficiency activities undertaken, the approximate investment in energy efficiency measures, and their overall economic costs and benefits.

Exec-12 Working in conjunction with the State Construction Office, the SEO should monitor, analyze, and report on the energy savings attributed to the new requirements on life-cycle cost analyses of the $3.1 billion higher education building program currently underway. The SEO should maintain records of the consequences of effects of life-cycle cost procedures.

Exec-13 NC should facilitate efforts of local governments to finance energy efficiency and renewable energy projects to achieve economies of scale and improve opportunities for financing, restructure the underwriting provisions of the SEO's low-interest energy loan program, and provide training in energy efficiency.

Energy Use in the Residential Sector

Exec-14 NC State Government should continue to support a strong low-income weatherization program to include review of the effectiveness of energy conservation programs conducted through the program and opportunities for improvements. The SEO should develop additional programs to address energy-efficient housing in the low-income sector.

Funding for Energy Programs

Exec-15 The General Assembly should review options, such as a Public Benefits Fund or other means, to enable funding of the basic services provided by the State Energy Office and the recommendations in the State Energy Plan.

Generalizations

In addition to the above, the proposed **NC Energy Plan** includes many other detailed recommendations and observations, many of which have been referenced previously in this document. Many other programs and resources exist that may likely have merit for discussion but are omitted here.[1] The CSA appears to be in consonance with these (proposed) policies. In addition, other new state and federal regulations on vehicle emissions will ultimately reduce emissions from cars and trucks and be in harmony with the stated purposes of the plan. Other new and ongoing programs will continue to promote energy efficiency and renewable resources that will reduce required uses of fuels. Though the charge of DAQ under the Section 13 of the CSA does not include the review, endorsement or otherwise mention the NC Energy Plan, they appear to be quite complimentary and headed toward similar and compatible objectives. The melding or alignment of these efforts will no doubt further evolve as these efforts march forward in the next few months and years.

[1] Advanced Energy Links; http://www.advancedenergy.org/root/general/links.html, July 2003.

Chapter 6 Interim Conclusions and Expectations

This report has been generated with the intent of providing background and state of knowledge as relates to emissions of CO_2 in North Carolina and elsewhere, the options for reduction and/or removal of these emissions from the atmosphere and a summary of state, national and international processes that relate to the actions or proposed actions in NC. The 2004 and 2005 reports will provide more information and eventually NC-specific recommendations on what should be done to reduce emissions of CO_2 from NC coal-fired power plants and other stationary sources.

Proposed Stakeholder and Public Workshop

In connection with our preparation of the 2004 Report, the Division of Air Quality is planning to hold a workshop to provide information and to solicit discussion of issues, viewpoints and other information needed to make the final decisions required by this Section of the CSA. We expect to discuss a list of issues and topics for which there are currently gaps of information and understanding, or for which there is a benefit of stakeholder feedback. These issues will be targeted at specific persons or organizations who will agree to prepare written papers on the topic(s) outlined, with as much supporting information and reference material as possible. At the conclusion of the workshop, these papers will be used to prepare a proceedings report for the meeting. An introduction, with an overview and the summation of the DAQ's view on the material and positions presented will be prepared and included as a part of these proceedings. Our intent is to provide this information and summary to the EMC and ERC as the 2004 report. This process will provide a means of identifying further issues and gaps that must be filled prior to the final 2005 report.

Economic Costs and Benefits

Currently, the costs of various options for reducing emissions of CO_2 are essentially in a state of flux that likely will not begin to stabilize until significant decisions are made and issues resolved at the national and international level. The fluctuating prices of natural gas, aggravated by increased demands upon a supply that is claimed adequate for needs on one day but pointed out to be unavailable because of transport and location factors the next, further complicate the uncertainty and method of dealing with optimum planning for the future. In addition, the research level of most of the sequestration and removal activities for collection and safe, stable, long-term disposal exacerbates the problems to make defensible statements on the economics. As this effort progresses over the next two years, many of these decisions will likely be made and it will be possible to collect more meaningful data and provide them in a manner that will be of benefit to these studies for the CSA. The DAQ will undertake what it is able, but most of these types of efforts will be subject to national forces.

Appendix A - General Background for CO_2 and Other GHG

DAQ staff feels it is important to the task of understanding the associated phenomena and regulatory options or requirements that a basic set of information be provided as background. This is the context and purpose of this appendix.

CHEMICAL/PHYSICAL ATTRIBUTES OF CO_2

CO_2 is a colorless, odorless gas that exists normally in the atmosphere in concentrations currently in the range of 370 parts per million by volume. Since it occurs naturally in ambient air and does not directly impair human health at ambient levels, it is not considered an "air pollutant" under the current interpretations of the Clean Air Act. This interpretation is currently being challenged in the courts by a collection of northeastern states.[1] Although at high concentrations CO_2 will displace the body's ability to take in oxygen and cause suffocation, it is not normally considered a toxic gas at normal ambient concentrations. In fact, the human body generates and exudes low concentrations of CO_2 as a product of the normal oxidation process of the body to generate energy from food. Thus, the body takes in oxygen, combines it with the carbon in the food, and releases the CO_2 as a by-product, which in turn is taken up by plants to use to generate oxygen and maintain the cycle.

SOURCES OF CO_2

CO_2 results when any carbon-containing material (fuel) burns. CO_2 is the GHG emitted by human activities in the largest quantities because it is a primary product of fossil-fuel combustion, as in coal-fired utility boilers and automobiles, vegetation burning, normal vegetative decomposition, and other such activities. Whether fossil or renewable, most fuels are carbon. Fossil fuels include coal, oil, natural and gas, which be believed were formed from prehistoric plant and animal matter that has been exposed to great pressures under the Earth over billions of years. Renewable fuels such as grain (ethyl) and wood (methyl) alcohols, which result from carbon compounds being formed within historic times and are available in the form in which they "grew" or derived from there, such that they result from sequestering carbon atoms from the "recent" atmosphere. These fuels are considered renewable because they can be produced or harvested by human activities and can be replaced within a few years or lifetimes as opposed to processes beyond the consideration of man that take millions or billions of years to achieve. Although there are reasons to promote the combustion of renewable fuels over fossil fuels, the burning of one atom of carbon will generate one molecule of CO_2 no matter the source of that carbon atom. In reality, natural decomposition is a form of "slow combustion" and contributes to the emission load. More details on the sources in general, and particularly in North Carolina, are presented later in this report.

In 2000, total estimated U.S. GHG emissions rose to 7,011 teragrams of carbon dioxide equivalent (Tg CO_2 Eq).[2] The increase from 1999 to 2000 was 2.5%, which was greater than the

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[1] Commonwealth of Massachusetts, State of Connecticut, and State of Maine, Civil Action v. Christine Todd Whitman, Defendant, in her capacity as Administrator of the United States Environmental Protection Agency United States District Court, District of Connecticut, June 4, 2003.

[2] Inventory of US GHG Emissions and Sinks 1990-2000,US EPA, Washington, DC, April 2002.

average annual rate of increase between 1990 and 2000 that was 1.3%. The higher than average increase in emissions in 2000 was, in part, attributable to robust economic growth in 2000, which led to increased demand for electricity and transportation fuels, cooler winter conditions compared to the previous two years, and decreased output from hydroelectric dams. The largest source of CO_2 and the overall GHG emissions continues to be fossil-fuel combustion.

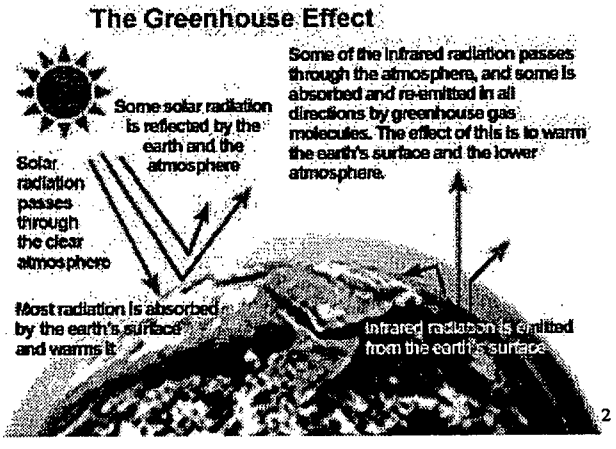
UNDERSTANDING THE GREENHOUSE PHENOMENON

For many years, there have been speculations and suppositions regarding the warming or cooling of Earth due to various physical forces and phenomenon. However, in the early 1960s, more and more scientists started to more seriously investigate and take actual measurements in a consistent manner so that they began to clearly recognize that concentrations of carbon dioxide in Earth's atmosphere were increasing every year. Because current concentrations of GHG keep Earth at its present temperature, scientists postulated that increasing concentrations of GHG would make the Earth warmer.[1] In computer-based simulation models, rising concentration of GHG nearly always result in an expected increase in the atmospheric temperature of Earth. (Note: Although this report is oriented toward CO_2 from coal-fired utility boilers, other GHG are discussed for completeness and context).

Average Earth Temperature

GHG, especially CO_2, result from burning coal, oil, and natural gas as well as wood and other organic matter from activities such as deforestation, burning of waste, prescribed burning, forest fires and land clearing. Natural decay of organic matter also results in such emissions. Over the last century, GHG have been emitted faster than natural processes, such as plant growth-carbon sequestration, can remove them. In a natural state, GHG would keep the Earth's surface about 60° F warmer than it would be without them. These GHG's trap outgoing energy and retain heat in similar manner to glass panels in a greenhouse and slow heat loss by re-radiation back to space.

Figure A.1: Illustration of the Greenhouse Effect



[1] Advanced Oxyfuel Boilers and Process Heaters for Cost Effective CO2 Capture and Sequestration, US Department of Energy, http://dominoweb2.fossil.energy.gov/domino/apps/fred/fred.nsf, July 2003.
[2] Climate Change: State of Knowledge, Office of Science and Technology Policy, Office of the President, Washington, DC, October 1997.

Contributors to Greenhouse Gases

Since the beginning of the industrial revolution, scientists have reconstructed information showing that atmospheric concentrations of CO_2 have increased nearly 30%, while methane concentrations have more than doubled and nitrous oxide concentrations have risen by 15%.[1, 2] Fossil-fuels burned to operate cars and trucks, heat homes and businesses, generate electricity and power factories are responsible for about 98% of US carbon dioxide emissions, 24% of methane emissions, and 18% of nitrous oxide emissions. In addition to fossil fuel combustion, increased agriculture, deforestation, landfills, industrial production and mining, all are significant tributors to GHG emissions. In 1994, the U.S., with about 5% of the globe's population, emitted about 20% of the Earth's total GHG.

Changes in CO_2 emissions from fossil fuel combustion are influenced by long-term and short-term factors, such as population and economic growth, energy price fluctuations, technological changes, and seasonal temperatures. Consumption of fossil fuels fluctuates in response to changes in economic conditions, energy prices, weather, and availability of non-fossil alternatives. Long-term changes in energy use patterns are largely a function of changes that affect the scale of consumption (e.g., population, number of cars and size of houses), the efficiency with which energy is used in equipment (e.g., cars, power plants, steel mills and light bulbs) and consumer behavior (e.g., walking, bicycling, or telecommuting to work instead of driving). Energy related CO_2 emissions are also a function of the type of fuel or energy consumed and its carbon intensity. Producing heat or electricity using natural gas instead of coal, for example, can reduce the CO_2 emissions associated with a specific quantity of energy consumption because of the lower carbon content of natural gas per unit of useful energy produced. This is not to say that there are not other trade offs and considerations, such as the increased use of natural gas, which inevitably causes increases in its price, and it may not be adequately available.

Energy-related activities accounted for the majority of US CO_2 emissions between 1990 and 2000. CO_2 from fossil-fuel combustion was the dominant contributor. In 2000, approximately 85% of the energy consumed was produced through fossil fuel combustion. The remaining 15% came from other energy sources such as hydropower, biomass, nuclear, wind and solar energy. From 1990 to 2000, petroleum supplied the largest share of US energy demands, accounting for an average of 39% of total energy consumption. Natural gas and coal accounted for an average of 24% and 23% of the total energy consumed, respectively. Most of the petroleum was consumed in the transportation end-use sector, the electricity power generators utilized the majority of coal and natural gas was largely consumed by the industrial and residential end-users.

Emissions of CO_2 from fossil-fuel combustion increased at an average annual rate of 1.6% from 1990 to 2000. The fundamental factors causing this trend were (1) a robust domestic economy, (2) relatively low energy prices as compared to 1990, (3) significant growth in

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[1] Global Warming – Climate, (http://yosemite.epa.gov/oar/globalwarming.nsf/content/climate.html), US EPA, Washington, DC, July 2003.

[2] Climate Change: State of Knowledge, Office of Science and Technology Policy, Office of the President, October 1997.

emissions from transportation activities and electricity generation, and (4) heavier reliance on nuclear energy (leading to a lower rate of increase).

Relation of CO_2 to other global warming gases

CO_2 is the largest global warming gas in terms of relative tonnage emitted. However, quantity is not the only climate change factor. Each GHG has two additional factors that make them different. These factors are the **relative global warming potential** and the **atmospheric lifetime**. The global warming potential relates to the physical aspect of the gas, which determines its ability to reflect the proper wavelengths of light or heat energy to result in the allowance or disallowance of this energy to escape from Earth's atmosphere. In order to compare the relativity of each GHG to trap heat in the atmosphere, the IPCC commissioned by the United Nations to assess the scientific, technical, and socioeconomic information relevant for the understanding of the risk of human-induced climate change, developed a system referred to as the global warming potential (GWP). GWP's are defined using the warming effects relative to CO_2 as the baseline. For example, methane has a GWP of 21, which indicates it has a global warming potential of 21 times that of CO_2. This comparison is valid for only GHG with long atmospheric lifetimes, making them more likely to be evenly distributed throughout the atmosphere. Also, the GWP's are used to convert GHG emissions to units of million metric tons of carbon equivalent (MMTCE).[1]

Greenhouse gases of most concern are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). The first three are the most prominent and important in most analyses. Table A-1 contains relevant information on the three primary GHG.

Table A.1: Global atmospheric concentration (ppm), Atmospheric Lifetime (years) and Global Warming Potential of Selected Greenhouse Gases

Atmospheric Variable	CO_2	CH_4	N_2O
Pre-Industrial (1790) Concentration	278	0.700	0.270
1998 Atmospheric Concentration	365	1.745	0.314
Atmospheric Lifetime-years	50-200[a]	12[b]	114[b]
Global Warming Potential	1[c]	21[c]	310[c]

[a] No single lifetime can be defined for CO_2 because of the different rates of uptake by different removal processes.
[b] This lifetime has been defined as an "adjustment time" that takes into account the indirect effect of the gas on its own residence time.
[c] GWP's are calculated over a 100 year time horizon.

- **Methane** (CH_4) is a colorless and odorless hydrocarbon produced through anaerobic (without oxygen) decomposition of waste landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas, coal and oil production and

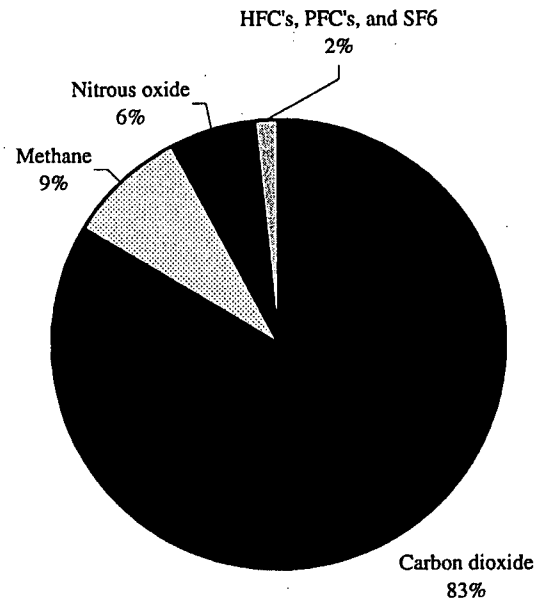
[1] Greenhouse Gases and Global Warming Potential Values,US EPA, Office of Atmospheric Programs, Washington, DC, April 2002.

incomplete fossil fuel combustion. As may be imagined, these sources proliferate in both the manmade and the natural environment.

- **Sulfur Hexafluoride** (SF_6) is a colorless gas utilized (in relatively small quantities) primarily in electrical transmission and distribution systems and in electronics. Often this gas is released in small quantities as a tracer in scientific atmospheric studies as it can be detected at very low levels and natural sources do not exist.
- **Perfluorocarbons** (PFCs) and **Hydroflurocarbons** (HFC's) are a group of man made chemicals composed only of carbon and fluorine. These chemicals were introduced as alternatives to certain ozone depleting substances. Additionally, perfluorocarbons and hydrofluorocarbons are emitted as by-products of industrial processes and used in manufacturing.
- **Nitrous Oxide** (N_2O) is emitted from farm soil (especially where commercial and organic fertilizers are used), fossil fuel combustion, nitric acid production and biomass combustion. Since N_2O is quickly oxidized to Nitrogen Dioxide (NO_2) in the atmosphere, it is normally estimated and presented as NOx. This pollutant (as emitted from coal fired utility boilers) is addressed by the controls imposed by the CSA.

The figure below illustrates the distribution of GHG by gas for 2000.[1]

Figure A.2: 2000 Greenhouse Gas Emissions by Gas



Review of these relative comparisons show that no simple relationship between the largest quantities of gas emitted in any given year and the predominant affecter of the resulting climate change phenomenon exist. Of course, one must not lose sight of the uncertainties

[1] Inventory of US GHG Emissions and Sinks 1990-2000,US EPA, Washington, DC, April 2002.

involved in all of these estimates. Though scientifically derived, the uncertainties are high, and it is difficult to make absolute and certain statements that can be defended without caveats and reservations.

Global Climatic Effects of Greenhouse Gases

Climate change refers to long-term fluctuations in temperature, precipitation, wind, and other elements of the Earth's climate system. The climate system can also be influenced by changes in the concentration of various gases in the atmosphere, which affect the Earth's absorption of radiation.[1] Under the United Nations Framework Convention on Climate Change (UNFCCC), the definition of climate change is " a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." Given the following definition, IPCC concluded in its Second Assessment Report that:

> *Human activities are changing the atmospheric concentrations and distributions of greenhouse gases and aerosols. These changes can produce a radiative forcing by changing either the reflection or absorption of solar radiation, or the emission and absorption of terrestrial radiation.*

IPCC further concluded, "Concentrations of atmospheric greenhouse gases and their radiative forcing have continued to increase as a result of human activities." In the aftermath of the IPCC report, the National Academy of Sciences commissioned the National Research Council to review the IPCC report and identify areas of uncertainty in the science of climate change. Among the National Research Council findings were:

- Greenhouse gases are accumulating in the earth's atmosphere because of human activities, causing surface air temperatures and subsurface ocean temperatures to rise.
- Human induced warming and associated sea-level rises are expected to continue through the 21st century. Secondary effects are suggested by computer model simulations and basic physical reasoning. These include increases in rainfall rates and increased susceptibility of semi-arid regions to drought.
- The greater our emissions of greenhouse gases and the associated changes in climate, the more severe the adverse impacts of climate change will be.
- Because there is considerable uncertainty in current understanding of how the climate system varies naturally and reacts to emissions of greenhouse gases and aerosols, current estimates of the magnitude of future warming should be regarded as tentative and subject to future adjustments.

The Earth's surface temperature has risen by approximately 1 degree Fahrenheit over the past century with accelerated warming over the past two decades, according to the National Academy of Sciences. Global mean surface temperatures have increased 0.5 to 1.0° F since the late 19th century. The 20th century's ten warmest years all occurred in the last fifteen years of this century.[2] Warming of this magnitude can cause changes in temperature and precipitation patterns, induces sea level rise, and alters the distribution of fresh water supplies. Globally, sea

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[1] Climate Change: State of Knowledge, Office of Science and Technology Policy, Office of the President, October 1997.

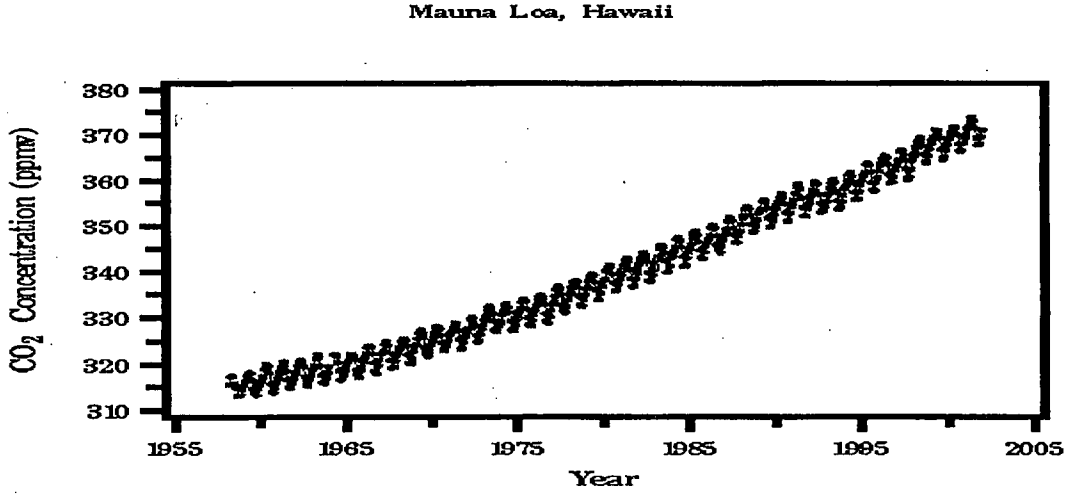
[2] Global Warming – Climate, US EPA, (http://yosemite.epa.gov/oar/globalwarming.nsf/content/index.html), July 2003

level has risen 4 to 10 inches over the past century and precipitation over land has increased by approximately 1%. Scientists expect that the average global surface temperature could rise 1 to 4.5° F in the next fifty years and 2.2 to 10° F in the next century. GHG have an atmospheric lifetime ranging from decades to centuries. The GHG currently being emitted will affect the climate well into the 21st century.

At Mauna Loa, Hawaii, atmospheric CO_2 measurements shown in Figure.A.3 constitute the longest continuous record of atmospheric CO_2 concentrations available in the world. The Mauna Loa site is considered one of the most favorable locations for measuring undisturbed air because possible local influences of vegetation or human activities on atmospheric CO_2 concentrations are minimal and any influences from volcanic vents may be excluded from the records. The methods and equipment used to obtain these measurements have remained essentially unchanged during the 44+-year monitoring program.

As Earth becomes warmer, the global water cycle speeds up. This is the exchange of water among the oceans, atmosphere, and land. Higher temperatures cause more evaporation, and soils dry out faster. Increased amounts of water in the atmosphere causes more rain or snow overall. Cold spells would still occur in the winter, but heat waves ill likely be more common. Some places will be drier and others wetter. Since the beginning of the century, precipitation in the U.S. has increased by about 6% and the frequency of intense precipitation (heavy downpours of more than two inches per day) has increased by 20%.[1] Such events can cause severe flooding. Between 1981 and 1991, the length of the growing season in the northern latitudes has been estimated to have increased by up to twelve days. "Greening" in spring and summer also have been estimated to occur up to eight days earlier than normal, and vegetation continued to photosynthesize about four days longer than "historically."

Figure A.2: Example of Ambient CO2 Concentration Trend[2]



Source: Dave Keeling and Tim Whorf (Scripps Institution of Oceanography)

[1] Climate Change: State of Knowledge, Office of Science and Technology Policy, Office of the President, October 1997.

[2] Carbon Dioxide Research Group, Scripps Institution of Oceanography, University of California, La Jolla, California, http://cdiac.esd.ornl.gov/trends/co2/sio-mlo.htm, 2003

A decrease in Northern Hemisphere snow cover, a decrease in Artic Sea ice, and continued melting of alpine glaciers, have also been corroborated. The global mean sea level has risen 4 to 10 inches over the last century, mainly because water expands when heated. Melting of glaciers, which has been measured worldwide over the last century, is believed to be a contributing factor to the rise in the sea level. Formerly frozen soils in the Alaskan and Siberian artic have begun the melt, damaging both the ecosystems and infrastructure. Melting and tundra warming will also lead to decay of organic matter and the release of trapped carbon and methane, thereby creating an additional source of GHG. Whether these are directly caused by man's activity is somewhat speculative, but they are certainly well correlated with the increases in GHG.

PREDICTIONS OF FUTURE CLIMATIC CHANGES

General circulation models are complex computer simulations that describe the circulation of air and ocean currents and how energy is transported with the climate system. Though still somewhat uncertain, these models provide powerful tools for studying climate. With such models, the developers and other scientists believe that a projected increase in the atmosphere's heat trapping ability for a given concentration of GHG has reasonable precision. However, the resulting impact on climate is more uncertain. This is primarily because the climate system is very complex and dynamic, with constant interaction between the atmosphere, land, ice, and oceans.

Such model calculations suggest that the global surface temperature could increase an average of 1.6 to 6.3° F by 2100, with considerable regional variation. These temperature changes would be far greater than recent natural fluctuations, and they would occur faster than any known changes in the last 10,000 years with the US is expected to warm faster than the global average.

The models suggest that the rate of evaporation will increase as the climate warms, increasing average global precipitation. They also suggest increased frequency of intense rainfall as well as a marked decrease in soil moisture over some mid-continental regions during the summer. Using these model results, sea level is projected to increase between 6 and 38 inches by 2100. The frequency and intensity of some extreme weather of critical importance to ecological systems (droughts, floods, frosts, cloudiness, the frequency of hot or cold spells, and the intensity of associated fire and pest outbreaks) could increase.

Projections for North Carolina

Calculations and estimates of climate change are much less reliable at regional scales than globally. It remains unclear whether the regional climate will become more variable. In reports authored by EPA and researchers at Appalachian State University, a series of projections were compiled from various sources.[1] These projections are very uncertain, and in many cases are internally inconsistent and contradictory. Separating the "sky is falling" scenarios from those that are realistic in a shorter term (100 years) or those that will likely or plausibly happen over centuries is difficult to impossible. This does not mean that we should not take prudent actions

[1] Climate Change and North Carolina, EP 236-F-98-007q, US EPA, Climate and Policy Assessment Division, September 1998.

to mitigate the effects. Some of these projections are summarized below for purposes of completeness and reference.

Climatic Effects

Based on projections made by the IPCC and results from the United Kingdom Hadley Centre climate model (HadCM2), temperatures in North Carolina could increase by 3° F (with a range of 1 to 5° F) in all seasons. By the same measures, precipitation could increase by about 15% (with a range of 5 to 30%) in winter and spring and slightly more in fall and summer. Variations (swings) in wet and dry extremes are also predicted to increase. Recent reports with updates and testing of this model have been reported to indicate that revisions to model cause it to provide substantially different results. This information will be reviewed and updated in a future report.

Health Effects

Direct effects of ambient CO_2 in the atmosphere on the human body have not been shown and are not believed to be problematic. Of course, extremely high levels of CO_2 levels in breathing air could cause suffocation. However, the concerns for health as projected from high ambient levels and climate changes are more subtle and indirect. Levels found in smokestacks from coal-fired power plants do not approach the levels to make this a problem in ambient air.

Possible or likely indirect health effects from elevated GHG have been identified that are not related to direct mechanisms. With variable degrees of plausibility some of these speculations are outlined below:

- Some increases in heat related deaths and illnesses.
- Mosquito populations could possibly increase, thus increasing the potential for transmission of diseases.
- Increased duration, intensity, and extent of harmful algal blooms (red tides) and related bacterial growth.
- Possible (over time) decline (and/or migration) of various forest and vegetative species northward.[1]

Water Resources

Increased precipitation could help alleviate water supply problems and provide more water for dilution of pollutants. However, projections[2] indicate there could also be increased flooding. Other projections made in these reports include:

- Higher rainfall could increase erosion and exacerbate levels of pesticides and fertilizers in runoff from agricultural mining and urban areas.
- Higher stream flows could intensify problems in low-lying coastal areas and recent developments in floodplains.
- Lower flows and higher water temperatures (from the increased irregularity of "dry" times) also could degrade water quality by concentrating pollutant levels and reducing the assimilation of wastes.

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[1] Climate Change: State of Knowledge, Office of Science and Technology Policy, Office of the President, Washington, DC, October 1997.

[2] Ibid Reference 1.

- Aquifers in the Coastal Plains could be diminished further under the drought scenario predictions that occur because of the variable conditions predicted in the model.

Agriculture

Climatic conditions and water availability influence the mix of crop and livestock production. The list of speculations below is typical:

- As climate warms, production patterns could shift northward.
- Increases in climate variability could make adaptation by farmers more difficult.
- Increases in heavy rainfall episodes could increase erosion.
- Warmer climates and less soil moisture (Note uncertainty and apparent conflict with previous projection of higher rainfall) because of increased evaporation may increase the need for irrigation. The updated model may provide improved information.
- Decreased water supplies, again from the variability predicted by the models.

Coastal Areas

Sea level rise could lead to flooding of low-lying property, loss of coastal wetlands, erosion of beaches, saltwater contamination of drinking water, and decreased longevity of low-lying roads, causeways, and bridges. In addition, sea level rise could increase vulnerability of coastal areas to storms and associated flooding.

Forests

Trees and forests are adapted to specific climate conditions. As climate becomes warmer and drier (or wetter), forests change. Such changes may include:

- Species composition
- Geographic range
- Health and productivity
- Types of trees dominating those forests.[1]

Ecosystems

Valuable ecosystems in North Carolina, include spruce-fir forests, bogs, and un-vegetated hilltops in the mountainous regions; bottomland hardwood forests and fire-maintained prairies in the piedmont; and longleaf pine forests, provide critical habitat for numerous native plants and animals. The Great Smoky Mountains are recognized as a center for biodiversity. The southern Appalachians also contain a diverse array of salamanders, which are very sensitive to climatic changes. In addition to climatic changes, air pollution (acid rain and ground-level ozone) and exotic pests (hemlock wooly adelgid) already threaten the Appalachian spruce-fir forests.[2] Climatic changes could result in significant changes in these ecosystems.

- Warmer temperatures could lead to reduced stream flow and warmer water temperatures, which could impair fish reproduction.
- Increases in average temperatures could also reduce the distribution and limit the range of some fish species.

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[1] Climate Change and North Carolina, EP 236-F-98-007q, US EPA, Climate and Policy Assessment Division, Washington, DC, September 1998.

[2] Ibid Reference 1

- In coastal habitats, rising sea levels could inundate,
- Salinization may increase, and
- Sedimentation of vital wildlife habitats may occur.
- These effects will likely include further inland penetration of saltwater with many streams and rivers affected.

UNCERTAINTY

No estimate or projection is certain. This is especially true with projected consequences of global warming and climate change. Science can be certain that something is happening and may be able to measure some of its attributes. Due to randomness, known and unknown variables, and the immensity of the volume of global gases and landmass, no one can say that they know all the answers with an unquestionable degree of certainty. Debate continues on climate change and global warming, by scientists on each side of the issue that appear to have appropriate credentials. Nevertheless, the National Academy of Sciences, and the IPCC, internationally are the recognized bodies of leading scientists on the topic, and they have declared that global warming is already happening and that it is caused by human activities, mainly the burning of fossil fuels, which produces CO_2 and other GHG pollution. Thus, this is generally the conclusion that the DAQ recognizes as having the most credibility, and the one that prudent decisions should be based upon, at least until proven to be faulty. The approaches of these studies will be focused on when and how to achieve these goals, rather than if they should be goals.

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Reductions to the Cash Balances of DENR Special Funds: FY 2000-2004

L = Legislative transfer; G= Transfer by Governor

	2000-2001	2001-2002	2002-2003	2003-2004	Total
Administration					
Fund 2104: Moorseville RO Vending			$472 L		$472
Division of Air Quality					
Fund 2331: Air Permit Fund	$100,000 G	$77,889 L	$250,000 L	$77,918 L	$505,807
Fund 2333: Title V*	$100,000 G	$100,000 G			$200,000
Fund 2338: Inspection and Maintenance	$200,000 G				$200,000
Division of Aquariums					
Fund 2850 Special Activity Fund-RI	$50,000 G				$50,000
Fund 2855 Special Activity Fund-FF	$250,000 G				$250,000
Office of Conservation and Community Affairs					
Fund 6710: Natural Heritage Trust Fund	$2,000,000 G	$3,000,000 G	$3,287,582 L		$8,287,582
Ecosystem Enhancement Program					
Fund 2980: Wetlands Restoration		$4,400,000 **			$4,400,000
Division of Environmental Education					
Fund 2105: Envi. Education Certification			$10,000 L		$10,000
Fund 2120: Keep America Beautiful	$1,450 G				$1,450
Division of Environmental Health					
Fund 2106: Sleep Products Fund		$46,437 L	$300,000 L	$200,000 L	$546,437
Fund 2754: GSWW System Account			$10,900 L		$10,900
Division of Forest Resources					
Fund 2220: Forestry Improvement Program	$500,000 G				$500,000
Fund 2221: Bladen Lakes State Forest	$25,000 G		$440,000 L		$465,000
Fund 2251: Forest Development	$250,000 G				$250,000
Fund 2255: Special Air Operations	$100,000 G		$6,759 L		$106,759
Fund 2710: Forestry Fran-FEMA	$16,128 G				$16,128
Fund 2711: Forestry Fire Suppression			$78,225 L		$78,225
Fund 2712: Forestry Restoration			$771,333 L		$771,333
Division of Land Resources					
Fund 2610: Mineral Interest	$25,000 G		$20,000 L		$45,000
Fund 2620: Land Env. Controls		$111,261 L			$111,261
Fund 2625: Mine Reclamation	$25,000 G				$25,000
Fund 2735:Sedimentation Fees	$300,000 G	$148,562 L			$448,562
Fund 2740: Dam Safety Account		$18,522 L	$100,000 L		$118,522
Fund 2745: Mining Fees	$25,000 G		$25,000 L		$50,000

Fiscal Research, 2/23/2004

February 24, 2004 ERC Meeting
EXHIBIT E

Reductions to the Cash Balances of DENR Special Funds: FY 2000-2004

L = Legislative transfer; G= Transfer by Governor

	2000-2001	2001-2002	2002-2003	2003-2004	Total
Division of Marine Fisheries					
Fund 2991: Governor's Cup Trust Fund	$10,000 G				$10,000
Museum of Natural Sciences					
Fund 2464: Other Extension Activities	$25,000 G				$25,000
Fund 2465: Scientific Publications	$1,500 G		$3,177 L		$4,677
Fund 2470: School Programs	$20,000 G				$20,000
Division of Parks and Recreation					
Fund 2235: Parks and Rec Trust Fund	$2,000,000 G	$5,000,000 G			$7,000,000
Division of Pollution Prevention and Envi. Assistance					
Fund 6760: Solid Waste Trust Fund	$75,629 G				$75,629
Division of Soil and Water Conservation					
Fund 2515: Agric. Waste Small Farms			$20,000 L		$20,000
Fund 2520: Animal Waste Cost Share			$500,000 L	$117,500 L	$617,500
Fund 2525: Neuse Animal Waste Cost Share			$366,335 L		$366,335
Division of Waste Management					
Fund 2387: Hazardous Waste Fees			$68,189 L		$68,189
Fund 2393: Septage Fees			$100,000 L		$100,000
Fund 6371: Non-Commercial LUST	$2,000,000 G				$2,000,000
Fund 6372: Inactive Hazardous Sites Cleanup		$499,263 L			$499,263
Fund 6373: Emergency Response Fund		$49,771 L			$49,771
Fund 6770: Scrap Tire Disposal Fund	$750,000 G	$2,900,000 L			$3,650,000
Fund 6780: White Good Management Fund	$2,750,000 G	$1,800,000 L			$4,550,000
Division of Water Quality					
Fund 2130: Well Construction Fund		$18,134 L			$18,134
Fund 2310: Oil Pollution Control		$8,170 L			$8,170
Fund 2335: Lab Certification Fees		$16,371 L			$16,371
Fund 2341: Water Permits		$371,682 L	$1,000,000 L		$1,371,682
Fund 6341: WW Treatment Maint. and Rep.		$43,256 L			$43,256
TOTAL	**$11,599,707**	**$18,609,318**	**$7,357,972**	**$395,418**	**$37,962,415**

* The Title V funds transferred to the General Fund by the Governor have been transferred back to Fund 2333.

**$3.3 million of this reduction was mandated by the legislature; the remaining $1 million reduction was an action of the Governor.

NOTE: The 2003-2004 budget included a provision to transfer $20 million from various special fund cash balances. At the time this table was created, the specific special funds from which this money would be transferred had not yet been identified.

Fiscal Research, 2/23/2004

February 24, 2004 ERC Meeting
EXHIBIT F

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24 February 2004

MEMORANDUM

To: Members of the Environmental Review Commission
From: Tim Dodge, Research Assistant for Environmental Issues
Re: Environmental Management Commission Reports

Attached to this memorandum are copies of the 2003 quarterly reports of the operation, activities, programs, and progress of the Environmental Management Commission (EMC) that were submitted to the Environmental Review Commission pursuant to G.S. 143B-282(b). Dr. David Moreau, chair of the EMC, will give an oral presentation summarizing these activities at today's Environmental Review Commission meeting.

Please contact George Givens, Jeff Hudson, Jennifer McGinnis, Susan Iddings, or Tim Dodge at (919) 733-2578 if you have any questions or comments.

QUARTERLY REPORT

TO THE

ENVIRONMENTAL REVIEW COMMISSION

ON

ENVIRONMENTAL MANAGEMENT COMMISSION ACTIVITIES

April 2003

YEAR 2002 – 2003 THIRD QUARTER REPORT TO ERC

I. Quarterly Report On **Air Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

II. Quarterly Report On **Ground Water Quality** Activities

A. Future EMC And Committee Agenda Items

III. Quarterly Report On **Surface Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

I. AIR QUALITY ACTIVITIES

Agenda Item _____: Consideration of a Temporary Amendment to the Municipal Waste Combustor Rule

Explanation:

The Environmental Management Commission is requested to adopt a temporary amendment to 15A NCAC 2D .1205, Municipal Waste Combustors, to change the final compliance date for small municipal waste combustors from March 1, 2003 to December 1, 2004. This change is being made as a result of Session Law 2002-24, Section 2.

The municipal waste combustor (MWC) rule currently requires small MWC to be in compliance by March 1, 2003. This date was set in response to a law enacted by the General Assembly in 2001 requiring the Environmental Management Commission to require small MWC to be in compliance no later than March 1, 2003. Last year (2002) the General Assembly enacted a law directing the Environmental Management Commission to change the final compliance date to be on or after December 1, 2004.

Furthermore, the Environment Management Commission is requested to approve one or more public hearings to consider this amendment following the permanent rulemaking procedures.

Recommendation:

The Director recommends that the Commission adopt the proposed amendment and authorized the Chairman to sign the temporary rule certification on behalf of the Commission. The Director also recommends that the Commission authorize a public hearing(s) on this amendment and that the Chairman appoint a member(s) of the Commission to serve as hearing officer(s).

Temporary rule adopted by EMC
EMC approved taking permanent rule to public hearing

Agenda Item _____ : Request to Proceed to Public Hearing on Air Quality Rules for Special Orders

Explanation:

The Environmental Management Commission is requested to approve one or more public hearings to consider adoption of special order rules for air quality.

Currently, special orders are issued under the procedures in 15A NCAC 2H .1200, Special Order by Consent. This Section was written for the old Division of Environmental Management and covers both air and water quality. The proposed change creates a new section of rules that describe the procedures that the Division of Air Quality would use in issuing special orders. These procedures are similar to those in the current rules.

Recommendation:

The Director also recommends that the Commission authorize a public hearing(s) on these proposed rules and that the Chairman appoint a member(s) of the Commission to serve as hearing officer(s).

Approved by EMC

Agenda Item : Hearing Officer's Report on the Amendment to Air Permitting Rule

Explanation:

On August 20, 2002, Mr. Dan Besse held a public hearing on the adoption of and amendments to various air quality rules. At the Commission's September meeting, Mr. Besse presented his recommendations for all but one rule, 15A NCAC 2Q .0306, Permits Requiring Public Participation. He delayed making a recommendation on this rule change so that he could further consider the public comment made on it.

Six people opposed the removal of Subparagraph 15A NCAC 2Q .0306(a)(5). This Subparagraph requires that the Director provide for public notice for comments, with an opportunity to request a public hearing, on draft permits for any physical or operational limit on the capacity of a source to emit a pollutant to avoid the applicability of 15A NCAC 2Q .0500, Title V Procedures (i.e., to be designated as a "synthetic minor" source).

All original draft permits to limit operating hours or control air pollutants to avoid the applicability of Title V Procedures have been issued.

Paragraph (b) has been added to the Rule that provides for public notice on the Division's website for comments with an opportunity to request a public hearing on draft permits to incorporate conditions to avoid Title V permitting. The information contained in the public notice is specified, and it shall allow at least 30 days for public comment. This procedure expands the size of the community given notice for public comment and streamlines administrative action.

An addendum to the hearing record was sent to you earlier.

Recommendation:

The Director recommends that the Commission adopt the proposed amendment contained in the addendum to the hearing record and authorize the Chairman to sign the certifications on behalf of the Commission.

Adopted by EMC

FUTURE EMC AND AIR QUALITY COMMITTEE AGENDA ITEMS

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
May 03			Hearing Request -Clarify 2D .0933 Re Shoe-Mounted Secondary Seals (363) -2Q .0105 to Change Address Where Permits May Be Reviewed (384) -Local Zoning Consistency Determination (331) -Add Insignificant Activities to 2Q .0706(a)(1) (336) -General Fugitive Dust Control (276) -Revision of Standards for Air Curtain Burners; Addition of No Nuisance Requirements to Land Clearing Burning; Revise 2D .1906 to add Municipalities (254, 272, 288) -Correction of Column Titles in 2Q .0203 (372) -Exclusionary Rule for Concrete Batch Plants (380) -Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381) -Concrete Batch Plants (284) -Revision of AAL for Hydrogen Sulfide and Exempting Wastewater Treatment Systems at Paper Mills (378, 400) Adoption -112(j) Revisions (377) -Lower Opacity Standard for Asphalt Plant s (308)
July 03			
Sept 03		-Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Amend Definition of AApplicable Requirement≅ to add reference to 2D .900,.1400, and .1200 (334) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Implementation of New AuthorityXI/M Codes (323a1) -Implementation of New AuthorityXsales and service of analyzers (323d)	Adoption -Correction to 2D .1400 (374) -Revision of 2Q .0806 (373) -Add Definition for Significant and Minor Modifications for Permit Fees (362) -MWC Compliance Date Change (390) -Special Order of Consent Rules Specifically for the Division of Air Quality (365)-Clarify 2D .0933 Re Shoe-Mounted Secondary Seals (363) -2Q .0105 to Change Address Where Permits May Be

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		-Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Boilers and Industrial Furnaces Burning Hazardous Waste (330) -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level - Should Be Changed in a Permit (396) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Portable Crushers (385) -Correct Cross-Reference in 2D .1208 (389) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Correct Cross-Reference in 2D .0519 (391) -Update Address in 2D .0103 (392) -To Revise PSD Rule (393)	Reviewed (384) -Local Zoning Consistency Determination (331) -Add Insignificant Activities to 2Q .0706(a)(1) (336) -General Fugitive Dust Control (276) -Revision of Standards for Air Curtain Burners; Addition of No Nuisance Requirements to Land Clearing Burning; Revise 2D .1906 to add Municipalities (254, 272, 288) -Correction of Column Titles in 2Q .0203 (372) -Exclusionary Rule for Concrete Batch Plants (380) -Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381) -Concrete Batch Plants (284) -Revision of AAL for Hydrogen Sulfide and Exempting Wastewater Treatment Systems at Paper Mills (378, 400)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		-Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276)	
Oct 03			Hearing Request -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Amend Definition of AApplicable Requirement≅ to add reference to 2D .900,.1400, and .1200 (334) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Implementation of New AuthorityXI/M Codes (323a1) -Implementation of New AuthorityXsales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Boilers and Industrial Furnaces Burning Hazardous Waste (330) -Portable Crushers (385) BCorrect Cross-Reference in 2D .1208 (389) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Correct Cross-Reference in 2D .0519 (391) -Update Address in 2D .0103 (392) -To Revise PSD Rule (393) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			Woodworking (21, 68) -Glass Melting Furnaces (328) -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285)
Oct 03 cont.			-Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level - Should Be Changed in a Permit (396) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Provide Option for Missing Data Requirements in 2D .1404 (399) -General Fugitive Dust Control (276)
Dec 03		-Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364)	<u>Adoption</u> -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Amend Definition of AApplicable Requirement≅ to add reference to 2D .900,.1400, and .1200 (334) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		-Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382)	-Implementation of New AuthorityXI/M Codes (323a1) -Implementation of New AuthorityXsales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Boilers and Industrial Furnaces Burning Hazardous Waste (330) -Portable Crushers (385) BCorrect Cross-Reference in 2D .1208 (389) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Correct Cross-Reference in 2D .0519 (391) -Update Address in 2D .0103 (392)
Dec 03 cont			-To Revise PSD Rule (393) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify That Transportation Facility Rules Apply Only

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level - Should Be Changed in a Permit (396) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Provide Option for Missing Data Requirements in 2D .1404 (399) -General Fugitive Dust Control (276)
Feb 04			Hearing Request -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Mar 04			
Apr 04			
May 04			<u>Adoption</u> -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382)

GROUNDWATER GWC/EMC FUTURE AGENDAS*

	Committee Agenda	EMC Agenda
April 2003	Meeting Cancelled.	Meeting Cancelled.
May 2003	<u>> DWQ-GWS ITEMS<</u> 1. Information on the Flynt/Wansona Variance Request 2. Information from the Well Contractors Certification Commission Regarding Changes to Well Contractor Application Requirements in Rule 15A NCAC 27 .0301.	<u>> DWQ-GWS ITEMS<</u> **1. Approval of the Flynt/Wansona Variance Request.**
July 2003	<u>> DWQ-GWS ITEMS<</u> **1. Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** **2. Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** **3. Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards in 15A NCAC 2L .0202.** **4. Request to Proceed with a 60-Day Notice of Rulemaking Proceedings to AMEND the 15A NCAC 2C .0200 Injection Well Rules.** ***(EMC GW Committee Delegated to approve Subject matter notices).*** <u>> DWM-UST SECTION ITEM <</u> 1. Status of the State Trust Fund for Cleanup of Underground Storage Tanks.	<u>No items scheduled at this time.</u>

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

	Committee Agenda	EMC Agenda
Sept 2003	> DWQ-GWS ITEMS< **1. Request for APPROVAL to Proceed with Public Notice and Hearing on Eleven Groundwater Quality Standards in title 15A NCAC 2L .0202.** **2. Request for APPROVAL to Proceed with Public Notice and Hearing to ADOPT Nine New Groundwater Quality Standards to Title 15A NCAC 2L .0202.**	> DWQ-GWS ITEMS< **1. Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** **2. Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** **3. Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards in 15A NCAC 2L .0202.**
Oct 2003	> DWQ-GWS ITEM< **1. Request to Proceed with a Notice of Hearing to AMEND the15A NCAC 2C .0200 – Injection Well Rules: "New Criteria for Aquifer Storage and Recovery Wells."**	> DWQ-GWS ITEMS< **1. Request to APPROVAL to Proceed with Public Notice and Hearing on Eleven Groundwater Quality Standards in title 15A NCAC 2L .0202.** **2. Request for APPROVAL to Proceed with Public Notice and Hearing to ADOPT Nine New Groundwater Quality Standards to Title 15A NCAC 2L .0202.**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

III. SURFACE WATER QUALITY ACTIVITIES

SURFACE WATER QUALITY ACTIVITIES

Agenda Item:

Request for Approval of the Final *Broad River Basinwide Water Quality Plan*

Explanation:

The *Broad River Basinwide Water Quality Plan* is sixteenth in a series of revised basinwide plans that the Division is preparing for all 17 of the state's major river basins.

The draft Broad River Basinwide Plan was approved by the Water Quality Committee in September 2002 to be taken to public meetings. Two public meetings were held in Lake Lure and Spindale in December 2002 with 57 people in attendance. Revisions were made and information was added to the draft plan based on comments. Copies of the revised plans were sent to EMC members.

This Basinwide Plan is a planning document that will guide the Division's actions in this river basin over the next five years and beyond. The management actions are based on existing rules and policy. Therefore, approval and endorsement of this plan by the Commission would affirm that the management actions set forth in this plan are consistent with the rules adopted by the Commission and with the decision-making policies under which the Division has acted in the past.

Recommendation:

It is recommended that the *Broad River Basinwide Water Quality Plan* be approved and endorsed by the Commission as a guide to water quality program management and implementation by the Division of Water Quality as it carries out its Water Quality Program duties and responsibilities in the Broad River basin.

EMC ACTION:

The EMC approved the *Broad River Basinwide Water Quality Plan* as recommended.

Agenda Item:

Request for Approval of the Final *Yadkin – Pee Dee River Basinwide Water Quality Plan*

Explanation:

The *Yadkin – Pee Dee River Basinwide Water Quality Plan* is seventeenth in a series of revised basinwide plans that the Division is preparing for all 17 of the state's major river basins.

The draft Yadkin – Pee Dee River Basinwide Plan was approved by the Water Quality Committee in December 2002 to be taken to public meetings. Five public meetings were held in Elkin, Winston-Salem, Albemarle, Salisbury, and Monroe in January 2003 with 161 people in attendance. Revisions were made and information was added to the draft plan based on comments. Copies of the revised plans were sent to EMC members.

This Basinwide Plan is a planning document that will guide the Division's actions in this river basin over the next five years and beyond. The management actions are based on existing rules and policy. Therefore, approval and endorsement of this plan by the Commission would affirm that the management actions set forth in this plan are consistent with the rules adopted by the Commission and with the decision-making policies under which the Division has acted in the past.

Recommendation:

It is recommended that the *Yadkin – Pee Dee River Basinwide Water Quality Plan* be approved and endorsed by the Commission as a guide to water quality program management and implementation by the Division of Water Quality as it carries out its Water Quality Program duties and responsibilities in the Yadkin – Pee Dee River basin.

EMC ACTION:

The EMC approved the *Yadkin – Pee Dee Basinwide Water Quality Plan* as recommended.

Agenda Item:

Request to Proceed to Public Hearing with Proposed Permanent National Pollutant Discharge Elimination System (NPDES) Phase 2 Stormwater Rules

Explanation:

In July 2002 the EMC and DWQ held five public hearings to gather public input on draft NPDES Phase 2 Stormwater Rules. These hearings were held in Asheville, Kernersville, Smithfield, Washington and Wilmington. Following these hearings, the Hearing Officers and Division Staff developed temporary rules that were approved by the EMC at its October meeting. DWQ Staff has now returned with proposed permanent NPDES Phase 2 Stormwater Rules and a request to publish the Notice of Text and proceed to public hearing with these proposed rules (mailed separately).

Recommendation:

That the EMC approve the request to proceed to public hearing with the proposed permanent NPDES Phase 2 Stormwater Rules.

EMC ACTION:

The EMC approved the request to proceed to public hearing with the proposed permanent NPDES Phase 2 Stormwater Rules as recommended.

Agenda Item:

Request to Proceed to Public Hearings with Proposed Permanent Catawba Buffer Rules

Explanation:

Temporary buffer rules were adopted by the Commission on May 10, 2001 and had an effective date of July 1, 2001. The rules imposed 50-foot wide buffers along the shorelines of the free-flowing portions of the Catawba River mainstem below Lake James and along the mainstem lake shorelines from the headwaters of Lake James to the North Carolina-South Carolina state line in Lake Wylie. The rules were set to expire within 270 days of their May 2001 adoption date unless permanent rules were adopted and submitted to the Rules Review Commission. However, the General Assembly passed legislation (HB 189) extending the effective life of the temporary rules until September 1, 2003.

The Commission has requested that staff prepare permanent buffer rules, based on the temporary rules, and present them for approval to go to public hearings. The intent is to adopt the existing temporary rules as permanent prior the September 1, 2003 expiration date. Staff's presentation will include a summary of the fiscal analysis of the rules, their benefits and limitations, staff resource needs, public sentiment, and possible tie-ins with other proposed rules.

Recommendation:

It is recommended that the Commission provide guidance to the staff on how to proceed with permanent buffer rule adoption based on the factors presented.

EMC ACTION:

The EMC directed DWQ Staff to proceed with the proposed Permanent Catawba Buffer Rules to public hearings.

Agenda Item:

Request for Approval of Tar-Pamlico Model Local Stormwater Program

Explanation:

As part of the Tar-Pamlico Nutrient Sensitive Waters strategy, the Tar-Pamlico stormwater rule requires the EMC to approve a model local stormwater program that DWQ staff has developed in cooperation with subject local governments. Following this approval, using the model as guidance, those jurisdictions are to design their programs over the ensuing year for submittal to the Commission. Since February 2002, staff has met regularly with the affected local governments and others to develop this model, which builds on a similar product created for the Neuse basin. The group, with contracted facilitation and technical support, addressed unique rule elements and improved on Neuse methods. Staff will offer the consensus recommendation of the group that the Commission approve the Tar-Pamlico model local stormwater program. Materials for this item were mailed to the members of the EMC.

Recommendation:

Staff requests that the Commission approve the Tar-Pamlico Model Local Stormwater Program to meet the requirements of the Tar-Pamlico stormwater rule, 15A NCAC 2B .0258.

EMC ACTION:

The EMC approved the Tar-Pamlico Model Local Stormwater Program as recommended.

Agenda Item:

Request for Approval of Full Tar-Pamlico Agricultural Accounting Method

Explanation:

In October 2002, as part of the Tar-Pamlico Nutrient Sensitive Waters strategy, the Commission approved a cropland nitrogen accounting method for the Tar-Pamlico agriculture rule, which was effective September 1, 2001. Session Law S.L. 2001-355, a product of legislative review of the rule, requires that the EMC approve a combined accounting method that incorporates accounting for pasture-based operations. Staff worked with the Basin Oversight Committee (BOC), experts from North Carolina State University, and pasture representatives to develop a combined accounting process, and will present the BOC's recommendation to approve this method. The method will be used by county-level Local Advisory Committees and the BOC to develop annual estimates of progress for each county and the basin as a whole toward the 30% nitrogen reduction goal of the rule. Staff will also provide an update on efforts to achieve full farmer registration under the rule. Materials for this item were mailed to the members of the EMC.

Recommendation:

Staff requests that the Commission approve the combined accounting tool to meet the full accounting requirements of session law S.L. 2001-355 and the Tar-Pamlico agriculture rule, 15A NCAC 2B .0256.

EMC ACTION:

The EMC approved the Tar-Pamlico Agricultural Accounting Method as recommended.

SURFACE WATER QUALITY WQC/EMC FUTURE AGENDAS

	WQC Agenda	EMC Agenda
April 2003	No Meeting Scheduled.	No Meeting Scheduled.
May 2003	• WS Ordinance Approval for Lenoir County • Request Consideration of Approval of Major Variance to the Riparian Protection Area Rules for Watauga Street Townhouses (Neuse River Basin) • Request Permission to Proceed to EMC next day with the Notice of Text for Rocky River Reclassification • Request for Variance to Water Supply Watershed Buffers for Polo Facility in High Point • Update on Regional Mercury Study and Permitting Status • NC Coastal Habitat Protection Plan/Update on Shellbottom and Hardbottom Options • Ecosystem Enhancement Program presentation re: functional replacement & other issues • Info on the SW model local ordinance review procedure: (for Delegation for New Hanover Co.)	• Request Permission to Proceed to Notice of Text and Public Hearing for Rocky River Reclassification • Metropolitan Sewerage District Delegation Request
June 2003	No Meeting Scheduled.	No Meeting Scheduled.

QUARTERLY REPORT

TO THE

ENVIRONMENTAL REVIEW COMMISSION

ON

ENVIRONMENTAL MANAGEMENT COMMISSION ACTIVITIES

July 2003

YEAR 2002 – 2003 FOURTH QUARTER REPORT TO ERC

I. Quarterly Report On **Air Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

II. Quarterly Report On **Ground Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

III. Quarterly Report On **Surface Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

I. AIR QUALITY ACTIVITIES

AGENDA ITEM _____ : Request to Proceed to Public Hearing on the Adoption of Amendments to Various Air Quality Rules

The Environmental Management Commission is requested to approve one or more public hearings to consider amendments to eighteen rules and the adoption of four new rules.

The toxic air pollutant guideline (15A NCAC 2D .1104) for hydrogen sulfide is proposed to be revised. Three options are being proposed. The rule for emission rates requiring a permit (15A NCAC 2Q .0711) is also proposed to be amended to revise the rate for hydrogen sulfide to correspond to the revised guideline. The air toxic permit exemption rule (15A NCAC 2Q .0702) is proposed to be amended to exempt wastewater treatment systems at pulp and paper mills until February 1, 2007, at which time the exemption would expire. A new rule (15A NCAC 2Q .0714) is proposed to require testing of emissions from wastewater treatment systems at pulp and paper mills and evaluation of activated sludge systems for wastewater treatment.

The ethylene oxide emissions standard rule (15A NCAC 2D .0538) is proposed to be amended to provide a compliance option for the unload and backdraft valve exhaust. It is also being amended to allow facilities that are covered under this rule to comply with the air toxic rules instead of the requirements of this rule.

A new rule (15A NCAC 2D .0543) is proposed to control particulate emissions from concrete batch plants. As a result of this proposed amendment, a definition for PM2.5 is proposed to be added to the definition rule (15A NCAC 2D .0101). Also, the visible emission rule (15A NCAC 2D .0521) is proposed to be amended to exempt concrete batch plants as the new rule contains visible emission limits for them.

The rule for petroleum liquid storage in external floating roof tanks (15A NCAC 2D .0933) is proposed to be amended to clarify the treatment of

metallic-type shoe primary seals with shoe-mounted secondary seals.

Several clarifications and other changes are proposed to be made to the open burning rule (Section 15A NCAC 2D .1900). Several new definitions are proposed (15A NCAC 2D .1901). A prohibition of most types of open burning on days forecast to be code orange or above is also proposed (15A NCAC 2D .1903 and .1904). The new source performance standards for air curtain burners covered under these standards are added to the air curtain burner rule (15A NCAC 2D .1904). (These requirements have already been adopted under the new source performance standard rule. They are also being added here for clarity.) The need for temporary air curtain burners to have a certified visible emissions reader onsite is proposed to be removed.

The rule notifying the public where copies of referenced documents may be reviewed (15A NCAC 2Q .0105) is proposed to be amended to update addresses.

A new rule (15A NCAC 2Q .0113) is proposed to require permit applicants in areas without zoning to notify the public of intent to file an air quality permit application before filing such application. Notification shall be by publishing a legal notice in a local newspaper and by posting a sign on the affected property. In addition to the rule, four other permitting rules are proposed to be amended to reference the new rule.

The rule containing the fees schedule for permit fees (15A NCAC 2Q .0203) is proposed to be amended to correct column titles in the permit application fee table.

The permit exemption rule for toxic air pollutants (15A NCAC 2Q .0702) is proposed to be amended to correct a cross-reference and to simplify the exemption for perchloroethylene drycleaning processes.

The air toxic rule for modifications (15A NCAC 2Q .0706) is proposed to amended to treat insignificant activities at Title V facilities the same way exempted activities at non-Title V facilities are treated. Before insignificant activities were required to be included in the Title V permit, they were treated the same way as exempted activities at non-Title V facilities.

A new exclusionary rule (15A NCAC 2Q .0809) is proposed for concrete batch plants. This rule declares concrete batch plants that produce less than 1,210,000 cubic yards of concrete to be small for permitting purposes.

RECOMMENDATIONS: The Director recommends that the Commission authorize a public hearing(s) on these amendments and that the Chairman appoint a member(s) of the Commission to serve as hearing officer(s)

EMC approved taking the rules to public hearing.

Agenda Item : Hearing Officer's Report on the Amendment to Hot Mix Asphalt Plant Rule

Explanation:

On August 20, 2002, Mr. Dan Besse held a public hearing on the adoption of and amendments to various air quality rules. The proposed Rule 15A NCAC 2D .0506, Particulates From Hot Mix Asphalt Plants, was adopted by the Environmental Management Commission and forwarded to the Rules Review Commission. Prior to their review of 2D .0506, the Division of Air Quality received a letter from attorneys representing the Carolina Asphalt Pavement Association (CAPA). They expressed concern with Paragraph 2D .0506(e), inserted into the Rule in response to the public hearing comments received.

During the hearing, a commenter drew attention that the term "fugitive emissions" had been stricken with the addition of "scavenger" dust system in the Rule. In response to the comment, paragraph (e) was added to the Rule to cover fugitive emissions not covered elsewhere by the Rule The proposed limit for fugitive emissions was ten percent.

In response to CAPA's concerns, the Rule was withdrawn from the Rules Review Commission and the public hearing comment period extended. CAPA and the National Asphalt Pavement Association provided written comments concerning this proposed Rule. They shared concern that the opacity standard for fugitive emissions, not otherwise covered in the Rule, would be reduced from 20 percent to 10 percent. They anticipate compliance costs will be $200,000 per plant. In response to comments received during the extended comment period, the opacity requirement for fugitive emissions not elsewhere covered under this Rule is proposed to be changed to 20 percent.

Additionally, CAPA requested that the compliance date for sources, currently subject to a 40 percent stack opacity standard, to meet the 20 percent opacity standard, be revised from January 1, 2004, to January 1,2005. Due to current legislative timing,

this request is reasonable. The compliance date has been revised to January 1, 2005

An addendum to the hearing record follows.

Recommendation:

The hearing officer recommends that the Commission adopt the proposed amendments contained in the addendum to the hearing record and authorize the Chairman to sign the certifications on behalf of the Commission.

EMC adopted rule.

FUTURE EMC AND AIR QUALITY COMMITTEE AGENDA ITEMS

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
July 03			Adoption -112(j) Revisions (377)
Sept 03		-Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level Should Be Changed in a Permit (396) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Portable Crushers (385) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Correct Cross-Reference in 2D .0519 (391) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Clarification of Facility Permit Exemption in 2Q .0102 (402) -Revision of Ranking of Incinerators in 2D .1201 (403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405)	-

Oct 03			Hearing Request -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level Should Be Changed in a Permit (396) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Portable Crushers (385) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Correct Cross-Reference in 2D .0519 (391) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Clarification of Facility Permit Exemption in 2Q .0102 (402) -Revision of Ranking of Incinerators in 2D .1201 (403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405)

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Feb 04			
Mar 04		-Amend Definition of Applicable Requirement to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Correct Cross-Reference in 2D .1208 (389) -To Revise PSD Rule (393) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276)	
Apr 04			<u>Hearing Request</u> -Amend Definition of Applicable Requirement to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Correct Cross-Reference in 2D .1208 (389) -To Revise PSD Rule (393) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276)

May 04			
July 04		-Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)	Adoption -Amend Definition of Applicable Requirement to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Correct Cross-Reference in 2D .1208 (389) -To Revise PSD Rule (393) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276)
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			-AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)
Feb 05		-Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of Small Facility and Synthetic Minor Facility -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)	
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II. GROUNDWATER ACTIVITIES

May 2003 EMC Agenda Item 03-20:

ACTION ITEM FROM THE DIVISION OF WATER QUALITY – GROUNDWATER SECTON: Request for Approval a Variance from Groundwater Quality Standards for the Flynt-Wansona Manufacturing Corporation Facility in Wadesboro, North Carolina (Groundwater Incident Number 14009)

EXPLANATION:

A textile manufacturing facility in Wadesboro, North Carolina was built back in the 1950s and was purchased by the Flynt Wansona Manufacturing Corporation in 1995. The corporate entities that had owned this facility through the years have released liquids into two former settling ponds from a building known as the "Main Plant". These former ponds have been covered and a storage building and catwalk now exist over one of these ponds. Liquids were also released from another building known as the "Wul-Zenco Facility" into a former septic tank and drainfield system. Both of the waste disposal areas are within the area requested for variance. The two waste disposal areas no longer receive waste and have been rendered such that they cannot. All wastewater from the plant is now pretreated and processed at the City of Wadesboro Treatment Plant. Substances found at this site include metals, volatile organic chemicals (VOCs) and other organic substances in soils and groundwater near the former settling ponds and former septic tank and drainfield system. The variance is requested for an 8.4-acre area of a 50-acre property owned by the Flynt Wansona Manufacturing Corporation. The Flynt/Wansona Manufacturing Corporation is entirely responsible for cleanup of this release, which is shown in Division of Water Quality files as Groundwater Incident Number 14009.

Pursuant to requirements of title 15A NCAC 2L .0113, a public notice was issued on December 18, 2003. This notice advised interested parties that a hearing on this variance request was scheduled for January 16, 2003 Notice of this variance was sent to local government officials and to the Anson County Health Director pursuant to 15A NCAC 2L.0113 rule. Individual notices were sent per the requirements of 15A NCAC 2L.0113 to 66 adjacent property owners and area property owners identified by Flynt-Wansona Corporation in its variance request. Approximately 67 notices were sent to the public at large consisting of persons listed in the Groundwater Section's Mailing List and served by the Groundwater Section in the Fayetteville Regional Office. A copy of the hearing notice was also published in the "Anson County Record" on December 18, 2002

The public hearing was held on Thursday, January 16, 2003 at 7:00 PM in Wadesboro, North Carolina. Nine persons attended the public hearing. Five of these persons were from the Division and the rest of the attendees were members of the public. Three persons expressed comments at the hearing. The hearing record remained open for written comments until February 18, 2003 and two written comments were received before that date. One comment made at the

hearing expressed concerns about water supply wells near the area proposed for variance. The consultant for the Flynt Wansona Manufacturing Corporation also expressed comments at this hearing as well as a representative from the Town of Wadesboro Public Works Department. One written comment from Town of Wadesboro employees expressed the view that monitoring should continue at this site. Another comment from the Fruit of the Loom stated that property shown in the Groundwater Section records as being owned by this company is no longer in its possession and expressed no interest in the public hearing.

Based on the information contained in the variance request it does not appear that substances within the area requested for variance is migrating at concentrations above the Groundwater Quality Standards. As stated in the hearing officer's report groundwater contamination is confined to a perched groundwater lense, which has no hydrogeological continuity with the deeper aquifers that supply groundwater to wells in the vicinity of the Flynt-Wansona facility. Also, in support of the variance request it has been shown that the subsoils and sediments in which the contaminant plume is situated are fine silts and clays, which serve to bind the contaminants and release them only very slowly back into the groundwater system. The company has submitted information showing that the extent of contamination is limited and that contaminants will attenuate within the area of the requested variance. The Flynt Wansona Manufacturing Corporation has submitted information showing that there is an extremely low probability of any off-site impacts. They have also demonstrated that there would be an extreme financial burden on the company if pump and treat cleanup or other Best Available Technology were implemented pursuant to 15A NCAC 2L .0106. Comments on this variance have also been received from the Division of Public Health and they have concluded that groundwater monitoring of the site should continue.

EMC Action:

On May 8, 2003, the Environmental Management Commission granted the variance request for the Flynt Wansona Manufacturing Corporation at One Wansona Way in Wadesboro, North Carolina (*Groundwater Incident Number # 14009*) pursuant to the requirements of 15A NCAC 2L .0113 and North Carolina General Statute 143-215.3(e). The Commission gave approval with a condition that a program of groundwater monitoring be continued for this site, pursuant to a monitoring plan approved by the Groundwater Section. Monitoring is to be implemented and maintained at the facility for as long as groundwater contamination is in excess of state standards. The Commission also granted this variance with the stipulation that the two areas of residual soil contamination be paved with impervious surfaces as proposed in Flynt-Wansona Company's variance request.

GROUNDWATER GWC/EMC FUTURE AGENDAS*

	Committee Agenda	EMC Agenda
July 2003	Groundwater Committee Meeting Cancelled.	No items scheduled at this time.
Aug 2003	No meeting scheduled.	No meeting scheduled.
Sept 2003	> DWQ-GWS ITEMS< 1. **Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** 2. **Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** 3. **Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards in 15A NCAC 2L .0202.** 4. Update on Barbour Orchard. 5. Distribution of Total Arsenic in the Groundwater Resource of the North Carolina Piedmont > DWM-UST SECTION ITEM < 1. Status of the State Trust Fund for Cleanup of Underground Storage Tanks.	

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

	Committee Agenda	EMC Agenda
Oct 2003	> DWQ-GWS ITEMS< **1. Request for APPROVAL Changes to Eleven Groundwater Quality Standards in 15A NCAC 2L .0202** **2. Request for APPROVAL to ADOPT Nine New Groundwater Quality Standards to Title 15A NCAC 2L .0202.**	> DWQ-GWS ITEMS< **1. Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** **2. Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** **3. Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards in 15A NCAC 2L .0202.**
Nov 2003	No meeting scheduled.	No meeting scheduled.
Dec 2003	> DWQ-GWS ITEM< **1. Request to Proceed with a 60-Day Notice of Rulemaking Proceedings to AMEND the15A NCAC 2C .0200 – Injection Well Rules.** *(EMC GW Committee Delegated to approve Subject matter notices).*	> DWQ-GWS ITEMS< **1. Request for APPROVAL Changes to Eleven Groundwater Quality Standards in title 15A NCAC 2L .0202.** **2. Request for APPROVAL to ADOPT Nine New Groundwater Quality Standards to Title 15A NCAC 2L .0202.**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

SURFACE WATER QUALITY ACTIVITIES

Agenda Item:

Request to Proceed to Public Hearing with the Proposed Reclassification of Two Sections of the Rocky River in Chatham County to WS-III CA

Explanation:

Dr. J.H. Carter III and Associates and the Town of Siler City submitted a request to reclassify two Rocky River segments to WS-III CA. The reason for the reclassification is to allow a new dam structure to be placed below the existing dam. The existing dam does not impound enough water to result in a true reservoir according to DWQ and DEH staff. However, the new dam will cause the nature of this water supply source to change from run-of-river to an approximately 160-acre reservoir. The new dam will raise the normal water level above the spillway of the existing dam, and as a result, approximately 140 acres of land will be impounded in the new CA. The Town wishes to have the new dam constructed and the resulting reservoir created in order to meet water demands through 2030.

The waters to be reclassified above the current CA meet water supply water standards because these waters are currently classified as WS-III. The waters to be reclassified below the current CA meet water supply water standards according to DWQ staff.

If reclassified, development and discharge restrictions will apply. However, there are no current or planned dischargers and no planned development in the entire proposed reclassification area. Chatham County and the Town of Siler City, the only local governments with jurisdiction in the reclassification area, would need to modify their water supply watershed protection ordinances within 270 days after the reclassification effective date. Chatham County has provided written support for this reclassification.

The Environmental Assessment for this proposed project was previously forwarded to the EMC Members. The proposed effective date for this reclassification is August 1, 2004.

Recommendation:

The Director and staff recommend that the EMC grant staff permission to proceed to public hearing for the above-mentioned proposed reclassification.

EMC ACTION:

The EMC approved the request to proceed to public hearing with the proposed reclassification.

SURFACE WATER QUALITY WQC/EMC FUTURE AGENDAS

	WQC Agenda	EMC Agenda
July 2003	• Request Permission to Send the Draft Lumber River Basinwide Plan to Public Meetings • Request Consideration of Major Variance to Neuse Riparian Area for Mr. Hunter/Watauga Str. • Request Approval of Greensboro's Use of a Special Studies Map for Managing Water Supply Buffers • Introduction to Developing Amendments to Rules for Waste Not Discharged to Surface Waters (15A NCAC 2H .0200) • CHPP- Request Approval of Annual Report	• Request for Adoption of NPDES Phase 2 Stormwater Permanent Rules • Request Approval of a Plan for Local Government Delegation of State Stormwater Management Program • Request for Adoption of Catawba River Buffer Permanent Rules • Request for Adoption of EMC's Declaratory Rulings Rules • Update on Changes to the Administrative Procedure Act Rulemaking Process as a Result of House Bill 1151
Aug 2003	No meeting scheduled.	No meeting scheduled.
Sept 2003	• Consideration of a Request for a Major Variance from the Tar-Pamlico River Riparian Area Protection Rule - Robert Hornung / Ocracoke • Ecosystem Enhancement Program: Program Presentation • Request for Approval of Water Supply Ordinance for Wilkes County	• Request Delegation of Metropolitan Sewerage District for Fayetteville

QUARTERLY REPORT

TO THE

ENVIRONMENTAL REVIEW COMMISSION

ON

ENVIRONMENTAL MANAGEMENT COMMISSION ACTIVITIES

October 2003

YEAR 2003 – 2004 FIRST QUARTER REPORT TO ERC

I. Quarterly Report On **Air Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

II. Quarterly Report On **Ground Water Quality** Activities

A. Future EMC And Committee Agenda Items

III. Quarterly Report On **Surface Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

I. AIR QUALITY ACTIVITIES

AGENDA ITEM: Mercury Emissions and Mercury Controls for Coal-fired Electrical Utility Boilers: First Interim Report

EXPLANATION: The DAQ is required by G.S. 143-215.107D of the Clean Smokestacks Act to study issues related to emissions of mercury from coal-fired generating units and report its interim findings and recommendations annually to the Environmental Management Commission and the Environmental Review Commission beginning September 1, 2003. The objective of this first interim report is to provide a technical background on mercury and mercury emission controls.

EMC ACTION: Report presented to EMC.

AGENDA ITEM: CO2 Emission Reduction Options for Coal-fired Electrical Utility Boilers and Other Stationary Sources

EXPLANATION: The DAQ is required by G.S. 143-215.107D of the Clean Smokestacks Act to study issues related issues related to the implementation of programs to control emissions of carbon dioxide (CO2) from coal-fired generating units and other stationary sources of air pollution, and to present its first interim report to the Environmental Management Commission and the Environmental Review Commission no later than September 1, 2003. The objective of this report is to provide technical background information about CO2 and to define the anticipated scope of effort.

EMC ACTION: Report presented to EMC.

AGENDA ITEM: Hearing Officer's Report on Rules Implementing Section 112(j) of the Federal Clean Air Act

EXPLANATION:

On August 20, 2002, Mr. Dan Besse held a public hearing on amendments to rules implementing Section 112(j) of the Clean Air Act.

Section 112(j) of the Clean Air Act requires state permitting authorities to require sources in a category that EPA has identified that it intends to cover under a Maximum Achievable Control Technology (MACT) standard to comply with a MACT level emission limitation if EPA fails to promulgate that MACT standard within 18 months of the date listed in the Clean Air Act schedule. The EMC previously adopted rules to implement 112(j) requirements as part of its approved Title V permit program. On March 5, 2002, the US EPA amended those portions of 40 CFR Part 63 subpart B that implement Section 112(j). The state rules implementing those requirements were proposed to be amended to incorporate the federal changes for consistency. The March 2002 federal and corresponding state rule amendments revise, delete, and add several definitions, restructure and reword text to clarify the relationship between case-by-case MACT determinations under Section 112(g) versus Section 112 (j) and their timing. The amendments also modify the case-by-case permitting procedures by splitting the application process into two parts, thereby delaying submittal of the substantive portion of the application by 24 months.

Two persons commented at the hearing and one additional person submitted written comments. The comments focused on the changes in definitions. No changes are proposed as the result of the public comments since the definition changes are being made for consistency with the federal regulation.

On August 15, 2002 EPA signed a settlement agreement that called for amendments to the 112 (j) rule that would decrease the time to submit Part 2 application to 12 months after submittal of the Part 1 application. A revised settlement agreement signed November 26, 2002 changed the submittal

timeframe to 60 days after the scheduled promulgation date. The 60 day submittal was proposed December 9, 2002 and finalized May 30, 2003.

The hearing record was sent to you earlier.

RECOMMENDATION: The hearing officer recommends that the Commission adopt the recommendation in Chapter I of the hearing record and authorize the Chairman to sign the certification on behalf of the Commission.

EMC ACTION: Approved renoticing for additional comments on changes recommended by Hearing Officer because of recent changes in EPA rule.

FUTURE EMC AND AIR QUALITY COMMITTEE AGENDA ITEMS

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Dec 03		-Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level Should Be Changed in a Permit (396) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Portable Crushers (385) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Correct Cross-Reference in 2D .0519 (391) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Clarification of Facility Permit Exemption in 2Q .0102 (402) -Revision of Ranking of Incinerators in 2D .1201 (403)	Adoption -112(j) Revisions (377)

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		-Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405)	
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Mar 04		-Amend Definition of Applicable Requirement" to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Correct Cross-Reference in 2D .1208 (389) -To Revise PSD Rule (393) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and	<u>Adoption</u> -Clarify 2D .0933 Re Shoe-Mounted Secondary Seals (363) -2Q .0105 to Change Address Where Permits May Be Reviewed (384) -Local Zoning Consistency Determination (331) -Add Insignificant Activities to 2Q .0706(a)(1) (336) -Open Burning Revisions (254, 272, 288) -Correction of Column Titles in 2Q .0203 (372) -Exclusionary Rule for Concrete Batch Plants (380) -Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381)-Option for Ethylene Oxide Sterilizes to Comply with Air Toxic Rules (381) -Concrete Batch Plants (284) -Revision of AAL for Hydrogen Sulfide and

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Revise PSD Rule (393) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409)	Exempting Wastewater Treatment Systems at Paper Mills (378, 400) -MWC Compliance Date Change (390) -Special Order of Consent Rules Specifically for the Division of Air Quality (365) -Correction to 2D .1400 (374) -Revision of 2Q .0806 (373) -Add Definition for Significant and Minor Modifications for Permit Fees (362) -Rewording of Laboratory Exemption in 2C .0902 (358) and Correct Cross-Reference in 2D .0902
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Apr 04 cont			-Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408)

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			-Intent to Construct (409) <u>Adoption</u> -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level Should Be Changed in a Permit (396) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Portable Crushers (385) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Correct Cross-Reference in 2D .0519 (391) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Clarification of Facility Permit Exemption in 2Q .0102 (402)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			-Revision of Ranking of Incinerators in 2D .1201 (403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405)
July 04		-Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)	Adoption -Amend Definition of Applicable Requirement" to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Correct Cross-Reference in 2D .1208 (389) -To Revise PSD Rule (393) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Revise PSD Rule (393) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409)
Sept 04			Hearing Request -Revision of AAL for Carbon Tetrachloride (376)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			-Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)
Dec 04			Adoption -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)
Feb 05		-Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382)	

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		-Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)	
Mar 05			Hearing Request -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of Small Facility and Synthetic Minor Facility" -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)
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II. GROUNDWATER ACTIVITIES

GROUNDWATER GWC/EMC FUTURE AGENDAS*

	Committee Agenda	EMC Agenda
Sept 2003	Groundwater Committee Meeting Cancelled.	No items scheduled.
Oct 2003	Groundwater Committee Meeting Cancelled.	No items scheduled at this time.
Nov 2003	No meeting scheduled.	No meeting scheduled.
Dec 2003	> DWQ-GWS ITEMS< 1. **Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** 2. Update on Barbour Orchard. 3. Distribution of Total Arsenic in the Groundwater Resource of the North Carolina Piedmont. > DWM-UST SECTION ITEMS < 1. **Request for Approval to Proceed with Temporary and Permanent Rulemaking to Implement Statutory Changes Regarding Cleanup of Co-Mingled Plumes of Petroleum.** 2. Status of the State Trust Fund for Cleanup of Underground Storage Tanks. > DWM- SUPERFUND SECTION ITEM< 1. **Request to Proceed with the Implementation of New Rules from the Dry-Cleaning Solvent Cleanup Fund.**	No items scheduled at this time.

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

	Committee Agenda	EMC Agenda
Jan 2004	No meeting scheduled.	No meeting scheduled.
Feb 2004	> DWQ-GWS ITEMS< 1. **Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** > DWQ-GWS ITEMS< 2. **Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards**	> DWQ-GWS ITEM< 1. **Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** > DWM- SUPERFUND SECTION ITEM< **1. Request to Proceed with the Implementation of New Rules from the Dry-Cleaning Solvent Cleanup Fund.** > DWM-UST SECTION ITEM < **1. Request for Approval to Proceed with Temporary and Permanent Rulemaking to Implement Statutory Changes Regarding Cleanup of Co-Mingled Plumes of Petroleum.**
Mar 2004	> DWQ-GWS ITEMS< **1. Request for APPROVAL Changes to Eleven Groundwater Quality Standards in title 15A NCAC 2L .0202.** **2. Request for APPROVAL to ADOPT Nine New Groundwater Quality Standards to Title 15A NCAC 2L .0202.**	> DWQ-GWS ITEMS< **1. Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** **2. Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards.**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

III. SURFACE WATER QUALITY ACTIVITIES

SURFACE WATER QUALITY ACTIVITIES

Agenda Item:

Request for Approval of Proposed Permanent NPDES Phase 2 Stormwater Rules

Explanation:

In October 2002 the EMC approved temporary NPDES Phase 2 Stormwater Rules. The temporary rules became effective November 1, 2002. A permanent rulemaking process followed including five public hearings held by the EMC and DWQ across the state in April 2003 to gather public input on draft NPDES Phase 2 Stormwater Rules. These hearings were held in Asheville, Kernersville, Smithfield, Washington and Wilmington. The hearing officers reviewed comments received and worked with the Division on development of a final draft of the rules that was presented to the full EMC for review and approval.

Recommendation:

The Hearing Officers recommended that the Commission approve the proposed permanent NPDES Phase 2 Stormwater Rules.

EMC ACTION:

The EMC approved the proposed NPDES Phase 2 Stormwater Rules.

Agenda Item:

Request for Adoption of Proposed Permanent Catawba River Buffer Rules. (EMC Hearing Officers)

Explanation:

In February 2003, the EMC directed staff to develop permanent Catawba riparian buffer rules to replace temporary rules that protect existing riparian buffers along the mainstem Catawba River below Lake James and the mainstem lakes. Public comments were taken from March 2003 through May 2003. Three public hearings in April drew a total of 99 registered attendees. Written and oral comments were received from over 280 people during the comment period. In general, the vast majority of commenters supported the proposed permanent rule.

Recommendation:

The Hearing Officers recommended that the Environmental Management Commission adopt these rules addressing riparian buffer protection in the Catawba River Basin as permanent rules.

EMC ACTION:

The EMC approved the proposed permanent Catawba River Buffer Rules.

Agenda Item:

Request for Approval of Proposed Temporary Rules and Request to Proceed to Public Hearing with Proposed Permanent Rules Amending the Sandy Creek and Swift Creek ORW Reclassification as Specified in House Bill 566 (30 Day Waiver required)

Explanation:

This rulemaking was proposed as a result of House Bill 566. The proposed temporary and permanent rules will amend the North Carolina Administrative Code (NCAC) to reflect the appropriate ORW reclassification and management strategy that were approved for these waters by the North Carolina General Assembly as a result of the legislative review performed under the auspices of House Bill 566. These proposed rules will assign the ORW classification and the ORW management strategy to the 14 miles of Sandy Creek and Swift Creek that had been identified as possessing excellent water quality. Furthermore, these proposed rules will implement the ORW management strategy in the watershed of the remainder of Sandy Creek, which is upstream of this 14 mile stretch. These actions were discussed in detail at the September 2003 Water Quality Committee Meeting.

A copy of the proposed rules was included separately in the agenda item package. Per the new rulemaking procedures implemented under House Bill 1151, the estimated effective date of the proposed temporary rules is October 2, 2003, and the estimated effective date of the proposed permanent rules is May 1, 2004, assuming that the permanent rules are not subject to further legislative review.

A 30 day waiver was required for the Commission to act on this proposal.

Recommendation:

The Director and staff recommended that the Environmental Management Commission approve the 30 day waiver, approve the proposed temporary rules, and grant staff permission to proceed to public hearing with the proposed permanent rules amending the Swift Creek and Sandy Creek ORW reclassification.

EMC ACTION:

The EMC approved the proposed temporary rules and the request to proceed to public hearing with the proposed permanent rules for the Sandy and Swift Creek ORW Reclassification as specified in House Bill 566.

SURFACE WATER QUALITY WQC/EMC FUTURE AGENDAS

	WQC Agenda	EMC Agenda
Oct 2003	• WS Ordinance for Garner • Overview of the Ecosystem Enhancement Program (EEP) • Request Approval to take the Draft Tar-Pamlico Basinwide Plan to Public Meetings • Approval of Local Strategies under the Tar-Pamlico Ag Rule • Annual Progress Report on the Neuse Agricultural Rule • Distribute TMDL Development Information	• Approval of Local Strategies under the Tar-Pamlico Ag Rule • Annual Progress Report on the Neuse Agricultural Rule
Nov 2003	• No meeting scheduled.	• No meeting scheduled.
Dec 2003	• Request Approval to take the Draft Catawba Basinwide Plan to Public Meetings • Request to Go to EMC for Final Approval of the Draft Basinwide Plan for the Lumber River • Allocation Scenarios for Jordan Lake • Update on Unique Wetlands Classification Work in Progress	• Request for Final Approval of the Draft Basinwide Plan for the Lumber River

QUARTERLY REPORT

TO THE

ENVIRONMENTAL REVIEW COMMISSION

ON

ENVIRONMENTAL MANAGEMENT COMMISSION ACTIVITIES

January 2004

YEAR 2003 – 2004 SECOND QUARTER REPORT TO ERC

I. Quarterly Report On **Air Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

II. Quarterly Report On **Ground Water Quality** Activities

A. Future EMC And Committee Agenda Items

III. Quarterly Report On **Surface Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

I. AIR QUALITY ACTIVITIES

AGENDA ITEM:

Hearing Officer's Report on Rules Implementing Section 112(j) of the Federal Clean Air Act

EXPLANATION:

On August 20, 2002, Mr. Dan Besse held a public hearing on amendments to rules implementing Section 112(j) of the Clean Air Act.

Section 112(j) of the Clean Air Act requires state permitting authorities to require sources in a category that EPA has identified that it intends to cover under a Maximum Achievable Control Technology (MACT) standard to comply with a MACT level emission limitation if EPA fails to promulgate that MACT standard within 18 months of the date listed in the Clean Air Act schedule. The EMC previously adopted rules to implement 112(j) requirements as part of its approved Title V permit program. On March 5, 2002, the EPA amended those portions of 40 CFR Part 63 subpart B that implement Section 112(j). The state rules implementing those requirements were proposed to be amended to incorporate the federal changes for consistency. The March 2002 federal and corresponding state rule amendments revise, delete, and add several definitions, restructure and reword text to clarify the relationship between case-by-case MACT determinations under Section 112(g) versus Section 112 (j) and their timing. The amendments also modify the case-by-case permitting procedures by splitting the application process into two parts, thereby delaying submittal of the substantive portion of the application by 24 months.

Two persons commented at the hearing and one additional person submitted written comments. The comments focused on the changes in definitions. No changes are proposed as the result of the public comments since the definition changes are being made for consistency with the federal regulation.

On August 15, 2002 EPA signed a settlement agreement that called for amendments to the 112 (j) rule that would decrease the time to submit Part 2 application to 12 months after submittal of the Part 1 application. A revised settlement agreement signed November 26, 2002 changed the submittal timeframe to 60 days after the scheduled promulgation date. The 60 day submittal was proposed December 9, 2002 and finalized May 30, 2003.

Because of the change in Part 2 application submittal deadline initiated during the comment period and subsequently finalized, and in light of the July 1, 2003 changes to North Carolina's Administrative Procedures Act, the Commission voted at its July 2003 meeting to re-notice the final rules resulting from the hearing and incorporating the subsequent federal rule deadline changes. The 60-day comment period closed September 30, 2003. No one requested a public hearing and no additional comments were received.

The hearing record was sent to you earlier.

RECOMMENDATION:

The hearing officer recommends that the Commission adopt the proposed amendments in Chapter II of the hearing record and authorize the Chairman to sign the certification on behalf of the Commission.

EMC adopted amendments.

Future EMC and Air Quality Committee Agenda Items

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Feb 04		-Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level Should Be Changed in a Permit (396) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Portable Crushers (385) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Correct Cross-Reference in 2D .0519 (391) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Clarification of Facility Permit Exemption in 2Q .0102 (402) -Revision of Ranking of Incinerators in 2D .1201	

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		(403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405) -Correct Washington Regional Office Address in 2D .1905 (410)	
Feb 04 cont.		-Make Emission Inventory Part of Permit Application (411) -Leaks at Gasoline Terminal Clarification (412) -Correct Testing Date for CISWI (413)	
Mar 04			Hearing Request -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level Should Be Changed in a Permit (396) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Provide Option for Missing Data Requirements in 2D .1404 (399)

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MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Cont			-Revise PSD Rule (393) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409)
Feb 05		-Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)	<u>Adoption</u> -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)
Mar 05			<u>Hearing Request</u> -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Mar 05 cont.			-Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)
July 05			Adoption -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility≅ and ASynthetic Minor Facility≅ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)

II. GROUNDWATER ACTIVITIES

GROUNDWATER GWC/EMC FUTURE AGENDAS*

	Committee Agenda	EMC Agenda
Jan 2004	No meeting scheduled.	No meeting scheduled.
Feb 2004	Ground water Committee Meeting cancelled.	No items scheduled at this time.
Mar 2004	<u>> DWQ-GWS ITEMS<</u> 1. **Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** <u>> DWM-UST SECTION ITEMS <</u> 1. **Request for Approval to Proceed with Temporary and Permanent Rulemaking to Implement Statutory Changes Regarding Cleanup of Co-Mingled Plumes of Petroleum.** 2. Information on Legislation to Require Secondary Containment for Non-Tank Components of a UST System 3. Status of the State Trust Fund for Cleanup of Underground Storage Tanks.	No items scheduled at this time.

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

	Committee Agenda	EMC Agenda
Apr 2004	> DWM- SUPERFUND SECTION ITEM< **1. Request to Proceed with the Implementation of New Rules from the Dry-Cleaning Solvent Cleanup Fund.**	> DWQ-GWS ITEMS< **1. Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** > DWM-UST SECTION ITEMS < **2. Request for Approval to Proceed with Temporary and Permanent Rulemaking to Implement Statutory Changes Regarding Cleanup of Co-Mingled Plumes of Petroleum.**
May 2004	> DWQ-GWS ITEMS< **1. Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** **2. Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards.**	> DWM- SUPERFUND SECTION ITEM< **1. Request to Proceed with the Implementation of New Rules from the Dry-Cleaning Solvent Cleanup Fund.**
Jun 2004	No meeting scheduled.	No meeting scheduled.

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

	Committee Agenda	EMC Agenda
Jul 2004	> DWQ-GWS ITEMS< **1. Request for APPROVAL of Changes to Eleven Groundwater Quality Standards in Title 15A NCAC 2L .0202.** **2. Request for APPROVAL to ADOPT Nine New Groundwater Quality Standards to Title 15A NCAC 2L .0202.** > DWM-UST SECTION ITEM < **1. Request for APPROVAL of Permanent Rulemaking to Implement Statutory Changes Regarding Cleanup of Co-Mingled Plumes of Petroleum** > DWM- SUPERFUND SECTION ITEM< 1. **Request for APPROVAL of New Rules from the Dry-Cleaning Solvent Cleanup Fund.**	> DWQ-GWS ITEMS< **1. Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** 2. **Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards.**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

III. SURFACE WATER QUALITY ACTIVITIES

SURFACE WATER QUALITY ACTIVITIES

Agenda Item:

Request for Approval of the Final Lumber River Basinwide Water Quality Plan

Explanation:

The *Lumber River Basinwide Water Quality Plan* is in the third cycle of basinwide plans that the Division is preparing for all 17 of the state's major river basins.

The draft Lumber River Basinwide Water Quality Plan was approved by the Water Quality Committee in July 2003 to be taken to public meetings. Three public meetings were held throughout the basin; Southern Pines, Lumberton and Ocean Isle Beach in September 2003 with approximately 60 people in attendance. Revisions were made and some information was added to the draft plan based on comments. Copies of the revised plans were sent to EMC members in the EMC package.

This Basinwide Water Quality Plan is a planning document that will guide the Division's management actions in this river basin over the next five years and beyond. The management actions are based on existing rules and policy. Therefore, approval and endorsement of this plan by the Commission would affirm that the management actions set forth in this plan are consistent with the rules adopted by the Commission and with the decision-making policies under which the Division has acted in the past.

Recommendation:

It is recommended that the *Lumber River Basinwide Water Quality Plan* be approved and endorsed by the Commission as a guide to water quality program management and implementation by the Division of Water Quality as it carries out its Water Quality Program duties and responsibilities in this river basin.

EMC ACTION:

The EMC approved the *Lumber River Basinwide Water Quality Plan* as recommended.

Agenda Item:

Request for Approval of Local Nitrogen Strategies, Tar-Pamlico Agriculture Rule

Explanation:

The Tar-Pamlico agriculture rule, part of the basin's NSW nutrient strategy, requires Local Advisory Committees (LACs) to develop county-level implementation strategies for achieving the rule's 30% nitrogen reduction goal. The Basin Oversight Committee and EMC are to approve these local strategies within two years of the rule's effective date. During Spring 2003, LACs were provided with tools and training with which to develop their strategies, which they submitted during August and September. The BOC has reviewed and approved them, and now seeks EMC approval. Counties have until September 2006 to accomplish remaining nitrogen reductions to reach local and basinwide agricultural goals. Materials have been provided in a separate mailing.

Recommendation:

Staff, reporting for the BOC, requests that the Commission approve the fourteen local strategies for achieving the Tar-Pamlico agricultural nitrogen reduction goal of 30% from 1991 loading.

EMC ACTION:

The EMC approved the fourteen local strategies for achieving the Tar-Pamlico agricultural nitrogen reduction goal as requested.

Agenda Item:

Request to Review Proposed Amendments to the Catawba Buffer Rules to Address Comments From the Staff of the Rules Review Commission

Explanation:

The revised Catawba Buffer Rules were submitted to the Rules Review Commission (RRC) in October and appeared on the RRC's October 16th agenda. The RRC staff provided comments to the Division on the rules and requested a number of technical changes. In addition, the RRC staff requested clarification concerning the measurement of the width of the riparian buffers. Another issue raised by the RRC staff was clarification regarding whether the local riparian buffer ordinance should be approved by the Division or the EMC. At their October meeting, the RRC objected to the rules based on ambiguity. The language regarding the start point of riparian buffers in the rules was modified. Now the rules clearly state that riparian buffers start at the top of the bank for the mainstem Catawba River, and riparian buffers start at the full pond elevation for the mainstem Catawba lakes. The local riparian buffer ordinance should be approved by the Division and the rules were modified accordingly.

Recommendation:

Staff recommends that the EMC act to approve the revised Catawba Buffer Rules that resulted from the objection of the RRC and technical changes recommended by the RRC.

EMC ACTION:

The EMC approved the revised Catawba Buffer Rules as proposed.

Agenda Item:

Update on NPDES Phase 2 Stormwater Rules

Explanation:

The Hearing Officers and DWQ Staff will update the Environmental Management Commission on the status and possible required changes to the proposed permanent NPDES Phase 2 Stormwater Rules as a result of the October Meeting of the Rules Review Commission and the objections of that Commission.

Recommendation:

That the Commission approve the Hearing Officers' recommended changes.

EMC ACTION:

The EMC approved the proposed changes to the Phase 2 Stormwater Rules.

Agenda Item:

Annual Progress Report of the Neuse Agricultural Rule (15A NCAC 2B .0238)

Explanation:

The Neuse Basin Oversight Committee (BOC) is required to report to the N.C. Environmental Management Commission each October on annual progress of implementation of the Neuse Agricultural Rule (15A NCAC 2B .0238). The BOC has received and approved annual reports from 17 Local Advisory Committees (LACs) in September 2003. As the result, the agricultural community for the basin as a whole has achieved a 37% Nitrogen reduction compared to the overall baseline. Nitrogen loss reduction from agricultural land was accomplished through BMP installation, fertilizer application reduction and cropland attenuation.

Recommendation:

This item was presented for information purposes. No action was recommended.

EMC ACTION:

This item was presented for information purposes only. No action was required.

SURFACE WATER QUALITY WQC/EMC FUTURE AGENDAS

	WQC Agenda	EMC Agenda
Jan 2004	• No meeting scheduled.	• No meeting scheduled.
Feb 2004	• Water Supply Ordinance Approval (Johnston Co.) • Variance Request for Project on Redfern Drive in Cary • Swamp Biological Criteria Update	• Request to Proceed to Public Hearing with Proposed Rules for Exceptions from DWQ Rules • Phase II Stormwater Rules Update
March 2004	• Request for Permission to Proceed to EMC for Final Approval of the Draft Tar-Pamlico River Basinwide Water Quality Plan	• Request for Final Approval of the Draft Tar-Pamlico River Basinwide Water Quality Plan

AIR QUALITY
April 2003

Temporary Amendment to the Municipal Waste Combustor Rule

Proceed to Public Hearing on Air Quality Rules for Special Orders

Amendment to Air Permitting Rule –technical changes

July 2003

Request to Proceed to Public Hearing on Amendments to Various Air Quality Rules

- hydrogen sulfide – revised guidelines/pulp and paper mills
- The ethylene oxide emissions
- control particulate emissions from concrete batch plants.
- petroleum liquid storage in external floating roof - seals
- require permit applicants in areas without zoning to notify the
- fees schedule for permit fees
- A new exclusionary rule for concrete batch plants.

Amendment to Hot Mix Asphalt Plant Rule – comment period extended

October 2003

Mercury Emissions and Mercury Controls for Coal-fired Electrical Utility Boilers: First Interim Report – required by Clean Smokestacks

CO2 Reduction Options for Coal-fired Electrical Utility Boilers and Other Stationary Sources - required by Clean Smokestacks

Renotice of Rules Implementing Section 112(j) of the Federal Clean Air Act – toxic air pollutant rule -changes made by EPA after rule published

January 2004

Rules Implementing Section 112(j) of the Federal Clean Air Act

SURFACE WATER QUALITY ACTIVITIES
April 2003

Approval of the Final *Broad River Basinwide Water Quality Plan*

Approval of the Final *Yadkin – Pee Dee River Basinwide Water Quality Plan*

Proceed to Public Hearing with Proposed Permanent National Pollutant Discharge Elimination System (NPDES) Phase 2 Stormwater Rules

Proceed to Public Hearings with Proposed Permanent Catawba Buffer Rules

Approval of Tar-Pamlico Model Local Stormwater Program

Approval of Full Tar-Pamlico Agricultural Accounting Method

July 2003

Proceed to Public Hearing with the Proposed Reclassification of Two Sections of the Rocky River in Chatham County to WS-III CA –Siler City water supply expansion

October 2003

Approval of Proposed Permanent NPDES Phase 2 Stormwater Rules

Adoption of Proposed Permanent Catawba River Buffer Rules.

Approval of Temporary Rules and Proceed to Public Hearing with Proposed Permanent Rules Amending the Sandy Creek and Swift Creek ORW Reclassification as Specified in House Bill 566 (30 Day Waiver required)

January 2004

Approval of the Final Lumber River Basinwide Water Quality Plan

Amendments to the Catawba Buffer Rules to Address Comments From the Staff of the Rules Review Commission

Update on NPDES Phase 2 Stormwater Rules – changes in response to RRC objections

Annual Progress Report of the Neuse Agricultural Rule (15A NCAC 2B .0238)

GROUNDWATER - July 2003

Approval a Variance from Groundwater Quality Standards for the Flynt-Wansona Manufacturing Corporation Facility in Wadesboro, North Carolina

Annual Report from the Basinwide Planning Program

For the Period of October 1, 2002 through September 30, 2003

I. Progress in Developing and Implementing Basinwide Water Quality Plans

A. Public Outreach/Involvement

The Basinwide Planning Program finalized the first cycle of basin plans in May 1998. The second cycle of plans was completed with the *Yadkin-Pee Dee Basinwide Water Quality Plan* in March 2003. The third cycle of basinwide water quality plans has begun, with the finalization and Environmental Management Commission approval of the *Neuse River Basinwide Water Quality Plan* in July 2002. Completion of the remaining third cycle plans is well underway for the Tar-Pamlico, Lumber, Catawba and French Broad River basins. Activities related to gathering public input on the basinwide plans during October 2002 through September 2003 are listed below.

River Basin	Plan Approved by Environmental Management Commission	Public Workshops	Public Meetings
Broad	February 2003		November 2002 (2)
Yadkin-Pee Dee	March 2003		January 2003 (3)
Lumber		December 2002 (3)	September 2003 (3)
Tar-Pamlico		March 2003 (4)	
Catawba		September 2003 (3)	
TOTAL	**2**	**10**	**8**

B. Coordination and Collaboration Activities Related to Basinwide Planning Implementation

Many additional activities have occurred over the past year that are not tied to a specific basin, but rather can be applied to the program as a whole. Some of the more significant activities are as follows.

- In an effort to assure Basinwide Plan implementation and to increase coordination among Division of Water Quality staff and other agencies, meetings to discuss implementation needs are held every six months for each river basin. At least one meeting has been held with each regional office staff during this reporting period to discuss the Implementation Packet for each river basin covered by the regional office. Central office staff from various units either attend these meetings with Basinwide staff, or further coordination is conducted with central office staff as follow-up to the meetings. Additional meetings are conducted with other agency personnel and local watershed organizations as needed to discuss specific management strategies and to assess progress being made to implement these strategies. These meetings are also used as an opportunity to share more information and jointly develop appropriate management strategies to address specific problems.

- Basinwide staff coordinate constantly with Wetlands Restoration Program staff on prioritization of targeted watersheds and getting input from local resource professionals.
- Staff coordinated with other state, federal and local agencies to obtain information pertinent to the basinwide plans, increasing the level of coordination and communication with these agencies and their participation in the development of basinwide plans. Discussions between the Basinwide Planning Program and the NC Divisions of Soil and Water Conservation, Environmental Health, Coastal Management, and Marine Fisheries, as well as the Wildlife Resources Commission and US Fish and Wildlife have occurred as a means of improving communication, sharing information and assuring appropriate information is presented in the basin plans.
- Basinwide information was provided to applicants for Clean Water Management Trust Fund and Section 319 grants. Basin planners also provide initial technical reviews of applications.
- Basinwide plans, basin statistics, notices of public input opportunities, a river quiz and other relevant information to the basinwide planning program are updated on the web site to provide interested parties with more access to information (see http://h2o.enr.state.nc.us/basinwide/).
- Over 1,076 copies of basin plans were printed and distributed during 2002 in response to public request for copies of the plans. Since the basin plans can be downloaded from the web page, we believe that several hundred more have been downloaded in this format.
- Over 330 people have attended the ten public workshops for the third cycle (includes the third cycle of workshops for the Neuse, Lumber and Tar-Pamlico River basins) and over 75 people attended the third cycle of public meetings (held only for the Neuse river basin to date).
- Basinwide staff continues to coordinate with the Classifications & Standards Unit and other federal and state agencies to develop management strategies for threatened and endangered species per DWQ rule.
- Basinwide staff provided presentations on use support and basinwide planning to the Coastal Resources Commision -Planning and Special Issues Committee. The Committee is especially interested in the development of improved use support methods for assessing shellfish harvesting in Class SA waters.
- Basinwide staff continues to work with US Geologic Survey, NC Department of Transportation (NCDOT) and the Center for Geographic Information and Analysis in development of 1:24,000 National Hydrography Data (NHD) for North Carolina. Methods continue to be developed and tested to incorporate water quality and NCDOT data onto the NHD. The NHD will be a necessary data layer for submittal of future 303(d) impaired waters lists to the Environmental Protection Agency.
- Basinwide staff continues to develop information and improve skills related to Geographic Information System procedures. The result of these efforts will increase proficiency in use support mapping and analysis.
- Basinwide staff continues to enhance procedures, methods and database implementation pertaining to use support decisions on water quality status (see Part II below).

C. Some Plan Development and Implementation Activities Related to Specific River Basins

The following bullets, by basin, present some of the more significant activities and accomplishments over the past year to achieve the goals of the Basinwide Planning Program. The program had two of four basin planner positions vacant for most of this reporting period due to hiring freezes and resulting inability to fill these positions.

Broad River –

- Held two public meetings in November 2002, with 57 people attending.
- Prepared a draft Broad River Basinwide Water Quality Plan, presented the plan to the Environmental Management Commission for final approval in February 2003.

Cape Fear River –

- Conducted basinwide biological sampling in addition to ambient monitoring.
- Continued to work with the Basin Coalitions in development of projects and coordination with basinwide planning efforts.
- Presented drought and water quality overview for Cape Fear River Assembly annual joint technical advisory committee.
- Participated in modeling and Total Maximum Daily Load (TMDL) meetings with stakeholders in lower Cape Fear and Durham.
- Participated in Conservation Resource Enhancement Program (CREP)) meeting to discuss nutrient impacted waters.
- Presented at basinwide meeting to coordinate efforts of Land Conservancies.

Catawba River –

- Participate in quarterly meetings of the Catawba River Bi-State Task Force, often providing a presentation on status of Catawba River Basinwide issues.
- Provide input to the Catawba River Bi-State Task Force by serving on the Executive Committee.
- Participating in monthly meetings with Department of Environment and Natural Resources agency staff and other stakeholders and Duke Power representatives to explore the potential for, and developing a process for, a Federal Energy Regulatory Commission (FERC) relicensing settlement agreement. Program supervisor, basin planner and regional office staff person each participate in a different team, the State Relicensing Team and Local Advisory Groups. Staff are working with the agencies and Duke Power to develop study plans to assess the impacts of hydropower operations on water quality, wetlands and aquatic habitat. Studies will begin in the spring and are expected to be completed in the coming year. Additional studies may be identified as needed next year. A 401 Certificate is required by DWQ and the FERC for renewing the expiring hydropower license. The new license will be a 30 or 40-year license.
- Beginning the process of updating the 1999 Basinwide Plan by developing use support ratings.
- Holding three public workshops in September to obtain input for updating the basin plan in 2004.

Chowan and Pasquotank Rivers –

- Coordinating with the Albemarle-Pamlico National Estuary Program (APNEP) and the Division of Solid Waste regarding oil recycling for the North Carolina/Virginia work group formed under the APNEP Memorandum of Agreement with Virginia.
- Participating in Submerged Aquatic Vegetation (SAV) meetings with several state and federal agencies to develop a SAV monitoring plan. Discussion is primarily focused on flight line planning for Back Bay and Currituck Sound for documentation of presence and/or absence of SAVs in these areas.

Little Tennessee River –

- Providing assistance to the Nonpoint Source Team of local, state and federal agencies and local watershed organizations to conduct education and demonstration projects in the basin.
- Worked with several professors at Western Carolina University to disseminate information and give presentations to students about water quality and state government jobs.
- Serving on the technical advisory board for the Little Tennessee Watershed Association.
- Working with the Wildlife Resources Commission and US Fish & Wildlife Service on strategies to improve and sustain water quality to protect federally-listed mussel and fish species in the basin.

Lumber River –

- Gave presentation at 2-day education workshops for the Friends of Lake Waccamaw with emphasis on Outstanding Resource Waters and how it pertains to Lake Waccamaw.
- Participated in discussions of the National Pollutant Discharge Elimination System/Pretreatment Mercury group pertaining to the new 1631 methods for mercury sampling.
- Coordinating with National Resource Conservation Service, Columbus County Soil and Water Conservation District office and the Conservation Resource Enhancement Program (CREP) coordinator regarding priority areas in the Lumber Basin.
- Coordinating with the Lumber River Council of Governments regarding a possible discharger coalition formation.

Neuse River –

- Participated in Upper Neuse River Basin Association technical advisory committee to develop recommendations on septic systems and on development of a watershed evaluation tool.
- Presented and participated in Envirothon at the Swift Creek with Soil and Water Conservation District.

New River –

- Conducted basinwide biological sampling in addition to ambient monitoring.

Roanoke River –

- Participating in Section 216 feasibility study meetings with multiple state and federal agencies. The Section 216 study regards the Army Corps of Engineers' (ACE) dam project at Kerr Reservoir. The States of NC and VA, as well as the ACE, are conducting a comprehensive study on impacts from the dam on the lower Roanoke River. Twelve technical workgroups have formed. The basin planner is serving on four workgroups and has been elected to serve as technical group leader for the 'Water Quality' workgroup. Several state and federal agencies and non-profit organizations are participants in this study. The study is composed of three phases. Phase One, the feasibility phase, is composed of several tasks such as gathering and evaluating existing relevant data, identifying gaps in the existing relevant data, and identifying and evaluating existing methods and tools for study of the subject. Phase One, scheduled for twelve months, has just begun. Phase Two, the design phase, will begin after the feasibility phase and is scheduled for 24-36 months. Phase Three, the construction phase, will begin after the design phase and is scheduled for 24 months.
- Coordinating communications between the Division of Water Quality and relevant agencies regarding flood releases/reductions from Kerr Reservior.

Tar-Pamlico River–

- Held three public workshops in March 2003, with 167 people attending.
- Participated in Upper Tar River collaboration effort with the Division of Soil and Water Conservation (DSWC), National Resources Conservation Service, Conservation REP, Division of Forest Resources (DFR), Wildlife Resources Commission (WRC) and Tar River Land Conservancy to identify, coordinate water quality target project areas and resources.
- Advised WRC, Division of Parks and Recreation National Heritage Program (DPR NHP), and US Fish and Wildlife Service (USFWS) staff in development of endangered species management plans for watersheds in the upper portion of the basin.

White Oak River –

- Presented and discussed the Division of Water Quality use support assessment methods for shellfish waters to shellfish committee of the Marine Fisheries Commission.

Yadkin-Pee Dee River –

- Held three public meetings in January 2003, with 161 people attending.
- Working with the Wildlife Resources Commission and US Fish & Wildlife Service on a strategy to improve and sustain water quality to protect federally-listed mussel species in the Goose Creek watershed.
- Prepared a draft Yadkin-Pee Dee River Basinwide Water Quality Plan; presented the plan to the Environmental Management Commission for final approval.
- Participating in monthly meetings with Department Of Environment And Natural Resources (DENR) agency staff and other stakeholders, along with Progress Energy and Yadkin, Inc. (APGI) representatives to explore the potential for, and developing a process for, Federal Energy Regulatory Commission (FERC)) relicensing settlement agreements for both hydropower facilities.

II. Activities Related to Use Support Assessments and Methods

A. Changes in Methodologies to Assess Water Quality Conditions

- Key to making determinations of the quality of the waters is a tool to assess the "use support" of a particular water body. Use support is directly related to the classification of the water body. For example, a water body may need to support a quality sufficient to enable the water to be used as a water supply. Staff continue to revise and improve both the decision-making methods as well as the database to support the decisions.
- Significant progress has made towards developing methods to better assess shellfish harvest area closures by using a frequency-based closures method to determine impairment, rather than simply using the Division of Environmental Health growing area classifications. A database and Geographic Information System related system is being developed to facilitate the use of these new methods. Presentations on these new methods have been given to the various commissions (Coastal Resources Commission and Marine Fisheries Commission) and other interested groups.

B. 305(b) Report

- Submitted electronic update of the *Water Quality Progress in North Carolina Year 2003 305(b) Update* and associated data to EPA by April 1, 2003.

- Incorporated this data into the submittal of the 305(b)/303(d) integrated report to EPA. EPA has approved the integrated report.

February 24, 2004 ERC Meeting
EXHIBIT H

Report to the Environmental Review Commission

Status of New Source Review Rulemaking Process
B. Keith Overcash, Director
Division of Air Quality
February 24, 2004

- EPA finalized changes to New Source Review on December 31, 2002.
- The rule changes became effective on March 2, 2003.
- As an approved NSR program, NC has 3 years to adopt the new rules or rules that are "at least as stringent as" the new rules (no later than March 2, 2006).
- Due to the APA process in NC, DAQ had to begin the process to adopt our rules at an early date.
- DAQ held two stakeholder public meetings in the Fall of 2003 to receive comments by interested parties.
- DAQ internal workgroup has met (January 2004) to discuss comments received and to begin a draft of rules.
- Another stakeholder meeting is planned for sometime in March 2004 to present proposed rules.
- Proposed rules to Air Quality Committee of EMC in April 2004
- Proposed rules to EMC for approval to take them to public hearing in May 2004
- Public hearing(s) in July/August 2004 time frame
- Hearing Officers' recommendations to EMC for approval of new rules in October 2004
- Rules to RRC in November 2004
- If approved by RRC and no written objections received, rules would be effective in December 2004.

This schedule is necessary because we must leave enough time for written objections to be considered during the '05 legislative session because the '06 session will not convene early enough for rules to be considered within the 3-year period which ends 3/02/06.

Background on NSR Reform

The history of reform of the New Source Review (NSR) Program began more than ten years ago with the first "NSR Simplification Workshop" held in August 1992. After countless meetings and negotiations with stakeholders of the program, the EPA published the first of a number of proposed changes in 1996. The fact sheet for this proposal noted that, "as part of the ...Administration's commitment to "reinventing" government, today's proposal [will] ...eliminate over 50 percent of the major source permitting actions [as compared with] ...the existing regulations." After more proposals and meetings, the EPA published a final rule on December 31, 2002 to *partially* amend the applicability provisions of the PSD program. On the same day, the EPA also published a new proposal for a change in the routine replacement provision of the program. The proposed routine replacement rule became final on October 27, 2003.

While many commentators have criticized the changes in the NSR rules without distinguishing between these two sets of rules, the substance of the criticisms are generally concerned with the replacement rule because it is at the heart of the EPA's on-going litigation with many electric utility companies including Duke Energy.

Attached is a brief explanation of the changes to the applicability provisions of the NSR program (the December 31, 2002 rule) as well as comments on how the changes compare with the current rules in North Carolina.

North Carolina's Approach to Implementing the Applicability Rules

As a state with an approved NSR program, North Carolina has three years to submit to the EPA approvable state rules implementing the applicability rule changes. While the state could adopt the rules by reference, the DAQ could also make changes to the rules that are at least as stringent as the EPA provisions. The national association of state and local regulators has also prepared rule language that could be used as a starting point for amendments to North Carolina's rules.

The Division has already held two public meetings (in Raleigh and in Hickory) to listen to comments by interested parties. The Division will now prepare a draft rule for consideration at an additional stakeholder meeting before proceeding to the AQC and the EMC to begin the rulemaking process.

Summary of (12/31/02) Rule Changes

(1) Baseline calculation – The new rule will use the highest utilization factor (widgets/yr) over the past ten years and the most recent (over the past 2 years) emission factor (lbs pollutant/widget) to determine baseline actual emissions.

Comment: In the past, sources were allowed to simply use the most "representative" 2-year emission rate (lbs pollutant/yr) over the past ten or more years.

(2) Plant-wide Applicability Limits (PALs) – The new rule will use the actual emissions as calculated under (1) above as the baseline for these caps. The facility will be able to make improvements, additions and modifications without triggering NSR *provided* their emissions do not exceed this cap. The facility will only be able to exceed the cap under certain approvals by the permitting authority. In addition, any other emission reduction rules (e.g., due to non-attainment designation) adjust the cap downward.

Comment: Based on six pilot studies, the EPA believes that the PAL option will result in a "net environmental benefit." Under the current rules, facilities can make multiple modifications over time with emission increases provided each is less than the significance level under NSR. This would not be allowed under the PAL. However, under the PAL, the facility may make changes without lengthy permit reviews.

(3) Clean Unit Exemption – The new rule will allow, without triggering NSR, modifications of sources that have installed BACT-level controls within the previous 10 years.

Comment: This option saves processing time and resources that, in the past, virtually never resulted in any emission reductions. In the past, additional control of already controlled sources that were modified was considered under the BACT analysis. However, since only the marginal reductions (beyond the existing control efficiency) would be compared with the considerable additional costs associated with retrofitting control devices, the cost effectiveness was always prohibitively large. Thus, additional controls were seldom required despite the considerable expenditure of resources.

(4) Pollution Control/Prevention projects – The new rule will allow non-utility facilities to put control projects into service even when a collateral increase in another pollutant may exceed the significance level for NSR.

Comment: Utilities were already given this option under the rules since 1992. The new rule effectively codifies existing guidance that allowed non-utility facilities to pursue emission control projects with greater regulatory certainty.

(5) Use of past-actual emission rates to compare with future actuals – The new rule will use these two emission rates for non-utility facilities to determine whether a proposed modification constitutes a major modification under NSR.

Comment: This is also the same approach that the EPA approved for the utility industry in 1992. The EPA stated that they believed other industries should be treated similarly to the utility industry. Under the current rules, past actuals were compared with future potential emissions. Since industrial equipment is seldom operated continuously for 365 days/year, this approach tended to overstate the increase in emissions.

February 24, 2004 ERC Meeting
EXHIBIT I

Designation of Areas as Non-Attainment for Fine Particulate Matter and Ground Level Ozone

Discussion Before Environmental Review Commission

February 24, 2004

Brock M. Nicholson, P.E.
Deputy Director
Division of Air Quality

What are designations?

- Federal rulemaking action by the Administrator of USEPA

Why is it required?

- By Federal Clean Air Act
- Upon establishment of National Ambient Air Quality Standard (NAAQS)
  - Particulate Matter, fine (PM fine)
  - Ozone (Ground level)

What is the State's role?

- Make recommendations to the US EPA

What is action status and schedule?

- **PM fine:**
- Recommendations to EPA on February 15, 2004
- EPA's intended modifications of recommendations by 120 days prior to final action -expected ~ July 2004
- Final rulemaking expected by EPA December 31, 2004
- **Ozone**
- Recommendations to EPA on July 15, 2003
- EPA sent its intended modifications of NC's recommendations by letter December 3, 2003
- State responded to EPA's comments February 6, 2004
- Final rulemaking by EPA by April 15, 2004

What are the requirement for setting boundaries?

- Area with a measured violation
- Area contributing to the violation

What is EPA's presumption?

- Metropolitan Statistical Areas (MSA)
- All counties of MSA and whole counties

Can there be areas smaller than EPA's presumption?

- Yes, based on EPA's published guidance - 9 point criteria for PM fine and 11 point for ozone

What generally was the basis for NC recommendations?

- Urban Vs rural, contributing to problem or not, existing controls and would inclusion make a difference in compliance strategy?

How does NC support areas less than EPA's presumption?

- Extensive technical analysis and documentation
  - Wind trajectories, Population, Population density, Vehicle use (VMT), Emissions, Rural, Growth potential
- Existing measures **in place; CSA, I/M**
- Air Quality forecasting
- North Carolina can control emissions **without designation** of non-attainment
- State's commitment to demonstrate maintenance (10 years), assure continual conformity with transportation plans - annual checks on growth and periodic updated demonstrations of NAAQS maintenance (every 8 years)
- No additional control strategy requirements expected - Attainment by 2007 / 2010 **without designating full EPA presumption**

What is the issue with NC's ozone (and PM fine) recommendations?

- Size of the designated area -i.e., boundaries
- NC recommended some counties be less than EPA's presumption for area

•What process did NC follow to develop the recommendations?

- Public meetings, meetings with local officials (city, county, MPO)
- Consulted / concurrence with DOT, Commerce and Agriculture

What are the consequences for areas designated as non-attainment?

- Non-attainment new source review (NSR) for major new or modified industry
    - Best control technology (LAER), Offset emissions
- Conformity analysis required; implication for Federal highway funds
    - Transportation / General
- Impact on economic development
    - "Tag" of non-attainment
    - Opportunities lost

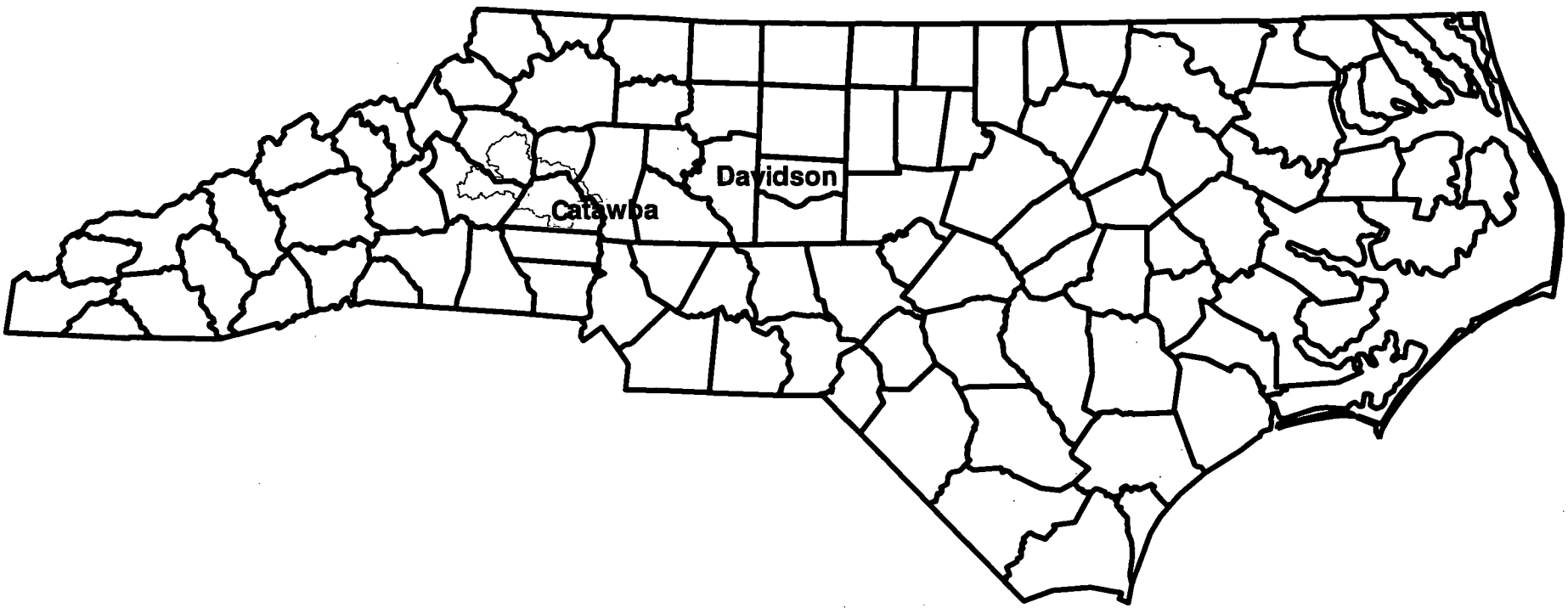
What was the basis for EPA's rejection of NC's recommendations?

- Primarily desire to be uniform across country (?)
- Secondarily growth issues

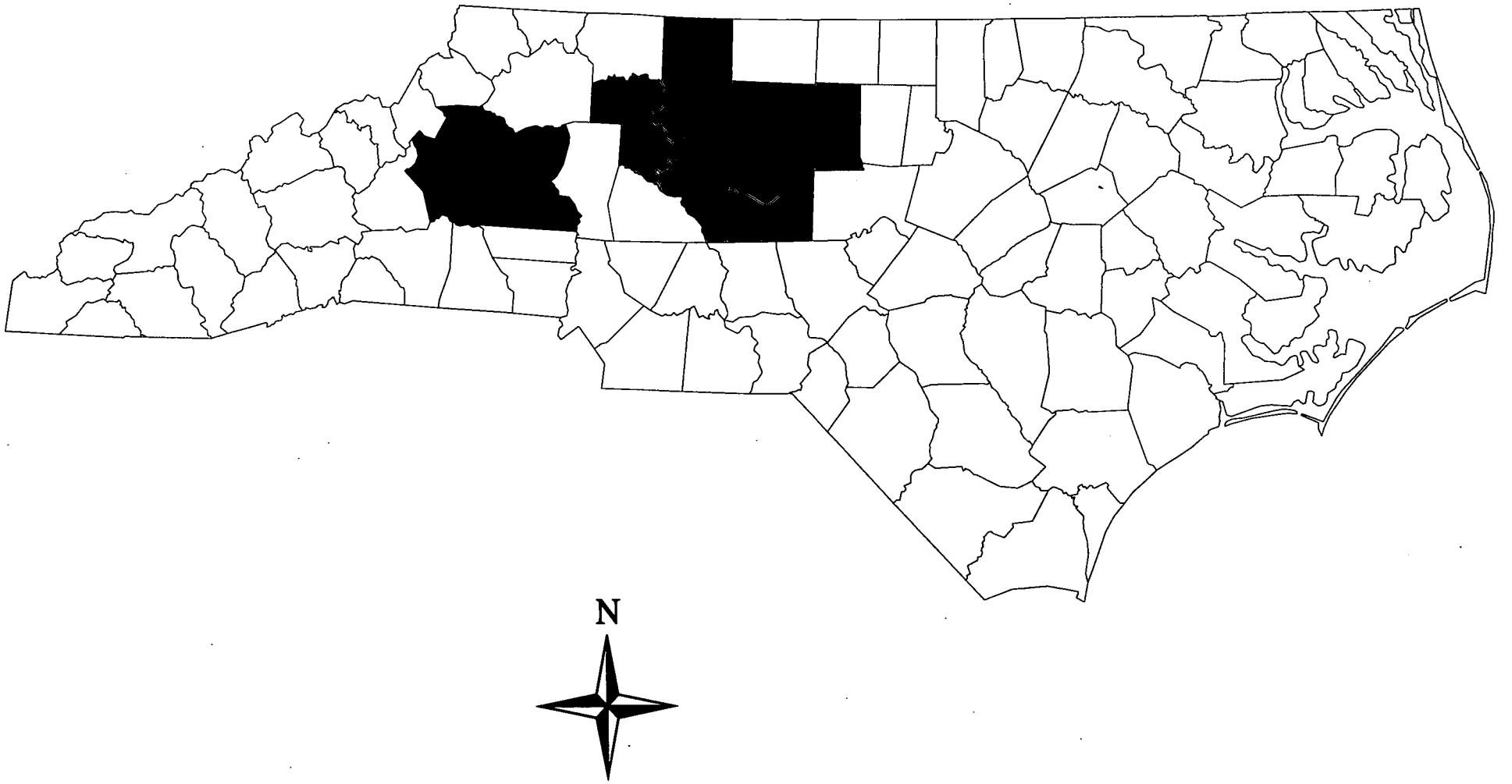
What is being done to change EPA's mind?

- Letters and meetings

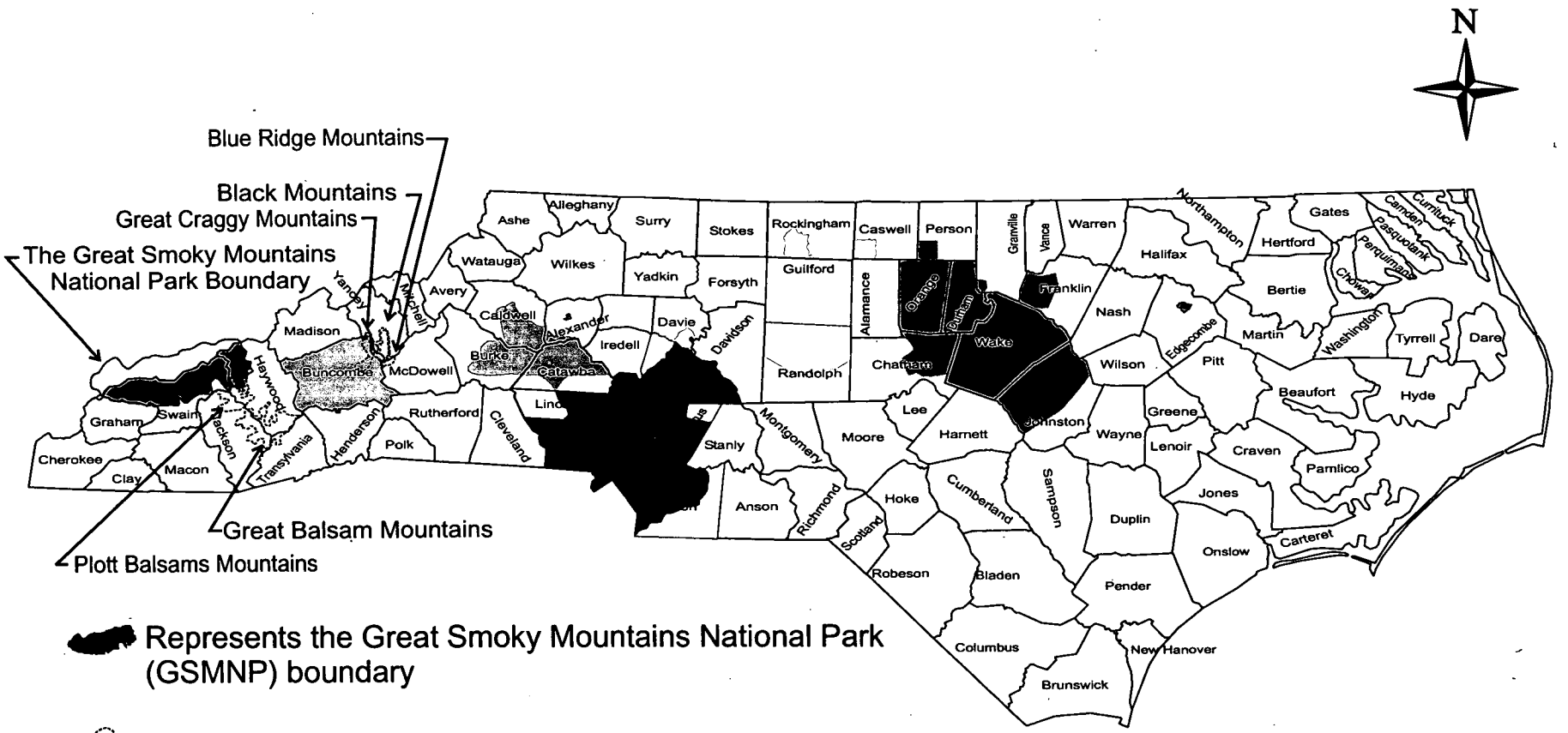
North Carolina's Recommendations on Boundaries for $PM_{2.5}$ Nonattainment Areas



Potential PM2.5 Nonattainment Areas Based on EPA's Presumptive MSA Boundary Guidence



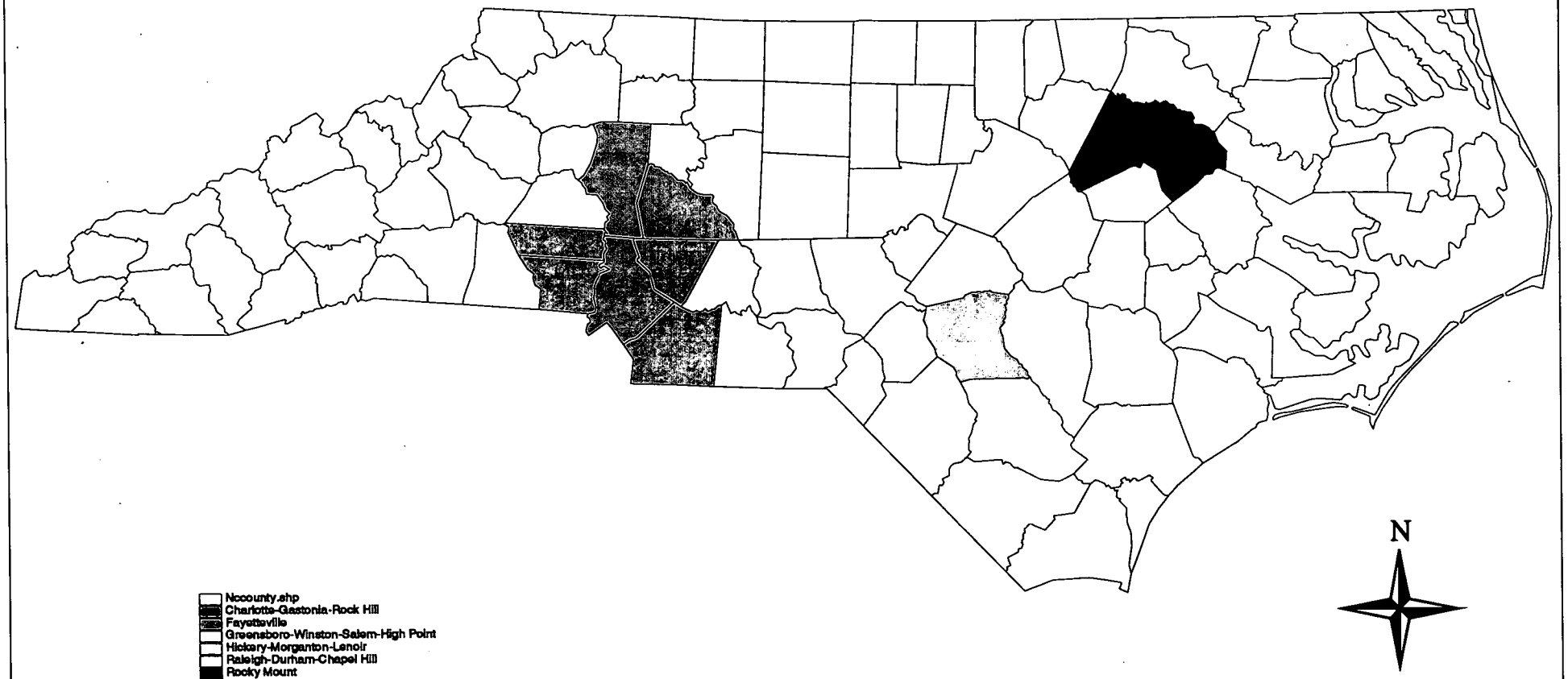
North Carolina's Recommendation on 8-hr Ozone Nonattainment Boundaries



Reductions in emissions will be required in areas as needed, even in areas not designated nonattainment.

Not To Scale
8-hrOZnonATT
07-15-03

EPA Recommended 8-Hour Ozone Nonattainment Boundary for North Carolina



1/6/04

February 24, 2004 ERC Meeting
EXHIBIT J

Remarks to the Environmental Review Commission
24 February 2004

Thank you Mr. Chairman. My name is Preston Howard and I appear before you today on behalf of the Manufacturers and Chemical Industry Council of North Carolina – MCIC.

I think that Brock Nicholson did a good job of covering the technical details of the 8-hour ozone nonattainment area delineations that he and his colleagues in the Department have proposed.

I appear before you this morning in support of the approach that the Department has taken in drawing the ozone nonattainment boundaries.

Although this is a subject that we collectively could spend days debating, I want to leave you with 3 specific reasons for why you should endorse the approach that the department has taken in drawing the nonattainment area boundaries: Jobs – Actions Already Taken – Consistent Successes.

1) **Jobs**

I don't need to remind you all that our state is hemorrhaging jobs. If we concede to draw our nonattainment area boundaries the way that EPA wants us to, based on their own "guidance" – not regulation – then our prospects for replacing those tens of thousands of jobs will be significantly diminished.

You see, once a county is included in the nonattainment area boundary, a significantly more detailed and complex and timely set of permit requirements are imposed on new and expanding industries.

It is no secret that companies that are looking to expand or to build new manufacturing operations look closely at the permitting requirements for the areas under consideration.

Having a prospective site located in a "nonattainment area" means at least one thing to the company – permitting is going to

be much morecomplicated and it's going to take much, much longer. Instead of looking at a 90 day widow for permitting the company will face a permitting window of 6 – 18 months.

In addition to the increased complexity and time requirements, As Dr. Moreau pointed out earlier, the company may also have to identify "offsets" greater than 1:1 for its new emissions. In other words, for every ton of VOC NOx emissions produced by the new facility, the applicant willhave to secure more than equal that amount from another source.

The bottom line is that the company will look elsewhere!

Which would be to bad, particularly in a situation like Representative Fox's district. Granville County is one of those outlying counties where EPA wants the entire county included in the nonattainment area boundaries.

Although most of the air quality problems in Granville County are being caused by the heavy concentration of motor vehicles in the Triangle Area (Raleigh Durham RTP), and they have virtually no industry that is contributing to nonattainment in the county.

Under EPA's approach to drawing the boundaries, Granville County will lose much of its competitive edge in attracting new jobs to other areas.

Senator Swindell and his constituents in Nash County would face the same dilemma. Most of their nonattainment is due to sources in neighboring counties (principally automobiles) – not sources in Nash County.

Ane the same handicaps on recruiting new industry in Granville and Nash Counties will be played out all across the state – that is if EPA has its way!

2) **Actions Already Taken**

As a result of two major steps that the North Carolina General

Assembly has already taken, we expect to attain the standard earlier than EPA requires in all areas except Charlotte.

First – in the Clean Air Act Amendments of 1999 (which Rep. Hackney championed) you significantly expanded the motor vehicle testing requirements from 9 to 48 counties, with full implementation in all 48 counties expected by 2006.

Second – in 2002 you adopted the Clean Smokestacks Act which which will result in 189,000 tons of NOx emissions reductions – a 77% reduction in NOx from 14 coal fired power plants in North Carolina.

3) **Consistent Successes**

A few of you were in the General Assembly in the early 1990's when we were going through a similar process for drawing the nonattainment boundaries for the 1-hour ozone nonattainment areas. In that case, the state also proposed "partial county" delineations.

At that time the Department took the position that most of the nonattainment measured at monitors in those rural outlying counties was due to automobile emissions in upwind counties – not industrial sources in the rural county where the monitor was located.

In that case EPA also objected.

But Governor Martin stood firm.

He asked EPA why in the world we would impose requirements that limit growth and development in the outlying counties when we know that they are not the ones contributing to their ozone nonattainment.

That same question needs to be asked – and is being asked today.

Just as in the early 1990's, most of our ozone nonattainment is

being caused by automobile emissions – not industrial sources.

We think the Department's approach to drawing the nonattainment boundaries is the right one! It is consistent with the successful approach taken in the early 1990's, and it is also the most protective of our ability to recruit and retain jobs in our state.

Thank you Mr. Chairman. I'll be happy to answer any questions.

February 24, 2004 ERC Meeting
EXHIBIT K

Report to the Environmental Review Commission

Update on Hydrogen Sulfide (H_2S) Acceptable Ambient Level (AAL) Rulemaking

B. Keith Overcash, Director
Division of Air Quality
February 24, 2004

The purpose of the rulemaking is to revise the H_2S AAL Guideline.

Current AAL

- Established in 1986 and adopted in 1990
- Only based on short-term effects of high level exposure, not long-term effects of low level exposure
- Set at 1500 ppb (2.1 mg/m^3, or 2100 ug/m^3), for 1-hour average, based on studies of acute irritancy.

In 2001 NC DENR Scientific Advisory Board reviewed studies since 1986 of long-term adverse effects of low level exposure.

SAB recommended 3 options over a range of H_2S AALs for consideration:

- 40 ppb (0.056 mg/m^3, or 56 ug/m^3), for 1-hour average, based on studies of respiratory effects in exposed asthmatics;
- 23 ppb (0.033 mg/m^3, or 33 ug/m^3) for 24-hour average, based on studies of eye irritation in exposed workers;
- 83 ppb (0.120 mg/m^3, or 120 ug/m^3) for 24-hour average, based on studies of nasal toxicity in exposed rats.

In late 2002 and early 2003 -- AQC reviewed the SAB recommended H_2S AALs economic impact of complying with the AALs, and other related issues.

DAQ received permission from EMC to take the proposed AAL change for H_2S to public hearing in May 2003.

H_2S rule proposed options approved by the EMC

Pollutant: Hydrogen sulfide	Annual (Carcinogens)	24-hour (Chronic Toxicants)	1-hour (Acute Systemic Toxicants)	1-hour (Acute Irritants)
OPTION 1		0.12		
OPTION 2			0.056	
OPTION 3 *		0.033		
OPTION 4 *		0.033	0.056	
OPTION 5 New facility Old facility (existing)		 0.033 0.12		
OPTION 6 * New facility Old facility (existing)		 0.033 0.12	0.056	

- Due to potentially high costs of new controls, the proposed rules include options exempting paper mills wastewater treatment systems

Late October / early November 2003 – Two public hearings (Winterville and Asheville) were held to receive comments on the proposed options for the revised H_2S AALs

November 2003 / February 2004 -- Public Hearing Officers' review of comments

March 2004 -- Public Hearing Officers' recommendation(s) of revised H_2S AAL to EMC for adoption consideration

If an option is approved by EMC in March, the proposed rule will go to the Rules Review Commission in April.

If approved by RRC and <10 written objections to the rule are received by the RRC, the rule change will go into effect on May 1, 2004.

Update on the Implementation of the Expanded Inspection and Maintenance Program

Brian C. Phillips
Division of Air Quality
February 23, 2004

February 24, 2004 ERC Meeting
EXHIBIT L

Inspection/Maintenance (I/M) Program Update

- I/M is the program to perform annual emissions inspections on motor vehicles
- Legislation enacted in 1999 and 2000
  - Introduce new test procedure
  - Expand from 9 to 48 counties

Introduce new test procedure

- Onboard diagnostics (OBD2)
  - 1996 and newer light duty gasoline vehicles have built-in computers and monitors
  - Continually self-monitor engine systems and emission control devices
  - Stores trouble codes and illuminates dashboard lamp
- Car constantly tests itself; inspector retrieves the results

Introduce new test procedure

- First OBD test performed in July 2002
- Widespread OBD2 testing by October 2002
- Performing over 5,000 inspections per day; about 2 million per year
  - Numbers will double when program is fully implemented in two years

Introduce new test procedure

- Overall, very positive reaction
  - Fast and easy for inspectors to perform
  - With dashboard light, motorists usually know whether they are going to pass
  - Trouble codes give technicians a head start on diagnostics
- Failure rate is 4%
  - Idle failure on same vehicles was less than 1%
  - Fail rate is consistent with other states

Expand from 9 to 48 counties

- Adding about six counties every six months
- There are currently 23 counties performing emissions inspections
- Next up (July 1): Buncombe, Cleveland, Granville, Harnett, and Rockingham
- Expansion will be complete on 1/1/06

Expand from 9 to 48 counties

- Advance preparations
  - License stations and inspectors (DMV)
  - Train inspectors and repair technicians (community colleges)
  - Buy test equipment (inspection stations)
  - Public outreach (DMV and DAQ)

Summary

- Overall, it has gone very well
  - Inspection capacity has not been a problem
  - Fail rates have been reasonable
  - Early problems affected small percentage of the fleet; were quickly addressed
  - Generally positive reaction from motorists, inspectors, and repair technicians

Online Resources

- Phase-in schedule
  - http://daq.state.nc.us/news/pr/2000/files/iandmphasein.pdf
- DAQ Brochure
  - http://daq.state.nc.us/news/brochures/smokewheels.pdf
- DMV Site
  - http://www.dmv.dot.state.nc.us/enforcement/emissionsinspections/

Offline Resources

- DAQ Phone Number
  - 919-733-3340
- DMV Phone Number
  - 919-861-3185

February 24, 2004 ERC Meeting
EXHIBIT M

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: George F. Givens
Environmental Review Commission Counsel

FROM: William G. Ross Jr. WGRJr

DATE: September 29, 2003

RE: Inactive Hazardous Sites Annual Report

In 1987 the North Carolina General Assembly enacted the Inactive Hazardous Sites Response Act (N.C.G.S. 130A-310) to address sites with non-permitted releases of hazardous substances. This legislation requires annual reporting to the Environmental Review Commission. The 2003 annual status report is enclosed.

Should you have any questions, please feel free to contact Jack Butler, Chief, Superfund Section, Division of Waste Management at 733-2801, ext. 293.

WGR/CVJ

Attachment

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR

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Report to the North Carolina General Assembly on the Inactive Hazardous Sites Program

October 2003

Superfund Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources

http://www.wastenotnc.org

EXECUTIVE SUMMARY

The Inactive Hazardous Sites Program was created by the North Carolina General Assembly to identify, control and correct properties contaminated with hazardous substances.

To date, 1,816 chemical spill or disposal sites and old, unlined dumps or landfills have been catalogued. Of this number, 1,400 still require work to address their hazards. The old, unlined landfills make up about one half of the sites still requiring action. In most cases, the locations of the landfills are still being determined. The Inactive Hazardous Sites Branch is currently supervising a contract to locate these landfills, collect information on property use, and determine the potential for exposure. Of the 241 landfills inspected under this contract thus far, 166 (or 69 percent) have a residence, school, church, day care or drinking water source on or within 1,000 feet of the landfill. Based on observations at sites investigated by the USEPA and the North Carolina Division of Waste Management, most of North Carolina's unlined landfills can be expected to have groundwater contamination.

The branch has a six person staff. To increase efficiency without additional appropriations, the General Assembly authorized the use of branch-approved private environmental consulting firms to certify lower priority, voluntary party cleanup actions. Called Registered Environmental Consultants or RECs, these private overseers are working on 31 sites. State staff audit a portion of the REC's work activities. At present, 70 firms have received REC status. In addition, oversight of remedial actions at two sites is being provided by federally-funded staff and oversight of work at 35 former manufactured gas plant sites is being provided through an agreement with a consortium of utilities and municipalities which fund two staff members.

The following summarizes site cleanup activities over this past reporting year.

Sites Identified	
Chemical spill or disposal sites	1,086
Old unlined dumps and landfills	730
Total	**1,816**
Sites With All Work Complete	
Since last status report in 10/02	12
Previous site completions	404
Total	**416**
Ongoing Cleanup Actions	
Ongoing REC-Supervised Site Cleanup Actions	31
Ongoing Priority Cleanup Actions Supervised by State Staff	64
Total	**95**

The Inactive Hazardous Sites Response Act requires annual reporting to the General Assembly. All of the reporting requirements specified under N.C.G.S. 130A-310.10 are met in this report. The status report on the Brownfields program, as required by N.C.G.S. 130A-310.40, is provided separately.

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I. THE INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST

The Inactive Hazardous Sites Branch is within the North Carolina Department of Environment and Natural Resources' Division of Waste Management. It implements the Inactive Hazardous Sites Response Act of 1987. This act requires the branch to maintain a catalog of inactive hazardous substance or waste disposal sites. Table 1, on the following page, provides a list of sites added to that inventory since the last program report in October 2003. Table 2, on page 3, provides a list of sites assigned "No Further Action" status. The entire inventory can be found in Appendix II. Figure 1, on page 4, shows how the inventory is distributed by category. Appendix I provides a description of each inventory category.

N.C.G.S. 130A-310.2 requires that sites catalogued in the Inactive Hazardous Sites Inventory be prioritized based on their threat to public health and the environment. After discovery, sites are first cataloged in the "Evaluations Pending" category of the Inactive Hazardous Sites Inventory until their rank is determined. Site rankings are determined using the rules found in 15A NCAC 13C .0200. Once ranked, sites are transferred to the Inactive Hazardous Waste Sites Priority List. This list is provided in Table 3, found on page 5.

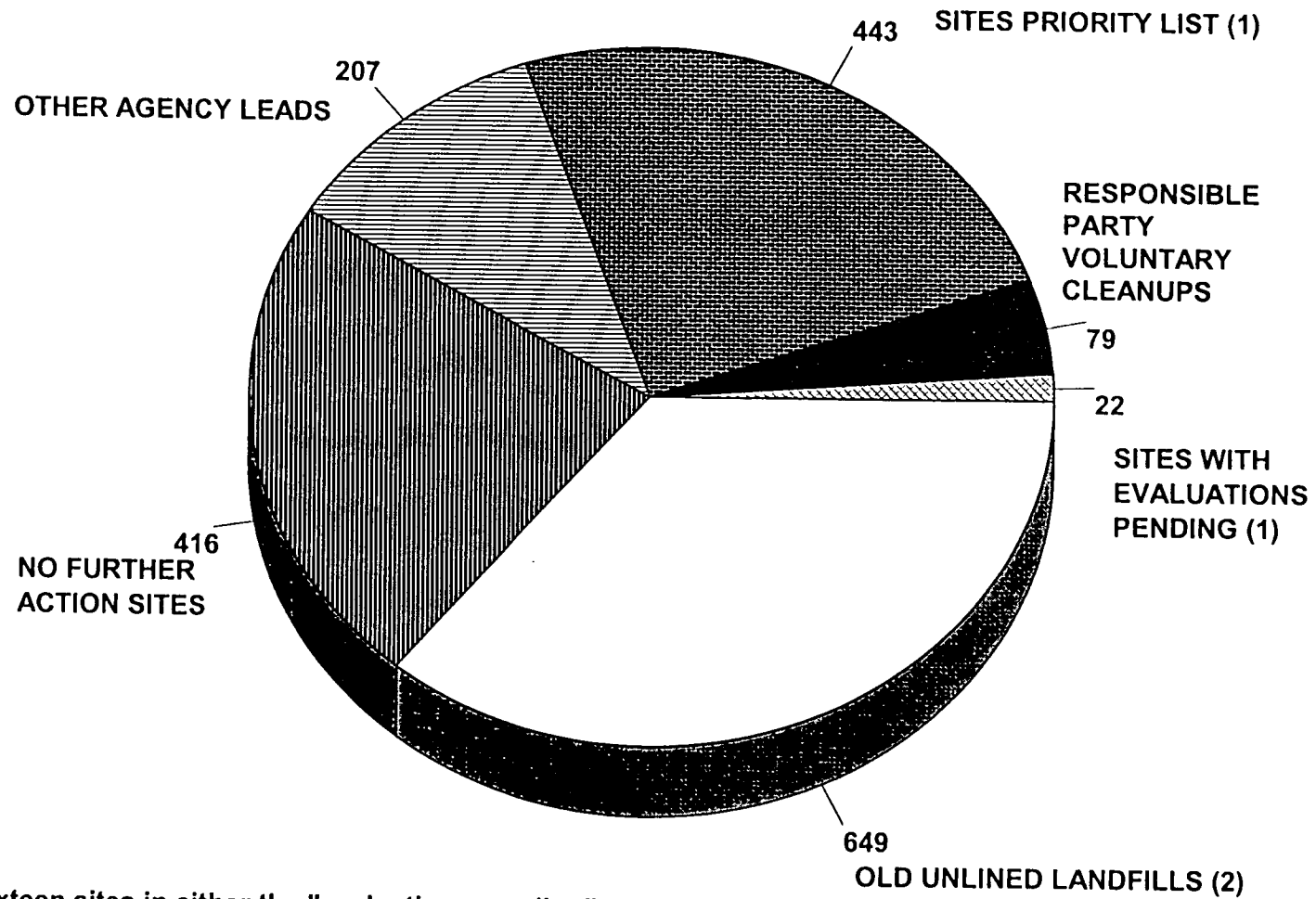
TABLE 1. INACTIVE HAZARDOUS SITES INVENTORY
LIST OF NEW SITES ADDED
OCTOBER 2002 - OCTOBER 2003

ID Number	*Site Name*	*City*	*County*
NONCD0001099	C & L SURPLUS	HAYESVILLE	CLAY
NONCD0001097	COPES-VULCAN, INC	CHARLOTTE	MECKLENBURG
NCN000407480	HORTON IRON & METAL	WILMINGTON	NEW HANOVER
NCD097361018	KIN PROPERTIES ABANDONED DRUMS	CHARLOTTE	MECKLENBURG
NONCD0001095	MOSES CONE MEMORIAL PARK	BLOWING ROCK	WATAUGA
NONCD0001098	NATIONAL TEXTILES, LLP	MORGANTON	BURKE
NONCD0001096	SALISBURY TOWNSHIP SHOPPING CENTER	SALISBURY	ROWAN
NONCD0001100	SIMPSON WELL CONTAMINATION	BELMONT	GASTON
NONCD0001101	STRONGHAVEN WAREHOUSE	MATTHEWS	MECKLENBURG
NCN000407564	WATHA FIRING RANGE	WATHA	PENDER

TABLE 2. INACTIVE HAZARDOUS SITES INVENTORY
SITES RECEIVING NO FURTHER ACTION STATUS
OCTOBER 2002 - OCTOBER 2003

ID Number	*Site Name*	*City*	*County*
NCD003157377	AMERICAN THREAD/SEVIER PLANT	MARION	MCDOWELL
NONCD0001063	ARROWOOD, INC	NORWOOD	STANLY
NONCD0001073	BONE FARM PESTICIDE AREA	NASHVILLE	NASH
NCD083682583	BROYHILL FURNITURE	NEWTON	CATAWBA
NCD986171171	ETHAN ALLEN-SPRUCE PINE	SPRUCE PINE	MITCHELL
NCD986175651	GLEN RAVEN MILLS	KINGS MOUNTAIN	CLEVELAND
NCD980557839	IDEAL BASIC INDS/PLANT MARL QUARRY	CASTLE HAYNE	NEW HANOVER
NCD097724009	LIGGETT AND MYERS COMPANY	DURHAM	DURHAM
NCD085083004	MOORE CO., INC/EASCO HAND TOOLS	GASTONIA	GASTON
NCSFN0406896	MULBERRY ROAD	SHALLOTTE	BRUNSWICK
NCN000407204	PHOENIX MINE	CONCORD	CABARRUS
NCD981477318	SOMERS ROAD DUMP SITE	HAMPTONVILLE	WILKES

FIGURE 1. INACTIVE HAZARDOUS SITES
OCTOBER 2003 INVENTORY CATEGORICAL DISTRIBUTION
(1,816 Sites)



(1) Sixteen sites in either the "evaluations pending" or "sites priority list" categories are also undergoing assessment and/or cleanup with program supervision (but not under an agreement).
(2) Inventory has 730 landfills. Of that number, 81 were already included in the inventory before the addition of the larger catalog of old, unlined landfills. As a result, they fall into other categories.

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD048181218	CAROLINA GALVANIZING CORP.	HWY 221 E	ABERDEEN	MOORE	63.73		
						soil	metals
						groundwater	metals
NONCD0000022	WATTS REGULATOR-DAVIS PROPERTY	OLD BALL PARK ROAD	SPINDALE	RUTHERFORD	59.73		
						groundwater	metals
						soil	metals
						soil	organics
NCD062552153	SAYLES-BILTMORE BLEACHERIES	SWANNANOA RD	ASHEVILLE	BUNCOMBE	57.04		
						groundwater	organics
NCD981864614	ULAH BATTERY/BATTERY PILES	SR 1219	ASHEBORO	RANDOLPH	55.64		
						soil	metals
						soil	acids
NONCD0000056	JAMES LANDFILL	HWY 74 & SR 1369	LAURINBURG	SCOTLAND	54.25		
						surface water	organics
						groundwater	metals
						soil	organics
						soil	metals
NCD087336335	TRIANGLE PACIFIC CORP/IXL DIV.	HWY 168	ELIZABETH CITY	PASQUOTANK	54.00		
						soil	organics
						sediment	organics
						soil	metals
						soil	pesticides
						groundwater	pesticides
						sediment	pesticides
NONCD0001056	LITTLE MOUNTAIN LANDFILL	(SR 1522) LITTLE MNT RD	TRYON	POLK	53.17		
						groundwater	organics
						groundwater	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD003229358	SCM PROCTOR-SILEX/WEAREVER	HAY ST	MOUNT AIRY	SURRY	53.02	surface water	metals
						soil	metals
						sediment	organics
						sediment	metals
						groundwater	metals
NCD000830646	CAROLINA P&L CO. SUTTON STEAM	HWY 421	WILMINGTON	NEW HANOVER	52.85	sediment	metals
NONCD0001080	SOUTHERN METALS RECYCLING, INC	1002 SOUTH FRONT STREET	WILMINGTON	NEW HANOVER	52.56	groundwater	metals
						soil	metals
NCD980729677	KNOB CREEK FLYASH DISPOSAL	SR 1540	BREVARD	TRANSYLVANIA	52.53	soil	metals
NCD986166692	HARWELL ROAD SEPTIC PIT	HARWELL ROAD	GASTONIA	GASTON	52.37	groundwater	organics
NCD003167780	SPRAGUE ELECTRIC COMPANY	HWY 194	LANSING	ASHE	52.33	soil	metals
						groundwater	organics
						groundwater	metals
NCD088563242	MONSANTO COMPANY/ROHM & HAAS	CEDAR CREEK RD	FAYETTEVILLE	CUMBERLAND	51.78	groundwater	organics
						sediment	metals
NCN000407333	TRIAD USED AUTO SALES	1520 ALAMANCE CHURCH RD	GREENSBORO	GUILFORD	51.53	groundwater	metals
						groundwater	organics
						soil	organics
						soil	metals
NCD980558035	HOMINY CREEK LANDFILL	RHODODENDRON PK	ASHEVILLE	BUNCOMBE	51.23	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0001025	TOOMEY PROPERTY	1020 HICKORY GROVE ROAD	SPRINGWOOD	GASTON	51.23	soil groundwater	organics organics
NCD982117590	CUSTOM PROC & MNFCTNG	1110 SURRETT DRIVE	HIGH POINT	GUILFORD	51.04	soil groundwater groundwater	organics metals organics
NONCD0000016	CMC LANDFILL	EAST MAIN STREET	ELKIN	SURRY	51.02	groundwater soil	organics organics
NONCD0001075	TEXFI INDUSTRIES, INC	601 HOFFER DRIVE	FAYETTEVILLE	CUMBERLAND	50.55	soil groundwater	organics organics
NCD093338119	SCM CORP. GLIDDEN COATINGS	3926 GLENWOOD DRIVE	CHARLOTTE	MECKLENBURG	50.29	groundwater	organics
NCD986172518	OLD MOUNT HOLLY ROAD PCE SITE	OLD MT HOLLY RD	CHARLOTTE	MECKLENBURG	50.26	groundwater	organics
NCD980839716	RIVERDALE HOMES/EARL GETTS	404 RIVERDALE DRIVE	DURHAM	DURHAM	50.10	groundwater	pesticides
NCD981750425	BUXTON DUMP	.5 MILES WEST OF BACK RD	BUXTON	DARE	49.81	soil groundwater	organics organics
NCD980558027	POND ROAD LANDFILL 2	POND ROAD	ASHEVILLE	BUNCOMBE	49.79	known/suspected	
NCD003231545	SHERWOOD TREATING CO., INC.	1660 SILAS CREEK PKWAY	WINSTON-SALEM	FORSYTH	49.78	groundwater soil	metals metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD003220969	WHITE FURNITURE CO.	201 EAST CORNER ST	MEBANE	ALAMANCE	49.76	soil	metals
						soil	organics
						groundwater	metals
NONCD0000679	STURGEON CITY PROPERTY	4 COURT STREET	JACKSONVILLE	ONSLOW	49.67	sediment	metals
						groundwater	organics
NCD980558761	GS LABORATORY EQUIPMENT	275 AIKEN RD	ASHEVILLE	BUNCOMBE	49.57	soil	metals
						groundwater	organics
						surface water	organics
						sediment	metals
						sediment	organics
NCD003221462	GARDNER MIRROR CORPORATION	HWY 268 E	NORTH WILKESBORO	WILKES	49.45	known/suspected	
NCD980502991	JACKSONVILLE LANDFILLS	(SEVERAL LOCATIONS)	JACKSONVILLE	ONSLOW	49.36	groundwater	organics
						groundwater	metals
NC0001279710	WOODY WILSON BATTERY/ASHLEY	HWY 211	ASHLEY HEIGHTS	HOKE	49.02	soil	metals
						soil	organics
NCD986171379	NEW HAVEN DRIVE TCE	NEW HAVEN DRIVE	GASTONIA	GASTON	48.98	groundwater	organics
NCD980557987	SWANNANOA LANDFILL	HWY 70 E	SWANNANOA	BUNCOMBE	48.93	soil	organics
						groundwater	organics
NCD000770487	JOHNSON CONTROLS GLOBE BATTERY	OLD GREENSBORO ROAD	WINSTON-SALEM	FORSYTH	48.85	soil	organics
						surface water	metals
						sediment	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCSFN0407074	NC MARITIME MUSEUM	310 FRONT ST	BEAUFORT	CARTERET	48.84		
						sediment	metals
						sediment	organics
						sediment	pesticides
NCD986175636	ASHE PATTERN SHOP (FORMER)	4411 BEATY ROAD	GASTONIA	GASTON	48.82		
						groundwater	organics
NCD980729412	CAROLINA TANK CLEANING COMPANY	HWY 68-4 MI N OF I-40	GREENSBORO	GUILFORD	48.53		
						soil	organics
						soil	metals
NONCD0000085	JONES & PRESNELL STUDIO	433 LAWTON ROAD	CHARLOTTE	MECKLENBURG	48.48		
						groundwater	organics
NCD986175628	LEE'S MOTOR WORKS	BEATY ROAD	GASTONIA	GASTON	48.48		
						surface water	organics
						groundwater	organics
						soil	organics
NCD000623223	MARTIN MANUFACTURING PROPERTIES	E MAIN ST US 17	WILLIAMSTON	MARTIN	48.40		
						groundwater	metals
						groundwater	organics
NCD986186518	OLD ATC REFINERY	801 SURRY STREET	WILMINGTON	NEW HANOVER	48.40		
						sediment	metals
						soil	organics
						groundwater	metals
						soil	metals
NCD042269134	SOUTHERN SCREW/FARLEY METALS	1211 BARKLEY RD	STATESVILLE	IREDELL	48.40		
						groundwater	organics
						groundwater	metals
						soil	metals
						soil	bases
						groundwater	cyanide

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD981474158	SWEETEN CREEK DRUM SITE	115 SWEETEN CREEK ROAD	ASHEVILLE	BUNCOMBE	48.40	soil	metals
NCD041230418	AMP INCORPORATED	3900 REIDSVILLE ROAD	WINSTON-SALEM	FORSYTH	48.35	sediment	cyanide
						soil	cyanide
						surface water	metals
						soil	metals
						soil	organics
						sediment	metals
NCD003216959	UNION CAMP CORPORATION	RAGSDALE RD	JAMESTOWN	GUILFORD	48.27	groundwater	organics
						sediment	metals
						surface water	organics
NCD986188027	CHAMPION LANDFILL #3	SR 1550 I40	CANTON	HAYWOOD	48.25	soil	metals
NCD060291051	HOW ENTERPRISES	TAYLOR STREET	ABERDEEN	MOORE	48.18	known/suspected	
NCD986185411	OLD WESTERN NC FAIRGROUNDS	BTWN US 176 & SOUTHER RR	EAST FLAT ROCK	HENDERSON	48.18	groundwater	organics
						groundwater	metals
						soil	pesticides
						soil	organics
NCD980600449	SED, INC. RADAR ROAD	500 RADAR ROAD	GREENSBORO	GUILFORD	48.18	soil	organics
NCD003163888	HENREDON FURNITURE	HENREDON RD	MORGANTON	BURKE	48.17	soil	organics
						groundwater	organics
NCD045924032	WEST POINT PEPPERELL	CHESTNUT ST EXTN	LUMBERTON	ROBESON	48.02	soil	organics
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD980558019	ELK MOUNTAIN LANDFILL	ELK MOUNTAIN ROAD	ASHEVILLE	BUNCOMBE	47.96	soil soil soil	pesticides organics metals
NCD024477556	WINSTON CONTAINER COMPANY	4732 MORRIS FIELD RD	CHARLOTTE	MECKLENBURG	47.89	soil	organics
NONCD0001094	ALLISON MANUFACTURING CO	930 OLD CHARLOTTE ROAD	ALBEMARLE	STANLY	47.87	groundwater soil	organics organics
NCD008839276	MONEY-WORTH, INC	US 70 E	SWANNANOA	BUNCOMBE	47.87	known/suspected	
NONCD0000023	CAROLINA P&L CO	CUMBERLAND RD & OWEN DR	FAYETTEVILLE	CUMBERLAND	47.78	surface water groundwater soil	organics organics organics
NONCD0001081	ALCOA-NARROWS POWERHOUSE	PINE STREET	BADIN	MONTGOMERY	47.77	soil soil	metals organics
NCD980848840	SCOTT'S CREEK BATTERY SITE	402 HOWELL ROAD	NEW BERN	CRAVEN	47.75	soil	metals
NCD980557870	CALDWELL COUNTY ABANDONED	NC HWY 90	LENOIR	CALDWELL	47.69	groundwater groundwater	organics metals
NCD990883001	MONARCH FURNITURE CORPORATION	300 SCIENTIFIC ST	JAMESTOWN	GUILFORD	47.40	soil groundwater	metals metals
NCD986180917	SPANN PROPERTY	US HIGHWAY 25	HENDERSONVILLE	HENDERSON	47.26	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0001029	R & D LAMINATORS INC	HOLLOMAN ROAD (SR 1187)	AHOSKIE	HERTFORD	47.21	groundwater	organics
NCD024895864	STEWART-WARNER	2941 INDIANA AVE	WINSTON-SALEM	FORSYTH	47.19	soil	organics
NCD980557557	ASHEBORO LANDFILL	OFF OF OLD US 64	ASHEBORO	RANDOLPH	47.10	soil	metals
NCD986176030	RHODERA DRIVE WELLS	LAKEWOOD & RHODERA	STALLINGS	UNION	46.98	groundwater soil	organics metals
NCD044444735	CROMPTON & KNOWLES CORP.	SPENCER MT RD	LOWELL	GASTON	46.97	soil soil	organics metals
NCD986231967	TOM SADLER ROAD WELLS	TOM SADLER RD	CHARLOTTE	MECKLENBURG	46.92	groundwater soil groundwater	organics metals metals
NCD003183571	WINTERVILLE MACHINE WORKS, INC.	209 S MILL ST	WINTERVILLE	PITT	46.90	soil	metals
NCN000407188	US 1-15/501 ABERDEEN	US 1 - US 15/501	ABERDEEN	MOORE	46.88	soil groundwater	metals organics
NONCD0000081	TRITON, INC	1610 SOUTH WARD BLVD	WILSON	WILSON	46.84	groundwater groundwater	metals organics
NCD000830653	CAROLINA P&L CO. ROXBORO STEAM	SR 1377	ROXBORO	PERSON	46.79	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0001001	CLOSED CITY OF HENDERSON LDFL	NC 39 & ST. ANDREWS	HENDERSON	VANCE	46.74		
						groundwater	organics
						groundwater	metals
NCD003233673	HOOVER REPAIR SHOP	461 N SOUTH STREET SR1669	MT AIRY	SURRY	46.69		
						soil	cyanide
						soil	metals
						groundwater	cyanide
						groundwater	metals
NCD980518211	IRT/IBM CORPORATION	4101 S I-85	CHARLOTTE	MECKLENBURG	46.67		
						groundwater	metals
NCD072012354	SINGER CO/FURNITURE DIV	STATE ROAD 1175	CHOCOWINITY	BEAUFORT	46.57		
						groundwater	organics
						groundwater	pesticides
						groundwater	metals
						soil	organics
						sediment	organics
NCD041519364	TEXASGULF CHEMICALS COMPANY	HWY 306 NORTH	AURORA	BEAUFORT	46.56		
						groundwater	organics
						surface water	metals
						sediment	organics
						groundwater	pesticides
						sediment	metals
						soil	pesticides
						soil	organics
NCD003184249	UNION CARBIDE CORP/EVEREADY	264 BYPASS-EVANS ST EXTN	GREENVILLE	PITT	46.52		
						groundwater	metals
						groundwater	organics
NC5210022906	USA RESERVE XVIII AIRBORNE CORPS	405 FISHER ST	MOREHEAD CITY	CARTERET	46.51		
						known/suspected	
NONCD0001049	LEXINGTON FURNITURE IND. PLNT #7	178 LFI COMPLEX LANE	LEXINGTON	DAVIDSON	46.43		
						groundwater	metals
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD980844336	UNION CARBIDE BATTERY	5400 HOVIS ROAD	CHARLOTTE	MECKLENBURG	46.30	soil surface water	metals organics
NCSFN0406906	OLD STAKE ROAD	OLD STAKE ROAD	CHADBOURNE	COLUMBUS	46.17	soil groundwater	metals metals
NCD003149663	RADIATOR SPECIALTY COMPANY	1900 WILKINSON BLVD	CHARLOTTE	MECKLENBURG	46.16	sediment soil soil groundwater sediment	organics metals organics organics metals
NCD049772023	H & S PROCESSORS, INC.	NC HIGHWAY 150 WEST	LINCOLNTON	LINCOLN	46.11	groundwater	organics
NCD003216462	UNION CARBIDE CORP/EVEREADY	800 ALBEMARLE RD	ASHEBORO	RANDOLPH	45.97	groundwater soil	organics organics
NCD003467099	CONE MILLS CORP/GRANITE FINISHING	OLD HWY 70	HAW RIVER	ALAMANCE	45.72	groundwater soil	organics metals
NCD003213030	DOUGLAS BATTERY MANUFACTURING	500 BATTERY DR	WINSTON-SALEM	FORSYTH	45.69	groundwater	metals
NCD144192606	PARKER-ZENITH	TAYLOR STREET	ABERDEEN	MOORE	45.67	groundwater	organics
NONCD0001074	OLD FORD BLDG	FIFTH ST	TABOR CITY	COLUMBUS	45.62	soil groundwater soil	organics metals metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD981015746	CAROLINA ALUMINUM/HERBERT TAYLOR	SR 1125	ROPER	WASHINGTON	45.33	soil	organics
NCD003167988	MARANTZ PIANO CO INC/ANEVKA, INC	HWY 64/70 E	MORGANTON	BURKE	45.30	groundwater soil groundwater soil	metals organics organics metals
NCD024600579	SUPERIOR PRODUCTS COMPANY	HWY 70A	GREENSBORO	GUILFORD	45.25	soil	metals
NCD981473150	CHERRY MT STREET DRUM	602 CHERRY MOUNTAIN	FOREST CITY	RUTHERFORD	45.07	soil	metals
NONCD0001022	GIBBS ELECTROPLATING-OLD LOC.	2229 N DAVIDSON	CHARLOTTE	MECKLENBURG	45.07	groundwater soil groundwater soil	organics organics metals metals
NCD055359079	MASONITE CORP. FIBERBOARD DIV.	HWY 64 & SR 1306	SPRING HOPE	NASH	45.02	groundwater soil sediment soil sediment	metals metals organics organics metals
NONCD0000050	HWY 268 MIRROR WASTE DUMP	HWY 268	NORTH WILKESBORO	WILKES	44.95	soil	metals
NONCD0001092	CMI WWTP (PARCEL1)	HWY 268	ELKIN	SURRY	44.85	groundwater groundwater soil sediment	organics metals organics organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD980728745	OSHIELDS FLY ASH	SR 1510	BREVARD	TRANSYLVANIA	44.80	known/suspected	
NCD066327313	FINETEX, INC.	I85 HACKETT ST EXIT	SPENCER	ROWAN	44.77	groundwater soil	organics organics
NONCD0001011	JUNG CORPORATION	718 INDUSTRIAL PARK AVE	ASHEBORO	RANDOLPH	44.77	groundwater	organics
NCD986228054	KANNAPOLIS PCE SPILL	ENOCHVILLE ROAD	KANNAPOLIS	CABARRUS	44.71	groundwater	organics
NCD980502983	HOPE MILLS LANDFILL	SR 1003/WIRE ROAD	HOPE MILLS	CUMBERLAND	44.50	groundwater	metals
NCD981468622	FORK SWAMP/GRADY WHITE BOAT	SR 1725	AYDEN	PITT	44.49	soil	organics
NCD093334969	S & S METALS RECYCLING COMPANY	SHORTCUT ROAD/SR 2455	GOLD HILL	CABARRUS	44.49	soil surface water	metals metals
NONCD0000060	WATTS REGULATOR-GENERAL AIDES	WITHROW ROAD	FOREST CITY	RUTHERFORD	44.49	soil	metals
NONCD0001079	LES MYERS PARK	LAWNDALE AVENUE EXT.	CONCORD	CABARRUS	44.42	soil	metals
NCD981928088	TEXFI INDUSTRIES, INC/NEW BERN	SR 1317/BOSCH STREET	NEW BERN	CRAVEN	44.30	groundwater	organics
NC0000195743	JIMMY GREEN METALS	BARN HILL CHURCH ROAD	NASHVILLE	NASH	44.29	soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD042891663	MITCHELL ENGR CO/CECO BLDG. DIV.	BYPASS 301	ROCKY MOUNT	NASH	44.27	groundwater soil	organics metals
NCD084167444	STANADYNE, INC/DIESEL SYSTEMS	405 WHITE ST	JACKSONVILLE	ONSLOW	44.22	soil soil	metals organics
NONCD0001034	GEORGE STREET PESTICIDE	SOUTH GEORGE STREET	GOLDSBORO	WAYNE	44.16	groundwater soil	pesticides pesticides
NONCD0000038	AYCOCK PROPERTY	SR 1162 & 1103	WILSON	WILSON	43.92	groundwater	organics
NCN000407206	SHULIMSON BROTHERS SCRAP YARD	MEADOW ROAD	ASHEVILLE	BUNCOMBE	43.79	soil groundwater groundwater	metals organics metals
NCD003164464	UNIROYAL INC/UNIROYAL CHEMICAL	214 W RUBY AVE	GASTONIA	GASTON	43.79	soil	organics
NCD003149556	CTS OF ASHEVILLE, INC.	MILLS GAP RD	SKYLAND	BUNCOMBE	43.44	surface water surface water soil soil	organics metals metals organics
NCN000407447	ABERDEEN CONTAMINATED	SR 211	ABERDEEN	MOORE	43.39	groundwater	organics
NCD053487765	STRATFORD METAL FINISHINGS, INC.	807 S MARSHALL ST	WINSTON-SALEM	FORSYTH	43.38	soil	metals
NONCD0000043	GREAT LAKES CARBON CORPORATION	307 JAMESTOWN ROAD	MORGANTON	BURKE	43.36	groundwater groundwater	organics metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD082363102	HELENA CHEMICAL COMPANY	HARRY MALLEY RD	LAURINBURG	SCOTLAND	43.32	groundwater soil	pesticides metals
NCD060306727	RICHARDS WC COMPANY, INC.	101 EAST MAPLE STREET	ABERDEEN	MOORE	43.31	soil soil	organics metals
NCD986211274	STONEY FORK CREEK DRUM DUMP	MT. ZION ROAD	DEEP GAP	WILKES	43.31	known/suspected	
NCD980557946	FAIRVIEW LANDFILL	FAIRVIEW ROAD	FAIRVIEW	BUNCOMBE	43.19	known/suspected	
NONCD0001095	MOSES CONE MEMORIAL PARK	BLUE RIDGE PKWY	BLOWING ROCK	WATAUGA	43.19	soil	metals
NCD981022072	BETTIS PROPERTY	1/2 MI. E OF BETTIS RD	EARL	CLEVELAND	43.16	known/suspected	
NCD980557805	KERR MCGEE CORPORATION	NAVASSA RD	NAVASSA	BRUNSWICK	43.11	soil	organics
NCD986197374	OLD RANDLEMAN TOWN DUMP	WALKER MILL ROAD /SR 1961	RANDLEMAN	RANDOLPH	43.05	groundwater soil	metals organics
NCSFN0406953	G&B/FARMER PROPERTY	DOUG HILL FARM RD	SCOTLAND NECK	HALIFAX	43.04	soil soil	organics metals
NONCD0000027	MEADOWVIEW ROAD	MEADOWVIEW ROAD	GREENSBORO	GUILFORD	43.04	groundwater	organics
NCD986172617	FORBES ROAD WELLS	501 FORBES ROAD	GASTONIA	GASTON	43.02	groundwater surface water	organics organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD048401087	HOOKER FURNITURE	1212 THROWER ROAD	PLEASANT GARDEN	GUILFORD	43.00	groundwater	organics
						soil	organics
						groundwater	metals
NCD003230836	DUKE REFINING CORPORATION	2020 JARRELL STREET	HIGH POINT	GUILFORD	42.87	groundwater	organics
						sediment	organics
						soil	organics
NONCD0000025	RANGE ROAD BURN SITE	RANGE ROAD	BUTNER	GRANVILLE	42.80	soil	organics
						soil	metals
NONCD0001090	OLD MILL BLDG	301 FOURTH AVE EAST	HENDERSONVILLE	HENDERSON	42.75	groundwater	organics
NCN000407197	LEARY BROTHERS STORAGE (FORMER)	VIRGINIA & BROAD STREET	EDENTON	CHOWAN	42.74	groundwater	organics
						groundwater	metals
						soil	organics
						soil	metals
NONCD0001016	ROYSTER-CLARK FERTILIZER PLANT	SR 1321	OAK CITY	MARTIN	42.74	soil	organics
						groundwater	pesticides
						groundwater	inorganics
NCD000615872	AMP INCORPORATED	1260 SHANNON-BRADLEY RD	GASTONIA	GASTON	42.72	groundwater	metals
						soil	metals
						soil	organics
NCD130708126	CONSOLIDATED WAREHOUSE	8300 MOORES CHAPEL RD	CHARLOTTE	MECKLENBURG	42.58	soil	organics
						groundwater	organics
						surface water	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD003198967	GENERAL ELECTRIC CO/CAROLINA	900 N GEORGE ST	GOLDSBORO	WAYNE	42.53	groundwater	metals
NCD045924339	ACME UNITED CORPORATION	HWY 117	FREMONT	WAYNE	42.36	groundwater	metals
NCSFN0407140	CARDINAL CONTAINER SERVICES	138 WALSER ROAD	LEXINGTON	DAVIDSON	42.30	groundwater groundwater	metals organics
NCD000830612	CAROLINA P&L CO. MAYO STEAM	HWY 501	ROXBORO	PERSON	42.13	soil	metals
NC0002374445	GASTONIA INDUSTRIAL TRUCK	HEMPHILL ROAD	GASTONIA	GASTON	42.08	groundwater	organics
NCD043711977	CHEMICAL LEAMAN TANK LINES, INC.	6600 WEST MARKET STREET	GREENSBORO	GUILFORD	42.05	groundwater	organics
NONCD0001072	J & C DYEING	1000 WEST GROVER STREET	SHELBY	CLEVELAND	41.98	groundwater soil groundwater	metals metals organics
NCD002571438	ABC ENGRAVERS	724 NORTH I-85	CHARLOTTE	MECKLENBURG	41.91	groundwater soil groundwater	organics metals metals
NCD980557698	GREENVILLE CITY LANDFILL	FIFTH STREET & CEMETERY	GREENVILLE	PITT	41.86	soil	metals
NCD981932023	TARBORO-EDGECOMBE AIRPORT	HWY 44	TARBORO	EDGECOMBE	41.81	soil	organics
NCD003155587	SCOTT AVIATION OF MONROE/TOOL	309 W. CROWELL ST	MONROE	UNION	41.73	soil groundwater	metals organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD981031578	RAINBOW DRIVE BATTERY	SR 1646	KANNAPOLIS	CABARRUS	41.66	soil	metals
NCD991278730	SQUIBB E R & SONS	FLOWERS RD	KENLY	JOHNSTON	41.61	groundwater	organics
NCD986166734	OLD BEAUFORT CO. LANDFILL	FLANDERS FILTERS ROAD	WASHINGTON	BEAUFORT	41.57	groundwater	metals
NCD000830620	CAROLINA P&L CO. WEATHERSPOON	74 EAST	LUMBERTON	ROBESON	41.55	known/suspected	
NONCD0000073	H. M. WADE FURNITURE	SOUTH GRAHAM STREET	CHARLOTTE	MECKLENBURG	41.50	groundwater	organics
NCD002972966	REA MAGNET WIRE COMPANY	OLD LAUREL HILL CHURCH	LAURINBURG	SCOTLAND	41.49	surface water soil	organics organics
NCD982124646	GREGSON FUNITURE INDUSTRIES	206 E FRAIZER AVENUE	LIBERTY	RANDOLPH	41.48	surface water groundwater soil soil	metals metals metals organics
NCD003195161	CORNING GLASS WORKS	3900 ELECTRONICS DRIVE	RALEIGH	WAKE	41.47	known/suspected	
NC0002178580	VC CHEMICAL-ALMONT WORKS	US 421 NORTH	WILMINGTON	NEW HANOVER	41.47	soil	metals
NCD980557854	FMC/NIAGARA PESTICIDES	OLD ST HWY 11 NORTH	AYDEN	PITT	41.44	soil soil	pesticides organics
NCD980557771	CHARLOTTE CITY DUMP	HWY 49 - YORK ROAD	CHARLOTTE	MECKLENBURG	41.34	groundwater	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD991278755	MARTIN'S BATTERY SALVAGE, INC.	ASHLAND RD	KANNAPOLIS	CABARRUS	41.22	soil	metals
NONCD0000047	MEADS AIRFIELD PESTICIDES	SR 1100	WEEKSVILLE	PASQUOTANK	41.22	soil	pesticides
NCN000407241	CHADBOURN BATTERY	US 76/74 & NC 410	CHADBOURN	COLUMBUS	41.21	soil	metals
NCD986171445	BENFIELD CHEMICALS	OLD CANTON CLYDE HWY	CANTON	HAYWOOD	41.20	soil soil soil	metals organics pesticides
NONCD0001099	C & L SURPLUS	1868 HWY 64 W	HAYESVILLE	CLAY	41.20	sediment	metals
NCD980848782	MADISON COUNTY CYANIDE SITE	RT 2/HWY 63	LEICESTER	MADISON	41.20	known/suspected	
NCD062664883	REINCO CHEMICAL COMPANY	EAST 11 ST	ROANOKE RAPIDS	HALIFAX	41.20	groundwater soil	organics organics
NCD024817827	HENREDON FURNITURE	ALTAPASS ROAD	SPRUCE PINE	MITCHELL	41.19	soil soil	metals organics
NCD981016280	DURHAM ANIMAL CLINIC	4306 ROXBORO ROAD	DURHAM	DURHAM	41.13	groundwater	organics
NCD054283189	HOOVER MACHINE SHOP	RATCHFORD ROAD	GASTONIA	GASTON	41.09	groundwater	organics
NCD001704980	WILMINGTON BRANCH/BORDEN/SMITH	NAVASSA ROAD	NAVASSA	BRUNSWICK	40.81	soil groundwater	organics organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD062566047	FASCO CONTROLS CORPORATION	SR 1926	SHELBY	CLEVELAND	40.78	soil soil	organics metals
NONCD0001077	CATAWISSA LUMBER CO	301 LOCUST ST	WEST JEFFERSON	ASHE	40.72	groundwater	organics
NONCD0001040	DOMESTIC LAUNDRY/WASHBURN	801 S MCDOWELL STREET	CHARLOTTE	MECKLENBURG	40.71	groundwater	organics
NCD075570820	PLYMOUTH WOOD TREATING COMPANY	N HWY 45	PLYMOUTH	WASHINGTON	40.68	groundwater	metals
NCD000605097	STATESVILLE ROAD LANDFILL	HWY 21 STATESVILLE ROAD	CHARLOTTE	MECKLENBURG	40.61	soil	metals
NCD982119463	DAYCO LANDFILL CRYME COVE ROAD	SR 1134	WAYNESVILLE	HAYWOOD	40.52	soil	organics
NCD981927908	KIDD LANE BATTERY DISPOSAL	3607 KIDD LANE	CHARLOTTE	MECKLENBURG	40.49	soil	metals
NCD024462327	ACADEMY STEEL DRUM	3213 RIDGE RD	MATTHEWS	MECKLENBURG	40.48	surface water surface water soil soil	metals organics organics metals
NC0000998344	HICKORY GROVE ROAD TCE	HICKORY GROVE ROAD	MCADENVILLE	GASTON	40.46	groundwater	organics
NCD003235066	NEW AGE FURNITURE CO/MILLER TOOL	PROSPECT STREET	LEXINGTON	DAVIDSON	40.42	known/suspected	
NCD082362989	TUNGSTEN QUEEN MINE/ATLAS MINE	SR 1348	TOWNSVILLE	VANCE	40.34	soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NONCD0000031	INDEPENDENCE MALL OUTPARCEL	OLEANDER & FORDHAM RDS	WILMINGTON	NEW HANOVER	40.19	groundwater	organics
NONCD0001068	GENCORP PRINTWORLD INC	2011 ROCKY RIVER ROAD	MONROE	UNION	40.18	soil groundwater groundwater	metals metals organics
NCD980838379	ROWE CORP PROPERTY/BOULIGNY	433 W MOREHEAD ST	CHARLOTTE	MECKLENBURG	40.18	groundwater soil	metals metals
NCD986172492	CRESTLINE CONTAMINATED WELLS	ROUTE 211	ABERDEEN	MOORE	40.12	groundwater groundwater	organics metals
NC0000183103	CHEMICAL CARTAGE COMPANY	141 OLD FAYETTEVILLE RD.	LELAND	BRUNSWICK	40.11	soil	organics
NCD093334894	BURLINGTON INDUSTRIES, INC.	PHOENIX STREET	STATESVILLE	IREDELL	40.03	soil groundwater	metals organics
NCD003158094	GLEN RAVEN MILLS	EAST MAIN STREET	BURNSVILLE	YANCEY	40.02	soil	metals
NCD986166379	PILOT MOUNTAIN TIRE FIRE	DAVENPORT ROAD	PILOT MOUNTAIN	SURRY	39.94	known/suspected	
NCSFN0406911	CAROLINA ASSOCIATED MILL	766 HWY 10 W	NEWTON	CATAWBA	39.88	soil	metals
NONCD0000012	WHITE'S GRAVEL PIT	1515 HWY 49 SOUTH	CONCORD	CABARRUS	39.83	soil	metals
NCD986223170	MCBESS INDUSTRIES	OLD HWY 321	HIGH SHOALS	GASTON	39.75	sediment soil	metals organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD980839757	INDIAN GRAVE GAP DRUM DISPOSAL	APPROX 2 MLS N OF SR 1513	LENOIR	CALDWELL	39.69	surface water	metals
NCD986172500	MCLEAN BROTHERS FARM	SR 1415	WAGRAM	SCOTLAND	39.67	soil soil	pesticides organics
NCD048958615	KELLY-SPRINGFIELD TIRE	NAVASSA RD	FAYETTEVILLE	CUMBERLAND	39.64	soil	organics
NCD986170694	POULOS GROUNDWATER	SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	39.63	groundwater	organics
NCD986188498	DURA-BUILT ENGINES CO	OFF HWY 55	COATS	HARNETT	39.57	sediment sediment	organics metals
NONCD0001041	MITCHELL & BECKER	1928 SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	39.56	soil groundwater groundwater	metals organics metals
NC0001402213	ELLIS JUNK YARD	NEEDMORE DRIVE	HAYESVILLE	CLAY	39.52	soil soil	metals organics
NCD980502827	BROWN #1	SR 1504 VANDERBILT RD	PISGAH FOREST	TRANSYLVANIA	39.30	soil	metals
NCD079066833	LENOIR REFINING COMPANY	263 PENNTON AVE NW	LENOIR	CALDWELL	39.26	soil	organics
NCD003216397	HIGHLAND INDUSTRIES/BURLINGTON	215 DRUMMOND ST/SR 2089	KERNERSVILLE	FORSYTH	39.25	groundwater soil	organics organics

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ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD003154960	FLEMING LABORATORIES	2205 THRIFT ROAD	CHARLOTTE	MECKLENBURG	39.24	groundwater soil	organics organics
NCD119168813	ANILOX ROLL COMPANY	4840 WALLACE NEAL RD	CHARLOTTE	MECKLENBURG	39.13	soil	metals
NCD980557649	GOLDSBORO MUNICIPAL LANDFILL	117 BYPASS	GOLDSBORO	WAYNE	39.01	known/suspected	
NCD033978396	ATEC INDUSTRIES	PERKINS DRIVE	ROXBORO	PERSON	38.92	soil groundwater groundwater soil	metals metals organics organics
NCD980557607	GLASS, EH COUNTY LANDFILL	1103 NEALTOWN ROAD	GREENSBORO	GUILFORD	38.91	known/suspected	
NCD986215499	PARKER INDUSTRIES	4867 RHONEY ROAD	CONNELLY SPRINGS	BURKE	38.88	groundwater	organics
NCD089914311	MILLER BREWING CO/CONT DIV	1900 BARNES ST	REIDSVILLE	ROCKINGHAM	38.85	soil groundwater	pesticides pesticides
NONCD0000079	OLD PINEHURST HOTEL CLEANERS	MCCASKILL ROAD	PINEHURST	MOORE	38.79	groundwater	organics
NONCD0000001	STANLY NEWS & PRESS	237 W NORTH STREET	ALBEMARLE	STANLY	38.78	soil	metals
NCD003520301	OVERCASH MACHINE SHOP, INC.	865 CONNOR STREET	STATESVILLE	IREDELL	38.69	known/suspected	
NCD083678631	SINCLAIR AND VALENTINE CO.	515 S TURNER AVE	CHARLOTTE	MECKLENBURG	38.69	soil soil	metals organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0000083	CHEESMAN PROPERTY	3251 GREGORY ROAD	ROCKWELL	CABARRUS	38.68	known/suspected	
NCD105797922	TECHNIBILT/DIV OF WHITTAKER	EAST PEACE ST	NEWTON	CATAWBA	38.61	soil soil	organics metals
NONCD0001018	HWY 49 BATTERY DUMP	NC HIGHWAY 49	CHARLOTTE	MECKLENBURG	38.47	soil groundwater	metals metals
NCD980557623	UNIVERSITY OF NC/ARPT WASTE DISP	AIRPORT RD	CHAPEL HILL	ORANGE	38.47	groundwater soil	organics organics
NONCD0000015	CENTRAL TRANSPORT COMPANY	215 SAMPSON ST	WILMINGTON	NEW HANOVER	38.45	surface water	metals
NONCD0000044	CHEMICAL AND SOLVENTS, INC.	2804 PATTERSON STREET	GREENSBORO	GUILFORD	38.45	soil	organics
NCD986190239	CHEROKEE OIL	925 SOUTH SUMMIT AVE	CHARLOTTE	MECKLENBURG	38.45	soil	metals
NCD081428104	SUN CHEM CORPORATION/GPI DIV	2400 0LD LEXINGTON ROAD	WINSTON-SALEM	FORSYTH	38.41	soil soil	metals organics
NCD052553641	WEYERHAEUSER CO/LEWISTON	HWY 308 W	LEWISTON	BERTIE	38.38	soil	metals
NCD980557615	UNIVERSITY OF NC/OLD SANITARY	AIRPORT ROAD	CHAPEL HILL	ORANGE	38.25	groundwater	organics
NCD004520136	EATON CORPORATION	ROUTE 501 SOUTH	ROXBORO	PERSON	38.14	groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD001871854	FRUEHAUF TRAILER CORPORATION	310 DALTON	CHARLOTTE	MECKLENBURG	38.12	groundwater	organics
NONCD0000055	GLISSON ENTERPRISES	HWY 903	GREENVILLE	PITT	38.12	known/suspected	
NONCD0001076	SOUTHSIDE INVESTMENTS LLC	2222 SOUTH BLVD	CHARLOTTE	MECKLENBURG	38.05	soil groundwater groundwater soil	organics metals organics metals
NONCD0000003	VAN WATERS & ROGERS	ATANDO INDUSTRIAL PARK	CHARLOTTE	MECKLENBURG	38.05	groundwater soil	organics organics
NONCD0000030	COLLINS AND AIKMAN	327 EAST ELM ST.	GRAHAM	ALAMANCE	38.04	groundwater	organics
NCD980844732	CLAYTON BALL FIELD	SR 1709	CLAYTON	JOHNSTON	37.98	soil	pesticides
NCD980557953	FISHBURNE LANDFILL	AIRPORT ROAD	FLETCHER	BUNCOMBE	37.98	groundwater	organics
NCD980503148	SOUTHCHEM LANDFILL	750 EAST MARKHAM AVE	DURHAM	DURHAM	37.98	surface water surface water soil sediment	organics pesticides pesticides pesticides
NONCD0001064	GUILFORD MILLS PLANT	200 DICKENS ROAD	FUQUAY-VARINA	WAKE	37.89	groundwater	organics
NCD980559983	PPG IND., INC./WKS 52	WASHBURN SWITCH ROAD	SHELBY	CLEVELAND	37.89	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD003148889	CHAMPION INTERNATIONAL/CANTON	NEWFOUND STREET	CANTON	HAYWOOD	37.79	groundwater	organics
NCD053010724	ICI - AMERICAS, INC.	2130 N TRYON	CHARLOTTE	MECKLENBURG	37.67	known/suspected	
NCD052813250	AMERICAN ENKA COMPANY/BASF	US 19 & 23 WEST	ENKA	BUNCOMBE	37.65	soil soil	metals organics
NONCD0001091	WEST MOREHEAD ST PESTICIDE	147 W MOREHEAD ST	CHARLOTTE	MECKLENBURG	37.62	groundwater	pesticides
NCD986171270	HESTA CARILLON PROJECT	WEST TRADE STREET	CHARLOTTE	MECKLENBURG	37.61	groundwater	organics
NONCD0000074	TEXTILE CHEMICAL FACILITY	GRAHAM STREET	CHARLOTTE	MECKLENBURG	37.60	groundwater	organics
NONCD0000024	GAITHER TRANSOU PROPERTY	1202 GUILFORD COLLEGE RD	GREENSBORO	GUILFORD	37.52	soil soil	organics metals
NCD062548995	QUORUM KNITTING	REEMS CREEK RD	WEAVERVILLE	BUNCOMBE	37.35	soil	organics
NCD981928021	HOLLINGSWORTH PROPERTY	BROADFOOT AVE & CLARK ST	FAYETTEVILLE	CUMBERLAND	37.34	soil	pesticides
NCD986171338	PEELE CO. PESTICIDE DISPOSAL	NC 42 EAST	CLAYTON	JOHNSTON	37.13	soil soil	metals pesticides
NCD075563932	ESB INC/EXIDE CORPORATION	2510 NORTH BOULEVARD	RALEIGH	WAKE	37.09	soil	metals

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ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0000057	WATTS, LEVI PROPERTY	103 FAIRBLUFF ROAD	TABOR CITY	COLUMBUS	37.09	known/suspected	
NCD980503098	PFIZER INC/SKATE STADIUM	4500 BLOCK OF HIGH POINT	GREENSBORO	GUILFORD	36.93	known/suspected	
NCD986166759	WILSON SEPTIC PITS	SR 1131	HICKORY	CATAWBA	36.90	soil soil	metals organics
NCD067428821	SIEMENS-ALLIS, INC/SWITCHGEAR DIV	5000 WOMACK ROAD	SANFORD	LEE	36.86	groundwater sediment	metals organics
NCD981022288	C&T REFINERY	4800 SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	36.80	soil	organics
NCD980557789	RICHMOND COUNTY LANDFILL	MIZDAH ROAD SR 1992	ROCKINGHAM	RICHMOND	36.64	known/suspected	
NCD003196847	NATIONAL SPINNING COMPANY	WEST 3RD STREET	WASHINGTON	BEAUFORT	36.61	groundwater	organics
NCD981929813	CARBONTON ROAD DRUM SITE	2816 CARBONTON ROAD	SANFORD	LEE	36.60	soil	metals
NCD044447639	CROWN CENTRAL PETROLEUM CORP.	7720 MOUNT HOLLY ROAD	PAW CREEK	MECKLENBURG	36.59	groundwater soil	organics organics
NONCD0000076	NC SALVAGE CO.	HWY 117 SOUTH	GOLDSBORO	WAYNE	36.38	soil	metals
NCD986188001	CHAMPION INTERNATIONAL LANDFILL #1	SR 1571 & 1573	CANTON	HAYWOOD	36.35	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD000830919	CAROLINA P&L CO. CAPE FEAR STM	SR 1916	MONCURE	CHATHAM	36.33	groundwater	metals
NCD980712038	SED, INC. SWING COURT	SWING COURT	GREENSBORO	GUILFORD	36.30	known/suspected	
NCD991279118	MEREDITH/BURDA, INC.	ST JAMES CHURCH RD	NEWTON	CATAWBA	36.12	soil	metals
NONCD0001009	SINGER PLANT #2	VIRGINIA STREET	LENOIR	CALDWELL	36.09	soil	organics
NCD986188019	CHAMPION LANDFILL #2	SR 1539	CANTON	HAYWOOD	36.04	soil	organics
NCD981015886	CAROLINA PRODUCTION FINISHING	105 FAIRVIEW RD	ASHEVILLE	BUNCOMBE	35.86	groundwater	organics
NCD981021702	CAMP, LEONARD PROPERTY	SR 2226	EARL	CLEVELAND	35.79	sediment	organics
NCD980557912	GROVE STONE LANDFILL	GROVE STONE ROAD	BLACK MOUNTAIN	BUNCOMBE	35.55	known/suspected	
NCD070619911	TELEDYNE ALLVAC MONROE PLANT	ASHECRAFT AVE	MONROE	UNION	35.37	soil	metals
NONCD0001028	GURLEY DRIVE LANDFILL	292 GURLEY DRIVE	CONCORD	CABARRUS	35.30	known/suspected	
NCD067437400	GULF OIL CORPORATION	SR 2813	MCLEANSVILLE	GUILFORD	35.22	surface water	metals
NCD003216413	RALEIGH ROAD FURNITURE CORP.	802 WEST CENTER ROAD	LEXINGTON	DAVIDSON	35.22	known/suspected	

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ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD044515211	HAYES-ALBION	3760 KIMWELL DR	WINSTON-SALEM	FORSYTH	35.17	soil	metals
NONCD0000006	LITTLEFIELD LANDFILL	NC 11 SOUTH	AYDEN	PITT	35.16	known/suspected	
NCD072028251	TORPEDO WIRE & STRIP, INC.	INSTRUMENT DR	ROCKY MOUNT	NASH	35.10	soil	metals
NCD980559389	TARBORO LANDFILL	BAKER STREET EXTN-SR 1518	TARBORO	EDGECOMBE	35.04	known/suspected	
NCD108702606	HARTSOE BATTERY	2513 LINA AVE	KANNAPOLIS	ROWAN	35.01	soil	metals
NCD003183480	UNION CAMP CORPORATION	524 BROGDEN RD	SMITHFIELD	JOHNSTON	35.01	known/suspected	
NONCD0001082	CMI FLYASH DISPOSAL (PARCEL 2)	HWY 268	ELKIN	SURRY	34.97	soil	metals
NCD024459471	GUYTON BATTERY SERVICE	HWY 401 S	CHADBOURN	COLUMBUS	34.92	soil	metals
NCN000407205	TRI-COUNTY AIRPORT	NC 561	AULANDER	HERTFORD	34.92	soil	pesticides
NCD061795696	UNITEX CHEMICALS	520 BROOME RD	GREENSBORO	GUILFORD	34.91	groundwater	organics
NCD084171545	HALIFAX COUNTY LANDFILL	SR 1103		HALIFAX	34.81	known/suspected	
NCD981023732	NEUVILLE SOCK PROPERTY	US 64/70 I-40 ACCESS ROAD	HILDEBRAN	BURKE	34.80	soil	metals

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ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD003228087	S&W CHEMICALS, INC.	OLD QUARRY ROAD SE	HICKORY	CATAWBA	34.80	known/suspected	
NCD986227965	STOLLER CHEMICAL - SEVERN	HIGHWAY 35	SEVERN	NORTHAMPTON	34.73	soil soil	pesticides organics
NCD086326741	TEXACO INC/APEX	APEX & MCCULLERS RDS	APEX	WAKE	34.66	groundwater groundwater	organics metals
NONCD0000028	CAROLINA P&L CO. SPRUCE PINE	MOUNTAIN LAUREL DR	SPRUCE PINE	MITCHELL	34.62	known/suspected	
NONCD0001038	BRYANT FARM DRUM DUMP	W OF NC 86 400 FT S OF VA	GATEWOOD	CASWELL	34.61	known/suspected	
NCD000616219	GA-PACIFIC CORP	HWY 1775	HAMLET	RICHMOND	34.61	known/suspected	
NONCD0001048	LEXINGTON FURNITURE IND. PLNT #2	3979 OLD LINWOOD ROAD	LEXINGTON	DAVIDSON	34.53	soil groundwater	organics organics
NONCD0000075	FOAMEX/REEVES BROTHERS	HWY 115	CORNELIUS	MECKLENBURG	34.50	soil	organics
NCD980557672	PITT COUNTY UTILITY LANDFILL	PORT TERMINAL RD	GREENVILLE	PITT	34.38	known/suspected	
NC0001206473	GLEN RAVEN MILLS	TUCKER STREET C	BURLINGTON	ALAMANCE	34.27	groundwater	organics
NCD040042426	AEROQUIP/FAWN PLASTICS	HIGHWAY 264 ALT.	MIDDLESEX	NASH	34.22	groundwater	organics

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ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD093132207	VOICE OF AMERICA RELAY STATION	COUNTY ROAD 1212	GREENVILLE	PITT	34.21	known/suspected	
NCD098765506	SINGER CO/FURNITURE DIV BRYSON	GIBBONS AVE	BRYSON CITY	SWAIN	34.16	groundwater	organics
NCD083673616	REEVES BROTHERS	RAILROAD AVE	RUTHERFORDTON	RUTHERFORD	34.10	soil	organics
NONCD0000042	SOUTHMET, INC.	NORTH GREENE STREET	GREENVILLE	PITT	34.04	known/suspected	
NCD000006361	SUPERIOR ELECTRO FINISHES	115 EAST POLO ROAD	WINSTON SALEM	FORSYTH	34.04	soil	metals
NONCD0000041	CIBA-GEIGY	WESTINGHOUSE BLVD	CHARLOTTE	MECKLENBURG	34.01	groundwater soil	organics organics
NCD986209575	CARDINAL CHEMICAL WAREHOUSE	NC 211 & NC 72	LUMBERTON	ROBESON	33.96	soil	pesticides
NONCD0000078	CAROLINA METAL AND ALLOYS	1016 E. SPRINGFIELD AVENUE	HIGH POINT	GUILFORD	33.72	soil	metals
NCD097361018	KIN PROPERTIES ABANDONNED DRUMS	920 EASTWAY DRIVE	CHARLOTTE	MECKLENBURG	33.72	soil	organics
NCD990715658	SOUTHERN MANUFACTURING, INC.	1000 SEABOARD ST	CHARLOTTE	MECKLENBURG	33.72	soil	inorganics
NCD046148318	TEXACO INC/PAW CREEK	410 SADLER RD	PAW CREEK	MECKLENBURG	33.72	known/suspected	
NCD003196193	PIFER INDUSTRIES, INC.	2210 E PETTIGREW ST	DURHAM	DURHAM	33.67	known/suspected	

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ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NONCD0001071	DOE-SPUN	ROUTE 1002	HOLLISTER	HALIFAX	33.63	groundwater	metals
NCD003162500	CONSOLIDATED ENGRAVERS CORP.	311 E 12TH ST	CHARLOTTE	MECKLENBURG	33.51	groundwater groundwater soil surface water surface water sediment soil sediment	organics metals organics metals organics organics metals metals
NCD065295495	TEXFI IMPRESSIONS	PALETOWN RD	GOLDSBORO	WAYNE	33.41	soil	organics
NONCD0000054	MOORES COMPANY	US 1 BUSINESS & SR 1001	HENDERSON	VANCE	33.35	soil	organics
NCD055550560	GULF ADHESIVES & RESINS/PERKINS	1717 WARD STREET	HIGH POINT	GUILFORD	33.33	groundwater soil	organics organics
NCD000281832	SANFORD PLATING COMPANY	SR 1466	SANFORD	LEE	33.32	soil soil	metals organics
NONCD0000097	MORRIS, NORMAN	HIGHWAY 87 NORTH	ELON COLLEGE	ALAMANCE	33.23	soil	metals
NCD054417308	COASTAL CHEMICAL CORP.	NC 42	CLAYTON	JOHNSTON	33.11	soil	pesticides
NONCD0000096	MASON DRUM STORAGE	42 FIBERVILLE STREET	CANTON	HAYWOOD	32.99	known/suspected	
NCD981928385	JOHN DEERE TRACTOR	HWY 601 AND SR 1413	MOCKSVILLE	DAVIE	32.95	known/suspected	

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ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD072018252	GENERAL ELECTRIC CO/MED STEAM	OLD RALEIGH RD	DURHAM	DURHAM	32.88	groundwater	organics
NCD093783876	VANIER GRAPHICS CORPORATION	655 MEADOW RD	EDEN	ROCKINGHAM	32.86	groundwater soil	organics organics
NCD980729479	CAROLAWN COMPANY	1426 W MOUNTAIN ST	KERNERSVILLE	FORSYTH	32.81	soil	organics
NCD000623199	TEXACO INC/FAYETTEVILLE	992 SHAW MILL RD	FAYETTEVILLE	CUMBERLAND	32.56	groundwater	organics
NCD002388965	LACKAWANNA LEATHER CO., INC.	HWY 70A WEST	CONOVER	CATAWBA	32.48	groundwater	metals
NCD981472624	US 70 DRUM DUMP	US 70	MORGANTON	BURKE	32.41	soil	organics
NONCD0001036	JOYCETON WATER WORKS WELL #2	300 FT N OF SWANSON RD	LENOIR	CALDWELL	32.38	groundwater	organics
NONCD0001037	JOYCETON WATER WORKS WELL #9	600 FT N OF SWANSON RD	LENOIR	CALDWELL	32.38	groundwater	organics
NCD980502892	CREEK BRIDGE/BORDEN CHEMICAL	US HWY 24-87 (GROVE ST)	FAYETTEVILLE	CUMBERLAND	32.35	known/suspected	
NCD095470332	THONIT A SIMMONS COMPANY	11900 STEELE CREEK ROAD	CHARLOTTE	MECKLENBURG	32.33	soil soil	organics metals
NCD986172526	GURLEY PESTICIDE BURIAL	PRESTON STREET	SELMA	JOHNSTON	32.28	soil soil	pesticides organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD080885551	DAUGHERTY CHEMICAL COMPANY	307 WALKER STREET	DURHAM	DURHAM	32.27	soil	metals
NCD980848766	GIBBS ELECTROPLATING	5210 HOVIS ROAD	CHARLOTTE	MECKLENBURG	32.27	soil	metals
NCD980847123	HURT RESIDENCE	HWY 64	MORGANTON	BURKE	32.27	soil	organics
NCD980502793	APEX SANITARY LANDFILL	HIGHWAY 55	APEX	WAKE	32.16	known/suspected	
NONCD0001006	WESTINGHOUSE TURBINE	WESTINGHOUSE ROAD	CHARLOTTE	MECKLENBURG	31.94	soil	organics
NCD003221868	CENTURY FURNITURE COMPANY	401 11TH ST NW	HICKORY	CATAWBA	31.90	soil	metals
NONCD0000084	THERMO PRODUCTS, INC.	800 JONES STREET	DENTON	DAVIDSON	31.77	soil soil	organics metals
NCD980799019	CHEROKEE OIL	1201 BERRYHILL ROAD	CHARLOTTE	MECKLENBURG	31.76	soil soil surface water	organics metals metals
NCD980559330	NASH COUNTY LANDFILL/SR 1524	SR 1524	RED OAK	NASH	31.76	known/suspected	
NCD083669952	STORY BURIAL AREAS/UNION	6101 ORR ROAD	CHARLOTTE	MECKLENBURG	31.76	groundwater	organics
NONCD0000059	DAYCO COCHRAN LANDFILL	RT 1 HYATT CREEK ROAD	WAYNESVILLE	HAYWOOD	31.71	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCSFN0407143	AMERICAN ELEMENTS	500 WALLACE ST	FARMVILLE	PITT	31.68	soil	metals
NCD986180883	CCFC PESTICIDE DISPOSAL	607 HILLSBOROUGH STREET	OXFORD	GRANVILLE	31.67	known/suspected	
NCD980557847	KAISER ACME FARMARKET	SR 1870	RIEGELWOOD	COLUMBUS	31.60	groundwater soil	organics pesticides
NCD980845119	BUCKHORN PESTICIDES	NC 581 & NC 42	WILSON	WILSON	31.36	soil soil	organics pesticides
NCD003229762	STRUCTURAL WOODS PRESERVING CO.	HWY 22	COLERIDGE	RANDOLPH	31.34	soil groundwater	metals metals
NCSFN0406924	VC CHEMICAL	STAMBACK FERRY RD	WADESBORO	ANSON	31.34	soil	metals
NCD000828566	TARTAN MARINE PROPERTY	NC HIGHWAY 77 & SR 2032	HAMLET	RICHMOND	31.33	soil	metals
NCD981863814	LANCASTER PLATING	802 EDWARDS ROAD	LILLINGTON	HARNETT	31.32	soil	metals
NONCD0001015	MARY CIRCLE BATTERY	ZION CHURCH & MARY CRL	CONCORD	CABARRUS	31.18	soil	metals
NCD096165121	TEXACO INC/GREENSBORO	HWY 421 & CHIMNEY ROCK	GREENSBORO	GUILFORD	31.08	soil groundwater	organics organics
NCD045451473	ACE CHEMICAL CORPORATION	9801 YORK ROAD	CHARLOTTE	MECKLENBURG	31.05	soil groundwater	organics organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD049845266	STANLEY CASE GOODS (FORMER)	HWY 211	WEST END	MOORE	31.01	groundwater	organics
NONCD0000019	SIR WALTER GUN CLUB	US 64	RALEIGH	WAKE	30.96	soil	metals
NONCD0000070	BENFIELD SANITATION SERVICE	1809 W FRONT ST	STATESVILLE	IREDELL	30.87	known/suspected	
NCD980843460	GRANT CREEK WWTP	CRUSE ROAD	SALISBURY	ROWAN	30.66	soil	organics
NCD003195963	WESTINGHOUSE ELEC METER & LIGHT	US 1 N	RALEIGH	WAKE	30.57	soil soil	metals organics
NCD024740433	EC MANUFACTURING	413 N. POLK STREET	PINEVILLE	MECKLENBURG	30.45	soil	metals
NONCD0001033	AMERICAN CONTRACT COATINGS	HWY 55	APEX	WAKE	30.43	known/suspected	
NONCD0001067	CC DICKSON	1524 SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	30.43	groundwater soil	organics organics
NCD003938586	CORNING GLASS WORKS	310 NORTH COLLEGE ROAD	WILMINGTON	NEW HANOVER	30.37	known/suspected	
NCD981031693	KEENER LANDFILL	SR 1820	CLINTON	SAMPSON	30.30	soil	organics
NCSFN0406962	VINEGAR HILL LEAD SITE	HWY 701 N	TABOR CITY	COLUMBUS	30.30	soil	metals
NONCD0001065	OLD CHARLOTTE LDFL/VANGUARD	SEVENTY SEVEN CENTER	CHARLOTTE	MECKLENBURG	30.26	groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NC0000998336	CP PROPERTIES	2350 BROWN ROAD	SANFORD	LEE	30.23	soil soil sediment	organics metals metals
NCD000616516	SCOVILL INC/SECURITY PRODUCTS	HWY 74 E	MONROE	UNION	30.21	soil soil	metals organics
NCD003186004	INTERNATIONAL PAPER RICHMOND	2215 S. WILMINGTON STREET	RALEIGH	WAKE	30.10	groundwater soil	organics organics
NCD024762668	BUSH BROTHERS PLATING INC/GREER	107 NE MARKET ST	REIDSVILLE	ROCKINGHAM	30.05	known/suspected	
NONCD0000035	CHAPEL STREET BATTERY DUMP	CHAPEL STREET	KANNAPOLIS	ROWAN	30.00	known/suspected	
NCD980557722	HARRISBURG BATTERY	HIGHWAY 49	HARRISBURG	CABARRUS	30.00	soil	metals
NCD067392175	TRAMCO, INC.	SR 1611	CONNELLY SPRINGS	BURKE	29.87	soil	organics
NCD991277724	MITCHELL SYSTEMS, INC.	ALTAPASS RD	SPRUCE PINE	MITCHELL	29.82	soil	metals
NCD057248759	PATCH RUBBER POND	GRACE BOULEVARD	ROANOKE RAPIDS	HALIFAX	29.82	soil	organics
NCD003213568	LIBERTY FURNITURE	HWY 421	LIBERTY	RANDOLPH	29.60	soil	organics
NCD986170678	WOOD ROAD DRUM BURIAL	WOOD ROAD/CR 2641	GASTONIA	GASTON	29.44	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD049845548	REICHHOLD CHEMICAL, INC.	SR 1916	MONCURE	CHATHAM	29.33	soil	organics
NCD003218161	CORNELL-DUBILIER ELECTRONICS	2652 DALYRUMPLE STREET	SANFORD	LEE	29.02	soil groundwater	organics organics
NCD991278714	CAROCHEM, INC.	540 GULF ST	DURHAM	DURHAM	28.72	soil	organics
NONCD0001050	LEXINGTON FURNITURE IND. PLNT #12	3301 COTTON GROVE LANE	LEXINGTON	DAVIDSON	28.59	soil	organics
NCD980843528	TOWN CREEK REGIONAL WWTP	HEILIGTOWN ROAD	SALISBURY	ROWAN	28.50	known/suspected	
NCD048184451	BURLINGTON HOME CHAIR	HIGHWAY 268	RONDA	WILKES	28.49	known/suspected	
NCD000828616	USS AGRI-CHEMICALS FARM SERVICE	HWY 701	WHITEVILLE	COLUMBUS	28.45	known/suspected	
NCD003186178	COASTAL CHEMICAL CORP.	EVANS ST EXT	GREENVILLE	PITT	28.33	soil	pesticides
NCD991278581	BURLINGTON FURNITURE/LUMBER PL	US 64 EAST	LEXINGTON	DAVIDSON	28.12	known/suspected	
NCD980483275	HELENA CHEMICAL COMPANY	DENNIS STREET EXTENSION	ENFIELD	HALIFAX	28.04	soil soil soil	metals organics pesticides
NCD003151651	WILLARD SMELTING CO.	101 NEWBERN ST	CHARLOTTE	MECKLENBURG	27.86	soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD991278839	NORTH STATE CHEMICALS	3301 SPRING GARDEN ST	GREENSBORO	GUILFORD	27.60	soil soil	organics metals
NCD990867855	FAWN PLASTICS CO., INC.	317 JEFFREYS ROAD	ROCKY MOUNT	NASH	27.52	known/suspected	
NONCD0001030	BLR	2911 LEE AVENUE	SANFORD	LEE	27.50	soil groundwater	organics organics
NONCD0000013	CAROLINA HARDWOODS	158 FACTORY STREET	WILLIAMSTON	MARTIN	27.49	surface water	metals
NCD024770125	BURLINGTON FURNITURE	ATOAH STREET	ROBBINSVILLE	GRAHAM	27.10	soil	organics
NONCD0000091	DUKE POWER/WALNUT COVE	POWER HOUSE ROAD	WALNUT COVE	STOKES	26.95	known/suspected	
NCD980557664	BURLINGTON INDUSTRIES, INC.	US 1 NORTH	RALEIGH	WAKE	26.86	soil	organics
NCD024468597	CHARLOTTE STEEL DRUM	2900 WEST TRADE STREET	CHARLOTTE	MECKLENBURG	26.67	known/suspected	
NCD003213881	BENDIX CORPORATION	I-85 INNES ST EXIT	SALISBURY	ROWAN	26.36	soil	metals
NCD986166288	WOODY'S TIRE FIRE	HIGHWAY 321	GASTONIA	GASTON	26.35	known/suspected	
NCD990868168	INMONT CORP/BASF CORPORATION	1701 W WESTINGHOUSE BLVD	CHARLOTTE	MECKLENBURG	26.22	soil groundwater	organics organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD003218492	CAROLINA RUBBER HOSE COMPANY	1801 SOUTH RAILROAD	SALISBURY	ROWAN	26.04	soil soil	organics metals
NCD003464765	VAUGHAN-BASSETT FURNITURE CO.	ROUTE 268 EAST	ELKIN	SURRY	25.93	soil	organics
NONCD0001039	OVERCASH GRAVEL & GRADING CO.	1150 SHELTON ROAD	CONCORD	CABARRUS	25.71	known/suspected	
NCD980602791	SALVAGE OIL OF AMERICA	1227 MCLEOD STREET	ROCKINGHAN	RICHMOND	25.68	soil	organics
NCD000822130	HARRELSON RUBBER COMPANY	HWY 220 SOUTH	ASHEBORO	RANDOLPH	25.45	known/suspected	
NCD990715070	NEW HANOVER CY & CAROLINA LDFL	SR 1534/DOW RD	CAROLINA BEACH	NEW HANOVER	25.42	known/suspected	
NCD980503031	MILAN YARD LANDFILL	NORTH ST. EXT. MILAN ROAD	FAYETTEVILLE	CUMBERLAND	25.25	soil	organics
NCD000609974	UNION OIL CO. SE TERM	6801 W MARKET ST	GREENSBORO	GUILFORD	24.94	groundwater soil	organics organics
NCSFN0406894	STALLINGS SALVAGE	SECREST AVE	MONROE	UNION	24.89	known/suspected	
NCD981003957	HENSON LANDFILL	US HIGHWAY 221 SOUTH	FOREST CITY	RUTHERFORD	24.35	soil	organics
NCD980559355	NASH COUNTY LANDFILL/SR 1145	STATE RD 1145	SPRING HOPE	NASH	24.18	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0000048	WALKER DRUM DISPOSAL	WYATTS CHURCH GROVE	GOLD HILL	ROWAN	23.80	soil soil	metals organics
NCD077821296	SOUTHERN RESIN/US INDUSTRIES INC	1510 DENTON ROAD	THOMASVILLE	DAVIDSON	23.62	groundwater	organics
NCD003189024	BORDEN CHEMICAL FAYETTEVILLE	1411 INDUSTRIAL DR	FAYETTEVILLE	CUMBERLAND	23.51	groundwater groundwater	organics metals
NCD982174492	NATIONAL PIN	SR 1572	SARATOGA	WILSON	23.37	known/suspected	
NCD077838589	THOMASVILLE FOREST PRODUCTS	CLARKSBURY CHRUCH ROAD	THOMASVILLE	DAVIDSON	23.10	soil	metals
NCD980838551	MCDOWELL FIREMAN ASSOCIATION SITE	SR 1214 GREENLEE ROAD	MARION	MCDOWELL	23.09	known/suspected	
NONCD0000087	HARPER CRAWFORD BAG CO.	401 PARKWOOD AVE	CHARLOTTE	MECKLENBURG	22.93	soil soil soil	metals pesticides organics
NCD096158696	BURLINGTON INDUSTRIES, INC.	6008 HIGH POINT RD	GREENSBORO	GUILFORD	22.43	groundwater soil groundwater soil	organics organics metals bases
NCD980557888	LENOIR CITY LANDFILL	904 VIRGINIA STREET	LENOIR	CALDWELL	22.42	soil	organics
NCD024583288	AIR PRODUCTS AND CHEMICALS, INC.	115 SOUTHERN OXYGEN RD	GREENSBORO	GUILFORD	22.39	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD980502934	FAYETTEVILLE LANDFILL	GRAY STREET	FAYETTEVILLE	CUMBERLAND	21.97	known/suspected	
NCD071579528	FORBUSH METAL	SPEER BRIDGE ROAD	YADKINVILLE	YADKIN	21.90	soil soil soil	cyanide metals organics
NCD980503106	SANITATION SERV LAND	SR 1743	SAINT PAULS	ROBESON	21.66	known/suspected	
NONCD0001027	CROWDERS MOUNTAIN STATE PARK	CROWDERS MOUNTAIN STATE	GASTONIA	GASTON	21.57	known/suspected	
NCD003236841	WARLICK PAINT COMPANY	945 MONROE ST	STATESVILLE	IREDELL	21.47	known/suspected	
NCD986232213	SUMMIT RESOURCE MANAGEMENT	3501 GRIBBLE ROAD	STALLINGS	UNION	21.45	soil soil surface water	inorganics organics organics
NCD000776732	SAFETY-KLEEN CORP 3-031-02	HWY 41W	WALLACE	DUPLIN	21.26	known/suspected	
NCD003223799	CLAYTON-MARCUS CO., INC.	HWY 127 N	BETHLEHEM	ALEXANDER	21.11	soil soil soil	metals organics cyanide
NCD054284518	STANDARD PACKAGING CORPORATION	HWY 73 W	MT GILEAD	MONTGOMERY	21.07	known/suspected	
NCD003214574	SPRUANCE SOUTHERN, INC.	HWY 8	WINSTON-SALEM	FORSYTH	20.81	known/suspected	
NCD046149019	HISTRAND CHEMICAL, INC.	HWY 9	LENOIR	CALDWELL	20.72	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0001062	SWAIM'S TRUCK PARTSSERVICE	WELCOME AVENUE	HENDERSON	VANCE	20.15	soil soil	organics metals
NCD980559637	BEAUNIT CORP./DYING & FINISHING	LINEBERGER STREET	LOWELL	GASTON	19.99	known/suspected	
NCD980502850	CABARRUS DISPOSAL COMPANY, INC.	SR 1152	CONCORD	CABARRUS	19.86	known/suspected	
NONCD0001005	TRANSEASTERN CORP.	509 S LODGE ST	WILSON	WILSON	19.56	known/suspected	
NCD048462881	ARMOLOY CO OF NC/HI-TECH	1603 SALISBURY ROAD	STATESVILLE	IREDELL	19.37	known/suspected	
NCD003152659	REICHHOLD CHEMICAL, INC.	161 BUFFALO RD	CONCORD	CABARRUS	19.32	known/suspected	
NCD003162666	CANNON MILLS COMPANY/FIELDCREST	HWY 29 & 601	KANNAPOLIS	CABARRUS	19.31	known/suspected	
NCD053528170	LAURENS GLASS/BALL-INCON GLASS	US 1 SOUTH	HENDERSON	VANCE	19.23	groundwater	organics
NCD981921083	SWIFT ADHESIVES	9724 INDUSTRIAL DRIVE	PINEVILLE	MECKLENBURG	19.19	known/suspected	
NCD003225620	HIGH POINT FURNITURE INDUSTRIES	CORPORATION DRIVE	HIGH POINT	GUILFORD	19.14	soil	organics
NONCD0000014	BOISE CASCADE	SR 1916	MONCURE	CHATHAM	18.86	known/suspected	
NONCD0000092	FUNDER AMERICA	200 FUNDER RD	MOCKSVILLE	DAVIE	18.33	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD067178707	FAWN PLASTICS CO., INC.	RT 264 BUSINESS	MIDDLESEX	NASH	17.34	soil	organics
NONCD0000034	ASHEVILLE INDUSTRIES	20 GLEN BRIDGE RD(SR3495)	ARDEN	BUNCOMBE	16.30	soil	organics
NCD071567259	WEYERHAEUSER CO	STATE ROAD 1916	MONCURE	CHATHAM	16.04	known/suspected	
NONCD0000053	CAROLINA MARBLE CO.	INDIAN MOUND ROAD	ALBEMARLE	STANLY	15.28	surface water	
NONCD0000099	PARTON'S MOTOR COMPANY	2800 SOUTH YORK ROAD	GASTONIA	GASTON	15.22	known/suspected	
NCD085082311	AMERICAN COLORS INCORPORATED	831 MORETZ AVE	CHARLOTTE	MECKLENBURG	14.85	known/suspected	
NONCD0000082	CAPE FEAR CHEMICALS/HL BRICE	HWY 701 S	ELIZABETHTOWN	BLADEN	11.48	soil	pesticides
NCD081333858	HOLSTON ENERGY INC/HOLSTON FUEL	HWY 19A/235 BYPASS	WAYNESVILLE	HAYWOOD	7.70	soil	organics

II. SITES THAT MAY OR ARE KNOWN TO REQUIRE USE OF THE INACTIVE HAZARDOUS SITES CLEANUP FUND

Purpose of the Fund

The Inactive Hazardous Sites Cleanup Fund is used to: (1) address imminent hazard sites; (2) pay for assessment and cleanup when responsible parties do not comply with orders to clean up sites; (3) pay for assessment and cleanup of sites without financially-viable responsible parties (orphan sites); and (4) pay for state-contracted survey and legal assistance necessary to prepare notices of Inactive Hazardous Substance or Waste Disposal Sites where owners do not comply with orders to conduct such work. The state must attempt to recover its expenditures from responsible parties in the first, second and fourth cases.

The branch's Sites Priority List helps determine priorities for cleanup. Responsible parties for top priority sites are encouraged to voluntarily clean up their sites. When a responsible party does not comply with a request and subsequent order to clean up a site, the state must perform the cleanup using the Inactive Hazardous Sites Cleanup Fund. The demand for state funds to conduct site cleanups, also known as "remedial actions," depends on two factors. First, how often responsible parties refuse to comply with orders to conduct remedial action. Second, how often sites are without financially-viable responsible parties. To date, the program has been successful in encouraging voluntary actions by responsible parties. Funds are mainly needed for orphan cases.

The statute requires that the program report the list of sites known to require funds and the list of sites suspected to require funds for cleanup. Determining if responsible parties exist (and thus, if funds are needed) is often a complex and lengthy process. This information can become dated as owners and operators of the facilities change over time. Therefore, to operate as efficiently as possible with limited staff resources, responsible party research is not done until a site is next in priority for action. For this reason, the total number of orphan sites on the SPL requiring state funds is not presently known.

Orphan Chemical Sites

As of this writing, the branch has identified 39 orphaned chemical waste sites. Of these, 33 have attributes that make them a high priority. These attributes include current use as a residence or some other use with high exposure potential, such as the existence of drinking water wells on or close to the disposal site. We have let a contract to collect samples and to conduct some waste and contaminated soil removal at these sites. This contract commits the remaining funds in the Inactive Hazardous Sites Cleanup Fund toward addressing some of these sites.

In addition to these orphan sites, the branch has been expending cleanup funds to address the large threat to public health and the environment posed by the Texfi, Inc. site in Fayetteville, Cumberland County. Groundwater contaminated with hazardous substances has migrated from Texfi to the adjoining City of Fayetteville's Hoffer Water Plant property. The contaminated groundwater is in contact with the city's primary

finished drinking water holding tank. This tank sits, in part, below the groundwater table. The tank's construction and the nature of its water flow make it possible for contaminated groundwater to enter the tank. In addition, the city's drinking water intakes on the Cape Fear River, 450 feet downstream from the Texfi property, and a city park adjoining the Texfi property, are also concerns. Thus far, analysis indicates the drinking water has not been affected.

The branch used cleanup funds to construct a barrier wall to prevent additional flow of contaminated water toward the tank. Extraction wells have been installed to remove some of the contaminated water that had already passed on to the water plant property and around the tank. Groundwater contaminant concentrations in the area between the wall and the tank have declined since initiating this action. The construction of the barrier wall, the removal of contaminated groundwater from between the wall and the tank and monitoring of the city's drinking water are being conducted as immediate protective measures. These activities will not clean up the larger groundwater contaminant plume or its sources at the Texfi site. Our contract for conducting the monitoring and maintenance of the protective measure will end in March 2004 when funds will be depleted.

There is a risk the barrier wall will fail overtime. Thus it is important to remove the source of the groundwater contamination on the Texfi property. The sources are solvents in the subsurface and contaminated soils.

Settlement of North Carolina's bankruptcy claim against the Texfi estate mandated that a portion of the proceeds from the estate's law suits and property sales are to be placed in a trust fund to conduct the removal of contaminant sources. We do not know how long it may take to generate these funds or how much money will result. After removing the sources of groundwater contamination, it could take many years before significant reductions in groundwater contaminant concentrations will occur.

Unlined Landfills

Due to the frequency of old unlined landfills having hazardous substance contamination, the branch has contracted the task of determining the location and current use of these sites. This activity is being funded by special state funds and by federal funds. These funds will be depleted by the end of the 2003 calendar year. A total of 39 of the 100 counties will have had this work completed. To date, we have completed field surveys of 241 old landfills. Of the landfills inspected, 166 are considered priorities. This is due to a drinking water source, a residence, a school, a church, or a daycare on the property or within 1,000 feet of the landfill.

We can estimate the number of old, unlined landfills that pose the greatest hazard by using the following equation:

> *Number of landfills with exposure concerns (166) ÷ number of landfills surveyed thus far (241) X total number of landfills in inventory (730) = estimated 503 landfills with exposure concerns.*

Almost without exception, these landfills were operated either by private individuals with limited financial ability or by counties and municipalities that operated in the public interest and did not make a profit. Thus, these sites may be considered to have no responsible parties available to pay for any corrective measures required.

Cleanup Funds Needed

There are a total of 769 orphan chemical sites and old unlined landfills that remain to be addressed. Of these, 199 are considered high priorities due to exposure concerns. There are only sufficient funds in the Inactive Hazardous Sites Cleanup Fund to address four or five of the 33 orphan chemical sites identified as being a priority due to exposure concerns. Based on the average cost expended per site under our contract, another $3,360,000 will be needed to address the remaining 28 sites. No monies are available to address the orphan landfills and the lower priority orphan chemical sites.

The Texfi, Inc. site has no other responsible parties. The federal government has already indicated the site is not a candidate for a cleanup under Superfund. Drinking water for the entire population of the City of Fayetteville is threatened. At a minimum, additional funds are needed to continue operating and maintaining the extraction wells on the City's property, and monitoring of the City's drinking water. These funds are needed until bankruptcy funds accrue to a level which can support a source area removal and until groundwater contaminant concentrations drop as a result. This may take many years. An estimated $28,000 per year is needed to conduct this work

As of July 31, 2003, the balance of the Inactive Hazardous Sites Cleanup Fund totaled $697,860. This balance is committed toward two contracts and will be depleted by March of 2004.

III. NATIONAL PRIORITIES LIST SITES REQUIRING A STATE COST SHARE

National Priorities List sites are those hazardous substance or waste disposal sites that are priorities for cleanup under the federal Comprehensive Environmental Response, Compensation and Liability Act, more commonly known as Superfund. North Carolina has 28 NPL sites.

The NPL includes sites with and without financially-viable responsible parties. Cleanup costs are financed either by responsible parties or by a federal trust fund with a state cost share. When the federal trust fund is used, CERCLA requires North Carolina to pay 10 percent of the cleanup cost plus 100 percent of the cost to operate and maintain the remediation system.

Table 4, found on page 52, provides a list of the North Carolina NPL sites, their locations, investigation/cleanup status, estimated costs, and projected start dates for cleanup. Part I, found on page 52, includes those sites where the Federal Trust Fund/North Carolina cost share is required. A summary of North Carolina's cost share obligations is provided at the end of this part. Part II, found on page 54 includes the status of responsible party funded cleanups.

TABLE 4. NORTH CAROLINA NATIONAL PRIORITIES LIST SITES
PART I - SITES WHERE FEDERAL TRUST FUND/NORTH CAROLINA COST SHARE IS REQUIRED

NPL Site	*City/County*	*Operable Unit*	*Cleanup Status*	*Estimated Cost*	*Cleanup Start Date***
ABC One Hour Cleaners	Jacksonville, Onslow	OU1-Groundwater	RA	$3,760,000	In Progress
		OU2-Soil	RA	$750,000	In Progress
Barber Orchard	Waynesville, Haywood	Entire Site	RI	Not Determined	2004
Benfield Industries	Waynesville, Haywood	Entire Site		$6,729,200	
		Soil	RA		Complete
		Groundwater	RA		In Progress
Cape Fear Wood Preserving	Fayetteville, Cumberland	Entire Site		$24,407,574	
		Soil	Complete		Complete
		Groundwater	RA		In Progress
Carolina Transformer	Fayetteville, Cumberland	Entire Site		$22,000,000	
		Soil/Sediment	RA		In Progress
		Groundwater	RD		2003
Davis Park Road TCE	Gastonia, Gaston	Groundwater	RA	$3,873,299	In Progress
FCX, Inc.-Statesville	Statesville, Iredell	OU1-Groundwater	RA	$4,161,525	In Progress
		OU2-Soil	Complete	$6,000,000	Complete
FCX, Inc.-Washington	Washington, Beaufort	OU1-Groundwater	RI	Not Determined	2005
		OU2-Soil/ Surface Water/ Sediment	Complete	No Cost Share	Complete
North Belmont PCE	Belmont, Gaston	Groundwater	RD	$7,535,000	In Progress
Potter's Septic Tank Service	Maco, Brunswick	Soil	Complete	$8,350,000	Complete
		Groundwater	RD		2003
Reasor Chemical	Castle Hayne, New Hanover	Entire Site	RD/RA	$2,000,000	2004
Ward Transformer	Raleigh, Wake	Entire Site	RI	Not Determined	Not Determined

TABLE 4. NORTH CAROLINA NATIONAL PRIORITIES LIST SITES
PART I - SITES WHERE FEDERAL TRUST FUND/NORTH CAROLINA COST SHARE IS REQUIRED

SUMMARY OF NORTH CAROLINA COST SHARE REQUIREMENTS
As of 30 June 2003

Estimated total cost of pending/ongoing federal trust fund/N.C. cost share cleanups:	$89,566,598
N.C.'s 10 percent cost share for pending/ongoing cleanups:	$8,956,660*
Fund disbursements for cost share payments:	$5,266,188
Current fund balance:	$5,139,891
Encumbered amount of the fund balance for cost share payments:	$3,690,472

* This number will increase due to remedial action cost estimates not being available for all sites. Also, other sites may be added to the National Priorities List which will require a state cost share.

** Date applies to either entire site or operable unit.

OU – Operable Unit
RA – Remedial Action
RD – Remedial Design
RI – Remedial Investigation

TABLE 4. NORTH CAROLINA NATIONAL PRIORITIES LIST SITES
PART II - RESPONSIBLE PARTY FUNDED CLEANUPS

NPL Site	*City/County*	*Operable Unit*	*Cleanup Status*
Aberdeen Pesticides	Aberdeen, Moore	OU1 & OU4 - Soils-All Sites	Complete
		OU3-Groundwater for FC, TS, F6	RA In Progress
		OU5-Groundwater for Rt 211 & McIver	RA In Progress
Bypass 601/Martin Scrap	Concord, Cabarrus	OU1-Soil/Sediment at Martin Scrap	O & M
		OU2-Off-Site Soil/Sediment	Complete
		OU3-Groundwater	O & M
Charles Macon Lagoon and Drum	Cordova, Richmond	Soil	Complete
		Groundwater	O & M
Celanese Corporation	Shelby, Cleveland	OU1-Groundwater	O & M
		OU2-Soil	Complete
		Surface Water	Complete
Chemtronics, Inc.	Swannanoa, Buncombe	Soil	O & M
		Groundwater	O & M
FCX, Inc.	Statesville, Iredell	OU3-Burlington Industries Site	RA In Progress
Geigy Chemical	Aberdeen, Moore	Soil	Complete
		Groundwater	RA In Progress
General Electric/ Shepard Farm	East Flat Rock, Henderson	Soil	O & M
		Groundwater	O & M
		Surface Water/Sediment	Complete
Jadco-Hughes	Belmont, Gaston	Soil/Sediment	RA In Progress
		Groundwater	RA In Progress
JFD Electronics/ Channel Master	Oxford, Granville	Soil	Complete
		Groundwater	O & M

TABLE 4. NORTH CAROLINA NATIONAL PRIORITIES LIST SITES
PART II - RESPONSIBLE PARTY FUNDED CLEANUPS

NPL Site	*City/County*	*Operable Unit*	*Cleanup Status*
Koppers Company, Inc.	Morrisville, Wake	Soil	Complete
		Groundwater	O & M
		Surface Water	Complete
Martin Marietta/Sodyeco	Charlotte, Mecklenburg	Soil	RA In Progress
		Groundwater	RA In Progress
National Starch & Chemical	Salisbury, Rowan	OU1-Groundwater in Western Part of Site	O & M
		OU2-Trench Area Soil/Surface Water	O & M
		OU3-Area 2 Groundwater/Wastewater Treatment Area/Surface Water/ Sediments in NE Tributary	O & M
		OU4-Area 2 Soil/Wastewater Treatment Lagoon Area	O & M
New Hanover County Airport	Wilmington, New Hanover	Groundwater	RA In Progress
NCSU	Raleigh, Wake	Soil	Complete
		Groundwater	Start 2004
USMC Camp LeJeune	Jacksonville, Onslow	Multiple Units	Various Stages
USMC Cherry Point	Cherry Point, Craven	Multiple Units	Various Stages

RA – Remedial Action
O & M - Operation and Maintenance
OU – Operable Unit

IV. RESPONSIBLE PARTY VOLUNTARY SITE REMEDIAL ACTION

When the Inactive Hazardous Sites Branch solicits the cooperation of responsible parties in taking action at a priority site, most parties agree to voluntarily conduct a cleanup with branch approval. In addition to these voluntary actions, responsible parties and owners often come forward on their own to initiate an approved assessment and/or remedial action. Due to the number of volunteers and very limited staff resources, the branch was authorized by the General Assembly to privatize its oversight role at lower priority, voluntary site remedial actions. Sites with more severe public health threats or concerns are still reviewed by state staff.

The privatized portion of the voluntary cleanup program is called the Registered Environmental Consultant, or REC Program. Under this program, a responsible party hires an REC to both conduct, and to certify the regulatory compliance of, a site's assessment and clean up. In order for a firm to qualify as an REC, it must demonstrate it meets certain regulatory qualifications criteria. The REC certification replaces state oversight. The state audits a portion of the REC projects to ensure the integrity of the program. The state sanctions RECs where necessary. A state staff auditor is funded through fees collected from the voluntary participants.

A current list of sites which have parties conducting assessments and cleanups in accordance with consent agreements with the state is provided in Table 5, on the following page. Table 6, found on page 59, is a list of additional, ongoing, Branch-directed priority actions not under consent agreements.

TABLE 5. SITES UNDERGOING VOLUNTARY REMEDIAL ACTION BY RESPONSIBLE PARTIES

ID Number	*Site Name*	*City*	*County*
NONCD0000040	ABBOTT LABORATORIES	LAURINBURG	SCOTLAND
NONCD0000039	ABITIBI-PRICE CORPORATION	ROARING RIVER	WILKES
NCD047257472	APPLIED RESEARCH GROUP, INC.	CHARLOTTE	MECKLENBURG
NCD074511361	AQUAIR CORPORATION	CHARLOTTE	MECKLENBURG
NCD986188787	ASHEVILLE COAL GAS PLANT #1	ASHEVILLE	BUNCOMBE
NONCD0000032	ASHEVILLE COAL GAS PLANT #2	ASHEVILLE	BUNCOMBE
NCD072003635	ATHOL MANUFACTURING COMPANY	BUTNER	GRANVILLE
NCD003193588	BARBOUR BOAT WORKS, INC.	NEW BERN	CRAVEN
NONCD0000002	BURLINGTON COAL GAS PLANT	BURLINGTON	ALAMANCE
NCD986171965	CARO-KNIT	WILMINGTON	NEW HANOVER
NCD000608117	CELANESE CORPORATION/FIBERS TECH	CHARLOTTE	MECKLENBURG
NCD986188803	CHARLOTTE COAL GAS PLANT NO. 2	CHARLOTTE	MECKLENBURG
NCD986197333	CONCORD COAL GAS PLANT	CONCORD	CABARRUS
NONCD0001097	COPES-VULCAN, INC	CHARLOTTE	MECKLENBURG
NONCD0001061	CP&L NORTHERN DIVISION COMPLEX	GARNER	WAKE
NC0001606250	CRISTEX DRUM	OXFORD	GRANVILLE
NCD062567623	DIAMOND SHAMROCK CORP/HENKEL	CHARLOTTE	MECKLENBURG
NONCD0001035	DUKE ENERGY-WINSTON-SALEM POWER	WINSTON-SALEM	FORSYTH
NCD981861743	DUKE POWER/GREENSBORO GAS PLANT	GREENSBORO	GUILFORD
NCD000813519	DUKE UNIVERSITY	DURHAM	DURHAM
NCD986173938	DURHAM GAS PLANT	DURHAM	DURHAM
NONCD0001058	ELECTRONICS COMPONENT CORPORATION	BURGAW	PENDER
NCD986197267	ELIZABETH CITY COAL GAS	ELIZABETH CITY	PASQUOTANK
NCD986197341	FAYETTEVILLE COAL GAS/RAY AVE	FAYETTEVILLE	CUMBERLAND
NCD041414780	FIELDCREST MILLS INC./NC FINISHING	SALISBURY	ROWAN
NONCD0000017	FLAKT PRODUCTS	WINSTON-SALEM	FORSYTH
NONCD0000029	FLEET AEROSPACE CORP./AERONCA	CHARLOTTE	MECKLENBURG
NCD093340487	FLORIDA STEEL CORPORATION	CHARLOTTE	MECKLENBURG
NCD000813600	GA-PACIFIC CORP CHIP-N-SAW	WHITEVILLE	COLUMBUS
NCD000773515	GA-PACIFIC CORP/HDWD SAW	BOWDENS	DUPLIN
NCD000773507	GA-PACIFIC CORP/HDWD SAW	ENFIELD	HALIFAX
NCD986188829	GASTONIA COAL GAS PLANT	GASTONIA	GASTON
NCD051322980	GENERAL ELECTRIC CO.	CHARLOTTE	MECKLENBURG
NCD003163730	GENERAL INSTRUMENT CORP.	FAIRVIEW	BUNCOMBE
NONCD0001069	GENERAL MARBLE COMPANY	LINCOLNTON	LINCOLN
NCD986197309	GOLDSBORO COAL GAS PLANT #1	GOLDSBORO	WAYNE
NONCD0001083	GOLDSBORO COAL GAS PLANT #2	GOLDSBORO	WAYNE
NONCD0001089	GREENSBORO COAL GAS PLANT #1	GREENSBORO	GUILFORD
NCD986188886	GREENVILLE COAL GAS PLANT	GREENVILLE	PITT
NCD986232379	GRESHAMS LAKE INDUSTRIAL PARK	RALEIGH	WAKE

TABLE 5. SITES UNDERGOING VOLUNTARY REMEDIAL ACTION BY RESPONSIBLE PARTIES

ID Number	*Site Name*	*City*	*County*
NCD051739209	HARRELSON RUBBER COMPANY	ASHEBORO	RANDOLPH
NONCD0001084	HENDERSON COAL GAS PLANT	HENDERSON	VANCE
NCD990734055	HERCOFINA/CAPE INDUSTRIES	WILMINGTON	NEW HANOVER
NCD039102959	HEVI-DUTY ELECTRIC/GENERAL SIG	GOLDSBORO	WAYNE
NONCD0001085	HICKORY COAL GAS PLANT	HICKORY	CATAWBA
NCD986188837	HIGH POINT COAL GAS PLANT	HIGH POINT	GUILFORD
NCD051745685	HOLDING POND FOR WASTE/USS	GREENSBORO	GUILFORD
NCD003215696	HUNT MANUFACTURING	STATESVILLE	IREDELL
NCD986197366	KINSTON COAL GAS PLANT	KINSTON	LENOIR
NCD981863327	KSP DRY CLEANERS	CHAPEL HILL	ORANGE
NCD986197358	LEXINGTON COAL GAS PLANT	LEXINGTON	DAVIDSON
NCD003183167	LONG MANUFACTURING	TARBORO	EDGECOMBE
NONCD0001086	MT AIRY COAL GAS PLANT	MT AIRY	SURRY
NCD986197259	NEW BERN COAL GAS PLANT	NEW BERN	CRAVEN
NONCD0000077	OLD STATE LAB	CARY	WAKE
NCD055165609	PANTASOTE INC. FILM/COMPOUND DIV.	HICKORY	CATAWBA
NCD055162069	PELTON & CRANE PLANT (FORMER)	CHARLOTTE	MECKLENBURG
NONCD0001020	PRECISION FABRICS GROUP, INC	GREENSBORO	GUILFORD
NCD986188894	RALEIGH COAL GAS PLANT NO. 1	RALEIGH	WAKE
NCD986188902	RALEIGH COAL GAS PLANT NO. 2	RALEIGH	WAKE
NONCD0001087	REIDSVILLE COAL GAS PLANT	REIDSVILLE	ROCKINGHAM
NCD053009510	RELIANCE UNIVERSAL OF KENTUCKY	LENOIR	CALDWELL
NCD986197325	ROCKY MOUNT COAL GAS PLANT NO. 1	ROCKY MOUNT	NASH
NCD986197317	ROCKY MOUNT COAL GAS PLANT NO. 2	ROCKY MOUNT	NASH
NCD981933096	ROCKY MOUNT, OLD AIRPORT	ROCKY MOUNT	NASH
NCD986197283	SALISBURY COAL GAS PLANT #1	SALISBURY	ROWAN
NONCD0001088	SALISBURY COAL GAS PLANT #2	SALISBURY	ROWAN
NCD003234549	SCM PROCTOR SILEX/WEAREVER	SOUTHERN PINES	MOORE
NCD053488557	SOUTHERN WOOD PIEDMONT COMPANY	GULF	CHATHAM
NCD058517467	SOUTHERN WOOD PIEDMONT COMPANY	WILMINGTON	NEW HANOVER
NCD986197291	STATESVILLE COAL GAS PLANT	STATESVILLE	IREDELL
NCD986176444	STROH/CHITTY FARM	WINSTON-SALEM	FORSYTH
NCD986166700	TOISNOT SWAMP	WILSON	WILSON
NCD053485991	VARCO-PRUDEN BUILDINGS	KERNERSVILLE	FORSYTH
NCD986197275	WASHINGTON COAL GAS PLANT	WASHINGTON	BEAUFORT
NCD986188910	WILMINGTON COAL GAS PLANT	WILMINGTON	NEW HANOVER
NCN000407302	WILMINGTON GUN CLUB (FORMER)	WILMINGTON	NEW HANOVER
NCD986188845	WINSTON-SALEM COAL GAS PLANT NO. 1	WINSTON-SALEM	FORSYTH
NCD986188852	WINSTON-SALEM COAL GAS PLANT NO. 2	WINSTON-SALEM	FORSYTH

TABLE 6. ADDITIONAL, ONGOING, STATE-DIRECTED PRIORITY ACTIONS NOT UNDER VOLUNTARY CONSENT AGREEMENTS

ID Number	*Site Name*	*City*	*County*
NCD024462327	ACADEMY STEEL DRUM	MATTHEWS	MECKLENBURG
NCD003193588	BARBOUR BOAT WORKS	NEW BERN	CRAVEN
NCD048181218	CAROLINA GALVANIZING	ABERDEEN	MOORE
NCD000830646	CAROLINA POWER & LIGHT	WILMINGTON	NEW HANOVER
NCD986175651	GLEN RAVEN MILLS	KINGS MOUNTAIN	CLEVELAND
NONCD0001064	GUILFORD MILLS	FUQUAY-VARINA	WAKE
NONCD0000050	HWY 268 MIRROR WASTE DUMP	WILKESBORO	WILKES
NONCD0000056	JAMES LANDFILL	LAURINBURG	SCOTLAND
NCD980729677	KNOB CREEK FLYASH	BREVARD	TRANSYLVANIA
NONCD0001056	LITTLE MOUNTAIN LANDFILL	TRYON	POLK
NCD986215499	PARKER INDUSTRIES	FAYETTEVILLE	CUMBERLAND
NCD062552153	SAYLES-BILTMORE BLEACHERIES	ASHEVILLE	BUNCOMBE
NCD990715658	SOUTHERN MANUFACTURING	CHARLOTTE	MECKLENBURG
NONCD0001062	SWAIM'S TRUCK PARTS	HENDERSON	VANCE
NONCD0001075	TEXFI INDUSTRIES	FAYETTEVILLE	CUMBERLAND
NCD082362989	TUNGSTEN QUEEN MINE	TUNGSTEN	VANCE

Note: There are 24 additional sites with active ongoing bankruptcy claims, new site screenings, "no further action" reviews or monitoring of perpetual land use restrictions.

V. IMMINENT HAZARD SITES

The N.C. Department of Environment and Natural Resources and the USEPA are committed to addressing imminent hazard sites when identified. Table 7 provides a list of sites where imminent hazards have been discovered, or where abatement activities have continued, since the last legislative report in October 2002. Their location, a site description, status and funding source are also provided.

TABLE 7. SUMMARY OF IMMINENT HAZARD SITES

Site	City/ County	Site Description	Status	Funding Source
Charlotte Potassium Cyanide Site	Charlottte/ Mecklenburg	Container of potassium cyanide discovered during a USEPA terrorist investigation.	Container was removed in 2003.	USEPA
Holmes Scrap Yard	East Spencer/ Rowan	Abandoned source of radium 226 found at scrap yard.	Source removal completed in 2003.	USEPA
Holtra Chem/Honeywell	Riegelwood/ Columbus	Tanks, lagoons, ponds, soils, materials and a building contaminated with mercury.	Waste removal ongoing. USEPA negotiating cleanup work with owner.	Owner
Fowler Properties Scrapyard	Kinston/ Lenoir	Numerous abandoned small containers of various chemicals.	Containers removed in 2002.	USEPA
P & B Distribution	Williamston/ Martin	Runoff from a fire caused a fish kill in Peter Creek.	Contaminated soils removed in 2002.	USEPA
Rosso Scrapyard	Dover/Craven	Numerous small containers of various chemicals in a dilapidated school building.	Containers removed in 2003.	USEPA
Texfi Industries	Fayetteville/ Cumberland	Chlorinated solvent groundwater contaminant plume has migrated from a former textile mill to the City of Fayetteville's water plant property. The city's finished drinking water holding tank sits in contact with contaminated groundwater. The city's drinking water intakes on the Cape Fear River are 450 feet downstream from the Texfi property line.	The State constructed a barrier wall to prevent further contaminant migration to the holding tank area and installed extraction wells to remove contamination presently near the tank. The State will operate the extraction wells and monitor the groundwater until March 2004 when funds will be depleted. The State is waiting for funds through a bankruptcy settlement to conduct a source removal.	State
VC Chemical	Wadesboro/ Anson	Former fertilizer manufacturing operation. Very high levels of metals in soils. Property is near a residential area.	Soil removal completed 2003.	Responsible party
West Pharmaceutical Fire	Kinston/ Lenoir	Fire at facility. Chemicals present at facility.	Owner conducting a cleanup with USEPA supervision.	Owner

VI. SUMMARY OF THE INACTIVE HAZARDOUS SITES CLEANUP FUND AND NATIONAL PRIORITIES LIST COST SHARE FUND

Inactive Hazardous Sites Cleanup Fund
As of July 31, 2003

Deposits (9/02-7/03)	
Interest	$58,478
Cost recovery of previous expenditures	$6,000
No further action review fees	$2,034
Total Deposits	**$66,512**
Withdrawals (9/02-7/03)	
Texfi Industries-Fayetteville emergency abatement contract	$111,746
Orphan priority site sampling/removal contract	$70,330
PCB Landfill Transfer	$2,500,000
Total Withdrawals	**$2,682,076**
Current Balance	**$697,861**
Obligations	
Texfi emergency abatement contract	$132,417
Orphan priority site sampling/removal contract	$565,444
Total Current Obligations	**$697,861**
Effective Balance	**$0**
Orphan Cleanup Cost Requirements (see Chapter II for more details)	
Funds needed for 28 additional priority orphan sites	$3,360,000
Funds to continue to maintain Texfi emergency abatement measure for five years	$140,000
Priority Orphan Site Cleanup Costs	**$3,500,000***

* Note that this figure does not cover the numerous orphan unlined landfill sites with exposure concerns.

National Priorities List Cost Share Fund
As of June 30, 2003

Estimated cost of federal trust fund/N.C. cost share cleanups	$89,566,598
N.C.'s 10 percent cost share for pending/ongoing cleanups	$8,956,660*
Fund disbursements for cost share payments	$5,266,188
Current balance	$5,139,891
Encumbered amount of the fund balance for cost share payments	$3,690,472
Effective Balance	**$1,449,419***

* Cleanup cost estimates are not yet available for all sites. The cost share figure will increase as cost estimates become available. Also, other sites may be added to the National Priorities List that will require a state cost share. This account will also be required to pay for the state's operation and maintenance obligations which, will begin in the next few years at some sites. Aside from interest, the fund has no continuing source of income.

APPENDIX I

INACTIVE HAZARDOUS SITES INVENTORY
Description of Categories

The Department of Environment and Natural Resources is required by North Carolina General Statute 130A-310.1(a) to maintain an inventory of inactive hazardous substance or waste disposal sites. The Inactive Hazardous Sites Inventory accounts for all of the sites in the EPA's Comprehensive Environmental Response, Compensation and Liability Act inventory of potential contaminated sites called CERCLIS. The intent is to address those sites determined not to be federal priorities. Many sites in the CERCLIS inventory, and therefore also the Inactive Hazardous Sites Inventory, are regulated by other state and federal laws. Thus, they are not priorities for the Inactive Hazardous Sites Branch. The Inactive Hazardous Sites Inventory is organized in the categories described below. To avoid duplication of work, sites being addressed by other agencies are tracked in separate categories. Ten of the inventory sites appear in multiple other agency lead categories (4 through 10).

1. **Sites Priority List**
   The SPL includes sites with confirmed contamination or known disposal of hazardous substances that have been ranked using the Prioritization System rules (15A NCAC Subchapter 13C .0200).

2. **Responsible Party Voluntary Remedial Action Sites**
   In accordance with North Carolina General Statute 130A-310.9(b), voluntary cleanups or "remedial actions" conducted by responsible parties under agreements with the state must be listed in a separate category.

3. **Sites with Evaluations Pending**
   This category includes those sites that require evaluation before site priority can be determined. Each site with evidence of contamination will be ranked and transferred to the SPL. Those sites where no further action is required will also be transferred to that category.

4. **National Priorities List**
   The NPL consists of sites the federal government has determined to be the most serious, uncontrolled hazardous waste disposal sites in the nation. Either federal and state dollars or responsible parties will fund these cleanups. This list only includes North Carolina NPL sites.

5. **Non-NPL Federal Superfund Cleanups**
   NPL-caliber sites where the USEPA has entered into agreements with responsible parties to conduct remedial action are supervised by the USEPA. This list includes only the USEPA non-NPL remedial action sites located in North Carolina.

6. **Inventory Sites Managed as TSD Facilities by the Hazardous Waste Section***
   Facilities that have, or are in the process of applying for, a Resource Conservation and Recovery Act permit to treat, store or dispose of hazardous waste are tracked in this category. These sites are exempt pursuant to G.S. 130A-310(3).

7. **Non-TSD Inventory Sites Under the Jurisdiction of the Hazardous Waste Section***
   The inventory includes some sites that are currently undergoing Resource Conservation and Recovery Act corrective action under the direction of the North Carolina Hazardous Waste Section, but do not hold RCRA permits.

8. **Inventory Sites Under the Jurisdiction of the Solid Waste Section***
   Permitted solid waste landfills being monitored and controlled by the North Carolina Solid Waste Section are tracked in this category.

9. **Inventory Sites Under the Jurisdiction of the Division of Water Quality ***
   Sites in this category include those where the North Carolina Division of Water Quality has been specified as the lead agency to oversee assessment and/or cleanup.

10. **Inventory Sites Under the Jurisdiction of the Division of Environmental Health's Radiation Protection Section***
    Sites conducting assessment and cleanup under the direction of the North Carolina North Carolina Radiation Protection Section are tracked in this category.

11. **Old Unlined Landfills**
    This is a list of all the old unlined landfills catalogued by the branch. Seventy-seven of the 755 landfills are also listed in other categories.

* **Additional sites, not included in the Inactive Hazardous Sites Inventory, may be managed by these regulatory agencies.**

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
OCTOBER 2003

SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD002571438	ABC ENGRAVERS	CHARLOTTE	MECKLENBURG
NCN000407447	ABERDEEN CONTAMINATED GROUNDWATER	ABERDEEN	MOORE
NCD024462327	ACADEMY STEEL DRUM	MATTHEWS	MECKLENBURG
NCD045451473	ACE CHEMICAL CORPORATION	CHARLOTTE	MECKLENBURG
NCD045924339	ACME UNITED CORPORATION	FREMONT	WAYNE
NCD040042426	AEROQUIP/FAWN PLASTICS	MIDDLESEX	NASH
NCD024583288	AIR PRODUCTS AND CHEMICALS, INC.	GREENSBORO	GUILFORD
NONCD0001081	ALCOA-NARROWS POWERHOUSE	BADIN	MONTGOMERY
NONCD0001094	ALLISON MANUFACTURING CO	ALBEMARLE	STANLY
NCD085082311	AMERICAN COLORS INCORPORATED	CHARLOTTE	MECKLENBURG
NONCD0001033	AMERICAN CONTRACT COATINGS	APEX	WAKE
NCSFN0407143	AMERICAN ELEMENTS	FARMVILLE	PITT
NCD052813250	AMERICAN ENKA COMPANY/BASF	ENKA	BUNCOMBE
NCD000615872	AMP INCORPORATED	GASTONIA	GASTON
NCD041230418	AMP INCORPORATED	WINSTON-SALEM	FORSYTH
NCD119168813	ANILOX ROLL COMPANY	CHARLOTTE	MECKLENBURG
NCD980502793	APEX SANITARY LANDFILL	APEX	WAKE
NCD048462881	ARMOLOY CO OF NC/HI-TECH	STATESVILLE	IREDELL
NCD986175636	ASHE PATTERN SHOP (FORMER)	GASTONIA	GASTON
NCD980557557	ASHEBORO LANDFILL	ASHEBORO	RANDOLPH
NONCD0000034	ASHEVILLE INDUSTRIES	ARDEN	BUNCOMBE
NCD033978396	ATEC INDUSTRIES	ROXBORO	PERSON
NONCD0000038	AYCOCK PROPERTY	WILSON	WILSON
NCD980559637	BEAUNIT CORP./DYING & FINISHING	LOWELL	GASTON
NCD003213881	BENDIX CORPORATION	SALISBURY	ROWAN
NCD986171445	BENFIELD CHEMICALS	CANTON	HAYWOOD
NONCD0000070	BENFIELD SANITATION SERVICE	STATESVILLE	IREDELL
NCD981022072	BETTIS PROPERTY	EARL	CLEVELAND
NONCD0001030	BLR	SANFORD	LEE
NONCD0000014	BOISE CASCADE	MONCURE	CHATHAM
NCD003189024	BORDEN CHEMICAL FAYETTEVILLE PLANT	FAYETTEVILLE	CUMBERLAND
NCD980502827	BROWN #1	PISGAH FOREST	TRANSYLVANIA
NONCD0001038	BRYANT FARM DRUM DUMP	GATEWOOD	CASWELL
NCD980845119	BUCKHORN PESTICIDES	WILSON	WILSON
NCD024770125	BURLINGTON FURNITURE	ROBBINSVILLE	GRAHAM
NCD991278581	BURLINGTON FURNITURE/LUMBER PL	LEXINGTON	DAVIDSON
NCD048184451	BURLINGTON HOME CHAIR	RONDA	WILKES
NCD096158696	BURLINGTON INDUSTRIES, INC.	GREENSBORO	GUILFORD
NCD980557664	BURLINGTON INDUSTRIES, INC.	RALEIGH	WAKE
NCD093334894	BURLINGTON INDUSTRIES, INC.	STATESVILLE	IREDELL

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
OCTOBER 2003

SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD024762668	BUSH BROTHERS PLATING INC/GREER	REIDSVILLE	ROCKINGHAM
NCD981750425	BUXTON DUMP	BUXTON	DARE
NONCD0001099	C & L SURPLUS	HAYESVILLE	CLAY
NCD981022288	C&T REFINERY	CHARLOTTE	MECKLENBURG
NCD980502850	CABARRUS DISPOSAL COMPANY, INC.	CONCORD	CABARRUS
NCD980557870	CALDWELL COUNTY ABANDONED WASTE	LENOIR	CALDWELL
NCD981021702	CAMP, LEONARD PROPERTY	EARL	CLEVELAND
NCD003162666	CANNON MILLS COMPANY/FIELDCREST	KANNAPOLIS	CABARRUS
NONCD0000082	CAPE FEAR CHEMICALS/HL BRICE	ELIZABETHTOWN	BLADEN
NCD981929813	CARBONTON ROAD DRUM SITE	SANFORD	LEE
NCD986209575	CARDINAL CHEMICAL WAREHOUSE FIRE	LUMBERTON	ROBESON
NCSFN0407140	CARDINAL CONTAINER SERVICES	LEXINGTON	DAVIDSON
NCD991278714	CAROCHEM, INC.	DURHAM	DURHAM
NCD980729479	CAROLAWN COMPANY	KERNERSVILLE	FORSYTH
NCD981015746	CAROLINA ALUMINUM/HERBERT TAYLOR	ROPER	WASHINGTON
NCSFN0406911	CAROLINA ASSOCIATED MILL	NEWTON	CATAWBA
NCD048181218	CAROLINA GALVANIZING CORP.	ABERDEEN	MOORE
NONCD0000013	CAROLINA HARDWOODS	WILLIAMSTON	MARTIN
NONCD0000053	CAROLINA MARBLE CO.	ALBEMARLE	STANLY
NONCD0000078	CAROLINA METAL AND ALLOYS	HIGH POINT	GUILFORD
NCD000830919	CAROLINA P&L CO. CAPE FEAR STM	MONCURE	CHATHAM
NONCD0000023	CAROLINA P&L CO. FAYETTEVILLE	FAYETTEVILLE	CUMBERLAND
NCD000830612	CAROLINA P&L CO. MAYO STEAM	ROXBORO	PERSON
NCD000830653	CAROLINA P&L CO. ROXBORO STEAM	ROXBORO	PERSON
NONCD0000028	CAROLINA P&L CO. SPRUCE PINE	SPRUCE PINE	MITCHELL
NCD000830646	CAROLINA P&L CO. SUTTON STEAM	WILMINGTON	NEW HANOVER
NCD000830620	CAROLINA P&L CO. WEATHERSPOON STEAM	LUMBERTON	ROBESON
NCD981015886	CAROLINA PRODUCTION FINISHING	ASHEVILLE	BUNCOMBE
NCD003218492	CAROLINA RUBBER HOSE COMPANY	SALISBURY	ROWAN
NCD980729412	CAROLINA TANK CLEANING COMPANY	GREENSBORO	GUILFORD
NONCD0001077	CATAWISSA LUMBER CO	WEST JEFFERSON	ASHE
NONCD0001067	CC DICKSON	CHARLOTTE	MECKLENBURG
NCD986180883	CCFC PESTICIDE DISPOSAL	OXFORD	GRANVILLE
NONCD0000015	CENTRAL TRANSPORT COMPANY	WILMINGTON	NEW HANOVER
NCD003221868	CENTURY FURNITURE COMPANY	HICKORY	CATAWBA
NCN000407241	CHADBOURN BATTERY	CHADBOURN	COLUMBUS
NCD986188001	CHAMPION INTERNATIONAL LANDFILL #1	CANTON	HAYWOOD
NCD003148889	CHAMPION INTERNATIONAL/CANTON MILL	CANTON	HAYWOOD
NCD986188019	CHAMPION LANDFILL #2	CANTON	HAYWOOD
NCD986188027	CHAMPION LANDFILL #3	CANTON	HAYWOOD
NONCD0000035	CHAPEL STREET BATTERY DUMP	KANNAPOLIS	ROWAN
NCD980557771	CHARLOTTE CITY DUMP	CHARLOTTE	MECKLENBURG

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD024468597	CHARLOTTE STEEL DRUM	CHARLOTTE	MECKLENBURG
NONCD0000083	CHEESMAN PROPERTY	ROCKWELL	CABARRUS
NONCD0000044	CHEMICAL AND SOLVENTS, INC.	GREENSBORO	GUILFORD
NC0000183103	CHEMICAL CARTAGE COMPANY	LELAND	BRUNSWICK
NCD043711977	CHEMICAL LEAMAN TANK LINES, INC.	GREENSBORO	GUILFORD
NCD980799019	CHEROKEE OIL	CHARLOTTE	MECKLENBURG
NCD986190239	CHEROKEE OIL	CHARLOTTE	MECKLENBURG
NCD981473150	CHERRY MT STREET DRUM	FOREST CITY	RUTHERFORD
NONCD0000041	CIBA-GEIGY	CHARLOTTE	MECKLENBURG
NCD980844732	CLAYTON BALL FIELD	CLAYTON	JOHNSTON
NCD003223799	CLAYTON-MARCUS CO., INC.	BETHLEHEM	ALEXANDER
NONCD0001001	CLOSED CITY OF HENDERSON LDFL	HENDERSON	VANCE
NONCD0000016	CMC LANDFILL	ELKIN	SURRY
NONCD0001082	CMI FLYASH DISPOSAL (PARCEL 2)	ELKIN	SURRY
NONCD0001092	CMI WWTP (PARCEL1)	ELKIN	SURRY
NCD054417308	COASTAL CHEMICAL CORP.	CLAYTON	JOHNSTON
NCD003186178	COASTAL CHEMICAL CORP.	GREENVILLE	PITT
NONCD0000030	COLLINS AND AIKMAN	GRAHAM	ALAMANCE
NCD003467099	CONE MILLS CORP/GRANITE FINISHING	HAW RIVER	ALAMANCE
NCD003162500	CONSOLIDATED ENGRAVERS CORP.	CHARLOTTE	MECKLENBURG
NCD130708126	CONSOLIDATED WAREHOUSE	CHARLOTTE	MECKLENBURG
NCD003218161	CORNELL-DUBILIER ELECTRONICS	SANFORD	LEE
NCD003195161	CORNING GLASS WORKS	RALEIGH	WAKE
NCD003938586	CORNING GLASS WORKS	WILMINGTON	NEW HANOVER
NC0000998336	CP PROPERTIES	SANFORD	LEE
NCD980502892	CREEK BRIDGE/BORDEN CHEMICAL	FAYETTEVILLE	CUMBERLAND
NCD986172492	CRESTLINE CONTAMINATED WELLS	ABERDEEN	MOORE
NCD044444735	CROMPTON & KNOWLES CORP.	LOWELL	GASTON
NONCD0001027	CROWDERS MOUNTAIN STATE PARK	GASTONIA	GASTON
NCD044447639	CROWN CENTRAL PETROLEUM CORP.	PAW CREEK	MECKLENBURG
NCD003149556	CTS OF ASHEVILLE, INC.	SKYLAND	BUNCOMBE
NCD982117590	CUSTOM PROCESSING AND	HIGH POINT	GUILFORD
NCD080885551	DAUGHERTY CHEMICAL COMPANY	DURHAM	DURHAM
NONCD0000059	DAYCO COCHRAN LANDFILL	WAYNESVILLE	HAYWOOD
NCD982119463	DAYCO LANDFILL CRYME COVE ROAD	WAYNESVILLE	HAYWOOD
NONCD0001071	DOE-SPUN	HOLLISTER	HALIFAX
NONCD0001040	DOMESTIC LAUNDRY/WASHBURN GRAPHICS	CHARLOTTE	MECKLENBURG
NCD003213030	DOUGLAS BATTERY MANUFACTURING CO.	WINSTON-SALEM	FORSYTH
NONCD0000091	DUKE POWER/WALNUT COVE	WALNUT COVE	STOKES
NCD003230836	DUKE REFINING CORPORATION	HIGH POINT	GUILFORD
NCD986188498	DURA-BUILT ENGINES CO	COATS	HARNETT
NCD981016280	DURHAM ANIMAL CLINIC	DURHAM	DURHAM

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ID Number	*Site Name*	*City*	*County*
NCD004520136	EATON CORPORATION	ROXBORO	PERSON
NCD024740433	EC MANUFACTURING	PINEVILLE	MECKLENBURG
NCD980558019	ELK MOUNTAIN LANDFILL	ASHEVILLE	BUNCOMBE
NC0001402213	ELLIS JUNK YARD	HAYESVILLE	CLAY
NCD075563932	ESB INC/EXIDE CORPORATION	RALEIGH	WAKE
NCD980557946	FAIRVIEW LANDFILL	FAIRVIEW	BUNCOMBE
NCD062566047	FASCO CONTROLS CORPORATION	SHELBY	CLEVELAND
NCD067178707	FAWN PLASTICS CO., INC.	MIDDLESEX	NASH
NCD990867855	FAWN PLASTICS CO., INC.	ROCKY MOUNT	NASH
NCD980502934	FAYETTEVILLE LANDFILL	FAYETTEVILLE	CUMBERLAND
NCD066327313	FINETEX, INC.	SPENCER	ROWAN
NCD980557953	FISHBURNE LANDFILL	FLETCHER	BUNCOMBE
NCD003154960	FLEMING LABORATORIES	CHARLOTTE	MECKLENBURG
NCD980557854	FMC/NIAGARA PESTICIDES	AYDEN	PITT
NONCD0000075	FOAMEX/REEVES BROTHERS	CORNELIUS	MECKLENBURG
NCD986172617	FORBES ROAD WELLS	GASTONIA	GASTON
NCD071579528	FORBUSH METAL	YADKINVILLE	YADKIN
NCD981468622	FORK SWAMP/GRADY WHITE BOAT	AYDEN	PITT
NCD001871854	FRUEHAUF TRAILER CORPORATION	CHARLOTTE	MECKLENBURG
NONCD0000092	FUNDER AMERICA	MOCKSVILLE	DAVIE
NCSFN0406953	G&B/FARMER PROPERTY	SCOTLAND NECK	HALIFAX
NCD000616219	GA-PACIFIC CORP	HAMLET	RICHMOND
NONCD0000024	GAITHER TRANSOU PROPERTY	GREENSBORO	GUILFORD
NCD003221462	GARDNER MIRROR CORPORATION	NORTH WILKESBORO	WILKES
NC0002374445	GASTONIA INDUSTRIAL TRUCK	GASTONIA	GASTON
NONCD0001068	GENCORP PRINTWORLD INC	MONROE	UNION
NCD003198967	GENERAL ELECTRIC CO/CAROLINA	GOLDSBORO	WAYNE
NCD072018252	GENERAL ELECTRIC CO/MED STEAM TURBIN	DURHAM	DURHAM
NONCD0001034	GEORGE STREET PESTICIDE	GOLDSBORO	WAYNE
NCD980848766	GIBBS ELECTROPLATING	CHARLOTTE	MECKLENBURG
NONCD0001022	GIBBS ELECTROPLATING - OLD LOCATION	CHARLOTTE	MECKLENBURG
NCD980557607	GLASS, EH COUNTY LANDFILL	GREENSBORO	GUILFORD
NC0001206473	GLEN RAVEN MILLS	BURLINGTON	ALAMANCE
NCD003158094	GLEN RAVEN MILLS	BURNSVILLE	YANCEY
NONCD0000055	GLISSON ENTERPRISES	GREENVILLE	PITT
NCD980557649	GOLDSBORO MUNICIPAL LANDFILL	GOLDSBORO	WAYNE
NCD980843460	GRANT CREEK WWTP	SALISBURY	ROWAN
NONCD0000043	GREAT LAKES CARBON CORPORATION	MORGANTON	BURKE
NCD980557698	GREENVILLE CITY LANDFILL	GREENVILLE	PITT
NCD982124646	GREGSON FUNITURE INDUSTRIES	LIBERTY	RANDOLPH
NCD980557912	GROVE STONE LANDFILL	BLACK MOUNTAIN	BUNCOMBE
NCD980558761	GS LABORATORY EQUIPMENT	ASHEVILLE	BUNCOMBE

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ID Number	Site Name	City	County
NONCD0001064	GUILFORD MILLS PLANT	FUQUAY-VARINA	WAKE
NCD055550560	GULF ADHESIVES & RESINS/PERKINS	HIGH POINT	GUILFORD
NCD067437400	GULF OIL CORPORATION	MCLEANSVILLE	GUILFORD
NONCD0001028	GURLEY DRIVE LANDFILL	CONCORD	CABARRUS
NCD986172526	GURLEY PESTICIDE BURIAL	SELMA	JOHNSTON
NCD024459471	GUYTON BATTERY SERVICE	CHADBOURN	COLUMBUS
NCD049772023	H & S PROCESSORS, INC.	LINCOLNTON	LINCOLN
NONCD0000073	H. M. WADE FURNITURE	CHARLOTTE	MECKLENBURG
NCD084171545	HALIFAX COUNTY LANDFILL		HALIFAX
NONCD0000087	HARPER CRAWFORD BAG CO.	CHARLOTTE	MECKLENBURG
NCD000822130	HARRELSON RUBBER COMPANY	ASHEBORO	RANDOLPH
NCD980557722	HARRISBURG BATTERY	HARRISBURG	CABARRUS
NCD108702606	HARTSOE BATTERY	KANNAPOLIS	ROWAN
NCD986166692	HARWELL ROAD SEPTIC PIT	GASTONIA	GASTON
NCD044515211	HAYES-ALBION CORP/BRIGGS-SHAFFNER	WINSTON-SALEM	FORSYTH
NCD980483275	HELENA CHEMICAL COMPANY	ENFIELD	HALIFAX
NCD082363102	HELENA CHEMICAL COMPANY	LAURINBURG	SCOTLAND
NCD003163888	HENREDON FURNITURE	MORGANTON	BURKE
NCD024817827	HENREDON FURNITURE	SPRUCE PINE	MITCHELL
NCD981003957	HENSON LANDFILL	FOREST CITY	RUTHERFORD
NCD986171270	HESTA CARILLON PROJECT	CHARLOTTE	MECKLENBURG
NC0000998344	HICKORY GROVE ROAD TCE	MCADENVILLE	GASTON
NCD003225620	HIGH POINT FURNITURE INDUSTRIES	HIGH POINT	GUILFORD
NCD003216397	HIGHLAND INDUSTRIES/BURLINGTON IND.	KERNERSVILLE	FORSYTH
NCD046149019	HISTRAND CHEMICAL, INC.	LENOIR	CALDWELL
NCD981928021	HOLLINGSWORTH PROPERTY	FAYETTEVILLE	CUMBERLAND
NCD081333858	HOLSTON ENERGY INC/HOLSTON FUEL	WAYNESVILLE	HAYWOOD
NCD980558035	HOMINY CREEK LANDFILL	ASHEVILLE	BUNCOMBE
NCD048401087	HOOKER FURNITURE	PLEASANT GARDEN	GUILFORD
NCD054283189	HOOVER MACHINE SHOP	GASTONIA	GASTON
NCD003233673	HOOVER REPAIR SHOP	MT AIRY	SURRY
NCD980502983	HOPE MILLS LANDFILL	HOPE MILLS	CUMBERLAND
NCD060291051	HOW ENTERPRISES	ABERDEEN	MOORE
NCD980847123	HURT RESIDENCE	MORGANTON	BURKE
NONCD0000050	HWY 268 MIRROR WASTE DUMP	NORTH WILKESBORO	WILKES
NONCD0001018	HWY 49 BATTERY DUMP	CHARLOTTE	MECKLENBURG
NCD053010724	ICI - AMERICAS, INC.	CHARLOTTE	MECKLENBURG
NONCD0000031	INDEPENDENCE MALL OUTPARCEL	WILMINGTON	NEW HANOVER
NCD980839757	INDIAN GRAVE GAP DRUM DISPOSAL	LENOIR	CALDWELL
NCD990868168	INMONT CORP/BASF CORPORATION	CHARLOTTE	MECKLENBURG
NCD003186004	INTERNATIONAL PAPER RICHMOND	RALEIGH	WAKE
NCD980518211	IRT/IBM CORPORATION	CHARLOTTE	MECKLENBURG

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ID Number	*Site Name*	*City*	*County*
NONCD0001072	J & C DYEING	SHELBY	CLEVELAND
NCD980502991	JACKSONVILLE LANDFILLS	JACKSONVILLE	ONSLOW
NONCD0000056	JAMES LANDFILL	LAURINBURG	SCOTLAND
NC0000195743	JIMMY GREEN METALS	NASHVILLE	NASH
NCD981928385	JOHN DEERE TRACTOR	MOCKSVILLE	DAVIE
NCD000770487	JOHNSON CONTROLS GLOBE BATTERY	WINSTON-SALEM	FORSYTH
NONCD0000085	JONES & PRESNELL STUDIO	CHARLOTTE	MECKLENBURG
NONCD0001036	JOYCETON WATER WORKS WELL #2	LENOIR	CALDWELL
NONCD0001037	JOYCETON WATER WORKS WELL #9	LENOIR	CALDWELL
NONCD0001011	JUNG CORPORATION	ASHEBORO	RANDOLPH
NCD980557847	KAISER ACME FARMARKET	RIEGELWOOD	COLUMBUS
NCD986228054	KANNAPOLIS PCE SPILL	KANNAPOLIS	CABARRUS
NCD981031693	KEENER LANDFILL	CLINTON	SAMPSON
NCD048958615	KELLY-SPRINGFIELD TIRE CO/GOODYEAR	FAYETTEVILLE	CUMBERLAND
NCD980557805	KERR MCGEE CORPORATION	NAVASSA	BRUNSWICK
NCD981927908	KIDD LANE BATTERY DISPOSAL	CHARLOTTE	MECKLENBURG
NCD097361018	KIN PROPERTIES ABANDONNED DRUMS	CHARLOTTE	MECKLENBURG
NCD980729677	KNOB CREEK FLYASH DISPOSAL	BREVARD	TRANSYLVANIA
NCD002388965	LACKAWANNA LEATHER CO., INC.	CONOVER	CATAWBA
NCD981863814	LANCASTER PLATING	LILLINGTON	HARNETT
NCD053528170	LAURENS GLASS/BALL-INCON GLASS PACK	HENDERSON	VANCE
NCN000407197	LEARY BROTHERS STORAGE (FORMER)	EDENTON	CHOWAN
NCD986175628	LEE'S MOTOR WORKS	GASTONIA	GASTON
NCD980557888	LENOIR CITY LANDFILL	LENOIR	CALDWELL
NCD079066833	LENOIR REFINING COMPANY	LENOIR	CALDWELL
NONCD0001079	LES MYERS PARK	CONCORD	CABARRUS
NONCD0001050	LEXINGTON FURNITURE IND. PLNT #12	LEXINGTON	DAVIDSON
NONCD0001048	LEXINGTON FURNITURE IND. PLNT #2	LEXINGTON	DAVIDSON
NONCD0001049	LEXINGTON FURNITURE IND. PLNT #7	LEXINGTON	DAVIDSON
NCD003213568	LIBERTY FURNITURE CORP/CHROMCRAFT	LIBERTY	RANDOLPH
NONCD0001056	LITTLE MOUNTAIN LANDFILL	TRYON	POLK
NONCD0000006	LITTLEFIELD LANDFILL	AYDEN	PITT
NCD980848782	MADISON COUNTY CYANIDE SITE	LEICESTER	MADISON
NCD003167988	MARANTZ PIANO CO INC/ANEVKA, INC	MORGANTON	BURKE
NCD000623223	MARTIN MANUFACTURING PROPERTIES	WILLIAMSTON	MARTIN
NCD991278755	MARTIN'S BATTERY SALVAGE, INC.	KANNAPOLIS	CABARRUS
NONCD0001015	MARY CIRCLE BATTERY	CONCORD	CABARRUS
NONCD0000096	MASON DRUM STORAGE	CANTON	HAYWOOD
NCD055359079	MASONITE CORP. FIBERBOARD DIV.	SPRING HOPE	NASH
NCD986223170	MCBESS INDUSTRIES	HIGH SHOALS	GASTON
NCD980838551	MCDOWELL FIREMAN ASSOCIATION SITE	MARION	MCDOWELL
NCD986172500	MCLEAN BROTHERS FARM	WAGRAM	SCOTLAND

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ID Number	Site Name	City	County
NONCD0000027	MEADOWVIEW ROAD	GREENSBORO	GUILFORD
NONCD0000047	MEADS AIRFIELD PESTICIDES	WEEKSVILLE	PASQUOTANK
NCD991279118	MEREDITH/BURDA, INC.	NEWTON	CATAWBA
NCD980503031	MILAN YARD LANDFILL	FAYETTEVILLE	CUMBERLAND
NCD089914311	MILLER BREWING CO/CONT DIV	REIDSVILLE	ROCKINGHAM
NONCD0001041	MITCHELL & BECKER	CHARLOTTE	MECKLENBURG
NCD042891663	MITCHELL ENGR CO/CECO BLDG. DIV.	ROCKY MOUNT	NASH
NCD991277724	MITCHELL SYSTEMS, INC.	SPRUCE PINE	MITCHELL
NCD990883001	MONARCH FURNITURE CORPORATION	JAMESTOWN	GUILFORD
NCD008839276	MONEY-WORTH, INC	SWANNANOA	BUNCOMBE
NCD088563242	MONSANTO COMPANY/ROHM & HAAS	FAYETTEVILLE	CUMBERLAND
NONCD0000054	MOORES COMPANY	HENDERSON	VANCE
NONCD0000097	MORRIS, NORMAN	ELON COLLEGE	ALAMANCE
NONCD0001095	MOSES CONE MEMORIAL PARK	BLOWING ROCK	WATAUGA
NCD980559355	NASH COUNTY LANDFILL/SR 1145	SPRING HOPE	NASH
NCD980559330	NASH COUNTY LANDFILL/SR 1524	RED OAK	NASH
NCD982174492	NATIONAL PIN	SARATOGA	WILSON
NCD003196847	NATIONAL SPINNING COMPANY	WASHINGTON	BEAUFORT
NCSFN0407074	NC MARITIME MUSEUM	BEAUFORT	CARTERET
NONCD0000076	NC SALVAGE CO.	GOLDSBORO	WAYNE
NCD981023732	NEUVILLE SOCK PROPERTY	HILDEBRAN	BURKE
NCD003235066	NEW AGE FURNITURE CO/MILLER TOOL	LEXINGTON	DAVIDSON
NCD990715070	NEW HANOVER CY & CAROLINA LDFL	CAROLINA BEACH	NEW HANOVER
NCD986171379	NEW HAVEN DRIVE TCE	GASTONIA	GASTON
NCD991278839	NORTH STATE CHEMICALS	GREENSBORO	GUILFORD
NCD986186518	OLD ATC REFINERY	WILMINGTON	NEW HANOVER
NCD986166734	OLD BEAUFORT CO. LANDFILL	WASHINGTON	BEAUFORT
NONCD0001065	OLD CHARLOTTE LDFL/VANGUARD CENTRE	CHARLOTTE	MECKLENBURG
NONCD0001074	OLD FORD BLDG	TABOR CITY	COLUMBUS
NONCD0001090	OLD MILL BLDG	HENDERSONVILLE	HENDERSON
NCD986172518	OLD MOUNT HOLLY ROAD PCE SITE	CHARLOTTE	MECKLENBURG
NONCD0000079	OLD PINEHURST HOTEL CLEANERS	PINEHURST	MOORE
NCD986197374	OLD RANDLEMAN TOWN DUMP	RANDLEMAN	RANDOLPH
NCSFN0406906	OLD STAKE ROAD	CHADBOURNE	COLUMBUS
NCD986185411	OLD WESTERN NC FAIRGROUNDS	EAST FLAT ROCK	HENDERSON
NCD980728745	OSHIELDS FLY ASH	BREVARD	TRANSYLVANIA
NONCD0001039	OVERCASH GRAVEL & GRADING CO. INC.	CONCORD	CABARRUS
NCD003520301	OVERCASH MACHINE SHOP, INC.	STATESVILLE	IREDELL
NCD986215499	PARKER INDUSTRIES	CONNELLY SPRINGS	BURKE
NCD144192606	PARKER-ZENITH	ABERDEEN	MOORE
NONCD0000099	PARTON'S MOTOR COMPANY	GASTONIA	GASTON
NCD057248759	PATCH RUBBER POND	ROANOKE RAPIDS	HALIFAX

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ID Number	*Site Name*	*City*	*County*
NCD986171338	PEELE CO. PESTICIDE DISPOSAL	CLAYTON	JOHNSTON
NCD980503098	PFIZER INC/SKATE STADIUM	GREENSBORO	GUILFORD
NCD003196193	PIFER INDUSTRIES, INC.	DURHAM	DURHAM
NCD986166379	PILOT MOUNTAIN TIRE FIRE	PILOT MOUNTAIN	SURRY
NCD980557672	PITT COUNTY UTILITY LANDFILL	GREENVILLE	PITT
NCD075570820	PLYMOUTH WOOD TREATING COMPANY	PLYMOUTH	WASHINGTON
NCD980558027	POND ROAD LANDFILL 2	ASHEVILLE	BUNCOMBE
NCD986170694	POULOS GROUNDWATER CONTAMINATION	CHARLOTTE	MECKLENBURG
NCD980559983	PPG IND., INC./WKS 52	SHELBY	CLEVELAND
NCD062548995	QUORUM KNITTING	WEAVERVILLE	BUNCOMBE
NONCD0001029	R & D LAMINATORS INC	AHOSKIE	HERTFORD
NCD003149663	RADIATOR SPECIALTY COMPANY	CHARLOTTE	MECKLENBURG
NCD981031578	RAINBOW DRIVE BATTERY	KANNAPOLIS	CABARRUS
NCD003216413	RALEIGH ROAD FURNITURE CORP. STANLEY	LEXINGTON	DAVIDSON
NONCD0000025	RANGE ROAD BURN SITE	BUTNER	GRANVILLE
NCD002972966	REA MAGNET WIRE COMPANY	LAURINBURG	SCOTLAND
NCD083673616	REEVES BROTHERS	RUTHERFORDTON	RUTHERFORD
NCD003152659	REICHHOLD CHEMICAL, INC.	CONCORD	CABARRUS
NCD049845548	REICHHOLD CHEMICAL, INC.	MONCURE	CHATHAM
NCD062664883	REINCO CHEMICAL COMPANY	ROANOKE RAPIDS	HALIFAX
NCD986176030	RHODERA DRIVE WELLS	STALLINGS	UNION
NCD060306727	RICHARDS WC COMPANY, INC.	ABERDEEN	MOORE
NCD980557789	RICHMOND COUNTY LANDFILL	ROCKINGHAM	RICHMOND
NCD980839716	RIVERDALE HOMES/EARL GETTS	DURHAM	DURHAM
NCD980838379	ROWE CORP PROPERTY/BOULIGNY SITE	CHARLOTTE	MECKLENBURG
NONCD0001016	ROYSTER-CLARK FERTILIZER PLANT	OAK CITY	MARTIN
NCD093334969	S & S METALS RECYCLING COMPANY	GOLD HILL	CABARRUS
NCD003228087	S&W CHEMICALS, INC.	HICKORY	CATAWBA
NCD000776732	SAFETY-KLEEN CORP 3-031-02	WALLACE	DUPLIN
NCD980602791	SALVAGE OIL OF AMERICA	ROCKINGHAN	RICHMOND
NCD000281832	SANFORD PLATING COMPANY	SANFORD	LEE
NCD980503106	SANITATION SERV LAND	SAINT PAULS	ROBESON
NCD062552153	SAYLES-BILTMORE BLEACHERIES	ASHEVILLE	BUNCOMBE
NCD093338119	SCM CORP. GLIDDEN COATINGS & RESINS	CHARLOTTE	MECKLENBURG
NCD003229358	SCM PROCTOR-SILEX/WEAREVER	MOUNT AIRY	SURRY
NCD003155587	SCOTT AVIATION OF MONROE/TOOL SERV	MONROE	UNION
NCD980848840	SCOTT'S CREEK BATTERY SITE	NEW BERN	CRAVEN
NCD000616516	SCOVILL INC/SECURITY PRODUCTS	MONROE	UNION
NCD980600449	SED, INC. RADAR ROAD	GREENSBORO	GUILFORD
NCD980712038	SED, INC. SWING COURT	GREENSBORO	GUILFORD
NCD003231545	SHERWOOD TREATING CO., INC.	WINSTON-SALEM	FORSYTH
NCN000407206	SHULIMSON BROTHERS SCRAP YARD	ASHEVILLE	BUNCOMBE

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N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD067428821	SIEMENS-ALLIS, INC/SWITCHGEAR DIV	SANFORD	LEE
NCD083678631	SINCLAIR AND VALENTINE CO.	CHARLOTTE	MECKLENBURG
NCD098765506	SINGER CO/FURNITURE DIV BRYSON	BRYSON CITY	SWAIN
NCD072012354	SINGER CO/FURNITURE DIV WASHINGTON	CHOCOWINITY	BEAUFORT
NONCD0001009	SINGER PLANT #2	LENOIR	CALDWELL
NONCD0000019	SIR WALTER GUN CLUB	RALEIGH	WAKE
NCD980503148	SOUTHCHEM LANDFILL	DURHAM	DURHAM
NCD990715658	SOUTHERN MANUFACTURING, INC.	CHARLOTTE	MECKLENBURG
NONCD0001080	SOUTHERN METALS RECYCLING, INC	WILMINGTON	NEW HANOVER
NCD077821296	SOUTHERN RESIN/US INDUSTRIES INC	THOMASVILLE	DAVIDSON
NCD042269134	SOUTHERN SCREW/FARLEY METALS	STATESVILLE	IREDELL
NONCD0000042	SOUTHMET, INC.	GREENVILLE	PITT
NONCD0001076	SOUTHSIDE INVESTMENTS LLC	CHARLOTTE	MECKLENBURG
NCD986180917	SPANN PROPERTY	HENDERSONVILLE	HENDERSON
NCD003167780	SPRAGUE ELECTRIC COMPANY	LANSING	ASHE
NCD003214574	SPRUANCE SOUTHERN, INC.	WINSTON-SALEM	FORSYTH
NCD991278730	SQUIBB E R & SONS	KENLY	JOHNSTON
NCSFN0406894	STALLINGS SALVAGE	MONROE	UNION
NCD084167444	STANADYNE, INC/DIESEL SYSTEMS	JACKSONVILLE	ONSLOW
NCD054284518	STANDARD PACKAGING CORPORATION	MT GILEAD	MONTGOMERY
NCD049845266	STANLEY CASE GOODS (FORMER)	WEST END	MOORE
NONCD0000001	STANLY NEWS & PRESS	ALBEMARLE	STANLY
NCD000605097	STATESVILLE ROAD LANDFILL	CHARLOTTE	MECKLENBURG
NCD024895864	STEWART-WARNER CORP/BASSICK-SACK	WINSTON-SALEM	FORSYTH
NCD986227965	STOLLER CHEMICAL - SEVERN	SEVERN	NORTHAMPTON
NCD986211274	STONEY FORK CREEK DRUM DUMP SITE	DEEP GAP	WILKES
NCD083669952	STORY BURIAL AREAS/UNION CHEMICAL	CHARLOTTE	MECKLENBURG
NCD053487765	STRATFORD METAL FINISHINGS, INC.	WINSTON-SALEM	FORSYTH
NCD003229762	STRUCTURAL WOODS PRESERVING CO.	COLERIDGE	RANDOLPH
NONCD0000679	STURGEON CITY PROPERTY	JACKSONVILLE	ONSLOW
NCD986232213	SUMMIT RESOURCE MANAGEMENT	STALLINGS	UNION
NCD081428104	SUN CHEM CORPORATION/GPI DIV	WINSTON-SALEM	FORSYTH
NCD000006361	SUPERIOR ELECTRO FINISHES	WINSTON SALEM	FORSYTH
NCD024600579	SUPERIOR PRODUCTS COMPANY	GREENSBORO	GUILFORD
NONCD0001062	SWAIM'S TRUCK PARTS & SERVICE	HENDERSON	VANCE
NCD980557987	SWANNANOA LANDFILL	SWANNANOA	BUNCOMBE
NCD981474158	SWEETEN CREEK DRUM SITE	ASHEVILLE	BUNCOMBE
NCD981921083	SWIFT ADHESIVES	PINEVILLE	MECKLENBURG
NCD980559389	TARBORO LANDFILL	TARBORO	EDGECOMBE
NCD981932023	TARBORO-EDGECOMBE AIRPORT	TARBORO	EDGECOMBE
NCD000828566	TARTAN MARINE PROPERTY	HAMLET	RICHMOND
NCD105797922	TECHNIBILT/DIV OF WHITTAKER	NEWTON	CATAWBA

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SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD070619911	TELEDYNE ALLVAC MONROE PLANT	MONROE	UNION
NCD086326741	TEXACO INC/APEX	APEX	WAKE
NCD000623199	TEXACO INC/FAYETTEVILLE	FAYETTEVILLE	CUMBERLAND
NCD096165121	TEXACO INC/GREENSBORO	GREENSBORO	GUILFORD
NCD046148318	TEXACO INC/PAW CREEK	PAW CREEK	MECKLENBURG
NCD041519364	TEXASGULF CHEMICALS COMPANY	AURORA	BEAUFORT
NCD065295495	TEXFI IMPRESSIONS	GOLDSBORO	WAYNE
NONCD0001075	TEXFI INDUSTRIES, INC	FAYETTEVILLE	CUMBERLAND
NCD981928088	TEXFI INDUSTRIES, INC/NEW BERN	NEW BERN	CRAVEN
NONCD0000074	TEXTILE CHEMICAL FACILITY	CHARLOTTE	MECKLENBURG
NONCD0000084	THERMO PRODUCTS, INC.	DENTON	DAVIDSON
NCD077838589	THOMASVILLE FOREST PRODUCTS	THOMASVILLE	DAVIDSON
NCD095470332	THONIT A SIMMONS COMPANY	CHARLOTTE	MECKLENBURG
NCD986231967	TOM SADLER ROAD WELLS	CHARLOTTE	MECKLENBURG
NONCD0001025	TOOMEY PROPERTY	SPRINGWOOD	GASTON
NCD072028251	TORPEDO WIRE & STRIP, INC.	ROCKY MOUNT	NASH
NCD980843528	TOWN CREEK REGIONAL WWTP	SALISBURY	ROWAN
NCD067392175	TRAMCO, INC.	CONNELLY SPRINGS	BURKE
NONCD0001005	TRANSEASTERN CORP.	WILSON	WILSON
NCN000407205	TRI-COUNTY AIRPORT	AULANDER	HERTFORD
NCN000407333	TRIAD USED AUTO SALES	GREENSBORO	GUILFORD
NCD087336335	TRIANGLE PACIFIC CORP/IXL DIV.	ELIZABETH CITY	PASQUOTANK
NONCD0000081	TRITON, INC	WILSON	WILSON
NCD082362989	TUNGSTEN QUEEN MINE/ATLAS MINE	TOWNSVILLE	VANCE
NCD981864614	ULAH BATTERY/BATTERY PILES	ASHEBORO	RANDOLPH
NCD003216959	UNION CAMP CORPORATION	JAMESTOWN	GUILFORD
NCD003183480	UNION CAMP CORPORATION	SMITHFIELD	JOHNSTON
NCD980844336	UNION CARBIDE BATTERY	CHARLOTTE	MECKLENBURG
NCD003216462	UNION CARBIDE CORP/EVEREADY BATTERY	ASHEBORO	RANDOLPH
NCD003184249	UNION CARBIDE CORP/EVEREADY BATTERY	GREENVILLE	PITT
NCD000609974	UNION OIL CO. SE TERM	GREENSBORO	GUILFORD
NCD003164464	UNIROYAL INC/UNIROYAL CHEMICAL	GASTONIA	GASTON
NCD061795696	UNITEX CHEMICALS	GREENSBORO	GUILFORD
NCD980557623	UNIVERSITY OF NC/ARPT WASTE DISP	CHAPEL HILL	ORANGE
NCD980557615	UNIVERSITY OF NC/OLD SANITARY LDFL	CHAPEL HILL	ORANGE
NCN000407188	US 1-15/501 ABERDEEN	ABERDEEN	MOORE
NCD981472624	US 70 DRUM DUMP	MORGANTON	BURKE
NC5210022906	USA RESERVE XVIII AIRBORNE CORPS	MOREHEAD CITY	CARTERET
NCD000828616	USS AGRI-CHEMICALS FARM SERVICE	WHITEVILLE	COLUMBUS
NONCD0000003	VAN WATERS & ROGERS	CHARLOTTE	MECKLENBURG
NCD093783876	VANIER GRAPHICS CORPORATION	EDEN	ROCKINGHAM
NCD003464765	VAUGHAN-BASSETT FURNITURE CO.	ELKIN	SURRY

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ID Number	*Site Name*	*City*	*County*
NCSFN0406924	VC CHEMICAL	WADESBORO	ANSON
NC0002178580	VC CHEMICAL-ALMONT WORKS	WILMINGTON	NEW HANOVER
NCSFN0406962	VINEGAR HILL LEAD SITE	TABOR CITY	COLUMBUS
NCD093132207	VOICE OF AMERICA RELAY STATION	GREENVILLE	PITT
NONCD0000048	WALKER DRUM DISPOSAL	GOLD HILL	ROWAN
NCD003236841	WARLICK PAINT COMPANY	STATESVILLE	IREDELL
NONCD0000022	WATTS REGULATOR-DAVIS PROPERTY SITE	SPINDALE	RUTHERFORD
NONCD0000060	WATTS REGULATOR-GENERAL AIDES SITE	FOREST CITY	RUTHERFORD
NONCD0000057	WATTS, LEVI PROPERTY	TABOR CITY	COLUMBUS
NONCD0001091	WEST MOREHEAD ST PESTICIDE	CHARLOTTE	MECKLENBURG
NCD045924032	WEST POINT PEPPERELL LUMBERTON	LUMBERTON	ROBESON
NCD003195963	WESTINGHOUSE ELEC METER & LIGHT	RALEIGH	WAKE
NONCD0001006	WESTINGHOUSE TURBINE	CHARLOTTE	MECKLENBURG
NCD052553641	WEYERHAEUSER CO/LEWISTON	LEWISTON	BERTIE
NCD071567259	WEYERHAEUSER CO/MONCURE	MONCURE	CHATHAM
NCD003220969	WHITE FURNITURE CO.	MEBANE	ALAMANCE
NONCD0000012	WHITE'S GRAVEL PIT	CONCORD	CABARRUS
NCD003151651	WILLARD SMELTING CO.	CHARLOTTE	MECKLENBURG
NCD001704980	WILMINGTON BRANCH/BORDEN/SMITH	NAVASSA	BRUNSWICK
NCD986166759	WILSON SEPTIC PITS	HICKORY	CATAWBA
NCD024477556	WINSTON CONTAINER COMPANY	CHARLOTTE	MECKLENBURG
NCD003183571	WINTERVILLE MACHINE WORKS, INC.	WINTERVILLE	PITT
NCD986170678	WOOD ROAD DRUM BURIAL	GASTONIA	GASTON
NC0001279710	WOODY WILSON BATTERY/ASHLEY HEIGHTS	ASHLEY HEIGHTS	HOKE
NCD986166288	WOODY'S TIRE FIRE	GASTONIA	GASTON

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RESPONSIBLE PARTY VOLUNTARY REMEDIAL ACTION SITES

ID Number	*Site Name*	*City*	*County*
NONCD0000040	ABBOTT LABORATORIES	LAURINBURG	SCOTLAND
NONCD0000039	ABITIBI-PRICE CORPORATION	ROARING RIVER	WILKES
NCD047257472	APPLIED RESEARCH GROUP, INC.	CHARLOTTE	MECKLENBURG
NCD074511361	AQUAIR CORPORATION	CHARLOTTE	MECKLENBURG
NCD986188787	ASHEVILLE COAL GAS PLANT #1	ASHEVILLE	BUNCOMBE
NONCD0000032	ASHEVILLE COAL GAS PLANT #2	ASHEVILLE	BUNCOMBE
NCD072003635	ATHOL MANUFACTURING COMPANY	BUTNER	GRANVILLE
NCD003193588	BARBOUR BOAT WORKS, INC.	NEW BERN	CRAVEN
NONCD0000002	BURLINGTON COAL GAS PLANT	BURLINGTON	ALAMANCE
NCD986171965	CARO-KNIT	WILMINGTON	NEW HANOVER
NCD000608117	CELANESE CORPORATION/FIBERS TECH	CHARLOTTE	MECKLENBURG
NCD986188803	CHARLOTTE COAL GAS PLANT NO. 2	CHARLOTTE	MECKLENBURG
NCD986197333	CONCORD COAL GAS PLANT	CONCORD	CABARRUS
NONCD0001097	COPES-VULCAN, INC	CHARLOTTE	MECKLENBURG
NONCD0001061	CP&L NORTHERN DIVISION COMPLEX	GARNER	WAKE
NC0001606250	CRISTEX DRUM	OXFORD	GRANVILLE
NCD062567623	DIAMOND SHAMROCK CORP/HENKEL	CHARLOTTE	MECKLENBURG
NONCD0001035	DUKE ENERGY-WINSTON-SALEM POWER	WINSTON-SALEM	FORSYTH
NCD981861743	DUKE POWER/GREENSBORO GAS PLANT	GREENSBORO	GUILFORD
NCD000813519	DUKE UNIVERSITY	DURHAM	DURHAM
NCD986173938	DURHAM GAS PLANT	DURHAM	DURHAM
NONCD0001058	ELECTRONICS COMPONENT CORPORATION	BURGAW	PENDER
NCD986197267	ELIZABETH CITY COAL GAS	ELIZABETH CITY	PASQUOTANK
NCD986197341	FAYETTEVILLE COAL GAS/RAY AVE	FAYETTEVILLE	CUMBERLAND
NCD041414780	FIELDCREST MILLS INC./NC FINISHING	SALISBURY	ROWAN
NONCD0000017	FLAKT PRODUCTS	WINSTON-SALEM	FORSYTH
NONCD0000029	FLEET AEROSPACE CORP./AERONCA	CHARLOTTE	MECKLENBURG
NCD093340487	FLORIDA STEEL CORPORATION	CHARLOTTE	MECKLENBURG
NCD000813600	GA-PACIFIC CORP CHIP-N-SAW	WHITEVILLE	COLUMBUS
NCD000773515	GA-PACIFIC CORP/HDWD SAW	BOWDENS	DUPLIN
NCD000773507	GA-PACIFIC CORP/HDWD SAW	ENFIELD	HALIFAX
NCD986188829	GASTONIA COAL GAS PLANT	GASTONIA	GASTON
NCD051322980	GENERAL ELECTRIC CO.	CHARLOTTE	MECKLENBURG
NCD003163730	GENERAL INSTRUMENT CORP.	FAIRVIEW	BUNCOMBE
NONCD0001069	GENERAL MARBLE COMPANY	LINCOLNTON	LINCOLN
NCD986197309	GOLDSBORO COAL GAS PLANT #1	GOLDSBORO	WAYNE
NONCD0001083	GOLDSBORO COAL GAS PLANT #2	GOLDSBORO	WAYNE
NONCD0001089	GREENSBORO COAL GAS PLANT #1	GREENSBORO	GUILFORD
NCD986188886	GREENVILLE COAL GAS PLANT	GREENVILLE	PITT
NCD986232379	GRESHAMS LAKE INDUSTRIAL PARK	RALEIGH	WAKE

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RESPONSIBLE PARTY VOLUNTARY REMEDIAL ACTION SITES

ID Number	*Site Name*	*City*	*County*
NCD051739209	HARRELSON RUBBER COMPANY	ASHEBORO	RANDOLPH
NONCD0001084	HENDERSON COAL GAS PLANT	HENDERSON	VANCE
NCD990734055	HERCOFINA/CAPE INDUSTRIES	WILMINGTON	NEW HANOVER
NCD039102959	HEVI-DUTY ELECTRIC/GENERAL SIG	GOLDSBORO	WAYNE
NONCD0001085	HICKORY COAL GAS PLANT	HICKORY	CATAWBA
NCD986188837	HIGH POINT COAL GAS PLANT	HIGH POINT	GUILFORD
NCD051745685	HOLDING POND FOR WASTE/USS	GREENSBORO	GUILFORD
NCD003215696	HUNT MANUFACTURING	STATESVILLE	IREDELL
NCD986197366	KINSTON COAL GAS PLANT	KINSTON	LENOIR
NCD981863327	KSP DRY CLEANERS	CHAPEL HILL	ORANGE
NCD986197358	LEXINGTON COAL GAS PLANT	LEXINGTON	DAVIDSON
NCD003183167	LONG MANUFACTURING	TARBORO	EDGECOMBE
NONCD0001086	MT AIRY COAL GAS PLANT	MT AIRY	SURRY
NCD986197259	NEW BERN COAL GAS PLANT	NEW BERN	CRAVEN
NONCD0000077	OLD STATE LAB	CARY	WAKE
NCD055165609	PANTASOTE INC. FILM/COMPOUND DIV.	HICKORY	CATAWBA
NCD055162069	PELTON & CRANE PLANT (FORMER)	CHARLOTTE	MECKLENBURG
NONCD0001020	PRECISION FABRICS GROUP, INC	GREENSBORO	GUILFORD
NCD986188894	RALEIGH COAL GAS PLANT NO. 1	RALEIGH	WAKE
NCD986188902	RALEIGH COAL GAS PLANT NO. 2	RALEIGH	WAKE
NONCD0001087	REIDSVILLE COAL GAS PLANT	REIDSVILLE	ROCKINGHAM
NCD053009510	RELIANCE UNIVERSAL OF KENTUCKY	LENOIR	CALDWELL
NCD986197325	ROCKY MOUNT COAL GAS PLANT NO. 1	ROCKY MOUNT	NASH
NCD986197317	ROCKY MOUNT COAL GAS PLANT NO. 2	ROCKY MOUNT	NASH
NCD981933096	ROCKY MOUNT, OLD AIRPORT	ROCKY MOUNT	NASH
NCD986197283	SALISBURY COAL GAS PLANT #1	SALISBURY	ROWAN
NONCD0001088	SALISBURY COAL GAS PLANT #2	SALISBURY	ROWAN
NCD003234549	SCM PROCTOR SILEX/WEAREVER	SOUTHERN PINES	MOORE
NCD053488557	SOUTHERN WOOD PIEDMONT COMPANY	GULF	CHATHAM
NCD058517467	SOUTHERN WOOD PIEDMONT COMPANY	WILMINGTON	NEW HANOVER
NCD986197291	STATESVILLE COAL GAS PLANT	STATESVILLE	IREDELL
NCD986176444	STROH/CHITTY FARM	WINSTON-SALEM	FORSYTH
NCD986166700	TOISNOT SWAMP	WILSON	WILSON
NCD053485991	VARCO-PRUDEN BUILDINGS	KERNERSVILLE	FORSYTH
NCD986197275	WASHINGTON COAL GAS PLANT	WASHINGTON	BEAUFORT
NCD986188910	WILMINGTON COAL GAS PLANT	WILMINGTON	NEW HANOVER
NCN000407302	WILMINGTON GUN CLUB (FORMER)	WILMINGTON	NEW HANOVER
NCD986188845	WINSTON-SALEM COAL GAS PLANT NO. 1	WINSTON-SALEM	FORSYTH
NCD986188852	WINSTON-SALEM COAL GAS PLANT NO. 2	WINSTON-SALEM	FORSYTH

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SITES WITH EVALUATIONS PENDING

ID Number	*Site Name*	*City*	*County*
NCD044447589	BLUE RIDGE PLATING COMPANY	ARDEN	BUNCOMBE
NCSFN0407144	CARTRETTE FIELD	CHADBOURN	COLUMBUS
NCD981014517	DYNATECH	CHARLOTTE	MECKLENBURG
NONCD0001070	EMPORIUM CLEANERS	RALEIGH	WAKE
NCD980503056	FLEMINGTON LANDFILL	WILMINGTON	NEW HANOVER
NCD000813592	GA-PACIFIC CORP/HDWD SAW	PLYMOUTH	WASHINGTON
NCN000407480	HORTON IRON & METAL	WILMINGTON	NEW HANOVER
NCN000407301	LOFLIN GOLD MINE	TRINITY	RANDOLPH
NONCD0001098	NATIONAL TEXTILES, LLP	MORGANTON	BURKE
NCD980848667	ONE HOUR KORETIZING	DURHAM	DURHAM
NONCD0001024	PARK PLAZA	SPENCER	ROWAN
NCN000407196	ROWAN ROAD LANDFILL	CLINTON	SAMPSON
NONCD0001096	SALISBURY TOWNSHIP SHOPPING CENTER	SALISBURY	ROWAN
NONCD0001100	SIMPSON WELL CONTAMINATION	BELMONT	GASTON
NONCD0001101	STRONGHAVEN WAREHOUSE	MATTHEWS	MECKLENBURG
NC0210020541	US DOD MILITARY OCEAN TERMINAL	SOUTHPORT	BRUNSWICK
NC6680090002	US EPA TECH CENTER	RTP	DURHAM
NC7210020544	USA TARHEEL ARMY MISSILE PLANT	BURLINGTON	ALAMANCE
NC6570027460	USAF DARE COUNTY RANGE SEYMOUR	ENGLEHART	HYDE
NC7170090008	USMC/CRASH CREW BURN PIT	MOREHEAD CITY	CARTERET
NCN000407564	WATHA FIRING RANGE	WATHA	PENDER
NCN000407243	WOODY'S SALVAGE YARD	VANDER	CUMBERLAND

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NATIONAL PRIORITIES LIST

ID Number	*Site Name*	*City*	*County*
NCD024644494	ABC ONE HOUR CLEANERS	JACKSONVILLE	ONSLOW
NCD980843346	ABERDEEN PESTICIDE DUMPS	ABERDEEN	MOORE
NCSFN0406989	BARBER ORCHARD	WAYNESVILLE	HAYWOOD
NCD981026479	BENFIELD INDUSTRIES, INC.	HAZELWOOD	HAYWOOD
NCD044440303	BYPASS 601	CONCORD	CABARRUS
NC6170022580	CAMP LEJEUNE MILITARY RESERVATION	CAMP LEJEUNE	ONSLOW
NCD003188828	CAPE FEAR WOOD PRESERVING	FAYETTEVILLE	CUMBERLAND
NCD003188844	CAROLINA TRANSFORMER	FAYETTEVILLE	CUMBERLAND
NCD003446721	CELANESE CORPORATION/SHELBY FIBER	SHELBY	CLEVELAND
NCD980840409	CHARLES MACON LAGOON & DRUM	CORDOVA	RICHMOND
NCD095459392	CHEMTRONICS, INC/JET RESEARCH	SWANNANOA	BUNCOMBE
NC1170027261	CHERRY POINT MARINE CORPS AIR STN	CHERRY POINT	CRAVEN
NCD986175644	DAVIS PARK ROAD TCE SITE	GASTONIA	GASTON
NCD095458527	FCX, INC. STATESVILLE	STATESVILLE	IREDELL
NCD981475932	FCX, INC. WASHINGTON PLANT	WASHINGTON	BEAUFORT
NCD981927502	GEIGY CHEMICAL CORPORATION	ABERDEEN	MOORE
NCD079044426	GENERAL ELECTRIC CO/SHEPHERD FARM	EAST FLAT ROCK	HENDERSON
NCD980729602	JADCO-HUGHES	BELMONT	GASTON
NCD122263825	JFD/CHANNEL MASTER	OXFORD	GRANVILLE
NCD003200383	KOPPERS COMPANY, INC.	MORRISVILLE	WAKE
NCD001810365	MARTIN MARIETTA-SODYECO DIV/SANDOZ	CHARLOTTE	MECKLENBURG
NCD991278953	NATIONAL STARCH CORPORATION	SALISBURY	ROWAN
NCD980557656	NC STATE UNIV. (LOT 86 FARM UNIT)	RALEIGH	WAKE
NCD981021157	NEW HANOVER COUNTY AIRPORT BURN	WILMINGTON	NEW HANOVER
NCD986187128	NORTH BELMONT PCE SITE	NORTH BELMONT	GASTON
NCD981023260	POTTER'S SEPTIC TANK SVS PITS	MACO	BRUNSWICK
NCD986187094	REASOR CHEMICAL	CASTLE HAYNE	NEW HANOVER
NCD003202603	WARD TRANSFORMER	RALEIGH	WAKE

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NON-NPL FEDERAL SUPERFUND CLEANUPS

ID Number	*Site Name*	*City*	*County*
NCD000648402	BATTERY TECH (DURACELL)	LEXINGTON	DAVIDSON
NCD051827905	ESTECH GENERAL CHEMICALS CORP.	NAVASSA	BRUNSWICK
NCD045922986	FLANDERS FILTERS, INC.	WASHINGTON	BEAUFORT
NCD981027915	J STREET FLYASH DISPOSAL SITE	ERWIN	HARNETT
NCD053530234	NORTHEAST CHEMICAL COMPANY	CAPE FEAR	NEW HANOVER
NC6570024475	POPE AFB	POPE AIR FORCE BASE	CUMBERLAND
NCD982096653	RAM LEATHER CARE	CHARLOTTE	MECKLENBURG
NCD062555792	SIGMON'S SEPTIC TANK	STATESVILLE	IREDELL
NC7570024474	USAF SEYMOUR JOHNSON AFB	GOLDSBORO	WAYNE
NCD991278540	WEYERHAEUSER COMPANY	PLYMOUTH	MARTIN

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RCRA PERMITTED OR INTERIM STATUS FACILITIES

ID Number	Site Name	City	County
NCD986171320	ALCOA BADIN LANDFILL	BADIN	STANLY
NCD003162542	ALCOA BADIN WORKS	BADIN	STANLY
NCD053488409	ALLIED CHEMICAL CORPORATION	MONCURE	CHATHAM
NCD003168168	AMERICAN CYANAMID/FREEDOM TEXTILES	CHARLOTTE	MECKLENBURG
NCD085074821	AMERICAN HOECHST SOU-TEX /HOECHST	MT. HOLLY	GASTON
NCD070619663	ASHEVILLE DYEING AND FINISHING	SWANNANOA	BUNCOMBE
NCD024599011	ASHLAND CHEMICAL CO	GREENSBORO	GUILFORD
NCD061263315	ASHLAND CHEMICAL COMPANY	CHARLOTTE	MECKLENBURG
NCD088560032	ASHLAND CHEMICAL COMPANY	RALEIGH	WAKE
NCD003466919	AXTON-CROSS COMPANY/VAN WATER	GREENSBORO	GUILFORD
NCD001725464	BORDEN CHEMICAL SMITH-DOUGLAS	KINSTON	LENOIR
NCD060295417	BURLINGTON FURNITURE/CENT MAIN	LEXINGTON	DAVIDSON
NCD047373766	BURROUGHS WELLCOME COMPANY	GREENVILLE	PITT
NCD052547635	BURROUGHS WELLCOME COMPANY	RTP	DURHAM
NCD086871282	CALDWELL SYSTEMS INCORPORATED	LENOIR	CALDWELL
NC6170022580	CAMP LEJEUNE MILITARY RESERVATION	CAMP LEJEUNE	ONSLOW
NCD003184710	CAROLINA CREOSOTING CORPORATION	LELAND	BRUNSWICK
NCD003154010	CARTER, A B INCORPORATED	GASTONIA	GASTON
NCD991278623	CHARLOTTE FIRE DEPT TRNG/CITY OF	CHARLOTTE	MECKLENBURG
NCD095459392	CHEMTRONICS, INC/JET RESEARCH	SWANNANOA	BUNCOMBE
NC1170027261	CHERRY POINT MARINE CORPS AIR STN	CHERRY POINT	CRAVEN
NCD061801361	CIBA-GEIGY CORPORATION	GREENSBORO	GUILFORD
NCD107868812	CONBRACO INDUSTRIES, INC.	MATTHEWS	MECKLENBURG
NCD042892067	COOPER INDUSTRIES, INC. LUFKIN DIV	APEX	WAKE
NCD049773245	DETREX CHEMICAL INDUSTRIES, INC.	CHARLOTTE	MECKLENBURG
NCD047368642	DUPONT EI DE NEMOURS & CO.	FAYETTEVILLE	CUMBERLAND
NCD003190386	DUPONT EI DE NEMOURS & CO.	KINSTON	LENOIR
NCD047369046	DUPONT EI DE NEMOURS & CO.	LELAND	BRUNSWICK
NCD003173358	DURABLE WOOD PRESERVERS, INC.	CHARLOTTE	MECKLENBURG
NCD986194439	DYNATECH - HAWKINS ST	CHARLOTTE	MECKLENBURG
NCD980559967	GA-PACIFIC CORP/HDWD SAW	MURFREESBORO	HERTFORD
NCD003237948	GENERAL ELECTRIC CO/HICKORY	HICKORY	CATAWBA
NCD093137636	GENERAL WOOD PRESERVING CO., INC.	LELAND	BRUNSWICK
NCD024900987	HOLCOMB CREOSOTE COMPANY	YADKINVILLE	YADKIN
NCD991278631	HOLTRA CHEM/HONEYWELL, INC.	REIGELWOOD	COLUMBUS
NCD041463761	IBM CORPORATION	RTP	DURHAM
NCD003185238	ITT TELECOMS CORP/ALCATEL	RALEIGH	WAKE
NCD981476955	JOHNSTON COUNTY SCHOOL BOARD	SMITHFIELD	JOHNSTON
NCD000771964	LITHIUM CORP. OF AMERICA /FMC	BESSEMER CITY	GASTON
NCD044438406	LITTON INDUSTRIES/CLIFTON PRECISION	CHEROKEE	CHEROKEE

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N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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RCRA PERMITTED OR INTERIM STATUS FACILITIES

ID Number	*Site Name*	*City*	*County*
NCD001810365	MARTIN MARIETTA-SODYECO DIV/SANDOZ	CHARLOTTE	MECKLENBURG
NCD048467427	MINERAL RESEARCH & DEV. CORP.	ROCKY RIVER	CABARRUS
NC1750890005	NATIONAL INST. ENVMTL. HLTH. SCI.	RTP	DURHAM
NCD000773655	OLDOVER CORP/CAROLINA SOLITE	NORWOOD	STANLY
NCD053010732	PARKS-CRAMER COMPANY	CHARLOTTE	MECKLENBURG
NCD041466806	PHILLIPS PLATING	BRIDGETON	CRAVEN
NCD091245969	RADIATOR SPECIALTY CO.	MATTHEWS	UNION
NCD042091975	RJR/MALLINKRODT	RALEIGH	WAKE
NCD046362117	ROADWAY EXPRESS TERMINAL	KERNERSVILLE	FORSYTH
NCD079060059	SAFETY KLEEN CORP.	CHARLOTTE	MECKLENBURG
NCD077840148	SAFETY-KLEEN CORP 3-064-01	HIGH POINT	GUILFORD
NCD000776740	SAFETY-KLEEN CORP 3-171-01	RALEIGH	WAKE
NCD980846935	SAFETY-KLEEN CORP. 3-031	ST PAULS	ROBESON
NCD065300519	SCHLAGE LOCK COMPANY	ROCKY MOUNT	EDGECOMBE
NCD002591014	SCOVILL, SHRADER-BELLOWS DIVISION	WAKE FOREST	WAKE
NCD071574164	SEABOARD CHEMICAL CORPORATION	JAMESTOWN	GUILFORD
NCD057451270	SINGER CO/AAF-MCQUAY	WILMINGTON	NEW HANOVER
NCD000604322	SINGER CO/FURNITURE DIV PLTS 3	LENOIR	CALDWELL
NCD083673681	SINGER CO/KERAFOTT DIV	BLACK MOUNTAIN	BUNCOMBE
NCD067203752	SQUARE D COMPANY	KNIGHTDALE	WAKE
NCD091249417	TEXTRON INC/HOMELITE DIV.	GASTONIA	GASTON
NCD000648451	TRIANGLE RESOURCE IND/LAIDLAW	REIDSVILLE	ROCKINGHAM
NCD982093783	UNC-CHAPEL HILL	CHAPEL HILL	ORANGE
NCD045646924	UNICAN SECURITY SYSTEMS/ILCO UNI	ROCKY MOUNT	NASH
NC8210020121	USA FORT BRAGG	FORT BRAGG	CUMBERLAND
NC2690308232	USCG SUPPORT CENTER	ELIZABETH CITY	PASQUOTANK
NCD041466251	VEEDER-ROOT COMPANY	ELIZABETHTOWN	BLADEN
NCD060299880	WEBER USA SANFORD PLANT	SANFORD	LEE
NCD003213907	WESTERN ELECTRIC CO/AT&T	WINSTON-SALEM	FORSYTH
NCD003471158	WORTH CHEMICAL	GREENSBORO	GUILFORD

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RCRA NON-PERMITTED CORRECTIVE ACTION SITES

ID Number	*Site Name*	*City*	*County*
NCD003200854	CAROLINA WOOD PRESERVING COMPANY	SCOTLAND NECK	HALIFAX
NCD003151990	KIMBERLY-CLARK CORP/LANDFILL	BALFOUR	HENDERSON

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SITES UNDER THE JURISDICTION OF THE SOLID WASTE SECTION

ID Number	*Site Name*	*City*	*County*
NCD980557714	BEAUFORT COUNTY LANDFILL	BATH	BEAUFORT
NCD980502801	BIGGERSTAFF LANDFILL	GASTONIA	GASTON
NCD980502819	BLADEN COUNTY LANDFILL	ELIZABETHTOWN	BLADEN
NCD980502835	BRUNSWICK COUNTY LANDFILL	LELAND	BRUNSWICK
NCD980558001	BUNCOMBE COUNTY LANDFILL	ASHEVILLE	BUNCOMBE
NCD980502843	CABARRUS COUNTY LANDFILL	CONCORD	CABARRUS
NCD982118960	CALDWELL LANDFILL	LENOIR	CALDWELL
NCD980502868	CHATHAM COUNTY LANDFILL	PITTSBORO	CHATHAM
NCD980502900	CUMBERLAND COUNTY LANDFILL	FAYETTEVILLE	CUMBERLAND
NCD003152329	DUPONT EI DE NEMOURS & CO.	CEDAR MOUNTAIN	TRANSYLVANIA
NCD047369046	DUPONT EI DE NEMOURS & CO.	LELAND	BRUNSWICK
NCD980502926	EDGECOMBE COUNTY LANDFILL	TARBORO	EDGECOMBE
NCD000605303	FEDERAL PAPER BOARD CO., INC.	RIEGELWOOD	COLUMBUS
NCD044388015	GA-PACIFIC CORP HDBD	CONWAY	NORTHAMPTON
NC4120000001	GRAHAM COUNTY MUNICIPAL LANDFILL	ROBBINSVILLE	GRAHAM
NCD991279027	GREENSBORO CITY LANDFILL	GREENSBORO	GUILFORD
NCD980502959	HARRISBURG PARK LANDFILL	CHARLOTTE	MECKLENBURG
NCD981474190	HAYWOOD COUNTY LANDFILL	WAYNESVILLE	HAYWOOD
NCD980557961	HENDERSON COUNTY SAN LANDFILL	HENDERSONVILLE	HENDERSON
NCD980557565	HIGH POINT CITY LANDFILL	HIGH POINT	GUILFORD
NCD003151990	KIMBERLY-CLARK CORP/LANDFILL	BALFOUR	HENDERSON
NCD075588913	KINSTON DEMOLITION LANDFILL	KINSTON	LENOIR
NCD980503015	LEE COUNTY LANDFILL	SANFORD	LEE
NCD980557581	LEXINGTON MUNICIPAL LANDFILL	LEXINGTON	DAVIDSON
NCD070626825	MACON COUNTY LANDFILL	FRANKLIN	MACON
NCD981928013	MOORE COUNTY LANDFILL	ABERDEEN	MOORE
NCD980559348	NASH COUNTY LANDFILL	NASHVILLE	NASH
NCD003166675	OLIN CORPORATION ECUSTA PAPER	PISGAH FOREST	TRANSYLVANIA
NCD986171106	ORANGE CO. REGIONAL LANDFILL	CHAPEL HILL	ORANGE
NCD980557680	PITT COUNTY LANDFILL	GREENVILLE	PITT
NCD043712298	PPG IND., INC.	LEXINGTON	DAVIDSON
NCD980557748	ROWAN COUNTY LANDFILL	SALISBURY	ROWAN
NCD980503122	SORRELL LANDFILL	APEX	WAKE
NC3120000002	SWAIN COUNTY LANDFILL	BRYSON CITY	SWAIN
NCD980503163	UNION COUNTY LANDFILL	MONROE	UNION
NCD980503171	WAKE COUNTY/FELTONVILLE LANDFILL	APEX	WAKE
NCD980557896	WILKES COUNTY MUNICIPAL LANDFILL	RONDA	WILKES

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SITES UNDER THE JURISDICTION OF THE DIVISION OF WATER QUALITY

ID Number	*Site Name*	*City*	*County*
NCD002464691	ALLIANCE CAROLINA TOOL AND MOLD	ARDEN	BUNCOMBE
NCD040049173	AMOCO OIL COMPANY	WILMINGTON	NEW HANOVER
NCD075582197	AMORE/WORTH CHEMICAL	DURHAM	DURHAM
NCD980844518	AMP INCORPORATED	CLEMMONS	FORSYTH
NCD003467974	AMP INCORPORATED	GREENSBORO	GUILFORD
NCD051853547	AUSTIN FOODS	CARY	WAKE
NCD054412283	BLACK & DECKER PLANT (FORMER)	TARBORO	EDGECOMBE
NCD047373766	BURROUGHS WELLCOME COMPANY	GREENVILLE	PITT
NCD045456134	BUSS AUTOMATION INCORPORATED	LENOIR	CALDWELL
NCD046148540	CENTRAL TRANSPORT COMPANY	CHARLOTTE	MECKLENBURG
NCD065288847	CF NITROGEN, INCORPORATED	WINTON	HERTFORD
NCD991278623	CHARLOTTE FIRE DEPT TRNG/CITY OF	CHARLOTTE	MECKLENBURG
NCD986176451	CITY OF SHELBY LANDFILL	SHELBY	CLEVELAND
NONCD0000065	CMI INDUSTRIES	ELKIN	SURRY
NONCD0001032	COCA COLA BOTTLING WORKS INC	NEW BERN	CRAVEN
NCD107868812	CONBRACO INDUSTRIES, INC.	MATTHEWS	MECKLENBURG
NCD042890525	DIAMOND SHAMROCK CORP/MARIETTA	CASTLE HAYNE	NEW HANOVER
NCD057454670	DIAMOND SHAMROCK CORP/OCCIDENTAL	CASTLE HAYNE	NEW HANOVER
NONCD0001066	DIMETRICS INC	DAVIDSON	MECKLENBURG
NCD000827832	ELECTRICAL UTILITIES/CO BB&T	FARMVILLE	PITT
NCD089989917	EMERSON ELECTRIC COMPANY	MURPHY	CHEROKEE
NCD003201837	ENCEE CHEMICAL SALES, INC.	BRIDGETON	CRAVEN
NCD000605303	FEDERAL PAPER BOARD CO., INC.	RIEGELWOOD	COLUMBUS
NCD041043811	FIBER INDUSTRIES INC/HOECHST-CELANES	SALISBURY	ROWAN
NCD067191262	FIRESTONE TIRE AND RUBBER COMPANY	WILSON	WILSON
NCD062553490	FLEET TRANSPORT CO., INC.	CHARLOTTE	MECKLENBURG
NCD980559975	GA-PACIFIC CORP/RESIN DIV	CONWAY	NORTHAMPTON
NCD003448610	GALVAN INDUSTRIES, INC.	HARRISBURG	CABARRUS
NCD003149291	GASTON COUNTY DYEING MACHINE CO.	MOUNT HOLLY	GASTON
NCD991277922	GASTON COUNTY DYEING MACHINE CO.	STANLEY	GASTON
NCD050409150	GENERAL ELECTRIC CO/WILMINGTON	WILMINGTON	NEW HANOVER
NCD043679349	GENERAL TIRE & RUBBER CO	CHARLOTTE	MECKLENBURG
NONCD0001023	HEAVY EQUIPMENT SCHOOL	CHARLOTTE	MECKLENBURG
NONCD0001078	HIGHLAND MILLS	CHARLOTTE	MECKLENBURG
NCD062571658	HONEYWELL MICRO SWITCH DIV.	MARS HILL	MADISON
NCD003198520	HONEYWELL, INC	DURHAM	DURHAM
NCD083674713	HULL SERVICE STATION/PHILLIPS 66	VALE	LINCOLN
NONCD0000089	JOHN MORRELL & CO	WILSON	WILSON
NCD000653576	KERN RUBBER CO. URETHANE PLANT	SALISBURY	ROWAN

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SITES UNDER THE JURISDICTION OF THE DIVISION OF WATER QUALITY

ID Number	*Site Name*	*City*	*County*
NCD062552989	MALLARD CREEK RD/UNION OIL CO OF CA	CHARLOTTE	MECKLENBURG
NCD000772046	MOBIL OIL CORP/KOCH REFINING	WILMINGTON	NEW HANOVER
NCD981030893	MUSIC CLUB PESTICIDE SITE	WILLIAMSTON	MARTIN
NCD091572073	NATIONAL STARCH & CHEMICAL COMPANY	LELAND	BRUNSWICK
NONCD0001053	PARAMOUNT CHEVROLET	GOLDSBORO	WAYNE
NCD057037178	PFIZER INC/COTY DIVISION	SANFORD	LEE
NCD040047425	PRILLAMAN CHEMICALS	FAYETTEVILLE	CUMBERLAND
NCD044514602	RJR ARCHER, INC.	WINSTON-SALEM	FORSYTH
NCD067441394	RJR ARCHER, INC.	WINSTON-SALEM	FORSYTH
NCD042091215	RJR TECH COMPANY	MERRY HILL	BERTIE
NCD041466525	ROCKY MOUNT FIBER DUMP	ROCKY MOUNT	EDGECOMBE
NCD003197704	SALT WOOD PRODUCTS, INC.	COVE CITY	CRAVEN
NCD981863228	SCHERER, R.P.	MONROE	UNION
NCD095458709	SCHRADER AUTOMOTIVE PRODUCTS DIV.	MONROE	UNION
NCD986180909	SHELBY DYEING & FINISHING	SHELBY	CLEVELAND
NONCD0000033	SPRINGS IND/UNIGLASS IND.	STATESVILLE	IREDELL
NCD003951878	SQUARE D COMPANY	ASHEVILLE	BUNCOMBE
NCD986191484	STOUT INTERNATIONAL OF NC, INC	MONROE	UNION
NONCD0000011	TERRELL MACHINE SHOP	CHARLOTTE	MECKLENBURG
NCD000770016	TEXAS CITY REFINING COMPANY	PAW CREEK	MECKLENBURG
NCD002560159	THIELE-ENGDAHL, INCORPORATED	WINSTON-SALEM	FORSYTH
NCD037160439	TOASTMASTER, INCORPORATED	LAURINBURG	SCOTLAND
NONCD0001017	TOWNE NORTH SHOPPING CENTER	RALEIGH	WAKE
NONCD0000088	TRANS TECHNOLOGY	CHARLOTTE	MECKLENBURG
NCD038551263	TRI-COUNTY COMMUNITY COLLEGE	MURPHY	CHEROKEE
NCD000609982	UNION OIL CO. SE TERM/PAW CREEK	PAW CREEK	MECKLENBURG
NONCD0000010	UNITED MERCHANTS/OLD FORT PLANT	OLD FORT	MCDOWELL
NCD980515308	UNIVERSITY OF NC AT CHAPEL HILL	CHAPEL HILL	ORANGE
NCD001493931	WECK, EDWARD INC.	RTP	DURHAM
NCD024766719	WRIGHT CHEMICAL CORP.	RIEGELWOOD	COLUMBUS

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SITE REMEDIAL ACTIONS UNDER THE JURISDICTION OF THE DIVISION OF ENVIRONMENTAL HEALTH'S RADIATION PROTECTION SECTION

ID Number	*Site Name*	*City*	*County*
NCD980559397	RADIATION PHYSICS CONSULTANTS	PURLEAR	WILKES

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OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000401	ABATTOIR LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000443	ABERDEEN DUMP	ABERDEEN	MOORE	No
NONCD0000361	AHOSKIE DUMP	AHOSKIE	HERTFORD	No
NONCD0000307	AIRPORT LANDFILL		FORSYTH	No
NONCD0000728	ALAMANCE CO LDFL		ALAMANCE	No
NONCD0000102	ALAMANCE GARBAGE SERVICE	BURLINGTON	ALAMANCE	No
NONCD0000571	ALBEMARLE DUMP	ALBERMARLE	STANLY	No
NONCD0000551	ALEXANDER MILLS DUMP	ALEXANDER MILLS	RUTHERFORD	No
NONCD0000192	ANDERSON REFUSE DUMP		CALDWELL	No
NONCD0000231	ANDREWS DUMP	ANDREWS	CHEROKEE	No
NONCD0000349	ANGIER REFUSE DUMP	ANGIER	HARNETT	No
NONCD0000731	ANSON CO LDFL		ANSON	No
NCD980502793	APEX SANITARY LF	APEX	WAKE	Yes
NONCD0000568	AQUADALE DUMP	AQUADALE	STANLY	No
NONCD0000717	ARAPAHOE LDFL	ARAPAHOE	PAMLICO	No
NONCD0000165	ARDEN DISPOSAL	ARDEN	BUNCOMBE	No
NONCD0000644	ARLINGTON DUMP	ARLINGTON	YADKIN	No
NONCD0000120	ASHE COUNTY LANDFILL	JEFFERSON	ASHE	No
NONCD0000509	ASHEBORO DUMP	ASHEBORO	RANDOLPH	No
NCD980557557	ASHEBORO MUNICIPAL LF	ASHEBORO	RANDOLPH	Yes
NONCD0000167	ASHEVILLE LANDFILL	ASHEVILLE	BUNCOMBE	No
NONCD0000489	ATKINSON DUMP	ATKINSON	PENDER	No
NONCD0000199	ATLANTIC REFUSE DUMP	ATLANTIC	CARTERET	No
NONCD0000138	AULANDER REFUSE DISPOSAL	AULANDER	HERTFORD	No
NONCD0000126	AURORA DUMP		BEAUFORT	No
NONCD0000659	AUTEN ROAD LANDFILL		GASTON	No
NONCD0000560	AUTRYVILLE LDFL	AUTRYVILLE	SAMPSON	No
NONCD0000502	AYDEN REFUSE DUMP	AYDEN	PITT	No
NONCD0000773	AZALEA ROAD LANDFILL	OTEEN	BUNCOMBE	No
NONCD0000556	B & G DUMP	CLIFFSIDE	RUTHERFORD	No
NONCD0000454	BAILEY DUMP	BAILEY	NASH	No
NONCD0000431	BAKERVILLE REFUSE DISPOSAL	BAKERVILLE	MITCHELL	No
NONCD0000768	BALFOUR ROAD LANDFILL	GRANITE QUARRY	ROWAN	No
NONCD0000594	BALSAM GROVE DUMP		TRANSYLVANIA	No
NONCD0000457	BARFIELD'S DUMP	WRIGHTSVILLE BEACH	NEW HANOVER	No
NONCD0000128	BATH DUMP	BATH	BEAUFORT	No
NONCD0000451	BATTLEBORO DUMP	BATTLEBORO	NASH	No
NONCD0000485	BAYBORO DUMP	BAYBORO	PAMLICO	No
NCD980557714	BEAUFORT COUNTY LF	BATH	BEAUFORT	Yes

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OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000200	BEAUFORT REFUSE DUMP	BEAUFORT	CARTERET	No
NONCD0000579	BEAULAH COMM. DUMP		SURRY	No
NONCD0000302	BECKEL ROAD DUMP	WINSTON-SALEM	FORSYTH	No
NONCD0000131	BELHAVEN DUMP	BELHAVEN	BEAUFORT	No
NONCD0000780	BELLTOWN ROAD DUMP	HAVELOCK	CRAVEN	No
NONCD0000070	BENFIELD SANITATION SERVICE	STATESVILLE	IREDELL	Yes
NONCD0000384	BENSON REFUSE DUMP	BENSON	JOHNSTON	No
NONCD0000669	BENTLEY WOODS SITE	RALEIGH	WAKE	No
NONCD0000325	BESSEMER CITY DUMP	BESSEMER CITY	GASTON	No
NONCD0000501	BETHEL REFUSE DUMP	BETHEL	PITT	No
NONCD0000108	BETHLEHEM COMMUNITY DUMP	BETHLEHEM	ALEXANDER	No
NONCD0000283	BEULAVILLE DUMP	BEULAVILLE	DUPLIN	No
NCD980502801	BIGGERSTAFF LF/GASTON CO LF	GASTONIA	GASTON	Yes
NONCD0000672	BISCOE OLD TOWN DUMP	BISCOE	MONTGOMERY	No
NONCD0000636	BLACK CREEK DUMP	BLACK CREEK	WILSON	No
NONCD0000166	BLACK MOUNTAIN	BLACK MOUNTAIN	BUNCOMBE	No
NCD980502819	BLADEN COUNTY LF	ELIZABETHTOWN	BLADEN	Yes
NONCD0000148	BLADENBORO REFUSE DISPOSAL	BLADENBORO	BLADEN	No
NONCD0000622	BLOWING ROCK LANDFILL	BLOWING ROCK	WATAUGA	No
NONCD0000194	BLOWING ROCK LF	BLOWING ROCK	CALDWELL	No
NONCD0000465	BLUE CLAY RD. LF		NEW HANOVER	No
NONCD0000241	BOILING SPRINGS DUMP	BOILING SPRINGS	CLEVELAND	No
NONCD0000160	BOILING SPRINGS LAKES DUMP	BOILING SPRINGS	BRUNSWICK	No
NONCD0000149	BOLIVIA REFUSE DISPOSAL	BOLIVIA	BRUNSWICK	No
NONCD0000252	BOLTON DUMP	BOLTON	COLUMBUS	No
NONCD0000226	BONLEE DUMP	BONELEE	CHATHAM	No
NONCD0000623	BOONE REFUSE DISPOSAL	BOONE	WATAUGA	No
NONCD0000645	BOONEVILLE DUMP	BOONEVILLE	YADKIN	No
NONCD0000546	BOSTIC REFUSE DISPOSAL	BOSTIC	RUTHERFORD	No
NONCD0000168	BRISTOL CREEK COMM. DUMP		BURKE	No
NONCD0000389	BROADWAY DUMP	BROADWAY	LEE	No
NONCD0000119	BRONSON SAND & GRAVEL	LILESVILLE	ANSON	No
NONCD0000320	BRUCES COUNTY LANDFILL		GASTON	No
NCD980502835	BRUNSWICK CO LF/LELAND	LELAND	BRUNSWICK	Yes
NONCD0000673	BUD HOLDING COMPANY	GREENSBORO	GUILFORD	No
NONCD0000306	BUDDY ROBINS LANDFILL		FORSYTH	No
NONCD0000348	BUIES CREEK DUMP	BUIES CREEK	HARNETT	No
NONCD0000354	BUIES CREEK LANDFILL	BUIES CREEK	HARNETT	No
NONCD0000300	BUILDING RUBBLE LF		FORSYTH	No
NONCD0000682	BUNCOMBE CO LF/E CANTON		BUNCOMBE	No

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OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NCD980558001	BUNCOMBE COUNTY LF	ASHEVILLE	BUNCOMBE	Yes
NONCD0000312	BUNN DUMP	BUNN	FRANKLIN	No
NONCD0000490	BURGAW DUMP	BURGAW	PENDER	No
NONCD0000100	BURLINGTON DUMP	BURLINGTON	ALAMANCE	No
NONCD0000649	BURNSVILLE DUMP	BURNSVILLE	YANCEY	No
NONCD0000695	BURNT MILL CREEK LANDFILL	WILMINGTON	NEW HANOVER	No
NCD981750425	BUXTON DUMP	BUXTON	DARE	Yes
NONCD0000765	BUXTON DUMP TWO	BUXTON	DARE	No
NONCD0000224	BYNUM DUMP	BYNUM	CHATHAM	No
NONCD0000510	C.A. BOWERS DUMP	TRINITY	RANDOLPH	No
NCD980502843	CABARRUS CO LANDFILL		CABARRUS	Yes
NCD980502850	CABARRUS DISPOSAL DUMP	CONCORD	CABARRUS	Yes
NCD982118960	CALDWELL LF	LENOIR	CALDWELL	Yes
NONCD0000284	CALYPSO DUMP	CALYPSO	DUPLIN	No
NONCD0000654	CAMDEN CO LF-CAMDEN	CAMDEN	CAMDEN	No
NONCD0000197	CAMDEN COUNTY LF-OLD TRAP	CAMDEN	CAMDEN	No
NONCD0000442	CAMERON DUMP	CAMERON	MOORE	No
NONCD0000683	CAMP DAVIS LANDFILL	HOLLY RIDGE	ONSLOW	No
NONCD0000162	CANDLER REFUSE DISPOSAL	CANDLER	BUNCOMBE	No
NONCD0000433	CANDOR DUMP	CANDOR	MONTGOMERY	No
NONCD0000755	CANNON MILLS LANDFILL		ROWAN	No
NONCD0000358	CANTON DUMP	CANTON	HAYWOOD	No
NONCD0000213	CAPE CARTERET DUMP	CAPE CARTERET	CARTERET	No
NONCD0000458	CAROLINA BEACH REFUSE	CAROLINA BEACH	NEW HANOVER	No
NONCD0000764	CAROVA BEACH LANDFILL	CAROVA BEACH	CURRITUCK	No
NONCD0000395	CARTER'S REFUSE DISPOSAL	KINSTON	LENOIR	No
NONCD0000214	CARTERET COUNTY LF	NEWPORT	CARTERET	No
NONCD0000446	CARTHAGE DUMP	CARTHAGE	MOORE	No
NONCD0000602	CARY DUMP	CARY	WAKE	No
NONCD0000448	CASTALIA REFUSE DUMP	CASTALIA	NASH	No
NONCD0000459	CASTLE HAYNE SERVICE DUMP	CASTLE HAYNE	NEW HANOVER	No
NONCD0000460	CASTLE HAYNE TRASH SERVICE	CASTLE HAYNE	NEW HANOVER	No
NONCD0000216	CASWELL LF	YANCEYVILLE	CASWELL	No
NONCD0000392	CASWELL SCHOOL DUMP	KINSTON	LENOIR	No
NONCD0000222	CATAWBA COUNTY LF	HICKORY	CATAWBA	No
NONCD0000217	CATAWBA DUMP		CATAWBA	No
NONCD0000254	CHADBOURN DUMP	CHADBOURN	COLUMBUS	No
NONCD0000642	CHAMBERLAND-HODGE DUMP	YADKINVILLE	YADKIN	No
NONCD0000484	CHAPEL HILL LANDFILL	CHAPEL HILL	ORANGE	No
NONCD0000716	CHARLIE LITTLE RD LDFL	DUDLEY SHOALS	CALDWELL	No

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ID Number	Site Name	City	County	In Other IHS Category
NCD980557771	CHARLOTTE CITY DUMP/YORK RD	CHARLOTTE	MECKLENBURG	Yes
NCD980502868	CHATHAM CO LDFL	PITTSBORO	CHATHAM	Yes
NONCD0000582	CHATHAM REFUSE DISPOSAL	ELKIN	SURRY	No
NONCD0000587	CHEROKEE INDIAN DUMP	CHEROKEE	SWAIN	No
NONCD0000627	CHERRY HOSPITAL DUMP	GOLDSBORO	WAYNE	No
NONCD0000779	CHERRY POINT LANDFILL	CHERRY POINT	CRAVEN	No
NONCD0000778	CHERRY POINT MCAS LANDFILL	CHERRY POINT	CRAVEN	No
NONCD0000250	CHERRYVILLE DUMP	CHERRYVILLE	CLEVELAND	No
NONCD0000187	CHESTER REFUSE DISPOSAL		CALDWELL	No
NONCD0000540	CHINA GROVE DUMP	CHINA GROVE	ROWAN	No
NONCD0000127	CHOCOWINITY DUMP	CHOCOWINITY	BEAUFORT	No
NONCD0000751	CITY OF ALBERMARLE DUMP	ALBERMARLE	STANLY	No
NONCD0000294	CITY OF DURHAM LF	DURHAM	DURHAM	No
NONCD0000740	CITY OF FAYETTEVILLE LDFL	FAYETTEVILLE	CUMBERLAND	No
NONCD0000739	CITY OF FAYETTEVILLE LDFL	FAYETTEVILLE	CUMBERLAND	No
NONCD0000244	CITY OF KINGS MTN.	KINGS MOUNTAIN	CLEVELAND	No
NONCD0000712	CITY OF LUMBERTON LDFL	LUMBERTON	ROBESON	No
NONCD0000332	CITY OF OXFORD LF	OXFORD	GRANVILLE	No
NONCD0000699	CITY OF SHELBY LDFL (STUBBS)	STUBBS	CLEVELAND	No
NCD986176451	CITY OF SHELBY LF	SHELBY	CLEVELAND	Yes
NONCD0000674	CITY OF WILSON LANDFILL	WILSON	WILSON	No
NONCD0000744	CITY OF WINSTON-SALEM	WINSTON-SALEM	FORSYTH	No
NONCD0000743	CITY OF WINSTON-SALEM	WINSTON-SALEM	FORSYTH	No
NONCD0000308	CITY OF WINSTON-SALEM LF	WINSTON-SALEM	FORSYTH	No
NONCD0000726	CIVIC CENTER AREA	GRAHAM	ALAMANCE	No
NONCD0000147	CLARKTON REFUSE DISPOSAL	CLARKTON	BLADEN	No
NCD980844732	CLAYTON BALL FIELD	CLAYTON	JOHNSTON	Yes
NONCD0000280	CLEMENT REFUSE DUMP	MOCKSVILLE	DAVIE	No
NONCD0000544	CLIFFSIDE MILL DUMP	CLIFFSIDE	RUTHERFORD	No
NONCD0000558	CLINTON DUMP	CLINTON	SAMPSON	No
NONCD0001001	CLOSED CITY OF HENDERSON	HENDERSON	VANCE	Yes
NONCD0000363	CLYDE LEACH DUMP	ARABIA	HOKE	No
NONCD0000745	COATS MODIFIED LDFL	COATS	HARNETT	No
NONCD0000353	COATS REFUSE DISPOSAL	COATS	HARNETT	No
NONCD0000142	COLERAIN REFUSE DISPOSAL	COLERAIN	BERTIE	No
NONCD0000314	COLLEGE ST DUMP	YOUNGSVILLE	FRANKLIN	No
NONCD0000426	COLLINS & AIKMAN LF	OLD FORT	MCDOWELL	No
NONCD0000595	COLUMBIA DUMP	COLUMBIA	TYRRELL	No
NONCD0000503	COLUMBUS REFUSE DISPOSAL	COLUMBUS	POLK	No
NONCD0000180	CONCORD LANDFILL	CONCORD	CABARRUS	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000295	CONETOE REFUSE DISPOSAL	CONETOE	EDGECOMBE	No
NONCD0000218	CONOVER DUMP	CONOVER	CATAWBA	No
NONCD0000470	CONWAY REFUSE DISPOSAL	CONWAY	NORTHAMPTON	No
NONCD0001093	CORBETT PACKAGING CO LDFL	WILMINGTON	NEW HANOVER	No
NONCD0000301	COUNTY GARBAGE LANDFILL	WINSTON-SALEM	FORSYTH	No
NONCD0000372	COUNTY GARBAGE LANDFILL	STATESVILLE	IREDELL	No
NONCD0000103	COUNTY GARBAGE SERVICE	ALAMANCE	ALAMANCE	No
NONCD0000261	CRAVEN COUNTY	HAVELOCK	CRAVEN	No
NONCD0000262	CRAVEN COUNTY-VANCEBORO	VANCEBORO	CRAVEN	No
NONCD0000333	CREEDMORE DUMP	CREEDMOOR	GRANVILLE	No
NONCD0000430	CRESCENT RESOURCES INC.	LEMLEY	MECKLENBURG	No
NONCD0000620	CRESWELL REFUSE DISPOSAL	CRESWELL	WASHINGTON	No
NONCD0000122	CROSSNORE REFUSE DUMP	CROSSMORE	AVERY	No
NONCD0000741	CUMBERLAND CO LDFL		CUMBERLAND	No
NONCD0000736	CUMBERLAND CO LDFL - BEAVER		CUMBERLAND	No
NONCD0000733	CUMBERLAND CO LDFL - BONES		CUMBERLAND	No
NONCD0000734	CUMBERLAND CO LDFL - TRAILER		CUMBERLAND	No
NONCD0000735	CUMBERLAND CO LDFL - WADE		CUMBERLAND	No
NCD980502900	CUMBERLAND CO/CLIFFDALE LF	FAYETTEVILLE	CUMBERLAND	Yes
NONCD0000279	DALTON REFUSE DUMP	MOCKSVILLE	DAVIE	No
NONCD0000753	DAN JOHNSON LDFL	ELKIN	WILKES	No
NONCD0000575	DANBURY DUMP	DANBURY	STOKES	No
NONCD0000272	DARE COUNTY DUMP	MANTEO	DARE	No
NONCD0000428	DAVIDSON LANDFILL	DAVIDSON	MECKLENBURG	No
NONCD0000591	DAVIDSON RIVER DUMP		TRANSYLVANIA	No
NONCD0000184	DAVIDSON SANITARY LANDFILL	DAVIDSON	CABARRUS	No
NONCD0000309	DEMOLITION LANDFILL		FORSYTH	No
NONCD0000275	DENTON DUMP	DENTON	DAVIDSON	No
NONCD0000276	DENTON LANDFILL	DENTON	DAVIDSON	No
NONCD0000277	DENTON LANDFILL	DENTON	DAVIDSON	No
NONCD0000408	DENVER LANDFILL	DENVER	LINCOLN	No
NONCD0000391	DOBBS FARM DUMP	KINSTON	LENOIR	No
NONCD0000259	DOVER REFUSE DUMP	DOVER	CRAVEN	No
NONCD0000531	DRAPER DUMP	DRAPER	ROCKINGHAM	No
NONCD0000172	DREXEL DUMP	DREXEL	BURKE	No
NONCD0000144	DUBLIN REFUSE DUMP	DUBLIN	BLADEN	No
NONCD0000671	DUDLEY LANDFILL	DUDLEY	WAYNE	No
NONCD0000769	DUDLEY SHOALS RD LDFL #1	DUDLEY SHOALS	CALDWELL	No
NONCD0000770	DUDLEY SHOALS RD LDFL #2	DUDLEY SHOALS	CALDWELL	No
NONCD0000292	DUKE AND GREGSON ST. DUMP	DURHAM	DURHAM	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000650	DUKE P0WER DUMP	HICKORY	ALEXANDER	No
NONCD0000351	DUNN REFUSE DISPOSAL	DUNN	SAMPSON	No
NONCD0000352	DUNN-ERWIN DUMP	ERWIN	HARNETT	No
NONCD0000666	DUPONT DUMP	RALEIGH	WAKE	No
NONCD0000289	DURHAM COUNTY LANDFILL		DURHAM	No
NONCD0000293	DURHAM COUNTY SANITARY LF		DURHAM	No
NONCD0000291	DURHAM LAND DISPOSAL AREA	DURHAM	DURHAM	No
NONCD0000723	DURHAM ST LDFL	BURLINGTON	ALAMANCE	No
NONCD0000169	DYSARTSVILLE DUMP	DYSARTSVILLE	BURKE	No
NONCD0000236	E.Z. SANITATION DUMP	LATTIMORE	CLEVELAND	No
NONCD0000439	EAGLE SPRINGS DUMP	EAGLE SPRINGS	MOORE	No
NONCD0000178	EARNHARDT ROAD DUMP	KANNAPOLIS	CABARRUS	No
NONCD0000757	EAST LAKE SHORE DRIVE LDFL	WILIMINGTON	NEW HANOVER	No
NONCD0000541	EAST SPENCER DUMP	EAST SPENCER	ROWAN	No
NONCD0000614	EAST WAKE COUNTY LF	KNIGHTDALE	WAKE	No
NONCD0000245	ECHO SERVICE, INC.	SHELBY	CLEVELAND	No
NONCD0000233	EDENTON LANDFILL	EDENTON	CHOWAN	No
NONCD0000653	EDGECOMBE COUNTY LANDFILL	TARBORO	EDGECOMBE	No
NCD980502926	EDGECOMBE COUNTY LF	TARBORO	EDGECOMBE	Yes
NONCD0000488	ELIZABETH CITY LF	ELIZABETH CITY	PASQUOTANK	No
NONCD0000145	ELIZABETHTOWN REFUSE	ELIZABETHTOWN	BLADEN	No
NCD980558019	ELK MOUNTAIN LDFL/ASHVILLE	ASHEVILLE	BUNCOMBE	Yes
NONCD0000123	ELK PARK DUMP	ELK PARK	AVERY	No
NONCD0000581	ELKIN LANDFILL	ELKIN	SURRY	No
NONCD0000547	ELLENBORO DUMP	ELLENBORO	RUTHERFORD	No
NONCD0000516	ELLERBE DUMP	ELLERBE	RICHMOND	No
NONCD0000638	ELM CITY REFUSE DISPOSAL	ELM CITY	WILSON	No
NONCD0000107	ELON COLLEGE DUMP	ELON COLLEGE	ALAMANCE	No
NONCD0000730	ELON COLLEGE LDFL - AMICK RD	ELON COLLEGE	ALAMANCE	No
NONCD0000212	EMERALD ISLE DUMP	EMERALD ISLE	CARTERET	No
NONCD0000340	ENFIELD REFUSE DISPOSAL	ENFIELD	HALIFAX	No
NONCD0000367	ENGLEHARD DUMP	ENGLEHARD	HYDE	No
NONCD0000410	ENVIRONETICS BURN SITE	LINCOLNTON	LINCOLN	No
NONCD0000632	EUREKA REFUSE DISPOSAL	EUREKA	WAYNE	No
NONCD0000396	EVERETT GARBAGE SERVICE	KINSTON	LENOIR	No
NONCD0000255	FAIR BLUFF DUMP	FAIR BLUFF	ROBESON	No
NONCD0000365	FAIRFIELD DUMP	FAIRFIELD	HYDE	No
NONCD0000521	FAIRMONT DUMP	FAIRMONT	ROBESON	No
NCD980557946	FAIRVIEW LANDFILL	FAIRVIEW	BUNCOMBE	Yes
NONCD0000287	FAISON DUMP	FAISON	DUPLIN	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000498	FALKLAND DUMP	FALKLAND	PITT	No
NONCD0000641	FALL CREEK COMM. DUMP		YADKIN	No
NONCD0000497	FARMVILLE REFUSE DISPOSAL	FARMVILLE	PITT	No
NONCD0000267	FAYETTEVILLE CITY LF	FAYETTEVILLE	CUMBERLAND	No
NCD980502934	FAYETTEVILLE LDFL	FAYETTEVILLE	CUMBERLAND	Yes
NCD980557953	FISHBURNE LANDFILL	FLETCHER	BUNCOMBE	Yes
NONCD0000163	FISHBURNE REFUSE DUMP		BUNCOMBE	No
NONCD0000179	FISHERTOWN DUMP	KANNAPOLIS	CABARRUS	No
NCD980503056	FLEMINGTON LF	WILMINGTON	NEW HANOVER	Yes
NONCD0000554	FOREST CITY	FOREST CITY	RUTHERFORD	No
NONCD0000496	FOUNTAIN REFUSE DISPOSAL	FOUNTAIN	PITT	No
NONCD0000379	FOUR OAKS DUMP	FOUR OAKS	JOHNSTON	No
NONCD0000412	FRANKLIN DISPOSAL	FRANKLIN	MACON	No
NONCD0000310	FRANKLINTON DUMP	FRANKLINTON	FRANKLIN	No
NONCD0000508	FRANKLINVILLE DUMP	FRANKLINVILLE	RANDOLPH	No
NONCD0000628	FREEMONT REFUSE DISPOSAL	FREMONT	WAYNE	No
NONCD0000606	FUQUAY VARINA DUMP	FUQUA VARINA	WAKE	No
NONCD0000580	GARBAGE SERVICE DUMP	MT AIRY	SURRY	No
NONCD0000562	GARLAND DUMP	GARLAND	SAMPSON	No
NONCD0000604	GARNER TRASH DUMP	GARNER	WAKE	No
NONCD0000188	GARNES REFUSE DUMP		CALDWELL	No
NONCD0000321	GASTON CO LF (MT HOLLY LF)	MT HOLLY	GASTON	No
NONCD0000475	GASTON REFUSE DISPOSAL	GASTON	NORTHAMPTON	No
NONCD0000658	GASTONIA REFUSE DUMP		GASTON	No
NONCD0000327	GATES COUNTY LF	GATESVILLE	GATES	No
NONCD0000326	GATESVILLE DUMP	GATESVILLE	GATES	No
NONCD0000564	GIBSON REFUSE DUMP	GIBSON	SCOTLAND	No
NONCD0000338	GIBSONVILLE TOWN LF	GIBSONVILLE	GUILFORD	No
NCD980557607	GLASS EH COUNTY LF	GREENSBORO	GUILFORD	Yes
NONCD0000173	GLEN ALPINE DUMP	ST PAUL	BURKE	No
NONCD0000630	GOLDSBORO DUMP	GOLDSBORO	WAYNE	No
NCD980557649	GOLDSBORO MUNICIPAL LF	GOLDSBORO	WAYNE	Yes
NONCD0000227	GOLDSTON DUMP	GOLDSTON	CHATHAM	No
NONCD0000576	GORDON'S DUMP		STOKES	No
NC4120000001	GRAHAM COUNTY MUNICIPAL	ROBBINSVILLE	GRAHAM	Yes
NONCD0000104	GRAHAM DISPOSAL	GRAHAM	ALAMANCE	No
NONCD0000725	GRAHAM MEMORIAL PARK	GRAHAM	ALAMANCE	No
NONCD0000186	GRANITE FALLS DUMP	GRANITE FALLS	CALDWELL	No
NONCD0000121	GREEN VALLEY DUMP		AVERY	No
NONCD0000336	GREENE COUNTY LF	SNOW HILL	GREENE	No

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ID Number	Site Name	City	County	In Other IHS Category
NCD991279027	GREENSBORO CITY LF	GREENSBORO	GUILFORD	Yes
NCD980557698	GREENVILLE CITY LF	GREENVILLE	PITT	Yes
NONCD0000500	GRIFTON DUMP	GRIFTON	PITT	No
NONCD0000495	GRIMESLAND REFUSE DUMP	GRIMESLAND	PITT	No
NONCD0000150	GRISSETTOWN LANDFILL	SEASIDE	BRUNSWICK	No
NCD980557912	GROVE STONE LF	BLACK MOUNTAIN	BUNCOMBE	Yes
NONCD0001028	GURLEY DRIVE LDFL	CONCORD	CABARRUS	Yes
NCD084171545	HALIFAX COUNTY LF		HALIFAX	Yes
NONCD0000343	HALIFAX DUMP		HALIFAX	No
NONCD0000418	HAMILTON DUMP	HAMILTON	MARTIN	No
NONCD0000515	HAMLET DUMP	HAMLET	RICHMOND	No
NONCD0000519	HAMLET TRASH DISPOSAL AREA	HAMLET	RICHMOND	No
NONCD0000722	HANOVER RD LDFL	BURLINGTON	ALAMANCE	No
NONCD0000207	HARKERS ISLAND REFUSE	HARKERS ISLAND	CARTERET	No
NONCD0000370	HARMONY REFUSE DISPOSAL	HARMONY	IREDELL	No
NCD980502959	HARRISBURG PARK LF	CHARLOTTE	MECKLENBURG	Yes
NONCD0000258	HAVELOCK REFUSE DUMP	HAVELOCK	CRAVEN	No
NONCD0000548	HAWKINS REFUSE DISPOSAL	FOREST CITY	RUTHERFORD	No
NONCD0000235	HAYESVILLE DUMP	HAYESVILLE	CLAY	No
NONCD0000553	HAYNES REFUSE DUMP		RUTHERFORD	No
NCD981474190	HAYWOOD COUNTY LF	WAYNESVILLE	HAYWOOD	Yes
NONCD0000355	HAZELWOOD DUMP	HAZELWOOD	HAYWOOD	No
NONCD0000191	HELTON REFUSE DUMP		CALDWELL	No
NCD980557961	HENDERSON CO. LANDFILL	HENDERSONVILLE	HENDERSON	Yes
NONCD0000680	HENDERSON DR LDFL	JACKSONVILLE	ONSLOW	No
NONCD0000359	HENDERSON DUMP	HENDERSONVILLE	HENDERSON	No
NONCD0000538	HENDIX GARBAGE DUMP		ROWAN	No
NONCD0000549	HENDRICKS DUMP	FOREST CITY	RUTHERFORD	No
NONCD0000171	HENRY RIVER COMM. DUMP		BURKE	No
NCD981003957	HENSON LANDFILL	FOREST CITY	RUTHERFORD	Yes
NONCD0000718	HERTFORD CO LDFL	UNION	HERTFORD	No
NONCD0000492	HERTFORD DUMP	HERTFORD	PERQUIMANS	No
NONCD0000651	HICKORY LANDFILL	HICKORY	CATAWBA	No
NCD980557565	HIGH POINT DUMP	HIGH POINT	GUILFORD	Yes
NONCD0000319	HIGH SHOALS DUMP		GASTON	No
NONCD0000413	HIGHLANDS REFUSE DISPOSAL	HIGHLANDS	MACON	No
NONCD0000170	HILDEBRAN DISPOSAL AREA	HILDEBRAN	BURKE	No
NONCD0000483	HILLSBOROUGH DUMP	HILLSBOROUGH	ORANGE	No
NONCD0000771	HILLSBOROUGH LDFL	HILLSBOROUGH	ORANGE	No
NONCD0000345	HOBGOOD DUMP	HOBGOOD	MARTIN	No

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NONCD0000429	HOLBROOK RD. LF	HUNTERSVILLE	MECKLENBURG	No
NONCD0000154	HOLDEN BEACH LF	HOLDEN BEACH	BRUNSWICK	No
NONCD0000478	HOLLY RIDGE REFUSE DISPOSAL	HOLLY RIDGE	ONSLOW	No
NONCD0000605	HOLLY SPRINGS DUMP	HOLLY SPRINGS	WAKE	No
NCD980558035	HOMINY CREEK LF	ASHEVILLE	BUNCOMBE	Yes
NONCD0000335	HOOKERTON DUMP	HOOKERTON	GREENE	No
NONCD0000264	HOPE MILLS DUMP	HOPE MILLS	CUMBERLAND	No
NCD980502983	HOPE MILLS LANDFILL	HOPE MILLS	CUMBERLAND	Yes
NONCD0000535	HOPKINS GARBAGE DUMP	LEAKSVILLE	ROCKINGHAM	No
NONCD0000664	HORN OPEN DUMP		RUTHERFORD	No
NONCD0000416	HOT SPRINGS REFUSE DISPOSAL	HOT SPRINGS	MADISON	No
NONCD0000402	HOWARD CREEK LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000435	HURLEY'S DUMP	BISCOE	MONTGOMERY	No
NONCD0000763	I-85 LANDFILL	SALISBURY	ROWAN	No
NONCD0000269	INDEPENDENT TRASH SERVICE	MAMIE	CURRITUCK	No
NONCD0000311	J.H. WINSTON DUMP	BUNN	FRANKLIN	No
NONCD0000232	J.W. BRADLEY DUMP	EDENTON	CHOWAN	No
NONCD0000767	JACKSON DUNES, LOT 14	OCRACOKE	HYDE	No
NONCD0000469	JACKSON REFUSE DISPOSAL	JACKSON	NORTHAMPTON	No
NONCD0000479	JACKSONVILLE DUMP	JACKSONVILLE	ONSLOW	No
NCD980502991	JACKSONVILLE LF -	JACKSONVILLE	ONSLOW	Yes
NONCD0000679	JACKSONVILLE WWTP LANDFILL	JACKSONVILLE	ONSLOW	Yes
NONCD0000713	JAMES DEBRAHL LAFAYETTE		ROBESON	No
NONCD0000421	JAMESVILLES DUMP	JAMESVILLE	MARTIN	No
NONCD0000273	JENNETTE'S DUMP	BUXTON	DARE	No
NONCD0000749	JOHNSONVILLE MODIFIED LDFL	JOHNSONVILLE	HARNETT	No
NONCD0000400	JONES AIRPORT LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000643	JONESVILLE DUMP	JONESVILLE	YADKIN	No
NONCD0000646	JOYNER REFUSE DUMP	YADKINVILLE	YADKIN	No
NCD981031693	KEENER LANDFILL	CLINTON	SAMPSON	Yes
NONCD0000136	KELFORD DUMP	KELFORD	BERTIE	No
NONCD0000282	KENANSVILLE DUMP	KENANSVILLE	DUPLIN	No
NONCD0000380	KENLY DUMP	KENLY	JOHNSTON	No
NONCD0000393	KENNEDY HOME DUMP	KINSTON	LENOIR	No
NONCD0000626	KERMIT GURLEY DUMP	GOLDSBORO	WAYNE	No
NONCD0000303	KERNERSVILLE DUMP	KERNERSVILLE	FORSYTH	No
NONCD0000678	KERR CITY PARK	JACKSONVILLE	ONSLOW	No
NONCD0000271	KILL DEVILS HILLS DUMP	KILL DEVIL HILLS	DARE	No
NONCD0000572	KINGS DUMP	KING	STOKES	No
NONCD0000675	KINGS MOUNTAIN LANDFILL	KINGS MOUNTAIN	CLEVELAND	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000239	KINGS MTN. DUMP	KINGS MOUNTAIN	CLEVELAND	No
NCDO75588913	KINSTON DEMOLITION LF	KINSTON	LENOIR	Yes
NONCD0000491	KIRKLAND'S DUMP	HAMPSTEAD	PENDER	No
NONCD0000603	KNIGHTDALE DUMP	KNIGHTDALE	WAKE	No
NONCD0000461	KURE BEACH REFUSE DISPOSAL	KURE BEACH	NEW HANOVER	No
NONCD0000394	LA GRANGE REFUSE DISPOSAL	LA GRANGE	LENOIR	No
NONCD0000228	LAKE HINASSEE RESORT DUMP		CHEROKEE	No
NONCD0000357	LAKE LOGAN DUMP	CANTON	HAYWOOD	No
NONCD0000552	LAKE LURE DUMP	LAKE LURE	RUTHERFORD	No
NONCD0000592	LAKE TOXAWAY DUMP	LAKE TOXAWAY	TRANSYLVANIA	No
NONCD0000253	LAKE WACCAMAW DUMP	LAKE WACCAMAW	COLUMBUS	No
NONCD0000697	LAKES APTS	RALEIGH	WAKE	No
NONCD0000539	LANDIS WASTE DISPOSAL AREA	LANDIS	ROWAN	No
NONCD0000237	LATTIMORE DUMP	LATTIMORE	CLEVELAND	No
NONCD0000565	LAURINBURG DUMP	LAURINBURG	SCOTLAND	No
NONCD0000534	LEAKSVILLE LANDFILL	LEAKSVILLE	ROCKINGHAM	No
NONCD0000411	LEDFORD PICK-UP SERVICE	FRANKLIN	MACON	No
NCD980503015	LEE COUNTY LF	SANFORD	LEE	Yes
NCD980557888	LENOIR CITY LF	LENOIR	CALDWELL	Yes
NONCD0000193	LENOIR DUMP	LENOIR	CALDWELL	No
NONCD0000140	LEWISTON REFUSE DISPOSAL	LEWISTON	BERTIE	No
NCD980557581	LEXINGTON LANDFILL	LEXINGTON	DAVIDSON	Yes
NONCD0000512	LIBERTY DUMP	LIBERTY	RANDOLPH	No
NONCD0000266	LIEBER SANITATION DUMP		CUMBERLAND	No
NONCD0000350	LILLINGTON DUMP	LILLINGTON	HARNETT	No
NONCD0000746	LILLINGTON MODIFIED LDFL	LILLINGTON	HARNETT	No
NONCD0000405	LINCOLNTON REFUSE DISPOSAL	LINCOLNTON	LINCOLN	No
NONCD0000304	LINK ROAD DUMP	WINSTON-SALEM	FORSYTH	No
NONCD0000423	LINVILLE FALLS REFUSE	LINVILLE FALLS	MCDOWELL	No
NONCD0001056	LITTLE MOUNTAIN LDFL	TRYON	POLK	Yes
NONCD0000422	LITTLE SWITZERLAND LANDFILL	LITTLE SWITZERLAND	MCDOWELL	No
NONCD0000006	LITTLEFIELD LDFL	LITTLEFIELD	PITT	Yes
NONCD0000339	LITTLETON DUMP	LITTLETON	HALIFAX	No
NONCD0000155	LONG BEACH REFUSE DISPOSAL	LONG BEACH	BRUNSWICK	No
NONCD0000219	LONG VIEW REFUSE DUMP	LONG VIEW	CATAWBA	No
NONCD0000315	LOUISBURG DUMP	LOUISBURG	FRANKLIN	No
NONCD0000655	LOUISBURG SITE #2	LOUISBURG	FRANKLIN	No
NONCD0000657	LOUISBURG SITE #3	LOUISBURG	FRANKLIN	No
NONCD0000373	LOVE VALLEY DUMP		IREDELL	No
NONCD0000323	LOWELL REFUSE DUMP	LOWELL	GASTON	No

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N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000522	LUMBER BRIDGE REFUSE	LUMBER BRIDGE	ROBESON	No
NONCD0000527	LUMBERTON DUMP	LUMBERTON	ROBESON	No
NONCD0000105	MAC BROOM SERVICE DUMP		ALAMANCE	No
NONCD0000296	MACCLESFIELD DUMP	MACCLESFIELD	EDGECOMBE	No
NONCD0000407	MACHPELAH LANDFILL	IRON STATION	LINCOLN	No
NONCD0000619	MACKEY'S DUMP		WASHINGTON	No
NCD070626825	MACON COUNTY LDFL	FRANKLIN	MACON	Yes
NONCD0000617	MACON DUMP	MACON	WARREN	No
NONCD0000536	MADISON LANDFILL	MADISON	ROCKINGHAM	No
NONCD0000286	MAGNOLIA DUMP	MAGNOLIA	DUPLIN	No
NONCD0000220	MAIDEN DUMP	MAIDEN	CATAWBA	No
NONCD0000748	MAMERS MODIFIED LDFL	MAMERS	HARNETT	No
NONCD0000270	MANTEO DUMP	MANTEO	DARE	No
NONCD0000425	MARION REFUSE DISPOSAL	MARION	MCDOWELL	No
NONCD0000415	MARS HILL REFUSE DISPOSAL	MARS HILL	MADISON	No
NONCD0000414	MARSHALL REFUSE DISPOSAL	MARSHALL	MADISON	No
NONCD0000203	MARSHALLBERG DUMP	MARSHALLBERG	CARTERET	No
NONCD0000600	MARSHVILLE DUMP	MARSHVILLE	UNION	No
NONCD0000747	MASON'S STORE MODIFIED LDFL		HARNETT	No
NONCD0000781	MATTHEWS POINT DUMP	HAVELOCK	CRAVEN	No
NONCD0000524	MAXTON DUMP	MAXTON	ROBESON	No
NONCD0000387	MAYSVILLE REFUSE DISPOSAL	MAYSVILLE	JONES	No
NONCD0000318	MCADENVILLE DUMP	MCADENVILLE	GASTON	No
NONCD0000101	MEBANE DUMP	MEBANE	ALAMANCE	No
NONCD0000545	MICHAEL'S DUMP		RUTHERFORD	No
NONCD0000449	MIDDLESEX DUMP	MIDDLESEX	NASH	No
NCD980503031	MILAN YARD LDFL	FAYETTEVILLE	CUMBERLAND	Yes
NONCD0000215	MILES GARBAGE DUMP	YANCEYVILLE	CASWELL	No
NONCD0000462	MILITARY CUTOFF LANDFILL	WILIMINGTON	NEW HANOVER	No
NONCD0000204	MILL CREEK REFUSE DUMP	MILL CREEK	CARTERET	No
NONCD0000513	MODERN GARBAGE DUMP	RANDLEMAN	RANDOLPH	No
NCD008839276	MONEY-WORTH, INC	SWANNANOA	BUNCOMBE	Yes
NONCD0000752	MONROE CRAIG LDFL	WALNUT COVE	STOKES	No
NONCD0000599	MONROE LANDFILL	MONROE	UNION	No
NONCD0000720	MOORE CO LDFL-CARTHAGE	CARTHAGE	MOORE	No
NCD981928013	MOORE CO. LANDFILL #1	ABERDEEN	MOORE	Yes
NONCD0000376	MOORESVILLE DUMP	MOORESVILLE	IREDELL	No
NONCD0000374	MOORESVILLE LANDFILL		IREDELL	No
NONCD0000205	MOREHEAD CITY REFUSE DUMP	MOREHEAD CITY	CARTERET	No
NONCD0000177	MORGANTOWN DUMP	MORGANTON	BURKE	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000116	MORVEN DUMP	MORVEN	ANSON	No
NONCD0000585	MOUNT AIRY LF	MT AIRY	SURRY	No
NONCD0000434	MOUNT GILEAD DUMP	MT GILEAD	MONTGOMERY	No
NONCD0000181	MOUNT PLEASANT DUMP	MT PLEASANT	CABARRUS	No
NONCD0000709	MT OLIVE LDFL	MOUNT OLIVE	WAYNE	No
NONCD0000584	MT. AIRY DUMP	MT AIRY	SURRY	No
NONCD0000631	MT. OLIVE REFUSE DISPOSAL	MOUNT OLIVE	WAYNE	No
NONCD0000362	MURFREESBORO DUMP	MURFREESBORO	HERTFORD	No
NONCD0000230	MURPHY REFUSE DUMP	MURPHY	CHEROKEE	No
NONCD0000737	N DAVIDSON CO LDFL		DAVIDSON	No
NONCD0000634	N. WILKESBORO DUMP	NORTH WILKESBORO	WILKES	No
NCD980559348	NASH COUNTY LF	NASHVILLE	NASH	Yes
NCD980559330	NASH COUNTY LF (RED OAK LF)	RED OAK	NASH	Yes
NCD980559355	NASH COUNTY LF (SPRING HOPE)	SPRING HOPE	NASH	Yes
NONCD0000456	NASHVILLE DUMP	NASHVILLE	NASH	No
NONCD0000783	NC 7 DUMP	BELMONT	GASTON	No
NONCD0000607	NC DEPT. OF AGRICULTURE LF	RALEIGH	WAKE	No
NONCD0000263	NEW BERN SANITARY DUMP	NEW BERN	CRAVEN	No
NCD990715070	NEW HANOVER CO & CAROLINA	CAROLINA BEACH	NEW HANOVER	Yes
NONCD0000463	NEW HANOVER CO. LANDFILL	CAROLINA BEACH	NEW HANOVER	No
NONCD0000368	NEW HOLLAND DUMP	SWAN QUARTER	HYDE	No
NONCD0000196	NEWBY'S TRASH SERVICE DUMP	CAMDEN	CAMDEN	No
NONCD0000124	NEWLAND REFUSE DUMP	NEWLAND	AVERY	No
NONCD0000559	NEWTON GROVE DUMP	NEWTON GROVE	JOHNSTON	No
NONCD0000221	NEWTON LANDFILL	NEWTON	CATAWBA	No
NONCD0000615	NORLINA DUMP	NORLINA	WARREN	No
NONCD0000403	NORTH BROOK LANDFILL	VALE	LINCOLN	No
NONCD0000246	NORTH EARL DUMP	EARL	CLEVELAND	No
NONCD0000570	NORWOOD DUMP	NORWOOD	STANLY	No
NONCD0000417	OAK CITY DUMP	OAK CITY	MARTIN	No
NONCD0000569	OAKBORO DUMP	OAKBORO	STANLY	No
NONCD0000656	OCEAN ISLE DUMP	OCEAN ISLE	BRUNSWICK	No
NONCD0000153	OCEAN ISLE LANDFILL	OCEAN ISLE	BRUNSWICK	No
NONCD0000369	OCRACOKE DUMP	OCRACOKE	HYDE	No
NONCD0000111	OLD ALEXANDER COUNTY LF (SR	TAYLORSVILLE	ALEXANDER	No
NONCD0000113	OLD ALLEGHENY COUNTY LF	SPARTA	ALLEGHANY	No
NCD986166734	OLD BEAUFORT COUNTY LF	WASHINGTON	BEAUFORT	Yes
NONCD0001065	OLD CHARLOTTE LDFL/	CHARLOTTE	MECKLENBURG	Yes
NONCD0000106	OLD CITY OF BURLINGTON SOLID	BURLINGTON	ALAMANCE	No
NONCD0000290	OLD DURHAM COUNTY LF		DURHAM	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000424	OLD FORT REFUSE DISPOSAL	OLD FORT	MCDOWELL	No
NONCD0000665	OLD HOLLY SPRINGS DUMP/	HOLLY SPRINGS	WAKE	No
NONCD0000404	OLD LINCOLN COUNTY LF	LINCOLNTON	LINCOLN	No
NONCD0000766	OLD QUARRY LANDFILL	HAW RIVER	ALAMANCE	No
NONCD0000684	OLD RALEIGH LF #1	RALEIGH	WAKE	No
NONCD0000693	OLD RALEIGH LF #10	RALEIGH	WAKE	No
NONCD0000694	OLD RALEIGH LF #11	RALEIGH	WAKE	No
NONCD0000685	OLD RALEIGH LF #2	RALEIGH	WAKE	No
NONCD0000686	OLD RALEIGH LF #3	RALEIGH	WAKE	No
NONCD0000687	OLD RALEIGH LF #4	RALEIGH	WAKE	No
NONCD0000688	OLD RALEIGH LF #5	RALEIGH	WAKE	No
NONCD0000689	OLD RALEIGH LF #6	RALEIGH	WAKE	No
NONCD0000690	OLD RALEIGH LF #7	RALEIGH	WAKE	No
NONCD0000691	OLD RALEIGH LF #8	RALEIGH	WAKE	No
NONCD0000692	OLD RALEIGH LF #9	RALEIGH	WAKE	No
NCD986197374	OLD RANDLEMAN TOWN DUMP	RANDLEMAN	RANDOLPH	Yes
NONCD0000445	OLD ROBBINS-HIGH FALLS LF	ROBBINS	MOORE	No
NONCD0000299	OLD ROCKY MOUNT LF	ROCKY MOUNT	EDGECOMBE	No
NONCD0000698	OLD SHELBY LANDFILL	SHELBY	CLEVELAND	No
NONCD0000777	OLD SMITHFIELD LANDFILL	SMITHFIELD	JOHNSTON	No
NONCD0000156	OLD SOUTHPORT LF		BRUNSWICK	No
NONCD0000593	OLIN-MATHEISON DUMP	PISGAH FOREST	TRANSYLVANIA	No
NONCD0000681	ONSLOW PINES RD LDFL	JACKSONVILLE	ONSLOW	No
NONCD0000760	OPTIMIST BALL PARK	WILIMINGTON	NEW HANOVER	No
NCD986171106	ORANGE CO REGIONAL LDFL	CHAPEL HILL	ORANGE	Yes
NONCD0000486	ORIENTAL DUMP	ORIENTAL	PAMLICO	No
NONCD0000198	OTWAY COMMUNITY REFUSE	OTWAY	CARTERET	No
NONCD0000331	OXFORD DUMP	OXFORD	GRANVILLE	No
NONCD0000719	PAMLICO CO LDFL	REELSBORO	PAMLICO	No
NONCD0000130	PANTEGO DUMP	BELHAVEN	BEAUFORT	No
NONCD0000133	PANTEGO REFUSE DISPOSAL	PANTEGO	BEAUFORT	No
NONCD0000520	PARKTON DUMP	PARKTON	ROBESON	No
NONCD0000249	PATTERSON SPRINGS	EARL	CLEVELAND	No
NONCD0000118	PEACHLAND DUMP	PEACHLAND	ANSON	No
NONCD0000229	PEACHTREE COM. DUMP	PEACHTREE	CHEROKEE	No
NONCD0000525	PEMBROKE DUMP	PEMBROKE	ROBESON	No
NONCD0000474	PERDUE, INC.	CONWAY	NORTHAMPTON	No
NONCD0000234	PERQUIMANS-CHOWAN LF	TYNER	CHOWAN	No
NONCD0000677	PHILLIPS PARK LANDFILL	JACKSONVILLE	ONSLOW	No
NONCD0000240	PHILLIPS REFUSE DUMP	GROVER	CLEVELAND	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000629	PIKEVILLE DUMP	PIKEVILLE	WAYNE	No
NONCD0000708	PIKEVILLE LDFL	PIKEVILLE	WAYNE	No
NONCD0000583	PILOT MT. REFUSE DUMP	PILOT MT	SURRY	No
NONCD0000440	PINE BLUFF DUMP	PINE BLUFF	MOORE	No
NONCD0000382	PINE LEVEL DUMP	PINE LEVEL	JOHNSTON	No
NONCD0000298	PINETOPS REFUSE DUMP	PINETOPS	EDGECOMBE	No
NONCD0000427	PINEVILLE DUMP	PINEVILLE	MECKLENBURG	No
NONCD0000397	PINK HILL DUMP	PINK HILL	LENOIR	No
NCD980557672	PITT CO UTILITY LDFL	GREENVILLE	PITT	Yes
NCD980557680	PITT COUNTY LANDFILL	GREENVILLE	PITT	Yes
NONCD0000621	PLYMOUTH REFUSE DUMP	PLYMOUTH	WASHINGTON	No
NONCD0000115	POLKTON DUMP	POLKTON	ANSON	No
NONCD0000248	POLKVILLE DUMP	POLKVILLE	CLEVELAND	No
NONCD0000388	POLLOCKSVILLE DUMP	MAYSVILLE	JONES	No
NONCD0000776	POLLOCKSVILLE DUMP #2	POLLOCKSVILLE	JONES	No
NONCD0000164	POND ROAD LF #1	ASHEVILLE	BUNCOMBE	No
NCD980558027	POND ROAD LF #2	ASHEVILLE	BUNCOMBE	Yes
NONCD0000727	PORTER AVENUE LDFL	GRAHAM	ALAMANCE	No
NONCD0000137	POWELLSVILLE REFUSE	AHOSKIE	HERTFORD	No
NONCD0000383	PRINCETON DUMP	PRINCETON	JOHNSTON	No
NONCD0000297	PRINCEVILLE DUMP	TARBORO	EDGECOMBE	No
NONCD0000482	PUMPKIN CENTER LF	JACKSONVILLE	ONSLOW	No
NONCD0000132	PUNGO DUMP	PANTEGO	BEAUFORT	No
NONCD0000364	RAEFORD DUMP	RAEFORD	HOKE	No
NONCD0000610	RALEIGH LANDFILL - DORTHEA	RALEIGH	WAKE	No
NONCD0000506	RAMSEUR	RAMSEUR	RANDOLPH	No
NONCD0000511	RANDLEMAN DUMP	RANDLEMAN	RANDOLPH	No
NONCD0000481	RAY'S RURAL DUMP	JACKSONVILLE	ONSLOW	No
NONCD0000211	RAYNOR GARBAGE DISPOSAL	BOGUE	CARTERET	No
NONCD0000529	RED SPRINGS DUMP	RED SPRINGS	ROBESON	No
NONCD0000537	REIDSVILLE LANDFILL	REIDSVILLE	ROCKINGHAM	No
NONCD0000711	RENNERT LANDFILL	RENNERT	ROBESON	No
NONCD0000190	RHODHISS DUMP	RHODHISS	CALDWELL	No
NONCD0000473	RICH SQUARE REFUSE DISPOSAL	RICH SQUARE	NORTHAMPTON	No
NONCD0000742	RICHARD FRANKLIN LDFL	WAYNESVILLE	HAYWOOD	No
NONCD0000566	RICHFIELD DUMP	RICHFIELD	STANLY	No
NONCD0000477	RICHLANDS REFUSE DISPOSAL	RICHLAND	ONSLOW	No
NCD980557789	RICHMOND COUNTY LF	ROCKINGHAM	RICHMOND	Yes
NONCD0000251	RIEGELWOOD DUMP	RIEGELWOOD	COLUMBUS	No
NONCD0000347	ROANOKE RAPIDS CITY LF	ROANOKE RAPIDS	HALIFAX	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000341	ROANOKE RAPIDS LANDFILL	ROANOKE RAPIDS	HALIFAX	No
NONCD0000437	ROBBINS DUMP	ROBBINS	MOORE	No
NONCD0000329	ROBBINSVILLE DUMP	ROBBINSVILLE	GRAHAM	No
NONCD0000420	ROBERSONVILLE DUMP	ROBERSONVILLE	MARTIN	No
NONCD0000517	ROCKINGHAM DUMP	ROCKINGHAM	RICHMOND	No
NONCD0000455	ROCKY MOUNT LANDFILL	ROCKY MOUNT	NASH	No
NONCD0000710	ROCKY MOUNT LDFL (LIEBERS)	ROCKY MOUNT	EDGECOMBE	No
NONCD0000715	ROHN ANDERSON LDFL	WHITEVILLE	COLUMBUS	No
NONCD0000601	ROLESVILLE DUMP	ROLESVILLE	WAKE	No
NONCD0000618	ROPER REFUSE DISPOSAL	ROPER	WASHINGTON	No
NONCD0000281	ROSE HILL DUMP	ROSE HILL	DUPLIN	No
NONCD0000561	ROSEBORO DUMP	ROSEBORO	SAMPSON	No
NONCD0000590	ROSMAN DUMP	ROSMAN	TRANSYLVANIA	No
NONCD0000589	ROSMAN RESEARCH LF		TRANSYLVANIA	No
NCD980557748	ROWAN COUNTY LANDFILL	SALISBURY	ROWAN	Yes
NCN000407196	ROWAN RD DUMP	CLINTON	SAMPSON	Yes
NONCD0000523	ROWLAND REFUSE DUMP	ROWLAND	ROBESON	No
NONCD0000494	ROXBORO DUMP	ROXBORO	PERSON	No
NONCD0000139	ROXOBEL REFUSE DISPOSAL	KELFORD	BERTIE	No
NONCD0000467	RURAL GARBAGE SERVICE		NEW HANOVER	No
NONCD0000274	RURAL GARBAGE SERVICE, INC.	THOMASVILLE	DAVIDSON	No
NONCD0000555	RUTHERFORDTON DISPOSAL	RUTHERFORDTON	RUTHERFORD	No
NONCD0000724	S MEBANE ST LDFL	BURLINGTON	ALAMANCE	No
NONCD0000557	SALEMBURG DUMP	SALEMBURG	SAMPSON	No
NONCD0000543	SALISBURY LANDFILL	SALISBURY	ROWAN	No
NONCD0000505	SALUDA REFUSE DUMP	SALUDA	POLK	No
NONCD0000706	SAMPSON CO LDFL (CARTERS	GARLAND	SAMPSON	No
NONCD0000702	SAMPSON CO LDFL (INGOLD)	INGOLD	SAMPSON	No
NONCD0000703	SAMPSON CO LDFL (IVANHOE)	IVANHOE	SAMPSON	No
NONCD0000701	SAMPSON CO LDFL (MT GILEAD)	MT GILEAD	SAMPSON	No
NONCD0000700	SAMPSON CO LDFL (SPIVEYS	SPIVEYS CORNER	SAMPSON	No
NONCD0000704	SAMPSON CO LDFL	SUTTONTOWN	SAMPSON	No
NONCD0000514	SANDFILL INDUSTRIAL DUMP	ROCKINGHAM	RICHMOND	No
NONCD0000390	SANFORD DUMP	SANFORD	LEE	No
NONCD0000305	SANITARY LANDFILL		FORSYTH	No
NONCD0000109	SANITARY PICK-UP SERVICE	TAYLORSVILLE	ALEXANDER	No
NCD980503106	SANITATION SERVICE LF	RENNERT	ROBESON	Yes
NONCD0000637	SARATOGA DUMP	SARATOGA	WILSON	No
NONCD0000563	SCOTLAND COUNTY COMM. DUMP	LAURINBURG	SCOTLAND	No
NONCD0000344	SCOTLAND NECK DUMP	SCOTLAND NECK	HALIFAX	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000596	SCUPPENONG COMM. DUMP	SCUPPERNONG	TYRRELL	No
NONCD0000471	SEABOARD REFUSE DISPOSAL	SEABOARD	NORTHAMPTON	No
NONCD0000507	SEAGROVE DUMP	SEAGROVE	RANDOLPH	No
NONCD0000381	SELMA REFUSE DUMP	SELMA	JOHNSTON	No
NONCD0000398	SEVEN SPRINGS DUMP	SEVEN SPRINGS	LENOIR	No
NONCD0000472	SEVERN REFUSE DISPOSAL	SEVERN	NORTHAMPTON	No
NONCD0000159	SHALLOTTE REFUSE DUMP	SHALLOTTE	BRUNSWICK	No
NONCD0000152	SHALLOTTE SANITARY LANDFILL	SHALLOTTE	BRUNSWICK	No
NONCD0000450	SHARPSBURG DUMP	SHARPSBURG	NASH	No
NONCD0000242	SHELBY REFUSE DUMP	SHELBY	CLEVELAND	No
NONCD0000195	SHEW REFUSE DISPOSAL		CABARRUS	No
NONCD0000225	SILER CITY DUMP	SILER CITY	CHATHAM	No
NONCD0000639	SIMS REFUSE DISPOSAL	SIMS	WILSON	No
NONCD0000385	SMITHFIELD REFUSE DUMP	SMITHFIELD	JOHNSTON	No
NONCD0000337	SNOW HILL DUMP	SNOW HILL	GREENE	No
NONCD0000493	SOLOMON'S DUMP	ROXBORO	PERSON	No
NCD981477318	SOMERS RD. DUMP	HAMPTONVILLE	WILKES	Yes
NCD980503122	SORRELL LDFL	APEX	WAKE	Yes
NONCD0000775	SOUND SHORES LOTS 18 & 19	OCRACOKE	HYDE	No
NONCD0000247	SOUTH EARL DUMP	EARL	CLEVELAND	No
NONCD0000668	SOUTH SAUDERS STREET DUMP	RALEIGH	WAKE	No
NONCD0000762	SOUTHERN PINES DUMP	SOUTHERN PINES	MOORE	No
NONCD0000447	SOUTHERN PINES LANDFILL	SOUTHERN PINES	MOORE	No
NONCD0000480	SOUTHWEST LF	JACKSONVILLE	ONSLOW	No
NONCD0000114	SPARTA REFUSE DISPOSAL	SPARTA	ALLEGHANY	No
NONCD0000542	SPENCER LAND DISPOSAL AREA	SPENCER	ROWAN	No
NONCD0000550	SPINDALE REFUSE DISPOSAL	SPINDALE	RUTHERFORD	No
NONCD0000533	SPRAY DUMP		ROCKINGHAM	No
NONCD0000452	SPRING HOPE DUMP	SPRING HOPE	NASH	No
NONCD0000268	SPRING LAKE DUMP	SPRING LAKE	CUMBERLAND	No
NONCD0000432	SPRUCE PINE REFUSE DISPOSAL	SPRUCE PINE	MITCHELL	No
NONCD0000206	STACY REFUSE DUMP		CARTERET	No
NONCD0000567	STANFIELD DUMP	STANFIELD	STANLY	No
NONCD0000316	STANLEY REFUSE DUMP	STANLEY	GASTON	No
NONCD0000371	STATESVILLE DUMP	STATESVILLE	IREDELL	No
NCD000605097	STATESVILLE RD. LF	CHARLOTTE	MECKLENBURG	Yes
NONCD0000635	STATONSBURG DUMP	STANTONSBURG	WILSON	No
NONCD0000265	STEDMAN DUMP	STEDMAN	CUMBERLAND	No
NONCD0000573	STOKES GARBAGE SERVICE		STOKES	No
NONCD0000721	STONE QUARRY RD LDFL	BURLINGTON	ALAMANCE	No

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NONCD0000532	STONEVILLE DUMP	STONEVILLE	ROCKINGHAM	No
NONCD0000330	STOVALL DUMP	STOVALL	GRANVILLE	No
NONCD0000125	SUBURBAN SANITATION SERVICE	WASHINGTON	BEAUFORT	No
NONCD0000518	SUBURBAN WASTE & GARBAGE	ROCKINGHAM	RICHMOND	No
NC0210020541	SUNNY POINT BASE LANDFILL	SOUTHPORT	BRUNSWICK	No
NC3120000002	SWAIN CO LDFL	BRYSON CITY	SWAIN	Yes
NONCD0000588	SWAIN COUNTY DUMP	BRYSON CITY	SWAIN	No
NONCD0000366	SWAN QUARTER DUMP	SWAN QUARTER	HYDE	No
NCD980557987	SWANNANOA LANDFILL	SWANNANOA	BUNCOMBE	Yes
NONCD0000476	SWANSBORO DUMP	SWANSBORO	ONSLOW	No
NONCD0000378	SYLVA DUMP		JACKSON	No
NONCD0000257	TABOR CITY DUMP	TABOR CITY	COLUMBUS	No
NONCD0000759	TALLMAN CLAY PIT	WILMINGTON	NEW HANOVER	No
NONCD0000143	TAR HEEL REFUSE DISPOSAL	TAR HEEL	BLADEN	No
NCD980559389	TARBORO LANDFILL	TARBORO	EDGECOMBE	Yes
NONCD0000729	TATE ST LDFL	MEBANE	ALAMANCE	No
NONCD0000112	TAYLORSVILLE DUMP	TAYLORSVILLE	ALEXANDER	No
NONCD0000406	TIN MINE LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000750	TOWN OF HAMLET LDFL	HAMLET	RICHMOND	No
NONCD0000714	TOWN OF MAXTON LDFL	MAXTON	ROBESON	No
NONCD0000135	TOWN OF WASHINGTON PARK	WASHINGTON PARK	BEAUFORT	No
NONCD0000356	TOWN OF WAYNESVILLE DUMP	WAYNESVILLE	HAYWOOD	No
NONCD0000386	TRENTON REFUSE DISPOSAL	TRENTON	JONES	No
NONCD0000436	TROY LANDFILL	TROY	MONTGOMERY	No
NONCD0000504	TRYON REFUSE DISPOSAL	TRYON	POLK	No
NCD980503163	UNION COUNTY LF	MONROE	UNION	Yes
NCD980557615	UNIVERSITY OF NC/OLD	CHAPEL HILL	ORANGE	Yes
NONCD0000223	UNKNOWN	CONOVER	CATAWBA	No
NONCD0000661	UNKNOWN #1 - PITT		PITT	No
NONCD0000662	UNKNOWN #1 - RANDOLPH	PLEASANT RIDGE	RANDOLPH	No
NONCD0000660	UNKNOWN #2 - PITT	GREENVILLE	PITT	No
NONCD0000663	UNKNOWN #2 - RANDOLPH	COLERIDGE	RANDOLPH	No
NONCD0000238	UPPER CLEVELAND DUMP	FALLSTON	CLEVELAND	No
NONCD0000174	VALDESE REFUSE DUMP	VALDESE	BURKE	No
NONCD0000260	VANCEBORO DUMP	VANCEBORO	CRAVEN	No
NONCD0000487	VANDEMERE DUMP	VANDEMERE	PAMLICO	No
NONCD0000441	VASS DUMP	VASS	MOORE	No
NONCD0000676	W DAVIDSON CO LDFL		DAVIDSON	No
NONCD0000772	W R BONSAL #1	LILESVILLE	ANSON	No
NONCD0000774	W R BONSAL #2		ANSON	No

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NONCD0000243	WACO DUMP	WACO	CLEVELAND	No
NONCD0000117	WADESBORO LANDFILL	WADESBORO	ANSON	No
NCD980503171	WAKE COUNTY/FELTONVILLE LF	APEX	WAKE	Yes
NONCD0000288	WALLACE DUMP	WALLACE	DUPLIN	No
NONCD0000577	WALNUT COVE DUMP	WALNUT COVE	STOKES	No
NONCD0000574	WALNUT COVE LF	WALNUT COVE	STOKES	No
NONCD0000189	WALSH REFUSE DUMP		CALDWELL	No
NONCD0000334	WALSTONBURG DUMP	WALSTONBURG	GREENE	No
NONCD0000609	WALTON'S DUMP	WENDELL	WAKE	No
NONCD0000696	WALTON'S SANITATION SERVICE	MORRISVILLE	WAKE	No
NONCD0000616	WARRENTON DUMP	WARRENTON	WARREN	No
NONCD0000285	WARSAW DUMP	WARSAW	DUPLIN	No
NONCD0000129	WASHINGTON DUMP	WASHINGTON	BEAUFORT	No
NONCD0000134	WASHINGTON PARK DUMP	WASHINGTON	BEAUFORT	No
NONCD0000598	WAXHAW DUMP	WAXHAW	UNION	No
NONCD0000667	WE BUFFALOE, JR PRIVATE	GARNER	WAKE	No
NONCD0000161	WEAVERVILLE LANDFILL	WEAVERVILLE	BUNCOMBE	No
NONCD0000346	WELDON CITY LANDFILL	WELDON	HALIFAX	No
NONCD0000342	WELDON REFUSE DISPOSAL	WELDON	HALIFAX	No
NONCD0000438	WEST END DUMP	WEST END	MOORE	No
NONCD0000586	WEYERHAUSER LF	ELKIN	SURRY	No
NONCD0000652	WHEELERS SAND ROCK PIT		DAVIDSON	No
NONCD0000444	WHISPERING PINES DUMP		MOORE	No
NONCD0000453	WHITAKERS DUMP	WHITAKERS	NASH	No
NONCD0000146	WHITE LAKE REFUSE DUMP	WHITE LAKE	BLADEN	No
NONCD0000256	WHITEVILLE DUMP	WHITEVILLE	COLUMBUS	No
NONCD0000670	WICKER PARK LANDFILL	PINEHURST	MOORE	No
NONCD0000754	WILKES CO LDFL	ROARING RIVER	WILKES	No
NCD980557896	WILKES CO MUNICIPAL LDFL	RONDA	WILKES	Yes
NONCD0000633	WILKESBORO REFUSE DISPOSAL	WILKESBORO	WILKES	No
NONCD0000419	WILLIAMSTON DUMP	WILLIAMSTON	MARTIN	No
NONCD0000466	WILMINGTON LANDFILL	WILMINGTON	NEW HANOVER	No
NONCD0000756	WILMINGTON LDFL (KIDDER ST)	WILIMINGTON	NEW HANOVER	No
NONCD0000640	WILSON SANITARY LF	WILSON	WILSON	No
NONCD0000141	WINDSOR REFUSE DISPOSAL	WINDSOR	BERTIE	No
NONCD0000597	WINGATE DUMP	WINGATE	UNION	No
NONCD0000151	WINNABOW LANDFILL	WINNABOW	BRUNSWICK	No
NONCD0000210	WINSTON HILL LF	ATLANTIC	CARTERET	No
NONCD0000499	WINTERVILLE DUMP	WINTERVILLE	PITT	No
NONCD0000360	WINTON DUMP	WINTON	HERTFORD	No

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
OCTOBER 2003

OLD UNLINED LANDFILL LIST

ID Number	*Site Name*	*City*	*County*	*In Other IHS Category*
NONCD0000758	WISTERIA DR LDFL	WILMINGTON	NEW HANOVER	No
NONCD0000468	WOODLAND REFUSE DISPOSAL	WOODLAND	NORTHAMPTON	No
NONCD0000464	WRIGHTSVILLE BEACH DUMP	WRIGHTSVILLE BEACH	NEW HANOVER	No
NONCD0000647	YADKINVILLE REFUSE DISPOSAL	YADKINVILLE	YADKIN	No
NONCD0000158	YAUPON BEACH DUMP	YAUPON BEACH	BRUNSWICK	No
NONCD0000608	ZEBULON DUMP	ZEBULON	WAKE	No

February 24, 2004 ERC Meeting
EXHIBIT N

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: Senator Marc Basnight, Co-chair
Joint Legislative Commission on Governmental Operations

Representative James Black, Co-chair
Joint Legislative Commission on Governmental Operations

Representative Richard Morgan, Co-chair
Joint Legislative Commission on Governmental Operations

George Givens, Environmental Review Commission Counsel

FROM: William G. Ross Jr., Secretary

DATE: September 29, 2003

RE: Report on Superfund Cost Share Fund Expenditures for North Carolina's 10 Percent Share for Cleanup of Sites on the National Priorities List

Section 15.12 (a) of House Bill 352 (ratified August 28, 1997) authorizes the Department of Environment and Natural Resources, with the approval of the Office of State Budget and Management, to use available funds for the 10 percent cost share required for Superfund cleanups on the National Priorities List sites.

Section 15.12 (b) directs the DENR to report to the Environmental Review Commission and the Joint Legislative Commission on Governmental Operations as to "the amount and source of the funds used pursuant to subsection (a) of this section within 30 days of the expenditure of these funds." The attached report provides this information.

If you have any questions, please contact Mr. David Lown, Head, Federal Remediation Branch, Superfund Section at 733-2801 x.278.

WR/djl

Attachment

cc: Dexter R. Matthews, Director
Division of Waste Management

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR

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Report to the
Environmental Review Commission

Expenditures from the
Superfund Cost Share Fund
For North Carolina's 10 Percent Share

July 2003

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

Superfund Section
Division of Waste Management

http://www.wastenotnc.org/

REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION ON EXPENDITURES FROM THE SUPERFUND COST SHARE FUND FOR NORTH CAROLINA'S 10 PERCENT SHARE OF CLEANUPS FOR SITES ON THE NATIONAL PRIORITIES LIST

At present, 28 hazardous waste sites in North Carolina have been included on the National Priority List (NPL) for cleanup. At twelve of the NPL sites, no viable responsible parties have been identified. These sites will be cleaned up using a combination of federal and state public funds. The federal Hazardous Response Trust Fund (the Superfund) contributes 90 percent of the money for remedial actions at these sites; the State contributes the remaining 10 percent. If the cleanup involves the ongoing use of remediation systems, the State must pay 100% of the operation and maintenance (O & M) costs for the system. One new North Carolina site has been proposed for addition to the NPL; that site will also be Fund financed.

Both the State's 10% cost share and any O & M costs are paid out of the State's Superfund Cost Share Fund (SCSF). As of July 31, 2003, the Fund had accumulated $11,914,069 in appropriations, interest and other income. Of that total, $8,756,660 has been encumbered or disbursed to pay for the State's share of clean up costs at eight NPL sites with signed Superfund State Contracts (SSCs). Other disbursements and reductions have removed $1,496,966 from the SCSF, leaving only $1,660,443 available for future cleanup actions. All remaining available SCSF funding could be obligated for cleanups in the next few months.

At the remaining four NPL sites, the State has not yet negotiated Superfund State Contracts and remedial actions have not begun. In addition to those four NPL sites, another potential Fund-financed site is proposed for the NPL. The actual amount required for State cost-share at those sites cannot be known until assessment of the sites has been completed. Additional sites likely will be added to the NPL in the future and some of those future sites will likely require a 10 percent state cost share for cleanup. Once funds in the SCSF have been exhausted, Superfund cleanups of NPL sites in North Carolina could end.

The attached table, Fund-Financed NPL Sites, lists the eight fund-financed sites for which an SSC has been signed. The table also shows all encumbrances and disbursements that have occurred due to the State's 10 percent cost share requirement. Note that some sites are divided into Operable Units (OU). This is common practice in the cleanup of NPL sites, because it makes designing and executing the cleanups more structured and easier to control.

There is one disbursement of $3,803 from the SCSF that was made in July 2003, for ABC Cleaners OU-2. This is the only disbursement since May 2003.

FUND-FINANCED NPL SITES
AMOUNTS ENCUMBERED AND DISBURSED
(as of 7/31/2003)

Site Name and Location	Dates SSC Signed	Estimated Total Cost of Remediation	Cost to State	Dates Disbursed	Amounts Disbursed	Remaining Amount Encumbered
ABC One Hour Cleaners	9/12/96	$3,760,000	$376,000	11/20/97	$94,000	
Operable Unit # 1				10/15/01	$26,964	
Jacksonville, Onslow Co.						
Site Totals		**$3,760,000**	**$376,000**		**$120,964**	**$255,036**
ABC One Hour Cleaners	9/19/97	$750,000	$75,000	11/20/97	$18,750	
Operable Unit # 2				7/31/03	$3,803	
Jacksonville, Onslow Co.						
Site Totals		**$750,000**	**$75,000**		**$22,553**	**$52,447**
Benfield Industries	9/27/96	$6,729,200	$672,920	11/20/97	$168,230	
Hazelwood (Waynesville)				3/31/01	$69,841	
Haywood Co.						
Site Totals		**$6,729,200**	**$672,920**		**$238,071**	**$434,849**
Cape Fear Wood Preserving	9/29/94	$16,965,300	$1,696,530	3/31/01	$1,758,697	
Fayetteville, Cumberland Co.	9/22/00	$4,350,000	$435,000			
	9/20/02	$3,092,274	$309,227			
				5/14/03	$478,263	
Site Totals		**$24,407,574**	**$2,440,757**		**$2,236,960**	**$203,798**
Carolina Transformer	9/25/97	$9,851,700	$985,170	11/20/97	$246,293	
Fayetteville, Cumberland Co.	1/14/00	$4,634,850	$463,485	4/30/01	$20,266	
	9/28/01	$2,000,000	$200,000	2/28/03	$1,181,561	
	9/20/02	$3,513,450	$351,345			
	5/13/03	$2,000,000	$200,000			
Site Totals		**$22,000,000**	**$2,200,000**		**$1,448,120**	**$751,880**
Davis Park Road TCE Site	4/1/00	$3,873,299	$387,330	3/31/01	$49,061	
Gastonia, Gaston Co.				12/3/01	$13,226	
Site Totals		**$3,873,299**	**$387,330**		**$62,287**	**$325,043**

FUND-FINANCED NPL SITES (continued)
AMOUNTS ENCUMBERED AND DISBURSED
(as of 7/31/2003)

Site Name and Location	Dates SSC Signed	Estimated Total Cost of Remediation	Cost to State	Dates Disbursed	Amounts Disbursed	Remaining Amount Encumbered
FCX-Statesville	9/12/96	$4,161,525	$416,153	11/20/97	$104,038	
Operable Unit # 1				5/31/03	$3,245	
Statesville, Iredell Co.						
Site Totals		**$4,161,525**	**$416,153**		**$107,283**	**$308,869**
FCX-Statesville	9/25/97	$4,840,000	$484,000	11/20/97	$121,000	
Operable Unit # 2				4/30/01	$53,979	
Statesville, Iredell Co.	2/22/02	$1,160,000	$116,000			
				3/31/02	$379,969	
				4/30/03	$23,814	
Site Totals		**$6,000,000**	**$600,000**		**$578,762**	**$21,238**
North Belmont PCE Site	7/26/00	$7,535,000	$753,500	12/3/01	$31,835	
North Belmont, Gaston Co.				5/14/03	$223,157	
Site Totals		**$7,535,000**	**$753,500**		**$254,992**	**$498,508**
Potters Septic Tank Pits	9/16/94	$8,000,000	$800,000	1/30/95	$200,000	
Maco, Brunswick Co.	6/15/98	$350,000	$35,000			
Site Totals		**$8,350,000**	**$835,000**		**$200,000**	**$635,000**
TOTALS		**$87,566,598**	**$8,756,660**		**$5,269,991**	**$3,486,668**

Report to the Environmental Review Commission

Expenditures from the Superfund Cost Share Fund For North Carolina's 10 Percent Share

January 2004

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Superfund Section
Division of Waste Management

http://www.wastenotnc.org/

REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION ON EXPENDITURES FROM THE SUPERFUND COST SHARE FUND FOR NORTH CAROLINA'S 10 PERCENT SHARE OF CLEANUPS FOR SITES ON THE NATIONAL PRIORITIES LIST

Exhaustion of North Carolina's Superfund Cost Share Fund (SCSF) threatens to end the cleanup of fund-lead National Priorities List (NPL) sites in the state. The remaining portions of the SCSF could be obligated to cleanups led by the USEPA in the next few months.

At present, 29 hazardous waste sites in North Carolina are included on the NPL. Thirteen of the NPL sites are fund-financed sites, where no viable responsible parties have been identified. These sites are being cleaned up using a combination of federal and state public funds. The Hazardous Response Trust Fund (the Superfund) contributes 90 percent of the money for remedial actions at these sites and the state contributes the remaining 10 percent.

The state's 10 percent contribution comes from the SCSF. As of 31 January 2004, the fund had accumulated $11,980,858 in appropriations, interest and other income. Of that total, $8,756,660 has been encumbered or disbursed to pay for the state's share of clean up costs at eight NPL sites with signed Superfund State Contracts (SSCs).

Other disbursements and reductions have removed $1,496,966 from the SCSF, leaving only $1,715,956 available for future cleanup actions. Available funding could be obligated for cleanups in the next few months. Remedial actions needed at five NPL sites have not begun. To date no SSCs have been negotiated for these sites. In addition to the sites discussed above, other sites will be added to the NPL. Some of these sites will require a 10 percent state cost share for cleanup. In addition to the 10 percent cost share at these fund-financed NPL sites, the state is responsible for the operation and maintenance (O&M) costs as well. The funds to perform O&M also come from the Superfund Cost Share Fund.

The attached table, Fund-Financed NPL Sites, lists the eight fund-financed sites for which an SSC has been signed. The table also shows all encumbrances and disbursements that have occurred due to the state's 10 percent cost share requirement. Note that some sites are divided into Operable Units (OU). This is common practice in the cleanup of NPL sites, because it makes designing and executing the cleanups more structured and easier to control.

Two disbursements totaling $27,092 were made the SCSF in December 2003. A payment of $5,133 was made for ABC Cleaners OU-2 and a payment of $21,958 was made for the Davis Park Road site. These are the only disbursements since July 2003.

To continue the cleanup of North Carolina's NPL sites, it is important that funding for the SCSF be reestablished.

TABLE 1
FUND-FINANCED NPL SITES
AMOUNTS ENCUMBERED AND DISBURSED
(as of 1/31/2004)

	Dates	Estimated				Remaining
	SSC	Total Cost of	Cost to	Dates	Amounts	Amount
Site Name and Location	Signed	Remediation	State	Disbursed	Disbursed	Encumbered
ABC One Hour Cleaners	9/12/96	$3,760,000	$376,000	11/20/97	$94,000	
Operable Unit # 1				10/15/01	$26,964	
Jacksonville, Onslow Co.						
Site Totals		**$3,760,000**	**$376,000**		**$120,964**	**$255,036**
ABC One Hour Cleaners	9/19/97	$750,000	$75,000	11/20/97	$18,750	
Operable Unit # 2				7/31/03	$3,803	
Jacksonville, Onslow Co.				11/30/03	$5,133	
Site Totals		**$750,000**	**$75,000**		**$27,686**	**$47,314**
Benfield Industries	9/27/96	$6,729,200	$672,920	11/20/97	$168,230	
Hazelwood (Waynesville)				3/31/01	$69,841	
Haywood Co.						
Site Totals		**$6,729,200**	**$672,920**		**$238,071**	**$434,849**
Cape Fear Wood Preserving	9/29/94	$16,965,300	$1,696,530	3/31/01	$1,758,697	
Fayetteville, Cumberland Co.	9/22/00	$4,350,000	$435,000			
	9/20/02	$3,092,274	$309,227			
				5/14/03	$478,263	
Site Totals		**$24,407,574**	**$2,440,757**		**$2,236,960**	**$203,798**
Carolina Transformer	9/25/97	$9,851,700	$985,170	11/20/97	$246,293	
Fayetteville, Cumberland Co.	1/14/00	$4,634,850	$463,485	4/30/01	$20,266	
	9/28/01	$2,000,000	$200,000	2/28/03	$1,181,561	
	9/20/02	$3,513,450	$351,345			
	5/13/03	$2,000,000	$200,000			
Site Totals		**$22,000,000**	**$2,200,000**		**$1,448,120**	**$751,880**
Davis Park Road TCE Site	4/1/00	$3,873,299	$387,330	3/31/01	$49,061	
Gastonia, Gaston Co.				12/3/01	$13,226	
				11/30/03	$21,958	
Site Totals		**$3,873,299**	**$387,330**		**$84,245**	**$303,085**

FUND-FINANCED NPL SITES (continued)
AMOUNTS ENCUMBERED AND DISBURSED
(as of 1/31/2004)

FCX-Statesville	9/12/96	$4,161,525	$416,153	11/20/97	$104,038	
Operable Unit # 1				5/31/03	$3,245	
Statesville, Iredell Co.						
Site Totals		**$4,161,525**	**$416,153**		**$107,283**	**$308,869**
FCX-Statesville	9/25/97	$4,840,000	$484,000	11/20/97	$121,000	
Operable Unit # 2				4/30/01	$53,979	
Statesville, Iredell Co.	2/22/02	$1,160,000	$116,000			
				3/31/02	$379,969	
				4/30/03	$23,814	
Site Totals		**$6,000,000**	**$600,000**		**$578,762**	**$21,238**
North Belmont PCE Site	7/26/00	$7,535,000	$753,500	12/3/01	$31,835	
North Belmont, Gaston Co.				5/14/03	$223,157	
Site Totals		**$7,535,000**	**$753,500**		**$254,992**	**$498,508**
Potters Septic Tank Pits	9/16/94	$8,000,000	$800,000	1/30/95	$200,000	
Maco, Brunswick Co.	6/15/98	$350,000	$35,000			
Site Totals		**$8,350,000**	**$835,000**		**$200,000**	**$635,000**
TOTALS		**$87,566,598**	**$8,756,660**		**$5,297,082**	**$3,459**

TABLE 2
Status of the Superfund Cost-Share Fund
(as of January 31, 2004)

Appropriations, Interest and Other Income	**$11,980,858**
Disbursements for NPL Sites Cost Share	$5,297,084
Other Disbursements	$11,545
Other Reductions	$1,485,421
Present Fund Balance	**$5,186,808**
Encumbrances for NPL Site Cost Share	$3,459,576
Present Amount Available	**$1,727,232**

Projected Additional NPL Cost Share
(FY2004 & 2005)

Barber Orchard Waynesville, Haywood County	**$2,200,000-$3,600,000**
FCX, Inc. Washington Washington, Beaufort County	Work being planned. Estimate unavailable.
Reasor Chemical Castle Hayne, New Hanover County	Work being planned. Estimate unavailable.
Ward Transformer Raleigh, Wake County	Work being planned. Estimate unavailable.
RAM Leather Care Charlotte, Mecklenberg County	Work being planned. Estimate unavailable.
Non-NPL Sites that May Require Cost Share for Cleanup	
Blue Ridge Plating Company Arden, Buncombe County	Work being planned. Estimate unavailable.
Sigmon's Septic Tank Statesville, Iredell County	Work being planned. Estimate unavailable.
State Cost-Share to Continue Cleanup	**Greater than $2,200,000**

TABLE 3
NPL Sites with Groundwater Remediation Systems Requiring State Long-Term Operation and Maintenance (O&M) (100% State-Funded upon Transfer)

Site Name	Remedy	O&M Transfer Date	Estimated Annual O&M Costs
FCX Statesville	GW: P&T	6/30/08	$200,000
Potters Pits	GW: MNA	9/27/11	$200,000
Benfield Industries	GW: P&T	5/21/12	$200,000
Davis Park Road TCE	GW: MNA	9/17/12	$200,000
Cape Fear Wood	GW: P&T/Air Sparging	7/1/13	$250,000
ABC 1-Hr Cleaners	GW: P&T	8/22/13	$200,000
North Belmont PCE	GW: P&T	6/1/14	$200,000

Abbreviations:
GW - Groundwater
MNA - Monitored Natural Attenuation
O&M - Operation and Maintenance
P&T - Pump and Treat

Other NPL Sites that May Require GW Monitoring Systems (Investigation Underway - Remediation Option Pending)

Site Name	Remedy	O&M Transfer Date	Annual O&M Costs
Barber Orchard	MNA	TBD	TBD
Carolina Transformer	MNA	TBD	TBD
FCX Washington	MNA	TBD	TBD
Reasor Chemical	MNA	TBD	TBD
Ward Transformer	MNA	TBD	TBD

Abbreviation: TBD - To Be Determined

O&M Cost Projections Based on Signed State Superfund Contracts (100% State Funded)

Year	Annual O&M Costs
2008	$200,000
2009	$200,000
2010	$200,000
2011	$400,000
2012	$800,000
2013	$1,250,000
2014	$1,450,000
2015	$1,250,000
2016	$1,000,000
2017	$1,000,000
2018	$600,000
2019	$600,000
2020	$600,000
TOTAL (Through 2020)	$9,550,000

Remarks Before the Environmental Review Commission of the NC General Assembly

NC Division of Waste Management Brownfields Program

February 24, 2004
Raleigh, NC

Mr. Chairmen and members of the environmental review Commission, my name is Bruce Nicholson. I am the Brownfields Program Manager in the Division of Waste Management. I thank you for the opportunity to once again speak to you about the Brownfields Program. And I am even more pleased to be once again giving you good news about the program's progress and effectiveness.

However, my time for this presentation is all too brief, so I will not take it up by citing all of the statistics that you may read in the annual report. Suffice to say, in 2003 the program has had a record number of applications and a record number of brownfields agreements processed. The program has now facilitated over $615 million in committed private investment in the cleanup and redevelopment of these sites, a number that is even biased low because of developers' hesitance in giving us their confidential capital investment numbers on many projects. Setting aside all the numbers for a moment, what the program is doing is recycling properties....by

providing prospective developers the option to reuse these brownfields sites rather than develop on greenspace all the time.

I show here a map of sites that are in the program [Show SLIDE of state map with sites marked]. Completed sites are in red, and sites in progress are in blue. The first thing you notice here is that there are now 98 sites in the program, and they are spread across the entire state. We know of several developers preparing letters of intent on new sites so that very soon, maybe by month's end, we will have our 100th site in the program.

Certainly the City of Charlotte has been more active than any other city in the renewal and redevelopment of sites. But their activity, fueled by the national brownfields conference being held in Charlotte last year, is certainly beginning to rub off on developers and local governments across the state, both in urban and rural areas. One statistic that may interest you is the number of abandoned textile operations that have entered the program. Of the 98 sites in the program, 26 are former textile operations. So we feel that the program is certainly serving to help redevelop the facilities of this industry as it declines. [One of these former textile facilities is a multimillion dollar redevelopment just a mile north of here that transformed an abandoned vagrant hangout into office space on the National Register of Historic Places. Office space redevelopment which has led to further investment into the neighboring parcels and has completely changed the area north of Peace College from "eyesore" into "eyepopping".

Projects like this are creating good use and good jobs out of abandoned facilities.]

Because we are spending federal dollars efficiently, facilitating actual redevelopments, rather than just assessing sites and hoping developers will come, the program's progress has made an impression on EPA Region 4. In October, we were able to obtain $1 million in federal funding for the brownfields and voluntary cleanup programs under the new federal brownfields act. This has allowed us to hire more staff for the program to handle the increasing demand. Two vacancies are posted as I speak to you. Two of these staff positions are in offices local offices remote from Raleigh. The first is in Charlotte where in 2002 the city committed its own funds to help us pay for a staffer. That funding has come to an end this year though the city continues to partner with us by providing office space for our staffer in Charlotte so that she has direct access to developers in the area. This DENR/City partnership has worked so well that we are now attempting to duplicate this arrangement through a partnership with the Land of Sky Regional Council in Asheville, where we hope to house a brand new position.

I also wanted to inform the Commission that, in addition to our Site-Specific activities, we are working on program development tasks to enhance the program. First, we are holding a Brownfields Workshop on April 1 where developers and local governments can learn about how the program can help them redevelop brownfields in their area, and also teach local government officials how to

apply U.S. EPA brownfield grants and how to use them to their best advantage. We are also planning to develop a demographic inventory of brownfield sites in order to characterize the number and nature of brownfields across the state, possibly working with the Institute of Government to do so.

The program looks forward to many more successful years ahead in safely recycling contaminated abandoned properties for the benefit of all the state's citizens.

I thank you for your attention and will answer any questions.

Annual Report to the North Carolina General Assembly

The NC Brownfields Program

December 2003

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Division of Waste Management
www.wastenotnc.org

North Carolina Brownfields Program
www.ncbrownfields.org

Department of Environment and Natural Resources

Michael F. Easley
Governor

William G. Ross Jr.
Secretary
NC Department of Environment and Natural Resources

Dexter R. Matthews
Director
Division of Waste Management

DENR
Division of Waste Management
1646 Mail Service Center
Raleigh, NC 27699-1646
(919) 733-4996

Brownfields Property Reuse Act
Annual Report to the General Assembly
December 2003

Executive Summary

This report to the General Assembly, required by the Brownfields Property Reuse Act (BPRA) of 1997 (G.S. 130-310.30 *et seq.*), describes the continued growth and success of the Brownfields Program in 2003. It also examines how effectively the BPRA encourages and facilitates the safe and productive reuse of abandoned, idled or underutilized properties where the threat of liability due to environmental contamination has hindered redevelopment.

During 2003, the Brownfields Program built on its success with expanded cost effectiveness and leveraging capability. By the end of 2003, the program will have completed a record 15 brownfields agreements -- a 50 percent increase over 2002 -- bringing the total of completed agreements to 39. These 39 projects represent more than $550 million in private investment committed to brownfields redevelopment. Moreover, demand for program service continues to increase. DENR projects that a record 33 applications to the program (Letters of Intent) will have been received from prospective developers during 2003, also a 50 percent increase over 2002. DENR's efforts to address the program's expanding inventory and the increasing demand are briefly described below.

- In June 2003, the U.S. EPA's Region 4 awarded DENR $1 million in Section 128(a) funding (for state response programs) under the Small Business Liability Protection and Brownfields Revitalization Act, which was enacted in December 2002. Increased federal funding enables DENR to significantly expand its ability to meet the increasing demand for Brownfields Program services. DENR recently added two project managers and plans to add one additional project manager in the first quarter of 2004. A toxicologist and a database/IT manager are also scheduled to be hired in early 2004. Grant funding will also be used to expand the state's voluntary cleanup program by adding two technical staff members to increase this program's effectiveness.

- The assistant attorney general that provided years of legal representation to brownfields and other Superfund-related programs will now work exclusively for the Brownfields Program. In addition to receiving more timely negotiation and review of brownfields agreements, the development community will benefit from additional programmatic continuity.

Background

Redeveloping brownfields properties has become increasingly popular as developers and cities realize these properties offer viable opportunities to bring economic growth, public health protection, jobs, and quality of life benefits to cities and rural areas. Brownfields are abandoned, idled or underutilized properties where environmental contamination hinders redevelopment due

to concerns about environmental liability. The BPRA gives DENR the authority to enter into brownfields agreements with prospective developers who did not cause or contribute to site contamination. The BPRA modifies the environmental liability barrier for prospective developers and motivates them to bring these properties and their hindrances to the department's attention. The department partners with the prospective developer to evaluate the possible risks associated with site contamination, and negotiates a brownfields agreement that stipulates the steps necessary to make the site safe for a specific intended reuse. The result is a redevelopment project that works economically while fully protecting public health and the environment.

Because brownfields agreements afford prospective developers liability protection for as long as they make and maintain the site safe for its intended reuse, the specter of open-ended financial uncertainty is lifted. This economic shield allows prospective developers to obtain financing hitherto unavailable for these properties.

Thus, the BPRA provides guidelines for a new public policy that allows DENR to distinguish between prospective developers of brownfields properties and the properties' polluters. Instead of mandating the site be cleaned to current standards, the BPRA requires developers to make the site safe for reuse. The program must examine the risks to public health or environment posed by the site. Then, DENR determines what the prospective developer must do to ensure safe redevelopment. These actions can range from land-use restrictions to cleanup, or a mixture of both. In addition to holding prospective developers accountable to their agreements, DENR reserves the right to enforce against those parties responsible for the original contamination. The process is summarized in Table 1 below.

Table 1. Summary of the Brownfield Process

Step 1 – A prospective developer with a brownfield site that needs liability protection submits a letter of intent with basic site facts. DENR determines if the prospective developer and the property proposed for reuse are eligible under the BPRA statute.
Step 2 - DENR reviews existing site data to determine the risk posed by contamination at the site. If the data are insufficient to evaluate such risk, DENR advises the prospective developer on further site assessment to gather the necessary data.
Step 3 - DENR determines what actions are necessary to make the site safe for reuse and includes these actions in a brownfields agreement. The prospective developer pays statutory fee.
Step 4 - The brownfields agreement is published with a 60-day public comment period.
Step 5 - The brownfields agreement is finalized after any public comments are considered and incorporated. The prospective developer uses the final brownfields agreement, which provides liability protection, to obtain financing for the project. Liability protection is contingent upon the completion of the actions required by the brownfields agreement. The brownfield agreement makes the site eligible for the brownfields property tax incentive.

The ancillary brownfields property tax incentive for prospective developers allows them to recoup funds spent on assessment and cleanup. The program motivates the market to recycle these sites back to productive reuse, while preserving or reducing the use of pristine or undeveloped "greenfield" property. While the environmental benefits are obvious, most

redevelopments also create a significant number of jobs and put properties back on the tax rolls. This double economic-environmental gain benefits the state, local government, and the brownfields developer.

As these benefits become better known, the program's popularity increases. After three years of successive record breaking growth, the program boasts 39 completed brownfields agreements and has over 50 others in the pipeline. Over $550 million private investment dollars have been used to redevelop abandoned properties that blighted urban and rural landscapes.

The overall result is a win-win scenario for both the environment and economic development. Risk reductions and cleanups are achieved at sites that could have harmed the public or the environment while prospective developers redevelop abandoned properties that once had little hope for redevelopment or productive reuse. The public benefits of job creation, improved quality of life in the surrounding neighborhoods, local tax base expansion and contribution to the general fund are other positive impacts.

The program also supports smart growth, sustainability and the One North Carolina Naturally agenda. Every project that reuses property in urban centers reduces suburban sprawl and preserves green space. Without brownfields agreements, many redevelopment dollars would have been spent on projects that increase suburban sprawl and promote commercial development in greenspace areas. In a very real sense, for each brownfield redeveloped, a greenspace is saved.

Program Status

Like past years, 2003 has seen significant program growth. The two staff members added in 2002 have gained experience and helped the program meet its increased demand for services. Their efforts made the program's success in 2003 possible.

Despite stagnant economic conditions in the development sector, a record-breaking 25 Letters of Intent were submitted to the program by the end of September 2003. We anticipate increased demand as the program's expansion serves to better educate both the public and the development community about brownfields' redevelopment benefits. The federal brownfield assessment and cleanup grants awarded by the U.S. EPA to local governments in 2003 (Greensboro, Concord, and Farmville) will further increase demand as these communities begin local brownfields redevelopment efforts.

In July 2003, the U.S. EPA's Region 4 approved DENR's application for brownfield cooperative agreement funding. It awarded DENR $1 million under Section 128 of the federal Small Business Liability Relief and Brownfields Revitalization Act. The funds are authorized for use starting October 1, 2003 through October 1, 2004.

This represents a five-fold increase in funding over the previous year. It allows DENR to expand the Brownfields Program to meet its increasing demand. DENR added its fourth project manager to the program in November 2003 and plans to hire an additional project manager, a toxicologist, and a database/IT manager in the first quarter of 2004. These hires will be made

using solely federal funds. The program also uses these funds to contract with the Department of Justice for one full time attorney position.

The City of Charlotte renewed its cooperative funding agreement with DENR on July 1, 2003. The agreement provides the program with the funds needed to locate a staff member in the City of Charlotte. In anticipation of receiving federal funds, the city's agreements allowed its salary funding commitment to drop by 50 percent. By adding federal funds in addition to those the city provides, the staff person is free to work projects outside the city as necessary. If funding allows, the City of Charlotte agreement may be reduced to zero salary dollars in the next renewal period although the city remains committed to providing office space and clerical support to support the position.

Site Summaries

For a brief description of all brownfields projects pending at the end of September 2003, please see the Appendix. The table is divided into three sections: active eligible projects, projects pending eligibility and projects with finalized brownfields agreements.

Active eligible projects have been deemed eligible by the program as they meet the statutory criteria. These developers are working with DENR in some stage of data gathering, analysis or agreement negotiation. At present, there are 44 active eligible projects. Projects at this stage receive guidance from DENR as they gather the additional data needed to ensure protection of public health and environment. Once research is complete, DENR analyzes the data, then drafts and negotiates the terms of the brownfields agreement with the prospective developer. At most of these sites, DENR is waiting for additional data requested by the program.

Projects pending eligibility are in the initial stage of consideration because the program has yet to determine if the sites are eligible by meeting statutory requirements. Here, the program has requested clarification or additional information from prospective developers regarding eligibility for nine sites. It is anticipated that most projects in this stage will be deemed eligible by year's end. Based on recent trends, the program anticipates that a total of 33 Letters of Intent will have been received by the end of 2003.

Projects with finalized brownfields agreements have completed the public notice phase of the brownfields process and either have a signed brownfields agreement or are waiting for the agreement to be executed. As of October 1, 2003, 36 projects had finalized agreements and three more agreements are anticipated by year's end. With a total of 39 completed projects in 2003, the program shows a 50 percent growth rate over 2002.

Brownfield Project Demographics

Brownfield sites in heavily industrial regions of the country tend to be weighted toward urban areas. However, North Carolina's tradition of rural manufacturing creates a significant number of rural brownfields opportunities. This fact continues to be reflected in the distribution of the program's inventory of projects. Of the 15 agreements to be completed during 2003, four are rural. Half of the program pending and eligible projects are rural, as are one-third of the program's total of 39 completed agreements.

The additional staff hired in 2002 allowed the program to conduct the outreach needed to make rural communities more aware of the state's Brownfields Program. As a result of these efforts, the public benefits enjoyed by urban areas with brownfields projects will extend to rural regions of the state as well. DENR will continue to focus on the importance of rural brownfields to their surrounding communities.

Improving Effectiveness

In its six-year existence, the Brownfields Program has provided a high "bang" for the federal and city "bucks" it uses for operation funds. The program's 39 brownfields agreements represent over $550 million in committed private redevelopment investment. To date, the program has spent approximately $405,000 in public funds ($335,000 from federal cooperative funding and $70,000 from the City of Charlotte). The extent to which these funds have been successfully leveraged has proven that the BPRA is both efficient and effective. By increasing resources, the program increases effectiveness by upping the total of projects that move through the brownfields process.

Adding program staff in 2002 significantly increased the program's volume capacity, but demand continues to increase. New internal technical protocols, more experienced project managers and an improved project tracking system reduced process time, as did streamlining and standardizing various administrative elements. The program continues to upgrade and update its Web site, which helps disseminate essential and timely information to brownfields stakeholders. These efforts have allowed staff to spend less time conveying information and more time processing applications and advancing projects through the brownfields process. This increase in effectiveness and efficiency is largely responsible for the program record of 15 agreements completed during 2003.

Placing a Brownfields Program staff person in the city of Charlotte has proven very successful. Processing time for Charlotte projects was reduced while efforts to educate and encourage developers to undertake brownfields redevelopment projects increased. In 2004, the program plans a similar arrangement in the Asheville area. A staff person will be housed in the Land-of-Sky Council of Governments (Land-of-Sky) offices. Coordination with Land-of-Sky has already yielded numerous redevelopment projects; the program hopes to duplicate the Charlotte success in Asheville. This is the program's first attempt to place a staff person outside of a large metro area, but, if the model proves successful, the program will explore placing additional staff in other cities as it grows.

The program is also increasing outreach efforts to educate property developers about BPRA. It plans to hold a state brownfields workshop for local governments and developers in 2004. The focus of the workshop will be two-fold. First, to educate developers about the program and second, to inform local governments about how to apply for and use U.S. EPA Brownfields Grants. North Carolina's program has found it more effective to use these funds to actually redevelop sites with committed prospective developers. In other states, funds are often used to assess eligible properties without regard to their future redevelopment prospects.

Fund Status

The Brownfields Property Reuse Act Implementation Account receives its income from the $2,000 fee charged to prospective developers who enter the program, and is to be used by DENR to defray the cost of the program. As of December 2003, the Brownfields Property Reuse Act Implementation Account had a balance of $75,199. The 2003 starting balance was $23,959. The total income was $51,901 in fees and interest. Expenditures from the fund totaled $661; the funds were used for supplies and software.

Further Information

For additional information on the Brownfields Program and how it works, please visit our Web site at **www.ncbrownfields.org**.

APPENDIX

Status Summary of Brownfield Projects as of September 30, 2003

Appendix

Status Summary of Brownfield Projects as of September 30, 2003

ACTIVE ELIGIBLE PROJECTS (44)

8th STREET LANDFILL West 8th Street Kannapolis, Rowan Co. PD: City of Kannapolis	Former landfill operated by Cannon Mills for the disposal of residential, commercial and industrial waste from the early 1900s through 1972. Landfill contents may include hazardous and regulated compounds. PD intends to redevelop the site for public recreational and dedicated open space uses.
ABC ENGRAVERS 724 North I-85 Charlotte, Mecklenburg Co. PD: Holden Business Park, LLC	Former engraving and plating facility with known chromium and chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site as an office complex.
ALPHA MILLS 312 E. 12th St. Charlotte, Mecklenburg Co. PD: Crosland, Inc.	Approximately 5.77-acre parcel that was historically a textile mill. Most recently the site was the former Consolidated Group Incorporated engraving facility. The site has known soil, groundwater, surface water and sediment impacts from historical site operations. PD intends to redevelop the property for residential apartments with compatible commercial and retail development.
AIRPORT EXXON 3305 North Liberty St. Winston-Salem, Forsyth Co. PD: Mrs. Becky Flowers	Former automobile engine repair and maintenance facility. Known soil and likely groundwater contamination involving petroleum and degreasing solvent constituents. Intended redevelopment is a gas station/convenience store to serve Smith-Reynolds Airport customers and employees.
ALAMAC AMERICAN 1885 Alamac Road Lumberton, Robeson Co. PD: Alamac American Knits, LLC	150-acre site containing a textile manufacturing facility. Known chlorinated solvent groundwater contamination from previous operations. PD intends to take over existing water quality monitoring plan prepared under N.C. DWQ and to redevelop the property for textile manufacturing.
FORMER AMP FACILITY 1126 Church Street Greensboro, Guilford Co. PD: Church Street Medical, LLC	Approximately 10-acre site is the former location of AMP Incorporated, a metal stamping, plating and manufacturing facility. Closed since the mid-1980s, the site has known chlorinated solvent groundwater contamination, which is being cleaned up under an approved CAP within the N.C. DWQ Groundwater Section. PD intends to redevelop the site as a medical office campus.
ARCHDALE MARKETPLACE 5801-6025 South Blvd Charlotte, Mecklenburg Co. PD: Eastbourne Investments Ltd.	Approximately 13-acre parcel known as Archdale Marketplace Shopping Center. Groundwater is contaminated due to historical site operations by an A&P grocery store, Sno-White Cleaners, and K-mart auto service center. PD intends to redevelop the property for commercial and retail.
AUSTIN FOODS 315 East Chatham Street Cary, Wake Co. PD: Cary Ice Company	This six-acre site contains former food processing and warehousing facilities. Known pesticide and herbicide contamination from previous operations exists in soil and groundwater. PD intends to redevelop the property as an ice manufacturing and distribution facility.

FORMER R.H. BOULIGNY 2320 N. Davidson St. Charlotte, Mecklenburg Co. PD: NODA Properties, LLC	Approximately 3.5-acre parcel that was the former R.H Bouligny facility. The site has known groundwater impacts from chlorinated solvents. PD intends to redevelop the property for mixed-use development with commercial, retail, industrial and residential uses.
BROWN'S SOLVENT CO. 2935 Griffith Street Charlotte, Mecklenburg Co. PD: Kathryn C. Bell Estate	Former paint and solvent formulation facility with known solvent-impacted soil and groundwater. PD intends to initially renovate and reuse the existing structure for office/warehouse use. Ultimately, PD will raze the building and redevelop the site as a mixed office/retail complex in keeping with other redevelopment taking place in Charlotte's South End.
BURLINGTON – JAMESTOWN 6008 High Point Road Jamestown, Guilford Co. PD: Alberdingk Boley, Inc.	22-acre site containing a abandoned chemical formulation facility operated in support of Burlington Industries textile manufacturing operations. Known chlorinated and petroleum hydrocarbon contamination exists in site soil and groundwater and is being addressed under a consent order with DENR. PD intends to redevelop the property as polyurethane and polyacrylate emulsions manufacturing facility.
BURLINGTON MILLS 476 South Main St. Mooresville, Iredell Co. PD: Cherokee Investment Partners	Abandoned textile manufacturing facility with known petroleum hydrocarbon contamination in soil and groundwater, and chlorinated solvent contamination in groundwater. PD intends to redevelop the site as an auto racing industry complex with office, flex, shop and R&D space.
CAMDEN ROAD 1600 Camden Road Charlotte, Mecklenburg Co. PD: Harris Murr & Vermillion, LLC	Approximate .25-acre parcel in Historic South End of Charlotte. The site has known groundwater impacts from previous gas station, tire repair and plumbing repair activities amid and other uses. PD intends to redevelop the property for commercial and retail purposes.
CAMEL CITY CLEANERS 501 East Third St. Winston-Salem, Forsyth Co. PD: Brownfields Redevelopment International	Former dry cleaning facility with chlorinated solvent-impacted soil and groundwater from dry cleaning operations and semi-volatile impacted groundwater from nearby manufactured gas plant facility. Intended reuse is for commercial/light industrial flex space.
CAROLINA LOG BUILDINGS Howard Gap Rd at US Hwy. 25 Fletcher, Henderson Co. PD: Town of Fletcher	Former wood treating facility with known pentachlorophenol contamination in soil and groundwater. PD intends to redevelop the 30-acre site as the new heart of the Town of Fletcher to include various office and retail uses.
CENTRAL PARK LANDFILL Salem and South Main Street Winston-Salem, Forsyth County PD: Salem Recreational Fields LLC	Former municipal landfill for the City of Winston-Salem. Site is 7.23 acres in size and has been used as a city park since the 1950s. Low levels of chlorinated solvents, with no surficial soil contamination. PD intends to redevelop the site as a soccer and a softball field for the adjoining Salem Academy and College so their current fields can be used for additional building space. A passive methane collection system will be installed before the recreational fields are installed.

CHATHAM MANUFACTURING NC Hwy. 268 Elkin, Surry Co. PD: Town of Elkin	A 30-acre site containing solid waste disposal area used by former textile manufacturing facility. Known VOC and SVOC contamination exists in groundwater at the site. PD intends to redevelop the property for park and recreational uses in keeping with the current use of adjoining property as baseball fields.
CHEROKEE OIL 925 Summit Avenue Charlotte, Mecklenburg Co. PD: M & J Equities, LLC	Approximately 2-acre site was formerly a non-permitted hazardous waste storage facility and the site of an EPA removal action. Known arsenic, oil and grease, and solvent contamination exist in site soil and groundwater. PD intends to redevelop the property as a nightclub and parking facility.
CMI WWTP NC Hwy. 268 Elkin, Surry Co. PD: Town of Elkin	Located in the flood plain of the Yadkin River, this 11-acre site was the former of an industrial waste water treatment plant with excess permitted capacity. Known VOC and SVOC contamination in soil and groundwater. PD intends to consolidate the town's sanitary waste and the current industrial waste into this single facility, allowing for current and future waste treatment requirements.
CSX RIVERFRONT 515 Nutt Street Wilmington, New Hanover County PD: Riverfront Developers, LLC	An 8.26-acre tract on the Cape Fear River in downtown Wilmington. Former CSX railroad property last used for offloading diesel for rail distribution. Minor naphthalene contamination in the groundwater and some polynuclear aromatic hydrocarbons in soil. Intended use is multi-purpose development that could include a hotel, private residences, professional offices, retail stores, restaurants and private marina. Public waterfront amenities, with a 600' extension of Wilmington's historic riverfront.
DYNATECH INDUSTRIES 2213 Toomey Ave. Charlotte, Mecklenburg Co. PD: R. G. Automation, Inc.	Former plating facility with metals-impacted soil and groundwater. EPA conducted soil removal activities at the site and has classified it as "no further remedial action planned." PD intends to redevelop the property for use as mixed office/retail complex.
EAST GANNON PROPERTY SE corner East Gannon and Arendell Avenues Zebulon, Wake Co. PD: Berkshire-Hudson Capital XI, LLC	This property consists of four parcels of land that total 1.75 acres with four exiting structures (former restaurant, current auto sales, auto service garage and hair salon). Site planned to be redeveloped into a stand-alone Eckerd Drug Store, with other surrounding complimentary retail tenants. Soil and groundwater are contaminated with petroleum constituents from above ground storage tanks used by previous gas station.
EAST PARK – BOYER 1607 & 1611 E. Fourth St. Charlotte, Mecklenburg Co. PD: Torrence Street Partners	Approximately .39-acre parcel that is a portion of the East Park Development Project. Known chlorinated solvent and gasoline contamination. PD intends to redevelop the site as a pedestrian, urban-infill multiple-use development with commercial, residential, recreational and common open space. The site is part of the City of Charlotte's East Park re-development zone.
EAST PARK – DOROTHY HALL 1423 & 1427 E. Fourth St Charlotte, Mecklenburg Co. PD: Torrence Street Partners	Approximately .8-acre parcel that is a portion of the East Park Development Project, with known chlorinated solvent and gasoline contamination. PD intends to redevelop the site as a pedestrian, urban- infill multiple use development with commercial, residential, recreational and common open space. The site is part of the City of Charlotte's East Park re-development zone.

EAST PARK – Craver 1601,1609,1615 Elizabeth Ave Charlotte, Mecklenburg Co. PD: Torrence Street Partners	Approximately .65-acre parcel that is a portion of the East Park Development Project, with known chlorinated solvent and gasoline contamination. PD intends to redevelop the site as a pedestrian, urban-infill multiple-use development with commercial, residential, recreational and common open space. The site is part of the City of Charlotte's East Park re-development zone.
ECUSTA 1 Ecusta Road Pisgah Forest, Transylvania Co. PD: Ecusta Business Development Center, LLC	In its prime, this 540-acre site was the world's largest non-wood pulp and specialty paper manufacturing facility. Closed since late 2002, the site has known metals, caustic and solvent contamination. PD intends to re-start flax pulping operations and to market the pulp to paper manufacturers. PD may also undertake other uses of site buildings and facilities, including office space and possible use of excess waste water treatment capacity by local municipalities.
ELK MOUNTAIN LANDFILL Elk Mountain Road Woodfin, Buncombe Co. PD: Town of Woodfin	Approximately 156-acre site contains a former municipal landfill which was operated under lease by the City of Asheville, and which has been closed since the late 1970s. PD has operated a 9-hole golf course on the site since 1990. PD will conduct assessment activities to determine if there is actual contamination at the site. PD intends to redevelop the site into an 18-hole golf course and approximately 250 condominiums in areas outside of the waste cells.
FISHBURNE EQUIPMENT Airport Road Arden, Buncombe Co. PD: R. & P. Van Praag	Former metal fabrication and tobacco press manufacturing facility with suspected VOC contamination in soil and groundwater (based on detection of these compounds on adjoining, downgradient property, the former Buncombe County landfill). PD intends to redevelop the site for light manufacturing/assembly, warehousing and public storage uses.
GENERAL WOOD 1901 Wood Treatment Road Leland, Brunswick County PD: Leland Land, LLC	Former 120-acre pole treatment facility [creosote, chromated copper arsenate (CCA) and pentachlorophenol (PCP)] under Chapter 11 bankruptcy, currently under RCRA jurisdiction. PD's intent is to be able to distinguish old from new contamination and then continue with pole treatment (CCA and PCP only). Groundwater contamination mainly associated with creosote and petroleum. Metal and PCP contamination in soil.
GLEN RAVEN MILLS 114 Raven Circle Kings Mountain, Cleveland Co. PD: Consortium for Progress	Former textile manufacturing facility with solvent contamination in groundwater. PD intends to redevelop the property as a residential/retirement center for senior citizens. Responsible party will continue assessment and/or cleanup activities under state Voluntary Cleanup Program.
GREY HOSIERY MILL Fourth & Laurel Streets Hendersonville, Henderson Co. PD: Old Mill Arts Committee	Former hosiery manufacturing facility located in downtown Hendersonville with low concentrations of chlorinated solvents in site groundwater. PD intends to renovate the building and redevelop the property as a performing arts center.
HOME DEPOT – South Blvd. 4750 South Boulevard Charlotte, Mecklenburg County PD: CNR Properties, RLLLP	This 12-acre site is currently occupied by a produce grocer and office rental store (1 acre), parking (7 acres), abandoned plant nursery (1acre) and the rest is undeveloped. Operations at adjacent Academy Steel Drum from 1947-69 included the disposal of wastes and sludge from drums into pits/lagoons appears to have contaminated subject property. After ASD burned in 1969, contamination was spread during re-grading of the site. Elevated concentrations of lead, chromium, and PCBs in soil along with lead, 2-chlorophenol, and trichloroethylene. PD plans to lease property to Home Depot for construction of a new Home Depot home improvement retail store.

HOME INNOVATIONS SITE Hwy 52 S & Ratliff Gin Road Morven, Anson Co. PD: Dan River Inc.	Former textile manufacturing facility with petroleum hydrocarbon and VOC contamination in soil and groundwater. PD intends to redevelop the site as a modern textile manufacturing operation where present environmental contaminant compounds are not used. Project has significant job creation potential.
KIDD LANE BATTERY DISPOSAL 3607 Kidd Lane Charlotte, Mecklenburg Co. PD: Joshua's Farm	Abandoned dairy farm with historical lead battery disposal operations. The approximately 1-acre parcel is adjacent to a 22-acre horse and animal farm area for the Joshua's Farm Operations. The site has a limited area with lead contamination in the surficial soils. PD intends to redevelop the area as a parking lot for the horse and animal farm operations.
NORTH HILLS MALL 4217 Six Forks Road Raleigh, Wake Co. PD: North Hills Mall Ownership Organization, LLC	This 31-acre site was originally developed in 1963 and later expanded into one of Raleigh's earliest enclosed malls. The site has known petroleum and chlorinated solvent contamination in soil and groundwater from auto gas and repair facilities and from an off-site drycleaner. DP intends to redevelop the site into a pedestrian friendly mixed-use retail, commercial and residential complex.
QUALITY METAL PRODUCTS 1111 Oates Road Gastonia, Gaston Co. PD: Porter's Fabrications	This 11-acre site contains an abandoned 48,000 square feet facility formerly used for metal fabrication. Parts cleaning activities resulted in solvent impacts to soil and groundwater. PD intends to refurbish the facility for metal fabrication utilizing high-tech, non-contaminating methods.
RADIATOR SPECIALTY 1900 Wilkinson Blvd. Charlotte, Mecklenburg Co. PD: Suttle Avenue, LLC	Idled automotive chemicals and hardware, and plumbing supplies manufacturing facility with volatile, semi-volatile and metals contamination in soil and groundwater. PD intends to redevelop the property into a major mixed-use office, retail, commercial and multi-family residential development.
RUSAK PROPERTY 3004 Bank Street/ 3331 Griffith Street Charlotte, Mecklenburg Co. PD: Charlotte Mecklenburg Board of Education	A 1.21-acre parcel that is adjacent to the Marie G. Davis Middle School. The site is contaminated from historical operations as a metal plating facility. The PD intends to incorporate the adjacent parcels into the new middle school construction. The brownfields parcel will be the plaza entrance.
SHELBY DYEING & FINISHING 1000 West Grover Street Shelby, Cleveland Co. PD: GMAC Commercial Credit, LLC	Former textile dyeing and finishing facility with solvent and metals contamination in soil and groundwater. Through its sale of the property to Environmental Fibers, PD intends to facilitate the redevelopment of the site as a cotton recycling facility, bringing the two site buildings back into productive use, and bringing jobs and tax base improvements to the community.
SHELBY WILLIAMS 401 Meacham Road Statesville, Iredell Co. PD: Lou Jay Associates, LLC	The 28-acre site contains an idled furniture manufacturing facility with metals contamination in soil and groundwater from former plating operations conducted at the site. Applicant-PD intends to up-fit the facility for the production of high-end cabinetry and add an estimated 650 jobs in the next three years.

SOUTH TRYON STREET 2028-2040 S. Tryon Street Charlotte, Mecklenburg Co. PD: Citiline, LLC	A 2.88-acre parcel near historic South End. PD intends to redevelop the property for commercial purposes such as office and showroom condominiums. Groundwater is contaminated due to historical site operations as industrial/warehouse storage.
SUTTON SHOPPING CENTER NW Corner of Walkup & Sutherland Ave Monroe, Union Co. PD: Whitley Commercial Properties	The site is an old run-down shopping strip center in the Monroe Area. It has known soil and groundwater contamination from chlorinated solvents and gasoline constituents. PD intends to renovated the shopping center and expand the building area.
TAR HEEL LIFT 7055 Albert Pick Road Greensboro, Guilford Co. PD: Idlewild Grading Co., LLC	This 8-acre site contains a forklift sales, maintenance and repair facility on approximately two acres. The site has known environmental contamination from historic operations of the forklift facility. The site is currently underused and PD intends to relocate and expand its grading business from Winston-Salem, NC to this brownfields property.
WELLMAN SITE 3224 Cedar Creek Road Fayetteville, Cumberland Co. PD: Technofil, Inc.	The Wellman site is approximately 18 acres and contains a filament polyester yard manufacturing facility which has been idle since January 2003. There is known PCE contamination in groundwater at the site. PD intends to refurbish and reuse a portion of the facility to manufacture polyester and bicomponent yarns utilizing a process that will allows discrimination of old contamination from new.

PROJECTS PENDING ELIGIBILITY (9)

ANDREX INDUSTRIES 220 Deaverview Road Asheville, Buncombe Co. PD: Milkco, Inc.	This nine-acre, light manufacturing site was formerly a textile facility that operated a knitting, weaving and cutting business along with dry cleaning, shrinking and packaging of fabrics. Tetrachloroethylene groundwater contamination from dry cleaning operations is being remediated by RP with pump-and-treat system. PD is adjacent property owner, a milk processing and distributing plant. Initial plan is to use part of property for truck and trailer parking. Within three years they plan to demolish Andrex buildings and expand the Milkco Plant to double capacity within eight years.
GUILFORD MILLS – W. Market Street 4925 W. Market Street Greensboro, Guilford County PD: Kim's Greensboro Real Estate, LLC	A 19.8-acre vacant textile facility with ancillary buildings. Minor groundwater contamination associated with former underground storage tanks. Other non-UST contamination has been documented but information has not yet been sent to us. PD plans to use the site for general commercial property.
HISTORIC COTTON MILL 191 Riverside Drive Asheville, Buncombe Co. PD: RiverLink, Inc.	This 2.63-acre site was formerly occupied by a cotton mill operated from the 1900s then abandoned for many years. PD will conduct environmental assessment to determine if the site has any contamination. PD intends to redevelop the site in mixed commercial/retail and residential uses. This project is part of the Asheville French Broad Riverfront Plan.
LEARY BROTHERS STORAGE Virginia & Broad Streets Edenton, Chowan Co. PD: Charles M. Reeves III	Approximate 6-acre site containing former flower distribution and pesticide storage facility. Known arsenic contamination exists in site soil and groundwater. PD intends to redevelop the property in commercial retail uses.

MOSER-HALL Indian Trail, Union Co. PD: Moser-Hall, LLC	Property with petroleum hydrocarbon contamination in groundwater which has migrated onto the property. The source of the contamination was a release from a leaking underground storage tank system located on an adjoining parcel. PD intends to redevelop the site for commercial/retail use.
NATIONAL TEXTILES Jamestown Road Morgantown, Burke Co. PD: National Textiles	Former textile manufacturing facility with chlorinated solvent contamination in soil and groundwater. The applicant PD intends to sell the site to an identified potential buyer for conversion and reuse as a furniture manufacturing facility.
SALEM UNIFORM 4015 N. Cherry Street Winston-Salem, Forsyth County PD: Winston Weaver Co. Inc.	Vacant for many years, this 2.53-acre site was leased from 1967-83 by Salem Uniform and from 1983-86 by Cintus Corp. who then purchased the Salem Uniform assets. During a Limited Site Assessment for petroleum USTs, high levels of PCE were discovered, probably from dry cleaning solvents. PD is currently leasing space, but would like to improve it for use as fertilizer storage and other commercial usage.
SPANCO Inc. 1604 Boone Trail Road Sanford, Lee Co. PD: Pier Real Estate, Ltd.	Former hosiery manufacturing facility on approximately 10 acres with chlorinated solvent contamination in soil and groundwater. Applicant-PD intends to redevelop the property for use as a fasteners manufacturing and distribution facility.
WILSON LANDFILL 6700 Ward Boulevard Wilson, Wilson Co. PD: Dillon Properties, LLC	This underused 14-acre site was formerly occupied by a waste-water treatment facility owned and operated by the City of Wilson. The site has known metals contamination in groundwater. PD intends to redevelop for mixed commercial, warehousing and residential uses

FINALIZED BROWNFIELDS AGREEMENTS (36) EITHER IN FORCE OR PENDING SIGNATURE

ALAMAC KNIT FABRIC Hamilton, Martin Co.	Former textile manufacturing facility with known soil and groundwater contamination involving chlorinated solvents. Site is undergoing active remediation under NC DWQ CAP. Intended reuse is as a non-polluting school locker manufacturing facility that will employ some 350 workers.
ANCHOR MILL Huntersville, Mecklenburg Co.	Abandoned textile manufacturing facility with known metals contamination in soil, and lead, chlorinated solvent, and petroleum hydrocarbon contamination in groundwater. PD intends to redevelop the 32-acre site as a mixed-use transit village that reuses the old mill building and adds new office, retail, and residential components.
BALDOR ELECTRIC Charlotte, Mecklenburg Co.	Former electric motor and motor component assembly and manufacturing facility with solvent impacted soil and groundwater. PD intends to redevelop the property for use as industrial condominiums.

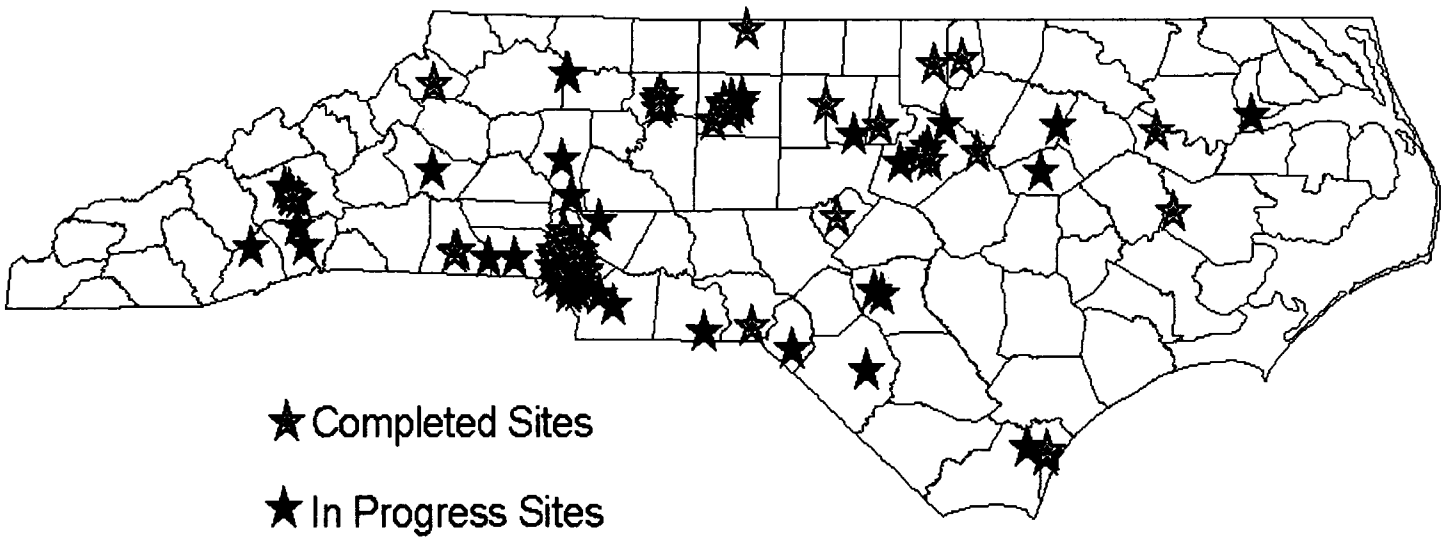
BURKHART CAROLINA Henderson, Vance Co.	Former pickle processing and packing facility with chloride impacted soil and groundwater and minor solvent contamination in groundwater. PD intends to redevelop the property for commercial retail use. Simultaneously, the responsible party will implement groundwater remediation at the site under separate action. The PD's development will provide an impervious cap on the site, further assisting remedial efforts.
CAMDEN SQUARE Charlotte, Mecklenburg Co.	Abandoned knitting and printing operations rebuilt into the "Design Center of the Carolinas." Development supported by the Wilmore Community as a vital redevelopment in an economically depressed area. Land use restrictions for chlorinated solvents in groundwater.
CAMDEN SQUARE ADDITION Charlotte, Mecklenburg Co.	This project will add, by amendment, 4.5 acres to the first brownfields agreement completed in North Carolina, Camden Square, in Charlotte's South End redevelopment corridor. Contamination includes VOC- and SVOC-impacted soil and groundwater. Intended reuse is mixed office and retail.
CAROLINA PRODUCTION FINISHING Asheville, Buncombe Co.	Former textile finishing facility with metals contamination in both soil and groundwater. PD intends to redevelop the site for warehousing and as a sewing operation. PD is in the process of reviewing DENR's draft brownfields agreement for this site.
CITY WEST COMMONS Charlotte, Mecklenburg Co.	Dilapidated shopping center seized in a drug raid by the U.S. Dept. of Justice that has been approved for transfer to the city of Charlotte. Site had VOC and chlorinated solvent contamination in soil and groundwater. The City intends transfer the property to a not-for-profit development corporation to redevelop the site as commercial retail shopping facility.
C.K. LAND DEVELOPMENT Charlotte, Mecklenburg Co.	A large mixed use development on a former industrial services firm adjacent to a manufactured gas plant. Ground floor retail and studio with office and residential units above. Project is in vicinity of Camden Square and provides redevelopment to economically depressed area. Capping and land use restrictions regarding PAHs in soil and chlorinated solvents in soil and groundwater.
CUMBERLAND SHOPPING CENTER Greensboro, Guilford Co.	Site of former shopping center and dry cleaners with chlorinated solvent impacted soil and groundwater. PD is a not-for-profit community development corporation. The PD has performed soil cleanup activities and intends to redevelop the site with affordable residential housing.

EAST GANNON PROPERTY Zebulon, Wake Co.	This property consists of four parcels of land totaling 1.75 acres with four exiting structures (former restaurant, current auto sales, auto service garage and hair salon). Site planned to be redeveloped into a stand-alone Eckerd Drug Store, with other surrounding complimentary retail tenants. Soil and groundwater are contaminated with petroleum constituents from above ground storage tanks used by previous gas station.
EAST PARK – JOAL REALTY Charlotte, Mecklenburg Co.	Part of the 24-acre site encompasses a six-block area with known chlorinated solvent contamination. PD intends to redevelop the site as a model for urban infill mixed use development with an emphasis on the pedestrian needs an urban setting. The site is part of the City of Charlotte's East Park re-development zone located between the CBD and the historic residential neighborhoods of Elizabeth and Myers Park.
EAST PARK – KOSSOVE Charlotte, Mecklenburg Co.	Part of the 24-acre site encompasses a six-block area with known chlorinated solvent contamination. PD intends to redevelop the site as a model for urban infill mixed use development with an emphasis on the needs of pedestrians in an urban setting. The site is part of the City of Charlotte's East Park re-development zone located between the CBD and the historic residential neighborhoods of Elizabeth and Myers Park.
ERWIN SQUARE Durham, Durham Co.	This approximately six acre property is a portion of a decommissioned former Burlington Industries site; other portions have already been redeveloped. There is known chlorinated solvent contamination in groundwater, and these impacts are being addressed under an approved Division of Water Quality corrective action plan. PD intends to redevelop the site in high density residential use.
FLEMINGTON LANDFILL Wilmington, New Hanover Co.	Site of a closed (1979), privately-operated domestic and industrial solid waste landfill with VOC-impacted soil and groundwater. Intended reuse is for a soccer complex. This is the first former landfill property proposed for redevelopment under the N.C. brownfields statute. The project's feasibility and technical challenges are being carefully evaluated.
FOOD LION Winston-Salem, Forsyth Co.	A new large supermarket placed on the site of an abandoned grocery store in urban Winston-Salem. Project had strong community support as a quality of life issue as the community had no supermarket. Land use restrictions for chlorinated solvent contamination in groundwater. Brownfield assessment determined the source to be nearby drycleaner.
GUILFORD MILLS Greensboro, Guilford Co.	This 55-acre site contains a former textile manufacturing facility with known VOC contamination in soil and groundwater. PD intends to redevelop the property in mixed retail uses. Public benefits include the creation of an estimated 500 jobs and substantial tax roles increases.
HAMILTON PROPERTY Charlotte, Mecklenburg Co.	Dilapidated property bought for the expansion of Cost Effective Maintenance Inc., a small business in the South End area of Charlotte. Expansion into this property allowed CEM to stay in Charlotte instead of move to suburbs. Land use restrictions for chlorinated solvent contamination in groundwater.

HILLSBOROUGH VENTURES Raleigh, Wake Co.	Project involves redeveloping an area of parking lots and dilapidated, underused retail structures. Land use restrictions are in place for the petroleum hydrocarbon and chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the property as mixed residential (private student dormitory for N.C. State University) and retail complex.
HILLSBOROUGH VENTURES ADDITION Raleigh, Wake Co.	Prospective developer added acreage to the footprint of original Hillsborough Ventures project, which involves redeveloping an area of parking lots and dilapidated, underused retail structures adjacent to N.C. State University for mixed residential (private student dormitory) and retail uses.
LEWITH TEXTILE Charlotte, Mecklenburg Co.	Project involves the redevelopment of 50+ acres of abandoned and underused commercial and industrial property, including the former Lewith Textile facility. Contaminants include petroleum hydrocarbon and chlorinated solvents in soil and groundwater. PD intends to redevelop the site as an industrial park for light manufacturing and warehousing/distribution.
LUCENT TECHNOLOGIES Greensboro, Guilford Co.	Former cotton mill and manufacturing facility with chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site in mixed commercial retail/office and residential.
MALLARD CREEK Charlotte, Mecklenburg Co.	This 21-acre site neighbors a former auto service station and chainsaw service center operations. Petroleum hydrocarbon and chlorinated solvent contamination in groundwater, sourced from underground and aboveground storage tanks releases on the adjacent site, has migrated onto the subject property. PD intends to redevelop the property as an apartment complex.
OXFORD PRINTING Oxford, Granville Co.	Former textile printing and finishing facility with VOC contamination in groundwater. PD has conducted cleanup of floor drain contents. PD intends to redevelop the site for industrial/distribution use.
PILOT MILLS Raleigh, Wake Co.	Abandoned, condemned, turn-of-the-century textile mill in Downtown Raleigh redeveloped into office space and preserved on the National Register of Historic Places. Land use restrictions for chlorinated solvent in groundwater and capping of mercury in soils.
REDMAN HOMES Mebane, Orange Co.	Former mobile home manufacturing facility with metals and solvent contamination in soil and groundwater. PD has performed drum removal and soil remediation activities. PD intends to redevelop the site as a manufacturing facility to produce windows and doors.
SANFORD WWTP Sanford, Lee Co.	Former municipal waste water treatment plant site with petroleum impacted sewer sludge and metals impacts in site soils and low concentrations of volatile and semi-volatile compounds in groundwater. PD intends to redevelop the property in commercial use, including restaurant, retail space and a multi-screen movie theater.
SINGER COMPANY Chocowinity, Beaufort Co.	Abandoned rural manufacturing facility with lead and phthalate contamination in soil and groundwater. The brownfields agreement provides for partial site remediation. PD intends to redevelop the site with mixed retail and light industrial uses.

SMITH METAL & IRON Charlotte, Mecklenburg Co.	Former site of a scrap metal yard and of a waste cell created for the temporary disposal of impacted soil removed during the construction of the adjoining Carolina Panther's practice field. The waste in the cell has been removed, and minor chlorinated solvent impacts remain in site groundwater. PD intends to redevelop the site in high density residential with additional office, entertainment, and retail potential.
SMITH PROPERTY Shelby, Cleveland Co.	Project involves the redevelopment of an area occupied by seven underused and dilapidated residential homes with petroleum hydrocarbon and chlorinated solvent contamination in groundwater. PD has the support of local residents to reuse the site as a parking lot serving the Cleveland County Offices.
SOUTHERN MANUFACTURING Charlotte, Mecklenburg Co.	This nine-acre site located in inner Charlotte was a former asbestos tile manufacturing facility. Operations involving asbestos were discontinued in 1986 and the facility was closed in 1999. The site has known asbestos contamination in soils. Intended reuse of the site includes an outdoor amphitheater, a technical business park, or a mixed-use development with industrial, commercial and residential components.
STATE FARM ROAD Boone, Watauga Co.	Project involves the redevelopment of property occupied by a rural residence with chlorinated solvent contamination in groundwater and in a spring from an off-site source. PD intends to redevelop the site as a medical office complex.
TARTAN MARINE Hamlet, Richmond Co.	Former boat manufacturing facility with lead contamination in soil. Additional site sampling conducted by the PD has shown previous soil removal actions to have left no health-based lead problems. PD intends to redevelop the site as a chair and table base manufacturing facility.
TERRELL MACHINE Charlotte, Mecklenburg Co.	Site of former textile manufacturing and gear box machining operations, property in Charlotte's South End district is being redeveloped with ground floor retail and office/residential above. Remedial actions to eliminate hot spot contamination included soil removal and groundwater pump and treat. Land use restrictions are in place to address chlorinated solvent contamination remaining in groundwater.
VANIER GRAPHICS Eden, Rockingham Co.	Former printing facility with petroleum and chlorinated hydrocarbon contamination in the soil and solvent contamination in the groundwater. PD intends to redevelop the site as a furniture assembly and upholstering facility.
WEST MOREHEAD Charlotte, Mecklenburg Co.	Former automobile repair and maintenance facility with chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site, to include both facility renovation and new construction for use as commercial office/retail.

Brownfields Program Site Locations - Feb 2004



County	Number of Sites
Anson	1
Beaufort	1
Brunswick	1
Buncombe	5
Burke	1
Chowan	1
Cleveland	3
Cumberland	2
Durham	1
Forsyth	5
Gaston	1
Granville	1
Guilford	8
Henderson	2
Iredell	2
Lee	1
Martin	1
Mecklenburg	35
Nash	1
New Hanover	2
Orange	2
Richmond	1
Robeson	1
Rockingham	1
Rowan	1
Scotland	1
Stanley	1
Surry	2
Transylvania	1
Union	2
Vance	1
Wake	7
Watauga	1
Wilson	1
Total	**98**

Textile Facilities Seeking Brownfield Agreements

Project Name	Also Known As	Status	City	County
Historic Cotton Mill		Active Elig.	Asheville	Buncombe
Home Innovations	Dan River	Active Elig.	Morven	Anson
Carolina Production		Complete	Asheville	Buncombe
Andrex Industries		Active Elig.	Asheville	Buncombe
National Textiles	Jamestown Road Prpty	Active Elig.	Morganton	Burke
Glen Raven Mills		Active Elig.	Kings Mtn	Cleveland
Shelby Dyeing & Finishing		Active Elig.	Shelby	Cleveland
Wellman Site	Cedar Creek Fibers, LLC	Active Elig.	Fayetteville	Cumberland
Erwin Square		Complete	Durham	Durham
Oxford Printing		Complete	Oxford	Granville
Cotton Mill Square	Lucent Technologies	Complete	Greensboro	Guilford
Guilford Mills		Complete	Greensboro	Guilford
Burlington - Jamestown	Alberdink Boley	Complete	Jamestown	Guilford
Guilford Mills-W. Market St.		Active Elig.	Greensboro	Guilford
Grey Hosiery Mill		Active Elig.	Hendersonvill	Henderson
Burlington Mills		Active Elig.	Mooresville	Iredell
Alamac Knit Fabrics		Complete	Hamilton	Martin
Camden Square		Complete	Charlotte	Mecklenburg
Lewith Textile	Wilkinson Business Park	Complete	Charlotte	Mecklenburg
Camden Square Addition		Complete	Charlotte	Mecklenburg
Anchor Mill		Complete	Huntersville	Mecklenburg
Alpha Mills	Consolidated Engravers	Active Elig.	Charlotte	Mecklenburg
Alamac American		Active Elig.	Lumberton	Robeson
Chatham Mfg.		Active Elig.	Elkin	Surry
Chatham Mfg. WWTP		Active Elig.	Elkin	Surry
Pilot Mill		Complete	Raleigh	Wake

Annual Report to the North Carolina General Assembly

The NC Brownfields Program

December 2003

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Division of Waste Management
www.wastenotnc.org

North Carolina Brownfields Program
www.ncbrownfields.org

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Brownfields Property Reuse Act
Annual Report to the General Assembly
December 2003

Executive Summary

This report to the General Assembly, required by the Brownfields Property Reuse Act (BPRA) of 1997 (G.S. 130-310.30 *et seq.*), describes the continued growth and success of the Brownfields Program in 2003. It also examines how effectively the BPRA encourages and facilitates the safe and productive reuse of abandoned, idled or underutilized properties where the threat of liability due to environmental contamination has hindered redevelopment.

During 2003, the Brownfields Program built on its success with expanded cost effectiveness and leveraging capability. By the end of 2003, the program will have completed a record 15 brownfields agreements -- a 50 percent increase over 2002 -- bringing the total of completed agreements to 39. These 39 projects represent more than $550 million in private investment committed to brownfields redevelopment. Moreover, demand for program service continues to increase. DENR projects that a record 33 applications to the program (Letters of Intent) will have been received from prospective developers during 2003, also a 50 percent increase over 2002. DENR's efforts to address the program's expanding inventory and the increasing demand are briefly described below.

- In June 2003, the U.S. EPA's Region 4 awarded DENR $1 million in Section 128(a) funding (for state response programs) under the Small Business Liability Protection and Brownfields Revitalization Act, which was enacted in December 2002. Increased federal funding enables DENR to significantly expand its ability to meet the increasing demand for Brownfields Program services. DENR recently added two project managers and plans to add one additional project manager in the first quarter of 2004. A toxicologist and a database/IT manager are also scheduled to be hired in early 2004. Grant funding will also be used to expand the state's voluntary cleanup program by adding two technical staff members to increase this program's effectiveness.

- The assistant attorney general that provided years of legal representation to brownfields and other Superfund-related programs will now work exclusively for the Brownfields Program. In addition to receiving more timely negotiation and review of brownfields agreements, the development community will benefit from additional programmatic continuity.

Background

Redeveloping brownfields properties has become increasingly popular as developers and cities realize these properties offer viable opportunities to bring economic growth, public health protection, jobs, and quality of life benefits to cities and rural areas. Brownfields are abandoned, idled or underutilized properties where environmental contamination hinders redevelopment due

to concerns about environmental liability. The BPRA gives DENR the authority to enter into brownfields agreements with prospective developers who did not cause or contribute to site contamination. The BPRA modifies the environmental liability barrier for prospective developers and motivates them to bring these properties and their hindrances to the department's attention. The department partners with the prospective developer to evaluate the possible risks associated with site contamination, and negotiates a brownfields agreement that stipulates the steps necessary to make the site safe for a specific intended reuse. The result is a redevelopment project that works economically while fully protecting public health and the environment.

Because brownfields agreements afford prospective developers liability protection for as long as they make and maintain the site safe for its intended reuse, the specter of open-ended financial uncertainty is lifted. This economic shield allows prospective developers to obtain financing hitherto unavailable for these properties.

Thus, the BPRA provides guidelines for a new public policy that allows DENR to distinguish between prospective developers of brownfields properties and the properties' polluters. Instead of mandating the site be cleaned to current standards, the BPRA requires developers to make the site safe for reuse. The program must examine the risks to public health or environment posed by the site. Then, DENR determines what the prospective developer must do to ensure safe redevelopment. These actions can range from land-use restrictions to cleanup, or a mixture of both. In addition to holding prospective developers accountable to their agreements, DENR reserves the right to enforce against those parties responsible for the original contamination. The process is summarized in Table 1 below.

Table 1. Summary of the Brownfield Process

Step 1 – A prospective developer with a brownfield site that needs liability protection submits a letter of intent with basic site facts. DENR determines if the prospective developer and the property proposed for reuse are eligible under the BPRA statute.
Step 2 - DENR reviews existing site data to determine the risk posed by contamination at the site. If the data are insufficient to evaluate such risk, DENR advises the prospective developer on further site assessment to gather the necessary data.
Step 3 - DENR determines what actions are necessary to make the site safe for reuse and includes these actions in a brownfields agreement. The prospective developer pays statutory fee.
Step 4 - The brownfields agreement is published with a 60-day public comment period.
Step 5 - The brownfields agreement is finalized after any public comments are considered and incorporated. The prospective developer uses the final brownfields agreement, which provides liability protection, to obtain financing for the project. Liability protection is contingent upon the completion of the actions required by the brownfields agreement. The brownfield agreement makes the site eligible for the brownfields property tax incentive.

The ancillary brownfields property tax incentive for prospective developers allows them to recoup funds spent on assessment and cleanup. The program motivates the market to recycle these sites back to productive reuse, while preserving or reducing the use of pristine or undeveloped "greenfield" property. While the environmental benefits are obvious, most

redevelopments also create a significant number of jobs and put properties back on the tax rolls. This double economic-environmental gain benefits the state, local government, and the brownfields developer.

As these benefits become better known, the program's popularity increases. After three years of successive record breaking growth, the program boasts 39 completed brownfields agreements and has over 50 others in the pipeline. Over $550 million private investment dollars have been used to redevelop abandoned properties that blighted urban and rural landscapes.

The overall result is a win-win scenario for both the environment and economic development. Risk reductions and cleanups are achieved at sites that could have harmed the public or the environment while prospective developers redevelop abandoned properties that once had little hope for redevelopment or productive reuse. The public benefits of job creation, improved quality of life in the surrounding neighborhoods, local tax base expansion and contribution to the general fund are other positive impacts.

The program also supports smart growth, sustainability and the One North Carolina Naturally agenda. Every project that reuses property in urban centers reduces suburban sprawl and preserves green space. Without brownfields agreements, many redevelopment dollars would have been spent on projects that increase suburban sprawl and promote commercial development in greenspace areas. In a very real sense, for each brownfield redeveloped, a greenspace is saved.

Program Status

Like past years, 2003 has seen significant program growth. The two staff members added in 2002 have gained experience and helped the program meet its increased demand for services. Their efforts made the program's success in 2003 possible.

Despite stagnant economic conditions in the development sector, a record-breaking 25 Letters of Intent were submitted to the program by the end of September 2003. We anticipate increased demand as the program's expansion serves to better educate both the public and the development community about brownfields' redevelopment benefits. The federal brownfield assessment and cleanup grants awarded by the U.S. EPA to local governments in 2003 (Greensboro, Concord, and Farmville) will further increase demand as these communities begin local brownfields redevelopment efforts.

In July 2003, the U.S. EPA's Region 4 approved DENR's application for brownfield cooperative agreement funding. It awarded DENR $1 million under Section 128 of the federal Small Business Liability Relief and Brownfields Revitalization Act. The funds are authorized for use starting October 1, 2003 through October 1, 2004.

This represents a five-fold increase in funding over the previous year. It allows DENR to expand the Brownfields Program to meet its increasing demand. DENR added its fourth project manager to the program in November 2003 and plans to hire an additional project manager, a toxicologist, and a database/IT manager in the first quarter of 2004. These hires will be made

using solely federal funds. The program also uses these funds to contract with the Department of Justice for one full time attorney position.

The City of Charlotte renewed its cooperative funding agreement with DENR on July 1, 2003. The agreement provides the program with the funds needed to locate a staff member in the City of Charlotte. In anticipation of receiving federal funds, the city's agreements allowed its salary funding commitment to drop by 50 percent. By adding federal funds in addition to those the city provides, the staff person is free to work projects outside the city as necessary. If funding allows, the City of Charlotte agreement may be reduced to zero salary dollars in the next renewal period although the city remains committed to providing office space and clerical support to support the position.

Site Summaries

For a brief description of all brownfields projects pending at the end of September 2003, please see the Appendix. The table is divided into three sections: active eligible projects, projects pending eligibility and projects with finalized brownfields agreements.

Active eligible projects have been deemed eligible by the program as they meet the statutory criteria. These developers are working with DENR in some stage of data gathering, analysis or agreement negotiation. At present, there are 44 active eligible projects. Projects at this stage receive guidance from DENR as they gather the additional data needed to ensure protection of public health and environment. Once research is complete, DENR analyzes the data, then drafts and negotiates the terms of the brownfields agreement with the prospective developer. At most of these sites, DENR is waiting for additional data requested by the program.

Projects pending eligibility are in the initial stage of consideration because the program has yet to determine if the sites are eligible by meeting statutory requirements. Here, the program has requested clarification or additional information from prospective developers regarding eligibility for nine sites. It is anticipated that most projects in this stage will be deemed eligible by year's end. Based on recent trends, the program anticipates that a total of 33 Letters of Intent will have been received by the end of 2003.

Projects with finalized brownfields agreements have completed the public notice phase of the brownfields process and either have a signed brownfields agreement or are waiting for the agreement to be executed. As of October 1, 2003, 36 projects had finalized agreements and three more agreements are anticipated by year's end. With a total of 39 completed projects in 2003, the program shows a 50 percent growth rate over 2002.

Brownfield Project Demographics

Brownfield sites in heavily industrial regions of the country tend to be weighted toward urban areas. However, North Carolina's tradition of rural manufacturing creates a significant number of rural brownfields opportunities. This fact continues to be reflected in the distribution of the program's inventory of projects. Of the 15 agreements to be completed during 2003, four are rural. Half of the program pending and eligible projects are rural, as are one-third of the program's total of 39 completed agreements.

The additional staff hired in 2002 allowed the program to conduct the outreach needed to make rural communities more aware of the state's Brownfields Program. As a result of these efforts, the public benefits enjoyed by urban areas with brownfields projects will extend to rural regions of the state as well. DENR will continue to focus on the importance of rural brownfields to their surrounding communities.

Improving Effectiveness

In its six-year existence, the Brownfields Program has provided a high "bang" for the federal and city "bucks" it uses for operation funds. The program's 39 brownfields agreements represent over $550 million in committed private redevelopment investment. To date, the program has spent approximately $405,000 in public funds ($335,000 from federal cooperative funding and $70,000 from the City of Charlotte). The extent to which these funds have been successfully leveraged has proven that the BPRA is both efficient and effective. By increasing resources, the program increases effectiveness by upping the total of projects that move through the brownfields process.

Adding program staff in 2002 significantly increased the program's volume capacity, but demand continues to increase. New internal technical protocols, more experienced project managers and an improved project tracking system reduced process time, as did streamlining and standardizing various administrative elements. The program continues to upgrade and update its Web site, which helps disseminate essential and timely information to brownfields stakeholders. These efforts have allowed staff to spend less time conveying information and more time processing applications and advancing projects through the brownfields process. This increase in effectiveness and efficiency is largely responsible for the program record of 15 agreements completed during 2003.

Placing a Brownfields Program staff person in the city of Charlotte has proven very successful. Processing time for Charlotte projects was reduced while efforts to educate and encourage developers to undertake brownfields redevelopment projects increased. In 2004, the program plans a similar arrangement in the Asheville area. A staff person will be housed in the Land-of-Sky Council of Governments (Land-of-Sky) offices. Coordination with Land-of-Sky has already yielded numerous redevelopment projects; the program hopes to duplicate the Charlotte success in Asheville. This is the program's first attempt to place a staff person outside of a large metro area, but, if the model proves successful, the program will explore placing additional staff in other cities as it grows.

The program is also increasing outreach efforts to educate property developers about BPRA. It plans to hold a state brownfields workshop for local governments and developers in 2004. The focus of the workshop will be two-fold. First, to educate developers about the program and second, to inform local governments about how to apply for and use U.S. EPA Brownfields Grants. North Carolina's program has found it more effective to use these funds to actually redevelop sites with committed prospective developers. In other states, funds are often used to assess eligible properties without regard to their future redevelopment prospects.

Fund Status

The Brownfields Property Reuse Act Implementation Account receives its income from the $2,000 fee charged to prospective developers who enter the program, and is to be used by DENR to defray the cost of the program. As of December 2003, the Brownfields Property Reuse Act Implementation Account had a balance of $75,199. The 2003 starting balance was $23,959. The total income was $51,901 in fees and interest. Expenditures from the fund totaled $661; the funds were used for supplies and software.

Further Information

For additional information on the Brownfields Program and how it works, please visit our Web site at **www.ncbrownfields.org**.

APPENDIX

Status Summary of Brownfield Projects as of September 30, 2003

Appendix

Status Summary of Brownfield Projects as of September 30, 2003

ACTIVE ELIGIBLE PROJECTS (44)

8th STREET LANDFILL West 8th Street Kannapolis, Rowan Co. PD: City of Kannapolis	Former landfill operated by Cannon Mills for the disposal of residential, commercial and industrial waste from the early 1900s through 1972. Landfill contents may include hazardous and regulated compounds. PD intends to redevelop the site for public recreational and dedicated open space uses.
ABC ENGRAVERS 724 North I-85 Charlotte, Mecklenburg Co. PD: Holden Business Park, LLC	Former engraving and plating facility with known chromium and chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site as an office complex.
ALPHA MILLS 312 E. 12th St. Charlotte, Mecklenburg Co. PD: Crosland, Inc.	Approximately 5.77-acre parcel that was historically a textile mill. Most recently the site was the former Consolidated Group Incorporated engraving facility. The site has known soil, groundwater, surface water and sediment impacts from historical site operations. PD intends to redevelop the property for residential apartments with compatible commercial and retail development.
AIRPORT EXXON 3305 North Liberty St. Winston-Salem, Forsyth Co. PD: Mrs. Becky Flowers	Former automobile engine repair and maintenance facility. Known soil and likely groundwater contamination involving petroleum and degreasing solvent constituents. Intended redevelopment is a gas station/convenience store to serve Smith-Reynolds Airport customers and employees.
ALAMAC AMERICAN 1885 Alamac Road Lumberton, Robeson Co. PD: Alamac American Knits, LLC	150-acre site containing a textile manufacturing facility. Known chlorinated solvent groundwater contamination from previous operations. PD intends to take over existing water quality monitoring plan prepared under N.C. DWQ and to redevelop the property for textile manufacturing.
FORMER AMP FACILITY 1126 Church Street Greensboro, Guilford Co. PD: Church Street Medical, LLC	Approximately 10-acre site is the former location of AMP Incorporated, a metal stamping, plating and manufacturing facility. Closed since the mid-1980s, the site has known chlorinated solvent groundwater contamination, which is being cleaned up under an approved CAP within the N.C. DWQ Groundwater Section. PD intends to redevelop the site as a medical office campus.
ARCHDALE MARKETPLACE 5801-6025 South Blvd Charlotte, Mecklenburg Co. PD: Eastbourne Investments Ltd.	Approximately 13-acre parcel known as Archdale Marketplace Shopping Center. Groundwater is contaminated due to historical site operations by an A&P grocery store, Sno-White Cleaners, and K-mart auto service center. PD intends to redevelop the property for commercial and retail.
AUSTIN FOODS 315 East Chatham Street Cary, Wake Co. PD: Cary Ice Company	This six-acre site contains former food processing and warehousing facilities. Known pesticide and herbicide contamination from previous operations exists in soil and groundwater. PD intends to redevelop the property as an ice manufacturing and distribution facility.

FORMER R.H. BOULIGNY 2320 N. Davidson St. Charlotte, Mecklenburg Co. PD: NODA Properties, LLC	Approximately 3.5-acre parcel that was the former R.H Bouligny facility. The site has known groundwater impacts from chlorinated solvents. PD intends to redevelop the property for mixed-use development with commercial, retail, industrial and residential uses.
BROWN'S SOLVENT CO. 2935 Griffith Street Charlotte, Mecklenburg Co. PD: Kathryn C. Bell Estate	Former paint and solvent formulation facility with known solvent-impacted soil and groundwater. PD intends to initially renovate and reuse the existing structure for office/warehouse use. Ultimately, PD will raze the building and redevelop the site as a mixed office/retail complex in keeping with other redevelopment taking place in Charlotte's South End.
BURLINGTON – JAMESTOWN 6008 High Point Road Jamestown, Guilford Co. PD: Alberdingk Boley, Inc.	22-acre site containing a abandoned chemical formulation facility operated in support of Burlington Industries textile manufacturing operations. Known chlorinated and petroleum hydrocarbon contamination exists in site soil and groundwater and is being addressed under a consent order with DENR. PD intends to redevelop the property as polyurethane and polyacrylate emulsions manufacturing facility.
BURLINGTON MILLS 476 South Main St. Mooresville, Iredell Co. PD: Cherokee Investment Partners	Abandoned textile manufacturing facility with known petroleum hydrocarbon contamination in soil and groundwater, and chlorinated solvent contamination in groundwater. PD intends to redevelop the site as an auto racing industry complex with office, flex, shop and R&D space.
CAMDEN ROAD 1600 Camden Road Charlotte, Mecklenburg Co. PD: Harris Murr & Vermillion, LLC	Approximate .25-acre parcel in Historic South End of Charlotte. The site has known groundwater impacts from previous gas station, tire repair and plumbing repair activities amid and other uses. PD intends to redevelop the property for commercial and retail purposes.
CAMEL CITY CLEANERS 501 East Third St. Winston-Salem, Forsyth Co. PD: Brownfields Redevelopment International	Former dry cleaning facility with chlorinated solvent-impacted soil and groundwater from dry cleaning operations and semi-volatile impacted groundwater from nearby manufactured gas plant facility. Intended reuse is for commercial/light industrial flex space.
CAROLINA LOG BUILDINGS Howard Gap Rd at US Hwy. 25 Fletcher, Henderson Co. PD: Town of Fletcher	Former wood treating facility with known pentachlorophenol contamination in soil and groundwater. PD intends to redevelop the 30-acre site as the new heart of the Town of Fletcher to include various office and retail uses.
CENTRAL PARK LANDFILL Salem and South Main Street Winston-Salem, Forsyth County PD: Salem Recreational Fields LLC	Former municipal landfill for the City of Winston-Salem. Site is 7.23 acres in size and has been used as a city park since the 1950s. Low levels of chlorinated solvents, with no surficial soil contamination. PD intends to redevelop the site as a soccer and a softball field for the adjoining Salem Academy and College so their current fields can be used for additional building space. A passive methane collection system will be installed before the recreational fields are installed.

CHATHAM MANUFACTURING NC Hwy. 268 Elkin, Surry Co. PD: Town of Elkin	A 30-acre site containing solid waste disposal area used by former textile manufacturing facility. Known VOC and SVOC contamination exists in groundwater at the site. PD intends to redevelop the property for park and recreational uses in keeping with the current use of adjoining property as baseball fields.
CHEROKEE OIL 925 Summit Avenue Charlotte, Mecklenburg Co. PD: M & J Equities, LLC	Approximately 2-acre site was formerly a non-permitted hazardous waste storage facility and the site of an EPA removal action. Known arsenic, oil and grease, and solvent contamination exist in site soil and groundwater. PD intends to redevelop the property as a nightclub and parking facility.
CMI WWTP NC Hwy. 268 Elkin, Surry Co. PD: Town of Elkin	Located in the flood plain of the Yadkin River, this 11-acre site was the former of an industrial waste water treatment plant with excess permitted capacity. Known VOC and SVOC contamination in soil and groundwater. PD intends to consolidate the town's sanitary waste and the current industrial waste into this single facility, allowing for current and future waste treatment requirements.
CSX RIVERFRONT 515 Nutt Street Wilmington, New Hanover County PD: Riverfront Developers, LLC	An 8.26-acre tract on the Cape Fear River in downtown Wilmington. Former CSX railroad property last used for offloading diesel for rail distribution. Minor naphthalene contamination in the groundwater and some polynuclear aromatic hydrocarbons in soil. Intended use is multi-purpose development that could include a hotel, private residences, professional offices, retail stores, restaurants and private marina. Public waterfront amenities, with a 600' extension of Wilmington's historic riverfront.
DYNATECH INDUSTRIES 2213 Toomey Ave. Charlotte, Mecklenburg Co. PD: R. G. Automation, Inc.	Former plating facility with metals-impacted soil and groundwater. EPA conducted soil removal activities at the site and has classified it as "no further remedial action planned." PD intends to redevelop the property for use as mixed office/retail complex.
EAST GANNON PROPERTY SE corner East Gannon and Arendell Avenues Zebulon, Wake Co. PD: Berkshire-Hudson Capital XI, LLC	This property consists of four parcels of land that total 1.75 acres with four exiting structures (former restaurant, current auto sales, auto service garage and hair salon). Site planned to be redeveloped into a stand-alone Eckerd Drug Store, with other surrounding complimentary retail tenants. Soil and groundwater are contaminated with petroleum constituents from above ground storage tanks used by previous gas station.
EAST PARK – BOYER 1607 & 1611 E. Fourth St. Charlotte, Mecklenburg Co. PD: Torrence Street Partners	Approximately .39-acre parcel that is a portion of the East Park Development Project. Known chlorinated solvent and gasoline contamination. PD intends to redevelop the site as a pedestrian, urban-infill multiple-use development with commercial, residential, recreational and common open space. The site is part of the City of Charlotte's East Park re-development zone.
EAST PARK – DOROTHY HALL 1423 & 1427 E. Fourth St Charlotte, Mecklenburg Co. PD: Torrence Street Partners	Approximately .8-acre parcel that is a portion of the East Park Development Project, with known chlorinated solvent and gasoline contamination. PD intends to redevelop the site as a pedestrian, urban- infill multiple use development with commercial, residential, recreational and common open space. The site is part of the City of Charlotte's East Park re-development zone.

EAST PARK – Craver 1601,1609,1615 Elizabeth Ave Charlotte, Mecklenburg Co. PD: Torrence Street Partners	Approximately .65-acre parcel that is a portion of the East Park Development Project, with known chlorinated solvent and gasoline contamination. PD intends to redevelop the site as a pedestrian, urban-infill multiple-use development with commercial, residential, recreational and common open space. The site is part of the City of Charlotte's East Park re-development zone.
ECUSTA 1 Ecusta Road Pisgah Forest, Transylvania Co. PD: Ecusta Business Development Center, LLC	In its prime, this 540-acre site was the world's largest non-wood pulp and specialty paper manufacturing facility. Closed since late 2002, the site has known metals, caustic and solvent contamination. PD intends to re-start flax pulping operations and to market the pulp to paper manufacturers. PD may also undertake other uses of site buildings and facilities, including office space and possible use of excess waste water treatment capacity by local municipalities.
ELK MOUNTAIN LANDFILL Elk Mountain Road Woodfin, Buncombe Co. PD: Town of Woodfin	Approximately 156-acre site contains a former municipal landfill which was operated under lease by the City of Asheville, and which has been closed since the late 1970s. PD has operated a 9-hole golf course on the site since 1990. PD will conduct assessment activities to determine if there is actual contamination at the site. PD intends to redevelop the site into an 18-hole golf course and approximately 250 condominiums in areas outside of the waste cells.
FISHBURNE EQUIPMENT Airport Road Arden, Buncombe Co. PD: R. & P. Van Praag	Former metal fabrication and tobacco press manufacturing facility with suspected VOC contamination in soil and groundwater (based on detection of these compounds on adjoining, downgradient property, the former Buncombe County landfill). PD intends to redevelop the site for light manufacturing/assembly, warehousing and public storage uses.
GENERAL WOOD 1901 Wood Treatment Road Leland, Brunswick County PD: Leland Land, LLC	Former 120-acre pole treatment facility [creosote, chromated copper arsenate (CCA) and pentachlorophenol (PCP)] under Chapter 11 bankruptcy, currently under RCRA jurisdiction. PD's intent is to be able to distinguish old from new contamination and then continue with pole treatment (CCA and PCP only). Groundwater contamination mainly associated with creosote and petroleum. Metal and PCP contamination in soil.
GLEN RAVEN MILLS 114 Raven Circle Kings Mountain, Cleveland Co. PD: Consortium for Progress	Former textile manufacturing facility with solvent contamination in groundwater. PD intends to redevelop the property as a residential/retirement center for senior citizens. Responsible party will continue assessment and/or cleanup activities under state Voluntary Cleanup Program.
GREY HOSIERY MILL Fourth & Laurel Streets Hendersonville, Henderson Co. PD: Old Mill Arts Committee	Former hosiery manufacturing facility located in downtown Hendersonville with low concentrations of chlorinated solvents in site groundwater. PD intends to renovate the building and redevelop the property as a performing arts center.
HOME DEPOT – South Blvd. 4750 South Boulevard Charlotte, Mecklenburg County PD: CNR Properties, RLLLP	This 12-acre site is currently occupied by a produce grocer and office rental store (1 acre), parking (7 acres), abandoned plant nursery (1acre) and the rest is undeveloped. Operations at adjacent Academy Steel Drum from 1947-69 included the disposal of wastes and sludge from drums into pits/lagoons appears to have contaminated subject property. After ASD burned in 1969, contamination was spread during re-grading of the site. Elevated concentrations of lead, chromium, and PCBs in soil along with lead, 2-chlorophenol, and trichloroethylene. PD plans to lease property to Home Depot for construction of a new Home Depot home improvement retail store.

HOME INNOVATIONS SITE Hwy 52 S & Ratliff Gin Road Morven, Anson Co. PD: Dan River Inc.	Former textile manufacturing facility with petroleum hydrocarbon and VOC contamination in soil and groundwater. PD intends to redevelop the site as a modern textile manufacturing operation where present environmental contaminant compounds are not used. Project has significant job creation potential.
KIDD LANE BATTERY DISPOSAL 3607 Kidd Lane Charlotte, Mecklenburg Co. PD: Joshua's Farm	Abandoned dairy farm with historical lead battery disposal operations. The approximately 1-acre parcel is adjacent to a 22-acre horse and animal farm area for the Joshua's Farm Operations. The site has a limited area with lead contamination in the surficial soils. PD intends to redevelop the area as a parking lot for the horse and animal farm operations.
NORTH HILLS MALL 4217 Six Forks Road Raleigh, Wake Co. PD: North Hills Mall Ownership Organization, LLC	This 31-acre site was originally developed in 1963 and later expanded into one of Raleigh's earliest enclosed malls. The site has known petroleum and chlorinated solvent contamination in soil and groundwater from auto gas and repair facilities and from an off-site drycleaner. DP intends to redevelop the site into a pedestrian friendly mixed-use retail, commercial and residential complex.
QUALITY METAL PRODUCTS 1111 Oates Road Gastonia, Gaston Co. PD: Porter's Fabrications	This 11-acre site contains an abandoned 48,000 square feet facility formerly used for metal fabrication. Parts cleaning activities resulted in solvent impacts to soil and groundwater. PD intends to refurbish the facility for metal fabrication utilizing high-tech, non-contaminating methods.
RADIATOR SPECIALTY 1900 Wilkinson Blvd. Charlotte, Mecklenburg Co. PD: Suttle Avenue, LLC	Idled automotive chemicals and hardware, and plumbing supplies manufacturing facility with volatile, semi-volatile and metals contamination in soil and groundwater. PD intends to redevelop the property into a major mixed-use office, retail, commercial and multi-family residential development.
RUSAK PROPERTY 3004 Bank Street/ 3331 Griffith Street Charlotte, Mecklenburg Co. PD: Charlotte Mecklenburg Board of Education	A 1.21-acre parcel that is adjacent to the Marie G. Davis Middle School. The site is contaminated from historical operations as a metal plating facility. The PD intends to incorporate the adjacent parcels into the new middle school construction. The brownfields parcel will be the plaza entrance.
SHELBY DYEING & FINISHING 1000 West Grover Street Shelby, Cleveland Co. PD: GMAC Commercial Credit, LLC	Former textile dyeing and finishing facility with solvent and metals contamination in soil and groundwater. Through its sale of the property to Environmental Fibers, PD intends to facilitate the redevelopment of the site as a cotton recycling facility, bringing the two site buildings back into productive use, and bringing jobs and tax base improvements to the community.
SHELBY WILLIAMS 401 Meacham Road Statesville, Iredell Co. PD: Lou Jay Associates, LLC	The 28-acre site contains an idled furniture manufacturing facility with metals contamination in soil and groundwater from former plating operations conducted at the site. Applicant-PD intends to up-fit the facility for the production of high-end cabinetry and add an estimated 650 jobs in the next three years.

SOUTH TRYON STREET 2028-2040 S. Tryon Street Charlotte, Mecklenburg Co. PD: Citiline, LLC	A 2.88-acre parcel near historic South End. PD intends to redevelop the property for commercial purposes such as office and showroom condominiums. Groundwater is contaminated due to historical site operations as industrial/warehouse storage.
SUTTON SHOPPING CENTER NW Corner of Walkup & Sutherland Ave Monroe, Union Co. PD: Whitley Commercial Properties	The site is an old run-down shopping strip center in the Monroe Area. It has known soil and groundwater contamination from chlorinated solvents and gasoline constituents. PD intends to renovated the shopping center and expand the building area.
TAR HEEL LIFT 7055 Albert Pick Road Greensboro, Guilford Co. PD: Idlewild Grading Co., LLC	This 8-acre site contains a forklift sales, maintenance and repair facility on approximately two acres. The site has known environmental contamination from historic operations of the forklift facility. The site is currently underused and PD intends to relocate and expand its grading business from Winston-Salem, NC to this brownfields property.
WELLMAN SITE 3224 Cedar Creek Road Fayetteville, Cumberland Co. PD: Technofil, Inc.	The Wellman site is approximately 18 acres and contains a filament polyester yard manufacturing facility which has been idle since January 2003. There is known PCE contamination in groundwater at the site. PD intends to refurbish and reuse a portion of the facility to manufacture polyester and bicomponent yarns utilizing a process that will allows discrimination of old contamination from new.

PROJECTS PENDING ELIGIBILITY (9)

ANDREX INDUSTRIES 220 Deaverview Road Asheville, Buncombe Co. PD: Milkco, Inc.	This nine-acre, light manufacturing site was formerly a textile facility that operated a knitting, weaving and cutting business along with dry cleaning, shrinking and packaging of fabrics. Tetrachloroethylene groundwater contamination from dry cleaning operations is being remediated by RP with pump-and-treat system. PD is adjacent property owner, a milk processing and distributing plant. Initial plan is to use part of property for truck and trailer parking. Within three years they plan to demolish Andrex buildings and expand the Milkco Plant to double capacity within eight years.
GUILFORD MILLS – W. Market Street 4925 W. Market Street Greensboro, Guilford County PD: Kim's Greensboro Real Estate, LLC	A 19.8-acre vacant textile facility with ancillary buildings. Minor groundwater contamination associated with former underground storage tanks. Other non-UST contamination has been documented but information has not yet been sent to us. PD plans to use the site for general commercial property.
HISTORIC COTTON MILL 191 Riverside Drive Asheville, Buncombe Co. PD: RiverLink, Inc.	This 2.63-acre site was formerly occupied by a cotton mill operated from the 1900s then abandoned for many years. PD will conduct environmental assessment to determine if the site has any contamination. PD intends to redevelop the site in mixed commercial/retail and residential uses. This project is part of the Asheville French Broad Riverfront Plan.
LEARY BROTHERS STORAGE Virginia & Broad Streets Edenton, Chowan Co. PD: Charles M. Reeves III	Approximate 6-acre site containing former flower distribution and pesticide storage facility. Known arsenic contamination exists in site soil and groundwater. PD intends to redevelop the property in commercial retail uses.

MOSER-HALL Indian Trail, Union Co. PD: Moser-Hall, LLC	Property with petroleum hydrocarbon contamination in groundwater which has migrated onto the property. The source of the contamination was a release from a leaking underground storage tank system located on an adjoining parcel. PD intends to redevelop the site for commercial/retail use.
NATIONAL TEXTILES Jamestown Road Morgantown, Burke Co. PD: National Textiles	Former textile manufacturing facility with chlorinated solvent contamination in soil and groundwater. The applicant PD intends to sell the site to an identified potential buyer for conversion and reuse as a furniture manufacturing facility.
SALEM UNIFORM 4015 N. Cherry Street Winston-Salem, Forsyth County PD: Winston Weaver Co. Inc.	Vacant for many years, this 2.53-acre site was leased from 1967-83 by Salem Uniform and from 1983-86 by Cintus Corp. who then purchased the Salem Uniform assets. During a Limited Site Assessment for petroleum USTs, high levels of PCE were discovered, probably from dry cleaning solvents. PD is currently leasing space, but would like to improve it for use as fertilizer storage and other commercial usage.
SPANCO Inc. 1604 Boone Trail Road Sanford, Lee Co. PD: Pier Real Estate, Ltd.	Former hosiery manufacturing facility on approximately 10 acres with chlorinated solvent contamination in soil and groundwater. Applicant-PD intends to redevelop the property for use as a fasteners manufacturing and distribution facility.
WILSON LANDFILL 6700 Ward Boulevard Wilson, Wilson Co. PD: Dillon Properties, LLC	This underused 14-acre site was formerly occupied by a waste-water treatment facility owned and operated by the City of Wilson. The site has known metals contamination in groundwater. PD intends to redevelop for mixed commercial, warehousing and residential uses

FINALIZED BROWNFIELDS AGREEMENTS (36) EITHER IN FORCE OR PENDING SIGNATURE

ALAMAC KNIT FABRIC Hamilton, Martin Co.	Former textile manufacturing facility with known soil and groundwater contamination involving chlorinated solvents. Site is undergoing active remediation under NC DWQ CAP. Intended reuse is as a non-polluting school locker manufacturing facility that will employ some 350 workers.
ANCHOR MILL Huntersville, Mecklenburg Co.	Abandoned textile manufacturing facility with known metals contamination in soil, and lead, chlorinated solvent, and petroleum hydrocarbon contamination in groundwater. PD intends to redevelop the 32-acre site as a mixed-use transit village that reuses the old mill building and adds new office, retail, and residential components.
BALDOR ELECTRIC Charlotte, Mecklenburg Co.	Former electric motor and motor component assembly and manufacturing facility with solvent impacted soil and groundwater. PD intends to redevelop the property for use as industrial condominiums.

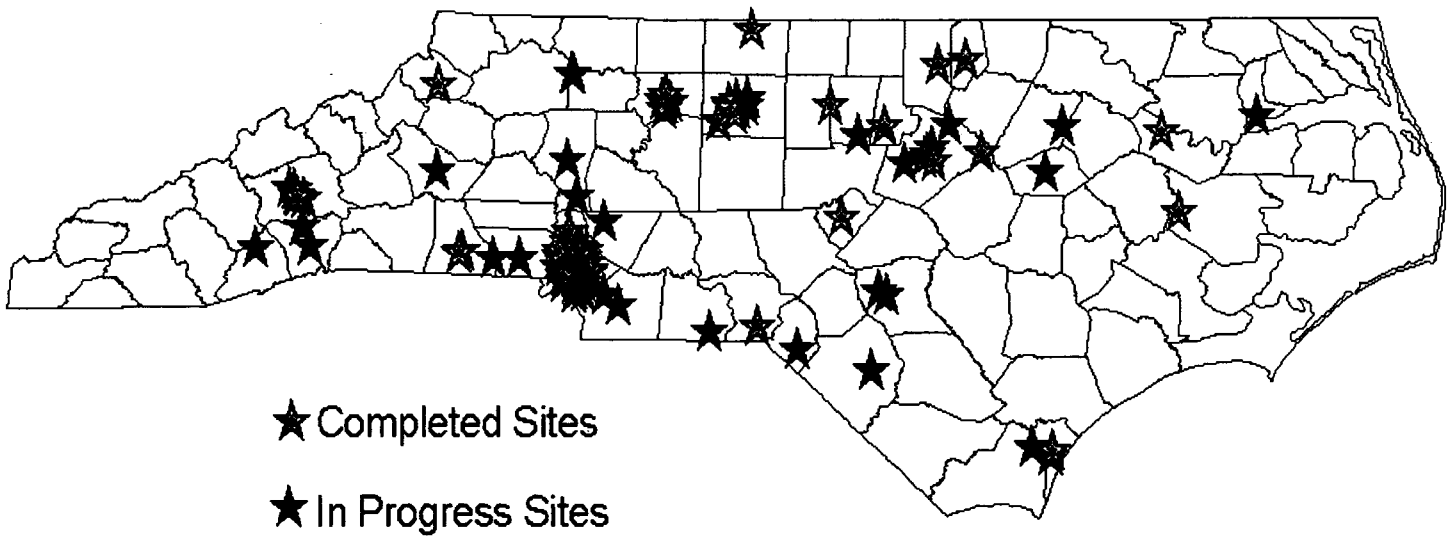
BURKHART CAROLINA Henderson, Vance Co.	Former pickle processing and packing facility with chloride impacted soil and groundwater and minor solvent contamination in groundwater. PD intends to redevelop the property for commercial retail use. Simultaneously, the responsible party will implement groundwater remediation at the site under separate action. The PD's development will provide an impervious cap on the site, further assisting remedial efforts.
CAMDEN SQUARE Charlotte, Mecklenburg Co.	Abandoned knitting and printing operations rebuilt into the "Design Center of the Carolinas." Development supported by the Wilmore Community as a vital redevelopment in an economically depressed area. Land use restrictions for chlorinated solvents in groundwater.
CAMDEN SQUARE ADDITION Charlotte, Mecklenburg Co.	This project will add, by amendment, 4.5 acres to the first brownfields agreement completed in North Carolina, Camden Square, in Charlotte's South End redevelopment corridor. Contamination includes VOC- and SVOC-impacted soil and groundwater. Intended reuse is mixed office and retail.
CAROLINA PRODUCTION FINISHING Asheville, Buncombe Co.	Former textile finishing facility with metals contamination in both soil and groundwater. PD intends to redevelop the site for warehousing and as a sewing operation. PD is in the process of reviewing DENR's draft brownfields agreement for this site.
CITY WEST COMMONS Charlotte, Mecklenburg Co.	Dilapidated shopping center seized in a drug raid by the U.S. Dept. of Justice that has been approved for transfer to the city of Charlotte. Site had VOC and chlorinated solvent contamination in soil and groundwater. The City intends transfer the property to a not-for-profit development corporation to redevelop the site as commercial retail shopping facility.
C.K. LAND DEVELOPMENT Charlotte, Mecklenburg Co.	A large mixed use development on a former industrial services firm adjacent to a manufactured gas plant. Ground floor retail and studio with office and residential units above. Project is in vicinity of Camden Square and provides redevelopment to economically depressed area. Capping and land use restrictions regarding PAHs in soil and chlorinated solvents in soil and groundwater.
CUMBERLAND SHOPPING CENTER Greensboro, Guilford Co.	Site of former shopping center and dry cleaners with chlorinated solvent impacted soil and groundwater. PD is a not-for-profit community development corporation. The PD has performed soil cleanup activities and intends to redevelop the site with affordable residential housing.

EAST GANNON PROPERTY Zebulon, Wake Co.	This property consists of four parcels of land totaling 1.75 acres with four exiting structures (former restaurant, current auto sales, auto service garage and hair salon). Site planned to be redeveloped into a stand-alone Eckerd Drug Store, with other surrounding complimentary retail tenants. Soil and groundwater are contaminated with petroleum constituents from above ground storage tanks used by previous gas station.
EAST PARK – JOAL REALTY Charlotte, Mecklenburg Co.	Part of the 24-acre site encompasses a six-block area with known chlorinated solvent contamination. PD intends to redevelop the site as a model for urban infill mixed use development with an emphasis on the pedestrian needs an urban setting. The site is part of the City of Charlotte's East Park re-development zone located between the CBD and the historic residential neighborhoods of Elizabeth and Myers Park.
EAST PARK – KOSSOVE Charlotte, Mecklenburg Co.	Part of the 24-acre site encompasses a six-block area with known chlorinated solvent contamination. PD intends to redevelop the site as a model for urban infill mixed use development with an emphasis on the needs of pedestrians in an urban setting. The site is part of the City of Charlotte's East Park re-development zone located between the CBD and the historic residential neighborhoods of Elizabeth and Myers Park.
ERWIN SQUARE Durham, Durham Co.	This approximately six acre property is a portion of a decommissioned former Burlington Industries site; other portions have already been redeveloped. There is known chlorinated solvent contamination in groundwater, and these impacts are being addressed under an approved Division of Water Quality corrective action plan. PD intends to redevelop the site in high density residential use.
FLEMINGTON LANDFILL Wilmington, New Hanover Co.	Site of a closed (1979), privately-operated domestic and industrial solid waste landfill with VOC-impacted soil and groundwater. Intended reuse is for a soccer complex. This is the first former landfill property proposed for redevelopment under the N.C. brownfields statute. The project's feasibility and technical challenges are being carefully evaluated.
FOOD LION Winston-Salem, Forsyth Co.	A new large supermarket placed on the site of an abandoned grocery store in urban Winston-Salem. Project had strong community support as a quality of life issue as the community had no supermarket. Land use restrictions for chlorinated solvent contamination in groundwater. Brownfield assessment determined the source to be nearby drycleaner.
GUILFORD MILLS Greensboro, Guilford Co.	This 55-acre site contains a former textile manufacturing facility with known VOC contamination in soil and groundwater. PD intends to redevelop the property in mixed retail uses. Public benefits include the creation of an estimated 500 jobs and substantial tax roles increases.
HAMILTON PROPERTY Charlotte, Mecklenburg Co.	Dilapidated property bought for the expansion of Cost Effective Maintenance Inc., a small business in the South End area of Charlotte. Expansion into this property allowed CEM to stay in Charlotte instead of move to suburbs. Land use restrictions for chlorinated solvent contamination in groundwater.

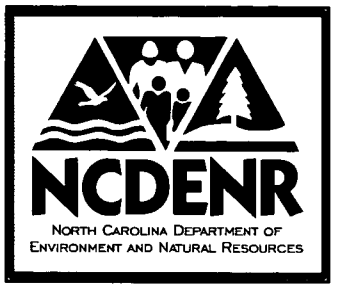
HILLSBOROUGH VENTURES Raleigh, Wake Co.	Project involves redeveloping an area of parking lots and dilapidated, underused retail structures. Land use restrictions are in place for the petroleum hydrocarbon and chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the property as mixed residential (private student dormitory for N.C. State University) and retail complex.
HILLSBOROUGH VENTURES ADDITION Raleigh, Wake Co.	Prospective developer added acreage to the footprint of original Hillsborough Ventures project, which involves redeveloping an area of parking lots and dilapidated, underused retail structures adjacent to N.C. State University for mixed residential (private student dormitory) and retail uses.
LEWITH TEXTILE Charlotte, Mecklenburg Co.	Project involves the redevelopment of 50+ acres of abandoned and underused commercial and industrial property, including the former Lewith Textile facility. Contaminants include petroleum hydrocarbon and chlorinated solvents in soil and groundwater. PD intends to redevelop the site as an industrial park for light manufacturing and warehousing/distribution.
LUCENT TECHNOLOGIES Greensboro, Guilford Co.	Former cotton mill and manufacturing facility with chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site in mixed commercial retail/office and residential.
MALLARD CREEK Charlotte, Mecklenburg Co.	This 21-acre site neighbors a former auto service station and chainsaw service center operations. Petroleum hydrocarbon and chlorinated solvent contamination in groundwater, sourced from underground and aboveground storage tanks releases on the adjacent site, has migrated onto the subject property. PD intends to redevelop the property as an apartment complex.
OXFORD PRINTING Oxford, Granville Co.	Former textile printing and finishing facility with VOC contamination in groundwater. PD has conducted cleanup of floor drain contents. PD intends to redevelop the site for industrial/distribution use.
PILOT MILLS Raleigh, Wake Co.	Abandoned, condemned, turn-of-the-century textile mill in Downtown Raleigh redeveloped into office space and preserved on the National Register of Historic Places. Land use restrictions for chlorinated solvent in groundwater and capping of mercury in soils.
REDMAN HOMES Mebane, Orange Co.	Former mobile home manufacturing facility with metals and solvent contamination in soil and groundwater. PD has performed drum removal and soil remediation activities. PD intends to redevelop the site as a manufacturing facility to produce windows and doors.
SANFORD WWTP Sanford, Lee Co.	Former municipal waste water treatment plant site with petroleum impacted sewer sludge and metals impacts in site soils and low concentrations of volatile and semi-volatile compounds in groundwater. PD intends to redevelop the property in commercial use, including restaurant, retail space and a multi-screen movie theater.
SINGER COMPANY Chocowinity, Beaufort Co.	Abandoned rural manufacturing facility with lead and phthalate contamination in soil and groundwater. The brownfields agreement provides for partial site remediation. PD intends to redevelop the site with mixed retail and light industrial uses.

SMITH METAL & IRON Charlotte, Mecklenburg Co.	Former site of a scrap metal yard and of a waste cell created for the temporary disposal of impacted soil removed during the construction of the adjoining Carolina Panther's practice field. The waste in the cell has been removed, and minor chlorinated solvent impacts remain in site groundwater. PD intends to redevelop the site in high density residential with additional office, entertainment, and retail potential.
SMITH PROPERTY Shelby, Cleveland Co.	Project involves the redevelopment of an area occupied by seven underused and dilapidated residential homes with petroleum hydrocarbon and chlorinated solvent contamination in groundwater. PD has the support of local residents to reuse the site as a parking lot serving the Cleveland County Offices.
SOUTHERN MANUFACTURING Charlotte, Mecklenburg Co.	This nine-acre site located in inner Charlotte was a former asbestos tile manufacturing facility. Operations involving asbestos were discontinued in 1986 and the facility was closed in 1999. The site has known asbestos contamination in soils. Intended reuse of the site includes an outdoor amphitheater, a technical business park, or a mixed-use development with industrial, commercial and residential components.
STATE FARM ROAD Boone, Watauga Co.	Project involves the redevelopment of property occupied by a rural residence with chlorinated solvent contamination in groundwater and in a spring from an off-site source. PD intends to redevelop the site as a medical office complex.
TARTAN MARINE Hamlet, Richmond Co.	Former boat manufacturing facility with lead contamination in soil. Additional site sampling conducted by the PD has shown previous soil removal actions to have left no health-based lead problems. PD intends to redevelop the site as a chair and table base manufacturing facility.
TERRELL MACHINE Charlotte, Mecklenburg Co.	Site of former textile manufacturing and gear box machining operations, property in Charlotte's South End district is being redeveloped with ground floor retail and office/residential above. Remedial actions to eliminate hot spot contamination included soil removal and groundwater pump and treat. Land use restrictions are in place to address chlorinated solvent contamination remaining in groundwater.
VANIER GRAPHICS Eden, Rockingham Co.	Former printing facility with petroleum and chlorinated hydrocarbon contamination in the soil and solvent contamination in the groundwater. PD intends to redevelop the site as a furniture assembly and upholstering facility.
WEST MOREHEAD Charlotte, Mecklenburg Co.	Former automobile repair and maintenance facility with chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site, to include both facility renovation and new construction for use as commercial office/retail.

Brownfields Program Site Locations - Feb 2004



County	Number of Sites
Anson	1
Beaufort	1
Brunswick	1
Buncombe	5
Burke	1
Chowan	1
Cleveland	3
Cumberland	2
Durham	1
Forsyth	5
Gaston	1
Granville	1
Guilford	8
Henderson	2
Iredell	2
Lee	1
Martin	1
Mecklenburg	35
Nash	1
New Hanover	2
Orange	2
Richmond	1
Robeson	1
Rockingham	1
Rowan	1
Scotland	1
Stanley	1
Surry	2
Transylvania	1
Union	2
Vance	1
Wake	7
Watauga	1
Wilson	1
Total	**98**



Textile Facilities Seeking Brownfield Agreements

Project Name	Also Known As	Status	City	County
Historic Cotton Mill		Active Elig.	Asheville	Buncombe
Home Innovations	Dan River	Active Elig.	Morven	Anson
Carolina Production		Complete	Asheville	Buncombe
Andrex Industries		Active Elig.	Asheville	Buncombe
National Textiles	Jamestown Road Prpty	Active Elig.	Morganton	Burke
Glen Raven Mills		Active Elig.	Kings Mtn	Cleveland
Shelby Dyeing & Finishing		Active Elig.	Shelby	Cleveland
Wellman Site	Cedar Creek Fibers, LLC	Active Elig.	Fayetteville	Cumberland
Erwin Square		Complete	Durham	Durham
Oxford Printing		Complete	Oxford	Granville
Cotton Mill Square	Lucent Technologies	Complete	Greensboro	Guilford
Guilford Mills		Complete	Greensboro	Guilford
Burlington - Jamestown	Alberdink Boley	Complete	Jamestown	Guilford
Guilford Mills-W. Market St.		Active Elig.	Greensboro	Guilford
Grey Hosiery Mill		Active Elig.	Hendersonvill	Henderson
Burlington Mills		Active Elig.	Mooresville	Iredell
Alamac Knit Fabrics		Complete	Hamilton	Martin
Camden Square		Complete	Charlotte	Mecklenburg
Lewith Textile	Wilkinson Business Park	Complete	Charlotte	Mecklenburg
Camden Square Addition		Complete	Charlotte	Mecklenburg
Anchor Mill		Complete	Huntersville	Mecklenburg
Alpha Mills	Consolidated Engravers	Active Elig.	Charlotte	Mecklenburg
Alamac American		Active Elig.	Lumberton	Robeson
Chatham Mfg.		Active Elig.	Elkin	Surry
Chatham Mfg. WWTP		Active Elig.	Elkin	Surry
Pilot Mill		Complete	Raleigh	Wake

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

August 25, 2003

George F. Givens, Commission Counsel
Environmental Review Commission
545 Legislative Office Building
300 North Salisbury Street
Raleigh, NC 27611

RE: Interim Report on Implementation of House Bill 1215

Dear Mr. Givens:

House Bill 1215, enacted in October 2002, requires the submission of an interim report to the Environmental Review Commission.

Attached is a copy of the Interim Report, which describes efforts made to: 1) evaluate water conservation measures being implemented in the State, and 2) identify incentive programs and other voluntary programs that can help foster water conservation and water reuse.

Sincerely,

William G. Ross Jr.

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Department of Environment and Natural Resources
INTERIM REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION AND ENVIRONMENTAL MANAGEMENT COMMISSION ON IMPLEMENTATION OF HOUSE BILL 1215 (Session Law 2002-167)

House Bill 1215, enacted by the North Carolina General Assembly in October 2001, has three related components targeted at improving water management.

Section 3 requires the Environmental Management Commission to develop and implement permanent rules governing water conservation and water reuse during droughts and water emergency situations in time to allow review by the 2005 Regular Session of the General Assembly. The rules are to establish minimum standards and practices for water conservation and water reuse for the following classes of water users: publicly owned water systems, privately owned water systems, State agencies, local governments, business users, industrial users, agricultural users, and horticultural users. The Department is directed to consult with these types of water users in developing the rules.

Section 4 establishes a goal to reduce water consumption by State agencies by 10 percent.

Section 5 requires the Department of Environment and Natural Resources to evaluate water conservation measures being implemented in the State and to identify incentives and voluntary programs that can help foster water conservation and water reuse. In conducting its evaluation, the Department is to review measures being implemented or advocated by the types of water users identified in Section 3 of the bill, plus residential users, electric utilities, environmental protection advocacy groups and natural resource advocacy groups.

Some of the tasks outlined in H1215 are already underway. In particular, the goal of reducing water consumption by State agencies is currently being addressed by the Utility Savings Initiative, a recommendation of the Governor's Efficiency Study Commission, and by Governor Easley's Executive Order 26 on water conservation. However, evaluation of water conservation measures, identification of incentive programs and formation of policies governing water conservation and reuse will require significant additional effort.

Three DENR divisions are cooperating on the implementation of H1215. The Division of Water Resources is coordinating the effort and concentrating on municipal water systems. The Division of Soil and Water Conservation has the lead role on agriculture, with the Division of Pollution Prevention and Environmental Assistance leading on industrial and commercial water use.

On March 7, these three divisions sponsored a meeting, to which representatives of all the groups identified in the statute were invited, to inform water users that the Department would be conducting an evaluation of water conservation measures. Participants were

asked to provide information on water conservation measures currently in use and those that should be included in the evaluation. Participants were also asked to suggest ideas for incentives and voluntary programs that could encourage water conservation and water reuse among any or all water users in the State. Participants were provided questionnaires designed to collect information needed for the evaluation and were encouraged to send in other suggestions and information useful to the evaluation process.

This meeting also served to inform interested parties about the formation of rules governing water use and reuse during drought and water emergency situations as required by Section 3 of House Bill 1215.

More than sixty people, representing almost all groups of water users specified in the statute, attended the meeting. Representatives of several user groups offered suggestions about water conservation with at least one suggestion of a voluntary program that could be used to improve water use efficiency. Departmental staff members expect to receive additional information as participants return questionnaires. Many participants stressed the importance of developing long term water resource management plans to ensure adequate future water supplies, to integrate appropriate water conservation measures and to encourage water recycling. The Department will continue to work with interested parties to determine the best way to develop the desired long-term plans. Participants also stated a desire that efforts at improving water efficiency be given due consideration in the formation of the rules governing water use during droughts. Additional meetings will be held in the coming months after we have had the opportunity to review survey results and determine an appropriate course of action.

To gather additional relevant information, the Division of Water Resources has developed a questionnaire to collect information about water conservation measures from water systems that submit Local Water Supply Plans under General Statute 243-355(l). Water systems are being asked to include information on the effectiveness of water conservation measures they use. This information is expected to provide data on water conservation measures that affect many of the designated water user groups, since many rely on public water systems for their water. Local Water Supply Plans are expected from more than 540 water systems. Water systems are being encouraged to submit local plans by the end of July 2003. The timing of these submissions will provide valuable information for the evaluation of water conservation measures by February 2004, as required by H1215.

The responsible divisions will continue working with water users and other interested parties toward the report due to the General Assembly on February 15, 2004. The next priorities are to gather information about successful incentives and voluntary programs that have been used in other states. Obtaining assistance from the university system and from other sources is being explored.

Report on Water Conservation and Water Use Efficiency
As Required by
House Bill 1215 (Session Law 2002-167), Section 5

NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

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INTRODUCTION

House Bill 1215 was ratified by the North Carolina General Assembly on October 3, 2002. House Bill 1215, now Session Law 2002-167, contains a number of provisions related to water conservation and water supply planning, motivated by North Carolina's experience with the extreme drought of 2002 and a heightened awareness of the need to focus more attention on assuring that North Carolina has an adequate water supply for future needs.

After experiencing dryer than normal weather for four years, the drought reached a critical point in 2002. During that year, North Carolina experienced many record lows for stream flows and ground water levels. In some cases these new drought records go back 50 to 75 years. In some of North Carolina's river basins, the State faced a danger that storage capacity in major reservoirs would be exhausted, leading to a disastrous drop in water availability for critical water supply needs. Agriculture experienced such severe drought-related impacts that the U.S. Department of Agriculture issued a disaster declaration for many North Carolina counties at Governor Easley's request.

During the 2002 drought, the Department of Environment and Natural Resources and the Drought Monitoring Council developed a 3-tier classification of communities according to their drought vulnerability. Thirty communities were included in Tier 1, which included those most vulnerable to running out of water. Tier 2 contained 88 communities with a serious but somewhat lesser degree of vulnerability. Tier 3 included 152 other communities of concern. Local governments, other water users, and state agencies responded to the drought challenge by increasing their monitoring of drought conditions, intensifying communication about drought dangers, and coordinating drought response measures. Many communities took vigorous steps to assure water supply availability for essential needs during the drought and to reduce their vulnerability to future droughts.

Against this background of concern regarding drought and the adequacy of future water supplies, House Bill 1215 dealt with two types of "water conservation" that are sometimes lumped together, but are in fact quite different.

The first type of water conservation is addressed by Section 3 of House Bill 1215, which deals with water conservation efforts necessary on a short-term basis during droughts or other emergency situations when water supply suddenly becomes reduced. Section 3 calls for the Environmental Management Commission to develop an administrative rule establishing minimum standards and practices for water conservation and water reuse for the following classes of water users: publicly and privately owned water supply systems, state agencies, local governments, business and industrial users, and agricultural and horticultural users.

During the 2002 drought, there were concerns that neighboring communities adopted very different approaches to emergency water conservation and that various types of water users were treated differently from community to community. There was also a lack of understanding about how water use by one community can affect other communities downstream. The intent of Section 3 of House Bill 1215 is to establish a fair and uniform set of minimum standards for

times when emergency reductions in water use are required to keep water demand in balance with a temporarily limited supply.

Similar to floods, droughts are random and unpredictable natural events. We know that, at some time in the future, droughts of various degrees of severity will occur. It is prudent for all North Carolina water suppliers to have policies and plans in place for emergency conservation when necessary to protect their most critical water needs and to minimize economic damage.

House Bill 1215 also deals with a second type of water conservation, which might be best described as year round water use efficiency. Efficient water use means using better practices or technology to get more economic productivity per unit of water used. Section 5 of House Bill 1215 requires the Department to evaluate water conservation measures being implemented in the state and to identify incentives and voluntary programs that can help foster water conservation and water reuse. The type of water conservation dealt with in Section 5 does not focus on occasional emergencies; instead, it is the kind of water conservation that all water users should work toward on an everyday basis. For every type of water user, including municipal, residential, industrial, agricultural, and others, there are proven practices that can improve the efficiency of water use. To the extent that North Carolina water users can become more efficient, we can stretch our available natural supply of water to support new water users in a growing economy. Improved water use efficiency can also postpone the need for costly capital investments in water supply infrastructure. While the General Assembly directed the Environmental Management Commission to develop an administrative rule for emergency water conservation as included in Section 3 of the Bill, it directed DENR to pursue voluntary measures and incentives that can increase long-range water use efficiency under Section 5.

This report deals only with Section 5 of House Bill 1215, the part directed toward improving long-range water use efficiency by North Carolina water users. This report was developed by the Division of Water Resources (primary responsibility for municipal water use), the Division of Soil and Water Conservation (agricultural water use), and the Division of Pollution Prevention and Environmental Assistance (industrial and commercial facilities and state agencies). The Division of Water Quality and the Division of Environmental Health also participated. To develop this report and recommendations, the Department held a public meeting on March 7, 2003, with participation by a broad range of water users, including municipal water systems, state agencies, businesses and industries, and agricultural water users. We requested the participants at this meeting to send us their recommendations on both techniques and methods to improve water use efficiency and on incentives or other voluntary measures that would motivate water users to become more efficient. The Department also requested and received information and recommendations on water use efficiency from the over 400 local governments that prepared and submitted Local Water Supply Plans (LWSP) to the Department during 2003. We sent out a follow-up email to a very broad list of water users and other interest groups on January 15, 2004 to invite any additional recommendations for the report.

The task of adopting an administrative rule on emergency water conservation during droughts or other temporary water shortages, as required by Section 3 of House Bill 1215, requires a different approach. The Department of Environment and Natural Resources will assemble an informal advisory committee to help us in drafting a rule to set minimum standards

for emergency water conservation for all types of water users. The draft rule will then go through the normal public notice and public hearing process before being considered by the Environmental Management Commission.

Improving water use efficiency in North Carolina, the subject of Section 5 of House Bill 1215, is a long-range effort that will require sustained attention over a period of years. Success will involve public education, improved incentives, and new practices and technology.

Determining the best approach to improve water use efficiency requires participation from all types of water users, who best understand the opportunities for improvement in their own operations. Because of this need for widespread participation and commitment, the Department intends to revise this report toward the end of the year, based on comments from the public and any additional recommendations that we receive during 2004.

Water conservation is an important element in good water resources management, but must be understood in the larger context. Improving the management of North Carolina's water resources and assuring adequate water supplies for our future requires a coordinated effort on three fronts:

- Accurate **monitoring** of the natural availability of water in North Carolina and of the rate of use of our surface and ground water supplies.
- Farsighted **planning** to project future water needs and to determine the most cost effective and environmentally sound water sources to meet these needs.
- Appropriate **incentives** and **regulation** to assure that North Carolina water resources are equitably shared among those who need to use them and that our use of water avoids the depletion or damage of our water resources.

Within this larger context, standards for emergency water conservation during droughts or other occasional water shortages will prepare communities to withstand these emergencies with minimal damage to public health and the economy. Improving our long-range efficiency of water use will improve the cost effectiveness of our water supplies and make water available for future economic development. Both of these aspects of water conservation are an important part of our total strategy for good long-range management of this essential natural resource.

RESIDENTIAL WATER USE

Families use residential water conservation measures to reduce water bills for purchased water or to avoid exceeding the capacity of their private wells. Many individuals are also motivated to conserve water because it contributes to good environmental stewardship. The willingness of individuals to comply with voluntary water conservation measures has a significant effect on total water use. Voluntary water conservation alone can reduce residential water use by an estimated two percent to five percent. Voluntary residential measures include:

shorter showers, turning off faucets while brushing teeth and shaving, washing only full loads of dishes and clothing, using a basin of rinse water when washing dishes by hand, installing automatic shut-off valves on water hoses, and using water efficiently when watering lawns and gardens.

CURRENT RESIDENTIAL CONSERVATION MEASURES

Home Water Audits

Home water audits and retrofit programs offer citizens assistance in quantifying how much water is being used in their home and recommendations to reduce water waste. Utility employees can perform home audits or provide education kits that teach customers to perform self-audits. A home water audit typically entails quantifying the amount of water being used and wasted throughout a household. An audit helps in developing an action plan to reduce wasted water. The plan may require leak detection and repair and retrofitting old faucets, showerheads and toilets with appropriate low flow devices.

Retrofitting and Replacing Inefficient Fixtures

Retrofitting and replacing fixtures and appliances with more efficient models are helping households to significantly reduce water use. Replacing inefficient toilets, showerheads, washing machines, and other water-using appliances can reduce water use by these devices between 18 percent to 44 percent.

Retrofitting involves making an improvement to an existing appliance or fixture rather than replacing it all together. It is generally much less expensive and can frequently be done by the user. A basic retrofitting kit generally includes low-flow faucet aerators, low-flow showerheads, leak detection dye tablets for the toilet, and replacement flapper valves for toilets. Standard retrofit kits are estimated to save 21.1 gallons per person per day (USEPA Water Conservation Plan Guidelines 150 – 151, 163, 166).

Irrigation Efficiency

Landscaping accounts for 31 percent of all residential water use (Vickers 12). Widespread use of xeriscaping and lawn watering guidelines can result in an estimated 22.5 percent to 27.5 percent reduction in outdoor water use (USEPA Water Conservation Plan Guidelines 166). Due to the large potential water savings, many major water systems, including Charlotte, Cary, Asheville, and OWASA, place a strong emphasis on irrigation practices, xeriscaping, and soil and lawn care. Irrigation policies include limitations on time of day, day of week and amount of watering; prohibiting the watering of non-vegetated surfaces such as sidewalks and driveways; eliminating water run-off outside of property lines; and installing moisture or rain sensors on irrigation systems.

Xeriscaping

In addition to modifying traditional irrigation methods, water systems are encouraging customers to reduce the need for irrigation. Educating residents about xeriscaping (landscaping

practices that utilize drought-tolerant native plants and grasses) and aeration of lawns reduces the need for irrigation by an estimated 7.5 percent and helps residents to keep their landscape beautiful (USEPA Water Conservation Plan Guidelines 166).

Charlotte-Mecklenburg has undertaken water efficient landscape education through the Mecklenburg County Solid Waste Division's Piedmont Landscape and Naturescape Training program (PLANT). The program emphasizes planting drought-resistant native plants, mulching to retain moisture, using compost to amend and aerate soil, and efficient watering methods. PLANT reached many Mecklenburg County residents in 2003 through school and community college programs and general public education workshops (Gill).

Results of Residential Programs

Where communities have coupled public education and indoor and outdoor water conservation policies, great water savings have occurred. For example, faced with a more than doubling population over the last 10 years and high water demands during summers, Cary's water resources were seriously strained. Through public education, landscape and irrigation ordinances, toilet flapper rebates, residential audits, a conservation rate structure, a new home water efficiency rating program, landscape water budgets and a water reclamation facility, Cary has drastically cut water demands on its system. These measures are expected to reduce water supply plant production by an estimated 4.6 million gallons per day by the end of 2028. This 16 percent savings will reduce operating costs and allowed Cary to delay two water plant expansions (USEPA Cases in Water Conservation 3).

WATER SUPPLY SYSTEMS

CURRENT WATER SYSTEM CONSERVATION MEASURES

Water System Audits and Universal Metering

In order for water systems to conserve water effectively, an accurate accounting of water entering and leaving the water system is necessary. A water system audit quantifies how much water a system produces and purchases and where that water is going. The first step should include universal metering, or the metering of all water-service connections. Water supply intakes and connections with other systems should also be metered. All the water entering the system should then be tracked through monitored service-connection meters (water that is billed for) and public-use meters (water provided free of charge). An annual average of 16 percent of water systems submitting a 2002 Local Water Supply Plan (LWSP) performed a water audit within the past five years, with 95 audits in 2002. To assure accurate metering, meters must be regularly tested and replaced when necessary. Sixty-seven percent of the water systems submitting a 2002 LWSP currently have a meter replacement program (2002 LWSP data).

If the water audit shows a difference of more than 15 percent between the water withdrawn and the water that can be accounted for, a thorough inspection of the water system is needed to determine the causes for water loss. Water meters should be checked for accuracy and leak detection and repair programs should be implemented (USEPA Water Conservation Plan Guidelines 144-146).

Leak Detection and Repair

Leak detection is a process to identify and repair water system leaks that are causing water loss. Leak detection methods range from visual inspection to using specialized leak detection equipment to find hidden leaks. The use of leak detection equipment is a more accurate and thorough method for locating leaks. Leaks can be detected by listening with a special microphone on contact points such as fire hydrants, meters, and valves and by listening on the ground over water lines with a special ground microphone. While 31 percent of the water systems in the state have an established leak detection program, 26 percent of the systems are seeking help to implement one (2002 LWSP data). A water loss reduction program that includes leak detection and repair enables water systems to reduce water waste and recover more of their operational costs by being able to bill for all the water they produce.

Water Pressure Reduction

Reducing excessive pressure within a water distribution system can save between three percent and six percent of a system's total production by limiting leakage. An auxiliary benefit of reducing pressure is a reduction in stress to the water distribution infrastructure. Decreased stress on the system can increase the life of pipes and valves and reduce maintenance costs. A system-wide decrease in pressure also reduces flow through open faucets and lessens wear on fixtures and appliances.

If the pressure in residential areas is greater than 80 pounds per square inch, water systems should determine if changing the system pressure is feasible. If decreasing the pressure of the entire system is not feasible, other water pressure reductions, such as pressure-reducing valves leading into buildings and flow restrictors on service meters can be put into place for water use efficiency. Water customer savings from pressure reduction range from five percent to 30 percent (USEPA Water Conservation Plan Guidelines 151, 166).

Water Reuse

Not all water uses require top quality potable water. Highly treated wastewater can be used for many purposes, such as irrigation, dust control, and some industrial processes. Reusing treated wastewater for suitable purposes increases efficiency by using the same water twice, allowing a water system to meet potable water demand with a smaller withdrawal from its water supply source.

Over eight percent of the water systems in North Carolina sell reclaimed water (2002 LWSP data). The Town of Cary implemented a reclaimed water project in June 2001. The project provides reclaimed, non-potable water for 400 residential and commercial users through a parallel distribution system to reduce demand on the potable water supply. As an incentive for reuse, Cary's year-round outdoor watering restrictions do not apply to reclaimed water use. Bulk reclaimed water (up to 200,000 gallons per day) is made available free to be hauled in tanker trucks to work sites for use for dust control, soil compaction, or landscaping. The program is helping Cary to meet its 20 percent water use reduction goal. UNC-Chapel Hill and the Orange Water and Sewer Authority (OWASA) are currently evaluating the feasibility of using highly treated wastewater in the University's cooling and steam cogeneration facilities. The proposed

reuse system would save one million gallons per day of OWASA's potable water production (Davis).

Public Education

Public education is a major factor encouraging year-round residential water conservation. Presently, 34 percent of the water systems submitting a 2002 Local Water Supply Plan (LWSP) have a water conservation public education program. Some water systems are hiring water conservation specialists to increase public awareness of residential water conservation. Other communities are coupling water conservation education responsibilities with other duties. For example, Greensboro's Storm Water Department is also responsible for water conservation education. Education initiatives include media announcements, informative water bills with usage histories, landscaping and irrigation workshops, school programs, and home water audits.

WATER SYSTEM EFFICIENCY INCENTIVES

Retrofitting and Replacement Incentives

The two most commonly practiced replacement and retrofit incentives employed in North Carolina are rebate and give-away programs. Rebate programs require customers to provide proof of purchase and installation of low flow appliances or devices to receive a one-time rebate for each device installed. Some public utilities give away low flow devices (such as low-flow showerheads, toilet bladders, faucet aerators, etc.) free of charge to customers. Currently, 35 percent of the water systems in North Carolina encourage the retrofitting of inefficient water fixtures.

While rebate and incentive programs generate up-front costs for the water system, replacing an old toilet and showerhead will save an estimated 24.1 gallons of water per resident per day (USEPA Water Conservation Plan Guidelines 166). The City of Asheville has an effective retrofit program, which has distributed more than 34,000 kits and produced a 7 percent water savings. The Asheville Housing Authority has upgraded sinks, showers and toilets with low-flow devices for a savings of more than 20 million gallons annually.

Retrofit and replacement programs targeted to older residential areas maximize water conservation efforts. New construction codes usually incorporate the installation of water efficient fixtures, making older homes a priority. Replacing a showerhead installed before 1980 can save over 14 gallons per person per day, with a yearly savings of over 5,000 gallons for the average household (Vickers 88).

Rate Structures

The traditional decreasing-block rate structure does not encourage water conservation (McNeill and Tate). In a decreasing-block rate structure, the price per unit volume of water decreases as the total volume consumed increases. Currently, 24 percent of the water systems in North Carolina submitting a 2002 LWSP use a decreasing-block rate structure. A flat rate (also known as uniform rate) is a constant price per unit of water consumed. Almost a third (31 percent) of the water systems submitting a 2002 LWSP use a flat rate structure.

Rate structures that encourage the efficient use of water include increasing-block rates, seasonal rates, and emergency water conservation rates. The increasing-block rate is a rate structure in which the cost per unit volume increases with the amount used. The more water consumers use above a specified threshold, the greater the cost of each unit. Approximately 22 percent of the water systems submitting local plans are currently using an increasing-block rate structure. The increasing-block rate establishes a clear economic incentive for customers to reduce water use. Customers are more inclined to perform water audits, repair leaks, and make use of conservation measures to avoid paying the higher rates. Simply by applying an increasing block rate to water utility bills, the Town of Cary projects a water savings of 140,000 gallons per day by 2009 (Platt, J. and Delforge M. 78).

Water systems have to be sized to treat and distribute enough water to meet peak demands. It is the growth in peak demands that frequently drives the need to expand treatment plants and the development of additional water sources. Seasonal conservation rates are designed to promote water conservation during the season when water demands are at their peak or available supplies are low. Two different rate structures, typically one for winter and a higher one for summer, are established. By charging more for water during peak use periods, seasonal rates can help control the growth in peak demands and extend the life of existing facilities and supplies. According to the submitted 2002 LWSPs, less than two percent of the systems reporting use a seasonal water rate structure.

BUSINESS AND INDUSTRIAL WATER USE

CURRENT BUSINESS AND INDUSTRIAL CONSERVATION MEASURES

Technical Assistance

Businesses and industries are motivated to use less water to reduce operating costs by lowering water bills. Cost savings can come from reduced water purchases, pumping expenses, and wastewater treatment costs. While many conservation measures used by this group of water users are the same as residential and municipal practices, many others have to be tailored to the specific processes at each plant or facility. DENR's Division of Pollution Prevention and Environmental Assistance and the Waste Reduction Partners (WRP) program provide technical assistance to business and industry to identify potential water, solid waste, and energy efficiency options. WRP is a group of retired engineers who volunteer their services in western North Carolina. As with other water users, the first step is a water audit to measure and evaluate water needs for specific processes within a facility. Common targets for water use reductions in businesses and industries include cooling water, process water, sanitation, exterior maintenance, and domestic water uses. In fiscal year 2003, WRP conducted 17 commercial and industrial water efficiency assessments for the Regional Water Authority of Asheville, Buncombe and Henderson. WRP assessors recommended measures to reduce water consumption by 15.2 million gallons per year. These strategies represent a potential cost saving of $209,200 per year for clients.

Cooling Water

Cooling towers can consume 20 percent to 30 percent of the water used by commercial and industrial facilities, making them prime targets for water conservation efforts. Depending on the nature of the facility, various measures can be implemented to make the use of cooling water more efficient. Facilities throughout North Carolina are investigating the use of reclaimed water for cooling purposes. For instance, WRP performed a water efficiency audit for a small medical equipment manufacturer in Arden, NC. An inefficient water-cooling system was identified. WRP engineers recommended that a closed loop chiller be installed to reduce costs and save water. The company acted upon the recommendations and is now saving 6.6 million gallons of water per year with an annual cost savings of $30,500.

Fixture Replacement

Business and industrial operations include domestic water use, such as washrooms and food preparation facilities. Replacing faucets, toilets, showerheads, hose nozzles, and other water delivery devices with more efficient models is a common, low-cost method of reducing water use.

Water Use Procedures

Water is used in many ways within a production facility. Careful investigation typically reveals many possible adjustments that can be made to operations to reduce water use. Switching to dry sweeping of floors instead of hosing them down has reduced water use in many facilities. Not washing waste down floor drains has the added benefit of reducing wastewater discharges. Installing automatic shutoff nozzles on hoses reduces water waste. Restaurant and food service operations have reduced water use by modifying dishwashing procedures and automatic dishwater operations. For example, the Statesville K&W Cafeteria's water consumption was reduced by 9,000 gallons per day, a 75 percent reduction, by modifying water use practices and equipment.

Process Water

Many production facilities in a variety of industries have been able to reduce water use by making adjustments to their production processes. A common adjustment is to recycle water based on the quality of water needed by various steps in an operation. The car wash industry has made good use of water recycling to reduce the amount of water needed for their operations. The North Carolina Chapter of the Southeastern Carwash Association provided information for this report, including a proposal for an incentive program discussed in the next section.

Sara Lee Knit Products in Winston-Salem requested an audit to help improve water efficiency and reduce production costs. The high cost of production, chemicals, and wastewater treatment was reducing profits. A water use study provided the basis for installing a 240,000-gallon per day filtration system that produces reusable brine and a treatable concentrated color solution. The new system significantly reduces water use, with savings estimated at $795,000 per year.

BUSINESS AND INDUSTRIAL EFFICIENCY INCENTIVES

Water Conservation Certification Programs

The North Carolina Chapter of the Southeastern Carwash Association suggested a Car Wash Water Conservation Certification Program. This voluntary program would certify that a particular facility is in compliance with a set of best management standards for water conservation. This program could be expanded to encompass other business sectors. The proposal calls for this program to be implemented at the local level with inspection and certification handled by the local water purveyor or local government inspection officials. Improved efficiency will reduce demand for water from the local water system. As an incentive, certified facilities would be recognized as efficient water users and be given consideration in the procedures established to reduce water use in response to drought and other water shortages.

The Regional Water Authority (RWA) of Asheville, Buncombe and Henderson worked with the WRP to assist businesses with a water efficiency certification for facilities that were already practicing state-of-the-art water efficiency measures. The certifications exempted businesses from water use surcharges when water use restrictions were imposed during the 2002 drought. The certification was an excellent incentive for businesses to quickly implement water use efficiency recommendations. The WRP program estimated a water savings of more than 90 million gallons per year from certified facilities.

STATE GOVERNMENT

CURRENT STATE CONSERVATION MEASURES

Policies

In August 2002, Gov. Mike Easley issued Executive Order #26, which banned non-essential water use by state agencies. House Bill 1215 mandates that state agencies reduce water consumption by 10 percent. The Utility Saving Initiative, led by the State Energy Office, is assisting state agencies and universities to reduce all types of utility costs, including reducing water use and water bills.

Technical Assistance

N.C. Project Green began in 1998 when the governor challenged state government to set an example of environmental stewardship in the way agencies operate and conduct business. To help state agencies and universities meet the challenge, the Division of Pollution Prevention and Environmental Assistance developed a number of tools and resources that are available on the N.C. Project Green website (www.sustainablenc.org). The long-term Water Efficiency Plan Guidance provides a step-by-step process, including a template and sample plan, to assist agencies with water use efficiency. The Division of Pollution Prevention and Environmental Assistance is also part of *The Way To Go* design committee. This group of state government divisions has pledged to adopt sustainable building practices in state government capital

remodeling and new construction projects, to use energy and water efficient design in all projects, and to manage natural resources in a sustainable manner.

Facility Water Use Efficiency

Water use by governmental agencies varies from facility to facility and includes indoor and outdoor water uses similar to other residential, institutional and commercial water users. Therefore, agency water efficiency plans include some of the same measures, such as auditing water use, preventing and repairing leaks, establishing water use policies to reduce waste, improving fixture and appliance efficiency, etc. To date, agencies have adopted the following measures to use water more efficiently: better accounting for water used, repair of leaks, reducing vehicle washing, reducing irrigation, converting cooling systems to reuse water, storing rainwater to irrigate athletic fields, consolidating ice making operations, installing water-free urinals, and educating water users. DENR's Washington Regional Office has completed a Water Efficiency Plan that can serve as an example for other agencies.

STATE EFFICIENCY INCENTIVES

Loan and Grant Funding

The Clean Water and Drinking Water State Revolving Fund Programs (CWSRF and DWSRF, respectively) were established by the federal Clean Water Act (CWA) and the North Carolina Clean Water Revolving Loan and Grant Program (NCCWRL&GP) to provide low interest loans and high unit-cost grants to wastewater and water systems. Under these programs, eligible projects receive funding priority points for different rating variables. Incentives for water conservation are created by assigning additional points for demonstrating efficient water use measures such as water loss reduction programs that include water audits, universal metering, and leak detection, water conservation education, incentive rates, retrofit and replacement programs, and a water reclamation or reuse system (15A NCAC 01J, 01L, and 01N).

Water Use Permit Requirements

In an effort to preserve future ground water supplies in the Central Coastal Plain Capacity Use Area (CCPCUA), all ground water users withdrawing more than 100,000 gallons per day are required to obtain a water use withdrawal permit. One condition of the permit requires well operators to "develop and implement a feasible water conservation plan" that must include, at a minimum, a water conservation rate structure, a water loss reduction program for systems exhibiting more than 15 percent unaccounted-for-water, an irrigation ordinance, retrofit and public education programs, and a water reuse feasibility study (15A NCAC 2E .0502(d)(5)).

Interbasin Transfer Certification also includes a water conservation requirement. An applicant must demonstrate that water conservation measures will be used to assure efficient use of the water and avoidance of waste (G.S. 143-215.22I(c)(3)). Communities requesting a water supply allocation from Jordan Lake also must include in their application details on their conservation and demand-management practices (15A NCAC 02G.0503(a)(4)).

Environmental Stewardship Initiative

DENR's Environmental Stewardship Initiative is designed to promote and encourage superior environmental performance by North Carolina's regulated facilities. This voluntary program gives recognition to companies that use innovative pollution prevention methods (including water conservation) to meet and exceed regulatory requirements. The program seeks to improve environmental quality beyond what is required by current laws and permits.

The program has two levels of participation. The "Environmental Partner" level is designed for adoption by a broad range of corporations or other institutions that want to develop a systematic approach to improving their environmental performance. Partners must set environmental performance goals that include pollution prevention and that are appropriate to the nature, scale and environmental impact of the organization. The "Environmental Steward" level is for those organizations that already display a commitment to exemplary environmental performance beyond what is required by law. Stewards are required to set aggressive environmental performance goals that include pollution prevention, a commitment to exceed compliance, and annual improvements to performance.

NPDES Permit Application Review

Applicants for new NPDES permits are encouraged to investigate how implementing water conservation measures could reduce the volume of wastewater discharges. The analysis should include realistic evaluations of how discharges could be reduced or avoided by improving the efficiency with which water is used in the system or facility applying for the permit.

Metering in Multifamily Residences

EPA recently revised a policy regarding the application of the Safe Drinking Water Act (SDWA) requirements to submetered properties in an effort to avoid discouraging this water efficient measure. Under the old policy, multifamily property owners who installed submeters to track and bill water use by individual tenants were subject to SDWA's national primary drinking water regulations. The new policy revision enables multifamily property owners to install submeters without facing any additional regulatory burden (USEPA Office of Water Memorandum, Dec. 16, 3003).

Submetering fosters water efficiency by making tenants and co-op property owners responsible for paying for their water use. The new policy change is a positive step towards water use efficiency and provides an incentive for property owners to implement submetering.

AGRICULTURAL WATER USE

CURRENT AGRICULTURAL CONSERVATION MEASURES

Agricultural and Horticultural Water Audits

As with all types of water use, the first step in improving efficiency is to do a water audit and characterize current conditions. A water audit helps identify components of an operation that are using more water than needed to accomplish the desired task. A major North Carolina livestock operation has reduced water use by 38 percent by tracking water use and making adjustments to reduce wasted water.

Technical Assistance

Technical assistance provided to agriculture for improved water management has a long history in North Carolina. Many agricultural best management practices were designed to improve water quality, but also conserve water resources. The Natural Resource Conservation Service publishes a series of Conservation Practice Standards that address many components of water management and water conservation for agricultural operations. The Soil and Water Conservation Districts and the Agricultural Extension Service provide technical assistance for implementing these practices in each county. Some producers have responded to the 2002 drought by becoming more efficient in water management through the improved use of storage ponds or water control structures. These improvements to water management also result in benefits to water quality by combining improved water storage and retention with the capture and attenuation of potential pollutants.

As improved water management systems are tested and proven effective, state and federal agencies provide technical assistance and incentives to assist farmers in putting them into operation. The North Carolina Soil and Water Conservation Commission is working through its technical advisory committee to consider how these water-saving technologies can be made available to producers through the NC Agriculture Cost Share Program. The program already offers assistance with conservation practices for watering cattle that reduce the wastage associated with earlier systems.

Livestock Watering Efficiency

North Carolina State University has on-going research and outreach programs to improve water management and reduce water waste across the spectrum of agricultural water applications. NCSU research continues to improve the efficiency of watering devices for livestock, especially in the swine industry. Producers and companies have tested various watering devices for the delivery of drinking water to animals in swine houses. Several of these technologies significantly reduce water use and wastewater generation. Similar research is underway for reducing water needs in the poultry industry. Potential water efficiency practices for swine houses can achieve an estimated 10 percent to 65 percent water savings.

Irrigation Efficiency

The simplest measures for water conservation in irrigated agriculture are fine-tuning equipment to avoid leaks and waste and monitoring the amount and timing of irrigation to meet crop requirements without excess. A more costly alternative involves retrofitting irrigation systems with more efficient component parts. For example, switching to low pressure nozzles or drop nozzles will reduce water loss from evaporation and wind drift and result in more effective water placement. Soil and Water Conservation Districts and the Cooperative Extension Service provide demonstrations and information in efficient irrigation practices to help promote water conservation.

AGRICULTURAL EFFICIENCY INCENTIVES

Agriculture Cost Share Program

The NC Agriculture Cost Share Program and the federal USDA Environmental Quality Incentives Program (EQIP) offer financial assistance for water conservation and for water saving technology. These programs offer over forty approved best management practices for producers that contribute to water use reduction and efficiency. Improved water management often results in improved water quality as well as water savings. State and federal agricultural cost share and technical assistance programs recognize this connection and are giving more attention to water use efficiency and conservation.

Technical Assistance

Current agricultural cost-share and technical assistance programs can be augmented by new and innovative approaches to promote efficiency. An example of such a tool is the Agricultural Mobile Irrigation Lab (MIL). This tool was developed by the USDA Natural Resources Conservation Service to help Florida agricultural operators conserve water by learning how to improve their water management and irrigation systems. MIL technicians work with producers to improve system performance through on-site evaluations. By developing proper irrigation schedules and avoiding over-watering, producers can save both water and energy while improving the utilization of nutrients and crop yields. MILs could assist golf courses, nurseries, local governments, homeowner associations, and commercial gardens as well as farmers.

The Division of Pollution Prevention and Environmental Assistance assists pork producers to implement environmental management systems (EMS). EMSs help pork producers to assess their operation's environmental impacts (including water use efficiency) and to develop a plan to reduce these impacts. Some limited funding provides an incentive for producers to participate in the program.

Reclaimed Water

Agriculture has very good potential for the application of reclaimed water. While reclaimed water is not appropriate for direct food chain crops, it does meet water quality standards for application on foraging crops. Agriculture can be a convenient and cost-effective partner for wastewater systems when developing and implementing water reuse projects. In

Florida, agricultural water users (and other users such as golf courses) perform feasibility assessments on the use of reclaimed water for irrigation needs. Farmers enter into agreements with wastewater treatment plants to meet their irrigation needs and provide a use for reclaimed wastewater. The application of reclaimed water to agriculture provides greater assurances of water availability for producers, cost effective treatment and disposal of wastewater, and conservation of water.

CONCLUSION

Improving water use efficiency means getting more benefit from each unit of water. In other words, using water efficiently gives us all the benefits that we are seeking from using water, but without wasting this resource.

Public water supply systems can benefit from improved water use efficiency by being able to postpone costly investments in new water supply capacity and by reducing operating costs for water treatment and wastewater treatment. Improved water use efficiency by existing water system customers can extend water supply availability for new businesses and industries.

Commercial and industrial facilities can benefit from water use efficiency by reducing their water purchase or production costs. Because industrial and business facilities are so diverse in the ways they use water, the opportunities available for improved efficiency are equally diverse. Experience has shown that many businesses and industries have great opportunities to reduce their costs and become more competitive by making careful audits of their water use and developing improved procedures or technology to use water more efficiently.

Agricultural and horticultural water users can benefit from improved efficiency by reducing their costs of pumping and applying water and in some cases by reducing the need to treat wastewater. Improved efficiency can allow a farmer to use his available water supply to support expanded production.

Using water efficiently also benefits North Carolina's environment. By reducing water withdrawals, the stress on rivers, streams, and aquifers is reduced and the amount of wastewater that must be assimilated by our streams also may be reduced. Consequently, water quality and aquatic habitat are improved. In some cases, the environmental benefits of improved water use efficiency are very significant, particularly in cases where reduced withdrawals would reduce overdraft of aquifers or the undesirable dewatering of streams and rivers.

It is important to recognize that the urgency of improving water use efficiency is not the same in all parts of the state or for all water users. Some water users have a more urgent need to make their limited available water supplies go further to serve new users or to postpone having to make investments to expand their water capacity. However, some communities may face difficult financial problems if improved water use efficiency causes their water revenues to drop too sharply. Many North Carolina communities have lost industrial water customers, which have resulted in fewer water users to pay the cost of operating their water systems and paying off

loans that were used to build them. Public water systems must carefully evaluate their revenues and costs and schedule water use efficiency improvements in a way that will not damage their financial security.

RECOMMENDATIONS

House Bill 1215 is directed toward voluntary programs and incentives that will improve water use efficiency. A voluntary or incentive-based approach requires reaching a consensus on water conservation measures that will be supported and implemented by water users. Although the Department of Environment and Natural Resources has met with a broad range of water users and invited their comments and suggestions, the North Carolina community of water users has not yet fully engaged with the water use efficiency issue. Further involvement of water users is needed to work out the best program for North Carolina.

- DENR should circulate this report and recommendations widely to water users in North Carolina and invite further comments and suggestions. DENR should review and revise the report in the fall of 2004 to incorporate the comments that have been received and to make more specific recommendations.

Public water supply systems have many effective tools available to them to improve water use efficiency. Many of these approaches have been successfully pioneered by communities in North Carolina who are willing to share their knowledge and experience.

- Reducing water loss within a water system will reduce water waste without affecting water revenues. Water audits, leak detection and repair programs, and water pressure adjustments should be pursued by all local governments for both environmental and financial stewardship reasons.

- Creating incentives for residential water users to replace or retrofit inefficient water-using appliances and fixtures can save a significant amount of water. Local governments should adopt these programs to improve water use efficiency.

- The use of water for landscape beautification is increasing in North Carolina and appears to be causing an increase in per capita water use in some areas. Local governments should have reasonable policies in place to assure that water for landscaping is efficiently used and to manage the demand from landscape uses, particularly to control the increases in high peak demands that require expensive capital investments.

- Public water supply systems should investigate opportunities for reuse of treated wastewater, which uses the same water supply twice and increases efficiency. Irrigation, construction site water uses, and some cooling and industrial uses are good possibilities. Water reuse projects must be planned with careful attention to all economic and environmental costs and impacts.

- Water use rates are the most powerful incentive available to local governments to motivate efficient water use. Rate changes should be evaluated with careful attention both to potential efficiency improvements and to assure fairness to all types of water users, including low-income users.

Businesses and industry in North Carolina have many opportunities available to improve water use efficiency. In the current economic climate, reducing water costs can help companies stay more competitive in the world economy.

- Because business and industrial water use is so diverse, water audits are a necessary starting point to determine what kinds of efficiency improvements are most cost effective. All businesses that use significant amounts of water should take advantage of efficiency opportunities to improve their balance sheets.

- Water efficiency certification programs, which identify those businesses within a particular category that have met high standards of water use efficiency, encourage efficiency improvements and create more fairness when water use reductions are required by droughts. Efficient water users should be given some degree of priority when water use reductions during droughts are necessary.

North Carolina's large agricultural economy is vitally dependent on water. Efficiency improvements in water use can reduce costs of production by reducing pumping and application costs and can also stretch a farm's water sources to serve expanded production.

- The key to improving agricultural water use efficiency is stronger technical assistance from federal and state agencies, including North Carolina State University, the NC Division of Soil and Water Conservation, the NC Department of Agriculture, and the Soil and Water Conservation Districts. The strong tradition of technical assistance for agriculture is the most effective means of bringing about water use improvements. Making mobile irrigation laboratories available to farmers, nurseries, and golf courses could help these water users improve efficiency and lower their costs.

State government is a large water using institution and has many opportunities to improve water use efficiency. State government is proceeding with the Utility Savings Plan, which will reduce water use as well as other utility costs, and is also working toward a directive from House Bill 1215 to reduce water use by ten percent.

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Internet Resources:

City of Asheville Water Resources Department
http://www.ci.asheville.nc.us/water/efficiency

Town of Cary
http://www.townofcary.org/depts/pwdept/water/waterconservation/overview.htm

Charlotte-Mecklenburg Utilities
http://www.charmeck.org/Departments/Utilities/WaterSmart/home

City of Greensboro Water Resources Department
http://www.ci.greensboro.nc.us/water/Education/conservation.htm

NC Division of Pollution Prevention and Environmental Assistance
http://www.p2pays.org

NC Division of Soil and Water Conservation
http://www.enr.state.nc.us/DSWC/

NC Division of Water Resources
http://www.ncwater.org/Water_Supply_Planning/Water_Conservation/

NC Project Green
http://www.sustainablenc.org

OWASA Water Conservation
http://www.owasa.org/pages/yearroundconserv03

Raleigh Public Utilities
http://www.raleigh-nc.org/putilities/h2oconserv

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: Senator Marc Basnight, Co-chair
Joint Legislative Commission on Governmental Operations

Representative James Black, Co-chair
Joint Legislative Commission on Governmental Operations

Representative Richard Morgan, Co-chair
Joint Legislative Commission on Governmental Operations

George Givens, Environmental Review Commission Counsel

FROM: William G. Ross Jr. WGRjr

DATE: September 29, 2003

RE: Report on Water Supply Planning Program

Pursuant to General Statute 143-355 (n), I am transmitting a report on the progress of Water Supply Planning and related programs.

The report was prepared by DENR's Division of Water Resources, which oversees the Water Supply Planning program. If you have further questions or would like additional information, please contact John Morris at 715-5422.

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Department of Environment and Natural Resources

Division of Water Resources

STATUS REPORT TO THE GENERAL ASSEMBLY

ON

WATER SUPPLY PLANNING

OCTOBER 1, 2002 THROUGH AUGUST 31, 2003

Drought

During the summer of 2002, many water systems in North Carolina faced serious water shortages due to an extended drought. Before relief arrived in the form of increased rainfall in September and October, 248 public water systems had instituted some degree of water use restrictions. Throughout 2002, the Department of Environment and Natural Resources and the Drought Monitoring Council closely monitored water resource conditions and provided assistance to local communities. Much staff time, especially in the Division of Water Resources and the Division of Environmental Health, was dedicated to helping local communities to assess available supplies of water, find alternative sources of water and develop water use reduction strategies. Funds made available through the Department of Commerce and the NC Rural Center were used to assist nine water systems with projects designed to help alleviate drought-related water supply shortages. Since October 2002, rainfall across the state has been above normal. In some areas precipitation has been considerably above normal. Surface waters recovered rapidly with most reservoirs approaching or above full by spring 2003. Ground waters recovered more slowly. By August 2003, wells in the monitoring network were indicating water levels at or above historical averages. Some wells had water levels above the previous maximum for the period of record. Recovery from the drought has been faster than anticipated due to the above average rainfall over the period covered in this report.

Water Supply Planning Program

Water supply planning in North Carolina is undertaken mainly at the local level. Local communities have the primary responsibility for maintaining adequate water supplies. To help assure and assess the availability of water and to protect the state's water resources, the General Assembly has established several planning and regulatory programs administered by the Division of Water Resources. The programs require a variety of activities which include: assessing the availability of water through a network of monitoring wells and stream gages, assisting with the preparation of Local Water Supply Plans by local government water systems, development of a statewide North Carolina Water Supply Plan, registration of large water withdrawals, certification of interbasin transfers of surface water, and permitting of water withdrawals in designated capacity use areas. This status report provides an update on these water supply programs, as well as on other related Division activities.

Local Water Supply Plans

The General Assembly established a water supply planning program under General Statute 143-355(l) and (m) in order to assure the availability of adequate supplies of good quality water to protect the public health and to support desirable economic

growth. The statute requires units of local government that provide or plan to provide public water service to prepare a Local Water Supply Plan (LWSP). LWSPs describe current and future water needs, as well as an assessment of the system's ability to meet those supply needs. LWSPs must be adopted by the water system's local governing board and updated at least every five years. The Division of Water Resources is responsible for reviewing the local plans for completeness and consistency with plans of other water systems in the same region. The Division uses the information from the LWSPs and other sources to develop the North Carolina Water Supply Plan (NCWSP), mandated by G.S. 143-355(m). The NCWSP presents a summary of water use statewide and identifies areas of concern where water availability or conflicts between uses may limit the ability to meet water demand.

Information from the local plans is available on the Division's web site (www.ncwater.org). The plans provide a valuable source of data for all local and regional water supply planning. Throughout 2002, water systems compiled information to update their local plans in 2003. Division staff, with the help of the North Carolina Rural Water Association, conducted eight workshops in the spring of 2003 to assist water system administrators with their local plan updates. We expect about 600 water systems to prepare 2002 local plans.

To simplify the completion of LWSPs, the Division has developed an online submission process that provides local officials with the option of completing and submitting their plans electronically. As of the end of this report period, 294 systems have submitted plans or are working on their plans online. Of that number, 248 systems are using the online system. Online submission of plans will reduce paperwork, speed the review process and reduce the staff time needed to enter and verify data.

During the 2003 legislative session, the General Assembly amended the local water supply planning statute. House Bill 1062 extended the scope of the statute to include some community water systems not operated by a unit of local government. Community water systems that regularly serve 1,000 or more service connections or 3,000 or more individuals are now required to prepare a LWSP. We estimate that this amendment will add about 30 additional water systems to the local water supply planning program. The affected systems have been notified of the changes to the statute and have been given the necessary forms for developing a LWSP.

As a result of the severe 2002 drought and the difficulties it caused for many local governments, DWR included a Water Shortage Response Plan as a necessary component of 2002 Local Water Supply Plans. In 2003, House Bill 1062 added the requirement that all systems completing a LWSP must include a description of how they will respond to future water shortage emergencies. We have updated our Water Shortage Response Plan Handbook and prepared a template to assist local officials with developing their Water Shortage Response Plan.

Legislation passed in 2002 (House Bill 1215), requires an analysis of water conservation measures and possible incentive programs that could encourage water conservation and water reuse. It also requires the development of rules establishing minimum standards and practices for water use during drought and water emergencies. We have added questions to the LWSP forms to collect data that will help identify current water conservation practices and their effectiveness as well as to receive suggestions on possible incentive programs. We are optimistic that the data from the local plans will

provide the necessary information to fulfill the requirements of the law that pertain to public water systems. We have also included a survey to identify and possibly quantify the impacts of last year's drought on public water systems. To date 57 competed surveys are in our database.

North Carolina Water Supply Plan (NCWSP)

The 2001 NCWSP is available on the Division of Water Resources web site at www.ncwater.org. It is based on information from the 1997 LWSPs and 1999 water withdrawal registrations submitted pursuant to General Statute 143-215.22H. No changes were made to this document during the period covered by this report. The NCWSP will be updated to reflect changes in conditions shown in the 2002 Local Water Supply Plans and the results of the River Basin Water Supply Plans.

River Basin Water Supply Plans

To further the legislative goal of assuring the availability of adequate supplies of water, DWR will be developing a River Basin Water Supply Plan for each of the major river basins in the state. The River Basin Water Supply Plans will provide a useful and reliable framework for local and regional water supply planning and will create the potential for increased integration of water resources management. The plans will combine projections of water supply demands and wastewater discharge needs with a hydrologic model of each basin to analyze the impacts of withdrawals and discharges on river flows.

The River Basin Water Supply Plans will analyze water demands and availability through the year 2050. Initial priority will focus on developing River Basin Water Supply Plans for the Catawba and Yadkin river basins in conjunction with the relicensing of hydropower operations in those basins.

The long-range River Basin Water Supply Plans will allow decision-makers to develop cost-effective and sustainable plans for the water supplies that are needed to support North Carolina's economy.

Bladen County Capacity Use Investigation

For some time, there has been concern that ground water withdrawals in the Bladen County area may be threatening the reliability of the underlying aquifers as long-term sources of water. In December 2002, the Environmental Management Commission (EMC) charged the Division with the task of conducting a capacity use investigation and reporting back to the EMC by June 2004. Information is being compiled and used to characterize the structure of the underlying aquifers, current regional water use rates and the impacts of withdrawals on regional aquifers. During FY 2003-2004, DWR will be adding some new multi-well monitoring stations in this area to provide additional data for analysis and monitoring.

Central Coastal Plain Capacity Use Area

For many years, communities in the Coastal Plain have depended on high quality ground water from the Black Creek and Upper Cape Fear aquifers to meet their public water supply needs. Ground water monitoring over the last decade indicated that water was being withdrawn from these aquifers faster than it could be recharged. The over-pumping

of the aquifers was leading to a failure of many water systems to be able to meet demands, which would have been an economic disaster.

In November 1998, the Division of Water Resources recommended that the EMC designate a Central Coastal Plain Capacity Use Area (CCPCUA) under authority granted to it by the Water Use Act of 1967. After several years of planning and consultation with affected water users, 15 counties in the coastal plain were so designated. Rules governing water use in the CCPCUA became effective on August 1, 2002. The rules and supporting documentation are available on the Division's web site at www.ncwater.org.

The purpose of the rules is to provide a fair and predictable schedule for reducing the unsustainable demand on the threatened aquifers and for developing new water sources to meet future needs. A variety of surface and ground water sources are available in the region.

Under the rules, anyone withdrawing more than 100,000 gallons of ground water per day in the designated counties must apply for a water use permit from the Division of Water Resources. To provide a better picture of overall water use in the region, the rules also require that anyone withdrawing more than 10,000 gallons per day of surface water or ground water must register their water use on an annual basis. Water withdrawals from the Black Creek and Upper Cape Fear aquifers within the defined management areas will be reduced in three stages over a 16-year period. In defined critical areas, reductions will be as much as 75 percent of current withdrawals. In addition, applicants for a water use permit must adopt a set of minimum water conservation measures to improve water use efficiency.

Many local governments in the 15-county region are actively planning to manage water demands and develop new, sustainable water sources to meet their future needs. As of August 25, 2003, there were 100 active water withdrawal permits and 92 applications for permits being processed.

The Division of Water Resources is partnering with the Department of Agriculture and Consumer Services (DA&CS) for registration and reporting of agricultural water use. In December 2002, the Agricultural Statistics Division of DA&CS mailed almost 6,000 surveys to agricultural operation in the fifteen counties of the CCPCUA. They collected water use data from 372 agricultural operations that used between 10,000 and 100,000 gallons on any one day. The information is being compiled and the results are expected to be released by the end of 2003.

Interbasin Transfer Certifications

General Statute 145-215.22I regulates large transfers (over 2 mgd) of surface water between designated river basins. In March 2002, the EMC approved, with conditions, an increase in the allowable interbasin transfer for Charlotte Mecklenburg Utilities from 16.1 to 33 million gallons per day. No interbasin transfer certificates were issued or applied for during the period covered by this report.

Hydropower Facility Relicensing

As noted in previous status reports, the licenses issued by the Federal Energy Regulatory Commission (FERC) for the major, non-federal hydroelectric projects in the state expire between 2001 and 2008. Nearly a dozen projects, involving over 30 impoundments along the Yadkin-PeeDee, Catawba, Roanoke, Little Tennessee, and other rivers will be relicensed. Relicensing is an intensive, multi-year process that attempts to

balance the many benefits of these projects, such as power generation, recreation, aquatic habitat, water quality, water supply, and others. The process provides a vehicle to address concerns of resource management agencies and local communities about how the lakes are managed. Licenses are typically issued for 30 to 50 years.

Relicensing is nearing completion for Dominion Energy's Lake Gaston and Roanoke Rapids projects on the Roanoke River. Relicensing begins five years before the expiration date of the current license. Holders of existing licenses are required to submit a license application to FERC two years before the current license expires. The three years prior to application submittal are used to identify, study and resolve, if possible, issues that need to be addressed in any new license. Duke Power-Nantahala Area submitted license applications for their facilities in the Nantahala, Tuckasegee, Little Tennessee, and Hiwassee river systems in July 2003. Alcoa Power Generating Inc.'s Tapoco Division's submitted a license application in February 2003 for its Tapoco project on the Little Tennessee River in western North Carolina and eastern Tennessee.

Work began this year on relicensing of Duke Power's facilities in the Catawba River Basin. Duke Power's lakes on the Catawba River are used by many water systems as sources for their public water supplies. Also, relicensing began this year for facilities operated by Alcoa Power Generating, Inc.-Yadkin Division and Progress Energy in the Yadkin-Pee Dee River Basin. Several water systems depend on these lakes for public water supplies. DWR personnel are actively involved in the relicensing process to insure that drinking water and other concerns are addressed in the licenses that will determine how these rivers and hydropower lakes are managed for the next 30-50 years.

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Water Resources

02/24/04

What North Carolina Needs to Do to Provide Water Supplies For Future Needs

The continuing growth of North Carolina's population and economy is requiring additional water. In recent years, a number of water supply problem spots have developed, where increased need for water is threatening to exceed available supplies. The four-year drought, which intensified in 2002, stressed North Carolina's water supply system, spotlighted some weaknesses in many water systems, and pointed out actions that need to be taken to assure a water supply that can support North Carolina's current and future economy.

Meeting North Carolina's water supply needs requires a partnership between state government and local government. The State must monitor water use and water availability statewide, provide a state and regional framework for planning, administer water management laws, and establish policies that will contribute to solving water supply problems.

Local governments must plan for meeting water needs in their service areas, cooperate with neighboring water systems to achieve regional efficiency and reliability, and make timely investments in infrastructure.

Industrial, agricultural, and other water users should provide data on their water use, cooperate in regional water supply planning, and take measures to use water efficiently.

To assure that water supply shortages are not a constraint to healthy economic growth in North Carolina and that our water supplies are as economical and as environmentally sound as possible, we need a coordinated program of monitoring, planning, and regulation.

Monitoring

The foundation of good water supply management is accurate and usable information, both about the amount of water available in the environment and about the amount that we are withdrawing for our use. North Carolina has a good system of water resources and water use data, which is superior to that of our neighboring states. However, some improvements are needed.

We determine the amount of surface water that is available by a network of stream gages which measure the flow of streams and rivers. These gages are supported by a partnership between the Department of Environment and Natural Resources, water users, and the US Geological Survey. Many of these gages have records 50 to 75 years long, which allows us to have a good statistical understanding of the probability and magnitude of droughts and floods that may be expected in

the future. We determine the availability of ground water through a network of over 500 monitoring wells operated by the Division of Water Resources, plus a much smaller network operated by the US Geological Survey. These wells measure water levels in major aquifers over time and allow us to determine how the natural recharge to aquifers and our withdrawals from them is changing the amount of water available in storage. Monitoring wells in shallow aquifers are also an early warning measure of serious drought, allowing us to determine when the ground water supplies that maintain the flow in rivers and streams is becoming exhausted.

It is also necessary to have good data on our withdrawals of ground and surface water and of the effect of these withdrawals on our water resources. North Carolina has excellent information on water use by units of local government in the legislatively-mandated water supply plans, which are updated every 5 years. These plans make up an extremely valuable data source on present and projected water use by local government, which is unmatched by other states. We have data on other kinds of water users from a requirement to register water use that exceeds 100,000 gallons per day (1 million gallons per day in the case of agricultural users). Our knowledge of agricultural water use has greatly increased due to a recent survey by the North Carolina Department of Agriculture of the fifteen counties in the Central Coastal Plain Capacity Use Area. The Department of Agriculture surveyed all agricultural water use of surface water and ground water exceeding 10,000 gallons per day, giving us by far the most detailed knowledge of agricultural water use in this region ever available.

This data on water availability and water use is the foundation for planning sustainable water sources for our future water needs.

Priorities for 2004

- **Ground water monitoring**--More monitoring wells are needed in the Central Coastal Plain and the Southern Coastal Plain areas, which are subject to actual or potential ground water depletion. This data is essential to assist local governments and other water users to make the maximum sustainable use of ground water resources.

- **Climate effect monitoring wells**--During the 2002 drought, we learned that declining water levels in shallow aquifers are the best warning sign of the approach of critical drought periods. More climate effect monitoring wells are needed in the piedmont and mountain region of North Carolina to allow us to anticipate and manage droughts more successfully.

- **Stream gages**--North Carolina's network of 72 stream gages gives us a generally good basis for water management, but there are a some critical holes in the system that leave local governments and portions of river basins without good management information. About 20 to 30 more stream gages are needed to fill these gaps.

- **Agricultural water use data**--Good information on the amount of water used for agricultural purposes is needed to evaluate the total demand on water resources and to make sure that agriculture is included in regional and river basin water supply planning. The North Carolina Department of Agriculture has a good means of surveying farmers to

gather this information. As resources permit, the Department of Agriculture should extend statewide the type of survey used in the Central Coastal Plain.

Planning

In addition to having good data on water availability and water use, North Carolina communities need to project their future water needs and determine the most desirable sources for meeting these needs. Following a legislative enactment in 1989, North Carolina has followed a "bottom up" approach to water supply planning, which has been extremely successful. About 600 local governments now prepare local water supply plans, projecting their water needs and water sources 30 years into the future. These plans are updated every 5 years. The latest update is now underway, based on water use data from 2002. These plans were submitted to the Division of Water Resources in 2003 and the technical review and adoption of the plans is underway. The completed plans are placed on the Division's website, where they are an essential source of information for any kind of local or regional water supply planning.

Responding to the same 1989 legislative act, the Division of Water Resources has developed a North Carolina Water Supply Plan, using the local water supply plans and other information as building blocks. The North Carolina plan summarizes the current water supply situation and projections of future needs in each river basin and identifies problems or issues that need attention. The latest version of the state plan was produced in 2001 and is available on our website at www.ncwater.org .

Priorities for 2004

- **River basin water supply plans**--Local water supply plans are essential and useful, but they cannot evaluate the long term, cumulative demand on an entire river basin. To make sure that we have reliable water sources for North Carolina's future, we must plan for water supply at the river basin level, to assure that our projected demands on the basin are sustainable and that we are choosing the most economically and environmentally sound water sources. The Division of Water Resources has developed a pilot river basin water supply plan for the Cape Fear River Basin. This plan, done in partnership with local governments and other water users, projects water needs for fifty years into the future and then uses a hydrologic model to analyze the interactions among upstream and downstream users over time to assess the cumulative impact on the basin. This same approach is being extended to all major river basins in North Carolina, with first priority on the Catawba and Yadkin basins, where this long-range water supply information is needed to meet the schedule for the relicensing of hydroelectric projects. In these two basins, North Carolina needs to develop the data and analytical tools to assure that our interests are protected and that adequate provisions are made for future water supply sources.

- **Local Water Supply Plans**--DWR will assist about 600 local governments with the completion of technically sound and feasible water supply plans. This third generation of LWSP's is emphasizing drought preparedness, accurate estimates of the safe yield of

water sources, and consideration of regional cooperation to secure reliable and cost effective water sources.

- **Ground water management**--In North Carolina's coastal plain, regional aquifers cover thousands of square miles and provide water to most of the cities, towns, industry, and agriculture in that part of the state. Our major aquifers do not coincide with river basin boundaries. We must develop management plans in partnership with water users for these major regional aquifers, just as we do for surface water from our river basins. In the Central Coastal Plain, local governments are evaluating their options for new water sources to provide for a planned transition from over-pumped aquifers to sustainable water supplies. The Southern Coastal Plain faces similar issues, but less advanced and confined to a smaller area. The Division of Water Resources is working with local governments and water users in the Southern Coastal Plain to develop a water management plan that will avoid aquifer damage and the economic risk of relying on unsustainable rates of ground water use.

- **Water Use Efficiency**--There are proven techniques that allow municipal, industrial, commercial, and agricultural water users to avoid wasting water and to get more productivity from each unit of water used. Adopting these techniques can reduce business costs and increase competitiveness, make water available for economic growth, and improve environmental quality. The General Assembly gave support to improved water use efficiency in House Bill 1215, enacted in 2002. The Department of Environment and Natural Resources has prepared a report and recommendations on water use efficiency as required by this act.

- **Drought Preparedness**--The 2002 drought stressed water systems statewide. Many new records were set for low river flows and ground water levels. The drought identified those communities most vulnerable to running out of water and motivated action to reduce this vulnerability. Governor Easley made special financial assistance available to communities to improve the security of their supplies. Sixteen communities received a total of $7 million in grants and $20.5 million in loans. At present, five projects are completed and eleven are underway. The Division of Water Resources is emphasizing drought preparedness in the current updates of Local Water Supply Plans. The North Carolina General Assembly enacted H1062 in 2003 to establish a technically sound drought warning system to allow water users to take steps to mitigate drought damage.

Regulation

Regulation of water use is sometimes needed to assure that water users have equitable access to water and to avoid depletion of water resources. North Carolina's primary laws for water use regulation are:

- **Water Use Act**--Regulates water use by permit in declared capacity use areas where there is a danger of depleting water resources.

- **Surface Water Transfers Act**--Regulates transfers of water from one river basin to another.

- **Dam Safety Act**--Provides for minimum releases of water from dams to protect downstream water users and aquatic habitat.

- **North Carolina Environmental Policy Act, US Environmental Policy Act, US Clean Water Act 404 Permits and 401 Certifications**--Statutes not specifically targeted at water use, but which can achieve review, coordination, and regulation of proposed water withdrawals.

Priorities for 2004

- **Hydropower relicensing**-- Federal law provides for the licensing of privately owned hydroelectric projects. These licenses, issued for periods of 30 to 50 years by the Federal Energy Regulatory Commission, determine the uses of these water sources for water supply, public recreation, and fish and wildlife habitat. North Carolina agencies and interested parties have a role in determining license provisions. Relicensing is underway in the Yadkin and Catawba basins, involving many water supply users and interstate issues with South Carolina. The State of North Carolina needs to develop the data and analytical tools to assure that state interests are protected and that adequate provisions are made for future water supply sources.

- **Central Coastal Capacity Use Area Permits**--The CCPCUA program will issue about 190 water use permits in the 15-county area. About 120 have been issued and the remaining 70 are projected to be completed by about October 2004. The permits are designed to allow water users to make the maximum use of ground water at rates that are sustainable and which will avoid aquifer damage.

- **Interbasin Transfer**--The Surface Water Transfers Act defines 38 river basins for the purpose of regulating interbasin transfers. Most other water management programs are based on the 17 major basins. Water managers and the General Assembly should consider whether making the interbasin transfer law consistent with other programs would be desirable.

- **Southern Coastal Plain**--DWR is working with local governments, water users, and the Lumber River Council of Governments to make recommendations to the Environmental Management Commission that will avoid damage to aquifers and assure sound long range management of ground water resources.

DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
March 25, 2004

The Environmental Review Commission (ERC) met on Thursday 25 March 2004 at 9:30 a.m. in Room 643 of the Legislative Office Building.

Senator Daniel Clodfelter and Representative Daniel McComas presided over the 25 March 2004 meeting. The following members were present: Senators Clodfelter, Dorsett, Forrester, Horton, Kinnaird, Swindell and Weinstein, and Representatives Fox, Hackney, Justice, LaRoque, McComas, Weiss and Williams. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Assistant Commission Counsel, Jennifer McGinnis, Assistant Commission Counsel, Tim Dodge, Research Assistant, and Mary Watson, Commission Clerk were also present.

On 8 March 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Senator Clodfelter called the meeting to order and welcomed members and visitors attending the meeting.

George Givens, Commission Counsel, was asked to explain the agenda.

Mr. Givens announced that Senator Albertson and Representative Gibson sent their regrets at not being able to attend today's meeting.

Mr. Givens said that he had distributed to each member, copies of read only reports that are required by law to be made to the Commission. These reports are listed as **Exhibit D**.

Mr. Givens called attention to the Quarterly Report on the Cape Fear River Assembly. This report relates to an appropriation that was originally made in 1997 for $1.5 million to the Cape Fear River Assembly. Attached to that appropriation was a reporting requirement to the Environmental Commission which was repealed three years ago because the money had been allocated; however, representatives from the Cape Fear River Assembly advised him that $91,247 of money which was obligated was not used by the grantee in a timely fashion and is being pulled back for reallocation for the original purpose of working the Cape Fear River area and it was felt that a report to the ERC was necessary.

Mr. Don Freeman, grantee of the Cape Fear River Assembly was present and available for questions.

Mr. Givens noted that the staff-planning meeting was held on Friday 12 March 2004. Mr. Givens said the next business meeting is scheduled for Tuesday 20 April 2004 from 9 a.m. until 12:00 Noon in Room 1228 of the Legislative Building.

Mr. Givens said that the final planning meeting before the Short Session will be held on 13 April 2004 in Room 605 of the LOB.

Mr. Givens said that the tentative agenda for 20 April 2004 will cover underground storage tanks, express review pallet program, one-stop permit assistance, littering, transportation management, Swift Creek and some discussion of the hydrogen sulfide rule. This rule is very controversial and will probably be ready for review by the General Assembly during the Short Session.

Mr. Givens said that there will be a tour of the Belews Creek Steam facility tomorrow, Friday 26 March 2004, for those members who are able to attend. The tour will begin with lunch at 11:30 a.m.

Mr. Givens reviewed the schedule for April. He noted that in addition to the 20 April 2004 meeting, there will be a special meeting on Thursday and Friday, 22 and 23 April 2004 in Brevard. The business portion of the meeting will be held on the afternoon of the 22 April with the focus on land conservation and preservation of open space. There will be a tour on Thursday morning of Gorges State Park and a tour on Friday morning of Dupont Forest. A poll will be taken of the membership as to room reservation needs for this trip. He encouraged members to attend if at all possible.

Mr. Givens reminded members to sign their reimbursement forms and send them forward and asked visitors to sign the registration pad.

Mr. Givens called to members' attention the issue of the organization of the environmental and public health programs and the administrative placement of those programs. The Public Health Task Force has submitted preliminary recommendations, which are attached to these minutes as Exhibit **E**.

Senator Kinnaird said that she had many inquiries into this issue.

Mr. Givens said that one of the programs that is at issue is the septic tanks issue.

Senator Forrester said that when environmental health was pulled out of the Department of Health it was thought that they would be able to receive more funding through new department if it was moved. It was found out that this was not the case and is now trying to get back into DHHS.

Mr. Givens said that it was some truth to that and the drinking water program is a source of federal funds that makes it appealing to whoever gets it.

Senator Clodfelter asked Mr. Givens if it was likely that the task force would make a final recommendation to ERC before the Short Session.

Mr. Givens said it was not clear to him and was one of the matters he is looking into.

Mr. James C. Gulick, Senior Deputy Attorney General, Environmental Division, North Carolina Department of Justice gave a report on the status of petitions to the Administrator of the United State Environmental Protection Agency (EPA) filed by North Carolina under Section 126 of the federal Clean Air Act for purposes of reducing interstate transport of ozone and its precursors.

Mr. Gulick said he was asked to give a status report with regard to the petition filed by the Attorney General's office on behalf of the State of North Carolina on March 18, 2004 with the EPA under Section 126 of the Clean Air Act. Under that section, the State is asking the EPA to make a finding that electric generating units in thirteen other states are significantly contributing to air quality problems in North Carolina, specifically to non-attainment or interference with maintenance of two national air quality standards: one dealing with ground level ozone and the second dealing with fine particulate matter (PM2.5).

Mr. Gulick said that the petition was filed on March 18, 2004 and alleges, and seeks to show in detail, that 12 of the 13 states significantly contribute to North Carolina's fine particulate issues and that four of those states and the State of Maryland contribute to North Carolina's difficulties in non attainment of ozone standards.

Mr. Gulick added that under the law, the EPA has 60 days from the receipt of the petition to make a finding as to the merits of this petition. This action was taken by the AG's office, in consultation with DENR and the Governor's office after numerous efforts were made to seek to engage with other states to negotiate similar reductions in their states to those taken in North Carolina under the Clean Smokestacks Act.

Mr. Gulick said that this step was taken in accordance with a directive in Section 10 of the Clean Smokestacks Act (CSA) that all available means, not limited to petitions under Section 126, to achieve that result. The ultimate goal was to achieve results as directed by the General Assembly in the CSA to achieve similar reductions in emissions.

Senator Clodfelter asked Mr. Gulick was are some of the things that could happen in response to the 126 petitions.

Mr. Gulick said that what 126 says is that EPA must make a finding either of merit to find that there is significant contribution or deny the petition. The result that flows from this, under the Act, is that the sources that are found to significantly contribute must cease operations within three months or the EPA could enter into a binding arrangement for changes in their operations that eliminate the significant contribution.

Mr. Gulick said that the schedule mandated by the Act was that the corrections must be made on a schedule of three years from the date the finding is made.

Senator Clodfelter asked Mr. Gulick if this had been done before.

Mr. Gulick said that what happened in the NOx SIP call is that the findings were made, the EPA did issue a rule that mandated the changes in accordance with that schedule; however, at the same time it had adopted a rule that called for the states directly to regulate the same facilities for the same pollutants and it eventually harmonized the two results with an order that provided that if a state adopted a SIP that implemented the NOx SIP call, that remedy would leave the facilities of the direct obligation under the 126 remedy.

Senator Clodfelter asked Mr. Gulick if EPA agrees, makes a finding and issues a mandated agreement, is there a three-year compliance deadline.

Mr. Gulick said this was correct.

Senator Clodfelter asked Mr. Gulick how that compares to the deadlines set out in the Clean Smokestacks Act.

Mr. Gulick said it would be a faster timeframe than the one set in the CSA.

Senator Clodfelter asked if EPA has the flexibility to match their schedule to ours.

Mr. Gulick said it was fair to say that in the proposed rule adopted, EPA believes it does have that flexibility although there is a legal debate on the subject.

Senator Kinnaird asked Mr. Gulick if the acknowledgement that TVA was contributing to our air pollution would help North Carolina.

Mr. Gulick said that the filing of this petition would have a salutary effect with respect to the whole process.

Senator Kinnaird asked Mr. Gulick if the mercury issue would be affected positively by the actions taken to clean up the air.

Mr. Gulick said that is believed that the controls that are going to be required to be put on to control SO2 and noxide emissions do have the collateral benefit of removing some of the mercury that is in the emissions.

Senator Clodfelter asked Mr. Gulick if North Carolina had individual negotiations with each of the 13 states with the conclusion that we were not going to get anywhere with this issue.

Mr. Gulick said that all of the states were invited to directly contribute to the negotiations but the response, while polite, was generally not indicative of a desire to negotiate.

Senator Clodfelter commented that we needed to be careful with our dialogue with our neighboring states to the south because they have a lot to say about the water that comes from our state. He hoped that our initiating legal proceedings against South Carolina would not diminish their enthusiasm for cooperating with us on water pollution issues.

Mr. Gulick said that the 126 petitions actually ask EPA to regulate sources within those states.

Senator Clodfelter asked Mr. Gulick when we are likely to hear some development on this issue.

Mr. Gulick said that it is highly likely that there will be some contact and discussions prior to the 60-day period under which the statute says that EPA is supposed to make a finding. The Clean Air Act does provide that EPA is to have a public hearing prior to making its determination under Section 126.

Mr. Givens said that with regard to the next item on the agenda which is stormwater, the ERC would be asked in April or May to look at a bill to address the stormwater matter or a bill would be introduced or a committee substitute would be offered for an existing bill would be offered that would address the stormwater matter.

Mr. Givens added that there was some discussion as to whether or not there should be a stakeholder working group formed to handle this issue. He said that the time does not seem right at this time. In the meantime, we have litigation. The Administrative Procedures Oversight Committee (APO), which focuses on procedural matters, has been assigned this issue.

Mr. Givens said that the Rules Review Commission (RRC) had been invited to speak at today's meeting concerning the status of litigation against the Rules Review Commission over its decision and the Phase II stormwater runoff rules. However, they did not feel it appropriate to discuss the lawsuits at this time. A letter declining the invitation to speak is listed as **Exhibit F**.

Mr. Gulick gave an update on issues related to the Phase II stormwater rules as legal counsel for the Environmental Management Commission (EMC).

Mr. Gulick said that the RRC returned the stormwater rules and made additional objections. The EMC met shortly thereafter and voted to ask counsel to seek appropriate judicial relief from this action by the RRC and also requested directly that in a letter to the RRC the rule stay the effect of its action until there had been an opportunity for a court to review the propriety of their return of the rules. The RRC met and put on the record the request from the EMC but took no action on.

Mr. Gulick said that on March 8, 2004, the AG's office, on behalf of the EMC, filed a complaint in Wake County Superior Court challenging the action of the RRC, which is the sole defendant in the EMC's action.

Mr. Gulick said that the complaint by the EMC is that the RRC exceeded its authority in returning the rule without a request from the EMC that it do so. And, further a ruling that the EMC had properly responded to the earlier objections of the RRC with respect to ambiguity and to the issue it had raised with regard to statutory authority and also that it had statutory authority that if the EMC had statutory authority for the revised rules that it had been tendered to the RRC and seeks relief accordingly from the Superior Court.

Mr. Gulick said that the fundamental issue is that the EMC believed it was following the process that had been established in the statute and that the RRC had without authority abruptly terminated that process with respect to these rules.

Senator Kinnaird asked Mr. Gulick if only this individual action is being challenged or if the constitutional entity of the RRC itself.

Mr. Gulick said that the EMC's complaint does not raise constitutional claims. It is alleging actions in excess of statutory authority are arbitrary and capricious.

Senator Kinnaird asked Mr. Gulick what effect this is going to have on our requirement from the federal government on the timelines for stormwater.

Mr. Gulick said that they, at the direction of the EMC, will be seeking a stay of the effectiveness of this rule while the court has this matter under consideration. The EMC alleges the action of the RRC, in terminating this rulemaking process, terminated the temporary rule, which had the effect of regularizing the process and setting out deadlines that municipalities and the state could meet to comply with federal rule that requires the state to address these stormwater issues.

Senator Clodfelter asked how it is decided whom the Attorney General represents when one state agency sues another state agency.

Mr. Gulick said that he is unable to respond to that question at this time.

Senator Clodfelter asked Mr. Gulick if the RRC is entitled to legal representation at the State level.

Mr. Gulick said he was not at liberty to answer the question.

Senator Kinnaird asked if the stay that the state court gives likely to convince the federal government that we don't need to meet the timeline.

Mr. Gulick said the state had authority under the federal rules to adjust timelines appropriately and it did, in fact, adjust the timelines using the

temporary rule as the mechanism to establish a process for applications for permits. If the temporary rule does not exist, the concern is that we are back on the original federal timeline, which has already passed for the application of permits.

Mr. Donnell "Trip" Van Noppen, III, Carolinas Office Director, Southern Environmental Law Center, gave his comments on the RRC's veto of the EMC's Phase II stormwater rules. A handout of his summary is listed as **Exhibit G**.

Mr. Van Noppen said that the stormwater rules, which have been vetoed, are essential to protecting the quality of our rivers and streams in coastal waters. The rules had specific protection for shell fishing and trout waters.

Mr. Van Noppen said that the Southern Environmental Law Center (SELC) also alleges that the RRC has improperly vetoed these rules, that EMC did follow the appropriate procedure and that the RRC was wrong in determining that the stormwater rules were without statutory authority and were wrong in determining that the stormwater rules were ambiguous.

Mr. Van Noppen said that the SELC had asked the court to validate these rules and over rule the RRC. In addition, a separate category of claims says that the RRC, as it is currently empowered by the general statutes, is unconstitutional.

Mr. Van Noppen said that there is a need for the RRC to make sure the rules are drafted clearly, the rulemaking procedure is followed; however, the law gives the RRC veto power over the actions of the executive branch, acting as a legislature but without having bills passed by both houses. They also intrude upon the role of the executive branch in carrying out the programs that are delegated by the General Assembly and they intrude upon the role of the courts in making binding determinations of statutory authority.

Representative Williams asked Mr. Van Noppen how long the RRC has had this authority.

Mr. Van Noppen said that the RRC had been given these additional authorities in the mid 1990s. They used to have a role of expressing objections to rules with the veto power. The veto power is what gives rise to the issues at hand.

Representative Williams asked if this veto power had ever been challenged.

Mr. Van Noppen said that it had been challenged but never ruled on. In three previous cases, there have been lawsuits filed to challenge actions of the RRC, the first two resolved without judicial ruling and a case pending which involves the Pharmacy Board and the RRC but have not been ruled on by the courts.

Senator Clodfelter asked if a judge had been assigned to the cases.

Mr. Van Noppen said that the two cases had not been assigned to a judge or consolidated but that SELC is requesting consolidation.

Senator Horton said that the reason the RRC was changed in the 1990s is because the bureaucracy was spewing out a volume of administrative rules, which had the effect of law on our citizens, and the General Assembly said they are responsible for passing the laws.

Mr. Van Noppen said that one thing that would have to be decided by the court is how far can the legislature go in delegating that authority to a non-legislative body.

Senator Clodfelter said that he believes the main message that we take away from it is the lawsuits make it probable that we may have to address some stop gap interim measures in the ERC so that the cities and counties are protected with EPA during the short session.

Mr. Givens added that what the Administrative Procedures Oversight Commission hopes is that it can deal with the substitutive matter here and that APO matters can be dealt with there. The legislature has it, within its capacity, to resolve some of the outstanding issues.

Dr. Charles M. "Mike" Williams, Director, Animal Waste Management Center, North Carolina State University, gave a report on issues related to the evaluation of alternative animal waste management technologies to determine whether those technologies are environmentally superior and economically feasible. A copy of Dr. Williams' slide presentation is listed as **Exhibit H**.

Dr. Williams said that he would be reporting on the results of three agreements that were put into place in the year 2000 between the Attorney General of North Carolina, Smithfield Food and Premium Standard Farms. Those agreements provided a total of $15 million and $2.3 million respectively for NCSU to pursue the environmental superior technology research and development component.

Dr. Williams said that in 2002, the Attorney General also entered into an agreement with Frontline Farmers. This organization came into the agreement representing the contract growers and independent growers in the state. They brought with them a spirit of cooperation and have provided farms for conducting technology performance evaluations.

Dr. Williams said NCSU is responsible for the technology determinations, which is the actual report, which defines whether the technology meets the performance, and economic criteria that are defined in the agreements and also sets a schedule for implementation. The companies, through these agreements, have agreed to install any of the technologies that are deemed to be environmentally superior technologies onto the company owned farms.

Dr. Williams said that each of the technologies then have to meet performance standards that have been ratified by the General Assembly relative to the conditions that a farm or technology must meet for waste management for implementation for a moratorium.

Dr. Williams said that NCSU is mandated by the agreement to measure each of the parameters for each technology. The agreements also incorporated economic feasibility standards for each technology. A cost benefit analysis was also added as a component as the economic feasibility analysis.

Dr. Williams said that a 23 member advisory panel that is providing input and oversight of this process. This panel represents the companies that have entered into this agreement; it represents government, environmental interest, community interest as well as the academic areas of public health, waste management, economics and business administration.

Dr. Williams said that there are 16 plus candidate technologies in this process. Two have fallen off of the table because of the lack of technology required to be able to put it on the ground for evaluation per the resources and deadlines they are under with this agreement. The agreement specifically indicates that at the end of this process, they have the authority to take different unit processes to build an environmentally superior technology based on the performance in the economic data.

Dr. Williams added that 13 of the 16 technologies are either operational or concluded. A task schedule and a timeline was been presented on March 5, 2004 to the advisory panel outlining what has to occur between now and the end of this process to make the technology determinations. The technologies are on commercial scale farms around the state in areas in which swine are produced with the exception of a few technologies on University property in Wake County.

Dr. Williams then showed slides of several of the working technologies. He asked members to keep in mind that similar data is being collected for each of the sites. He explained in detail the Anaerobic Digester being used on the Barham Farm.

Dr. Williams said that the ambient digest/greenhouse technology is a covered digester and the affluent from that digester goes into a secondary holding pond and is further treated in nitrification tanks. Some of the affluent is used for re-flushing in the buildings and in additional there is a greenhouse vegetable production facility on that property.

Senator Clodfelter asked Dr. Williams what percentage of the affluent is reused.

Dr. Williams said that most of affluent is used for reflux and a small percentage used for the greenhouse vegetable production.

Senator Horton asked Dr. Williams is the affluent used as a fertilizer or heat in the greenhouse.

Dr. Williams said it was used for fertilizer. Because it is an anaerobic digester there is energy and heat generated with this system. On this particular farm, it is a sow furrowing operation and there is appreciable heat needed.

Dr. Williams said that one of the performance criteria is that the systems have to substantially eliminate atmospheric conditions of ammonia. Any type of anaerobic digester system will conserve ammonia so it has to be further treated in some way that will prevent it from being volatilized into the atmosphere.

Representative McComas asked Dr. Williams if the tomatoes grown in the greenhouse would qualify for organically grown vegetables.

Dr. Williams said that they should qualify and the total amount of marketable tomatoes produced is approximately 1500 pounds per day.

Senator Horton asked if there was a resistance to this type of fertilizer therefore creating a marketing problem.

Dr. Williams said that it wasn't really a resistance but it could be an issue. The availability and competitiveness of tomatoes coming from other locations has been an issue with this producer.

Senator Forrester asked Dr. Williams if these technologies are ones used in other countries or are they ones developed here through NCSU or through private entrepreneurs.

Dr. Williams said that these technologies are developed largely through private entrepreneurs. However, some other countries are represented. Of the 16 technologies, some were developed in Australia, Spain, France and Germany. Most of these technologies are from private technology suppliers from the United States and/or academic institutions.

Dr. Williams said that one of the criteria is odor. It must be measured for each technology. For odor, Sue Shiffman's group at Duke University is doing this work.

Dr. Williams then showed a slide of a technology for solids separation, nitrification, de-nitrification and phosphorous removal. This is an example of a technology that would eliminate the need for any type of earthen containment facility.

Dr. Williams said that the solids produced by this system are then further treated in another technology located on a separate site that does not contain any animals. It is also an anaerobic digester technology. The results from that particular type of technology are very good.

Senator Horton asked what happens to the solids.

Dr. Williams said that the solids are transported to the high solids anaerobic digester and further digested.

Senator Horton asked what would happen next.

Dr. Williams said that after the solids are digested, they are dried. Dr. Williams said that DOT is interested in seeing what nutrient value would be in these solids that would be of value to roadside vegetation projects.

Senator Horton asked Dr. Williams if they had a solution as to what to do with the solids after they are dried.

Dr. Williams said that there are other processes he would show but they are not able to say they have the answer for the solids.

Senator Forrester asked Dr. Williams if, in the present lagoon system, what do they do with the pathogens and how much reduction is there in pathogens in the lagoon system.

Dr. Williams said that the current system is a biological treatment and according to their data, there is up to 2 and 3 percent reduction in the pathogens.

Senator Kinnaird asked why these solids couldn't be sold as fertilizer.

Dr. Williams said they could be sold as fertilizer but the market development is the real key. The real issue with animal manure solids has been the ability to consistently deliver a product that has a low variability of NPK and also has no odor.

Senator Kinnaird asked if Millorganite smells.

Dr. Williams said it has an earthy type smell. The issue there is that the organization has incorporated a quality control to deliver a consistent product. Where limited success has been seen with animal manure systems is where that type of control has been incorporated.

Dr. Williams showed a technology developed in France, which separates solids at a high dry matter content. In this particular project, the solids have actually been combined with poultry litter and processed in a fluidized bed production process that exceeds 1,000 degrees Fahrenheit.

Dr. Williams showed another digester process using larvae. Because of the BSE issue, there will be issues with this process. This project also involves a water reuse project, further treating the water so that it is drinking water quality to be consumed by the animals.

Dr. Williams said that we do not want to restrict these technologies that are only funded by these agreements. Last year an additional technology was

added that involves water reuse. Smithfield Foods in the State of Utah has committed approximately $20 million to develop a process in which they are using the mesophillic digester design. They are taking the methane produced and putting it through a chemical process in a bio refinery. The methane is converted into methanol. The manure from approximately 125,000 animals is projected to generate about 7,500 gallons of methanol per day. That methanol is then railed to a facility in Texas and converted into bio diesel fuel.

Dr. Williams said that Smithfield Foods is cooperating with them in the North Carolina project to conduct a performance verification of this technology in Utah and see how and if it may fit the North Carolina model. This gives us another option for a value added product.

Dr. Williams concluded by saying that after all the data is collected; he hopes to have his recommendations to the panel ready by 2005.

Senator Clodfelter asked Dr. Williams what month in 2005 would he expect to have the report ready.

Dr. Williams said that a lot has to happen to get to the technology determination process but it is feasible that he would have it by July 2005.

Senator Kinnaird asked Dr. Williams if, when all of this is finished, would it be better to go back to a lot of small farmers who are raising a few hundred animals, which might cost the same as the $1 million we would have spent on this technology.

Dr. Williams said that if their objective is to produce a quality product at a low price, he feels very strongly that with the proper technology, that this can be done with animals in concentrated environments. But it has to be done with the proper technology.

Dr. Williams said that he did not feel that the current system is long term sustainable and that we need this technology change if we are serious about keeping animal production agriculture in this state and within the U.S..

Dr. Williams said that the technologies are meeting the performance criteria relative to odor, ammonia emissions, pathogen reductions and nutrients. Beginning in April, the economical analysis will be ready and he is not as optimistic about this. These systems will cost more than the current systems and someone will have to pay for them.

Senator Horton asked Dr. Williams if five or six of the 16 most promising technology methods would be analyzed and presented in 2005.

Dr. Williams said this was correct.

Senator Horton asked Dr. Williams why this had to be done all at one time. Why couldn't some of the promising ones be rushed on through and get certification so that the industry could decide where it wants to go rather than holding everybody back until mid 2005.

Dr. Williams said that at the March 5, 2004 meeting, this process was outlined in two phases: with phase one, beginning as early as July 2004. A lot has to happen for that to occur but it could be done in phases. The argument from many stakeholders to this is that when the determination is made, it is more fair to see what happens when all of the technologies are completed in the event that a technology determination is a thumbs up for one that comes later in the process that may be more effective in reducing the environmental impacts as well as being more cost effective. Once the data is in, a phased approach is one he would be pursuing.

Mr. Givens added that many observers of this process had speculated as to whether any of these technologies would be viewed as economically feasible, particularly in the short run, as the current technology. This would lead to the question as whether the legislature would have to take some steps to assist in the economic feasibility.

Mr. Givens asked Dr. Williams about the thermal depolinerization process and if it was one of the technologies being considered.

Dr. Williams said that it was not being considered. However, it is one that Premium Standard Farms has had as part of their process in Missouri. This facility has been improved but is not at 100 percent operation yet. The economics of this system is a lot more favorable if you can generate oil as compared to biogas.

Senator Kinnaird asked Mr. Givens if the taxpayers may have to subsidize this project.

Mr. Givens said that what he said was that there may have to be some assistance in achieving economic feasibility.

Senator Kinnaird asked Mr. Givens if this was not a taxpayer subsidy.

Senator Clodfelter said that it was something for the legislature to decide when we get the report.

Mr. Joseph Rudeck, Senior Scientist, Environmental Defense, gave a presentation on what happens after an environmentally superior technology for hog waste treatment is designated. A copy of Mr. Rudeck's comments, in full, and a handout outlining his presentation are listed as **Exhibit I**.

Representative Weiss asked if there was someone specific at DENR who is currently leading the way to help with this transition or planning ahead for this.

Senator Clodfelter said that he did not know but was thinking during the presentation that this could fall into our laps to set the policy framework before DENR could launch off into doing anything about implementation.

Senator Clodfelter asked Robin Smith, Deputy Secretary of DENR, if there was a captain for the conversion process at DENR.

Robin Smith, DENR, said that their staff had worked closely with Dr. Williams during the entire process and like everyone else; they are taking it one step at a time. As they get to each step, they are prepared to play an appropriate role but right now they are focusing on identification and testing of technologies and issuing the permit required.

Senator Horton commented that we have a number of things that need to be on our plate. One of the obvious and least expensive by-products would be electrical energy, from these farm conversions, but that will not work unless the power companies are required to pay a fair price for the energy sold to them.

Mr. Forest R. Westall, Regional Supervisor, Asheville Regional Office, Division of Water Quality, DENR, and Thomas A. Reeder, Supervisor Classification and Standards Unit, Division of Water Quality, DENR, presented a report on the study conducted by the Department of Environment and Natural Resources (DENR) regarding the use of general no discharge permits for animal waste management systems for swine, cattle, and poultry operations on the land application and potential discharge of nitrogen and phosphorous to surface water and groundwater in the State. A copy of the slides, a summary sheet of the major issues of the advisory group, and a final report on the Activities and Findings of DWQ Animal Feeding Operations Non-discharge General Permit Advisory Group are listed as **Exhibit J**.

Mr. Westall said he was asked, along with Tom Reeder, to facilitate an advisory group under Senate Bill 733 to evaluate the state non-discharge permitting process.

Mr. Westall said that the permits that DENR uses to regulate these activities are where the rubber meets the road. It is a list of requirements instructing people how to conduct their business. Sometimes when there is feedback from people being regulated or impacted, there is a process to respond to them.

Mr. Westall said that his office gets a lot of telephone complaints from citizens about animal operations. All animal waste operations have some regulatory oversight; all operations under the threshold numbers can operate by permit without any regulatory document from DENR as long as they don't have a discharge.

Mr. Westall said that approximately 1041 facilities are covered by NPDES Federal Permits and 1437 facilities are covered by state Nondischarge Permits. Of the pounds of animals in an operation at any given time, the NPDES permits cover about 70 percent of all poundage.

Mr. Westall explained that deemed permitting is for operations using dry litter.

Mr. Westall said that from 1998 until 2003, DENR had learned a lot about the regulatory process and some changes were made in the permitting process.

Mr. Westall said that the original nondischarge permits were issued in May of 1998 and were set to expire on April 30, 2003. DWQ began a process of drafting those permits and put them out in January for the permits that would be expiring.

Mr. Westall said that he and Mr. Reeder were the hearing officers for the public hearings held in February 2003. The comments from these hearings helped them to draft the new permits.

Mr. Westall said that the general permit was adopted in May 2003 but Senate Bill 733 stayed the implementation of the new general permit and directed DENR to go through a process that would allow coverage after October 2004. This would require DENR to evaluate use and impacts of general permits for animal waste management and would also involve interest groups.

Mr. Westall said that the advisory group met four times in 2003 and have issued the report of their findings in Exhibit J.

Mr. Westall said that fourteen out of sixteen issues were settled in a concensus. The issue of phosphorus on land was one of the major issues of contention. Since phosphorus is not retained on the site and does leach away after a time, a tool was adopted by NRCS, called the plat tool, to be used on these sites to evaluate phosphorus. Any new or expanding facility is required to evaluate phosphorus on their application site, but do not have to comply with it in order to get a certificate of coverage. The AG's office felt that this was the most appropriate way to deal with this in the permit.

Mr. Westall said there might have to be some proposed revisions to the statute to specifically include phosphorous. The statutes include nitrogen but not phosphorus.

Mr. Westall said that the rainbreaker requirements are devices set up on irrigation equipment that regulates water going out of the system. These are required on some operations but the smaller operations use on-site personnel to make this determination. Automatic devices are required in the permit only if there is trouble with compliance. If this is done on-site, it has to be done every two hours.

Mr. Westall said that frequency of calibration of testing equipment is once every year in the NPDES permit. In smaller operations, it was revised to once every two years.

Mr. Westall said that precipitation event, measuring rainfall, was a very important issue. It was determined that measuring rainfall should be done at the farm site with someone reading a rain gauge and documenting the information.

Mr. Westall said that the frequency of sludge surveys in the lagoons that hold the waste is required within one year with the NPDES permit. With the smaller operations, they are given two years to do the initial evaluation and yearly after that.

Mr. Westall said that the manual monitoring of lagoons is better than automated lagoon monitoring equipment. The permit requires someone to read the gauge and report it. Automated monitoring systems are required only if there is a compliance problem.

Mr. Westall said that there should be no land application activity within 100 feet of active water supply wells used for human consumption.

Mr. Westall said that annual certification is not required in the new permit. This was the most contentious issue on which consensus was not reached. The producers felt very strongly that this annual reporting requirement was a burden; however, the environmental and public interest groups felt this was a necessary requirement. It is required in the NPDES permits but not in the new permit.

Mr. Westall said that the recommendation was that a permit cycle would be given for five years, 2004-2009, to allow producers to learn about how submission works on the NPDES permits and to get them comfortable with the permitting form.

Mr. Westall concluded by saying that consensus was reached on all but two of the issues—the issue of phosphorus requirements and the issue of annual certification. The requirements for SB733 were met and the permit developed by DWQ is should be approved by October 2004.

Senator Clodfelter said that the ERC is not required to take any further action with SB733.

Senator Horton asked Mr. Westall if the permits allow opportunity for the operator to provide information or does the permit it just list regulations.

Mr. Westall referred to attachments six and seven in Exhibit J, which show regulations as well as reporting requirements by operators. The permits are the written description of what they are supposed to do.

Representative Hackney asked Mr. Westall to remind members of the two issues on which they did not reach consensus.

Mr. Westall said that the phosphorus requirement and the issue of annual certification were the two issues on which they did not reach consensus.

Senator Clodfelter asked if the phosphorus requirement would require additional legislative action.

Mr. Westall said that the General Counsel office is working on some proposed changed that would be submitted to the legislature for clarifying the role of phosphorous.

Senator Clodfelter asked Mr. Westall if the phosphorus issue would be brought back to the ERC as a separate item.

Mr. Westall answered in the affirmative.

Mr. M. Paul Sherman, Environmental Engineer, Division of Water Quality, DENR, gave a report on the resolution by the 605 Working Group of issues related to Notices of Violation (NOVs) and Notices of Deficiency (NODs) for lagoon freeboard violations due to chronic rainfall conditions. A copy of Mr. Sherman's slide presentation and a copy of the final report on the resolution of issues related to notices of violation and notices of deficiency due to lagoon freeboard violations due to chronic rainfall conditions, is listed as **Exhibit K**.

Mr. Sherman said that this working group was convened under the direction of the ERC.

Mr. Sherman said that in April 2003, DWQ issued approximately 385 notices of violation to animal facilities with high freeboard levels. And, on June 25, 2003 a memo from Secretary Ross (DENR) initiated a working group to resolve the issue of high freeboard enforcement during chronic rainfall events. The memo directed DWQ to divert back to using a previous guidance document in order to make the process of determining the enforcement on high freeboards.

Mr. Sherman said that the Chronic Rainfall Working Group met five times between October 28, 2003 and March 15, 2004. Several stakeholder group meetings were also held.

Mr. Sherman said that several of the major items discussed in the working group were lagoon design, DWQ's enforcement guidance utilized after Secretary Ross' memo and conditions in the DWQ guidance.

Mr. Sherman showed a slide of a lagoon design. He said that in 1996, NRCS also included a heavy rainfall factor, an additional 25-year, 24-hour storm event storage that was initiated for periods of heavy rainfall.

Mr. Sherman said that those lagoons that were built after 1996, most lagoons in use now were built before 1996, did not have that heavy rainfall factor built into them.

Mr. Sherman said there was also a study now to allow facilities to go below the permanent treatment level, approximately 8 inches. This allows facilities that do not have the heavy rainfall factor built in to pump their lagoons lower to compensate for not having that extra storage at the top.

Mr. Sherman said that DWQ devised its own plan of action forms and submitted them to the working group. They included these forms in the guidance document.

Mr. Sherman said that the working group discussed that there should only be one compliance action taken during any single rainy period. There was concern that facilities, during a single rainy period, could rise up to where they wert out of compliance with their permit, pump for a few days, but could become out of compliance again until the rainy season was over. Any action taken by DWQ prior to this guidance must be considered as if it was based on the new guidance.

Senator Clodfelter asked Mr. Sherman if any violations would be withdrawn as a result of the new guidance criteria.

Mr. Sherman said that none would be withdrawn.

Mr. Sherman concluded by saying that the Chronic Rainfall Working Group reached consensus on resolving issues related to chronic rainfall. The resulting recommended guidance document sets a clear and consistent guidance for making enforcement determinations and the recommended guidance will replace the Freeboard section of the current DWQ Compliance/Enforcement Procedures dated April 2, 2003.

Representative LaRoque asked Mr. Sherman if there would be any type of monetary penalty to the farmers who had NODs in excess of three years.

Mr. Sherman said that as long as the farmers are properly operating and maintaining their facility then this would not be a possibility.

Senator Horton asked Mr. Sherman how many actual penalties had been assessed against the hog farmers and what is the monetary cost.

Mr. Sherman deferred this question to Coleen Sullins.

Senator Clodfelter told Senator Horton that Ms. Sullins would be addressing these questions in her presentation, later in the agenda.

Ms. Beth Anne Mumford, Director of Public Affairs, North Carolina Pork Council and Mr. Daniel J. Whittle, Senior Attorney, Environmental Defense, gave their comments on the general nondischarge permit study and on the resolution of issues related to freeboard violations due to chronic rainfall.

Ms. Mumford said that the Pork Council does support the use of general permits. The new permit is the sixth permit the producers have had to operate under since the State began permitting in the mid 1990s.

Ms. Mumford said the goal of the Pork Council has been and will continue to be in developing permits around those well managed farms with

available management tools and regulatory enforcement where necessary to deal with situations where compliance is difficult on the farm.

Ms. Mumford said that they hear quite a bit from their producers about the increased paperwork required with the new permits that keeps them off the farm and in an office filling out paperwork.

Ms. Mumford said that as we move through the public hearing process, we would continue to hear from producers on some of those concerns.

Mr. Whittle said he was representing the Sierra Club, the North Carolina Perg, the Alliance for Responsible Swine Industry, and Southern Environmental Law Center. All of these groups participated in one or both of these working groups.

Mr. Whittle emphasized that the two groups focused on issues surrounding the current lagoon system. The resolution of these issues does not obviate the need to continue to make progress on conversion that Dr. Williams and Dr. Rudek talked about this morning.

Mr. Whittle said that DWQ did an excellent job on the state permit issue. The process was constructive and consensus was reached on 14 of 16 issues.

Mr. Whittle said that they believed the federal and state permits should be the same; however, dairy farmers and others said that the federal permit was too cumbersome.

Mr. Whittle said that the two issues they could not reach consensus on were annual certification and the phosphorus standard.

Mr. Whittle said that on annual certification, their view was that it is common sense that it is not a burden for farmers to certify the compliance status of their farms and also maintain the annual certification is routine and is important in compliance monitoring and reporting. Filling out a form is an incentive for doing things right.

Mr. Whittle said they had worked with other stakeholders to come up with a simplified form but some rejected this.

Mr. Whittle said that DWQ was recommending that we drop the annual certification and work with groups with the hope that in the future the certification can be restored.

Mr. Whittle said that the other issue, which was less contentious, but was arguably more important, was the issue of phosphorus. One is with new operations of swine, poultry, dairy should have to comply with a future phosphorus standard being currently developed by USDA and the other was whether or when existing operations should evaluate their capacity to comply with a future phosphorus standard. There are currently no limits on phosphorus applications to land from livestock operations. Phosphorus, in

excessive amounts, poses a serious threat to our river streams and coastal waters.

Mr. Whittle said that with respect to new operations of complying with future standards, there was disagreement as to whether DWQ had the statutory authority to do so. The AG and DENR's Assistant General Counsel offered an informal opinion that the statute does not address phosphorus and therefore it is not clear as to whether DWQ has the authority. In the Environmental Defense's opinion, Under the Clean Water Act of North Carolina, authority is there and hopes that DWQ will exercise its discretion to require new operations to comply with the phosphorus standard.

Mr. Whittle said that with regard to existing operations, they firmly believe that no time should be lost in evaluating capacity to comply with a future standard, if and when a standard is developed.

Mr. Whittle said that permit violations are inevitable, using the current lagoon and sprayfield system. They focused on how to work with farmers who manage their lagoons by the book.

Mr. Whittle concluded by saying that they do agree with the final recommendations and will support them in the public hearings and hope for a timely adoption of that permit. On the enforcement issue, he commended Mr. Givens and his colleagues on a productive 605 process and accept the final outcome of that working group. The shared goal of all stakeholders is to keep hog waste out of rivers and streams and their highest priority is to make enforcement policy actually work with farmers to avoid problems and to fix them once they occur.

Mr. Whittle said he felt there was widespread acknowledgement within the group that the lagoon technology is not here to stay and we will do the best we can with it until the conversion begins, hopefully in July.

Senator Clodfelter suggested to the co-chairs that we might refer the stormwater phase to these two working groups and let them work it out.

Mr. Givens added that Mr. David McCloud asked him to read the following statement to the ERC. "With regard to general nondischarge permits, the Department of Agriculture and Consumer Services (DACS) participated in the study and supports the consensus of the group that the new proposed permit is much improved. With regard to the 605 working Group on Chronic Rainfall, DACS participated in this process and supports the new compliance and enforcement procedure."

Mr. Givens said that the milder treatment for violations is available only to those farmers who voluntarily and in a timely fashion report when they are getting into trouble. It does not offer any protection to those who fail to report as required by their permit. That was the consensus of all parties.

Mr. Gary Hunt, Director, Division of Pollution Prevention and Environmental Assistance, DENR, gave a report on the development of

environmental management systems (EMS) for pork producers. A copy of three handouts Mr. Hunt provided is listed as **Exhibit L**.

Mr. Hunt said that an environmental management system (EMS) is a systematic approach to managing an organization of environmental affairs using quality principals. It is the plan due check act based on continual improvement. This is what every business uses to increase their profitability and become more effective.

Mr. Hunt said that in the 1990s that was international recognition that organizations needed a more holistic approach to managing environmental impacts and requirements. This is when international standards were developed of what a model EMS would be based on quality principals. Since that time there has been a steady growth in implementation of the standard by industry, businesses and government agencies.

Mr. Hunt listed the North Carolina Zoo, wastewater treatment plants in Gastonia and a number of facilities in North Carolina currently meeting the international standard.

Mr. Hunt said that studies have shown that EMS's improved the environmental performance of the regulated facilities. There is also a growing interest from the agricultural and agribusiness to start looks at EMS's. In 2000, Smithfield and Premium Standard agreed to put third party, certified EMS's on all of their company-owned swine farms. In 2001, Murphy Brown was the first livestock company to be certified to the international standard.

Mr. Hunt said that for small contract farms and for independent farms, there was really no assistance to put an EMS into place. So, they partnered with cooperative extension and their knowledge of animal operations, obtained some federal funding to do a local project to work with small farms to develop materials they could use to put an EMS into place. This project was coordinated with the Division of Soil and Water, Water Quality, the Pork Council, NRCS and anyone else who wanted to participate in the project.

Mr. Hunt said they had recently completed working with eight contractors and independent swine farms with their staff on site, one from cooperative extension and one from DENR to see what parts of EMS would work and be most beneficial to a small organization.

Mr. Hunt said that out of that project, which was started in 2001 and just completed, a set of comprehensive, web-based tools that provided a step-by-step process to develop an effective EMS for small farms.

Mr. Hunt said that Murphy Brown also developed a series of hard copy EMS documents that a farm can use to step themselves through the process. There is also an electronic system that is very extensive that can reach all farmers.

Mr. Hunt said that some results were increased overall farm efficiency, improved documentation, improved environmental preparation and enhanced response to emergency problems.

Mr. Hunt said that a full-blown EMS is probably not doable for a small farm operation; however, parts of the model work very well and can help farms. The farms need assistance to put an EMS into place. They have proven to be beneficial and have a great potential to really help swine farms meet environmental regulations.

Mr. Hunt said that his office would be training the trainer. The have obtained federal funding that would help with the six swine farms they have just signed on with to help with putting EMS into place and monitoring compliance.

Mr. Hunt said there was a national effort to look at other sectors in agribusiness; such as poultry, to put EMS's into place. DENR thinks that EMS is where the industry is going and have established a program called environmental stewardship initiative which companies sign up for to help put environmental management systems into place. Those that have systems into place are awarded stewardship awards. They have over 40 companies signed up and more are coming in everyday.

Mr. Hunt concluded by saying that Chuck Stokes and Don Butler had helped develop the EMS manuals and were in the audience today.

Senator Dorsett asked Mr. Hunt what percentage of companies in North Carolina does the 40 represent.

Mr. Hunt said there are 150 certified companies in the state with 40 signed up for the EMS program.

Senator Clodfelter asked if funding was predominantly federal funding at this time.

Mr. Hunt answered in the affirmative.

Mr. Hunt introduced two farmers, Don Butler and Chuck Stokes, in the audience. Senator Clodfelter asked if either of them would like to address the ERC.

Mr. Don Butler, producer and employee of Murphy Brown spoke. He said he was the project manager for the EMS. They started the process in 1997 and are pleased to report that all of the company farms nationwide are certified to the international standard. It is proven to be a great tool for them. Their farms are cleaner and their employees are better informed, the neighbors are happier and they have less conflict with regulatory agencies. They have decided to make it available to anyone in the country who wants to use it, free of charge.

Mr. Chuck Stokes, hog farmer from Aiden, North Carolina, in Greene County, spoke to the Commission. He said he installed an EMS as a form of being proactive. They have identified many problems and have initiated some outreach they didn't have before in the form of a newsletter for the community and opened a website for farmers to have an opportunity to engage in discussions.

Senator Clodfelter asked Mr. Hunt if we are connecting the EMS program to the regulatory program appropriately so that the word is getting out.

Mr. Hunt said that they were. They just had a training program to get the word out.

Ms. Coleen H. Sullins, Deputy Director, Division of Water Quality, DENR, gave an annual report on permitting and inspecting animal waste management systems/Animal Waste Compliance Report and the annual report on the compliance/enforcement of water quality laws for facilities that discharge into surface waters. A copy of Ms. Sullins presentation in its entirety, as well as a copy of her slides and status reports for both presentations, is listed as **Exhibit M**.

Senator Kinnaird asked Ms. Sullins about repeat offenders with regard to penalties and violations if they were just paying a fine as a cost of doing business and not changing their ways.

Ms. Sullins said there were some who were doing that but it is getting to be a costly part of doing business. They are working with those repeat offenders, trying to help them find solutions to their problems. One of the reasons they revamped the escalation for those repeat offenders was to not allow it to continue it to be a cost of doing business.

With regard to moratoriums on sewer systems, Senator Clodfelter asked Ms. Sullins how many are system wide moratoriums and would most of them be on a line basis.

Ms. Sullins said that of the 34 sewer systems on a moratorium, about 13 of them are associated with problems at the wastewater plant or system wide.

Senator Kinnaird asked Ms. Sullins if the Clean Water Management Trust Fund is putting the money into some of the more severe problems.

Ms. Sullins said that a number of organizations are providing some resources to address these problems including the Clean Water Management Trust Fund. However, the resources are not there to address all of the needs.

Ms. Sullins said that most of the resources had been dedicated to water main issues rather than toward the wastewater collection system issue.

Senator Kinnaird asked Ms. Sullins if she was familiar with a report that stated there are large amounts of lead in drinking water supplies.

Ms. Sullins said she was not familiar with that report.

Senator Swindell asked Ms. Sullins how the $356,000 fine levied against swine and poultry operations compares with the $800,000 levied against principalities. He also asked Ms. Sullins to explain the range of fines from $5 to $22,000.

Ms. Sullins said that the fines ranged from $500 to $22,000.

Ms. Sullins said that the assessments against municipalities are based on their monthly reports. With the swine operations, the assessments are made on an annual basis. She also said that with the number of NPDES facilities, there are 1454 with close to $1 million worth of penalties assessed to them and over 50 percent of them were municipalities. Most of the noncompliance problems are with the smaller municipalities.

Representative Justice asked Ms. Sullins if there is any data shows that municipalities are educating the public as to how to prevent problems with the municipal sewer systems.

Ms. Sullins said there is probably some data on that but she would need to go to the municipalities to ask for their help on providing this information.

Representative Justice stated that, if we had that data and it was making a difference, maybe we could come up with a plan that would help reduce the number of spills in municipal systems.

Ms. Sullins said that where a strong grease campaign was initiated, they were seeing fewer problems.

Mr. Givens asked if there were 1800 inspections and 2461 operations, how would that square with the statutory requirement that they all be inspected once a year.

Ms. Sullins said that obviously it did not square with the statutory requirement that they all be inspected. Those inspections she reported on were strictly the ones done by DWQ. The Division of Water and Soil Conservation also go out and do annual inspections. Also, some of the facilities not inspected could be in the pilot programs.

Mr. Givens asked Ms. Sullins what the total gallons were for spills in sanitary sewer systems.

Ms. Sullins said it was 151 million gallons.

Representative Weiss asked Ms. Sullins to go into a little more detail about why there were fewer inspections in 2003 than in 2001.

Ms. Sullins said that they were down significantly in staff and they had tremendous difficulty in hiring new staff. One of the reasons the number of NPDES inspections had been reduced was that they were trying to devote resources to some of those issues where they have significant problems such as the sanitary sewer system overflows.

Mr. Robert M. Zarzecki, Environmental Specialist, Wetlands 401 Certification Unit, Division of Water Quality, DENR, gave a report on the Effectiveness of the Surface Water Identification Training and Certification Program (SWITC). A copy of Mr. Zarzecki's slide presentation and a copy of information regarding the SWITC program are listed as **Exhibit N**.

Senator Horton asked Mr. Zarzecki to define a stream. He had a situation where a stream does not appear on any local maps, not on any soil conservation maps and asked if there is siltation in that sort of a water course, is it a violation of our current methodology.

Mr. Zarzecki said that it possibly is a violation. The Neuse River Basin and Tar Pamlico River Basin buffer rules only apply to intermittent streams shown on USGA and Soil Survey maps. The streams that are not shown on those maps could very well be jurisdictional waters of the United States and the State of North Carolina and may still hold water quality standards and other federal regulations.

Senator Horton asked if a landowner finds that some of his topsoil has washed over onto a neighbor and into a dry watercourse, would he be subject to civil penalties.

Mr. Zarzecki said that they have no jurisdiction over dry watercourses, called femoral streams or channels. However, if the sediment got into an intermittent stream, it would be in violation.

Mr. David L. Penrose, Environmental Biologist, Wetlands 401 Certification Unit, Division of Water Quality, DENR, gave a report on the Effectiveness of the Surface Water Identification Training and Certification Program (SWITC), gave a PowerPoint presentation on a stream mapping grant initiative.

Mr. Penrose said that as much as the small headwater streams drain 85 percent of the land surface in North Carolina and the current maps do not illustrate the occurrence of those streams at an alarming rate.

Mr. Penrose said that 25 percent of the streams in the Piedmont are not mapped or are mapped inaccurately. This number increases in the mountains.

Mr. Penrose said that the DOT and WQ are joining efforts to come up with a model driven, computer devised mapping program of small streams in North Carolina.

Mr. Penrose recognized Mr. Steve Kroeger who has been hired by DWQ to administer this grant for the next couple of years. Private contractors will conduct most of the fieldwork. Computer models will be completed and other funding will be continued and the final map will be complete by winter of 2004. There will be a Phase II of the mapping process, which will map the entire state.

Senator Horton asked Mr. Penrose where the map would be available.

Mr. Penrose said that he assumed it would be a web based product which could be downloaded from DWQ's website or that an interactive website would be developed for that purpose.

Senator Horton said that he had a real problem with our citizens having penalties imposed on them out of bureaucracy out of a stream that is not mapped anywhere.

Mr. Penrose said that he was frequently asked to go into the field to assess the type of the stream and what people have called intermittent streams in the past is frequently inaccurate. Many of these small streams are perennial channels.

Mr. Givens said that he was pleased to hear that we do have a program and that there is a schedule to get this mapping done.

Ms. Sullins said that mapping has been an issue for some time and that with the small funding they have available, they would see if good results could be achieved. If so, they would look into other grants and resources to take the program statewide and make it available with the GIS mapping system.

Senator Kinnaird asked if this program could be coordinated with the mapping of floodplains.

Mr. Penrose said that he was sure it would be.

Mr. Paul S. Crissman, Head, Planning and Program Management Branch, Solid Waste Section, Division of Waste Management, DENR, Mr. James C. Coffey, Chief, Solid Waste Section, Division of Waste Manaqgement, DENR, and Mr. Scott B. Mouw, Chief, Community and Business Assistance Section, Division of Pollution Prevention and Environmental Assistance, DENR gave a report on the status of solid waste management efforts.

Mr. Crissman gave a slide presentation and handed out a copy of the Annual Report on Solid Waste and a copy of his slides listed as **Exhibit O.**

Mr. Crissman reported that North Carolina relies heavily on out of state facilities to manage our waste and we export nearly ten percent of our waste.

Mr. Crissman said that North Carolina produces about one and one quarter ton of solid waste per person each year. The implications of this with regard to our landfill capacity are very surprising.

Mr. Crissman said that landfill capacity is a difficult concept, which can be considered in three different ways. It can be considered in absolute airspace or cubic yards and landfills are permitted according to airspace.

Mr. Crissman said that in North Carolina we have used up 83 million cubic yards of airspace with garbage. Almost 300 million cubic yards of airspace have been permitted. The total permitted does not include what an owner/operator may envision for a site.

Mr. Crissman said that another way to consider landfill capacity is by weight. The statewide average is about .57 percent of a ton to fill a cubic yard of airspace or about 1100 pounds.

Mr. Crissman said that in 2003, about 604,000 cubic yards of waste were put into landfills. There is room for 118 million tons of waste.

Mr. Crissman said that the third way to consider landfill capacity is how long will it take to put 1,000 pounds into a cubic yard. There is about 16 years of permitted time left before our landfills are full if we continue to fill at the same rate that we filled in 2003.

Mr. Crissman said that our forecasting is historically based. The individual analysis of each landfill is included in Exhibit O.

Senator Kinnaird asked Mr. Crissman if Orange County was the only county that had reduced their waste by 40 percent.

Mr. Crissman said that there were a few other counties that had reduced their waste but Orange County was the largest county to do so.

Senator Swindell said that this is a critical problem that the legislature will be addressing in the near future.

Mr. Coffey gave his presentation on the status of municipal solid waste landfills both unlined and unlined. A copy of his presentation and slides is listed as **Exhibit P**.

Mr. Coffey said that of the 128 unlined landfills closed since 1990, 122 of those have detected chemical contaminants in groundwater monitoring and 71 of them have detected contamination at or beyond the property boundary.

Senator Kinnaird asked Mr. Coffey whose liability it is if it goes beyond the boundary.

Mr. Coffey said it was the owner of the landfill.

Mr. Coffey said that there were 42 landfills that are currently being monitored and eight of those have detected contaminants in the groundwater monitoring wells with only one having contamination at the property boundary.

Representative McComas asked Mr. Coffey if the chemical contaminant at the property boundary had been determined as coming from the landfill.

Mr. Coffey said that it had.

Senator Kinnaird asked Mr. Coffey what the answer is for getting people to cut down on their waste disposal.

Mr. Coffey said that we make land filling fairly inexpensive and is one reason why people may not choose to recycle.

Mr. Coffey concluded by saying that the Division has decided to make substantial changes to the proposed C&D landfill rules and will not ask for approval of these rules in the upcoming session.

Representative McComas asked Mr. Coffey if the New Core facilities in Hertford's numbers were accounted for in his graphs.

Representative McComas asked if the automobile recycling facility proposed for Brunswick County would have their numbers included in the new C&D report.

Mr. Crissman said that these numbers would be included in those for an industrial landfill and just municipal C&D numbers.

Representative Fox asked Mr. Coffey if recycling by local governments had an effect.

Mr. Coffey said that recycling by some local governments does have an effect.

Representative McComas asked Mr. Crissman if most of the newspapers in the State were using vegetable ink for printing.

Mr. Crissman said that he did not know.

Representative McComas asked if this is data we may be looking for.

Mr. Crissman said that ink on paper is not a problem with recycling.

Mr. Scott Mouw responded by saying that most manufacturers are using soy-based ink that does help the recycling process.

Mr. Givens asked Mr. Coffey if he anticipates that the C&D landfill rules would be ready in 2005.

Mr. Coffey said that they would probably not be ready at least until 2005.

Senator Horton asked Mr. Coffey if there is anyway that we have quantified our percentage of waste that has come from packaging.

Mr. Mouw answered Senator Horton by saying that about 30 percent of our waste is C&D waste and about one quarter of recycling comes from packaging.

Senator Kinnaird asked if most retail people are doing cardboard recycling.

Mr. Mouw said that cardboard is the most widely recycled item.

Mr. Mouw said that North Carolina has made really good progress on recycling with local governments and in the private sector.

Mr. Mouw reviewed his handout on Options for Reducing Waste in North Carolina. A copy of this handout is listed as **Exhibit Q**.

Senator Kinnaird asked if they were suggesting a statewide tipping fee in addition to a local surcharge.

Mr. Mouw said that they were 22 other states that were doing this and it would be a 22 percent surcharge on disposal facilities.

Representative McComas asked Mr. Mouw if we could also consider an incentive rather than a mandate if a recycler or a hauler performs better.

Mr. Mouw said that there are options that could be looked at with regard to this. For example, the State of Iowa has a tipping fee surcharge but the community is not obliged to send in their surcharge proceeds if they are meeting their waste reduction quota.

Mr. Mouw said that North Carolina estimates an overall generation of 50,000 tons per year of electronics disposals.

Mr. Mouw said that there are six communities that have permanent collection programs for electronics. All 100 counties have collection programs for white good and tires.

Mr. Mouw said that the economic benefits of recyling are more jobs, capacity growth for electronic recycling. The biggest challenges for recyclers is competing disposal rate and inability to get the supply that they need.

Mr. Mouw said that some of the manufacturers that rely on recycled materials are glass plants and paper mills.

Representative McComas asked for hard copies of Mr. Mouw's slide presentation and asked Mr. Mouw to provide them to all Commission members.

Mr. Larry E. Shirley, Director, gave a report on the Energy Policy Council and the revision of the State Energy Plan. A copy of Mr. Shirley's report is listed as **Exhibit R.**

Mr. Shirley told members that he would provide copies of the full State Energy Plan upon request.

Mr. Shirley recognized Senator Kinnaird, Senator Horton and Representative Tolson who serve on the Energy Policy Council and have put in long days and hours on the Energy Plan.

Mr. Shirley said that the State Energy Office (SEO) is located in the Department of Administration. Many years they were in the Department of Commerce and celebrated their 30th anniversary in 2003. The State Energy office was created as a result of the Arab Oil Embargo.

Mr. Shirley said that in 2000, the General Assembly moved the State Energy office to the Department of Administration. They are the lead agency for programs in the State and focus on energy efficiency programs, renewable energy programs and by creating jobs for our state. They also work with the Utility Commission and Emergency Management when there is an energy emergency. Mr. Shirley said that the SEO is the lead agency if there is a supply cutoff of petroleum or fuels.

Mr. Shirley said that the first thing they did in the development of the SEP was to look at where the energy was flowing. Electric power generation, coal and nuclear power, supply half of our energy along with half of our emissions in the state.

Mr. Shirley said that we use a lot of petroleum; natural gas and the emissions coming from these are significant in terms of sulfur dioxide, nitrous oxide and greenhouse gases like carbon dioxide.

Mr. Shirley said that the state imports $7 billion worth of energy per year in terms of fuels. The more we can keep and develop in the State, the more jobs and the stronger our economy will be.

Mr. Shirley said that the SEP focuses on cutting our growth of consumption of energy out to year 2020. Some of the savings in transportation, some in industrial, some in residential and some in commercial will result in using 13 percent less energy if the SEP is followed.

Mr. Shirley said that the SEP was an eighteen month process with many public hearings which came up with 92 recommendations of which 15 were taken and made top priority for the next two years, beginning in September 2003.

Mr. Shirley said that the SEO is the lead agency for implementation of these programs, which will be overseen by the Energy Policy Council. The SEP will be revisited every two years and revised as is appropriate. A report will be made to the General Assembly as well as to the Governor.

Mr. Shirley said that one of the big reasons to develop energy efficiency is that it strengthens our economy. The SEO's has 36 existing renewable energy related manufacturing firms spread out over the state.

Mr. Shirley said that one of the primary recommendations of the SEO is creating a greenhouse gas registry to encourage reduction of greenhouse gasses in industry.

Mr. Shirley said that DENR and the SEO have developed a list of policy options and are now under consideration by DENR. These options focus on setting goals for reduction of greenhouse gases, including all of the area and point sources involved.

Mr. Shirley said that these emissions are likely to create credit and will be tradable.

Mr. Shirley said that alternative fuels and biomass are great renewable energy resources. A recommendation was made to develop this industry through matching grants and funding. It was suggested that some form of infrastructure be put into place for alternative fuels in each of our counties by 2007.

Mr. Shirley said there was also a recommendation of a $1 to $2 increase of vehicle registration fee to provide some of these matching grants and incentives.

Mr. Shirley said there was a lot of activity in this area. Pilot programs have begun to refund rebates and matching grants statewide. The State Motor fleet has over 1500 alternative fuel vehicles in its fleet.

Mr. Shirley concluded by saying that the State is working with Advanced Energy Corporation to develop hybrid school buses. They now have clean city programs established in the Triangle, the greater Charlotte region and in Asheville. These programs bring all of the stakeholders together to formulate the strategies as to where the fueling stations should go and how they should be developed locally.

Mr. Shirley said that DOT has become the leader in the use of bio diesel, which is 20 percent soybean oil mixed with diesel and is better for the environment than straight diesel.

Mr. Shirley continued by saying that some of our schools are working with model fuel cell cars and are converting full sized vehicles to electric vehicles so that the students can learn more about this technology and what is involved.

Mr. Shirley said that in the biomass area, one of the things the Council was concerned about is animal waste. They have started a project at NCSU to get ethanol from swine waste.

Mr. Shirley said that the Energy Policy Council suggested that the General Assembly consider adopting net metering for all utilities. The North Carolina Utilities Commission has an open docket on this issue and the North Carolina GreenPower Program is also considering the many issues related to interconnection to the grid.

Mr. Shirley said that negotiations are underway between renewable energy producers and our electric utility suppliers to see if they can work out a strategy that will be good for the State.

Mr. Shirley said that the Council also recommended that the General evaluate a renewable portfolio standard that compliments the GreenPower program. This program will be the way to launch renewable energy in our State.

Mr. Shirley said that the State had contracted with Appalachian State University Energy Center to evaluate the options and look at the job and economic impacts of various scenarios.

Mr. Shirley said that the Council also called on the General Assembly to look at the Mountain Ridge Protection Act of 1983 as it pertains to wind energy. There is an specific exclusion of windmills in the law but there is a wide variety of controversy about whether or not the turbines used today are what was intended under that law.

Mr. Shirley said that ASU has developed wind maps for the mountain region and is now developing them for the coastal region.

Mr. Shirley said that a lot of effort and funding had been put into the GreenPower program. The State Energy Office is one of the largest contributors to this program, along with the Attorney General's office and Smithfield Farms settlement.

Mr. Shirley said that the Solar Center at NCSU has started a residential green building program and has formed a consortium of people involved in day lighting to encourage natural lighting in our schools, office buildings and other public facilities.

Mr. Shirley said that they are looking at the economic impacts of incorporating solar water heating in new housing.

Mr. Shirley said that there are about 20 states that have laws relating to disclosure, which the GreenPower program may address.

Mr. Shirley said that the government buildings have been the major focus for the last eighteen months in North Carolina. An ambitious goal was

set to reduce our energy consumption by 4 percent a year over the next five years, or a 20 percent total reduction in our energy uses.

Mr. Shirley said that the state now has strategic energy plans for nearly every university campus and most of our state agencies. We have saved $1 million in the last year.

Mr. Shirley said that the General Assembly passed a bill in 2003 that allows performance contractors to go out to state facilities and engage in contract where energy measures are performed and paid for out of the energy savings generated. Sixteen firms have been qualified and applications are in from four universities and agencies.

Mr. Shirley said it is the law in North Carolina that when you build a building, you do an analysis of life cycle costs and have that certified by the State Construction office before building begins. They are now evaluating a random sample of plans of recently constructed buildings with the State Construction office.

Mr. Shirley said that they have now turned their attention to local governments and finding financing alternatives for them. They have developed with the DPI a program to do strategic energy plans in the school systems. Seventy school systems have already been signed up.

Mr. Shirley said that in the residential sector, focus has been on what can be done with affordable housing. With the help of the General Assembly, $1 million has been provided from petroleum escrow funds for low-income housing programs.

Mr. Shirley said that one way of funding for the renewable energy programs in the state is through a public benefit fund, which is being evaluated by the Energy Policy Council. There are 14 other states with public benefit funds which is a small charge on your electric and gas bills which funds these programs.

Representative McComas asked Mr. Shirley if the State Energy Office was trying to adopt and promote an energy efficiency plan service for new homebuilders.

Mr. Shirley said that most of their services have been on low-income housing. Some of the utilities have an audit service for industrial clients but not for residential housing.

Representative McComas asked Mr. Shirley to bring this issue up to the Energy Policy Council and find ways to promote this.

Representative Hackney said that he and Senator Kinnaird have a constituent who is interested in bio fuels and burning vegetable oils at the State level and asked Mr. Shirley if the State Energy office would be interested in this project.

Mr. Shirley said that the State Energy office issued three requests in the last year for proposals for alternative fuels in sustainable communities and one for clean energy technologies. Bio diesel has a lot of promise in the state and would assist with environmental emissions.

Mr. Shirley said that a major bio diesel conference was planned in North Carolina to highlight and raise awareness of what bio diesel can do for the State.

Representative McComas asked Mr. Shirley if his office had discussed bio diesel with the engine manufacturers.

Mr. Shirley said that his office had not had those discussions with manufacturers but it is something that should be looked into.

The report on the implementation and initial findings of the NC GreenPower program by Carl L. Wilkins was deferred to the next meeting on 20 April 2004.

Representative McComas announced the field trip to Belews Creek in Stokes County and said that members had been provided with directions to the facility.

The meeting was adjourned at 3:45 p.m.

Senator Daniel Clodfelter	Mary R. Watson
Presiding Co-Chair	Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Reports that are required by law to be made to the Commission – read only
EXHIBIT E:	Handout - recommendation by the Public Health Task Force on the organization of the environmental and public health programs and the administrative placement of those programs
EXHIBIT F:	Copy of Letter from Rules Review Commission declining the invitation to speak at today's meeting concerning the status of litigation against the Rules Review Commission over its decision and the Phase II stormwater runoff rules
EXHIBIT G:	Handout: Summary of comments on the Rules Commission's veto of the Environmental Management Commission's Phase II stormwater rules
EXHIBIT H:	Report by Dr. Charles M. "Mike" Williams, Director, Animal Waste Management Center, North Carolina State University, on issues related to the evaluation of alternative animal waste management technologies to determine whether those technologies are environmentally superior and economically feasible
EXHIBIT I:	Presentation by Mr. Joseph Rudeck, Senior Scientist, Environmental Defense, gave a presentation on what happens after an environmentally superior technology for hog waste treatment is designated
EXHIBIT J:	Handouts: Copy of the slides, a summary sheet of the major issues of the advisory group, and a final report on the Activities and Findings of DWQ Animal Feeding Operations Non-discharge General Permit Advisory Group
EXHIBIT K:	Handouts: Copy of Mr. Sherman's slide presentation and a copy of the final report on the resolution of issues related to notices of violation and notices of deficiency due to lagoon freeboard violations due to chronic rainfall conditions

EXHIBIT L:	Copy of report by Mr. Gary Hunt, Director, Division of Pollution Prevention and Environmental Assistance, DENR, on the development of environmental management systems (EMS) for pork producers
EXHIBIT M:	Copy of annual report on permitting and inspecting animal waste management systems/Animal Waste Compliance Report and the annual report on the compliance/enforcement of water quality laws for facilities that discharge into surface waters presented by Coleen Sullins. A copy of Ms. Sullins presentation in its entirety, as well as a copy of her slides and status reports for both presentations
EXHIBIT N:	Report by Mr. Robert M. Zarzecki on the Effectiveness of the Surface Water Identification Training and Certification Program (SWITC). A copy of Mr. Zarzecki's slide presentation and a copy of information regarding the SWITC program
EXHIBIT O:	Presentation by Mr. Paul S. Crissman - copy of the Annual Report on Solid Waste and a copy of his slides
EXHIBIT P:	Presentation by Mr. James C. Coffey on the status of municipal solid waste landfills both unlined and unlined
EXHIBIT Q:	Copy of presentation by Scott B. Mouw on Options for Reducing Waste in North Carolina
EXHIBIT R:	Handout: Report by Mr. Larry E. Shirley, Director of the Energy Policy Council and the revision of the State Energy Plan

March 25, 2004 ERC Meeting
EXHIBIT A

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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8 March 2004

TO: Members and Interested Parties – Environmental Review Commission

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meetings; Additional Information**

COMMISSION MEETING:

The Environmental Review Commission will meet at 9:30 a.m. Thursday 25 March 2004 in Room 643 of the Legislative Office Building in Raleigh.

At this meeting, the Commission will hear reports from State agencies, consider studies for which the Commission is responsible, discuss topics to be considered at future meetings, and attend to other matters. Listed below are potential agenda topics for this meeting. More specific information regarding the agenda for the 25 March meeting of the Commission will be developed at the staff planning meeting discussed below.

1) Interim Report on the Effectiveness of Surface Water Identification Training and Certification Program. (S.L. 2001-404, Sec. 2).

2) Annual Report on permitting and inspecting animal waste management systems/Animal Waste Compliance Report (G.S. 143-215.10M).

3) Annual Report on the compliance/enforcement of water quality laws for facilities that discharge into surface waters (G.S. 143-215.9A).

4) Report on the study conducted by the Department of Environment and Natural Resources regarding the use of general nondischarge permits for animal waste management systems for swine, cattle, and poultry operations on the land application and potential discharge of nitrogen and phosphorous to surface water and groundwater in the State (S.L. 2003-28, Sec. 2).

5) Annual report on the effectiveness of projects funded under the Agricultural Cost Share Program for Nonpoint Source Pollution Control (G.S. 143-215.74(e)).

6) Discussion of issues related to the evaluation of alternative animal waste management technologies to determine whether those technologies are environmentally superior and economically feasible.

7) Report on the resolution of issues related to Notices of Violation and Notices of Deficiency due to lagoon freeboard violations related to chronic rainfall conditions.

8) Information items on the State Energy Plan and NC GreenPower Program.

9) Information item on the Transportation Demand Management Program.

10) Annual report on the status of solid waste management efforts (G.S. 130A-309.06(c)).

11) Semiannual report on agency litter enforcement, litter prevention, and litter removal efforts (G.S. 147-12(b))

12) Annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund (G.S. 143-215.94M)

SITE VISIT:

The Commission may tour Duke Energy's Belews Creek Steam Station in Stokes County on **Friday 26 March 2004**. Belews Creek is being upgraded to control emissions pursuant to the S.L. 2002-4 (Clean Smokestacks Act) and is currently perhaps the largest construction project in the State. Detailed information about this possible site visit is being developed.

PLANNING MEETING:

To facilitate development of the agenda for the 25 March meeting of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel will hold an informal planning meeting at **10:00 a.m. on Friday 12 March 2004 in Room 605 of the Legislative Office Building**. Persons who wish to participate in the development of the agenda for meetings of the Commission, or who are interested in any matter before the Commission, are invited to attend.

SCHEDULE OF FUTURE MEETINGS:

Below is a schedule of meetings of the Commission for April through May 2004. Please note the following:

1. This schedule provides for a two-day meeting in April. In some months it may be desirable to have a two-day meeting to accommodate the workload. This also allows for the possibility of one or more out of town meetings that could include field trips. Thus this schedule is tentative and subject to adjustment. For planning purposes, however, please reserve these dates.

2. Meetings normally begin at 9:30 a.m., include a lunch break, and run until mid-afternoon. Please plan on meeting from 9:30 a.m. until 3:30 p.m.

3. To facilitate development of the agenda for meetings of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel holds informal planning meetings for staff and interested parties. Commission members are not expected to attend these meetings.

4. The 2004 Regular Session is scheduled to begin at 12:00 noon on Monday 10 May. The Commission normally meets shortly after the beginning of the session to complete work on legislative proposals prior to the commission/committee bill request deadline, which in 2004 is 4:00 p.m. Wednesday 12 May. The Tuesday 11 May meeting date is tentatively scheduled for this purpose.

Commission Meeting	Staff Planning Meeting
9:30 a.m. Tuesday 20 April (tentative)	10:00 a.m. Tuesday 13 April
9:30 a.m. Thursday and Friday 22 and 23 April	10:00 a.m. Tuesday 13 April
9:30 a.m. Wednesday 5 May	
2:30 p.m. Tuesday 11 May	

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. Friday 12 March 2004– 605 Legislative Office Building

Chronic Rainfall Working Group
2:00 p.m. Monday 15 March 2004 – 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel at (919) 733-2578.

March 25, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — March 25, 2004

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Arthur Mouberry	NWQ - Groundwater Section
DONNIE REDMOND	DENR - DAQ
Gary Hunt	DENR - DPPEA
Diana Rees	DENR - DPPEA
Beth Graves	DENR - DPPEA
David Vogel	DSWC
DENNIS RAMSEY	DENR - DWQ
Mike Williams	NCSU Box 7608 Campus
STEVE LEWIS	DENR - DWQ
Keith Larick	DENR - DWQ
Paul Sherman	DENR - DWQ

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION
Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Forrest Westall	DENR - DWQ - Asheville
T REEDER	DWQ
Steve Wall	DENR
Robin Smith	DENR
Courtney Washburn	NC Sierra Club
Amy Pickle	Southern Env. Law Center
Michael Nelson	Conservation Council of NC
James Gulick	NCAGO
Joe Rudek	Environmental Defense
DAN WHITTLE	ENVIRONMENTAL DEFENSE
Tom Bean	" "

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 3/25/04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Christine Wunsche	NCPIRG - Raleigh
[signature]	Capitol Group / Progress Energy
Trip VanNoppen	Southern Environmental Law Center
Elizabeth Outts	NCPIRG
Mavis Mickel	BREAC
Don Freeman	Cape Fear River Assembly
Lisa Glaver	AG's office / transportation sec.
Beth Warren	AG's office/Env. Div.
Tammy Harvey	AG's office/Env. Div.
Sharon Stroud	State Energy Office, DOA
Dick Carlton	Carlton + Alexander, PLLC

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION
Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Kim Hibbard	NCLM
GEORGE H. PETTUS	GOLDSBORO HOG FARMS
Garth Boyd	Smithfield Foods
David McLeod	NC. Dept. of Ag. & CS
David Meredith	NC state Grange
MARTIN GUTHRIE JR.	PREMIUM STANDARD FARMS
LYNN WORLEY-DAVIS	NC STATE UNIVERSITY
TAD BIGGS	NCDENR
Beth Anne Mumford	NCPC
Bob Sloan	NC FORESTRY ASSOC
Nancy Thompson	NMC.IC

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION
Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Rick Zechini	NC Assoc. of REALTORS
Lucius Pullen	NCMA Counsel
[illegible] Sr	Undisclosed
Sandra Long	Martin Marietta
Paul Cummings	N.C. Pork Council
CARL WILKINS	NC GREEN POWER
Sam Watson	NC Utils Comm

March 25, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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AGENDA
9:30 a.m. Thursday 25 March 2004
Room 643 – Legislative Office Building

1. Call to order
   Senator Daniel G. Clodfelter, Presiding

2. Introductory remarks by Cochairs
   Senator Daniel G. Clodfelter
   Senator Charles W. Albertson
   Representative Pryor A. Gibson
   Representative Daniel F. McComas

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Status of petitions to the Administrator of the United States Environmental Protection Agency (EPA) filed by North Carolina under Section 126 of the federal Clean Air Act for purposes of reducing interstate transport of ozone and its precursors
   James C. Gulick, Senior Deputy Attorney General
   Environmental Division, North Carolina Department of Justice

5. Update on issues related to the Phase II stormwater rules
   George F. Givens, Commission Counsel

   James C. Gulick, Senior Deputy Attorney General
   Environmental Division, North Carolina Department of Justice

   Donnell "Trip" Van Noppen, III, Carolinas Office Director
   Southern Environmental Law Center

6. Discussion of issues related to the evaluation of alternative animal waste management technologies to determine whether those technologies are environmentally superior and economically feasible
   Charles M. "Mike" Williams, Director
   Animal Waste Management Center, North Carolina State University

Joseph Rudek, Senior Scientist
Environmental Defense

7a. Report on the study conducted by the Department of Environment and Natural Resources (DENR) regarding the use of general nondischarge permits for animal waste management systems for swine, cattle, and poultry operations on the land application and potential discharge of nitrogen and phosphorous to surface water and groundwater in the State (S.L. 2003-28, Sec. 2)

Forrest R. Westall, Regional Supervisor
Asheville Regional Office, Division of Water Quality, DENR

Thomas A. Reeder, Supervisor
Classification and Standards Unit, Division of Water Quality, DENR

7b. Report on the resolution by the 605 Working Group of issues related to Notices of Violation (NOVs) and Notices of Deficiency (NODs) for lagoon freeboard violations due to chronic rainfall conditions

M. Paul Sherman, Environmental Engineer
Division of Water Quality, DENR

7c. Comments on the general nondischarge permit study and on the resolution of issues related to freeboard violations due to chronic rainfall

Beth Anne Mumford, Director of Public Affairs
North Carolina Pork Council

Daniel J. Whittle, Senior Attorney
Environmental Defense

8. Report on the development of environmental management systems (EMS) for pork producers

Gary Hunt, Director
Division of Pollution Prevention and Environmental Assistance, DENR

9. Annual report on permitting and inspecting animal waste management systems/Animal Waste Compliance Report (G.S. 143-215.10M)

Coleen H. Sullins, Deputy Director
Division of Water Quality, DENR

10. Annual report on the compliance/enforcement of water quality laws for facilities that discharge into surface waters (G.S. 143-215.9A)

Coleen H. Sullins, Deputy Director
Division of Water Quality, DENR

LUNCH BREAK – Estimated for 12:30 p.m. to 1:15 p.m.

11. Report on the effectiveness of the Division of Water Quality's program to train and certify individuals to determine the presence of surface waters that would require the application of

rules adopted by the Environmental Management Commission for the protection of riparian buffers (S.L. 2001-404, Sec. 2); Report on efforts to update maps and other tools used to indicate the presence of surface water

Robert M. Zarzecki, Environmental Specialist
Wetlands/401 Certification Unit, Division of Water Quality, DENR

David L. Penrose, Environmental Biologist
Wetlands/401 Certification Unit, Division of Water Quality, DENR

12. Annual report on the status of solid waste management efforts (G.S. 130A-309.06(c))

James C. Coffey, Chief
Solid Waste Section, Division of Waste Management, DENR

Paul S. Crissman, Head
Planning and Program Management Branch, Solid Waste Section, Division of Waste Management, DENR

Scott B. Mouw, Chief
Community and Business Assistance Section, Division of Pollution Prevention and Environmental Assistance, DENR

13. Report on the Energy Policy Council and the revision of the State Energy Plan

Larry E. Shirley, Director
State Energy Office, Department of Administration

14. Report on the implementation and initial findings of the NC GreenPower program

Carl L. Wilkins, Program Manager
NC GreenPower, Advanced Energy

15. Commission discussion and announcements

16. Adjourn

SCHEDULE OF FUTURE MEETINGS:

Friday 26 March 2004 -- Site Visit to Belews Creek Steam Station
On Friday 26 March 2004, those members and staff of the Commission who can participate will tour Duke Power's Belews Creek Steam Station. The Belews Creek Steam Station is located north of Winston-Salem in southeastern Stokes County. The tour will begin at 11:30 a.m. and should finish by approximately 2:00 p.m. No business meeting will be held in connection with this tour.

Tuesday 13 April 2004 -- Staff Planning Meeting
To facilitate development of the agenda for meetings of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel will hold an informal public planning meeting for staff and interested parties at 10:00 a.m. on Tuesday 13 April 2004 in room 605 of the Legislative Office Building. This meeting will serve as the public

Commission Staff Planning Meeting for the Commission meetings scheduled for 20 April 2004, 22 April 2004, 5 May 2004 and 11 May 2004.

Tuesday 20 April 2004 -- Regular Business Meeting
Time: 9:00 a.m.
Location: 1228 Legislative Building

Thursday 22 April and Friday 23 April 2004 – Special business meeting in Brevard; Site visit to Gorges State Park and Dupont State Forest
The Commission will hold a special business meeting in Brevard on Thursday 22 April 2004 at a time to be determined. This special meeting will focus primarily on various matters related to land conservation and preservation of open spaces and will be held in conjunction with a tour of Gorges State Park, Dupont State Forest, and other sites on Thursday 22 April 2004 and Friday 23 April 2004. Specific directions, information on accommodations, and a more detailed itinerary will be provided at a later date.
Time: To be determined
Location: Specific location in Brevard to be determined

Wednesday 5 May 2004 -- Regular Business Meeting
Time: 9:30 a.m.
Location: 643 Legislative Office Building

Tuesday 11 May 2004 -- Regular Business Meeting
Time: 2:30 p.m. (tentative)
Location: 643 Legislative Office Building

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. 31 March 2004 – 605 Legislative Office Building

March 25, 2004 ERC Meeting
EXHIBIT D

Cape Fear River Assembly
P.O. Box 1089 • Fayetteville, NC 28302
Phone (910) 223-4920 • Fax (910) 486-9057
e-mail: cfra@faynet.com

March 23, 2004

Mr. George Givens
Commission Counsel
Room 541 Legislative Office Building
300 North Salisbury Street
Raleigh, North Carolina 27611

Dear Mr. Givens:

Pursuant to Senate Bill 352, Section 15.14, the General Assembly required that the Cape Fear River Assembly, Inc., report to the Environmental Review Commission regarding uses of funds appropriated to the Cape Fear River Assembly by the 1997 Session of the General Assembly. Although, this reporting requirement was repealed in House Bill 1006 of Session 2001, a Cape Fear River Funds status report was considered appropriate due to a reallocation of funds. This report on the Cape Fear River Program includes the twenty-fifth quarter of activity.

If you have any questions, please contact me at (910)-223-4601.

Sincerely,

Don Freeman

Don Freeman
Executive Director

CAPE FEAR RIVER ASSEMBLY

QUARTERLY REPORT TO THE NORTH CAROLINA GENERAL ASSEMBLY

REPORT PERIOD: October 1, 2003 through December 31, 2003

Fiscal disbursements for the twenty fifth quarter of activity after the N.C. General Assembly 1997 appropriation of $1,500,000 to the Cape Fear River Assembly were $0.

Measures/Actions taken during the report period were as follows:

1) All Lower and Middle Basin projects supported by this appropriation have been completed.

2) All Upper Basin projects supported by this appropriation were completed except for the Comprehensive Monitoring project, the GIS support services project, the Upper Storm Event Sampling project, and the Upper Watershed Management project.

3) The Upper Basin Comprehensive Monitoring project was approved to be conducted through April 30, 2004 and $35,914 remain to be applied therein.

4) The GIS support services project, the Upper Storm Event Sampling project, and the Upper Watershed Management project were to have been completed approximately two or more years ago. Of the $285,432 approved for these three projects, $194,185 has been paid for work completed. Requests for project extensions have not been received, and, accordingly, the $91,247 remaining from these three expired projects will be applied to other Cape Fear River Basin water resource research projects/efforts.

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: George Givens
Environmental Review Commission Counsel

FROM: William G. Ross, Jr. WGR

DATE: December 4, 2003

RE: Report on the Dry-Cleaning Solvent Cleanup Act Program

Pursuant to G.S. 143-215.104U, I am transmitting a report on the Dry-Cleaning Solvent Cleanup Act Program. This annual report provides an overview of program activities for 2003.

The report was prepared by DENR's Division of Waste Management. If you have any questions or would like additional information, please contact Dexter Matthews at 733-4996.

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Annual Report to the Environmental Review Commission

The Dry-Cleaning Solvent Cleanup Act Program

October 2003

NCDENR

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

Superfund Section
Division of Waste Management
www.wastenotnc.org
www.ncdsca.org

Department of Environment and Natural Resources

Michael F. Easley
Governor

William G. Ross Jr.
Secretary
NC Department of Environment and Natural Resources

Dexter R. Matthews
Director
Division of Waste Management

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DRY-CLEANING SOLVENT CLEANUP ACT ANNUAL REPORT

Executive Summary

As required by the Dry-Cleaning Solvent Cleanup Act (DSCA) of 1997 and amendments (G.S. 143-215.104A *et seq.*), this report provides an annual update on activities conducted in the Dry-Cleaning Solvent Cleanup Act Program in 2003. The DSCA of 1997 and its amendments created a fund for assessment and cleanup of drycleaning solvent environmental contamination at dry-cleaning and wholesale distribution facilities.

Significant progress has been made in all aspects of program implementation. Areas of program development showing the most progress are Prioritization Assessment Agreements, work authorizations, Prioritization Assessments, priority ranking, guidance development, database development, outreach and contracting.

The Department of Environment and Natural Resources (DENR) has identified152 operating or abandoned drycleaning facilities with environmental contamination by drycleaning solvent. Of these, 85 have voluntarily petitioned for acceptance, and 82 have been certified into the DSCA Program. During 2003, assessment and/or remediation have been authorized at 23 sites and 17 sites have been assigned a priority ranking score.

Currently, the majority of claims against the Fund are for "past costs." The DSCA Program is authorized to reimburse petitioners for reasonable, necessary and documented costs incurred between October 1997 and June 2001 in certain situations. Petitioners have submitted past cost reimbursement claims for 13 sites totaling $2,612,290. These claims are currently under review. Once all 13 sites have been ranked as to priority, reimbursements will be made in the order of highest to lowest priority. The cost of the authorized work is $318,920.60. Of that amount, approximately $110,000 will exceed site deductibles and will be reimbursed to petitioners.

With the infusion of the sales tax monies, which began in July 2003, DSCA now appears to have sufficient financial resources to assess and clean up the contaminated drycleaning facilities identified to date by DENR. New discoveries will continue to be reported, largely due to property transactions. However, with 14 new sites reported in 2003, if the rate of discovery remains steady, the influx of new sites into the program should not overwhelm the DSCA Fund.

Program Status

The DENR has made significant progress in implementing the DSCA. DENR has solicited input from members of the DSCA Stakeholders Working Group (DSCA Stakeholders) and other interested parties to develop new policies and procedures. This group includes the following:

- DENR representatives and its attorney from the Department of Justice,

- Drycleaners from leadership of the North Carolina Association of Launderers and Cleaners,
- Environmental consultants,
- Representatives from environmental advocacy organizations,
- Drycleaners using alternative dry-cleaning technologies,
- North Carolina State University's School of Textiles faculty, and
- Private attorneys representing drycleaners and shopping centers.

A summary of DSCA program status is provided in Table 1 and a discussion of significant achievements follows. Specific areas of discussion include rule making, program development, contracting, work authorizations, prioritization assessments, site priority ranking, database development and outreach.

Table 1. Summary of DSCA Program Status

DSCA Process	Status as of October 1, 2003
Step 1. The drycleaner or property owner petitions DENR for certification.	To date, 85 sites have petitioned for entry into the Program. The main motivating factors for petitioning have been real estate transactions and redevelopment.
Step 2. DENR certifies the site and checks for imminent threats.	Of the 85 sites that have petitioned, 82 sites have been certified into the Program. The 3 sites that have not yet been certified are currently under review. Each petition is reviewed for imminent threats to human health and the environment. Drinking water sources have been identified in proximity to several sites. Evaluation of potential imminent threats has been expedited for these sites.
Step 3. The drycleaner signs an assessment agreement with DENR.	The Prioritization Assessment Agreement (PAA) is a legally binding agreement between DENR and the petitioner that commits the Petitioner to conduct a prioritization assessment (PA) at the site. DSCA has prepared 78 PAAs, of which 71 have been executed.
Step 4. The drycleaner conducts a prioritization assessment.	Following execution of the PAA, petitioners have 30 days to submit a detailed PA work plan and corresponding cost proposal to DSCA for approval. To date, 23 PA proposals have been negotiated and approved; 15 PAs are complete.
Step 5. DENR ranks the site and checks again for imminent threats.	Information collected during the PA is used by DSCA to rank each site in terms of risk to human health and the environment. The DSCA Prioritization Ranking System and supporting database application were developed to efficiently assign priority ranking scores to sites. To date, 17 sites have been prioritized and both higher and lower priority sites have been identified. Monitoring is being conducted of public and private supply wells at several higher priority sites.
Step 6. DENR contracts for comprehensive assessment and cleanup.	After the PA stage is complete and the site is ranked, the drycleaner will typically no longer have to contract for additional site work. DENR will contract directly for site investigation and cleanup using four state-lead environmental and engineering firms. These four firms will be granted initial contracts totaling $2.4 million.

Rule Making

DENR has been delegated the task of developing proposed rules that establish a risk-based approach to assess, prioritize and clean up dry-cleaning solvent contamination that resulted from releases at certified facilities or abandoned sites. DSCA is developing a two-fold framework to create the risk-based rules. First, there are ongoing discussions with the DSCA Stakeholders. Second, review of risk-based rules developed by other states with drycleaning solvent cleanup programs is taking place. DSCA will begin drafting proposed rules in late fall of 2003.

Program Development

The primary objective of DSCA in 2003 was to fully implement the program. To attain this goal, DSCA staff directed significant energy towards the development of needed policies and procedures. In addition, staff focused on reviewing petitions, determining site eligibility, executing agreements with petitioners, screening sites for imminent hazards, supply well sampling and prioritizing sites for corrective action.

DSCA has created several new procedural forms and guidance documents for use by petitioners and others (e.g., attorneys, developers, environmental consultants.) To reduce resource consumption and optimize customer service, DSCA uses its Web site (www.ncdsca.org) and e-mail as the primary means to deliver program documents to its customers. Procedures, forms and documents that were finalized during 2003 include the following:

- Prioritization Assessment (PA) Work Plans and Cost Proposals Guidance
- Prioritization Assessment Agreements (PAAs)
- Work Authorization Forms
- Change Order Forms
- Prioritization Ranking Form (PRF)
- Prioritization Scoring Letter Form
- Certification of Cost Forms
- Disbursement Request Forms
- Professional Services Rate Table

Work Authorizations

Work plan review has been an especially important and labor intensive task for DSCA during 2003. Guidance was developed in 2002 to assist environmental contractors in developing work plans and cost proposals (proposals) and to streamline DSCA's review. However, work plans submitted to DSCA have required detailed technical and financial review and negotiations with consultants. DSCA has reviewed and approved proposals for assessment or remediation at 23 sites.

At this phase of program development, it is critical that the review process focuses on continuity and consistency in terms of work plan scope and work plan costing. This is

being achieved using a multi-phased approach. Each DSCA project manager reviews work plans for cost effectiveness and technical soundness. The DSCA Program Manager is then responsible for the final review of each authorized work plan. This ensures consistency between project managers and individual projects. The DSCA database has been expanded to allow for input of all work plan costing details. Access to this data helps the DSCA project managers maintain consistency in approved costs. In the future, reasonable rates may be developed from the database. DSCA considers the time devoted to current work plans as essential; decisions made now may well drive future policies.

Prioritization Assessments

DSCA uses information collected during the PA to rank sites in terms of their relative threat to human health and the environment. DSCA has reviewed work plans and issued work authorization for consultants to complete PAs at 23 sites. Additionally, DSCA project managers prepared Prioritization Ranking Forms (PRFs) and ranked 3 sites with files containing sufficient information. To date, 14 PAs have been completed.

Prioritization Assessment Ranking

Environmental contractors are required to report their PA findings in a Prioritization Assessment Report (PAR) and complete a PRF. DSCA uses the PRF to assign a numeric ranking score to each site. Currently, 17 sites are ranked. Both higher and lower priority sites have been identified. DSCA will address sites based on their score and the availability of monies in the DSCA Fund.

Contracting

DSCA made progress toward establishing state-lead contracts for environmental services in 2003. The State Building Commission approved DSCA to award four contracts in November 2002. These four firms will be granted initial contracts totaling $2.4 million. Contract negotiations are currently in progress and contracts should be in place by January 2004.

Database Application

DSCA has invested significant time and effort to develop and refine its database/GIS application. Rapid application development techniques have been used to ensure DSCA's ability to manage data is flexible and can grow with the program. Technical and financial information has been entered into the database. Its programmatic tracking and reporting applications are frequently revised to respond to changing information management needs.

Major improvements in 2003 focused on refining the database so that it could track project account details. Reporting capabilities include project status, planned site actions, site deductibles, costs applied toward the deductible, past cost reimbursements, invoices, payments, work authorized on a per cost basis, and change orders.

Outreach

DENR continues its outreach efforts to educate drycleaners about the Minimum Management Practices Rules (15A NCAC 2S) and DSCA procedures and policies. DSCA staff have spoken at North Carolina Association of Launderers and Cleaners (NCALC) and local Korean drycleaners association meetings. DSCA has published several articles in the NCALC newsletters in an effort to reach all drycleaners in North Carolina. Outreach efforts have also been made to shopping mall owners, environmental service providers and the legal community.

DSCA uses its web address, www.ncdsca.org, to provide programmatic information, guidance documents, applicable laws, rules and downloadable forms to assist the public and the regulated community.

Finally, DSCA has continued its association with dry-cleaning programs in other states through its participation in the State Coalition for the Remediation of Drycleaners. This work group is sponsored by the EPA's Technology Innovation Office. DSCA has benefited greatly from this organization by learning from the experiences of other states.

Annual Report Elements Required by G.S. 143-215.104U

(1) DRY-CLEANING SOLVENT CONTAMINATION REPORTED TO THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

DSCA maintains files and a database inventory of 152 sites that are contaminated by drycleaning solvent. This number represents all drycleaning solvent releases known to DENR, assuming other agencies have forwarded notices of release to DSCA. However, it has been estimated that over 900 contaminated current or former dry cleaning sites exist in North Carolina. Table 2 provides a list, by county, of all sites contaminated with dry cleaning solvent. A total of 14 new drycleaning solvent releases were reported to DSCA in 2003. The new reports appear to have resulted from real estate transactions and redevelopment projects.

(2) SITES CERTIFIED BY THE COMMISSION

DSCA must review a petition and the site file to determine if the site and the petitioner meet the statutory criteria for certification into the Program. Of the 85 sites that have petitioned for Program entry, 82 have been certified into the Program. The three sites that have not yet been certified have newly received petitions that are currently under review. The certified sites, along with the dates of certification, are shown in Table 2.

Table 2. Sites with Drycleaning Solvent Contamination

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
ALAMANCE COUNTY (2)					
001-0001	DELUXE CLEANERS AND LAUNDRY				
001-0002	WORKMAN PROPERTY				
BRUNSWICK COUNTY (2)					
010-0001	TOWN GATE CLEANERS	7/25/01	1/10/02	10/11/02	
010-0002	LOVE CLEANERS, INC.	10/20/02	10/30/02	11/20/02	9/ 9/03
BUNCOMBE COUNTY (1)					
011-0001	SWANNANOA LAUNDRY	8/31/01	11/ 2/01	3/25/03	
BURKE COUNTY (1)					
012-0001	FERREE CLEANERS	8/22/03			
CABARRUS COUNTY (1)					
013-0001	FULLER SUPPLY COMPANY	11/ 1/02	12/17/02	5/ 7/03	
CARTERET COUNTY (1)					
016-0001	COASTAL DRY CLEANERS	7/24/02	7/18/02	4/21/03	
CLEVELAND COUNTY (1)					
023-0001	FOLKS DRY CLEANERS	1/ 2/02	2/ 6/02	1/30/03	6/19/03
CUMBERLAND COUNTY (4)					
026-0001	MAYFLOWER LAUNDRY AND DRY	6/28/02	9/16/02	12/19/02	
026-0002	EASY WASH DRY CLEANERS				
026-0003	SMITTYS CLEANERS				
026-0004	KORE-O-MAT LAUNDROMAT	3/27/02	5/15/02	4/ 2/03	
DAVIE COUNTY (1)					
030-0001	FALLIES DRY CLEANING				
DURHAM COUNTY (8)					
032-0001	ONE HOUR KORETIZING				
032-0002	PLANTS UNLIMITED				
032-0003	TRIANGLE SQUARE CLEANERS	8/16/01	1/10/02	3/17/03	
032-0004	EAKES CLEANERS				
032-0005	AMERICAN DRY CLEANERS	6/28/02	9/26/02	5/30/03	
032-0006	AMERICAN DRYCLEANERS				
032-0007	MODEL LAUNDRY				
032-0008	W.P. BALLARD	11/ 5/01	1/23/02	10/24/02	
FORSYTH COUNTY (11)					
034-0001	CAMEL CITY CLEANERS				
034-0002	SHORES CLEANERS				
034-0003	A CLEANER WORLD				
034-0004	HOOKER FURNITURE				
034-0005	KLEAN RITE CLEANERS				
034-0006	YOUNG CLEANERS				
034-0007	CAMELOT CLEANERS	6/28/02	9/23/02	4/ 1/03	
034-0008	HOUR GLASS CLEANERS	6/17/02	8/15/02	10/11/02	6/11/03
034-0009	SMITH DRY CLEANERS	10/18/02	12/17/02		
034-0010	C AND S CLEANING SERVICES				
034-0011	CAMELOT CLEANERS	3/25/02	5/14/02	12/10/02	3/11/03
GASTON COUNTY (2)					
036-0001	UNTZ DRYCLEANERS - SUPERFUND'S NATIONAL PRIORITY LIST				
036-0002	CARSONS DRYCLEANERS				
GRANVILLE COUNTY (1)					
039-0001	OXFORD DRY CLEANERS				

Table 2. Sites with Drycleaning Solvent Contamination Continued

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
GUILFORD COUNTY (18)					
041-0001	CLEANER IMAGE	10/16/02	12/16/02		
041-0002	CINDERELLA CLEANERS				
041-0003	U.S. $1.75 CLEANERS	5/21/02	8/21/02	3/ 5/03	
041-0004	COLUMBIA LAUNDRY CORP				
041-0005	DUTCH CLEANERS				
041-0006	EASTGATE CLEANERS	11/ 8/02	9/ 3/02	12/16/02	
041-0007	MASTER KLEEN	6/26/02	10/25/02	2/21/03	
041-0008	A CLEANER WORLD	6/24/02	11/ 4/02	3/26/03	
041-0009	EVERHART DRY CLEANERS	11/30/01	12/ 6/01	1/ 6/03	6/ 9/03
041-0010	GLAM-O-RAMA				
041-0011	O HENRY CLEANERS				
041-0012	STOKESDALE FIRE DEPARTMENT				
041-0013	BANNER LAUNDRY				
041-0014	MASTER KLEEN CLEANERS	7/ 6/01	12/ 6/01	11/18/02	
041-0015	A CLEANER WORLD				
041-0016	$2.50 PRO CLEANERS				
041-0017	PREMIER CLEANERS	4/24/03	6/ 6/03	6/24/03	
041-0018	DRY CLEAN AMERICA	2/27/03	3/24/03	4/16/03	
HENDERSON COUNTY (2)					
045-0001	BLUE RIDGE CLEANERS				
045-0002	VILLAGE ONE HOUR CLEANERS	10/18/01	9/19/02		
IREDELL COUNTY (2)					
049-0001	SMITHS DRY CLEANERS				
049-0002	JOHNSON CLEANERS, INC.	1/14/02	1/25/02	8/ 5/03	
LINCOLN COUNTY (1)					
055-0001	LINCOLN CLEANERS	1/ 9/02	7/17/02	11/26/02	
MARTIN COUNTY (1)					
059-0001	WILLIFORD CLEANERS				
MCDOWELL COUNTY (1)					
056-0001	NICHOLS LAUNDRY AND DRY CLEANING				
MECKLENBURG COUNTY (31)					
060-0001	A CLEANER WORLD				
060-0002	AMERICAN DRY CLEANER				
060-0003	CROSSROADS DRY CLEANERS				
060-0004	MINUTE MAN CLEANERS	5/10/02	6/13/02	1/ 6/03	6/11/03
060-0005	MITCHELLS FORMAL WEAR WAREHOUSE	6/28/02	10/ 1/02	2/10/03	8/13/03
060-0006	PEOPLES CLEANERS				
060-0007	QUAIL DRY CLEANERS	3/25/03	4/24/03	8/ 5/03	
060-0008	SNO-WHITE CLEANERS AND LAUNDERERS	6/28/02	9/26/02	6/ 9/03	
060-0009	SPRINGFRESH CLEANER				
060-0010	BOGGS AND COMPANY		12/ 2/02	5/21/03	8/28/03
060-0011	SNO-WHITE CLEANERS	6/28/02	10/25/02	5/30/03	
060-0012	DOMESTIC LAUNDRY	2/11/02	2/21/02	4/ 1/03	
060-0013	CUNNINGHAM CLEANERS				
060-0014	ONE PRICE DRYCLEANING	3/27/02	4/26/02	1/ 6/03	
060-0015	CARRIAGE FINE DRY CLEANING				
060-0016	60 MINUTE CLEANERS	7/ 1/02	1/30/03		
060-0017	GATEWAY VILLAGE DEVELOPMENT				
060-0018	SUDS N DUDS				
060-0019	CUNNINGHAM CLEANERS				
060-0020	HOME DEPOT				
060-0021	HEARTS DRY CLEANERS	8/29/02	10/25/02	6/ 9/03	

Table 2. Sites with Drycleaning Solvent Contamination Continued

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
MECKLENBURG COUNTY (contd)					
060-0022	RAINBOW CLEANERS				
060-0023	PRESTOWN LAUNDRY AND CLEANERS	8/16/01	12/ 6/01	2/21/03	
060-0024	60 MINUTE CLEANERS	10/ 8/01	12/21/01	12/16/02	
060-0025	HO CLEANERS	10/ 3/01	12/11/01	12/16/02	
060-0026	SNO-WHITE CLEANERS	1/25/02	4/26/02	12/19/02	
060-0027	CHARLIE BROWNS DRY CLEANERS				
060-0028	SHARON CLEANERS	3/15/02	7/ 2/02	4/ 8/03	
060-0029	ABRA COSTUMES	4/29/03	5/ 6/03	5/14/03	6/ 4/03
060-0030	VILLAGE CLEANERS	6/11/03	7/14/03	7/23/03	
060-0031	SNO-WHITE CLEANERS	8/26/03			
MOORE COUNTY (4)					
063-0001	PINEHURST HOTEL CLEANERS	8/24/01	12/21/01	1/ 7/03	
063-0002	CARTERS FABRICARE				
063-0003	CARTERS LAUNDRY AND CLEANING	3/25/02	5/ 7/02		
063-0004	SOAPY BUBBLES	8/30/02	9/24/02	12/16/02	
NASH COUNTY (2)					
064-0001	CLEAN-CLEAN DRY CLEANERS				
064-0002	CLEAN-CLEAN DRY CLEANERS				
NEW HANOVER COUNTY (5)					
065-0001	MODERN DRY CLEANERS AND LAUNDRY	1/ 3/03	6/ 9/03		
065-0002	COASTAL DRY CLEANERS	6/26/02	11/ 8/02	2/ 7/03	
065-0003	COASTAL DRY CLEANERS AND COIN				
065-0004	COASTAL DRY CLEANERS	6/28/02	11/ 8/02	2/12/03	
065-0005	WILLIAMS CLEANERS	12/ 7/01	12/17/01	2/12/03	
ONSLOW COUNTY (5)					
067-0001	ABC ONE HOUR CLEANERS - SUPERFUND'S NATIONAL PRIORITY LIST				
067-0002	SOUTHERN CLEANERS AND LAUNDRY	12/20/01	5/ 2/02	11/14/02	6/11/03
067-0003	COASTAL DRY CLEANERS				
067-0004	COASTAL DRY CLEANERS				
067-0005	VILLAGE CLEANERS	5/21/02	6/24/02	11/18/02	
ORANGE COUNTY (3)					
068-0001	KSP CLEANERS	10/19/01	2/ 6/02	3/25/03	6/ 5/03
068-0002	AMERICAN DRY CLEANERS				
068-0003	DELUXE CLEANERS	6/10/03	7/11/03	9/23/03	
PASQUOTANK COUNTY (1)					
070-0001	SOUTHGATE KORETIZING	5/ 6/02	6/14/02	2/12/03	6/23/03
PITT COUNTY (5)					
074-0001	KORETIZING CLEANERS				
074-0002	AYDEN PLAZA				
074-0003	BETTER LOOK GARMENT CARE				
074-0004	BOWEN CLEANERS	8/ 8/03	8/28/03		
074-0005	BOWEN CLEANERS	7/21/03			
POLK COUNTY (1)					
075-0001	BROCKS CLEANERS	10/22/01	1/28/02	2/27/03	
RANDOLPH COUNTY (1)					
076-0001	HILLSIDE LAUNDROMAT				
ROBESON COUNTY (1)					
078-0001	STEVENS DRY CLEANERS				
ROWAN COUNTY (2)					
080-0001	SHUPING CLEANERS	12/17/02	1/10/02	5/ 6/03	
ROWAN COUNTY (2)					
080-0002	AVALON CLEANERS				

Table 2. Sites with Drycleaning Solvent Contamination Continued

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
SURRY COUNTY (1)					
086-0001	MODERN LAUNDRY AND DRY CLEANERS	7/22/02	9/16/02	11/18/02	
WAKE COUNTY (24)					
092-0001	PRO CLEANERS	8/17/01	12/13/01	11/20/02	
092-0002	SHERRILLS DRY CLEANERS				
092-0003	RAINBOW CLEANERS AND LAUNDRY	6/28/02	9/26/02	5/30/03	
092-0004	MEDLIN-DAVIS CLEANERS	4/22/03	4/29/03	5/14/03	
092-0005	DJ CLEANERS	8/12/03	8/14/03	9/ 2/03	
092-0006	HILKERS CLEANERS	3/21/02	6/12/02	2/27/03	
092-0007	BROTHERS CLEANERS	12/ 7/01	1/23/02	7/10/03	
092-0008	JOHNSONS DRY CLEANERS	1/10/02	5/ 6/02	4/ 2/03	
092-0009	KNIGHTDALE CLEANERS				
092-0010	FULLER SUPPLY COMPANY				
092-0011	MEDLIN-DAVIS CLEANERS	11/21/01	2/ 6/02	7/ 3/03	
092-0012	NEWTONS CLEANERS	6/28/02	12/12/01	8/14/03	
092-0013	MEDLIN-DAVIS CLEANERS	6/28/02	12/12/01	8/14/03	
092-0014	GLAM-O-RAMA CLEANERS	2/12/02	2/27/02		
092-0015	EMPORIUM CLEANERS	2/20/02	3/28/02	10/24/02	
092-0016	NEW HOPE CLEANERS AND TAILORS	4/ 8/02	5/17/02	3/31/03	
092-0017	BROTHERS CLEANERS	8/23/02	9/12/02	11/ 7/02	
092-0018	ACE DRY CLEANERS	6/28/02	1/30/03	2/27/03	
092-0019	SANITARY LAUNDRY	8/ 9/02	10/ 8/02		
092-0020	SHERRILL'S DRY CLEANING AND	3/13/03	4/ 7/03	4/24/03	
092-0021	T AND J CLEANERS	3/31/03	4/22/03	6/19/03	
092-0022	MEDLIN DAVIS CLEANERS	4/ 2/03	4/21/03	5/14/03	
092-0023	POPES DRY CLEANERS	8/13/03	9/24/03		
092-0024	BROTHERS CLEANERS				
WAYNE COUNTY (1)					
096-0001	PENNY DRY CLEANERS				
WILSON COUNTY (4)					
098-0001	KORETIZING CLEANERS	4/15/02	5/21/02	2/ 6/03	
098-0002	DISCOUNT CLEANERS	4/15/02	7/19/02		
098-0003	EXCLUSIVE CLEANERS				
098-0004	EXCLUSIVE CLEANERS				
TOTALS:	152 Identified Contaminated Sites	84	82	71	12

Data from these petitions have been compiled to evaluate general site characteristics. A summary is presented in Table 3. The majority of the petitioners are property owners (63), as opposed to drycleaner business owners/operators (37). Of the sites that applied, 68 percent have been abandoned.

Table 3. DSCA Site Statistics

Petition Status	Number	Percent of Total
Sites Petitioned in Program	85	----
Sites Certified	82	97
Sites Pending Certification	3	3
Site Classification		
Abandoned	56	67
Wholesale Distribution	2	2
Operating	23	27
Undetermined	3	4
Size Distribution of Operating Sites		
Small Size (1-4 employees)	7	30
Medium Size (5 - 9 employees)	8	35
Large Size (≥ 10 employees)	8	35
Distribution and Classification of Petitions[1]		
Property Owners	68	64
Dry Cleaning Business Owners/Operator	39	36

(3) COST ESTIMATE FOR ASSESSMENT AND REMEDIATION OF CERTIFIED SITES

Comprehensive assessment and cleanup at certified sites is pending as sites are prioritized and contracts with state-lead contractors are executed. Therefore, there is no reason to revise the cost estimates from previous annual reports. For the purpose of estimating, it is assumed that 30 percent of sites that enter the program will require active cleanup and that the remainder will require monitored natural attenuation prior to risk-based closure. An active remedy is estimated to require a capital outlay of approximately $300,000 and operating costs of $50,000 annually after the first year. Natural attenuation demonstrations and groundwater monitoring for sites where a less active remedy is warranted are estimated to cost $50,000 per year.

Actual site costs are anticipated to vary widely from site to site. Costs will vary depending on site geology, age of release, the chemical nature of the solvents released, and threats posed to potential receptors. However, there is an annual spending cap of $200,000 per site unless they pose an imminent threat to public health. In these cases, annual expenditures are capped at $400,000 per site.

DSCA's efforts to control costs have been quite successful. Project cost control measures are applied at the beginning of site work in the PA stage. Since every DSCA site must have a PA to be ranked, it is important that these cost control measures be applied

[1] Reflects multiple petitioners for some sites.

effectively. DSCA reviews, negotiates and pre-approves all proposals. Staff analyze proposed costs using their professional knowledge and experience. They also compare proposals using DSCA's cost tracking database. DSCA also refers to cost control policies developed by the Underground Storage Tank Section for general guidance. All proposals are required to provide sufficient detail (e.g., unit costs, subcontractor bids) to allow for an effective pre-approval review.

Thus far, the cost of a PA appears to average about $13,000. This figure falls within the $10,000 to $15,000 range DENR originally estimated for these initial assessments. This cost typically includes soil sampling, installation of three to four monitoring wells, a thorough receptor survey, and preparation of the PA Report and Prioritization Ranking Form.

(4) RECEIPTS AND DISBURSEMENTS FOR THE FUND

The primary funding sources for the dry-cleaning solvent cleanup fund are a tax on dry-cleaning solvents and, beginning in July 2003, the state portion of the current sales tax on dry-cleaning. The DSCA Fund's finances through August 2003 are summarized below:

Collections FY 97-98	$ 474,717.47
Collections FY 98-99	$ 927,004.50
Collections FY 99-00	$ 968,993.09
Collections FY 00-01	$ 863,772.16
Collections FY 01-02	$1,061,298.70
Collections FY 02-03	$1,076,826.57
Collections YTD (8/03)	$2,330,693.82
Total Collections as of September 2003	$7,703,306.31
Less Dept. of Revenue Expenses (all years)	$ 13,986.10*
Less Contractor Expense	$ 490.00
Fund Balance	$7,688,830.21
DENR Administrative Allowance	$1,960,323.27
Balance for Assessment and Cleanup of Sites	**$5,728,506.94**

* This represents the actual amount charged by the Department of Revenue for its expenses. The Department of Revenue is authorized to charge no more than $125,000 per year by DSCA.

(5) CLAIMS AGAINST THE FUND

There are two types of claims against the DSCA Fund. The majority of claims come from petitioners that incurred past investigative/remedial costs in response to an order or notice of violation from DENR prior to DSCA implementation. Reasonable, necessary and documented costs in excess of $50,000, incurred from October 1, 1997 through June 30, 2001, are reimbursable. Thirteen petitioners submitted claims for reimbursement of past cost expenditures totaling $2,612,290.79. As per DSCA, claims will be paid in order

of site priority. Payout for past cost claims is limited by DSCA to 10 percent of the DSCA Fund's income in the previous year.

In addition, the law allows petitioners to apply past costs toward the site's deductible in some circumstances. Fifteen petitioners submitted claims for application toward their site's deductible totaling $336,948.99.

The second type of claim against the DSCA Fund is for approved costs for site work which exceed the site's deductible. To date, 23 sites have at least one authorized work plan for site work. The total amount authorized to date is $318,920.60. Of the 23 sites with authorized work, six have approved costs that exceed the site's deductible and will require payout from the DSCA Fund. It is estimated that this payout will not exceed $115,000.

In 2003, DSCA created the infrastructure to support accurate and timely reimbursement payments to petitioners and/or environmental consultants for costs incurred which exceed the site's deductible. Three reimbursement checks have been issued to date and other invoices are currently under review.

(6) RECOMMENDATIONS TO ASSURE THE SOLVENCY OF THE FUND

The DENR has no recommendations regarding fund solvency at this time. Prior to passage of statutory amendments to the DSCA in 2000 (S.L.2000-19), it was clear that the fund balance was inadequate to address all of the dry-cleaning sites in the state. However, with the passage of the DSCA Amendments that established a second funding mechanism, the General Assembly took the most important step necessary to assure future fund solvency. With the infusion of the sales tax monies, which began July 2003, DSCA now appears to have sufficient financial resources to assess and remediate the contaminated drycleaning facilities on a priority basis.

The Fiscal Note on the DSCA Amendments (S.L. 2000-19) anticipated that the funding mechanisms would provide the fund with $8 million to $10 million annually. This estimate has been borne out by our first quarter 2003 installment of sales tax of $2,159,258.40. As a direct result, the DSCA Program is solvent.

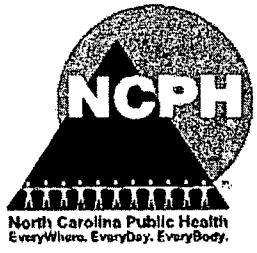
It is of interest to note that other state dry-cleaning solvent cleanup programs are examining sales tax earmarking funding mechanisms, similar to that employed by the North Carolina General Assembly in the DSCA Amendments (S.L. 2000-19) to ensure their state fund's solvency.

March 25, 2004 ERC Meeting
EXHIBIT E

THE NORTH CAROLINA PUBLIC HEALTH TASK FORCE 2004 PUBLIC HEALTH IMPROVEMENT PLAN

PRELIMINARY RECOMMENDATIONS

Strengthening public health infrastructure is important. Either we are all protected or we are all at risk.
The Public Health Foundation



PART I: CORE INFRASTRUCTURE

Structure & Organization Committee

7. Create three (3) public health "incubators" to support regional collaboration by sharing resources and developing economies of scale. $375,000 one time funding
8. Reunite the Division of Environmental Health from the Department of Environment and Natural Resources (DENR) with the Division of Public Health under the leadership of the State Health Director in the Department of Health and Human Services (DHHS).
9. Require that the position of State Health Director report directly to the Secretary of the DHHS.
10. Drive collaboration of local health departments and any related structural changes at the local and state level through the accreditation process.
11. Perform and distribute a Self Assessment of the Division of Public Health using National Performance Standards.

Planning & Outcomes Committee

12. Improve the data and epidemiology to drive state and local decision-making and allocation of resources.

    ⇒ Establish a common set of core health indicators.
    ⇒ Build capacity to conduct the Behavioral Risk Factor Surveillance Survey (BRFSS) to provide county specific or county cluster specific data. $300,000
    ⇒ Enhance the opportunities to collect and report county or county cluster health information on children (e.g. Youth Risk Behavior Survey).
    ⇒ Identification and analysis of existing state and local public health problems, health disparities, and potential threats. $100,000
    ⇒ Identify the best scientific and evidence-based strategies to address identified public health problems at the local level. $200,000
    ⇒ Provide epidemiology training for local partners. $200,000

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 1997

SESSION LAW 1998-76
HOUSE BILL 1433

AN ACT TO EXTEND THE STUDY OF THE ORGANIZATIONAL STRUCTURE AND ADMINISTRATIVE PLACEMENT OF THE PROGRAMS IN THE DIVISION OF ENVIRONMENTAL HEALTH OF THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES AND TO EXPAND THE SCOPE OF THE STUDY TO INCLUDE THE ORGANIZATION, FUNCTIONS, POWERS, AND DUTIES OF THE VARIOUS BOARDS, COMMISSIONS, AND COUNCILS HAVING JURISDICTION OVER ENVIRONMENTAL, PUBLIC HEALTH, AND NATURAL RESOURCES PROGRAMS, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

Section 1. Section 11A.127 of S.L. 1997-443 reads as rewritten:

"Section 11A.127. Pending ~~the results of~~ action by the General Assembly on the recommendations of the Environmental Review Commission resulting from the study to be undertaken by the Environmental Review Commission as provided in this Part, on-site wastewater functions, public drinking water programs, and environmental health programs shall remain in the Department of Environment and Natural Resources, the Division of Environmental Health, shall remain intact in the Department of Environment and Natural Resources, and the Department of Environment and Natural Resources shall not consolidate on-site wastewater functions or drinking water programs in the Division of Water Quality."

Section 2. Section 11A.128 of S.L. 1997-443 reads as rewritten:

"Section 11A.128. The Environmental Review Commission shall study the following issues and report its findings to the ~~1997 General Assembly, Regular Session 1998,~~ 1999 General Assembly, along with any legislation it proposes to address these issues:

(1) The appropriate roles and financing of local and state agencies in reviewing, permitting, inspecting, and monitoring private wells, community wells, municipal wells, and municipal surface water supplies;

(2) The appropriate roles and financing of local and State agencies in reviewing, permitting, inspecting, monitoring, and maintaining septic tanks, package wastewater treatment plants, municipal wastewater treatment plants, industrial treatment plants, and animal waste operations;

(3) The appropriate roles and financing of local and State agencies in administering the various environmental health programs;

(4) The integration of State's review of the financial integrity of applicants for drinking water and wastewater discharge permits;
(5) Policies to monitor the quality and prevent and reduce pollution of groundwaters;
(6) Consistent State policies for cleaning up contaminated groundwater and soils;
(7) Coordination of adoption and development of policies by the Coastal Resources Commission, Environmental Management Commission, Commission on Health Services, Marine Fisheries Commission, and other commissions having roles in water quality or wastewater issues;
(8) Policies to monitor the quality and prevent and reduce pollution of surface waters;
(9) Organization of the State's water planning agencies;
(10) Technical and financial assistance to business, industry, local governments, and citizens;
(11) Policies to encourage water conservation;
(12) Policies to encourage regional water supply and wastewater treatment planning; and
(13) The role of the North Carolina Cooperative Extension Services, North Carolina Department of Agriculture, and the North Carolina Department of Transportation in the protection of water supplies.
(14) The organization, functions, powers, and duties of the various boards, commissions, and councils having jurisdiction over environmental, public health, and natural resources programs, including whether those functions, powers, and duties should be consolidated in a single commission."

Section 3. Section 11A.129 of S.L. 1997-443 reads as rewritten:

"Section 11A.129. The Secretary of Health and Human Services may reorganize the Department of Health and Human Services in accordance with G.S. 143B-10 and shall report as required by that section. In addition, the Department of Health and Human Services shall do the following:

(1) Report to the Joint Legislative Commission on Governmental Operations by December 31, 1997, on the Department's progress in incorporating health functions and agencies into the Department;
(2) Report to the General Assembly by ~~May 1, 1998,~~ 1 February 1999 on additional changes, including proposed legislation necessary to effectuate the purposes of this Part including the findings of the Environmental Review Commission's study.
(3) Report to the Joint Legislative Commission on Governmental Operations by ~~October 31, 1998,~~ 1 February 1999 on any proposed changes in the Department's structure of boards and commissions not already implemented as a result of the Environmental Review Commission's study or necessary to effectuate the purposes of this Part and to deliver services more efficiently;

(4) Report to the General Assembly by February 1, 1999, on the Department's progress in adopting any rule changes necessary to effectuate the purposes of this Part and any proposed legislation necessary to change the structure of any boards and commissions as reported to the Joint Legislative Commission on Governmental Operations."

Section 4. This act is effective when it becomes law.

In the General Assembly read three times and ratified this the 30th day of July, 1998.

s/ Dennis A. Wicker
President of the Senate

s/ Harold J. Brubaker
Speaker of the House of Representatives

s/ James B. Hunt, Jr.
Governor

Approved 11:55 a.m. this 6th day of August, 1998

GENERAL ASSEMBLY OF NORTH CAROLINA
1997 SESSION

S.L. 1997-443
SENATE BILL 352

AN ACT TO MAKE APPROPRIATIONS FOR CURRENT OPERATIONS AND FOR CAPITAL IMPROVEMENTS FOR STATE DEPARTMENTS, INSTITUTIONS, AND AGENCIES, AND FOR OTHER PURPOSES.

PART I. INTRODUCTION AND TITLE OF ACT

INTRODUCTION

Section 1. The appropriations made in this act are for maximum amounts necessary to provide the services and accomplish the purposes described in the budget. Savings shall be effected where the total amounts appropriated are not required to perform these services and accomplish these purposes and, except as allowed by the Executive Budget Act, or this act, the savings shall revert to the appropriate fund at the end of each fiscal year.

TITLE OF ACT

Section 1.1. This act shall be known as "The Current Operations and Capital Improvements Appropriations Act of 1997."

PART II. CURRENT OPERATIONS/GENERAL FUND

Section 2. Appropriations from the General Fund of the State for the maintenance of the State departments, institutions, and agencies, and for other purposes as enumerated are made for the biennium ending June 30, 1999, according to the following schedule:

Current Operations - General Fund	1997-98	1998-99
General Assembly	$ 31,226,277	$ 34,642,598
Judicial Department	327,814,503	327,102,308
Office of the Governor		
01. Office of the Governor	5,232,934	5,150,352
02. Office of State Budget and Management	13,923,220	10,930,838
03. Office of State Planning	1,802,450	1,815,850

Section . Pending the results of the study to be undertaken by the Environmental Review Commission as provided in this Part, on-site wastewater functions, public drinking water programs, and environmental health programs shall remain in the Department of Environment and Natural Resources, the Division of Environmental Health, shall remain intact in the Department of Environment and Natural Resources, and the Department of Environment and Natural Resources shall not consolidate on-site wastewater functions or drinking water programs in the Division of Water Quality.

Section 11A.128. The Environmental Review Commission shall study the following issues and report its findings to the 1997 General Assembly, Regular Session 1998, along with any legislation it proposes to address these issues:

(1) The appropriate roles and financing of local and state agencies in reviewing, permitting, inspecting, and monitoring private wells, community wells, municipal wells, and municipal surface water supplies;

(2) The appropriate roles and financing of local and State agencies in reviewing, permitting, inspecting, monitoring, and maintaining septic tanks, package wastewater treatment plants, municipal wastewater treatment plants, industrial treatment plants, and animal waste operations;

(3) The appropriate roles and financing of local and State agencies in administering the various environmental health programs;

(4) The integration of State's review of the financial integrity of applicants for drinking water and wastewater discharge permits;

(5) Policies to monitor the quality and prevent and reduce pollution of groundwaters;

(6) Consistent State policies for cleaning up contaminated groundwater and soils;

(7) Coordination of adoption and development of policies by the Coastal Resources Commission, Environmental Management Commission, Commission on Health Services, Marine Fisheries Commission, and other commissions having roles in water quality or wastewater issues;

(8) Policies to monitor the quality and prevent and reduce pollution of surface waters;

(9) Organization of the State's water planning agencies;

(10) Technical and financial assistance to business, industry, local governments, and citizens;

(11) Policies to encourage water conservation;

(12) Policies to encourage regional water supply and wastewater treatment planning; and

(13) The role of the North Carolina Cooperative Extension Services, North Carolina Department of Agriculture, and the North Carolina Department of Transportation in the protection of water supplies.

Section 11A.129. The Secretary of Health and Human Services may reorganize the Department of Health and Human Services in accordance with G.S. 143B-10 and shall report as required by that section. In addition, the Department of Health and Human Services shall do the following:

(1) Report to the Joint Legislative Commission on Governmental Operations by December 31, 1997, on the Department's progress in incorporating health functions and agencies into the Department;

(2) Report to the General Assembly by May 1, 1998, on additional changes, including proposed legislation necessary to effectuate the purposes of this Part including the findings of the Environmental Review Commission's study.

(3) Report to the Joint Legislative Commission on Governmental Operations by October 31, 1998, on any proposed changes in the Department's structure of boards and commissions not already implemented as a result of the Environmental Review Commission's study or necessary to effectuate the purposes of this Part and to deliver services more efficiently;

(4) Report to the General Assembly by February 1, 1999, on the Department's progress in adopting any rule changes necessary to effectuate the purposes of this Part and any proposed legislation necessary to change the structure of any boards and commissions as reported to the Joint Legislative Commission on Governmental Operations.

SUBPART 3. CHANGE THE TERM "AMBULANCE ATTENDANT"TO "MEDICAL RESPONDER"AND CHANGE THE STATUTES RELATING TO MEDICAL RESPONDERS.

Section 11A.129A. G.S. 14-34.6 reads as rewritten:

"**§ 14-34.6. Assault or affray on an emergency medical technician, ~~ambulance attendant,~~ medical responder, emergency department nurse, or emergency department physician.**

(a) A person is guilty of a Class A1 misdemeanor if the person commits an assault or an affray on an emergency medical technician, ~~ambulance attendant,~~ medical responder, emergency department nurse, or emergency department physician while the technician, attendant, nurse, or physician is discharging or attempting to discharge official duties.

(b) Unless a person's conduct is covered under some other provision of law providing greater punishment, a person is guilty of a Class I felony if the person violates subsection (a) of this section and (i) inflicts bodily injury or (ii) uses a deadly weapon other than a firearm.

(c) Unless a person's conduct is covered under some other provision of law providing greater punishment, a person is guilty of a Class F felony if the person violates subsection (a) of this section and uses a firearm."

Section 11A.129B. G.S. 14-276.1 reads as rewritten:

"**§ 14-276.1. Impersonation of firemen or emergency medical services personnel.**

or private grants, receipts becoming a part of special funds by act of the General Assembly or any other funds available to a State department or institution may be utilized for advance planning through the working drawing phase of capital improvement projects, upon approval of the Director of the Budget. The Director of the Budget may make allocations from the Advance Planning Fund for advance planning through the working drawing phase of capital improvement projects, except that this revolving fund shall not be utilized by the Board of Governors of The University of North Carolina or the State Board of Community Colleges.

Requested by: Senators Plyler, Perdue, Odom, Representatives Russell, G. Wilson

APPROPRIATIONS LIMITS/REVERSION OR LAPSE

Section 34.16. Except as permitted in previous sections of this act, the appropriations for capital improvements made by the 1997 General Assembly may be expended only for specific projects set out by the 1997 General Assembly and for no other purpose. Construction of all capital improvement projects enumerated by the 1997 General Assembly shall be commenced, or self-liquidating indebtedness with respect to them shall be incurred, within 12 months following the first day of the fiscal year in which the funds are available. If construction contracts on those projects have not been awarded or self-liquidating indebtedness has not been incurred within that period, the direct appropriation for those projects shall revert to the original source, and the self-liquidating appropriation shall lapse; except that direct appropriations may be placed in a reserve fund as authorized in this act. This deadline with respect to both direct and self-liquidating appropriations may be extended with the approval of the Director of the Budget up to an additional 12 months if circumstances and conditions warrant such extension.

PART XXXV. MISCELLANEOUS PROVISIONS

Requested by: Senators Plyler, Perdue, Odom, Representatives Holmes, Creech, Esposito, Crawford

EXECUTIVE BUDGET ACT APPLIES

Section 35. The provisions of the Executive Budget Act, Chapter 143, Article 1 of the General Statutes, are reenacted and shall remain in full force and effect and are incorporated in this act by reference.

Requested by: Senators Plyler, Perdue, Odom, Representatives Holmes, Esposito, Creech, Crawford

COMMITTEE REPORT

Section 35.1. (a) The Conference Report on the Continuation, Expansion and Capital Budgets, dated August 27, 1997, which was distributed in the Senate and the House of Representatives and used to explain this act, shall indicate action by the General Assembly on this act and shall therefore be used to construe this act, as provided in G.S. 143-15 of the Executive Budget Act, and for these purposes shall be considered a part of this act and as such shall be printed as a part of the Session Laws.

(b) The budget enacted by the General Assembly for the maintenance of the various departments, institutions, and other spending agencies of the State for the 1997-99 fiscal biennium is a line item budget, in accordance with the Budget Code Structure and the State Accounting System Uniform Chart of Accounts set out in the Administrative Policies and Procedures Manual of the Office of the State Controller. This budget includes the appropriations made from all sources including the General Fund, Highway Fund, special funds, cash balances, federal receipts, and departmental receipts.

The General Assembly amended the itemized budget requests submitted to the General Assembly by the Director of the Budget and the Advisory Budget Commission, in accordance with the steps that follow and the line item detail in the budget enacted by the General Assembly may be derived accordingly:

(1) The negative reserve set out in the submitted budget was deleted and the totals were increased accordingly.

(2) The base budget was adjusted in accordance with the base budget cuts and additions that were set out in the Conference Report on the Continuation, Expansion and Capital Budgets, dated August 27, 1997, together with any accompanying correction sheets.

(3) Transfers of funds supporting programs were made in accordance with the Conference Report on the Continuation, Expansion and Capital Budgets, dated August 27, 1997, together with any accompanying correction sheets.

The budget enacted by the General Assembly shall also be interpreted in accordance with the special provisions in this act and in accordance with other appropriate legislation.

In the event that there is a conflict between the line item budget certified by the Director of the Budget and the budget enacted by the General Assembly, the budget enacted by the General Assembly shall prevail.

Requested by: Senators Plyler, Perdue, Odom, Representatives Holmes, Creech, Esposito, Crawford

MOST TEXT APPLIES ONLY TO 1997-99

Section 35.2. Except for statutory changes or other provisions that clearly indicate an intention to have effects beyond the 1997-99 fiscal biennium, the textual provisions of this act apply only to funds appropriated for, and activities occurring during, the 1997-99 fiscal biennium.

Requested by: Senators Plyler, Perdue, Odom, Representatives Holmes, Creech, Esposito, Crawford

EFFECT OF HEADINGS

Section 35.3. The headings to the parts and sections of this act are a convenience to the reader and are for reference only. The headings do not expand, limit, or define the text of this act, except for effective dates referring to a Part.

Requested by: Senators Plyler, Perdue, Odom, Representatives Holmes, Creech, Esposito, Crawford

SEVERABILITY CLAUSE

Section 35.4. If any section or provision of this act is declared unconstitutional or invalid by the courts, it does not affect the validity of this act as a whole or any part other than the part so declared to be unconstitutional or invalid.

Requested by: Senators Plyler, Perdue, Odom, Representatives Holmes, Creech, Esposito, Crawford

EFFECTIVE DATE

Section 35.5. Except as otherwise provided, this act becomes effective July 1, 1997.

In the General Assembly read three times and ratified this the 28th day of August, 1997.

s/ Dennis A. Wicker
President of the Senate

s/ Harold J. Brubaker
Speaker of the House of Representatives

s/ James B. Hunt, Jr.
Governor

Approved 1:30 p.m. this 28th day of August, 1997

March 25, 2004 ERC Meeting
EXHIBIT F

NORTH CAROLINA RULES RE
1307 Glenwood Avenue,
Raleigh, NC 27605
(919) 733-2721 ▪ FAX (919) 733-9415

SENATE
Jim R. Funderburk
Jeffrey P. Gray
Thomas Hilliard, III
Robert Saunders
David R. Twiddy

HOUSE
Jennie J. Hayman, Chairman
Graham Bell
Dana Simpson
John Tart

Staff Attorneys
Joseph J. DeLuca, Jr.
Robert A. Bryan, Jr.

RECEIVED
MAR 26 2004
RESEARCH DIVISION

BY EMAIL AND USPS

March 24, 2004

Mr. George Givens
Environmental Review Commission
N.C. General Assembly
Legislative Office Building
300 N. Salisbury St.
Raleigh, N.C. 27603

Dear Mr. Givens:

This letter is to acknowledge the invitation from the Environmental Review Commission to address the commission concerning the status of litigation against the Rules Review Commission over its decision and the Phase II stormwater runoff rules. Jennie Hayman, our commission chairman, does not feel it appropriate to discuss the lawsuits at this time other than as I will set out in this letter.

The commission has been sued, along with the commissioners in their official capacity, over its decision involving the EMC's Phase II stormwater runoff rules. Since the letter has not gone to the attorney general's office concerning representation in this matter and the desires of the commission, I do not feel it appropriate to discuss what the RRC wishes to do until that has been communicated in writing to Mr. Grayson Kelly, the Chief Deputy A.G. The Commission does intend to defend both these lawsuits as vigorously as possible.

Thank you for the invitation. Please convey our appreciation to the ERC for the opportunity to address them concerning this issue, but I am sure they understand why we must decline at this time.

Sincerely,

Joseph J. DeLuca
Staff Director

March 25, 2004 ERC Meeting
EXHIBIT G

ENVIRONMENTAL REVIEW COMMISSION
MARCH 25, 2004

SUMMARY OF LEGAL CHALLENGE BROUGHT BY 4 CONSERVATION GROUPS TO THE NORTH CAROLINA RULES REVIEW COMMISSION'S VETO OF THE EMC'S PHASE II STORMWATER RULES

Submitted by Donnell Van Noppen III
Southern Environmental Law Center

1. Case filed in Wake County Superior Court by NC Shellfish Growers Association, NC Coastal Federation, NC Trout Unlimited, and Environmental Defense

2. Two categories of claims: challenges to the legality of the particular RRC action of vetoing the stormwater rules, and challenge to the constitutionality of the RRC's powers under the APA.

3. Challenges to the legality of the RRC action regarding the rules:

    a. EMC complied with all procedural requirements of the APA in its rulemaking, so return of the rules was wrong.
    b. RRC failed to carry out its statutory duty to explicitly determine whether the changes made by the EMC in response to prior RRC objections satisfied the RRC objections.
    c. RRC failed to state the reasons for objecting to all of the rules, as required by the APA.
    d. The EMC acted within its statutory authority in adopting the rules, so the RRC was wrong to object on that grounds.
    e. The rules are not impermissibly ambiguous, so the RRC was wrong to object on that grounds.

4. Constitutional challenges:

    a. The RRC's power to veto rules in the current version of the APA is an unconstitutional exercise of legislative authority without following the requirements for legislative

action of presenting a bill to both houses and having the bill pass both houses.

b. The RRC's power to veto rules is an unconstitutional intrusion into the powers and duties of the executive branch to carry out the laws passed by the General Assembly.

c. The RRC's power to veto rules based on lack of statutory authority is an unconstitutional intrusion into the powers and duties of the judicial branch.

5. Judicial relief sought

a. Declaration that the Phase II stormwater rules are lawful and valid.

b. Declaration that the APA provisions granting the RRC a veto power over executive branch rules are unconstitutional.

Animal & Poultry Waste Management Center

NC STATE UNIVERSITY

Campus Box 7608
Raleigh, NC 27695-7608

919.515.5386
919.513.1762 (fax)

Environmentally Superior Technology Initiative - concise status report

Prepared by: C.M. (Mike) Williams March 2004

Agreements between the Attorney General of North Carolina and Smithfield Foods (SF), Premium Standard Farms (PSF), and Frontline Farmers[1] provided resources for the development and performance verification of "Environmentally Superior Technologies" (EST). Performance standards defined in the Agreements mandate that the technologies target environmental variables including the discharge of animal waste to surface waters and groundwater; emission of ammonia; emission of odor; release of disease-transmitting vectors and airborne pathogens; and nutrient and heavy metal contamination of soil and groundwater. Detail progress reports describing this initiative between the dates of July 25, 2000 and July 25, 2003 have been previously published.[2]

The following table shows the current field status of the candidate technologies.

Technology candidate	Construction status	Operation status
Ambient digester / greenhouse tomato production	Complete	Operational
Constructed wetlands	Complete	Operational
Upflow biofilter	Complete	Decommissioned (data procurement completed)
Reciprocating wetland	Complete	Under decommission
Solids and P removal / nitrification – denitrification	Complete	Operational
Belt / gasification	Complete	Operational
Belt / insect biomass	Complete	Decommissioned
High solids anaerobic digester	Complete	Operational
Solids separation / ash recovery	Complete	Operational
Mesophilic digester / microturbine / permeable cover / water reuse	Complete	Operational
Sequencing batch reactor	Complete	Operational
Mesophilic digester	Permitted/construction underway	May 2004
Ultrasonic plasma resonator	Spring 2004	Summer 2004
Dewatering drying system	Spring 2004	Summer 2004

Environmental performance data procurement and economic assessment has occurred for several of the candidate technologies[3] – that work is in progress for the remaining operational technologies. Based on progress to date, this initiative is projected to conclude in 2005.

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[1] See Agreements between Attorney General of North Carolina and, SF, PSF, and Frontline Farmers (North Carolina Department of Justice, on file with Ryke Longest, 2000 & 2002).

[2] See Development of Environmentally Superior Technologies: Two and Three Year Progress Reports, available at www.cals.ncsu.edu/waste_mgt/ (2002 &2003).

[3] See Proceedings – North Carolina Animal Waste Management Workshop, October 16-17, 2003. Edited by G.B. Havenstein, published by North Carolina State University College of Agriculture and Life Sciences, 149 pages.

NC STATE UNIVERSITY

Development of Environmentally Superior Technologies - Status Report

NC Attorney General Agreements with Smithfield Foods, Premium Standard Farms, and Frontline Farmers

C.M. (Mike) Williams
Animal and Poultry Waste Management Center
North Carolina State University

NC STATE UNIVERSITY

Agreements (3) Overview

- Smithfield Foods - $15 million for development of "Environmentally Superior Technologies" (EST); $50 million for "environmental enhancement" activities
- Premium Standard Farms – $2.5 million ($2.3 for EST)
- Frontline Farmers - "..use its best efforts and influence to encourage its members to convert to economically feasible EST"
- NCSU responsible for Technology Determinations
- Install Environmentally Superior Technologies on each company owned farm in NC

NC STATE UNIVERSITY

Environmentally Superior Technologies

- "permittable by the appropriate governmental authority
- determined to be technically, operationally, and economically feasible for identified categories of farms
- meets the following performance standards..."

NC STATE UNIVERSITY

Performance Standards

- "Eliminate the discharge of animal waste to surface waters and groundwater through direct discharge, seepage, or runoff;
- Substantially eliminate atmospheric emissions of ammonia;
- Substantially eliminate the emission of odor that is detectable beyond the boundaries of the parcel of land on which the swine farm is located;
- Substantially eliminate the release of disease-transmitting vectors and airborne pathogens;
- Substantially eliminate nutrient and heavy metal contamination of soil and groundwater"

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Economic Feasibility Determination

- Projected 10 year annualized cost of the technology (including capital, operation and maintenance) per 1000 # steady state live weight for each category of farm system
- Compared to lagoon and spray-field system
- Projected revenues, including income from byproducts
- Available cost-share monies or other financial assistance from federal, state or other public sources
- Impact that the adoption of the technology may have on the competitiveness of the NC pork industry
- ID/quantification (if possible) of emissions to environmental media from each category of farm system implementing the technology as compared to lagoon and spray-field system
- Estimate of the economic benefits to NC households arising from the changes in emissions to environmental media resulting from implementation of the technology

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Advisory Panel Membership

- Delilah B. Blanks; North Carolina Association. of County Commissioners
- Alan Briggs; Save Our State
- Don Butler; Murphy-Brown, LLC
- Kim Colson; NCDENR
- Bob Epting; EPTING & HACKNEY
- Bundy Lane; Frontline Farmers, Inc.
- George Lucier; National Institute of Environmental Health Sciences
- Randy Mapes; AgProVision, LLC
- Fred Pfaender; UNC-CH, Dept. of Environmental Science and Engineering
- Karen Priest; Alliance for a Responsible Swine Industry
- Joe Rudek; NC Environmental Defense
- Paul Sherman; NCDENR
- Shihwu Sung; ISU, Dept. of Civil and Construction Engineering
- John Sweeten; Texas A&M Univ.,Texas Agri. Experiment Station
- Dave Townsend; Premium Standard Farms, Inc.
- Phil Westerman; NCSU, Dept. of Biol. and Agri. Engineering
- Richard Whisnant; UNC-CH, School of Gov., Envir. Finance Center
- Johnny Wynne; NCSU, NC Agricultural Research Service
- Chantal Line Carpentier; Commission for Envir. Cooperation
- Richard Eason; Cape Fear Farm Credit
- Bart Ellis; Smithfield Foods, Inc.
- Kerry Smith; NCSU, Dept. of Agri. and Resources Economics

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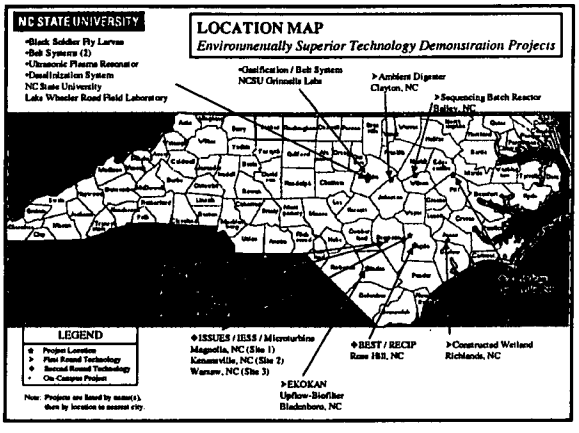
Overview of Progress
March 2004

- 16 (+) candidate technologies
- 13 candidate EST operational (or concluded)
- Performance data analysis and economic analysis in progress
- Tasks schedule and timeline has been presented to Advisory Panel for Technology Determinations process



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Nitrification Tanks – Barham Farm Project

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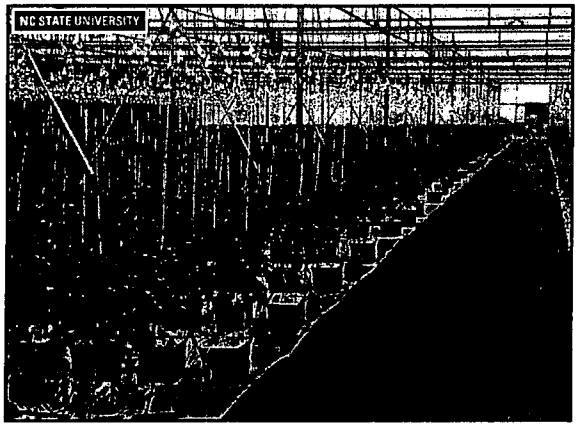

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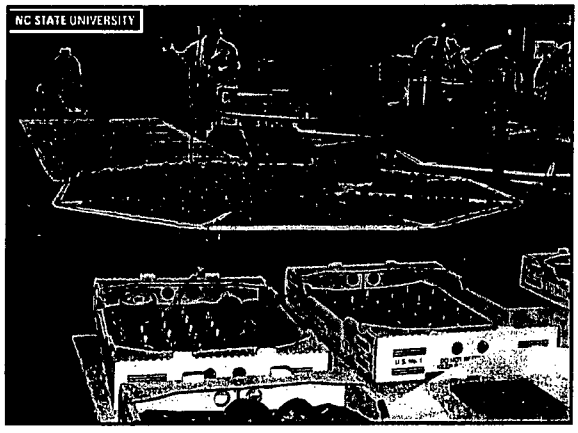

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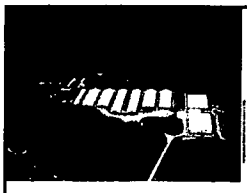

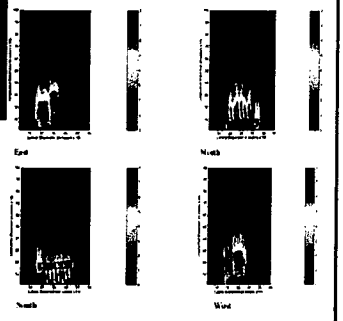

Eulerian- Lagrangian model to simulate odor dispersion

$y = 33.546\ e^{x}$

x = odor intensity (0-8)

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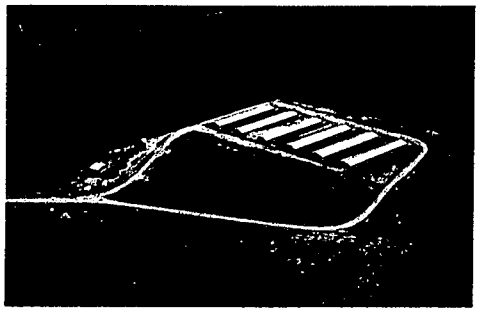
Solids Separation, Nitrification – De-Nitrification, Phosphorus Removal System (Super Soils Systems USA, Inc.)



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Solids removal, Nitrification De-nitrification, P removal system

- Solids, COD, metals, TKN reduced by 35-96% in solid separation module (TKN=35%, P=70%)
- TKN and NH3 reduced by 98-99% in nitrification module

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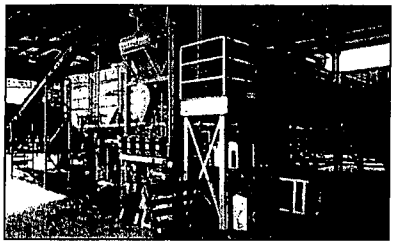
High Solids High Temp. Anaerobic Digester



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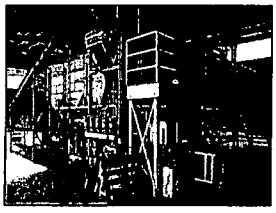
DATA: High Solids High Temp. Anaerobic Digester



- 12 decatherms of methane per ton of feedstock
- Post processed material met Class A biosolids requirement for fecal coliform bacteria

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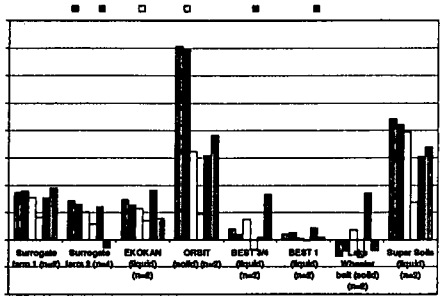
Pathogen reductions

(examples to date)



Mean reductions for waste stream portion (solid or liquid) the technology treats. ORBIT and Super Soils achieve higher reductions than others

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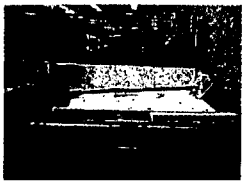
Belt manure removal system



- DM of belt collected manure fraction app. 50%
- NH3 emissions of app. 1.0 kg/pig space/yr

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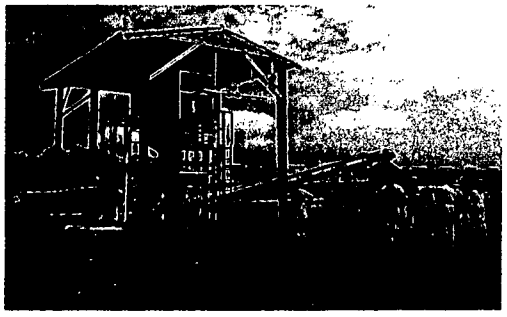
Solids separation technology



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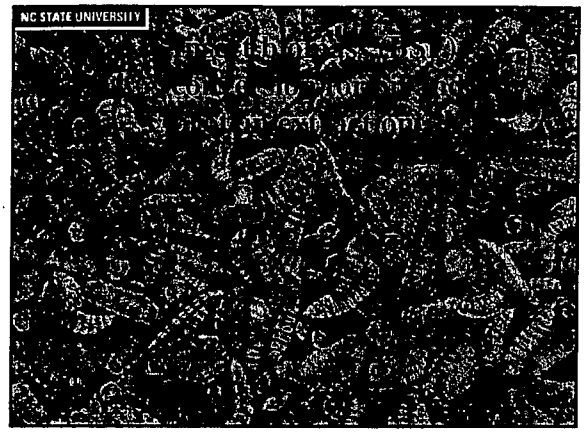
Solids @ 30 % Dry Matter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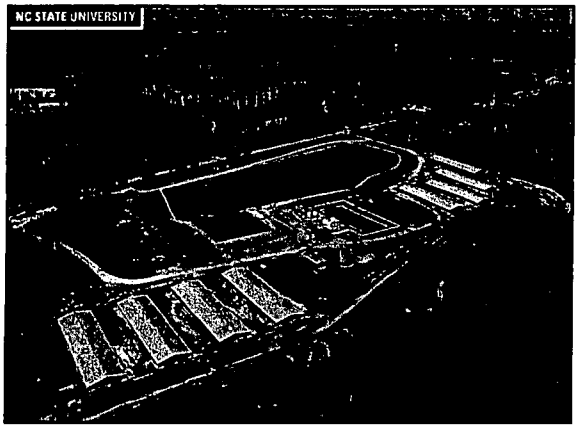
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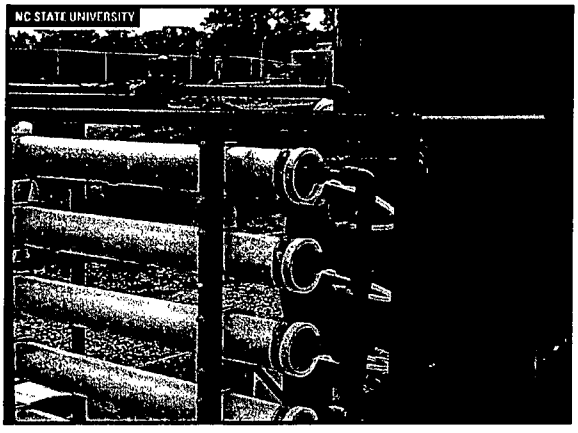
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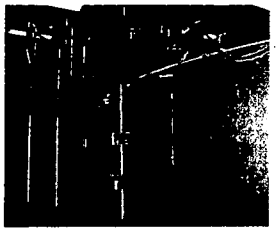
Smithfield Foods Utah Initiative:
Bio-diesel fuel from manure

Premium Standard Farms MO Initiative:"Next Generation Technology"



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Technology Determination: process

1. Draft reports from project investigator teams
2. Draft review by panel and technology supplier
3. Investigators review input and finalize reports
4. Panel review / discussion
5. Technology Determination Draft
6. Panel review / discussion
7. Technology Determination Final Reports

(Report process initiated in 2004 and projected to conclude in 2005)

March 25, 2004 ERC Meeting
EXHIBIT I

ERC Presentation: March 25, 2004
Joe Rudek, Ph.D.
Environmental Defense

Intro:
I want to thank the Environmental Review Commission for the opportunity to speak today. I am Joe Rudek, a senior Scientist with Environmental Defense. I am on the technical advisory panel for the AG's Agreement. I am also on the advisory committee of the NC State Animal and Poultry Waste Management Center, which Dr. Williams Directs, and the USDA Agricultural Air Quality Task Force, appointed by the Secretary of Agriculture.

Let me take a moment to compliment Dr. Williams on the fine job he has done in assuring that a sound scientific process is being employed in the evaluations of alternative hog waste treatment technologies. I feel confident that the process which Dr. Williams is leading will result in the designation of ESTs to better treat hog waste.

But what happens after an EST is designated? I'm here to urge the General Assembly to prepare for the efficient conversion of the Pork Industry's waste management systems as Environmentally Superior Technologies are identified. This is a complex challenge, but as you think about this issue, it's important to bear in mind three key elements:

A. The General Assembly should adopt a timeline for conversion of the majority of the industry not included in the AG's Agreement. Such a timeline will drive the process ensuring that necessary policies are adopted and necessary resources allocated in a timely fashion. Timelines can be revisited, but they are critical to planning and implementation of conversion.
B. Funding mechanisms need to be identified for conversion and remediation of existing systems on contract and independent farms, including removing obstacles to business opportunities that many EST's will offer to hog operations (e.g. Energy production and sale).
C. DENR must develop the capacity to quickly and thoroughly review a large number of permits, including evaluating potential EST's that come from outside the Smithfield process.

The industrywide conversion of hog waste treatment systems to ESTs can be viewed as Two Phase process.

I. Determination of ESTs and subsequent installation on SF- and PSF-owned farms
II. Conversion of the remainder of the industry in NC.

Phase I is essentially the focus of the AG's Agreement. However, what is not often discussed is that once an EST is designated and the 3 year clock starts, somewhere near

300 permits will need to be issued by DENR on new waste technologies. This brings up numerous issues:

- DENR must be prepared for this workload, including an honest assessment of its capacity, and of additional resources needed.
- Numeric performance standards for ESTs should be codified.
- Actions should be taken to assure that sufficient resources will be available in the private sector to handle to construction of these systems within the 3 year conversion period.
- Administrative processes which handle the building permits, oversight and inspections associated with such construction projects also must prepare for this workload

Phase II is envisioned in the Agreement, as the AG's office has committed to undertaking efforts to convert the entire industry in NC to ESTs. The conversion of the entire hog industry to ESTs is also highly desirable for the benefits it brings in decreased environmental and public health risks.

- Once again, DENR must be prepared for the workload of permitting approximately 2000 conversions to ESTs over a reasonable time period.
- Construction resources and the associated administrative processes will face an even greater task than faced in the conversion of company owned farms.
- In addition, funds for conversion to ESTs by contract farmers will be needed. Innovative methods should be explored to provide funding without an undesirable increase in the control the large industry interests have on contract farmers?
- The development of markets for the value-added products created by ESTs is critical to their financial success. The GA, NCDA, Dept of Commerce, DOT, and other parts of the government should work together to support market development for manure value-added products.
- In essence, the conversion of the hog industry to ESTs will produce an array of value-added products, including energy production, concentrated fertilizers and animal feed. It can be viewed as an economic enhancement program for eastern NC. While it is my belief that the industry should pay the majority of the costs associated with conversion to ESTs, given the potential for economic advancement in eastern NC, as well as the environmental and public health benefits, the state could provide some level of support for this process. An evaluation of how the state can best do this is needed.

In conclusion, NC can lead the country in the effort to achieve conversion of the pork production industry. The benefits to local economies can be enhanced, environmental and public health risks can be minimized, and quality of life can be protected. Clearly DENR has a major role to play in the conversion to ESTs. There are many challenges which the GA could tackle in making such a conversion more efficient. In addition, the Governor's office and other offices of government such as the AG's office, the Dept of Ag, the Dept of Commerce, and the Dept of Transp. can and should also play key roles in leading or supporting this conversion.

The time to begin to plan in earnest for the conversion of the NC pork industry is upon the state. If delays are to be avoided or minimized, discussions and actions to prepare for conversion should begin very soon. The GA can play a major role first, by mandating the conversion of the entire industry, and second, by helping to set the stage for a smooth conversion program.

Thank you.

ERC Presentation: March 25, 2004
Joe Rudek, Ph.D.
Environmental Defense

WHAT HAPPENS AFTER AN ENVIRONMENTALLY SUPERIOR TECHNOLOGY FOR HOG WASTE TREATMENT IS DESIGNATED?

The General Assembly can prepare for the efficient conversion of the pork industry's waste management systems.

Three key elements:

A. A timeline for conversion of the industry is needed.
B. Funding for conversion on contract and independent farms is needed. Remove obstacles to business opportunities that many Environmentally Superior Technologies will offer.
C. DENR must develop the capacity to review a large number of Environmentally Superior Technology permits in a relatively short period of time.

Industrywide conversion is Two Phase process.

I. Determination of Environmentally Superior Technologies and subsequent installation on SF- and PSF-owned farms
II. Conversion of the remainder of the industry in NC.

Actions:

- DENR and other administrative agencies must be prepared for this workload.
- Numeric performance standards for Environmentally Superior Technologies should be codified.
- Evaluation of construction infrastructure relative to needs for industrywide conversion to Environmentally Superior Technologies.
- Funds for conversion to Environmentally Superior Technologies by contract farmers will be needed.
- Market development for the value-added products develop by Environmentally Superior Technologies is critical.

ERC Presentation: March 25, 2004
Joe Rudek, Ph.D.
Environmental Defense

WHAT HAPPENS AFTER AN ENVIRONMENTALLY SUPERIOR TECHNOLOGY FOR HOG WASTE TREATMENT IS DESIGNATED?

The General Assembly can prepare for the efficient conversion of the pork industry's waste management systems.

Three key elements:

A. A timeline for conversion of the industry is needed.
B. Funding for conversion on contract and independent farms is needed. Remove obstacles to business opportunities that many Environmentally Superior Technologies will offer.
C. DENR must develop the capacity to review a large number of Environmentally Superior Technology permits in a relatively short period of time.

Industrywise conversion is Two Phase process.

I. Determination of Environmentally Superior Technologies and subsequent installation on SF- and PSF-owned farms
II. Conversion of the remainder of the industry in NC.

Actions:

- DENR and other administrative agencies must be prepared for this workload.
- Numeric performance standards for Environmentally Superior Technologies should be codified.
- Evaluation of construction infrastructure relative to needs for industrywide conversion to Environmentally Superior Technologies.
- Funds for conversion to Environmentally Superior Technologies by contract farmers will be needed.
- Market development for the value-added products develop by Environmentally Superior Technologies is critical.

Report on the Activities of the DWQ CAFO General Permits Advisory Group

Environmental Review Commission
March 25, 2004

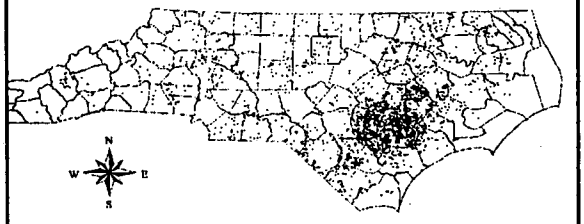
Introduction

- Report of the Advisory Group mandated by SB 733 (SL 2003-28).
- Required DENR to Study and Evaluate State Non-Discharge General Permit for Animal Operations
- State Permit Addresses Smaller Facilities Not Covered Under Federal National Pollutant Discharge Elimination System (NPDES) Permit
- At least 100 Confined Cattle, 250 Swine, or 30,000 Birds w/Liquid Manure System

Water Quality Related Animal Operation Permits in NC

- **NPDES Permit - Federal Permit**
  - 2500 swine/1000 cattle/30,000 birds & liquid waste.
  - Approximately 1041 facilities in NC
- **State Nondischarge Permit - Subject of SB 733**
  - 250 swine/100 cattle/30,000 birds & liquid waste.
  - Approximately 1437 facilities in NC.
- **Deemed Permitted**
  - Dry waste and/or under the number thresholds above.
  - No data on the number of these facilities in NC.

CAFO Locations in NC



Background

- Original State Non-Discharge Permits issued May 1998
- Original Permits were set to expire on April 30, 2003
- DWQ Proposed New, Draft Replacement Non-Discharge Permits in January 2003
- Draft Permits were the subject of 3 Public Meetings in February 2003
- Based upon public comments received, the proposed draft permits were substantially modified and revised.

SB 733

- Stayed Implementation of New General Permit
- Extended Effective Date of Original General Permit and Certificates of Coverage to Oct 2004
- Required DENR to evaluate use & impacts of General Permits for Animal Waste Management
- Required DENR to consult w/NCDA&CS, NCSU, industry reps, reps of env. & conservation groups
- Prepare revised, draft permits and forms & circulate among interested parties
- Report to ERC by March 1, 2004

Advisory Group Membership

- Forrest Westall / Tom Reeder - NC DWQ
- Jim Cummings - NCDA&CS
- Robert Evans - NCSU
- Tommy Stevens / Jake Barrow - NC Pork Council
- Neil Strother - Frontline Farmers
- Jimmy Randolph - NC Poultry Federation
- Anne Coan - NC Farm Bureau
- Dan Whittle - Environmental Defense
- Courtney Washburn - NC Sierra Club
- Michelle Nowlin - Southern Env Law Center
- Don Webb - Alliance for a Responsible Swine Industry
- Rick Dove - Waterkeepers Alliance

Advisory Group Activities

- Advisory Group Meetings
  - Sept 23 / Oct 14 / Oct 28 / Nov 13
- Fulfilled All Requirements of SB 733
  - Circulated draft permits and forms among members.
  - Issued a detailed report of proceedings.

Review of Major Issues

- More flexibility for required phosphorous evals.
  - Flexibility provided in proposed permits.
- Compliance with phosphorous standard?
  - Legal discussion in final report.
- "Amendments" to Animal Waste Plans submitted?
  - "Major Changes" and "Revisions" submitted to DWQ.

Review of Major Issues

- Rainbreakers required?
  - Required only for noncompliance.
- Frequency of inspection of application sites.
  - Every 120 minutes during application.
- Frequency of testing and calibration of application equipment.
  - Once every two years.

Review of Major Issues

- Precipitation event monitoring.
  - Daily monitoring of precipitation events.
- Frequency of sludge surveys.
  - Within 2 years, then annually.
- Automated lagoon monitoring equipment.
  - Required only for noncompliance.
- Pre-notification to DWQ of burial.
  - Not required.

Review of Major Issues

- Land application in proximity to wells.
  - No land application within 100' of wells.
- Crop management.
  - Crops managed in accordance with the Certified Animal Waste Management Plan.
- Annual certification form requirement.
  - Not required for compliant operations in this permitting cycle.

Summary

- Consensus reached on all but 2 major issues.
- Proposed permits and associated forms circulated among all group members.
- Proposed permits now ready for public notice and issuance.

CAFO Advisory Group Major Issues / Questions Summary Table

Issue	Resolution	Complete Consensus Among Group Members?
Provide more flexibility for performing the required phosphorous standard evaluation during this permit cycle.	Flexibility is provided in the proposed permits in language drafted by producer group representatives.	Yes
Do the NC General Statutes preclude DWQ from requiring compliance with the NRCS phosphorous standard?	Specific language regarding this issue is contained in the final report.	N/A
Do "amendments" to the Certified Animal Waste Management Plans (CAWMP) need to be submitted to DWQ?	The proposed permits only require "major changes" and "revisions" to the CAWMP to be submitted to DWQ.	Yes
Do "major changes" and "revisions" to the CAWMP need to be submitted to DWQ within 15 working days?	The proposed permits require "major changes" and "revisions" to the CAWMP to be submitted within 30 calendar days.	Yes
Should "rainbreakers" (to automatically cease land application during rain) only be required on a case-by-case basis for noncompliant farms?	The proposed permits only mandate "rainbreaker" devices on a case-by-case basis for noncompliant farms.	Yes
Frequency of inspection of land application sites.	The proposed permits require the inspection of land application sites every 120 minutes during application.	Yes
Frequency of testing and calibration of land application equipment.	The proposed permits require testing and calibration of land application equipment once every two years.	Yes
Crop management.	The proposed permits require crops to be managed in accordance with the applicable CAWMP.	Yes
Precipitation event monitoring.	The proposed permits require daily monitoring and recording of precipitation events at a site that is reflective of the farm's land application sites. These records must be maintained and available for Departmental review.	Yes

Frequency of required sludge surveys.	The proposed permits require sludge surveys to be performed within two years after the permits are issued and then annually thereafter.	Yes
Automated lagoon monitoring equipment.	Required only for noncompliant operations.	Yes
Was swine afterbirth factored into the design criteria for the CAWMP?	Yes	N/A
Does DWQ need to be pre-notified prior to the burial of animals that exceed normal mortality rates?	No. Burial activities are regulated under State veterinarian regulations and the farm's mortality plan.	Yes
Land application in proximity to groundwater wells.	The proposed permits specify that animal waste shall not be applied within 100 feet of any well with the exception of monitoring wells.	N/A
Inclusion of Annual Certification Form in final permit requirements.	An Annual Certification Form is not a requirement for compliant operations in the proposed permits.	No[2]
Mandatory compliance with the NRCS Phosphorous standard for new and expanding animal operations.	In the proposed permits new and expanding operations are required to conduct the phosphorous standard evaluation, but not demonstrate compliance with the standard, in order to receive a Certificate of Coverage (COC).	No[2]

Footnotes:

1. New legislation may be required to clarify this issue.
2. Representatives from Environmental Defense, Sierra Club, Waterkeepers Alliance, Alliance for a Responsible Swine Industry, and the Southern Environmental Law Center did not concur with this resolution.

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

FINAL REPORT ON THE ACTIVITIES AND FINDINGS OF THE DIVISION OF WATER QUALITY ANIMAL FEEDING OPERATION NON-DISCHARGE GENERAL PERMIT ADVISORY GROUP

FEBRUARY 16, 2004

TABLE OF CONTENTS

		Page
I.	Introduction	1
II.	Background	1
III.	Activities of the Advisory Group	2
IV.	Major Issues and Recommendations	3
V.	Final Recommendation	12

Attachments

Attachment 1 – Copy of Senate Bill 733 (Session Law 2003-28)
Attachment 2 – Minutes and Supporting Material from Sept. 23 Advisory Group Meeting
Attachment 3 – Minutes and Supporting Material from Oct. 14 Advisory Group Meeting
Attachment 4 – Minutes and Supporting Material from Oct. 28 Advisory Group Meeting
Attachment 5 – Minutes and Supporting Material from Nov. 13 Advisory Group Meeting
Attachment 6 – Proposed North Carolina General Nondischarge Permits for AFOs
Attachment 7 – Recommended Forms

FINAL REPORT ON THE ACTIVITES AND FINDINGS OF THE DIVISION OF WATER QUALITY ANIMAL FEEDING OPERATION NON-DISCHAGE GENERAL PERMIT ADVISORY GROUP

I. Introduction

This document contains the final written report of the proceedings and findings of the NC Division of Water Quality (DWQ) Animal Feeding Operation (AFO) State Nondischarge General Permit Advisory Group (Advisory Group) for the DWQ Director. The Advisory Group was established and this report has been developed in order to fulfill the mandate of Senate Bill 733 (Session Law 2003-28), which required the Department of Environment and Natural Resources (DENR) to consult with affected parties and study the use of general nondischarge permits for animal waste management and report back to the Environmental Review Commission with its findings and recommendations by March 1, 2004. Included in this document are detailed minutes of all the meetings of the Advisory Group, an analysis of the major permitting issues reviewed by the group, and revised draft State Nondischarge General Permits for swine, cattle, and wet waste poultry operations. In addition, this report contains a number of recommendations. It should be noted that while every effort was made to reach consensus with the Advisory Group on all issues discussed, these recommendations in this summary report incorporate all agreements reached by consensus and the recommendations of the DWQ-appointed Advisory Group facilitators, Forrest Westall and Tom Reeder.

II. Background

Senate Bill 733 (SB 733), which was signed by Governor Easley on April 30, 2003, directed DENR to study the use of Nondischarge General Permits for animal waste management systems and to evaluate the impacts of using general permits for these operations on the land application and potential discharge of nitrogen and phosphorus to surface waters and groundwater in the state. (A copy of SB 733 is included as Attachment 1 of this document.)

In conducting this study, DENR was directed to consult with the Department of Agriculture and Consumer Services; the College of Life Sciences at NCSU; representatives of swine, cattle, and poultry farmers; representatives of environmental protection and natural resource conservation groups; and other interested parties. In addition, as part of the study, DENR was directed to prepare draft revised general permits for animal waste management systems that serve swine, cattle and poultry operations and to circulate these draft permits, along with drafts of any forms that farmers would be required to use in connection with these permits among interested parties. Furthermore, SB 733 required DENR to report its findings and recommendations to the Environmental Review Commission (ERC) on or before 1 March 2004.

In order to meet these requirements DENR chose to establish an Advisory Group to review the subject permits and to help develop the required recommendations and findings. Forrest Westall, the DWQ Supervisor in the Asheville Regional Office, and Tom Reeder, a member of the DWQ Planning Branch in the Raleigh Central Office, were appointed to facilitate the discussions of this Advisory Group. It is the results of the efforts of this Advisory Group that are contained in this document.

The membership of the Advisory Group is represented in the following table:

Name	Affiliation
Forrest Westall	NC DWQ
Tom Reeder	NC DWQ
Jim Cummings	NCDA & CS
Robert Evans	NC State University
Tommy Stevens	NC Pork Council
Jake Barrow	NC Pork Council
Neil Strother	Frontline Farmers
Jimmy Randolph	NC Poultry Federation
Anne Coan	NC Farm Bureau
Dan Whittle	Environmental Defense
Courtney Washburn	NC Sierra Club
Michelle Nowlin	Southern Env Law Center
Don Webb	Alliance for a Responsible Swine Industry
Rick Dove	Waterkeepers Alliance

The group included five representatives from producer organizations and five representatives from environmental advocacy groups. In addition, the group was advised on legal issues by representatives from the North Carolina Attorney General's Office. Other interested parties, including officials of the Department of Environment and Natural Resources, which were not formal members of the group, often attended some or all of the meetings. The attached meeting minutes reflect the attendance at the sessions.

III. Activities of the Advisory Group

The Advisory Group met on four occasions between September 23rd and November 13th, 2003 to review the draft general permits, seek resolution of the major outstanding issues, and fulfill the other requirements of its charter. Detailed minutes of these meetings, and all the supporting documentation discussed and reviewed at these meetings, are contained in this report in the following attachments:

Advisory Group Meeting Date	Meeting Minutes and Associated Supporting Material Presented In
September 23, 2003	Attachment 2
October 14, 2003	Attachment 3
October 28. 2003	Attachment 4
November 13, 2003	Attachment 5

IV. Major Issues and Recommendations

The following is a synopsis and analysis of the major issues reviewed and discussed by the Advisory Group. The recommendations presented represent the work of the Advisory Group and the recommendations of facilitators Forrest Westall and Tom Reeder.

1. Issue: Annual Certification Form Requirement

Discussion: By far the most contentious issue discussed by the Advisory Group concerned whether the proposed State General Permits would contain a requirement for the regulated farmers to complete an Annual Certification Form, certifying the compliance status of the animal operation during the preceding year. The completion of this form is currently a provision of the NPDES General Nondischarge Permits for CAFOs. The representatives from the producer organizations felt that it was highly inequitable to include this Federal requirement in the permit for farms of a much smaller size than those covered under the NPDES permits. In addition, the farming representatives explained that there was much apprehension and misunderstanding regarding this form among the regulated community and that the form added no, or negligible, value to the actual permit. Furthermore, producer representatives explained that 71% of the swine steady state live weight was already covered under the NPDES requirements so, therefore, it would be wise to observe how the implementation of this form proceeded under the NPDES Permit requirements before levying this requirement on the smaller, State-permitted farms. In general, the producer group representatives were resolute in their opinion that the inclusion of this form in the State General Permit was a non-negotiable issue.

Representatives of the environmental advocacy groups felt just as strongly that this requirement was necessary to create viable and useful State permits. Advocacy group representatives pointed out that the requirement for an Annual Certification Form was a key issue and that they felt that the certification would be an important and critical public policy tool for the regulation of these facilities. These representatives insisted that the form was not punitive in nature and that law-abiding, honest farmers had nothing to fear from the completion of this requirement. They felt that an increased educational campaign by DWQ and the producer organizations could allay the fears of the regulated community. Although, the environmental interest group representatives could agree to a

"phased-in" approach for this form requirement, they felt that its inclusion in the permit at some point was extremely important.

An important element that was considered during this discussion is the fact that the affected animal operations are presently subject to two annual reviews by DENR representatives. One is an annual inspection conducted by DWQ personnel. The second is an annual "operational review" performed by Division of Soil and Water Conservation personnel. During these annual inspections/operational reviews all the farm's records and self-inspection results must be available for review. These are the same records upon which the annual certification would be based. Therefore, from the producers' perspective, an additional annual certification by the farmer is unnecessarily redundant since a farm's records have already been subject to review by DENR representatives on two occasions during the calendar year. Furthermore, the advisory group discussed the level of "self-reporting" already required in the proposed permit. If the draft permits contained in this document are implemented, the affected animal operations would be required to self-report to the appropriate Regional Office on the following matters:

- Any discharge to ditches, surface waters or wetlands.
- Any discharge that poses a serious threat to the environment or human safety or health.
- Failure to maintain storage capacity in a lagoon/storage pond greater than or equal to that required in Condition V. 3. of the proposed permit.
- Over applying waste either in excess of the limits set out in the CAWMP or where runoff enters surface waters or wetlands.
- Failure of any component of the animal waste collection, treatment, storage and land application system resulting in a discharge to surface waters or wetlands.
- Any failure of the waste treatment and disposal system that renders the facility incapable of adequately receiving, treating or storing the waste and/or sludge.
- A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge to surface waters or wetlands.
- A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge that poses a serious threat to surface waters or wetlands.
- Any deterioration or leak in a lagoon/storage pond that poses an immediate threat to the environment or human safety or health.

In light of the above, representatives from the producer organizations stated that with the two annual inspections/operational reviews, the level of self-reporting already mandated in the proposed permits, and in consideration of the amount of anxiety and apprehension that the certification form was generating in the regulated community, that

the annual certification form requirement was an unnecessary and redundant burden on the affected farmers.

Recommendation: There was not overall consensus among the group on the resolution of this issue. After reviewing all aspects of this discussion and considering the self-reporting and inspections already required in the proposed permits, we recommend the following:

1) Require the annual certification form only on a case by case basis for non-compliant operations during the permitting cycle covered by the proposed permits.
2) Study the process and impact of the annual certification form requirement as the Division manages this process for the NPDES-permitted operations over the life of the current NPDES General Permit. The first of these forms are due beginning in March 2004. Based on this evaluation, the agency would develop a plan to implement the annual certification form requirement for the State-permitted facilities in their next five-year permitting cycle (beginning in 2009). This will allow the Division and the regulated community an opportunity to review the effects of the form on the NPDES-permitted operations prior to making a future decision for non-NPDES facilities.

2. Issue: Phosphorous Standard Compliance for New and Expanding Operations

Discussion: The original, draft permits contained a provision that would have required new and expanding operations covered under the State Permit to demonstrate compliance with the Natural Resource Conservation Service (NRCS) Phosphorous (P) Standard before receiving a Certificate of Coverage (COC) from DWQ. Poultry Federation representatives, in particular, questioned the legality of this requirement in light of the fact that the General Statutes only list Nitrogen as a rate determining nutrient for State AFO Permits. For their part, the environmental advocacy groups asserted that G.S. 143-215.1(b) does provide the State with the discretion to require compliance with a phosphorous standard if compliance with this standard is deemed appropriate.

Recommendation: There was not consensus among the group on the resolution of this issue. However, based upon advice from the NC Attorney General's Office representatives, our recommendation is that the requirement for new and expanding operations to demonstrate compliance with the P standard before receiving a COC should be removed from the proposed permits. New and expanding operations will still be required to complete a phosphorous evaluation, but will not be required to demonstrate compliance in order to receive a COC unless demonstration of compliance at some future date becomes a Statutory requirement for COC issuance.

3. **Issue: Mandatory Phosphorous Standard Evaluation and Flexibility for Existing Facilities**

Discussion: There was considerable discussion among the group about the proposed permit provision that would require all existing covered animal operations to perform an evaluation using the Phosphorous Loss Assessment Tool (PLAT) to evaluate the farms' ability to comply with the NRCS P Standard. This is already a requirement in the NDPES CAFO Permits. According to the original draft state permit requirement, this evaluation would have to be completed within 6 months of a covered farm receiving notification from DWQ that the evaluation was required.

The environmental advocacy group representatives felt strongly that the phosphorous evaluations should be performed during this permit cycle, but understood that the Division would need flexibility in determining when the evaluations should take place due to the limited resources available to perform the evaluations and the need to gain experience with this process through the NPDES permitting program. The advocacy group representatives were in favor of requiring the evaluations to be completed within six months following receipt of notification from the Division, but were willing to support a phased in approach.

There was considerable concern among the representatives of the producer groups about the language in this original provision. These representatives felt that because the PLAT had never been utilized on North Carolina's farms, more flexibility should be incorporated into this requirement to allow all parties to gain valuable experience in conducting these evaluations first on the NPDES-covered farms. In addition, the producer representatives felt that 6 months was not enough time to complete the evaluations considering the extremely limited resources (external technical specialists) that would be available to assist the regulated farmers in performing the PLAT evaluation. In response to a general request from the group, Tommy Stevens, of the Pork Council, drafted language that he felt was more acceptable to the regulated farmers.

Recommendation: We recommend that the proposed permits include the following language regarding this requirement:

"During the period of this general permit, the Division of Water Quality may notify the permittee to conduct an evaluation of the facility and its CAWMP to determine the facility's ability to comply with the NRCS nutrient management standard as it relates to phosphorus. The Division will make its decision as whether to notify permittees based on experience gained through the NPDES permit implementation.

This evaluation will not be required until such time as the permittee is notified to conduct the evaluation by the Division of Water Quality. The evaluation must be documented on forms supplied by or approved by the Division and must be submitted to the Division. This evaluation must be completed by existing facilities within (12) months of receiving notification from the Division."

4. Issue: NC General Statues and Phosphorous Standard Compliance

Discussion: During the course of the group's discussion of the phosphorous-related issues, Dan Whittle of Environmental Defense requested informal guidance from the NC Attorney General's Office representatives as to whether the existing General Statutes actually preclude DWQ from requiring compliance with a P standard, or whether the statutes simply do not mandate this compliance. He further requested that this information be included in the group's final report.

Response: The following information was provided to the Advisory Group by Mary Penny Thompson, the Assistant General Counsel for DENR:

"DWQ has broad authority to protect water quality from pollutants, such as phosphorus, through its permitting requirement, see N.C. Gen. Stat. § 143-215.1, and its administration of federally-mandated programs, see N.C. Gen. Stat. §§ 143-211 and 143-215.3. Although the animal waste permitting statute allows the development of "individual and general permits based on the number of animals *and other relevant factors*," it does not specifically mention phosphorus (unlike its specific mention of nitrogen). N.C. Gen. Stat. § 143-215.10C (emphasis added). The Attorney General's Office has advised DWQ that the omission of a specific reference to phosphorus in the animal waste permitting statute may preclude requiring compliance with a specific phosphorus standard. Therefore, at this point, DWQ will not include a specific compliance standard for phosphorus in the animal waste permits, but will monitor the status of standards and the effect of phosphorus on water quality."

5. Issue: Submission of Amendments to the CAWMP to DWQ

Discussion: The original, proposed draft permits contained a provision that required regulated farmers to submit any amendments to their Certified Animal Waste Management Plans (CAWMP) to the appropriate DWQ Regional Office within 15 working days. The group discussed whether DWQ really needed to receive all "amendments" to the CAWMP, as these are normally very minor in nature, or whether it would be more appropriate for the Division to only receive "major changes" and "revisions." All these terms are specifically defined in Guidance Memos from the Senate Bill 1217 Interagency Group and the Advisory Group reviewed these definitions in detail to determine which of these items would be most appropriate for DWQ review.

Recommendation: There was general consensus among the group on the resolution of this issue. We recommend that the proposed permits require that only "major changes" and "revisions," as defined in the SB 1217 Guidance Memos, to the CAWMP be forwarded to the appropriate DWQ Regional Office for review. We further recommend that the SB 1217 Guidance Memo definitions of "amendments," "revisions," and "major changes" be included in the proposed permits.

6. Issue: Timeliness of Submission of "Major Changes" and "Revisions" to the CAWMP to the DWQ Regional Office

Discussion: When discussing the issues surrounding the submission of changes, revisions, and amendments to the CAWMP to the Regional Office for review, the Advisory Group also reviewed the issue of the timeliness of those submissions. The original, draft permits required these submissions within 15 working days. The producer group representatives discussed whether this was a reasonable requirement in light of the fact that these submissions must be formulated by a limited number of technical specialists serving a large number of animal operations and it is sometimes physically impossible for these specialists to compile and forward all the major changes and revisions within 15 working days. In addition, the producer representatives asserted that there would be very little lost, from a regulatory perspective, if more time was provided.

Recommendation: There was general consensus from the group on the resolution of this issue. We recommend that the proposed permits require "major changes" and "revisions" to the CAWMP to be submitted to the DWQ Regional Office within 30 calendar days of the changes.

7. Issue: Rainbreaker Requirement

Discussion: The group agreed that the implementation of devices designed to terminate the land application of wastewater in the event of rain, the so-called "Rainbreaker" devices, would only be required on a case by case basis for those farms found to be out of compliance with the permit requirement to cease land application during precipitation events.

Recommendation: There was general consensus from the group on this issue. We recommend that the proposed permits mandate on a case by case basis the Rainbreaker devices only for those farms found to be out of compliance with the permit requirement to cease land application during precipitation events.

8. Issue: Inspection of Land Application Sites

Discussion: The group agreed that land application sites should be inspected by the Operator in Charge (OIC), the back-up OIC or a person under the supervision of the OIC or the designated back-up OIC at least every 120 minutes.

Recommendation: There was consensus among the group on this issue. We recommend that the proposed permit require that land application sites be inspected by the Operator in Charge (OIC), the back-up OIC or a person under the supervision of the OIC or the designated back-up OIC at least every 120 minutes.

9. Issue: Testing and Calibration of Land Application Equipment

Discussion: The group spent some time discussing how often the proposed permit should require the testing and calibration of land application equipment. The options discussed by the group included whether this testing and calibration should be required on an annual basis or once every two years. The producer group representatives asserted that annual testing was an unnecessary expense for the farmers and added little value in terms of protection of the environment. Furthermore, these representatives noted that annual testing and calibration was a requirement of the NPDES CAFO Permits and that in recognition of the smaller size of the farms regulated under the State Permit that testing every other year was a more equitable solution. Robert Evans, of NC State, noted that land application equipment that has not been calibrated recently tends to spray or apply less waste instead of more. Also, he noted that available data support testing and calibration every other year. Environmental interest group representatives were interested in determining from the producer group representatives what additional costs would be incurred by the farmers with an annual testing and calibration requirement.

Recommendation: There was general consensus among the group on the resolution of this issue. We recommend that the proposed permits require testing and calibration of the land application equipment once every two years.

10. Issue: Crop Management

Discussion: The group noted that the draft permits clearly require covered crops to be managed in strict accordance with the CAWMP. The group determined that this provision was adequate in order to require regulated farmers to account for any nitrogen that may be introduced into the environment by allowing harvested crops to become unusable.

Recommendation: There was general consensus among the group on this issue. The proposed permits should require regulated crops to be managed in accordance with the applicable CAWMP and that no additional language was necessary.

11. Issue: Precipitation Event Monitoring

Discussion: The group clarified that the intention of the provision in the permits requiring daily monitoring and recording of precipitation events was that this activity should occur at a site that is reflective of the general meteorological conditions of the farm's application sites. Furthermore, the group specified that this daily monitoring and recording is only required for precipitation events. Finally, the group clarified that the permits should require that the records of these precipitation events should be maintained on site for Departmental review.

Recommendation: There was general consensus among the group on this issue. We recommend that the proposed permits require daily monitoring and recording of all precipitation events, that this monitoring be conducted at a single facility site that is reflective of the general conditions of the farm's land application sites, and that these records of precipitation events be maintained on site and be available for review by Departmental Inspectors. The permit condition should also note that precipitation events would be required to be recorded only on days when rainfall or other precipitation occurred.

12. Issue: Sludge Survey Requirement

Discussion: The group felt that due to existing resource limitations that sludge surveys on the State-permitted farms should be required within two years after the proposed permits are issued and then on an annual basis thereafter, unless some other more flexible agreement is reached with DWQ on a case-by-case basis.

Recommendation: There was general consensus on this issue. We recommend that the proposed permits require sludge surveys to be performed within two years after the proposed permits are issued and then on an annual basis thereafter, unless some other more flexible agreement is reached with DWQ on a case-by-case basis. This permit condition should clarify that sludge survey results are only required for lagoon facilities and not manure storage areas (this is specifically in reference to cattle operations and other animal waste management facilities that use such storage areas).

13. Issue: Automated Lagoon Monitoring Equipment

Discussion: There was discussion among the group regarding the provision in the draft permits that specifies that mandatory installation of automated lagoon monitoring equipment at non-compliant farms may be waived if "the Permittee can demonstrate to the satisfaction of the Director that the violations were due to conditions beyond its control." There was discussion regarding what would be required to successfully demonstrate that conditions were beyond the Permittee's control and whether this would excuse non-compliance as a result of chronic rainfall. In response, alternate language was proposed by representatives of the environmental advocacy groups.

Recommendation: There was general agreement on the wording developed. We recommend that the previous language be replaced in the proposed permits with *"The Director may determine that installation of automated waste level monitors is not required if the Permittee can demonstrate that preventative measures were taken to avoid the violation and that it resulted from conditions beyond the Permittee's control."*

14. Issue: Swine Afterbirth

Discussion: There was some discussion within the group as to the management of the afterbirth associated with swine reproduction and whether it was considered as part of the lagoon loading in the NRCS lagoon design standards. Research by group members determined that the design criteria for the lagoons were originally developed under the assumption that swine afterbirth was included in the waste samples utilized to establish these NRCS lagoon design criteria.

Recommendation: We recommend that no further action be taken on this issue at this time.

15. Issue: Pre-Notification to DWQ Prior to Burial Above Normal Mortality

Discussion: The Advisory Group reviewed the permit requirements pertaining to the burial of dead animals whose numbers exceed the normal mortality rates. Normal mortality disposal is covered as a part of the CAWMP. A provision in the draft, proposed State Permits required notification of DWQ before a regulated operation proceeds with the burial of animals exceeding normal mortality rates. However, representatives from the producer organizations questioned the benefit of this requirement, due to the fact that the permit already requires this burial to be executed in accordance with appropriate NCDA & CS and State Veterinarian regulations and requirements. Furthermore, representatives from NCDA & CS pointed out to the group that a facility's Mortality Plan must already plan for burial activities such as this and must ensure that designated burial sites are protective of groundwater and other resources.

Recommendation: There was general consensus among the group on this issue. We recommend that the requirement to notify DWQ prior to the burial of animals exceeding normal mortality rates be deleted and that instead a provision be added to the proposed permits that would require the regulated operation to submit a map designating burial sites within 15 calendar days after the burial takes place.

16. Issue: Land Application in Proximity to Groundwater Wells

Discussion: A provision in the draft, proposed permits mandated that animal waste could not be land applied within 100 feet of wells. The Advisory Group reviewed this requirement and discussed whether this 100-foot set-back should apply to all types of wells or just drinking water wells.

Recommendation: We recommend that the proposed permit specify that "Animal waste shall not be applied within 100 feet of any well with the exception of monitoring wells. The allowable distance to monitoring wells shall be established on a case by case basis by the Division."

V. Final Recommendation

It is recommended that General Permits continue to be used as the main permit type at all animal facilities. General Permits are the most effective and efficient tool for the permitting of these facilities. The General Permits being proposed along with the individualized Certified Animal Waste Management Plans for each facility provide the regulated facilities with a comprehensive list of required activities needed to protect both surface and groundwater quality.

Proposed North Carolina General Nondischarge Permits for swine, wet waste poultry, and cattle operations are contained in Attachment 6 of this document. These revised permits incorporate all of our recommendations and the Advisory Group's findings, which have been presented previously in this report. In accordance with Senate Bill 733, these proposed permits and this final report have been circulated among all the members of the Advisory Group for their review.

The Draft forms needed to document the required record keeping requirements associated with the proposed Draft General Permits were also evaluated and shared with the Advisory Group. Following this review, it was determined that many of the forms currently being used by the NPDES permitted animal facilities were also appropriate for use by facilities that would be covered by the Draft Non-Discharge General Permits. Therefore it is recommended that forms FRBD-1, IRR-1, IRR-2, SLUR-1, SLUR-2, SOLID-1, SOLID-2, STOCK-1, TRAN-1, and CROP-1 be approved for use by these facilities. Copies of these forms can be found in Attachment 7. While some of these forms will be required at all facilities, the exact number of forms required to be kept at an individual facility will need to be determined on a case by case basis, dependent upon an individual facility's type of manure management system. It is also recommended that the Division continue to work with producers to develop and approve alternative forms that can be demonstrated to meet all the permit's record keeping requirements.

We recommend that the Director and the Department forward these proposed General Permits, along with this Final Report, to the Environmental Review Commission for further review and consideration.

Attachment 1

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2003

SESSION LAW 2003-28
SENATE BILL 733

AN ACT TO PROVIDE FOR EXTENSIONS OF THE EXPIRATION DATES OF CERTAIN GENERAL NONDISCHARGE PERMITS FOR ANIMAL WASTE MANAGEMENT SYSTEMS THAT SERVE SWINE, CATTLE, AND POULTRY OPERATIONS AND TO DIRECT THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES TO STUDY THE USE OF GENERAL NONDISCHARGE PERMITS FOR ANIMAL WASTE MANAGEMENT SYSTEMS THAT SERVE SWINE, CATTLE, AND POULTRY OPERATIONS TO PROTECT WATER QUALITY.

The General Assembly of North Carolina enacts:

SECTION 1. Notwithstanding 15A NCAC 2H.0225(e), the Department of Environment and Natural Resources, pursuant to the powers relative to general permits and to permits for facilities not discharging to the surface waters of the State that are granted to the Environmental Management Commission under G.S. 143-215.1 and G.S. 143-215.10C and delegated by the Commission to the Department, shall extend the expiration of general permits AWG100000 (Swine), AWG200000 (Cattle), and AWG300000 (Poultry) until 1 October 2004. Subject to the provisions of 40 Code of Federal Regulations Part 123 (1 July 2002 Edition) and of subsections (g) and (h) of 15 NCAC 2H.0225, the Department of Environment and Natural Resources shall extend the expiration of individual certificates of coverage issued under these general permits until 1 October 2004.

SECTION 2. The Department of Environment and Natural Resources shall study the use of general nondischarge permits for animal waste management systems for swine, cattle, and poultry operations to protect water quality, including the impact of the use of general permits for swine, cattle, and poultry operations on the land application and potential discharge of nitrogen and phosphorous to surface water and groundwater in the State. In conducting this study, the Department shall consult with the Department of Agriculture and Consumer Services; the College of Agriculture and Life Sciences at North Carolina State University; representatives of swine, cattle, and poultry farmers; representatives of environmental protection and natural resources conservation groups; and other interested parties. In the course of the study required by this section, the Department of Environment and Natural Resources shall prepare draft revised general permits for animal waste management systems that serve swine, cattle, and poultry operations and shall circulate these draft permits, along with drafts of the forms that farmers would be required to use in connection with these permits, among interested parties for comment. Consistent with water quality protection goals and strategies, the Department of Environment and Natural Resources may further revise the draft revised general permits and associated forms on the basis of comment from interested parties. The Department of Environment and Natural Resources shall report its findings and recommendations to the Environmental Review Commission on or before 1 March 2004.

SECTION 3. This act becomes effective 30 April 2003.

In the General Assembly read three times and ratified this the 28th day of April, 2003.

s/ Beverly E. Perdue
President of the Senate

s/ James B. Black
Speaker of the House of Representatives

s/ Michael F. Easley
Governor

Approved 10:18 a.m. this 30th day of April, 2003

Initial Meeting of DWQ CAFO General Permit Advisory Group
September 23, 2003

The meeting commenced at approximately 1:00 pm on September 23rd in Conference Room #3 on the 14th Floor of the Archdale Building, Raleigh, NC.

Those in attendance for all or part of the meeting were:

Name	Affiliation
Forrest Westall	NC DWQ
Tom Reeder	NC DWQ
Tom Ellis	NCDA & CS
Jimmy Randolph	NC Poultry Federation
Henry Jones	NC Poultry Federation (Attorney)
Megan Brown	Southern Env Law Center
Neil Strother	Frontline Farmers
Tommy Stevens	NC Pork Council
Jake Barrow	NC Pork Council
Amy Pickle	NC Dept of Justice
Anita LeVeaux	NC Attorney General's Office
Kathryn Jones Cooper	NC Attorney General's Office
Joe Rudek	Environmental Defense
Sheryl Stevens	DENR / Legislative Affairs
Robert Evans	NC State University
Courtney Washburn	NC Sierra Club
Molly Diggins	NC Sierra Club
Chester Lowder	NC Farm Bureau
Boyd DeVane	NC DWQ
Dennis Ramsey	NC DWQ
Kim Colson	NC DWQ

The meeting commenced with Forrest welcoming those in attendance, thanking them for their participation, and briefly reviewing Senate Bill 733 and the reason for the establishment of this advisory group.

Introductions were conducted. All members introduced themselves and their affiliation.

A short list of meeting ground rules were presented and adopted by the group. These ground rules are:

- Respect others
- Listen
- One person speaks at a time
- Participate
- Focus on interests / ideas not positions

- Stay on subject
- Focus on issues at hand
- Consensus – ***If possible***

A comprehensive briefing was presented that provided an overview of the following subjects:

- Senate Bill 733
- the goals and charter of this advisory group
- the types of CAFO permitting programs regulated by NC DWQ
- the evolution of the National Pollutant Discharge Elimination System (NPDES) and State General Non-Discharge CAFO Permits
- a contrast and comparison of the NPDES and State CAFO Permits
- the major issues regarding the development of a new State General CAFO Permit

An electronic copy of this PowerPoint brief has been provided to all the recipients of these meeting minutes.

Issues and Discussion Points

Tom Ellis suggested that the new permit needed to address the 25-year, 24-hour storm issue. He feels that this provision, which does not allow overflows except in the event of a 25-year, 24-hour storm, is too restrictive as it does not address chronic rainfall situations when one rain event does not meet the statistical 25-year, 24-hour storm. This is the situation NC farmers find themselves in this year. Kathy Cooper noted that the 25-year, 24-hour storm provision is a statutory requirement that DWQ is not free to change on its own. Dennis Ramsey noted that DWQ is currently reviewing the chronic rainfall issue under a process separate from this advisory group and hopes to develop some recommendations on this issue by the end of 2003.

Joe Rudek asked if DWQ could provide some statistics that would approximate what percentage of the State's swine population is regulated under the NPDES permit and what percentage is regulated under the State permit.

Action Item: DWQ thought that it could provide some figures based on steady state live weights at the next meeting that would answer Joe's question.

There was considerable discussion regarding the phosphorous (P) loss standard evaluation requirement contained in Paragraph 5 of the Performance Standards of the draft State General Permits. Dennis Ramsey explained to the group that the Natural Resource Conservation Service (NRCS) has published the phosphorous loss standard so that the mandatory evaluation to determine if a farm could comply with this new standard would now be a requirement for any farm covered under the new NPDES General Permits for animal facilities and the Draft State General Permits. Dennis stated that the evaluation will need to be completed 6 months after a farm receives notification from the Division by mail that it is required to perform the evaluation. Dennis explained that the

notification to conduct this evaluation would be mailed to the covered farms in a staggered fashion (that has yet to be determined) so that local technical specialists would not be overwhelmed by requests for assistance in conducting these evaluations. Dennis further explained that even if this evaluation requirement became part of the final Non-Discharge General Permits that notification for this requirement would be first mailed to farms covered under the NPDES General CAFO Permit before notifying farms covered under the State General permit. Representatives from the Poultry Federation questioned why existing farms and new and expanding farms are treated differently in this provision. Dennis explained that the NRCS P loss standard would probably become a requirement in the next round of NPDES and State Permits so, therefore, the State would be negligent in issuing a Certificate of Coverage (COC) to a new or expanding farm that it knew would be incapable of meeting this impending requirement. Furthermore, Dennis explained that existing farms would want to conduct the evaluation because if it was determined that the farm would not be able to comply with the new P loss standard, the farm owners would have several years to try to find a solution before the next round of permits (containing the P standard) are implemented. The Poultry Federation Reps asked for an interpretation of the meaning of the phrase "phosphorous loss standards that are applicable to land application activities" in Paragraph 5. Dennis explained that this was the NRCS P loss standard. Several representatives from the regulated community questioned the legality of requiring an evaluation for a phosphorous standard when only compliance with a nitrogen standard is mandated in the General Statutes. Dennis explained that it is imperative that DWQ be able to gauge the magnitude of the phosphorous loss problem in the State and that these evaluations were the best method to accomplish this. Although the legality issue was never completely resolved, most in the meeting agreed that if the P loss standard is to become a requirement of the next round of NPDES and State CAFO Permits it is a good idea for all the affected farms to get some idea if they will be able to comply with this standard and to seek a solution if it can not.

An issue raised by representatives from the swine producers concerned the requirement to forward all amendments to the Certified Animal Waste Management Plan (CAWMP) to the DWQ Regional Office within 15 working days. Swine producer representatives noted that often these amendments are very minor issues, such as a change in crops in an application field, and the requirement to have these changes to the Regional Office in 15 working days often can not be met. Neil, Tommy, and Jake explained that often these minor changes are worked out at the farm with the local technical specialist on the hood of a truck. These changes are annotated on the existing plan and are initialed by the farmer and the technical specialist. At this point in time the farmer is authorized to proceed to implement the amendments. However, the technical specialist must go back to office, input the changes into the applicable CAWMP and then forward this revised smooth plan to the farmer and the Regional Office. Tommy, Jake, and Neil explained that it was often physically impossible to accomplish this within 15 working days due to the high workload of the technical specialists. They felt that a 30 to 45 day requirement would be more realistic. Several members of the group noted that most DWQ regulatory requirements (outside of the CAFO arena) allow regulated parties 30 days to respond to requests. It was the consensus of the group that this provision should be amended to provide 30 calendar days for amendments to the CAWMP to be forwarded to the

Regional Office, although some members from the regulated community requested that this be 30 working days.

There was a brief discussion regarding Paragraph #9 in the Performance Standards of the draft permit. This requirement states "Animal waste shall not be applied within 100 feet of wells." After some discussion regarding monitoring vs. drinking wells and abandoned vs. active wells it was the general consensus of the group that this provision should be considered for change to "Animal waste shall not be applied within 100 feet of *potable drinking water* wells."

Action Item: Contacts will be made with the Division's Groundwater Section to determine the appropriate language for this condition.

There was a brief discussion regarding Provision #9 in the Operation and Maintenance Requirements of the draft State permit. The question was raised as to what constituted an exceedance of the normal mortality rate. Dennis explained that this was any mortality that exceeded the normal average annual mortality for animals at a specific farm. Joe Rudek suggested that some consideration be given to requiring animal operations to have designated, pre-selected burial sites that would be capable of holding large numbers of animal carcasses in the event of a natural disaster.

Action Item:

Forrest requested that all members of the group consider and review the outstanding issues with the proposed State General Permit (as delineated in the briefing) and any other issues that they may want to raise during the course of the Advisory Group. The group members should send these issues / concerns electronically to forrest.westall@ncmail.net and to tom.reeder@ncmail.net so that a master list can be compiled.

Next Meetings:

The group established the following dates and times for the next meetings:

October 14, 1:00 to 4:00
October 28, 1:00 to 4:00
November 13, 1:00 to 4:00
November 25, 1:00 to 4:00

Tom Ellis stated that he would investigate securing a conference room in the NCDA&CS facility on Blue Ridge Road for future meetings as this would make the parking situation more convenient.

The group recognized that all the meetings scheduled may not be required, dependent upon the progress made at future meetings.

The meeting adjourned at approximately 4:00.

Any comments, concerns, or questions regarding these meeting minutes should be directed to Tom Reeder at 919-733-5083 ext. 557 or to the e-mail address noted above.

NC CAFO General Permits Advisory Group

Introductory Meeting
September 23, 2003

Introduction

- Study and Evaluate State Non-Discharge General Permit for Animal Operations
- State Permit Addresses Facilities Not Covered Under Federal NPDES Permit
- At least 100 Confined Cattle, 250 Swine, or 30,000 Birds w/Liquid Manure System

Background

- Original State Non-Discharge Permits issued May 1998
- Original Permits were set to expire on April 30, 2003
- DWQ Proposed New, Draft Replacement Non-Discharge Permits in January 2003
- Draft Permits were the subject of 3 Public Meetings in February 2003
- Based upon public comments received, draft permits were substantially modified and revised.

Background (Continued)

- SB 733 Introduced in General Assembly
- Subsequently Ratified by Legislature and Signed by Governor
- SB 733 Stayed the Implementation of New, Proposed General Permits and extended the effective date of original permits from May 1, 2003 to Oct 1, 2004.

SB 733

- Stayed Implementation of New General Permit
- Extended Effective Date of Original General Permit and Certificates of Coverage to Oct 2004
- Required DENR to evaluate use & impacts of General Permits for Animal Waste Management
- Required DENR to consult w/NCDA&CS, NCSU, industry reps, reps of env. & conservation groups
- Prepare revised, draft permits and forms & circulate among interested parties
- Report to ERC by March 1, 2004

CAFO General Permits Advisory Group

- Composed of Reps as mandated by SB 733
- Goals:
  - Study and evaluate the use of general non-discharge permits for animal operations
  - Prepare draft, revised general permits.
  - Review and circulate draft, revised permits w/associated monitoring forms
  - Report to ERC by March 1, 2004

Review of CAFO Permitting Programs in North Carolina

Permitting Programs for Animal Operations in NC

- NPDES General Permit
  - Liquid manure system with:
  - Swine: 2,500 or more > 55 lbs or 10,000 < 55 lbs
  - Cattle: 1,000 confined beef or 700 mature dairy
  - Poultry: 30,000 laying hens or broilers
  - Federal permit
  - Not a subject of these discussions
  - Includes approximately 1041 facilities in NC

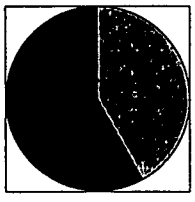
Permitting Programs for Animal Operations in NC

- State General Non-Discharge Permit
  - Not covered under NPDES Permit
  - Liquid manure system with at least:
  - 250 Swine
  - 100 Confined Cattle
  - 30,000 Birds
  - Subject of SB 733 and these discussions
  - Includes approximately 1437 facilities in NC

Permitting Programs for Animal Operations in NC

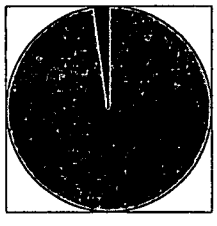
- Deemed Permitted
  - Dry waste management systems or
  - Under the animal threshold for State permit
  - Includes all animal facilities that are not covered under NPDES or State Permits
  - Not a subject of these discussions
  - No data on the number of these facilities in NC

NPDES vs. State Permit for CAFOs



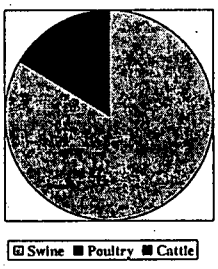
- NPDES General Permit for CAFOs = 1041
- State General Permit for CAFOs = 1437

Breakdown of NPDES CAFO Permits



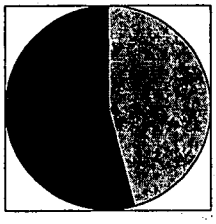
- Swine - 1019
- Poultry - 17
- Cattle - 5

Breakdown of State CAFO Permits



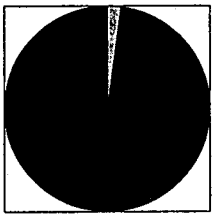
- Swine - 1203
- Poultry - 9
- Cattle - 225

Breakdown of Permitted Swine Facilities in NC



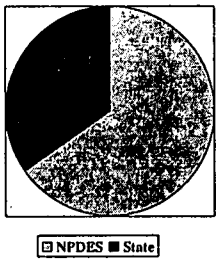
- NPDES - 1019
- State - 1203

Breakdown of Permitted Cattle Facilities in NC



- NPDES - 5
- State - 225

Breakdown of Permitted Poultry Facilities in NC



- NPDES - 17
- State - 9

Evolution of CAFO Permits in North Carolina

First State General Non-Discharge Permit

- Adopted on January 14th, 1997
- SB 1217 Required General permits for:
  - Swine
  - Cattle & Dairy
  - Poultry
- Covered all CAFOs w/Liquid Waste Systems except those "deemed permitted."
- Implemented first basic permit requirements for animal operations in NC.

First State General Non-Discharge Permit - Performance Standards

- Performance Standards
  - No discharge except for 25 yr / 24 hr storm
  - Expansions must be permitted
  - Initiated record maintenance requirement
  - Implemented Certified Animal Waste Management Plan & Component Requirements

First State General Non-Discharge Permit - O & M Requirements

- General Operation & Maintenance Requirements
  - Proper maintenance
  - Vegetative cover required
  - Agronomic and hydraulic application rates
  - Limits on the timing of application
  - Restrictions on other wastes
  - Basic dead animal disposal
  - Stormwater & solid waste restrictions

First State General Non-Discharge Permit - Monitoring & Reporting

- General Monitoring & Reporting Requirements
  - Regular inspections
  - Maintenance records
  - Testing requirements
  - Lagoon level gauge monitoring
  - Site inspection
  - Regional notification

First State General Non-Discharge Permit - General Conditions

- General Conditions
  - Certified operator requirement
  - Storage control requirement
  - Monitoring
  - Enforcement upon non-compliance
  - Compliance obligation

Revision of Original General Non-Discharge Permit

- Original general permits revised as a result of legislative mandate - Senate Bill 352
- Revised permits adopted in May 1998
- Revisions of some requirements were intended to provide clarification, increase flexibility, and make administrative corrections to previous permits.

NPDES General Non-Discharge Permit for Animal Operations

- Federal mandates required NC DWQ to develop and implement a NPDES General Permit
- NPDES Permit was adopted in March 2003
  - Lawsuit filed to block implementation of this permit.
  - Judge has not yet ruled on motion to dismiss.
- Affected only "large" operations
- Included new permit requirements not contained in State General Permits.

Major Changes in NPDES General Permit for CAFOs

- Federally enforceable
- Amendments to CAWMP w/explanation submitted to Regional Office within 10 days
- Determine ability to comply with P loss standard
- No ponding or runoff from land application
- More stringent burial site requirements
- Testing and calibration of application equipment
- Required monthly stocking records

Major Changes in NPDES General Permit for CAFOs

- Increased management of crops at land app sites
- Installation of rain gauges & precipitation records
- Sampling and analysis of discharges
- Annual certification form
- Sludge survey requirement
- Rainbreakers or ORC on site during land app
- Lagoon monitoring and recording

Proposed New State General Non-Discharge Permit

- Existing State permits set to expire in April 2003
- DWQ developed proposed new State permits to replace expiring permits
- Proposed permits noticed to public in January '03
- DWQ had gained much experience in permitting animal operations in the ensuing 5 years
- DWQ needed to incorporate this refined knowledge in new proposed permits.

Proposed New State General Non-Discharge Permit

- Proposed permit contained many NPDES permit requirements not in existing State general permits:
  - Amendments to CAWMP to Reg Off within 15 days
  - Evaluate ability to comply w/P loss stnd within 6 mos.
  - Restrict land application by water wells
  - Ponding or runoff during land application forbidden
  - Restrict dead animal burial above normal mortality
  - Rainbreakers or operator on site during land app
  - Testing and calibration of land application equipment

Proposed New State General Non-Discharge Permit

- Differences between the existing and proposed State General Permits continued:
  - Increased crop management on land application sites
  - Automated lagoon monitoring and recording
  - Monitoring and recording of precipitation events
  - Stocking records required
  - Annual certification report required
  - Sludge survey required

Proposed State Permits Reviewed at Public Meetings

- Meetings were conducted to solicit public input regarding the proposed permits in February 2003
- Much input regarding the proposed changes was provided during the comment period
- This input resulted in Meeting Officer revisions to the proposed permits

Major Issues & Meeting Officers Recommendations for Proposed State Permit

- Annual testing and calibration requirement
  - MO Rec: Once every two years
- Annual certification report requirement
  - MO Rec: Remove, require only on case-by-case basis
- Annual sludge survey requirement
  - MO Rec: Once every 2 yrs, or case-by-case basis
- Phosphorous evaluation requirement
  - MO Rec: Retain, grant extension to 6 mos. if nec.

Major Issues & Meeting Officers Recommendations for Proposed State Permit

- Rainbreaker or operator on-site for land application equipment
  - MO Rec: No rainbreakers, but inspect every 120 mins.
- Increased frequency of inspection of land app.
  - MO Rec: Retain, see above
- Automated rain gauges and recorders
  - MO Rec: Only required if problems are noted
- Daily recording of precipitation
  - MO Rec: Retain

Major Issues & Meeting Officers Recommendations for Proposed State Permit

- Stocking records
  - MO Rec: Retain, but make as flexible as possible
- Do not forward records to DWQ regional Offices
  - MO Rec: Forward amendments to CAWMP

Side-by-Side Comparison of Existing, NPDES, Proposed, & Meeting Officer General Permits

Requirement	Existing	NPDES	Proposed	Mtg Off
Forward amendments to CAWMP to DWQ	No	Yes	Yes	Yes
P Loss standard evaluation required	No	Yes	Yes	Yes
No land app within 100 feet of wells	No	No	No	Yes
No ponding or runoff from land app	No	Yes	Yes	Yes

Side-by-Side Comparison of Existing, NPDES, Proposed, & Meeting Officer General Permits

Requirement	Existing	NPDES	Proposed	Mtg Off
Restricted burial over normal mortality	No	Yes	Yes	Yes
Frequency of inspection of land app	Every 4 hours	Rainbrkr & 120 mins.	Rainbrkr & 120 mins.	Every 120 mins.
Rainbreaker required for land app equipmnt	No	Yes or Op. on-site	Yes or Op. on-site	No
Testing & calibration of land app equipment	Not required	Annually	Annually	Every 2 years

Side-by-Side Comparison of Existing, NPDES, Proposed, & Meeting Officer General Permits

Requirement	Existing	NPDES	Proposed	Mtg Off
More stringent crop management	Not addressed	Yes	Yes	Yes
Automated lagoon monitoring/recording	Not addressed	Only with violations	DWQ Dir. discretion	DWQ Dir. discretion
Monitoring/recordng of precipitation	Not addressed	Yes	Yes	Yes
Stocking records	No	Yes	Yes	Yes, but flexible

Side-by-Side Comparison of Existing, NPDES, Proposed, & Meeting Officer General Permits

Requirement	Existing	NPDES	Proposed	Mtg Off
Annual certification report	No	Yes	Yes	No
Sludge survey	Not required	Annually	Annually	Within 2 yrs, then annually

Discussion Starting Points and Summary

- SB 733 has "chartered" the Department, in consultation with the Advisory Group, to review the State General Permit conditions
- We suggest that the Group look at the SB 733 "extended" State General Permits as the starting point of the discussions.
- We recommend that the Group consider the NPDES Permit conditions as the requirements for "large" animal operation systems

Discussion Starting Points and Summary

- We would "offer" the State General Non-Discharge Permits as at least one effort to develop a permit with conditions "between" the original State GP and the NPDES GP for animal operations.
- Please consider that SB 733 "requires" a report by DENR to the ERC by March 1, 2004.

Meeting of DWQ CAFO General Permit Advisory Group
October 14, 2003

The meeting commenced at approximately 1:00 pm on October 14th in the Conference Room of the NCDA & CS Agronomics Lab, Raleigh, NC.

Meeting attendance is represented in the following table:

Name	Affiliation	Present (Yes or No)
Forrest Westall	NC DWQ	Yes
Tom Reeder	NC DWQ	Yes
Dennis Ramsey	NC DWQ	Yes
Paul Sherman	NC DWQ	Yes
Anita LeVeaux	NC Attorney General's Office	Yes
Tommy Stevens	NC Pork Council	Yes
Jake Barrow	NC Pork Council	Yes
Neil Strother	Frontline Farmers	Yes
Jim Cummings	NCDA & CS	Yes
Tom Ellis	NCDA & CS	Yes
Jimmy Randolph	NC Poultry Federation	Yes
Dan Whittle	Environmental Defense	Yes
Courtney Washburn	NC Sierra Club	Yes
Ann Coan	NC Farm Bureau	Yes
Chester Lowder	NC Farm Bureau	Yes
Robert Evans	NC State University	Yes
Michelle Nowlin	Southern Env Law Center	No
Don Webb	Alliance for a Resp. Swine Ind.	No
Rick Dove	Waterkeepers	No

The meeting began with Forrest briefly reviewing what had been covered at the initial meeting of this group, and briefly reviewing the attached slides that delineated Animal Permitting Percentages based on Steady State Live Weight.

Forrest then directed the group's attention to the Side-by-Side Permitting Comparison slides. The issues presented on these slides were covered and discussed for the remainder of the meeting.

The first issue dealt with the forwarding of amendments to the Certified Animal Waste Management Plan (CAWMP) to the DWQ Regional Offices. Ann Coan questioned whether the Division actually read these amendments and what were they used for by the Regional Offices (ROs). Forrest and Dennis explained that all the amendments were looked at as they were received by the ROs and that they were utilized to organize, prioritize, and maximize the effectiveness of the limited personnel resources available to conduct field inspections. There was considerable discussion, initiated by Jim Cummings, as to whether DWQ really wanted "amendments" forwarded to the ROs, or whether they were interested in the "revisions" and "major changes" to the CAWMPs,

which are more substantial changes than the amendments. This significant discussion was resolved when Jim Cummings retrieved a copy of the "1217 Guidelines" that defined the terms "major changes," "revisions," and "amendments" to the CAWMPs. Following a review of these definitions the group concurred that "revisions" and "major changes" to the CAWMPs should be forwarded to the DWQ Reg. Offices within 30 calendar days and that amendments (the lowest form of CAWMP changes) would not be forwarded.

Action Item: NC DWQ will revise the draft permits to indicate that only "revisions" and "major changes" to the CAWMP are required to be forwarded to the DWQ Reg. Offices within 30 calendar days of the changes. Furthermore, NC DWQ will include definitions for "major changes," "revisions," and "amendments" to the general permits as defined in the 1217 Guidelines.

There was substantial discussion at the meeting regarding the DWQ proposal to include a requirement for animal operations covered under the draft permit to conduct the Phosphorous (P) standard evaluation during the next permitting cycle. This would require all animal operations covered under the proposed permit to perform this evaluation sometime in the next 6 years. Ann Coan suggested that due to the fact that the P loss tool is brand new and has not been used previously and due to the fact that all the animal operations covered under the NPDES Permit are already required to do this evaluation, and due to the fact that there are limited resources at the county level to assist all the permitted farmers in performing these evaluations, that DWQ should wait until the next cycle of the State General Permit to require this evaluation for non-NPDES covered farms. Forrest and Dennis pointed out that conducting the evaluations within the next 5-6 years was imperative so that the Division could determine if P loss to surface waters was a serious problem in the State. Dennis further noted that the DWQ Director had the flexibility to not send out the notifications to perform the evaluations, thus not requiring the evaluation, dependent upon how the evaluation in the NPDES facilities progresses and dependent upon whether these evaluations indicate problems in certain specific counties. Dennis noted that the Division understood the workload concerns and that is why this flexibility has been built into the process. Several of the producer representatives noted that they would feel much better about this requirement if the Division explicitly and clearly stated in the permit the inherent flexibility provisions that had been just discussed by Dennis. Forrest suggested that the producers provide this draft language that DWQ could use in the proposed permit.

Action Item: Representatives from the Producer Organizations agreed to provide the Division with draft language concerning the Director's discretion and flexibility in requiring notification and completion of the phosphorous standard evaluation to the covered facilities. This discretion and flexibility is to be utilized dependent upon the progress with the evaluations on the NPDES covered farms and workload considerations.

Jimmy Randolph stated that he was still concerned about the legality of holding operators to a P standard that is not a statutory requirement. Jimmy noted that the draft permits, as written, will not allow new or expanded poultry or cattle operations until these operations

can demonstrate compliance with the NRCS P standard through the P loss evaluation. Jimmy wondered if the Division could legally stop a new poultry or cattle facility from operating because of a failure to comply with a standard that is not a statutory requirement.

Action Item: Forrest requested that Anita conduct an evaluation as to whether DWQ has the authority to retain the language that the Division will not issue a Certificate of Coverage (COC) to a new or expanding animal operation until that facility can demonstrate compliance with the NRCS P standard.

In regards to this discussion Ann noted that she did not think that a 700 cow dairy and a 100 cow dairy should be required to comply with the same requirements.

In regards to the proximity of land application to groundwater wells issue, Ann noted that she would like the 100 foot restriction to apply only to potable water wells where the potable water is intended for human consumption. Dennis noted that DWQ is still waiting for guidance from the Groundwater Section as to what the appropriate language should be in this requirement.

Ann stated that she thought there was too much redundancy in the draft permit and that many of the permit requirements are already contained in the farm's CAWMP. Forrest noted that he felt there was no harm in reinforcing proper management techniques but that if Ann felt that there were redundant statements that might cause some problem or confusion to please identify these and the Division would consider deleting those conditions from the proposed permit. Ann simply requested that the Division not add additional, extraneous requirements in the permit.

There was some discussion regarding the requirements associated with the burial of dead animals over normal mortality as delineated in II.9 of the draft, proposed general permit. In particular, this discussion centered around the rationale and the purpose of notifying the Division ***prior*** to burial if this burial is being conducted in accordance with the facility's CAWMP and the State Veterinary Statutes.

Action Item: DWQ will remove requirement #2 from provision II.9 of the draft permit. This is the requirement that states "the Division shall be notified prior to burial." Furthermore, DWQ will modify requirement #4 of provision II.9 to state "the map is submitted to the appropriate Regional Office Groundwater Section within 15 days of burial."

The group agreed that "rainbreaker" devices for land application equipment would only be required for those farms found to be out of compliance with the requirement to cease application during precipitation events. Furthermore, the group agreed that inspections of land application activities should occur at least every 120 minutes.

Action Item: DWQ will ensure that in the cattle general permit under provision II.16 it will specify that the inspection of land application equipment can be

conducted by a "person under the supervision of the OIC or a designated back-up OIC."

There was considerable discussion as to whether the new permit should require testing and calibration of land application equipment every year or once every two years. Dan Whittle requested to know why the original requirement of every year was changed to once every two years. Ann Coan noted that the spreader trucks used by the poultry and cattle industry require specialized equipment for testing and calibration and that this procedure is no small matter. This assertion was supported by Bob Evans. Producer representatives noted that most technical specialists consider once every two years to be a reasonable requirement. Forrest noted that this requirement was modified from an annual requirement is order to recognize that the farms that are regulated under the general permit are much smaller than those under the NPDES permit and that the Division felt that this was a fair and equitable concession that would have only a negligible, if any, impact on the environment. Producer reps noted that, in general, land application equipment that has not been calibrated recently tends to spray less, not more. Therefore, theoretically, longer periods between testing and calibration will result in less land application of wastes, not over-application. Courtney Washburn requested that the producers groups be prepared to quantify what extra costs and impacts might be incurred by the farmers if this remained an annual requirement.

Bob Evans also observed that having the calibration requirement of once every two years would still provide a beneficial effect on making sure land application equipment was working properly. Forrest noted again that the annual requirement was seen by the farmers/producers in this size category as "excessive" and that he and Tom had recommended the "every two years" standard as a reasonable concession that had little potential to harm the environment, but significant benefits over the existing permit that requires no calibration requirement.

Action Item: Pending any additional information that would establish some specific data that shows that the longer period between calibration efforts would significantly impact the environment , the Division plans to retain the longer calibration period in the proposed non-discharge permit.

Forrest noted that the crop management requirements in the proposed permit, provision II.26, are primarily narrative in nature. After some discussion regarding whether these requirements adequately protected the environment from increased nitrogen loads if the crops are improperly managed, the group decided to leave this provision essentially as it is currently written. The group noted that the current provision clearly requires crops to be managed in accordance with the provisions of the CAWMP, but Anne pointed out that the last sentence in this condition implied that allowing harvested crops to become unusable would be a permit violation. The intention of this condition was to see that any crops "left" on an application site would require the owner to "adjust" nitrogen application rates to take into consideration the "reintroduction" of nitrogen in the crops that should have been harvested. Since the first statement in condition II 26 covers this

by requiring crops to be removed and managed in accordance with the CAWMP, the second sentence was not necessary.

Action Item: Condition II 26 of the proposed permit would be modified by DWQ to remove the second sentence.

Jim Cummings noted that provision II.23 requires a Mehlich 3 Soil Test for zinc and copper, but Jim felt that the Mehlich 2 Soil Test was also appropriate for this requirement, and less expensive.

Action Item: Jim is going to check with the appropriate personnel in NCDA & CS and determine if the Mehlich 2 Soil Test should be added as an allowable test to meet this requirement, or if more appropriate, to recommend modification of the condition to reflect zinc and copper limits on an application site, not a specific analysis procedure.

There was some discussion regarding the requirement to install automated lagoon monitoring equipment at the Director's discretion. Producer representatives requested that the permit explicitly state what manner of non-compliance would lead to the Director's decision to require automated lagoon monitors at an individual farm.

Action Item: DWQ will ensure that the language of the General Permit specifically states what non-compliant activities shall result in the notification to install automated lagoon monitoring equipment. As a guide, DWQ will use similar language utilized for the mandated installation of "rainbreaker" equipment on land application equipment or the language used in the NPDES Permit.

There was some discussion regarding the requirement to conduct monitoring and recording of precipitation events. Forrest and Dennis clarified that this monitoring should be conducted at a site that is reflective of the conditions at the land application site and that the mandatory daily recording was only required for precipitation events.

Action Item: DWQ will include additional language in this condition to clarify that precipitation data reflective of the general conditions at the farm's application sites and that only one monitoring site would be required. Further, the condition will reflect that daily recording is required only for precipitation events.

Forrest reiterated to the group that DWQ was willing to make the mandatory stocking records as a flexible as possible to meet the unique requirements of dairy, poultry, swine, or other cattle operations.

Near the end of the meeting, Forrest noted to the group that the only two identified outstanding issues that remained to be discussed at the next meeting were the **annual certification report issue** and the **frequency of sludge survey issue.** It was agreed by the participants that the next session would look only at those issues not addressed to this point of the process, and that focus would turn toward developing a new draft permit that

reflected the work of this group and that would be placed before the group prior to the next session.

Action Item: DWQ will make the revisions to the draft general permit that were agreed upon at this meeting and send this out to everyone for their review prior to our next gathering.

It is hoped that if progress continues , the next meeting may prove to be the last meeting needed to develop a report to the ERC for March of 2004. One additional session to finalize a recommended permit and to outline the report planned for the ERC may be needed after October 28, but this can be discussed at that time.

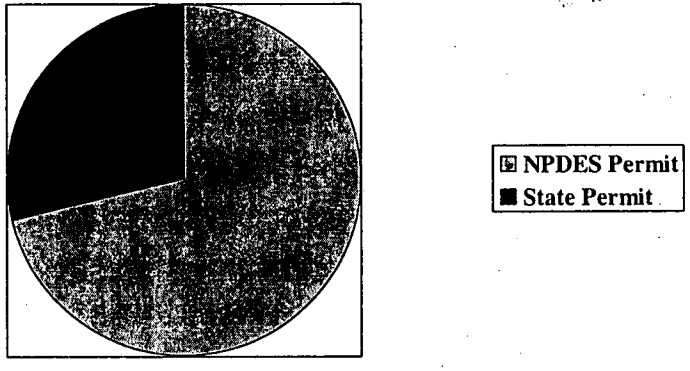
Group members were reminded that the next meeting was scheduled for **October 28th from 1:00 to 4:00 pm** in the **NCDA & CS Agronomics Lab on Reedy Creek Road, Raleigh, NC.**

The meeting ended at 4:00 pm.

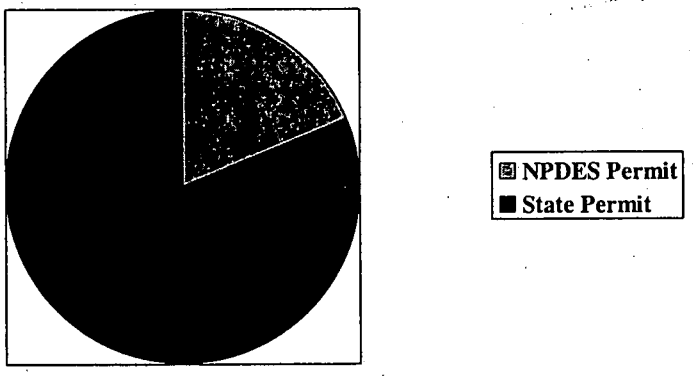
Animal Permitting Percentages Based on Steady State Live Weight (SSLW)

- Swine
  - NPDES Permit Covered - 71%
  - State Permit Covered - 29%
- Cattle
  - NPDES Permit Covered - 19%
  - State Permit Covered - 81%
- Poultry
  - NPDES Permit Covered - 100%
  - State Permit Covered - 0%

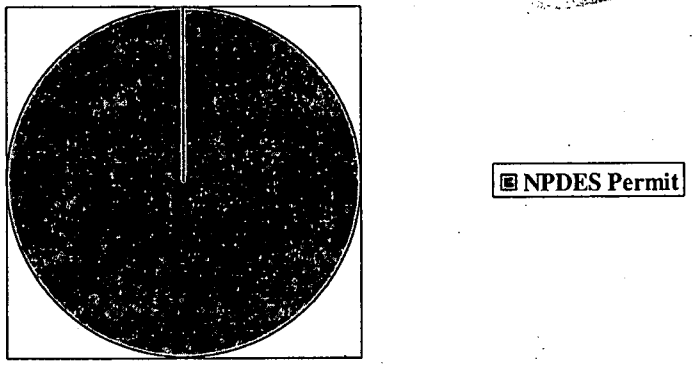
Animal Permitting Percentages Based on Steady State Live Weight (SSLW) - Swine



Animal Permitting Percentages Based on Steady State Live Weight (SSLW) - Cattle



Animal Permitting Percentages Based on Steady State Live Weight (SSLW) - Poultry



Side-by-Side Comparison of Existing, NPDES, Proposed, & Meeting Officer General Permits

Requirement	Existing	NPDES	Proposed	Mtg Off
Forward amendments to CAWMP to DWQ	No	Yes	Yes	Yes
P Loss standard evaluation required	No	Yes	Yes	Yes
No land app within 100 feet of wells	No	No	No	Yes
No ponding or runoff from land app	No	Yes	Yes	Yes

Attachment 3

Side-by-Side Comparison of Existing, NPDES, Proposed, & Meeting Officer General Permits

Requirement	**Existing**	**NPDES**	**Proposed**	**Mtg Off**
Restricted burial over normal mortality	No	Yes	Yes	Yes
Frequency of inspection of land app	Every 4 hours	Rainbrkr & 120 mins.	Rainbrkr & 120 mins.	Every 120 mins.
Rainbreaker required for land app equipmnt	No	Yes or Op. on-site	Yes or Op. on-site	No
Testing & calibration of land app equipment	Not required	Annually	Annually	Every 2 years

Attachment 3

Side-by-Side Comparison of Existing, NPDES, Proposed, & Meeting Officer General Permits

Requirement	**Existing**	**NPDES**	**Proposed**	**Mtg Off**
More stringent crop management	Not addressed	Yes	Yes	Yes
Automated lagoon monitoring/recording	Not addressed	Only with violations	DWQ Dir. discretion	DWQ Dir. discretion
Monitoring/recordng of precipitation	Not addressed	Yes	Yes	Yes
Stocking records	No	Yes	Yes	Yes, but flexible

Attachment 3

Side-by-Side Comparison of Existing, NPDES, Proposed, & Meeting Officer General Permits

Requirement	**Existing**	**NPDES**	**Proposed**	**Mtg Off**
Annual certification report	No	Yes	Yes	No
Sludge survey	Not required	Annually	Annually	Within 2 yrs, then annually

Attachment 3

Meeting of DWQ CAFO General Permit Advisory Group
October 28, 2003

The meeting commenced at approximately 1:00 pm on October 28th in the Conference Room of the NCDA & CS Agronomics Lab, Raleigh, NC.

Meeting attendance is represented in the following table:

Name	Affiliation	Present (Yes or No)
Forrest Westall	NC DWQ	Yes
Tom Reeder	NC DWQ	Yes
Dennis Ramsey	NC DWQ	Yes
Kim Colson	NC DWQ	Yes
Paul Sherman	NC DWQ	Yes
Michelle McKay	NC DWQ	Yes
Daryl Merritt	NC DWQ	Yes
Robin Smith	DENR	Yes
Sheryl Stephens	DENR	Yes
Anita LeVeaux	NC Attorney General's Office	Yes
Tommy Stevens	NC Pork Council	Yes
Jake Barrow	NC Pork Council	No
Neil Strother	Frontline Farmers	No
Jim Cummings	NCDA & CS	Yes
Tom Ellis	NCDA & CS	No
Jimmy Randolph	NC Poultry Federation	Yes
Dan Whittle	Environmental Defense	Yes
Courtney Washburn	NC Sierra Club	Yes
Anne Coan	NC Farm Bureau	Yes
Chester Lowder	NC Farm Bureau	Yes
Robert Evans	NC State University	Yes
Garry Grabow	NC State University	Yes
Michelle Nowlin	Southern Env Law Center	No
Don Webb	Alliance for a Resp. Swine Ind.	Yes
Rick Dove	Waterkeepers	Yes

Forrest commenced the meeting by reviewing the minutes of the previous (Oct 14) meeting of this group and, in particular, reviewing the completion of the Action Items delineated in those meeting minutes.

In response to an Action Item Jim Cummings stated that he was advised that due to implications associated with the analysis process, that the General Permit should retain the Mehlich 3 Soil Test requirement as currently specified in provision II.23.

Representatives from the producer organizations stated that they were still in the process of drafting their proposed language regarding the flexibility of the Director to require the phosphorous standard evaluation.

Action Item: Representatives from the Producer Organizations agreed to provide the Division with draft language concerning the Director's discretion and flexibility in requiring notification and completion of the phosphorous standard evaluation to the covered facilities. This discretion and flexibility is to be utilized dependent upon the progress with the evaluations on the NPDES covered farms and workload considerations.

Following a report from Anita LeVeaux, the group concluded that the language in provision I.5 that states that no Certificate of Coverage (COC) will be issued to a new or expanding facility until it demonstrates compliance with the phosphorous standard should probably be removed from the draft permit. This conclusion was based on the fact that there is not currently a NC statutory requirement for CAFOs to comply with a phosphorous standard.

Action Item: DWQ should delete the requirement to demonstrate compliance prior to receiving a COC from the draft permit. The language should be modified to require a PLAT evaluation but not a demonstration of compliance.

Accordingly, Anne requested that the parenthetical language containing phosphorous be deleted from provision II.4 of the draft permit.

Action Item: DWQ will delete this parenthetical language.

Forrest noted that in response to comments received from the Groundwater Section that the DWQ Staff will need to conduct some internal discussions regarding the land application of waste in proximity to wells provision, provision I.9, and the burial provision, provision II.9.

Action Item: DWQ Staff will conduct internal discussion with representatives of the Groundwater Section to clarify their comments concerning these two provisions.

Rick Dove noted that he had a problem with the proposed burial requirements in that there was no requirement for a veterinarian inspection of the site prior to burial and no requirement for notification of the local health departments. Forrest noted that the permit required farmers to mark and record all sites that are used for burial above normal mortality only after consultation with the State Veterinarian's Office. Forrest then explained the rationale that was discussed at the previous meeting to remove the requirement for DWQ notification prior to burial. Jim Cummings noted that the State Vet's Office had upgraded its burial requirements in response to the aftermath of Hurricane Floyd. Don Webb asked why the burial sites were not pre-approved and pre-checked before they are required. Jim noted that all farms are required to have an up to date Mortality Management Plan that discusses such matters as a requirement of the 1217

Guidelines and the overall CAWMP. Jim noted that this mortality plan requires farmers to designate where their animals will be buried and specifies the requirements that must be met by designated burial sites. Don Webb questioned whether there were any requirements regarding the management of after-birth. Several members of the group noted that they would investigate this matter, particularly as related to the impacts of managing this after-birth is having on the waste management system and how it is being managed today. Don Webb felt strongly that this material should be managed as part of the mortality management process.

Action Item: Dennis Ramsey, Jim Cummings and Bob Evans will consult on the current practices of after-birth disposal and its impacts on the CAWMP and report back at the next meeting.

Anne noted that she would submit a list of items currently contained in the draft permit that she feels are redundant and extraneous and should be deleted to DWQ Staff. Forrest noted that staff would then forward this list to all the members of the group for consideration and review for the next meeting.

The group spent most of the remainder of the meeting discussing the issue regarding whether the General Permit should contain a requirement for farmers to submit an Annual Certification Form.

Forrest explained why this requirement was previously removed from the draft permit. He stated that the meeting officers had determined that this reporting requirement added little value to the protection of the environment and appeared to be a great source of apprehension and aggravation to the regulated farmers. Don stated that he felt strongly that this requirement should be returned to the permit to require the self-reporting of permit violations. Dan Whittle noted that the certification report encourages stronger compliance and can be effectively used as an "aggravating factor" in penalty determinations associated with deliberate violations. Rick Dove stated that we should put into the permit whatever we can that encourages lax operators to comply with the permit requirements. Rick noted that falsification of the certification form would incur two violations: false official statement and the permit violation and that this should encourage better compliance.

Anne noted that the dairy farmers felt strongly that the certification report was just another opportunity to be tripped up by paperwork and that this certification report is an NPDES requirement that should not be required of small farmers. Don Webb questioned who was looking out for common American citizens that want environmental regulations that will protect their rights to a healthy environment. Tommy Stevens noted that the swine farmers objected to the inclusion of NPDES requirements into the State permit. Tommy noted that he did not see how a certification statement would improve regulatory compliance.

Forrest noted that the certification form requirement was removed because the draft Permit Meeting Officers (Forrest & Tom) were trying to be responsive to the requests of the citizens that attended the Public Meetings and objected vehemently to this provision. Forrest noted that this was an overwhelming concern at the Public Meetings. Dan noted that he felt it was a DWQ responsibility to dispel the liability concerns associated with the certification form through an education program. Dan noted that this form was the most important requirement to the environmental advocacy groups. Courtney Washburn noted that the certification form should be retained in the permit because there is an important benefit from public access to and review of these completed forms.

Don Webb questioned why the producers were afraid of self-monitoring and reporting. Rick Dove noted that since much of the permit called for self-monitoring there must be an annual requirement for self-reporting. Rick stated that accountability is a requirement that must be retained in the final permit. Chester Lowder noted that he felt that the certification form was an extraneous requirement on top of the requirement for farmers to comply with their CAWMP. Tommy stated that additional monitoring and reporting requirements are already contained in the new draft permit and that these forms are part of the official record. Tommy noted that if these forms are not completed correctly that there are already consequences associated with that. However, Tommy said that the certification form is one form that the farmers feel strongly that they should not be required to complete.

Jim Cummings asked the group to imagine the fear of being a dairy farmer that is worried about inadvertently filling out the form incorrectly. Jim noted that there are already many reporting and monitoring requirements in the draft permit and what good is the certification form if the benefit is out weighed by the fear it creates.

Dan Whittle stated that he understood that the fear is real, however, he noted that the form is not "strict liability." Dan noted that if a farmer did not know he was out of compliance, that erroneously certifying compliance on the form would not be a violation. Dan suggested that the next state permit cycle exempt cattle producers from the certification form but that the hog producers be required to comply with this provision because they have a strong support system that can educate them about the true nature of this certification requirement.

Don Webb asked whatever happened to accountability. Don suggested that hog farms should be held accountable.

Forrest noted that in his experiences that most people are sincerely trying to do the right thing. He asked Tommy how the hog producers felt about an exemption from the certification form for the cattle producers only. Tommy noted that there is a great fear in the hog producing community as a result of a lack of understanding regarding the certification forms.

Forrest asked the group how it felt about the idea of giving the non-NPDES farms several years into the next permitting cycle before they would be required to comply with the

annual certification form requirement. Dan noted that the remedy to the confusion surrounding the form is better education. He felt that efforts should be made in this direction.

Forrest noted that the Division had clearly heard and understood both sides of the discussion concerning the inclusion or removal of the certification form requirement from the next State permit and that it was now up to the DWQ Staff to make a final recommendation to the Director. Forrest noted that the issue is whether there will be some form of annual affirmative statement from the farmers that declares if the facility is in compliance with the applicable permit requirements or not. Forrest stated that this affirmative statement may be quite useful, but not necessarily essential. He noted that educational workshops will probably be required during the implementation of this certification form, if it is included in the next permit.

Tommy stated that there is already too much confusion and education required for other aspects of the draft permit. He noted that 71% of the steady state live weight for swine in North Carolina is covered under the NPDES permit requirements and is therefore already subject to an annual certification form requirement.

Forrest and Dennis noted that the first series of annual certification forms required under the NPDES CAFO Permits would be due in March 2004 and that it would be interesting to see if any issues arise during the submission of these initial forms. Tommy noted that we do not have any previous experience with this requirement in the NPDES CAFO process, and that he did not know what type of problems may be encountered when the first forms become due.

Bob Evans offered that making the form shorter and simpler might improve the acceptability of an annual certification to the producers. Following this discussion, Dan suggested that the group should consider a "reduced" the form for the State permit to make it more clear and manageable, to still accomplish the objective of the certification, and if problems are encountered during the NPDES submissions, delay the initial submittals under the State permit until these problems are sorted out.

Action Item: Forrest requested that Dan Whittle and Bob Evans draft a reduced version of the certification form that can be reviewed by the group at the next meeting. Following the completion of this discussion at the next session, the Department would then be in a position to make a recommendation to the ERC in March.

The final issue discussed was the sludge survey requirement. Forrest clarified that this requirement as it presently appears in the draft permit is for the farmers to perform a sludge survey within the first two years after the permit is issued and then on an annual basis thereafter, unless some other more flexible agreement is reached with DWQ on a case-by-case basis. Forrest explained that the regulated parties were provided two years to complete the initial sludge survey due to resource issues. There was consensus among the group that this requirement did not need to be modified.

Forrest requested that anyone having comments about the draft permit that was distributed at the meeting should forward those comments to Forrest and Tom before the next scheduled meeting so they could be shared prior to the November 13 session.

The next meeting of this group will be **November 13 from 1:00 to 4:00 pm at the Agronomics Lab.**

The meeting concluded at 3:30 pm.

Attachment 5

Meeting of DWQ CAFO General Permit Advisory Group
November 13, 2003

The meeting commenced at approximately 1:00 pm on November 13th in the Conference Room of the NCDA & CS Agronomics Lab, Raleigh, NC.

Meeting attendance is represented in the following table:

Name	Affiliation	Present (Yes or No)
Forrest Westall	NC DWQ	Yes
Tom Reeder	NC DWQ	Yes
Dennis Ramsey	NC DWQ	Yes
Paul Sherman	NC DWQ	Yes
Daryl Merritt	NC DWQ	Yes
Anita LeVeaux	NC Attorney General's Office	Yes
Tommy Stevens	NC Pork Council	Yes
Jake Barrow	NC Pork Council	Yes
Neil Strother	Frontline Farmers	Yes
Jim Cummings	NCDA & CS	Yes
Jimmy Randolph	NC Poultry Federation	Yes
Dan Whittle	Environmental Defense	Yes
Courtney Washburn	NC Sierra Club	Yes
Anne Coan	NC Farm Bureau	Yes
Chester Lowder	NC Farm Bureau	Yes
Robert Evans	NC State University	No
Garry Grabow	NC State University	Yes
Michelle Nowlin	Southern Env Law Center	No
Don Webb	Alliance for a Resp. Swine Ind.	Yes
Rick Dove	Waterkeepers	Yes

The meeting commenced with a review of the minutes of the previous (Oct 28) meeting of this group. In response to the change in the permit that would allow new or expanded poultry or cattle operations without demonstrated compliance with the new phosphorous standard, Dan Whittle asked whether the statutes actually ***preclude*** DWQ from requiring compliance with the P standard for new or expanding operations, or simply do not mandate this compliance.

Action Item: Dan stated that he is satisfied with this proposed language in the revised permit, however, he would like the final report of this group to include an evaluation as to whether DWQ is actually precluded from requiring compliance with the P standard as the statutes are currently written.

The group discussed the phosphorous evaluation language that was proposed by Tommy Stevens (which is attached). The group noted that the major substantive change in this proposed language is to extend the time allowed to complete the phosphorous evaluation after notification from 6 to 12 months. The group discussed the time it would actually

take to complete these evaluations and Anne Coan noted that this is a major resource issue. Forrest noted that only when the evaluations are actually conducted under the requirements of the NPDES permits will it become clear how long these evaluations will take and how difficult they will be to complete. Forrest stated that DWQ needs this knowledge base in requiring the P evaluation on the state-permitted CAFOs.

Dan Whittle asked whether the resource issues for completing this evaluation were internal or external (technical specialists) to the permitted farms. Dan noted that in many instances the problem of a lack of resources is used to weaken permit requirements. He further noted that the state needed additional resources to properly enforce these permits. Courtney Washburn requested that Tommy's draft language be added to the final revised permit for the group to review. After further discussion of the resource issues, which included clarification that the limiting factor was the availability of the technical specialists external to the permitted farms, Dan agreed that 12 months was a reasonable time to complete the required P evaluations. Courtney noted that she would hope that all these mandatory evaluations would be completed by the end of this 5-year permitting cycle. Forrest responded that this was certainly the Division's goal but that no one would know for sure until the evaluations were actually performed on the farms.

The question was raised regarding the acceptability of the draft phosphorous language for new and expanding facilities. There was no objection to the language addressing this requirement in the draft permit dated November 4, 2003.

Dan expressed his hope that the producer organizations would not try to overturn all the progress that had been made at these Advisory Group meetings by opposing these proposed changes at the Legislature. Anne noted that the recommendations of this group would be reported to the ERC. Forrest then clarified that it was the charter of this group to advise the DWQ Director and the Department leadership on this matter, and then DENR would to report to the ERC. Dan asked if the group would get a chance to review the final group recommendations before they are forwarded to the DWQ Director. Forrest explained that he and Tom would produce a draft final report of the group's activities (including all the meeting minutes) along with a final, draft, proposed permit and that the Advisory Group would have the opportunity to review these final documents and comment on them before they are forwarded to the Division Director. Forrest noted that another meeting of the group may be scheduled in the future to discuss these final draft documents if group members expressed such an interest.

There was a brief discussion regarding the two items noted in the correspondence from the Groundwater Section: 1) the notification prior to the burial of dead animals issue and 2) the proximity of land application to wells issue. Forrest noted that DWQ will resolve these questions internally prior to the drafting of the final report.

There was a brief discussion of the proper management of swine after-birth. Forrest asked whether the management of this was already factored into and accounted for in a farm's CAWMP. Don Webb questioned as to whether it was proper for this material to be disposed of in a waste lagoon and if it should be buried with dead animals.

Action Item: Forrest requested Dennis Ramsey to look into the proper management of after-birth on swine farms and whether it was already accounted for in the CAWMP. The results of this evaluation would be included in the final report.

Anne Coan noted that in Provision III.8 of the draft permit the word "Department" should be changed to "Division of Water Quality" for consistency. Forrest requested that any errors in the permit be brought to the group's attention for consideration in making final modifications to the draft permit.

The group then discussed comments regarding the draft permit that had been submitted by Courtney Washburn (Attached). The group quickly agreed with Courtney's suggestion that the definitions of "major changes," "revisions," and "amendments" to the CAWMP should be moved from Section I of the draft permit to Section VII, Definitions.

Action Item: DWQ Staff will moved the subject definitions in the next revision of the draft permit.

Courtney also questioned the current language in provision III.2.b which stated that "the installation of automated waste level monitors is not required if the Permittee can demonstrate to the satisfaction of the Director that the violations were due to conditions beyond its control." Courtney wondered how an individual would successfully demonstrate that a violation was beyond their control. Dan Whittle noted that he could not support this provision if it was provided to excuse violations that may have been the result of chronic rainfall. Forrest responded that the provision as it is currently written is there to provide the Director some discretion in regards to mitigating factors before requiring the installation of automated lagoon waste-level monitors at facilities with violations. Dan noted that if this language was allowed to remain unchanged in the final permit, exceptions could become the rule. Neil Strother observed that in his experiences automated waste level monitors don't work properly and are often inaccurate.

Don Webb stated that farmers must be on site and observe their lagoons with their own eyes in order to properly manage their waste levels. Don requested that the final permit not contain loopholes that compensate for farmers that can not properly manage their farms. Forrest noted that the mandatory installation of automated monitors is considered to be a punitive measure and that visual observation is still considered to be the best method.

Rick Dove observed that the CAFO animal waste management systems are fundamentally flawed because these systems were designed to handle the historic average rainfall and the actual rainfall is greater than average. Rick noted that the permits contain these exceptions because the waste management systems are fundamentally flawed. Rick stated that the systems need to get away from average rainfall and the permits must not provide relief from violations that lead to the destruction of the environment. In response, Forrest noted that permits are a regulatory device to indicate violations and that some exceptions will always be necessary.

Action Item: Courtney Washburn and Dan Whittle will compose some draft language for the group to consider in this provision.

Courtney questioned where the rain data was submitted in provision III.3.a of the draft permit. Forrest and Dennis noted that this information is retained on site for review by DWQ inspectors.

Action Item: Modify provision III.3.a to read "The precipitation type and amount must be recorded daily for all precipitation events and maintained on site for Department review."

The group then resumed its discussion of the Annual Certification Form issue from the previous meeting.

Forrest noted that Bob Evans and Dan Whittle had both submitted simplified versions of the original certification form for the group's consideration. Forrest asked the group if some consensus was possible regarding these simplified forms?

Don Webb asked what accountability the signer of the certification form will be held to. He noted that the owner of the farm should be required to sign the form to prevent loopholes.

Tommy Stevens noted that for the people he represents and for the people that attended the public meetings regarding these permits he can not agree to the inclusion of any annual certification form in the final permit. Tommy noted that the form adds no value to the permit and that he could not negotiate this issue. It was noted that the agriculture community in general was not if favor of a solution that would exempt some producers (like cattle farms) from the form requirement and require it of others.

Courtney observed that the group would obviously not reach a consensus decision on the certification form issue.

Forrest presented a possible two-part solution to this issue:
1) Require the annual certification form for non-compliant operations.
2) Study the impact of the annual certification form requirement on the NPDES-permitted operations when it becomes due beginning next March. Plan to implement the annual certification form requirement for the State-permitted facilities in their next five-year permitting cycle (beginning in 2009). This will allow the Division and the regulated community to review the effects of the form on the NPDES-permitted operations.

Dan Whittle noted to the group that obviously DWQ believes that the form serves a valid purpose and that, therefore, it should be implemented in the State-permitted facilities over time. If the Division feels that these operations are not ready, then DWQ should give more time for implementation. Forrest observed that there are many concerns in the

producer community about DWQ's true intentions in regards to the certification form, however, at some point in time this form (in some manner) is likely to be included in the State permits.

Courtney noted that the form is not a punishment tool. It is an extremely useful public policy tool and should be represented as such to the producers.

Don observed that honest American farmers will not have a problem with signing the truth.

Forrest noted that permitting moves very fast in relation to other regulatory programs. The Division understands the concerns of the farmers, however, it also understands the value of the certification form as a public policy tool.

Anne noted that many farmers are concerned that citizen action groups will initiate citizen enforcement actions based solely on the certification form. She did not think this was fair to put small, non-NPDES farmers at such risk.

Rick noted that law-abiding citizens have nothing to fear from citizen action groups.

Forrest observed that there is much concern about enforcement actions related to these forms. Don stated that many government employees must take an oath to support the Constitution of the Untied States. He added that there is nothing wrong with requiring farmer certification.

Forrest felt that there is so much misunderstanding regarding the true nature of these certification forms that both sides of this discussion may be over-reacting slightly. Forrest noted that in other permitting arenas outside of the CAFO regulations there is often misunderstanding regarding the true nature of the permit requirements.

Dan Whittle remarked that he does not expect the producers to ever fully endorse the implementation of the certification form in the State permit. He understands that there is a lot of confusion among the regulated community surrounding this form and noted that he was agreeable with a phased-in approach for the certification form that would allow us to learn from our experiences with the certification form and the NPDES-permitted facilities. However, Dan remarked that he felt that producer concerns should not be allowed to completely remove the form requirement. He stated that the form should definitely be phased in over a 2-year, 3-year, or some other period unless the Division determined that there are problems with the form through the NPDES experiences.

Don added that honorable farmers should not have a problem with the form.

Tommy Stevens remarked that he appreciated the proposed changes to the form that would simplify it and make it more understandable to the farmers. However, Tommy noted that the farmers are truly anxious about this requirement and are afraid that it may significantly alter their way of doing business. Tommy remarked that over time the

NPDES experiences with the certification form may help to alleviate the fears associated with this form.

Forrest noted that in most permitting instances forms that are incorrectly filled out are done so through misunderstanding and not willful negligence.

Forrest added that, in all likelihood, the Division Director will have to make a final recommendation on this issue.

Forrest stated that he and Tom would work on the meeting minutes and final report and would note in these documents that complete consensus was not reached with the Advisory Group on this issue. Furthermore, Forrest added that he and Tom would make every effort to ensure that their final report and recommendations to the Division Director would be as balanced as possible. Forrest noted that, traditionally, DWQ has always had more responsibilities to regulate that it had personnel to do so.

Forrest extended his appreciation to everyone in the Advisory Group for their attendance and participation at these meetings.

Rick Dove asked if it was possible to add a requirement to the permit for the routine inspection of application fields by the farmer to determine if there is run-off during application. Forrest noted that the existing draft permit already requires inspection of the application site at least every 120 minutes.

Rick asked if there is anything in the existing or proposed permits that allows the spraying of waste above the lagoon to facilitate evaporative discharge. Forrest noted that the permits are silent on this issue.

Dennis added that some non-discharge systems are equipped with aerators.

Anne added that she would provide some draft language that she would like to see added to the stocking record form for the cattle producers.

Dan Whittle asked if the group would be able to meet again after being provided with an opportunity to review the draft of the final report.

Forrest stated that the current plan was for the Division to produce a draft of the final report on the activities of the Advisory Group and to produce final draft permits by the beginning of January 2004. These drafts will then be distributed to the entire group for review. Forrest stated that after the group has had an opportunity to review these final draft document that he and Tom would be happy to meet with the Advisory Group members in a group setting or on an individual basis to listen to their comments and concerns. Forrest noted that draft versions of all three permits (swine/cattle/poultry) will be included with the draft final report.

The meeting ended at approximately 3:30 pm.

ATTACHMENTS TO NOVEMBER 13 MEETING MINUTES

Tommy Stevens' Comments on the Phosphorous Condition

The following comments relate to the stakeholder discussions on issues with the General Permit and specifically regarding the current wording on and/or inclusion of phosphorus in the permit.

There is still much uncertainty with regard to the technical resource effort that will be needed to assist farmers with running PLAT. Currently the software is not ready to run PLAT and there will be a significant workload associated with running this tool on the farms that fall under coverage of the NPDES permit. Based on the numbers that you provided to us, 71% of the steady state live weight in swine is covered by an NPDES permit and will be required to run PLAT during the current permit cycle. Once this evaluation process is underway for NPDES facilities, there will be more certainty as to the resource requirements and the resource needs associated with making adjustments to waste management plans.

The first choice would be to remove the condition from the current general permit and evaluate the results from the NPDES facilities to determine the resource needs and impact to animal operations prior to including this on the non-NPDES facilities. If the condition remains in the permit, I would offer the following language for consideration.

During the period of this general permit, the Division of Water Quality may notify the permittee to conduct an evaluation of the facility and its CAWMP to determine the facility's ability to comply with the NRCS nutrient management standard as it relates to phosphorus. The Division will make its decision as whether to notify permittees based on experience gained through the NPDES permit implementation.

This evaluation will not be required until such time as the permittee is notified to conduct the evaluation by the Division of Water Quality. The evaluation must be documented on forms supplied by or approved by the Division and must be submitted to the Division. This evaluation must be completed by existing facilities within (12) months of receiving notification from the Division.

Courtney Washburn's Comments on the Draft Permit

I have reviewed the draft permit from Nov 4, 2003 and have some clarification comments. These are just some items that raised questions in my mind.

Page 2, Item 3- I believe the definitions of Major changes, Revisions, and Amendments should be moved to the definition section of the permit. Defining these terms in the performance section seems to be confusing and detracts from the purpose of the performance standard. I would also eliminate the quotations marks on these terms.

Page 7, Item b.- I am unclear regarding the basis on which the Director would determine that freeboard violations were beyond the Permittee's control. I think the demonstration that freeboard violations were beyond control needs to be defined and the basis the Director would make that determination needs to be explained.

Page 7, Item a.- This indicates that precipitation events need to be recorded but does not indicate if this information needs to be submitted to DWQ or what the Permittee needs to do with it once they collect it. Would monthly, or twice a year submittal of this information to DWQ be appropriate?

I look forward to commenting further in the future.

Thanks

Attachment 5

ANIMAL FACILITY ANNUAL CERTIFICATION FORM

Certificate of Coverage or Permit Number _____ County _____ Year 200__

Facility Name (as shown on Certificate of Coverage or Permit)_____

Operator in Charge for this Facility _____ Certification #_____

1. Land application of animal waste as allowed by the above permit occurred during the past calendar year _____ YES _____ NO. If No, proceed to the certification (signature lines at bottom).

IF THE ANSWER TO ANY STATEMENT BELOW IS "**NO**", PLEASE PROVIDE A WRITTEN DESCRIPTION AS TO WHY THE FACILITY WAS NOT COMPLIANT, THE DATES OF ANY NON COMPLIANCE, AND EXPLAIN CORRECTIVE ACTION TAKEN OR PROPOSED TO BE TAKEN TO BRING THIS FACILITY BACK INTO COMPLIANCE.

2. Only animal waste generated at this facility was applied to the permitted sites during the past calendar year. Yes No

3. The facility was operated in such a way that there was no discharge or direct runoff of waste to surface waters from the facility (including the houses, lagoons/storage ponds and the application sites) during the past calendar year. Yes No

4. All required monitoring and reporting was performed in accordance with the facility's permit during the past calendar year. Yes No

5. All operations and maintenance requirements in the permit were complied with during the past calendar year or, in the case of a deviation, prior authorization was received from the Division of Water Quality. Yes No

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

_____
Permittee Name and Title (type or print)

_____ _____
Signature of Permittee Date

_____ _____
Signature of Operator in Charge (if different from Permittee) Date

Attachment 5

ANIMAL FACILITY ANNUAL CERTIFICATION FORM

Certificate of Coverage or Permit Number _____ County _____ Year 200__

Facility Name (as shown on Certificate of Coverage or Permit)_____

Operator in Charge for this Facility _____ Certification #_____

1. ~~1.~~ Land application of animal waste as allowed by the above permit occurred during the past calendar year _____ YES _____ NO. ~~If No, proceed to the certification (signature lines at bottom).~~ [Even if waste not land applied, other operation and maintenance requirements must still be complied with. Not sure there is any good reason growers should skip questions 2-5?].

IF THE ANSWER TO ANY STATEMENT BELOW IS "**NO**", PLEASE PROVIDE A WRITTEN DESCRIPTION AS TO WHY THE FACILITY WAS NOT COMPLIANT, THE DATES OF ANY NON COMPLIANCE, AND EXPLAIN CORRECTIVE ACTION TAKEN OR PROPOSED TO BE TAKEN TO BRING THIS FACILITY BACK INTO COMPLIANCE.

2. Only animal waste generated at this facility was applied to the permitted sites during the past calendar year. Yes No

3. The facility was operated in such a way that there was no discharge or direct runoff of waste to surface waters from the facility (including the houses, lagoons/storage ponds and the application sites) during the past calendar year. Yes No

4. All required monitoring, analysis and reporting was performed in accordance with the facility's permit during the past calendar year. Yes No

5. All operations and maintenance requirements in the permit, including but not limited to freeboard requirements and PAN application levels, were complied with during the past calendar year or, in the case of a deviation, prior authorization was received from the Division of Water Quality. Yes No

[Note: I think freeboard and PAN application compliance needs to be explicit, as these are among the most important operational requirements in the permit, along with the no discharge requirement. Incorporating them into #5 works for me. Another way would be to create a new #4 for freeboard and PAN compliance.]

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

_____

Permittee Name and Title (type or print)

Signature of Permittee — Date

Signature of Operator in Charge (if different from Permittee) — Date

I AGREE WITH MOST OF ROBERT'S EDITS. THE ABOVE CHANGES ARE MINIMAL AND ARE INTENDED TO REINSERT ONLY THOSE PROVISIONS THAT WE CONSIDER TO BE THE MOST IMPORTANT.

I AM COMFORTABLE ELIMINATING MOST OF PART I: FACILITY INFORMATION AS ROBERT HAS DONE.. EXCEPT THE FOLLOWING: **INTEGRATOR INFORMATION** (I.8), AS INTEGRATORS SOMETIMES CHANGE DURING THE YEAR AND IT IS IMPORTANT THAT DWQ HAVE ACCURATE RECORDS. I AM ASSUMING THAT THE OTHER INFORMATION PROPOSED TO BE DROPPED FROM THE CERTIFICATION FORM (E.G. PAN APPLIED) IS AVAILABLE ON FARM IF NEEDED?

NORTH CAROLINA
ENVIRONMENTAL MANAGEMENT COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

SWINE WASTE MANAGEMENT SYSTEM GENERAL PERMIT

This General Permit is issued pursuant to North Carolina General Statutes 143-215 et seq., may apply to any swine facility in the State of North Carolina, and shall be effective from October 1, 2004 until September 30, 2009.

All activities authorized herein shall be consistent with the terms and conditions of this General Permit.

Holders of Certificates of Coverage (COC) under this General Permit shall comply with the following specified conditions and limitations.

I. PERFORMANCE STANDARDS

1. Any discharge of waste that reaches surface waters or wetlands is prohibited except as otherwise provided in this General Permit and associated statutory and regulatory provisions. Waste shall not reach surface waters or wetlands by runoff, drift, manmade conveyance, direct application, direct discharge or through ditches not otherwise classified as state waters.

   The waste collection, treatment, storage and application system operated under this General Permit shall be effectively maintained and operated as a non-discharge system to prevent the discharge of pollutants to surface waters or wetlands. Application of waste to terraces and grassed waterways is acceptable as long as it is applied in accordance with Natural Resources Conservation Service (NRCS) Standards and does not result in a discharge of waste to surface waters or wetlands.

   Facilities must be designed, constructed and operated to contain all waste plus the runoff from a 25-year, 24-hour rainfall event for the location of the facility. A facility that has a discharge of waste that results because of a storm event more severe than the 25-year, 24-hour storm will not be considered to be in violation of this General Permit if the facility is in compliance with its Certified Animal Waste Management Plan (CAWMP) and this General Permit.

   Any discharge or application of waste to a ditch that drains to surface waters or wetlands is prohibited except as follows: (a) discharges from the ditches are controlled by best management practices (BMPs) designed in accordance with NRCS standards; (b) the BMPs have been submitted to and approved by the Division of Water Quality (Division); (c) the BMPs were implemented as designed to prevent a discharge to surface waters or wetlands; (d) the waste was removed immediately from the ditch upon discovery; and (e) the event was documented and reported in accordance with Part III.13. of this General Permit. Nothing in this exception shall excuse a discharge to surface waters or wetlands except as may result because of rainfall from a storm event more severe than the 25-year, 24-hour storm.

2. No discharge of waste shall result in a violation of the water quality standards established for the receiving waters as per Title 15A, Subchapter 2B, Section .0200 of the North Carolina Administrative Code and Title 15A, Subchapter 2L of the North Carolina Administrative Code.

3. The facility's COC and its CAWMP are hereby incorporated by reference into this General Permit. The CAWMP must be consistent with all applicable laws, rules, ordinances, and standards (federal, state and local) in effect at the time of siting, design and certification of the facility.

   The Permittee must assess, on an ongoing basis, the effectiveness of the implementation of the CAWMP. The Permittee must make "major changes," "revisions," or "amendments" to the CAWMP, as defined in Section VII, "Definitions," of this Permit, in order to address any changes needed to maintain compliance with the facility's COC and this General Permit. "Major changes," "revisions," and "amendments" to the CAWMP must be documented, dated, and included as part of the CAWMP. "Major changes " and "revisions" to the CAWMP shall be submitted to the appropriate Division Regional Office within thirty (30) calendar days of the "major change" or "revision." "Amendments" are not required to be submitted to the Division Regional Office unless specifically requested by the Division. If field, riser or pull numbers are changed, an explanation shall also be submitted and include a description of how the new numbers relate to the old numbers. Any violation of the COC or the CAWMP shall be considered a violation of this General Permit and subject to enforcement actions. A violation of this General Permit may result in the Permittee having to take immediate or long-term corrective action(s) as required by the Division. These actions may include but are not limited to: modifying the CAWMP; ceasing land application of waste; removing animals from the facility; or the COC being reopened and modified, revoked and reissued, and/or terminated.

4. Any proposed increase or modification to the annual average design capacity from that authorized by the COC will require a modification to the CAWMP and the COC prior to modification of the facility.

5. During the period of this General Permit, the Division of Water Quality may notify the permittee to conduct an evaluation of the facility and its CAWMP to determine the facility's ability to comply with the NRCS nutrient management standard as it relates to phosphorous. The Division will make its decision as whether to notify permittees based on experience gained through the NPDES permit implementation. This evaluation will not be required until such time as the permittee is notified to conduct the evaluation by the Division of Water Quality. The evaluation must be documented on forms supplied by or approved by the Division and must be submitted to the Division. This evaluation must be completed by existing facilities within twelve (12) months of receiving notification from the Division.

   No COC will be issued to any new or expanding facility to operate under this General Permit until the applicant has completed and submitted a phosphorous loss assessment to determine if the new or expanding facility can comply with the NRCS phosphorous standards. This assessment shall not be a basis for denial of a COC to operate under this permit unless that demonstration of compliance is a Statutory requirement for COC issuance.

6. If prior approval is received from the Director of the Division of Water Quality (Director), facilities which have been issued a COC to operate under this General Permit may add treatment units for the purpose of removing pollutants before the waste is discharged into the lagoons/storage ponds. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the new treatment unit will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

7. If prior approval is received from the Director, facilities which have been issued a COC to operate under this General Permit may add innovative treatment processes to the systems on a pilot basis in order to determine if the innovative treatment process will improve how the waste is treated and/or managed. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the innovative treatment process will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

8. For all new and expanding operations, no collection, treatment or storage facilities may be constructed in a 100-year flood plain.

9. Animal waste shall not be applied within 100 feet of any well with the exception of monitoring wells. The allowable distance to monitoring wells shall be established on a case by case basis by the Division.

10. Existing swine dry lots may remain in wetlands as long as the wetlands uses are not removed or degraded as a result of the swine. The swine however may not be confined within 100 feet of an adjacent surface water or a seasonally-flooded area. The swine also must not cause a loss of more than 10% of the existing tree canopy. Where trees do not exist, the area must be managed to include crop rotation.

II. OPERATION AND MAINTENANCE REQUIREMENTS

1. The collection, treatment, and storage facilities, and the land application equipment and fields shall be properly operated and maintained at all times.

2. A vegetative cover shall be maintained as specified in the facility's CAWMP on all land application fields and buffers in accordance with the CAWMP. No waste shall be applied upon areas not included in the CAWMP.

3. Soil pH on all land application fields must be maintained in the optimum range for crop production.

4. Land application rates shall be in accordance with the CAWMP. In no case shall land application rates exceed the agronomic rate of the nutrient of concern for the receiving crop. In no case shall land application rates result in excessive ponding or any runoff during any given application event.

5. Animal waste shall not be directly applied onto crops for direct human consumption that do not undergo further processing (e.g., strawberries, melons, lettuce, cabbage, apples, etc.) at any time during the growing season, or in the case of fruit bearing trees, following breaking dormancy. Application of animal wastes shall not occur within thirty (30) days of the harvesting of fiber and food crops for direct human consumption that undergoes further processing.

6. If manure or sludges are applied on conventionally tilled bare soil, the waste shall be incorporated into the soil within two (2) days after application on the land. This requirement does not apply to no-till fields, pastures, or fields where crops are actively growing.

7. Pesticides, toxic chemicals and petroleum products shall not be disposed of in the animal waste collection, treatment, storage or application systems.

8. Domestic and/or industrial wastewater from showers, toilets, sinks, etc. shall not be discharged into the animal waste collection, treatment, storage and application system. Washdown of stock trailers owned by and used to transport animals to and from the facility only, will be permissible as long as the system has been evaluated and approved to accommodate the additional volume. Only those cleaning agents and soaps that are EPA approved according to their label, will not harm the cover crop, and will not contravene the groundwater standards listed in 15A NCAC 2L may be utilized in facilities covered by this General Permit. Instruction labels are to be followed when using cleaning agents and soaps.

9. Disposal of dead animals resulting from normal mortality rates associated with the facility shall be done in accordance with the facility's CAWMP and the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) Veterinary Division's Statutes and regulations.

   Disposal of dead animals whose numbers exceed normal mortality rates associated with the facility shall also be done in accordance with the facility's CAWMP and NCDA&CS Veterinary Division's Statutes and regulations provided that: 1) burial of such animals shall be done in consultation with the State Veterinarian of the NCDA&CS Veterinary Division's Statutes and in compliance with NCDA&CS regulations; 2) all such burial sites must be mapped, and the dates and numbers of the animals buried by type must be recorded; and 3) the map is submitted to the appropriate Regional Office Groundwater Section within 15 calendar days of burial.

   In the event of a state of emergency declared by the Governor, disposal of dead animals shall be done in accordance with requirements and guidelines dictated by the State Veterinarian according G.S. §106-339.4. The Division may require groundwater monitoring when there is massive burial of animals. All burial sites of such animals must be mapped, and the dates and numbers of the animals buried by type must be recorded.

10. Unless accounted for in temporary storage volume, all uncontaminated runoff from the surrounding property and buildings shall be diverted away from the waste lagoons/storage ponds to prevent any unnecessary addition to the liquid volume in the structures.

11. A protective vegetative cover shall be established and maintained on all earthen lagoon/storage pond embankments (outside toe of embankment to maximum pumping elevation), berms, pipe runs, and diversions to surface waters or wetlands. Trees, shrubs, and other woody vegetation shall not be allowed to grow on the lagoon/storage pond embankments. All trees shall be removed in accordance with good engineering practices. Lagoon/storage pond areas shall be accessible, and vegetation shall be kept mowed.

12. At the time of sludge removal from a lagoon/storage pond, the sludge must be managed in accordance with the CAWMP. When removal of sludge from the lagoon is necessary, provisions must be taken to prevent damage to the lagoon dikes and liner.

13. Lagoons/storage ponds shall be kept free of foreign debris including, but not limited to, tires, bottles, light bulbs, gloves, syringes or any other solid waste.

14. The facility must have at least one of the following items at all times: (a) adequate animal waste application and handling equipment, (b) a lease, or other written agreement, for the use of the necessary equipment, or (c) a contract with a third party applicator capable of providing adequate waste application.

15. The Permittee shall designate a certified animal waste management system operator with a valid certification to be in charge of the animal waste management system. The waste management system shall be operated by the OIC or a person under the OIC's supervision.

16. In accordance with 15A NCAC 8F .0203(b)(2), the Operator in Charge (OIC) or a designated back-up OIC of a Type A Animal Waste Management System shall inspect, or a person under the supervision of an OIC or designated back-up OIC shall inspect, the land application site as often as necessary to insure that the animal waste is land applied in accordance with the CAWMP. In no case shall the time between inspections be more than 120 minutes during the application of waste. A record of each inspection shall be recorded on forms supplied by, or approved by, the Division and shall include the date, time, sprayfield number and name of the operator for each inspection.

    The Permittee may assert as an affirmative defense in any enforcement action alleging noncompliance with the requirements imposed in this condition that such noncompliance was due to circumstances beyond the Permittee's control. A notation shall be made on the form indicating the inspection affected by such circumstance and an explanation setting forth the circumstances claimed to have been beyond the Permittee's control shall be submitted with the form.

17. The Director may require any permittee to install, operate and maintain devices on all irrigation pumps/equipment designed to automatically stop irrigation activities during precipitation. This decision will be based on the facility's compliance history for irrigation events.

18. The Director may require any permittee to install and operate flow meters with flow totalizers based on the facility's violations and/or incomplete or incorrect record keeping events.

19. No waste shall be applied in wind conditions that might reasonably be expected to cause the mist to reach surface waters or wetlands.

20. The Permittee shall maintain buffer strips or other equivalent practices as specified in the facility's CAWMP near feedlots, manure storage areas and land application areas.

21. Waste shall not be applied on land that is flooded, saturated with water, frozen or snow covered at the time of land application.

22. Land application of waste is prohibited during precipitation events. The Permittee shall consider pending weather conditions in making the decision to land apply waste and shall document the weather conditions at the time of land application on forms supplied by or approved by the Division.

23. Land application activities shall cease on any application site that exceeds a Mehlich 3 Soil Test Index for Copper of greater than 3,000 (108 pounds per acre) or Zinc of greater than 3,000 (213 pounds per acre).

24. All waste application equipment must be tested and calibrated once in the first two years after issuance of the COC and then at least once every two years thereafter. The results must be documented on forms provided by, or approved by, the Division.

25. Any major structural repairs to lagoons/storage ponds must have written documentation from a technical specialist certifying proper design and installation. However, if a piece of equipment is being replaced with a piece of equipment of the identical specifications, no technical specialist approval is necessary [i.e. piping, reels, valves, pumps (if the gallons per minute (gpm) capacity is not being increased or decreased), etc.] unless the replacement involves disturbing the lagoon/storage pond embankment.

26. Crops for which animal waste is land applied must be removed from the land application site and properly managed and utilized unless other management practices are approved in the CAWMP.

III. MONITORING AND REPORTING REQUIREMENTS

1. An inspection of the waste collection, treatment, and storage structures, and runoff control measures shall be conducted and documented at a frequency to insure proper operation but at least monthly and after all storm events of greater than one (1) inch in 24 hours. For example, lagoons/storage ponds, and other structures should be inspected for evidence of erosion, leakage, damage by animals or discharge.

2. Monitoring and Recording Freeboard Levels

   a. Highly visible waste-level gauges shall be maintained to mark the level of waste in each lagoon/storage pond that does not gravity feed through a free flowing transfer pipe into a subsequent structure. The gauge shall have readily visible permanent markings.

      The waste level in each lagoon with a waste level gauge shall be monitored and recorded weekly on forms supplied by or approved by the Division.

      The Director may require more frequent monitoring and recording on lagoon levels based on the facility's compliance history for freeboard violations.

   b. The freeboard levels of lagoons serving any facility which experiences freeboard violations in any two consecutive years following the issuance of this General Permit, or as determined necessary by the Director, shall be monitored and recorded as follows:

      In addition to the facility's existing lagoon waste-level gauges, automated lagoon/storage pond waste-level monitors and recorders (monitored and recorded at least hourly) must be installed on all treatment and storage lagoons covered by a COC issued under this General Permit to measure and record lagoon freeboard. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer's operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following notification from the Director. The Director may determine that installation of automated waste level monitors is not required if the Permittee can demonstrate that preventative measures were taken to avoid the violations and that the violations resulted from conditions beyond the Permittee's control.

      If an automated level monitor(s) becomes inoperable, the Permittee shall:

      i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than 24 hours following first knowledge of the problem; and,

      ii. make any needed repairs to the equipment as quickly as possible, and take and record daily lagoon levels at the same time every day until such time as the automated equipment is placed back into operation.

   c. The Director may require new or modified waste-level gauges at any facility if he determines that the existing gauges are not adequate to accurately indicate actual lagoon levels, or the various lagoon levels required to be maintained by this General Permit or the facility's CAWMP.

3. Monitoring and Recording Precipitation Events

   a. Precipitation events at facilities issued a COC to operate under this General Permit shall be monitored and recorded as follows:

A rain gauge must be installed at a site that is representative of the weather conditions at the farm's land application site(s) to measure all precipitation events. The precipitation type and amount must be recorded daily for all precipitation events and maintained on site for Department review. Daily records do not need to be maintained for those days without precipitation events.

b. The Director may require that an automated rain gauge and recorder must be installed on site to measure and record all precipitation events. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer's operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following receipt of notice from the Director.

If an automated rain gauge(s) becomes inoperable, the Permittee shall:

i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty four (24) hours following first knowledge of the problem; and,

ii. make any needed repairs to the equipment as quickly as possible, and take and record all rainfall events until such time as the automated equipment is placed back into operation.

4. A representative Standard Soil Fertility Analysis, including pH, phosphorus, copper, and zinc, shall be conducted on each application field receiving animal waste in accordance with NCGS 143-215.10C(e)(6). As of the effective date of this General Permit, the Statute requires that the analysis be conducted at least annually.

5. An analysis of the animal waste shall be conducted in accordance with recommended laboratory sampling procedures as close to the time of application as practical and at least within sixty (60) days (before or after) of the date of application. Every reasonable effort shall be made to have the waste analyzed prior to the date of application and as close to the time of waste application as possible. This analysis shall include the following parameters:

Nitrogen	Zinc
Phosphorus	Copper

6. The Permittee shall record all irrigation and land application event(s) including hydraulic loading rates, nutrient loading rates and cropping information. The Permittee shall also record removal of solids and document nutrient loading rates if disposed on-site or record the off-site location(s). These records must be on forms supplied by, or approved by, the Division.

7. A record shall be created and maintained of all transfers of waste between lagoons/storage ponds on the same site not typically operated in series. Such record shall include at least the identity of the lagoon from which the waste was transferred, the identity of the lagoon receiving the waste, the date and time of transfer and the total volume of waste transferred.

8. The Permittee must maintain monthly stocking records for the facility and make the records available to Department of Environment and Natural Resources (Department).

9. If, for any reason, there is a discharge from the waste collection, treatment, storage and application systems (including the land application sites), to surface waters or wetlands, the Permittee is required to make notification in accordance with Condition III. 13. The discharge notification shall include the following information:

a. Description of the discharge: A description of the discharge including an estimate of the volume discharged, a description of the flow path to the receiving surface waters or wetlands and a site sketch showing the path of the waste. Also, an estimation of the volume discharged.

b. Time of the discharge: The length of time of the discharge, including the exact dates and times that it started and stopped, and if not stopped, the anticipated time the discharge is expected to continue.

c. Cause of the discharge: A detailed statement of the cause of the discharge. If caused by a precipitation event, detailed information from the on-site rain gauge concerning the inches and duration of the precipitation event.

d. All steps being taken to reduce, stop and cleanup the discharge. All steps to be taken to prevent future discharges from the same cause.

e. Analysis of the waste: A copy of the last waste analysis conducted as required by Condition III. 5. above.

10. A copy of this General Permit, the facility's COC, certification forms, lessee and landowner agreements, the CAWMP and copies of all records required by this General Permit and the facility's CAWMP shall be maintained by the Permittee in chronological and legible form for a minimum of three (3) years. Records include but are not limited to: soil and waste analyses, rain gauge readings, freeboard levels, irrigation and land application event(s), past inspection reports and operational reviews, animal stocking records, records of additional nutrient sources applied (including but not limited to sludges, unused feedstuff leachate, milk waste, septage and commercial fertilizer), cropping information, waste application equipment testing and calibration, and records of removal of solids to off-site location(s). These records shall be maintained on forms provided or approved by the Division and shall be readily available at the facility (stored at places such as the farm residence, office, outbuildings, etc.) where animal waste management activities are being conducted for the life of this General Permit, unless otherwise specified in this General Permit.

11. Within fifteen (15) working days of receiving the request from the Division, the Permittee shall provide to the Division one (1) copy of all requested information and reports related to the operation of the animal waste management system. Once received by the Division, all such information and reports become public information, unless they constitute confidential information under NC G.S. 132-1.2, and shall be made available to the public by the Division as specified in Chapter 132 of the General Statutes.

12. The Division may require any additional monitoring and reporting (including but not limited to groundwater, surface water or wetland, waste, sludge, soil, lagoon/storage pond levels and plant tissue) necessary to determine the source, quantity, quality, and effect of such waste upon the surface waters, groundwaters or wetlands. Such monitoring, including its scope, frequency, duration and any sampling, testing, and reporting systems, shall meet all applicable Division requirements.

13. Regional Notification:

The Permittee shall report by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty-four (24) hours following first knowledge of the occurrence of any of the following events:

a. Any discharge to ditches, surface waters or wetlands.

b. Any discharge that poses a serious threat to the environment or human safety or health.

c. Failure to maintain storage capacity in a lagoon/storage pond greater than or equal to that required in Condition V. 3. of this General Permit.

d. Over applying waste either in excess of the limits set out in the CAWMP or where runoff enters surface waters or wetlands.

e. Failure of any component of the animal waste collection, treatment, storage and land application system resulting in a discharge to surface waters or wetlands.

f. Any failure of the waste treatment and disposal system that renders the facility incapable of adequately receiving, treating or storing the waste and/or sludge.

g. A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge to surface waters or wetlands.

h. A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge that poses a serious threat to surface waters or wetlands.

i. Any deterioration or leak in a lagoon/storage pond that poses an immediate threat to the environment or human safety or health.

For any emergency, which requires immediate reporting after normal business hours, contact must be made with the Division of Emergency Management at 1-800-858-0368.

The Permittee shall also file a written report to the appropriate Division Regional Office within five (5) calendar days following first knowledge of the occurrence. This report shall outline the actions taken or proposed to be taken to correct the problem and to ensure that the problem does not recur. The requirement to file a written report may not be waived by the Division Regional Office.

14. The Director may require any permittee to file an annual certification report based on the compliance history of the facility. If required, the report must be filed on forms provided by the Division.

15. The Director may require facilities to submit additional reports and/or certifications based on the facility's compliance history.

16. In the event of a discharge of 1,000 gallons or more of waste to surface waters or wetlands, the Permittee must issue a press release to all print and electronic news media that provide general coverage in the county in which the discharge occurred setting out the details of the discharge. The press release must be issued within forty-eight (48) hours after it is determined that the discharge has reached the surface waters or wetlands. A copy of the press release and a list of the news media to which it was distributed must be kept for at least one (1) year after the discharge and must be distributed to any person upon request.

17. In the event of a discharge of 15,000 gallons or more of animal waste to surface waters or wetlands, a public notice is required in addition to the press release described in Condition III 13. The public notice must be placed in a newspaper having general circulation in the county in which the discharge occurred and the county immediately downstream within ten (10) days of the discharge. The minimum content of the notice is the name of the facility, location of the discharge, estimated volume of waste entering state waters, time and date discharge occurred, duration of the discharge, identification water body that was discharged into including creek and river basin if applicable, actions taken to prevent further discharge, and a facility contact person and phone number.

18. If a discharge of 1,000,000 gallons of wastewater or more reaches surface waters or wetlands, the appropriate Division Regional Office must be contacted to determine in what additional counties, if any, a public notice must be published. A copy of all public notices and proof of publication must be sent to the Division within thirty (30) days of the discharge.

19. All facilities, which are issued a COC to operate under this General Permit, shall conduct a survey of the sludge accumulation in all lagoons within two (2) years of receiving the COC and every year thereafter. This survey shall include but not be limited to a sketch showing the depth of sludge in the various locations within each lagoon. This survey frequency may be reduced if it can be demonstrated to the satisfaction of the Division that the rate of sludge accumulation does not warrant an annual survey.

    If the sludge accumulation is such that it is greater than the volume for which the lagoon was designed or the accumulation reduces the lagoon's minimum treatment volume to less than the volume for that which the lagoon was designed, a sludge removal or management plan must be submitted to the appropriate Division Regional Office within ninety (90) days of the determination. The plan shall describe removal and waste utilization procedures to be used.

IV. INSPECTIONS AND ENTRY

1. The Permittee shall allow any authorized representative of Department, upon the presentation of credentials and other documents as may be required by law and in accordance with reasonable and appropriate biosecurity measures, to:

    a. Enter the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this General Permit;

    b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this General Permit;

    c. Inspect, at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this General Permit; and,

    d. Sample or monitor, at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location.

V. GENERAL CONDITIONS

1. The issuance of a COC to operate under this General Permit shall not relieve the Permittee of the responsibility for compliance with all applicable surface water, wetlands, groundwater and air quality standards or for damages to surface waters, wetlands or groundwaters resulting from the animal operation.

2. The maximum waste level in lagoons/storage ponds shall not exceed that specified in the facility's CAWMP. At a minimum, maximum waste level for lagoons/storage ponds must not exceed the level that provides adequate storage to contain the 25-year, 24-hour storm event plus an additional one (1) foot of structural freeboard except that there shall be no violation of this condition if: (a) there is a storm event more severe than a 25-year, 24-hour event, (b) the Permittee is in compliance with its CAWMP, and (c) there is at least one (1) foot of structural freeboard.

   In addition to the above requirements, for new and expanding farms with lagoon and storage pond designs completed after September 1, 1996, storage must also be provided for the heavy rainfall factor for the lagoons/storage pond. In case of lagoons/storage ponds in series that are gravity fed, the 25-year, 24-hour storm event and/or the heavy rainfall factor storage requirement for the system may be designed into the lowest lagoon/storage pond in the system. However, adequate freeboard must be designed into the upper lagoons/storage ponds to allow sufficient storage to prevent the waste level from rising into the structural freeboard while the storm water is draining into the lowest lagoon in the system.

3. Any containment basin, such as a lagoon or a storage pond, used for waste management shall continue to be subject to the conditions and requirements of this General Permit until properly closed. When the containment basin is properly closed in accordance with the "Natural Resource Conservation Service (NRCS) North Carolina Standard for Closure of Waste Impoundments," March 2002 or any subsequent amendment, the containment basin shall not be subject to the requirements of this General Permit. The Permittee must submit a letter to the Division to request rescission of the COC by providing documentation of closure of all containment basins.

   Closure shall also include a minimum of 24 hours pre-notification of the Division and submittal of the Animal Waste Storage Pond and Lagoon Closure Report Form to the address identified on the form within fifteen (15) days of completion of closure.

4. This General Permit allows for the distribution of up to four cubic yards of manure per visit to individuals for personal use. The Permittee provide the recipient(s) with information on the nutrient content of the manure. Distribution of greater quantities must be to individuals or businesses permitted to distribute the waste, or to be land applied to sites identified in the Permittee's CAWMP.

5. The Permittee must inform the recipient(s) of his/her responsibilities to properly manage the land application of manure. Record keeping for the distribution of manure up to four (4) cubic yards per visit to individuals for personal use is not required.

6. The annual permit fee shall be paid by the Permittee within thirty (30) days after being billed by the Division. Failure to pay the fee accordingly constitutes grounds for revocation of its COC to operate under this General Permit.

7. Failure of the Permittee to maintain, in full force and effect, lessee and landowner agreements, which are required in the CAWMP, shall constitute grounds for revocation of its COC to operate under this General Permit.

8. A COC to operate under this General Permit is not transferable. In the event there is a desire for the facility to change ownership, or there is a name change of the Permittee, a Notification of Change of Ownership form must be submitted to the Division, including documentation from the parties involved and other supporting materials as may be appropriate. This request will be considered on its merits and may or may not be approved.

9. A COC to operate under this General Permit is effective only with respect to the nature and volume of wastes described in the application and other supporting data. The Permittee shall notify the Division immediately of any applicable information not provided in the permit application.

10. If the Permittee wishes to continue an activity regulated by this General Permit after the expiration date of this General Permit, the Permittee must apply for and obtain a new COC. Renewal applications must be filed at least 180 days prior to the expiration of the General Permit.

11. The issuance of a COC to operate under this General Permit does not prohibit the Division from reopening and modifying the General Permit or COC, revoking and reissuing the General Permit or COC, or terminating the General Permit or COC as allowed by the appropriate laws, rules, and regulations.

12. The Director may require any person, otherwise eligible for coverage under this General Permit, to apply for an individual permit by notifying that person that an application is required.

13. The Groundwater Compliance Boundary is established by 15A NCAC 2L and 15A NCAC 2H .0225. An exceedance of Groundwater Quality Standards at or beyond the Compliance Boundary is subject to the requirements of 15A NCAC 2L and the Division in addition to the penalty provisions applicable under the North Carolina General Statutes.

VI. PENALTIES

1. Failure to abide by the conditions and limitations contained in this General Permit; the facility's COC; the facility's CAWMP; and/or applicable state law; may subject the Permittee to an enforcement action by the Division including but not limited to the modification of the animal waste management system, civil penalties, criminal penalties and injunctive relief.

2. The Permittee must comply with all conditions of this General Permit. Any permit noncompliance constitutes a violation of state law and is grounds for enforcement action; for permit coverage termination, revocation and reissuance, or modification; or denial of a permit coverage renewal application.

3. It shall not be a defense for a Permittee in an enforcement action to claim that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this General Permit.

VII. DEFINITIONS

25-year, 24-hour rainfall or storm event means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years, as defined by the National Weather Service in Technical Paper Number 40, "Rainfall Frequency Atlas of the United States," May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom.

Agronomic rates means the amount of animal waste and/or other nutrient sources to be land applied to lands as contained in the nutrient management standard of the USDA Soil Conservation Service Technical Guide Section IV or as recommended by the North Carolina Department of Agriculture and Consumer Services and the North Carolina Cooperative Extension Service at the time of certification of the Animal Waste Management Plan by the appropriate technical specialist.

Amendment to the CAWMP means a change and/or addition to a part(s) of the plan, and requires that the change and/or addition adhere to current applicable standards. The following are examples of amendments to the CAWMP:

- In an existing CAWMP, a change in crops and/or cropping pattern that utilizes 25% or less of the N generated is considered a plan amendment. Additional acreage needed to facilitate the change in crops and/or cropping pattern is permissible and considered part of the amendment.

- The addition of winter crops and/or interseeded perennial crops are considered amendments to an existing CAWMP when the operation does not require additional acreage and/or crops for N utilization, and does not exceed the 25% criteria stated above.

- When a CAWMP cannot meet N utilization requirements due to land lost to irrigation inefficiency (useable versus total acres), then the CAWMP may be amended to increase available acreage and/or change the crop for N utilization. This is the only exception to the 25% N criteria for plan revision.

- Inclusions of emergency action plans, and insect, odor and mortality checklists are considered CAWMP amendments.

- Including additional acreage for land application beyond what is required in the existing CAWMP is considered a plan amendment.

Animal feeding operation means a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of forty five (45) days or more in any twelve (12) month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Two or more animal feeding operations under common ownership are considered to be a single animal feeding operation if they adjoin each other, or if they use a common area or system for the disposal of wastes.

Ditch means any man made channel for the purpose of moving water off a site to the surface waters.

Excessive Ponding means any area of the application field where visible liquid waste is ponded on the surface of the land application site more than four (4) hours following the application of waste. Excessive ponding also means any areas where the ponding of waste has resulted in crop failure.

Groundwaters means any subsurface waters, as defined in 15A NCAC 2L .0102.

Land application means the application of wastewater and/or waste solids onto or incorporation into the soil.

Major changes to the CAWMP means changes in the number of animals, type of operation (feeder to finish to wean to feeder), retrofit of a lagoon, installation of a new irrigation system, and similar type changes. Recertification is only required for major changes to the CAWMP. Major changes to a facility must first be approved by DWQ. The new CAWMP and the certification shall be submitted with a request that the COC be amended to reflect the changes. The facility may not make the changes until a new or amended COC has been issued.

Revision to the CAWMP means a change to an entire CAWMP to meet current applicable standards. A CAWMP must be revised if the operation cannot utilize all N nitrogen generated by the animal production in accordance with the existing CAWMP, except for the specific conditions noted in the CAWMP amendment criteria as previously defined. For an existing CAWMP, a change in crops and/or cropping pattern that utilizes more than 25% of the N generated by the operation is considered a plan revision. Any change to an existing CAWMP, whether an amendment or revision, must be signed and dated by both the producer and a technical specialist for the new CAWMP to be valid. A revision of the CAWMP does not require recertification.

State Waters means all surface waters, wetlands, groundwaters and waters of the United States located in the State.

Surface Waters means any stream, river, brook, swamp, lake, sound, tidal estuary, bay, creek, reservoir, waterway, or other surface body or surface accumulation of water, whether public or private, or natural or artificial, that is contained in, flows through, or borders upon any portion of the State of North Carolina, including any portion of the Atlantic Ocean over which the State has jurisdiction as well as any additional Waters of the United States which are located in the State.

Waste means manure, animal waste, process wastewater and/or sludge generated at an animal feeding operation.

Wetlands means areas that are inundated or saturated by an accumulation of surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions, as defined in 15A NCAC 2B .0202.

This General Permit issued the XXth day of XXX, 2004.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

_____, Director

Alan W. Klimek, P.E.
North Carolina Division of Water Quality
By Authority of the Environmental Management Commission

Permit Number AWG100000

NORTH CAROLINA
ENVIRONMENTAL MANAGEMENT COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

CATTLE WASTE MANAGEMENT SYSTEM GENERAL PERMIT

This General Permit is issued pursuant to North Carolina General Statutes 143-215 et seq., may apply to any cattle facility in the State of North Carolina, and shall be effective from October 1, 2004 until September 30, 2009.

All activities authorized herein shall be consistent with the terms and conditions of this General Permit.

Holders of Certificates of Coverage (COC) under this General Permit shall comply with the following specified conditions and limitations.

I. PERFORMANCE STANDARDS

1. Any discharge of waste that reaches surface waters or wetlands is prohibited except as otherwise provided in this General Permit and associated statutory and regulatory provisions. Waste shall not reach surface waters or wetlands by runoff, drift, manmade conveyance, direct application, direct discharge or through ditches not otherwise classified as state waters.

   The waste collection, treatment, storage and application system operated under this General Permit shall be effectively maintained and operated as a non-discharge system to prevent the discharge of pollutants to surface waters or wetlands. Application of waste to terraces and grassed waterways is acceptable as long as it is applied in accordance with Natural Resources Conservation Service (NRCS) Standards and does not result in a discharge of waste to surface waters or wetlands.

   Facilities must be designed, constructed and operated to contain all waste plus the runoff from a 25-year, 24-hour rainfall event for the location of the facility. A facility that has a discharge of waste that results because of a storm event more severe than the 25-year, 24-hour storm will not be considered to be in violation of this General Permit if the facility is in compliance with its Certified Animal Waste Management Plan (CAWMP) and this General Permit.

   Any discharge or application of waste to a ditch that drains to surface waters or wetlands is prohibited except as follows: (a) discharges from the ditches are controlled by best management practices (BMPs) designed in accordance with NRCS standards; (b) the BMPs have been submitted to and approved by the Division of Water Quality (Division); (c) the BMPs were implemented as designed to prevent a discharge to surface waters or wetlands; (d) the waste was removed immediately from the ditch upon discovery; and (e) the event was documented and reported in accordance with Part III.13. of this General Permit. Nothing in this exception shall excuse a discharge to surface waters or wetlands except as may result because of rainfall from a storm event more severe than the 25-year, 24-hour storm.

2. No discharge of waste shall result in a violation of the water quality standards established for the receiving waters as per Title 15A, Subchapter 2B, Section .0200 of the North Carolina Administrative Code and Title 15A, Subchapter 2L of the North Carolina Administrative Code.

3. The facility's COC and its CAWMP are hereby incorporated by reference into this General Permit. The CAWMP must be consistent with all applicable laws, rules, ordinances, and standards (federal, state and local) in effect at the time of siting, design and certification of the facility.

   The Permittee must assess, on an ongoing basis, the effectiveness of the implementation of the CAWMP. The Permittee must make "major changes," "revisions," or "amendments" to the CAWMP, as defined in Section VII, "Definitions," of this Permit, in order to address any changes needed to maintain compliance with the facility's COC and this General Permit. "Major changes," "revisions," and "amendments" to the CAWMP must be documented, dated, and included as part of the CAWMP. "Major changes" and "revisions" to the CAWMP shall be submitted to the appropriate Division Regional Office within thirty (30) calendar days of the "major change" or "revision." "Amendments" are not required to be submitted to the Division Regional Office unless specifically requested by the Division. If field, riser or pull numbers are changed, an explanation shall also be submitted and include a description of how the new numbers relate to the old numbers.

   Any violation of the COC or the CAWMP shall be considered a violation of this General Permit and subject to enforcement actions. A violation of this General Permit may result in the Permittee having to take immediate or long-term corrective action(s) as required by the Division. These actions may include but are not limited to: modifying the CAWMP; ceasing land application of waste; removing animals from the facility; or the COC being reopened and modified, revoked and reissued, and/or terminated.

4. Any proposed increase or modification to the annual average design capacity from that authorized by the COC will require a modification to the CAWMP and the COC prior to modification of the facility.

5. During the period of this General Permit, the Division of Water Quality may notify the permittee to conduct an evaluation of the facility and its CAWMP to determine the facility's ability to comply with the NRCS nutrient management standard as it relates to phosphorous. The Division will make its decision as whether to notify permittees based on experience gained through the NPDES permit implementation. This evaluation will not be required until such time as the permittee is notified to conduct the evaluation by the Division of Water Quality. The evaluation must be documented on forms supplied by or approved by the Division and must be submitted to the Division. This evaluation must be completed by existing facilities within twelve (12) months of receiving notification from the Division.

   No COC will be issued to any new or expanding facility to operate under this General Permit until the applicant has completed and submitted a phosphorous loss assessment to determine if the new or expanding facility can comply with the NRCS phosphorous standards. This assessment shall not be a basis for denial of a COC to operate under this permit unless that demonstration of compliance is a Statutory requirement for COC issuance.

6. If prior approval is received from the Director of the Division of Water Quality (Director), facilities which have been issued a COC to operate under this General Permit may add treatment units for the purpose of removing pollutants before the waste is discharged into the lagoons/storage ponds. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the new treatment unit will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

7. If prior approval is received from the Director, facilities which have been issued a COC to operate under this General Permit may add innovative treatment processes to the systems on a pilot basis in order to determine if the innovative treatment process will improve how the waste is treated and/or managed. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the innovative treatment process will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

8. For all new and expanding operations, no collection, treatment or storage facilities may be constructed in a 100-year flood plain.

9. Animal waste shall not be applied within 100 feet of any well with the exception of monitoring wells. The allowable distance to monitoring wells shall be established on a case by case basis by the Division.

II. OPERATION AND MAINTENANCE REQUIREMENTS

1. The collection, treatment, and storage facilities, and the land application equipment and fields shall be properly operated and maintained at all times.

2. A vegetative cover shall be maintained as specified in the facility's CAWMP on all land application fields and buffers in accordance with the CAWMP. No waste shall be applied upon areas not included in the CAWMP.

3. Soil pH on all land application fields must be maintained in the optimum range for crop production.

4. Land application rates shall be in accordance with the CAWMP. In no case shall land application rates exceed the agronomic rate of the nutrient of concern for the receiving crop. In no case shall land application rates result in excessive ponding or any runoff during any given application event.

5. Animal waste shall not be directly applied onto crops for direct human consumption that do not undergo further processing (e.g., strawberries, melons, lettuce, cabbage, apples, etc.) at any time during the growing season, or in the case of fruit bearing trees, following breaking dormancy. Application of animal wastes shall not occur within thirty (30) days of the harvesting of fiber and food crops for direct human consumption that undergoes further processing.

6. If manure or sludges are applied on conventionally tilled bare soil, the waste shall be incorporated into the soil within two (2) days after application on the land. This requirement does not apply to no-till fields, pastures, or fields where crops are actively growing.

7. Pesticides, toxic chemicals and petroleum products shall not be disposed of in the animal waste collection, treatment, storage or application systems.

8. Domestic and/or industrial wastewater from showers, toilets, sinks, etc. shall not be discharged into the animal waste collection, treatment, storage and application system. Washing machines located in the milking parlors and used exclusively for washing rags used during milking; and wash vats required to be connected to the animal waste collection, treatment, storage and application system by Grade A Pasteurized Milk Ordinance Part II, Section 7, Item 5r are exempt from this requirement. Washdown of stock trailers owned by and used to transport animals to and from the facility only, will be permissible as long as the system has been evaluated and approved to accommodate the additional volume. Only those cleaning agents and soaps that are EPA approved according to their label, will not harm the cover crop, and will not contravene the groundwater standards listed in 15A NCAC 2L may be utilized in facilities covered by this General Permit. Instruction labels are to be followed when using cleaning agents and soaps.

9. Disposal of dead animals resulting from normal mortality rates associated with the facility shall be done in accordance with the facility's CAWMP and the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) Veterinary Division's Statutes and regulations.

   Disposal of dead animals whose numbers exceed normal mortality rates associated with the facility shall also be done in accordance with the facility's CAWMP and NCDA&CS Veterinary Division's Statutes and regulations provided that: 1) burial of such animals shall be done in consultation with the State Veterinarian of the NCDA&CS Veterinary Division's Statutes and in compliance with NCDA&CS regulations; 2) all such burial sites must be mapped, and the dates and numbers of the animals buried by type must be recorded; and 3) the map is submitted to the appropriate Regional Office Groundwater Section within fifteen (15) calendar days of burial.

   In the event of a state of emergency declared by the Governor, disposal of dead animals shall be done in accordance with requirements and guidelines dictated by the State Veterinarian according G.S. §106-339.4. The Division may require groundwater monitoring when there is massive burial of animals. All burial sites of such animals must be mapped, and the dates and numbers of the animals buried by type must be recorded.

10. Unless accounted for in temporary storage volume, all uncontaminated runoff from the surrounding property and buildings shall be diverted away from the waste lagoons/storage ponds to prevent any unnecessary addition to the liquid volume in the structures. Runoff from lounging areas to the waste storage ponds or lagoons shall be prevented unless approved in the CAWMP.

11. A protective vegetative cover shall be established and maintained on all earthen lagoon/storage pond embankments (outside toe of embankment to maximum pumping elevation), berms, pipe runs, and diversions to surface waters or wetlands. Trees, shrubs, and other woody vegetation shall not be allowed to grow on the lagoon/storage pond embankments. All trees shall be removed in accordance with good engineering practices. Lagoon/storage pond areas shall be accessible, and vegetation shall be kept mowed.

12. At the time of sludge removal from a lagoon/storage pond, the sludge must be managed in accordance with the CAWMP. When removal of sludge from the lagoon is necessary, provisions must be taken to prevent damage to the lagoon dikes and liner.

13. Lagoons/storage ponds shall be kept free of foreign debris including, but not limited to, tires, bottles, light bulbs, gloves, syringes or any other solid waste.

14. The facility must have at least one of the following items at all times: (a) adequate animal waste application and handling equipment, (b) a lease, or other written agreement, for the use of the necessary equipment, or (c) a contract with a third party applicator capable of providing adequate waste application.

15. The Permittee shall designate a certified animal waste management system operator with a valid certification to be in charge of the animal waste management system. The waste management system shall be operated by the OIC or a person under the OIC's supervision.

16. In accordance with 15A NCAC 8F .0203(b)(2), the Operator in Charge (OIC) or a designated back-up OIC of a Type B Animal Waste Management System shall inspect, or a person under the supervision of an OIC or designated back-up OIC shall inspect, the land application site as often as necessary to insure that the animal waste is land applied in accordance with the CAWMP. In no case shall the time between inspections be more than 120 minutes during the application of waste. A record of each inspection shall be recorded on forms supplied by, or approved by, the Division and shall include the date, time, sprayfield number and name of the operator for each inspection.

    The Permittee may assert as an affirmative defense in any enforcement action alleging noncompliance with the requirements imposed in this condition that such noncompliance was due to circumstances beyond the Permittee's control. A notation shall be made on the form indicating the inspection affected by such circumstance and an explanation setting forth the circumstances claimed to have been beyond the Permittee's control shall be submitted with the form.

17. The Director may require any permittee to install, operate and maintain devices on all irrigation pumps/equipment designed to automatically stop irrigation activities during precipitation. This decision will be based on the facility's compliance history for irrigation events.

18. The Director may require any permittee to install and operate flow meters with flow totalizers based on the facility's violations and/or incomplete or incorrect record keeping events.

19. No waste shall be applied in wind conditions that might reasonably be expected to cause the mist to reach surface waters or wetlands.

20. The Permittee shall maintain buffer strips or other equivalent practices as specified in the facility's CAWMP near feedlots, manure storage areas and land application areas.

21. Waste shall not be applied on land that is flooded, saturated with water, frozen or snow covered at the time of land application.

22. Land application of waste is prohibited during precipitation events. The Permittee shall consider pending weather conditions in making the decision to land apply waste and shall document the weather conditions at the time of land application on forms supplied by or approved by the Division.

23. Land application activities shall cease on any application site that exceeds a Mehlich 3 Soil Test Index for Copper of greater than 3,000 (108 pounds per acre) or Zinc of greater than 3,000 (213 pounds per acre).

24. All waste application equipment must be tested and calibrated once in the first two years after issuance of the COC and then at least once every two years thereafter. The results must be documented on forms provided by, or approved by, the Division.

25. Any major structural repairs to lagoons/storage ponds must have written documentation from a technical specialist certifying proper design and installation. However, if a piece of equipment is being replaced with a piece of equipment of the identical specifications, no technical specialist approval is necessary [i.e. piping, reels, valves, pumps (if the gallons per minute (gpm) capacity is not being increased or decreased), etc.] unless the replacement involves disturbing the lagoon/storage pond embankment.

26. Crops for which animal waste is land applied must be removed from the land application site and properly managed and utilized unless other management practices are approved in the CAWMP.

III. MONITORING AND REPORTING REQUIREMENTS

1. An inspection of the waste collection, treatment, and storage structures, and runoff control measures shall be conducted and documented at a frequency to insure proper operation but at least monthly and after all storm events of greater than one (1) inch in 24 hours. For example, lagoons/storage ponds, and other structures should be inspected for evidence of erosion, leakage, damage by animals or discharge.

2. Monitoring and Recording Freeboard Levels

   a. Highly visible waste-level gauges shall be maintained to mark the level of waste in each lagoon/storage pond that does not gravity feed through a free flowing transfer pipe into a subsequent structure. The gauge shall have readily visible permanent markings.

      The waste level in each lagoon with a waste level gauge shall be monitored and recorded weekly on forms supplied by or approved by the Division.

      The Director may require more frequent monitoring and recording on lagoon levels based on the facility's compliance history for freeboard violations.

   b. The freeboard levels of lagoons serving any facility which experiences freeboard violations in any two consecutive years following the issuance of this General Permit, or as determined necessary by the Director, shall be monitored and recorded as follows:

      In addition to the facility's existing lagoon waste-level gauges, automated lagoon/storage pond waste-level monitors and recorders (monitored and recorded at least hourly) must be installed on all treatment and storage lagoons covered by a COC issued under this General Permit to measure and record lagoon freeboard. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer's operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following notification from the Director. The Director may determine that installation of automated waste level monitors is not required if the Permittee can demonstrate that preventative measures were taken to avoid the violations and that the violations resulted from conditions beyond the Permittee's control.

      If an automated level monitor(s) becomes inoperable, the Permittee shall:

      i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than 24 hours following first knowledge of the problem; and,

      ii. make any needed repairs to the equipment as quickly as possible, and take and record daily lagoon levels at the same time every day until such time as the automated equipment is placed back into operation.

   c. The Director may require new or modified waste-level gauges at any facility if he determines that the existing gauges are not adequate to accurately indicate actual lagoon levels, or the various lagoon levels required to be maintained by this General Permit or the facility's CAWMP.

3. Monitoring and Recording Precipitation Events

   a. Precipitation events at facilities issued a COC to operate under this General Permit shall be monitored and recorded as follows:

      A rain gauge must be installed at a site that is representative of the weather conditions at the farm's land application site(s) to measure all precipitation events. The precipitation type and amount must be recorded daily for all precipitation events and maintained on site for Department review. Daily records do not need to be maintained for those days without precipitation events.

   b. The Director may require that an automated rain gauge and recorder must be installed on site to measure and record all precipitation events. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer's operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following receipt of notice from the Director.

      If an automated rain gauge(s) becomes inoperable, the Permittee shall:

      i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty four (24) hours following first knowledge of the problem; and,

      ii. make any needed repairs to the equipment as quickly as possible, and take and record all rainfall events until such time as the automated equipment is placed back into operation.

4. A representative Standard Soil Fertility Analysis, including pH, phosphorus, copper, and zinc, shall be conducted on each application field receiving animal waste in accordance with NCGS 143-215.10C(e)(6). As of the effective date of this General Permit, the Statute requires that the analysis be conducted at least annually.

5. An analysis of the animal waste shall be conducted in accordance with recommended laboratory sampling procedures as close to the time of application as practical and at least within sixty (60) days (before or after) of the date of application. Every reasonable effort shall be made to have the waste analyzed prior to the date of application and as close to the time of waste application as possible. This analysis shall include the following parameters:

Nitrogen	Zinc
Phosphorus	Copper

6. The Permittee shall record all irrigation and land application event(s) including hydraulic loading rates, nutrient loading rates and cropping information. The Permittee shall also record removal of solids and document nutrient loading rates if disposed on-site or record the off-site location(s). These records must be on forms supplied by, or approved by, the Division.

7. A record shall be created and maintained of all transfers of waste between lagoons/storage ponds on the same site not typically operated in series. Such record shall include at least the identity of the lagoon from which the waste was transferred, the identity of the lagoon receiving the waste, the date and time of transfer and the total volume of waste transferred.

8. The Permittee must maintain monthly stocking records for the facility and make the records available to Department of Environment and Natural Resources (Department). Pastured animals not contributing waste to the animal waste management systems should not be counted on the monthly stocking records.

9. If, for any reason, there is a discharge from the waste collection, treatment, storage and application systems (including the land application sites), to surface waters or wetlands, the Permittee is required to make notification in accordance with Condition III. 13. The discharge notification shall include the following information:

   a. Description of the discharge: A description of the discharge including an estimate of the volume discharged, a description of the flow path to the receiving surface waters or wetlands and a site sketch showing the path of the waste. Also, an estimation of the volume discharged.

   b. Time of the discharge: The length of time of the discharge, including the exact dates and times that it started and stopped, and if not stopped, the anticipated time the discharge is expected to continue.

   c. Cause of the discharge: A detailed statement of the cause of the discharge. If caused by a precipitation event, detailed information from the on-site rain gauge concerning the inches and duration of the precipitation event.

   d. All steps being taken to reduce, stop and cleanup the discharge. All steps to be taken to prevent future discharges from the same cause.

   e. Analysis of the waste: A copy of the last waste analysis conducted as required by Condition III. 5. above.

10. A copy of this General Permit, the facility's COC, certification forms, lessee and landowner agreements, the CAWMP and copies of all records required by this General Permit and the facility's CAWMP shall be maintained by the Permittee in chronological and legible form for a minimum of three (3) years. Records include but are not limited to: soil and waste analyses, rain gauge readings, freeboard levels, irrigation and land application event(s), past inspection reports and operational reviews, animal stocking records, records of additional nutrient sources applied (including but not limited to sludges, unused feedstuff leachate, milk waste, septage and commercial fertilizer), cropping information, waste application equipment testing and calibration, and records of removal of solids to off-site location(s). These records shall be maintained on forms provided or approved by the Division and shall be readily available at the facility (stored at places such as the farm residence, office, outbuildings, etc.) where animal waste management activities are being conducted for the life of this General Permit, unless otherwise specified in this General Permit.

11. Within fifteen (15) working days of receiving the request from the Division, the Permittee shall provide to the Division one (1) copy of all requested information and reports related to the operation of the animal waste management system. Once received by the Division, all such information and reports become public information, unless they constitute confidential information under NC G.S. 132-1.2, and shall be made available to the public by the Division as specified in Chapter 132 of the General Statutes.

12. The Division may require any additional monitoring and reporting (including but not limited to groundwater, surface water or wetland, waste, sludge, soil, lagoon/storage pond levels and plant tissue) necessary to determine the source, quantity, quality, and effect of such waste upon the surface waters, groundwaters or wetlands. Such monitoring, including its scope, frequency, duration and any sampling, testing, and reporting systems, shall meet all applicable Division requirements.

13. Regional Notification:

The Permittee shall report by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty-four (24) hours following first knowledge of the occurrence of any of the following events:

a. Any discharge to ditches, surface waters or wetlands.

b. Any discharge that poses a serious threat to the environment or human safety or health.

c. Failure to maintain storage capacity in a lagoon/storage pond greater than or equal to that required in Condition V. 3. of this General Permit.

d. Over applying waste either in excess of the limits set out in the CAWMP or where runoff enters surface waters or wetlands.

e. Failure of any component of the animal waste collection, treatment, storage and land application system resulting in a discharge to surface waters or wetlands.

f. Any failure of the waste treatment and disposal system that renders the facility incapable of adequately receiving, treating or storing the waste and/or sludge.

g. A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge to surface waters or wetlands.

h. A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge that poses a serious threat to surface waters or wetlands.

i. Any deterioration or leak in a lagoon/storage pond that poses an immediate threat to the environment or human safety or health.

For any emergency, which requires immediate reporting after normal business hours, contact must be made with the Division of Emergency Management at 1-800-858-0368.

The Permittee shall also file a written report to the appropriate Division Regional Office within five (5) calendar days following first knowledge of the occurrence. This report shall outline the actions taken or proposed to be taken to correct the problem and to ensure that the problem does not recur. The requirement to file a written report may not be waived by the Division Regional Office.

14. The Director may require any permittee to file an annual certification report based on the compliance history of the facility. If required, the report must be filed on forms provided by the Division.

15. The Director may require facilities to submit additional reports and/or certifications based on the facility's compliance history.

16. In the event of a discharge of 1,000 gallons or more of waste to surface waters or wetlands, the Permittee must issue a press release to all print and electronic news media that provide general coverage in the county in which the discharge occurred setting out the details of the discharge. The press release must be issued within forty-eight (48) hours after it is determined that the discharge has reached the surface waters or wetlands. A copy of the press release and a list of the news media to which it was distributed must be kept for at least one (1) year after the discharge and must be distributed to any person upon request.

17. In the event of a discharge of 15,000 gallons or more of animal waste to surface waters or wetlands, a public notice is required in addition to the press release described in Condition III 13. The public notice must be placed in a newspaper having general circulation in the county in which the discharge occurred and the county immediately downstream within ten (10) days of the discharge. The minimum content of the notice is the name of the facility, location of the discharge, estimated volume of waste entering state waters, time and date discharge occurred, duration of the discharge, identification water body that was discharged into including creek and river basin if applicable, actions taken to prevent further discharge, and a facility contact person and phone number.

18. If a discharge of 1,000,000 gallons of wastewater or more reaches surface waters or wetlands, the appropriate Division Regional Office must be contacted to determine in what additional counties, if any, a public notice must be published. A copy of all public notices and proof of publication must be sent to the Division within thirty (30) days of the discharge.

19. All facilities, which are issued a COC to operate under this General Permit, shall conduct a survey of the sludge accumulation in all lagoons within two (2) years of receiving the COC and every year thereafter. This survey shall include but not be limited to a sketch showing the depth of sludge in the various locations within each lagoon. This survey frequency may be reduced if it can be demonstrated to the satisfaction of the Division that the rate of sludge accumulation does not warrant an annual survey.

    If the sludge accumulation is such that it is greater than the volume for which the lagoon was designed or the accumulation reduces the lagoon's minimum treatment volume to less than the volume for that which the lagoon was designed, a sludge removal or management plan must be submitted to the appropriate Division Regional Office within ninety (90) days of the determination. The plan shall describe removal and waste utilization procedures to be used.

IV. INSPECTIONS AND ENTRY

1. The Permittee shall allow any authorized representative of Department, upon the presentation of credentials and other documents as may be required by law and in accordance with reasonable and appropriate biosecurity measures, to:

    a. Enter the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this General Permit;

    b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this General Permit;

    c. Inspect, at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this General Permit; and,

    d. Sample or monitor, at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location.

V. GENERAL CONDITIONS

1. The issuance of a COC to operate under this General Permit shall not relieve the Permittee of the responsibility for compliance with all applicable surface water, wetlands, groundwater and air quality standards or for damages to surface waters, wetlands or groundwaters resulting from the animal operation.

2. The maximum waste level in lagoons/storage ponds shall not exceed that specified in the facility's CAWMP. At a minimum, maximum waste level for lagoons/storage ponds must not exceed the level that provides adequate storage to contain the 25-year, 24-hour storm event plus an additional one (1) foot of structural freeboard except that there shall be no violation of this condition if: (a) there is a storm event more severe than a 25-year, 24-hour event, (b) the Permittee is in compliance with its CAWMP, and (c) there is at least one (1) foot of structural freeboard.

   In addition to the above requirements, for new and expanding farms with lagoon and storage pond designs completed after September 1, 1996, storage must also be provided for the heavy rainfall factor for the lagoons/storage pond. In case of lagoons/storage ponds in series that are gravity fed, the 25-year, 24-hour storm event and/or the heavy rainfall factor storage requirement for the system may be designed into the lowest lagoon/storage pond in the system. However, adequate freeboard must be designed into the upper lagoons/storage ponds to allow sufficient storage to prevent the waste level from rising into the structural freeboard while the storm water is draining into the lowest lagoon in the system.

3. Any containment basin, such as a lagoon or a storage pond, used for waste management shall continue to be subject to the conditions and requirements of this General Permit until properly closed. When the containment basin is properly closed in accordance with the "Natural Resource Conservation Service (NRCS) North Carolina Standard for Closure of Waste Impoundments," March 2002 or any subsequent amendment, the containment basin shall not be subject to the requirements of this General Permit. The Permittee must submit a letter to the Division to request rescission of the COC by providing documentation of closure of all containment basins.

   Closure shall also include a minimum of 24 hours pre-notification of the Division and submittal of the Animal Waste Storage Pond and Lagoon Closure Report Form to the address identified on the form within fifteen (15) days of completion of closure.

4. This General Permit allows for the distribution of up to four cubic yards of manure per visit to individuals for personal use. The Permittee provide the recipient(s) with information on the nutrient content of the manure. Distribution of greater quantities must be to individuals or businesses permitted to distribute the waste, or to be land applied to sites identified in the Permittee's CAWMP.

5. The Permittee must inform the recipient(s) of his/her responsibilities to properly manage the land application of manure. Record keeping for the distribution of manure up to four (4) cubic yards per visit to individuals for personal use is not required.

6. The annual permit fee shall be paid by the Permittee within thirty (30) days after being billed by the Division. Failure to pay the fee accordingly constitutes grounds for revocation of its COC to operate under this General Permit.

7. Failure of the Permittee to maintain, in full force and effect, lessee and landowner agreements, which are required in the CAWMP, shall constitute grounds for revocation of its COC to operate under this General Permit.

8. A COC to operate under this General Permit is not transferable. In the event there is a desire for the facility to change ownership, or there is a name change of the Permittee, a Notification of Change of Ownership form must be submitted to the Division, including documentation from the parties involved and other supporting materials as may be appropriate. This request will be considered on its merits and may or may not be approved.

9. A COC to operate under this General Permit is effective only with respect to the nature and volume of wastes described in the application and other supporting data. The Permittee shall notify the Division immediately of any applicable information not provided in the permit application.

10. If the Permittee wishes to continue an activity regulated by this General Permit after the expiration date of this General Permit, the Permittee must apply for and obtain a new COC. Renewal applications must be filed at least 180 days prior to the expiration of the General Permit.

11. The issuance of a COC to operate under this General Permit does not prohibit the Division from reopening and modifying the General Permit or COC, revoking and reissuing the General Permit or COC, or terminating the General Permit or COC as allowed by the appropriate laws, rules, and regulations.

12. The Director may require any person, otherwise eligible for coverage under this General Permit, to apply for an individual permit by notifying that person that an application is required.

13. The Groundwater Compliance Boundary is established by 15A NCAC 2L and 15A NCAC 2H .0225. An exceedance of Groundwater Quality Standards at or beyond the Compliance Boundary is subject to the requirements of 15A NCAC 2L and the Division in addition to the penalty provisions applicable under the North Carolina General Statutes.

VI. PENALTIES

1. Failure to abide by the conditions and limitations contained in this General Permit; the facility's COC; the facility's CAWMP; and/or applicable state law; may subject the Permittee to an enforcement action by the Division including but not limited to the modification of the animal waste management system, civil penalties, criminal penalties and injunctive relief.

2. The Permittee must comply with all conditions of this General Permit. Any permit noncompliance constitutes a violation of state law and is grounds for enforcement action; for permit coverage termination, revocation and reissuance, or modification; or denial of a permit coverage renewal application.

3. It shall not be a defense for a Permittee in an enforcement action to claim that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this General Permit.

VII. DEFINITIONS

25-year, 24-hour rainfall or storm event means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years, as defined by the National Weather Service in Technical Paper Number 40, "Rainfall Frequency Atlas of the United States," May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom.

Agronomic rates means the amount of animal waste and/or other nutrient sources to be land applied to lands as contained in the nutrient management standard of the USDA Soil Conservation Service Technical Guide Section IV or as recommended by the North Carolina Department of Agriculture and Consumer Services and the North Carolina Cooperative Extension Service at the time of certification of the Animal Waste Management Plan by the appropriate technical specialist.

Amendment to the CAWMP means a change and/or addition to a part(s) of the plan, and requires that the change and/or addition adhere to current applicable standards. The following are examples of amendments to the CAWMP:

- In an existing CAWMP, a change in crops and/or cropping pattern that utilizes 25% or less of the N generated is considered a plan amendment. Additional acreage needed to facilitate the change in crops and/or cropping pattern is permissible and considered part of the amendment.

- The addition of winter crops and/or interseeded perennial crops are considered amendments to an existing CAWMP when the operation does not require additional acreage and/or crops for N utilization, and does not exceed the 25% criteria stated above.

- When a CAWMP cannot meet N utilization requirements due to land lost to irrigation inefficiency (usable versus total acres), then the CAWMP may be amended to increase available acreage and/or change the crop for N utilization. This is the only exception to the 25% N criteria for plan revision.

- Inclusions of emergency action plans, and insect, odor and mortality checklists are considered CAWMP amendments.

- Including additional acreage for land application beyond what is required in the existing CAWMP is considered a plan amendment.

Animal feeding operation means a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of forty five (45) days or more in any twelve (12) month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Two or more animal feeding operations under common ownership are considered to be a single animal feeding operation if they adjoin each other, or if they use a common area or system for the disposal of wastes.

Ditch means any man made channel for the purpose of moving water off a site to the surface waters.

Excessive Ponding means any area of the application field where visible liquid waste is ponded on the surface of the land application site more than four (4) hours following the application of waste. Excessive ponding also means any areas where the ponding of waste has resulted in crop failure.

Groundwaters means any subsurface waters, as defined in 15A NCAC 2L .0102.

Land application means the application of wastewater and/or waste solids onto or incorporation into the soil.

Major changes to the CAWMP means changes in the number of animals, type of operation (feeder to finish to wean to feeder), retrofit of a lagoon, installation of a new irrigation system, and similar type changes. Recertification is only required for major changes to the CAWMP. Major changes to a facility must first be approved by DWQ. The new CAWMP and the certification shall be submitted with a request that the COC be amended to reflect the changes. The facility may not make the changes until a new or amended COC has been issued.

Revision to the CAWMP means a change to an entire CAWMP to meet current applicable standards. A CAWMP must be revised if the operation cannot utilize all N nitrogen generated by the animal production in accordance with the existing CAWMP, except for the specific conditions noted in the CAWMP amendment criteria as previously defined. For an existing CAWMP, a change in crops and/or cropping pattern that utilizes more than 25% of the N generated by the operation is considered a plan revision. Any change to an existing CAWMP, whether an amendment or revision, must be signed and dated by both the producer and a technical specialist for the new CAWMP to be valid. A revision of the CAWMP does not require recertification.

State Waters means all surface waters, wetlands, groundwaters and waters of the United States located in the State.

Surface Waters means any stream, river, brook, swamp, lake, sound, tidal estuary, bay, creek, reservoir, waterway, or other surface body or surface accumulation of water, whether public or private, or natural or artificial, that is contained in, flows through, or borders upon any portion of the State of North Carolina, including any portion of the Atlantic Ocean over which the State has jurisdiction as well as any additional Waters of the United States which are located in the State.

Waste means manure, animal waste, process wastewater and/or sludge generated at an animal feeding operation.

Wetlands means areas that are inundated or saturated by an accumulation of surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions, as defined in 15A NCAC 2B .0202.

This General Permit issued the XXth day of XXX, 2004.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

_____, Director

Alan W. Klimek, P.E.
North Carolina Division of Water Quality
By Authority of the Environmental Management Commission

Permit Number AWG200000

NORTH CAROLINA
ENVIRONMENTAL MANAGEMENT COMMISSION
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

POULTRY WASTE MANAGEMENT SYSTEM GENERAL PERMIT

This General Permit is issued pursuant to North Carolina General Statutes 143-215 et seq., may apply to any poultry facility in the State of North Carolina, and shall be effective from October 1, 2004 until September 30, 2009.

All activities authorized herein shall be consistent with the terms and conditions of this General Permit.

Holders of Certificates of Coverage (COC) under this General Permit shall comply with the following specified conditions and limitations.

I. PERFORMANCE STANDARDS

1. Any discharge of waste that reaches surface waters or wetlands is prohibited except as otherwise provided in this General Permit and associated statutory and regulatory provisions. Waste shall not reach surface waters or wetlands by runoff, drift, manmade conveyance, direct application, direct discharge or through ditches not otherwise classified as state waters.

   The waste collection, treatment, storage and application system operated under this General Permit shall be effectively maintained and operated as a non-discharge system to prevent the discharge of pollutants to surface waters or wetlands. Application of waste to terraces and grassed waterways is acceptable as long as it is applied in accordance with Natural Resources Conservation Service (NRCS) Standards and does not result in a discharge of waste to surface waters or wetlands.

   Facilities must be designed, constructed and operated to contain all waste plus the runoff from a 25-year, 24-hour rainfall event for the location of the facility. A facility that has a discharge of waste that results because of a storm event more severe than the 25-year, 24-hour storm will not be considered to be in violation of this General Permit if the facility is in compliance with its Certified Animal Waste Management Plan (CAWMP) and this General Permit.

   Any discharge or application of waste to a ditch that drains to surface waters or wetlands is prohibited except as follows: (a) discharges from the ditches are controlled by best management practices (BMPs) designed in accordance with NRCS standards; (b) the BMPs have been submitted to and approved by the Division of Water Quality (Division); (c) the BMPs were implemented as designed to prevent a discharge to surface waters or wetlands; (d) the waste was removed immediately from the ditch upon discovery; and (e) the event was documented and reported in accordance with Part III.13. of this General Permit. Nothing in this exception shall excuse a discharge to surface waters or wetlands except as may result because of rainfall from a storm event more severe than the 25-year, 24-hour storm.

2. No discharge of waste shall result in a violation of the water quality standards established for the receiving waters as per Title 15A, Subchapter 2B, Section .0200 of the North Carolina Administrative Code and Title 15A, Subchapter 2L of the North Carolina Administrative Code.

3. The facility's COC and its CAWMP are hereby incorporated by reference into this General Permit. The CAWMP must be consistent with all applicable laws, rules, ordinances, and standards (federal, state and local) in effect at the time of siting, design and certification of the facility.

   The Permittee must assess, on an ongoing basis, the effectiveness of the implementation of the CAWMP. The Permittee must make "major changes," "revisions," or "amendments" to the CAWMP, as defined in Section VII, "Definitions," of this Permit, in order to address any changes needed to maintain compliance with the facility's COC and this General Permit. "Major changes," "revisions," and "amendments" to the CAWMP must be documented, dated, and included as part of the CAWMP. "Major changes" and "revisions" to the CAWMP shall be submitted to the appropriate Division Regional Office within thirty (30) calendar days of the "major change" or "revision." "Amendments" are not required to be submitted to the Division Regional Office unless specifically requested by the Division. If field, riser or pull numbers are changed, an explanation shall also be submitted and include a description of how the new numbers relate to the old numbers.

   Any violation of the COC or the CAWMP shall be considered a violation of this General Permit and subject to enforcement actions. A violation of this General Permit may result in the Permittee having to take immediate or long-term corrective action(s) as required by the Division. These actions may include but are not limited to: modifying the CAWMP; ceasing land application of waste; removing animals from the facility; or the COC being reopened and modified, revoked and reissued, and/or terminated.

4. Any proposed increase or modification to the annual average design capacity from that authorized by the COC will require a modification to the CAWMP and the COC prior to modification of the facility.

5. During the period of this General Permit, the Division of Water Quality may notify the permittee to conduct an evaluation of the facility and its CAWMP to determine the facility's ability to comply with the NRCS nutrient management standard as it relates to phosphorous. The Division will make its decision as whether to notify permittees based on experience gained through the NPDES permit implementation. This evaluation will not be required until such time as the permittee is notified to conduct the evaluation by the Division of Water Quality. The evaluation must be documented on forms supplied by or approved by the Division and must be submitted to the Division. This evaluation must be completed by existing facilities within twelve (12) months of receiving notification from the Division.

   No COC will be issued to any new or expanding facility to operate under this General Permit until the applicant has completed and submitted a phosphorous loss assessment to determine if the new or expanding facility can comply with the NRCS phosphorous standards. This assessment shall not be a basis for denial of a COC to operate under this permit unless that demonstration of compliance is a Statutory requirement for COC issuance.

6. If prior approval is received from the Director of the Division of Water Quality (Director), facilities which have been issued a COC to operate under this General Permit may add treatment units for the purpose of removing pollutants before the waste is discharged into the lagoons/storage ponds. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the new treatment unit will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

7. If prior approval is received from the Director, facilities which have been issued a COC to operate under this General Permit may add innovative treatment processes to the systems on a pilot basis in order to determine if the innovative treatment process will improve how the waste is treated and/or managed. Prior to any approval, the Permittee must demonstrate to the satisfaction of the Director that the innovative treatment process will not interfere with the operation of the existing treatment system and that a process is in place to properly manage and track the pollutants removed.

8. For all new and expanding operations, no collection, treatment or storage facilities may be constructed in a 100-year flood plain.

9. Animal waste shall not be applied within 100 feet of any well with the exception of monitoring wells. The allowable distance to monitoring wells shall be established on a case by case basis by the Division.

II. OPERATION AND MAINTENANCE REQUIREMENTS

1. The collection, treatment, and storage facilities, and the land application equipment and fields shall be properly operated and maintained at all times.

2. A vegetative cover shall be maintained as specified in the facility's CAWMP on all land application fields and buffers in accordance with the CAWMP. No waste shall be applied upon areas not included in the CAWMP.

3. Soil pH on all land application fields must be maintained in the optimum range for crop production.

4. Land application rates shall be in accordance with the CAWMP. In no case shall land application rates exceed the agronomic rate of the nutrient of concern for the receiving crop. In no case shall land application rates result in excessive ponding or any runoff during any given application event.

5. Animal waste shall not be directly applied onto crops for direct human consumption that do not undergo further processing (e.g., strawberries, melons, lettuce, cabbage, apples, etc.) at any time during the growing season, or in the case of fruit bearing trees, following breaking dormancy. Application of animal wastes shall not occur within thirty (30) days of the harvesting of fiber and food crops for direct human consumption that undergoes further processing.

6. If manure or sludges are applied on conventionally tilled bare soil, the waste shall be incorporated into the soil within two (2) days after application on the land. This requirement does not apply to no-till fields, pastures, or fields where crops are actively growing.

7. Pesticides, toxic chemicals and petroleum products shall not be disposed of in the animal waste collection, treatment, storage or application systems.

8. Domestic and/or industrial wastewater from showers, toilets, sinks, etc. shall not be discharged into the animal waste collection, treatment, storage and application system. Washdown of stock trailers owned by and used to transport animals to and from the facility only, will be permissible as long as the system has been evaluated and approved to accommodate the additional volume. Only those cleaning agents and soaps that are EPA approved according to their label, will not harm the cover crop, and will not contravene the groundwater standards listed in 15A NCAC 2L may be utilized in facilities covered by this General Permit. Instruction labels are to be followed when using cleaning agents and soaps.

9. Disposal of dead animals resulting from normal mortality rates associated with the facility shall be done in accordance with the facility's CAWMP and the North Carolina Department of Agriculture and Consumer Services (NCDA&CS) Veterinary Division's Statutes and regulations.

   Disposal of dead animals whose numbers exceed normal mortality rates associated with the facility shall also be done in accordance with the facility's CAWMP and NCDA&CS Veterinary Division's Statutes and regulations provided that: 1) burial of such animals shall be done in consultation with the State Veterinarian of the NCDA&CS Veterinary Division's Statutes and in compliance with NCDA&CS regulations; 2) all such burial sites must be mapped, and the dates and numbers of the animals buried by type must be recorded; and 3) the map is submitted to the appropriate Regional Office Groundwater Section within fifteen (15) calendar days of burial.

   In the event of a state of emergency declared by the Governor, disposal of dead animals shall be done in accordance with requirements and guidelines dictated by the State Veterinarian according G.S. §106-339.4. The Division may require groundwater monitoring when there is massive burial of animals. All burial sites of such animals must be mapped, and the dates and numbers of the animals buried by type must be recorded.

10. Unless accounted for in temporary storage volume, all uncontaminated runoff from the surrounding property and buildings shall be diverted away from the waste lagoons/storage ponds to prevent any unnecessary addition to the liquid volume in the structures.

11. A protective vegetative cover shall be established and maintained on all earthen lagoon/storage pond embankments (outside toe of embankment to maximum pumping elevation), berms, pipe runs, and diversions to surface waters or wetlands. Trees, shrubs, and other woody vegetation shall not be allowed to grow on the lagoon/storage pond embankments. All trees shall be removed in accordance with good engineering practices. Lagoon/storage pond areas shall be accessible, and vegetation shall be kept mowed.

12. At the time of sludge removal from a lagoon/storage pond, the sludge must be managed in accordance with the CAWMP. When removal of sludge from the lagoon is necessary, provisions must be taken to prevent damage to the lagoon dikes and liner.

13. Lagoons/storage ponds shall be kept free of foreign debris including, but not limited to, tires, bottles, light bulbs, gloves, syringes or any other solid waste.

14. The facility must have at least one of the following items at all times: (a) adequate animal waste application and handling equipment, (b) a lease, or other written agreement, for the use of the necessary equipment, or (c) a contract with a third party applicator capable of providing adequate waste application.

15. The Permittee shall designate a certified animal waste management system operator with a valid certification to be in charge of the animal waste management system. The waste management system shall be operated by the OIC or a person under the OIC's supervision.

16. In accordance with 15A NCAC 8F .0203(b)(2), the Operator in Charge (OIC) or a designated back-up OIC of a Type A Animal Waste Management System shall inspect, or a person under the supervision of an OIC or designated back-up OIC shall inspect, the land application site as often as necessary to insure that the animal waste is land applied in accordance with the CAWMP. In no case shall the time between inspections be more than 120 minutes during the application of waste. A record of each inspection shall be recorded on forms supplied by, or approved by, the Division and shall include the date, time, sprayfield number and name of the operator for each inspection.

The Permittee may assert as an affirmative defense in any enforcement action alleging noncompliance with the requirements imposed in this condition that such noncompliance was due to circumstances beyond the Permittee's control. A notation shall be made on the form indicating the inspection affected by such circumstance and an explanation setting forth the circumstances claimed to have been beyond the Permittee's control shall be submitted with the form.

17. The Director may require any permittee to install, operate and maintain devices on all irrigation pumps/equipment designed to automatically stop irrigation activities during precipitation. This decision will be based on the facility's compliance history for irrigation events.

18. The Director may require any permittee to install and operate flow meters with flow totalizers based on the facility's violations and/or incomplete or incorrect record keeping events.

19. No waste shall be applied in wind conditions that might reasonably be expected to cause the mist to reach surface waters or wetlands.

20. The Permittee shall maintain buffer strips or other equivalent practices as specified in the facility's CAWMP near feedlots, manure storage areas and land application areas.

21. Waste shall not be applied on land that is flooded, saturated with water, frozen or snow covered at the time of land application.

22. Land application of waste is prohibited during precipitation events. The Permittee shall consider pending weather conditions in making the decision to land apply waste and shall document the weather conditions at the time of land application on forms supplied by or approved by the Division.

23. Land application activities shall cease on any application site that exceeds a Mehlich 3 Soil Test Index for Copper of greater than 3,000 (108 pounds per acre) or Zinc of greater than 3,000 (213 pounds per acre).

24. All waste application equipment must be tested and calibrated once in the first two years after issuance of the COC and then at least once every two years thereafter. The results must be documented on forms provided by, or approved by, the Division.

25. Any major structural repairs to lagoons/storage ponds must have written documentation from a technical specialist certifying proper design and installation. However, if a piece of equipment is being replaced with a piece of equipment of the identical specifications, no technical specialist approval is necessary [i.e. piping, reels, valves, pumps (if the gallons per minute (gpm) capacity is not being increased or decreased), etc.] unless the replacement involves disturbing the lagoon/storage pond embankment.

26. Crops for which animal waste is land applied must be removed from the land application site and properly managed and utilized unless other management practices are approved in the CAWMP.

III. MONITORING AND REPORTING REQUIREMENTS

1. An inspection of the waste collection, treatment, and storage structures, and runoff control measures shall be conducted and documented at a frequency to insure proper operation but at least monthly and after all storm events of greater than one (1) inch in 24 hours. For example, lagoons/storage ponds, and other structures should be inspected for evidence of erosion, leakage, damage by animals or discharge.

2. Monitoring and Recording Freeboard Levels

a. Highly visible waste-level gauges shall be maintained to mark the level of waste in each lagoon/storage pond that does not gravity feed through a free flowing transfer pipe into a subsequent structure. The gauge shall have readily visible permanent markings.

The waste level in each lagoon with a waste level gauge shall be monitored and recorded weekly on forms supplied by or approved by the Division.

The Director may require more frequent monitoring and recording on lagoon levels based on the facility's compliance history for freeboard violations.

b. The freeboard levels of lagoons serving any facility which experiences freeboard violations in any two consecutive years following the issuance of this General Permit, or as determined necessary by the Director, shall be monitored and recorded as follows:

In addition to the facility's existing lagoon waste-level gauges, automated lagoon/storage pond waste-level monitors and recorders (monitored and recorded at least hourly) must be installed on all treatment and storage lagoons covered by a COC issued under this General Permit to measure and record lagoon freeboard. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer's operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following notification from the Director. The Director may determine that installation of automated waste level monitors is not required if the Permittee can demonstrate that preventative measures were taken to avoid the violations and that the violations resulted from conditions beyond the permittee's control.

If an automated level monitor(s) becomes inoperable, the Permittee shall:

i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than 24 hours following first knowledge of the problem; and,

ii. make any needed repairs to the equipment as quickly as possible, and take and record daily lagoon levels at the same time every day until such time as the automated equipment is placed back into operation.

c. The Director may require new or modified waste-level gauges at any facility if he determines that the existing gauges are not adequate to accurately indicate actual lagoon levels, or the various lagoon levels required to be maintained by this General Permit or the facility's CAWMP.

3. Monitoring and Recording Precipitation Events

a. Precipitation events at facilities issued a COC to operate under this General Permit shall be monitored and recorded as follows:

A rain gauge must be installed at a site that is representative of the weather conditions at the farm's land application site(s) to measure all precipitation events. The precipitation type and amount must be recorded daily for all precipitation events and maintained on site for Department review. Daily records do not need to be maintained for those days without precipitation events.

b. The Director may require that an automated rain gauge and recorder must be installed on site to measure and record all precipitation events. This equipment must be properly maintained and calibrated in a manner consistent with manufacturer's operation and maintenance recommendations. This automated equipment must be in place no later than ninety (90) days following receipt of notice from the Director.

If an automated rain gauge(s) becomes inoperable, the Permittee shall:

i. report the problem by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty four (24) hours following first knowledge of the problem; and,

ii. make any needed repairs to the equipment as quickly as possible, and take and record all rainfall events until such time as the automated equipment is placed back into operation.

4. A representative Standard Soil Fertility Analysis, including pH, phosphorus, copper, and zinc, shall be conducted on each application field receiving animal waste in accordance with NCGS 143-215.10C(e)(6). As of the effective date of this General Permit, the Statute requires that the analysis be conducted at least annually.

5. An analysis of the animal waste shall be conducted in accordance with recommended laboratory sampling procedures as close to the time of application as practical and at least within sixty (60) days (before or after) of the date of application. Every reasonable effort shall be made to have the waste analyzed prior to the date of application and as close to the time of waste application as possible. This analysis shall include the following parameters:

Nitrogen	Zinc
Phosphorus	Copper

6. The Permittee shall record all irrigation and land application event(s) including hydraulic loading rates, nutrient loading rates and cropping information. The Permittee shall also record removal of solids and document nutrient loading rates if disposed on-site or record the off-site location(s). These records must be on forms supplied by, or approved by, the Division.

7. A record shall be created and maintained of all transfers of waste between lagoons/storage ponds on the same site not typically operated in series. Such record shall include at least the identity of the lagoon from which the waste was transferred, the identity of the lagoon receiving the waste, the date and time of transfer and the total volume of waste transferred.

8. The Permittee must maintain monthly stocking records for the facility and make the records available to Department of Environment and Natural Resources (Department).

9. If, for any reason, there is a discharge from the waste collection, treatment, storage and application systems (including the land application sites), to surface waters or wetlands, the Permittee is required to make notification in accordance with Condition III. 13. The discharge notification shall include the following information:

a. Description of the discharge: A description of the discharge including an estimate of the volume discharged, a description of the flow path to the receiving surface waters or wetlands and a site sketch showing the path of the waste. Also, an estimation of the volume discharged.

b. Time of the discharge: The length of time of the discharge, including the exact dates and times that it started and stopped, and if not stopped, the anticipated time the discharge is expected to continue.

c. Cause of the discharge: A detailed statement of the cause of the discharge. If caused by a precipitation event, detailed information from the on-site rain gauge concerning the inches and duration of the precipitation event.

d. All steps being taken to reduce, stop and cleanup the discharge. All steps to be taken to prevent future discharges from the same cause.

e. Analysis of the waste: A copy of the last waste analysis conducted as required by Condition III. 5. above.

10. A copy of this General Permit, the facility's COC, certification forms, lessee and landowner agreements, the CAWMP and copies of all records required by this General Permit and the facility's CAWMP shall be maintained by the Permittee in chronological and legible form for a minimum of three (3) years. Records include but are not limited to: soil and waste analyses, rain gauge readings, freeboard levels, irrigation and land application event(s), past inspection reports and operational reviews, animal stocking records, records of additional nutrient sources applied (including but not limited to sludges, unused feedstuff leachate, milk waste, septage and commercial fertilizer), cropping information, waste application equipment testing and calibration, and records of removal of solids to off-site location(s). These records shall be maintained on forms provided or approved by the Division and shall be readily available at the facility (stored at places such as the farm residence, office, outbuildings, etc.) where animal waste management activities are being conducted for the life of this General Permit, unless otherwise specified in this General Permit.

11. Within fifteen (15) working days of receiving the request from the Division, the Permittee shall provide to the Division one (1) copy of all requested information and reports related to the operation of the animal waste management system. Once received by the Division, all such information and reports become public information, unless they constitute confidential information under NC G.S. 132-1.2, and shall be made available to the public by the Division as specified in Chapter 132 of the General Statutes.

12. The Division may require any additional monitoring and reporting (including but not limited to groundwater, surface water or wetland, waste, sludge, soil, lagoon/storage pond levels and plant tissue) necessary to determine the source, quantity, quality, and effect of such waste upon the surface waters, groundwaters or wetlands. Such monitoring, including its scope, frequency, duration and any sampling, testing, and reporting systems, shall meet all applicable Division requirements.

13. Regional Notification:

The Permittee shall report by telephone to the appropriate Division Regional Office as soon as possible, but in no case more than twenty-four (24) hours following first knowledge of the occurrence of any of the following events:

a. Any discharge to ditches, surface waters or wetlands.

b. Any discharge that poses a serious threat to the environment or human safety or health.

c. Failure to maintain storage capacity in a lagoon/storage pond greater than or equal to that required in Condition V. 3. of this General Permit.

d. Over applying waste either in excess of the limits set out in the CAWMP or where runoff enters surface waters or wetlands.

e. Failure of any component of the animal waste collection, treatment, storage and land application system resulting in a discharge to surface waters or wetlands.

f. Any failure of the waste treatment and disposal system that renders the facility incapable of adequately receiving, treating or storing the waste and/or sludge.

g. A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge to surface waters or wetlands.

h. A spill or discharge from a vehicle transporting waste or sludge to the land application field which results in a discharge that poses a serious threat to surface waters or wetlands.

i. Any deterioration or leak in a lagoon/storage pond that poses an immediate threat to the environment or human safety or health.

For any emergency, which requires immediate reporting after normal business hours, contact must be made with the Division of Emergency Management at 1-800-858-0368.

The Permittee shall also file a written report to the appropriate Division Regional Office within five (5) calendar days following first knowledge of the occurrence. This report shall outline the actions taken or proposed to be taken to correct the problem and to ensure that the problem does not recur. The requirement to file a written report may not be waived by the Division Regional Office.

14. The Director may require any permittee to file an annual certification report based on the compliance history of the facility. If required, the report must be filed on forms provided by the Division.

15. The Director may require facilities to submit additional reports and/or certifications based on the facility's compliance history.

16. In the event of a discharge of 1,000 gallons or more of waste to surface waters or wetlands, the Permittee must issue a press release to all print and electronic news media that provide general coverage in the county in which the discharge occurred setting out the details of the discharge. The press release must be issued within forty-eight (48) hours after it is determined that the discharge has reached the surface waters or wetlands. A copy of the press release and a list of the news media to which it was distributed must be kept for at least one (1) year after the discharge and must be distributed to any person upon request.

17. In the event of a discharge of 15,000 gallons or more of animal waste to surface waters or wetlands, a public notice is required in addition to the press release described in Condition III 13. The public notice must be placed in a newspaper having general circulation in the county in which the discharge occurred and the county immediately downstream within ten (10) days of the discharge. The minimum content of the notice is the name of the facility, location of the discharge, estimated volume of waste entering state waters, time and date discharge occurred, duration of the discharge, identification water body that was discharged into including creek and river basin if applicable, actions taken to prevent further discharge, and a facility contact person and phone number.

18. If a discharge of 1,000,000 gallons of wastewater or more reaches surface waters or wetlands, the appropriate Division Regional Office must be contacted to determine in what additional counties, if any, a public notice must be published. A copy of all public notices and proof of publication must be sent to the Division within thirty (30) days of the discharge.

19. All facilities, which are issued a COC to operate under this General Permit, shall conduct a survey of the sludge accumulation in all lagoons within two (2) years of receiving the COC and every year thereafter. This survey shall include but not be limited to a sketch showing the depth of sludge in the various locations within each lagoon. This survey frequency may be reduced if it can be demonstrated to the satisfaction of the Division that the rate of sludge accumulation does not warrant an annual survey.

    If the sludge accumulation is such that it is greater than the volume for which the lagoon was designed or the accumulation reduces the lagoon's minimum treatment volume to less than the volume for that which the lagoon was designed, a sludge removal or management plan must be submitted to the appropriate Division Regional Office within ninety (90) days of the determination. The plan shall describe removal and waste utilization procedures to be used.

IV. INSPECTIONS AND ENTRY

1. The Permittee shall allow any authorized representative of Department, upon the presentation of credentials and other documents as may be required by law and in accordance with reasonable and appropriate biosecurity measures, to:

    a. Enter the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this General Permit;

    b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this General Permit;

    c. Inspect, at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this General Permit; and,

    d. Sample or monitor, at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location.

V. GENERAL CONDITIONS

1. The issuance of a COC to operate under this General Permit shall not relieve the Permittee of the responsibility for compliance with all applicable surface water, wetlands, groundwater and air quality standards or for damages to surface waters, wetlands or groundwaters resulting from the animal operation.

2. The maximum waste level in lagoons/storage ponds shall not exceed that specified in the facility's CAWMP. At a minimum, maximum waste level for lagoons/storage ponds must not exceed the level that provides adequate storage to contain the 25-year, 24-hour storm event plus an additional one (1) foot of structural freeboard except that there shall be no violation of this condition if: (a) there is a storm event more severe than a 25-year, 24-hour event, (b) the Permittee is in compliance with its CAWMP, and (c) there is at least one (1) foot of structural freeboard.

In addition to the above requirements, for new and expanding farms with lagoon and storage pond designs completed after September 1, 1996, storage must also be provided for the heavy rainfall factor for the lagoons/storage pond. In case of lagoons/storage ponds in series that are gravity fed, the 25-year, 24-hour storm event and/or the heavy rainfall factor storage requirement for the system may be designed into the lowest lagoon/storage pond in the system. However, adequate freeboard must be designed into the upper lagoons/storage ponds to allow sufficient storage to prevent the waste level from rising into the structural freeboard while the storm water is draining into the lowest lagoon in the system.

3. Any containment basin, such as a lagoon or a storage pond, used for waste management shall continue to be subject to the conditions and requirements of this General Permit until properly closed. When the containment basin is properly closed in accordance with the "Natural Resource Conservation Service (NRCS) North Carolina Standard for Closure of Waste Impoundments," March 2002 or any subsequent amendment, the containment basin shall not be subject to the requirements of this General Permit. The Permittee must submit a letter to the Division to request rescission of the COC by providing documentation of closure of all containment basins.

   Closure shall also include a minimum of 24 hours pre-notification of the Division and submittal of the Animal Waste Storage Pond and Lagoon Closure Report Form to the address identified on the form within fifteen (15) days of completion of closure.

4. This General Permit allows for the distribution of up to four cubic yards of manure per visit to individuals for personal use. The Permittee provide the recipient(s) with information on the nutrient content of the manure. Distribution of greater quantities must be to individuals or businesses permitted to distribute the waste, or to be land applied to sites identified in the Permittee's CAWMP.

5. The Permittee must inform the recipient(s) of his/her responsibilities to properly manage the land application of manure. Record keeping for the distribution of manure up to four (4) cubic yards per visit to individuals for personal use is not required.

6. The annual permit fee shall be paid by the Permittee within thirty (30) days after being billed by the Division. Failure to pay the fee accordingly constitutes grounds for revocation of its COC to operate under this General Permit.

7. Failure of the Permittee to maintain, in full force and effect, lessee and landowner agreements, which are required in the CAWMP, shall constitute grounds for revocation of its COC to operate under this General Permit.

8. A COC to operate under this General Permit is not transferable. In the event there is a desire for the facility to change ownership, or there is a name change of the Permittee, a Notification of Change of Ownership form must be submitted to the Division, including documentation from the parties involved and other supporting materials as may be appropriate. This request will be considered on its merits and may or may not be approved.

9. A COC to operate under this General Permit is effective only with respect to the nature and volume of wastes described in the application and other supporting data. The Permittee shall notify the Division immediately of any applicable information not provided in the permit application.

10. If the Permittee wishes to continue an activity regulated by this General Permit after the expiration date of this General Permit, the Permittee must apply for and obtain a new COC. Renewal applications must be filed at least 180 days prior to the expiration of the General Permit.

11. The issuance of a COC to operate under this General Permit does not prohibit the Division from reopening and modifying the General Permit or COC, revoking and reissuing the General Permit or COC, or terminating the General Permit or COC as allowed by the appropriate laws, rules, and regulations.

12. The Director may require any person, otherwise eligible for coverage under this General Permit, to apply for an individual permit by notifying that person that an application is required.

13. The Groundwater Compliance Boundary is established by 15A NCAC 2L and 15A NCAC 2H .0225. An exceedance of Groundwater Quality Standards at or beyond the Compliance Boundary is subject to the requirements of 15A NCAC 2L and the Division in addition to the penalty provisions applicable under the North Carolina General Statutes.

VI. PENALTIES

1. Failure to abide by the conditions and limitations contained in this General Permit; the facility's COC; the facility's CAWMP; and/or applicable state law; may subject the Permittee to an enforcement action by the Division including but not limited to the modification of the animal waste management system, civil penalties, criminal penalties and injunctive relief.

2. The Permittee must comply with all conditions of this General Permit. Any permit noncompliance constitutes a violation of state law and is grounds for enforcement action; for permit coverage termination, revocation and reissuance, or modification; or denial of a permit coverage renewal application.

3. It shall not be a defense for a Permittee in an enforcement action to claim that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this General Permit.

VII. DEFINITIONS

25-year, 24-hour rainfall or storm event means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years, as defined by the National Weather Service in Technical Paper Number 40, "Rainfall Frequency Atlas of the United States," May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom.

Agronomic rates means the amount of animal waste and/or other nutrient sources to be land applied to lands as contained in the nutrient management standard of the USDA Soil Conservation Service Technical Guide Section IV or as recommended by the North Carolina Department of Agriculture and Consumer Services and the North Carolina Cooperative Extension Service at the time of certification of the Animal Waste Management Plan by the appropriate technical specialist.

Amendment to the CAWMP means a change and/or addition to a part(s) of the plan, and requires that the change and/or addition adhere to current applicable standards. The following are examples of amendments to the CAWMP:

- In an existing CAWMP, a change in crops and/or cropping pattern that utilizes 25% or less of the N generated is considered a plan amendment. Additional acreage needed to facilitate the change in crops and/or cropping pattern is permissible and considered part of the amendment.

- The addition of winter crops and/or interseeded perennial crops are considered amendments to a existing CAWMP when the operation does not require additional acreage and/or crops for N utilization, and does not exceed the 25% criteria stated above.

- When a CAWMP cannot meet N utilization requirements due to land lost to irrigation inefficiency (usable versus total acres), then the CAWMP may be amended to increase available acreage and/or change the crop for N utilization. This is the only exception to the 25% N criteria for plan revision.

- Inclusions of emergency action plans, and insect, odor and mortality checklists are considered CAWMP amendments.

- Including additional acreage for land application beyond what is required in the existing CAWMP is considered a plan amendment.

Animal feeding operation means a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of forty five (45) days or more in any twelve (12) month period, and (ii) crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. Two or more animal feeding operations under common ownership are considered to be a single animal feeding operation if they adjoin each other, or if they use a common area or system for the disposal of wastes.

Ditch means any man made channel for the purpose of moving water off a site to the surface waters.

Excessive Ponding means any area of the application field where visible liquid waste is ponded on the surface of the land application site more than four (4) hours following the application of waste. Excessive ponding also means any areas where the ponding of waste has resulted in crop failure.

Groundwaters means any subsurface waters, as defined in 15A NCAC 2L .0102.

Land application means the application of wastewater and/or waste solids onto or incorporation into the soil.

Major changes to the CAWMP means changes in the number of animals, type of operation (feeder to finish to wean to feeder), retrofit of a lagoon, installation of a new irrigation system, and similar type changes. Recertification is only required for major changes to the CAWMP. Major changes to a facility must first be approved by DWQ. The new CAWMP and the certification shall be submitted with a request that the COC be amended to reflect the changes. The facility may not make the changes until a new or amended COC has been issued.

Revision to the CAWMP means a change to an entire CAWMP to meet current applicable standards. A CAWMP must be revised if the operation cannot utilize all N nitrogen generated by the animal production in accordance with the existing CAWMP, except for the specific conditions noted in the CAWMP amendment criteria as previously defined. For an existing CAWMP, a change in crops and/or cropping pattern that utilizes more than 25% of the N generated by the operation is considered a plan revision. Any change to an existing CAWMP, whether an amendment or revision, must be signed and dated by both the producer and a technical specialist for the new CAWMP to be valid. A revision of the CAWMP does not require recertification.

State Waters means all surface waters, wetlands, groundwaters and waters of the United States located in the State.

Surface Waters means any stream, river, brook, swamp, lake, sound, tidal estuary, bay, creek, reservoir, waterway, or other surface body or surface accumulation of water, whether public or private, or natural or artificial, that is contained in, flows through, or borders upon any portion of the State of North Carolina, including any portion of the Atlantic Ocean over which the State has jurisdiction as well as any additional Waters of the United States which are located in the State.

Waste means manure, animal waste, process wastewater and/or sludge generated at an animal feeding operation.

Wetlands means areas that are inundated or saturated by an accumulation of surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions, as defined in 15A NCAC 2B .0202.

This General Permit issued the XXth day of XXX, 2004.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

_____, Director

Alan W. Klimek, P.E.
North Carolina Division of Water Quality
By Authority of the Environmental Management Commission

Permit Number AWG300000

FORM FRBD-1

Attachment 7

Waste Structure Freeboard and Daily Precipitation Record

Farm Owner

Operator

Facility Number -

Date (mm/dd/yy)	**Waste Structure Freeboard (inches) #	#	#	#	#	#	*Precipitation (inches)	Initials

FORM IRR-1

Lagoon Liquid Irrigation Fields Record
For Recording Irrigation Events on Different Fields

Farm Owner _____

Operator _____

Facility Number _____ - _____

Attachment 7

Tract & Field #	Date (mm/dd/yr)	Crop Type	Field Size (acres)	Irrigation Time			# Sprinklers Operating	Operator Initials	*Weather Code	**Inspections (initials)
				Start Time	End Time	Total Minutes				

* Weather Codes: C-Clear, PC-Partly Cloudy, Cl-Cloudy, R-Rain, S-Snow/Sleet, W-Windy

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** Persons completing the irrigation inspections must initial to signify that inspections were completed at least every 120 minutes.

Note: If conditions beyond the permittee's control have caused noncompliance with the CAWMP or permit, explain on reverse.

FORM IRR-2

Lagoon Liquid Irrigation Fields Record
One Form for Each Field per Crop Cycle

Hydrant # _____ Field # _____

Facility Number _____ - _____

Field Size (wetted acres) = **(A)** _____

Farm Owner _____

Owner's Address _____

Owner's Phone # _____

Irrigation Operator _____

Irrigation Operator's Address _____

Operator's Phone # _____

From Waste Utilization Plan

Crop Type _____

Recommended PAN _____

Loading (lb/acre) = **(B)** _____

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Irrigation									
***Nutrient Source	Date (mm/dd/yr)	Start Time	End Time	Total Minutes (3) - (2)	# of Sprinklers Operating	Flow Rate (gal/min)	Total Volume (gallons) (6) x (5) x (4)	Volume per Acre (gal/acre) (7) / **(A)**	Waste Analysis PAN* (lb/1000 gal)	PAN Applied (lb/acre) (8) x (9) / 1000	Nitrogen Balance** (lb/acre) (B) - (10) B=
Crop Cycle Totals											

Owner's Signature _____

Certified Operator (Print) _____

Operator's Signature _____

Operator's Certification No. _____

* NCDA Waste Anaylsis or Equivalent. At a minimum, waste analysis is required within 60 days of land application events.

** Enter the value received by subtracting column (10) from **(B)**. Continue subtracting column (10) from column (11) following each irrigation event.

***Enter nutrient source (ie. Lagoon/Storage Pond ID, commerical fertilizer, dry litter, etc.)

3/14/03

Attachment 7

FORM SLUR-1

Slurry and Sludge Application Field Record
For Recording Slurry Applicaton Events on Different Fields

Farm Owner _____ Facility Number _____ - _____

Spreader Operator _____

Tract & Field #	Date (mm/dd/yr)	***Weather Code	Crop Type	Field Size (acres)	Application Method*	Number of Loads per Field	Volume of each Load** (gallons)

Attachment 7

* SI = soil incorporated (disked); BR = broadcast (surface applied).

** Can be found in operator's manual for the spreader. Contact a local dealer if you do not have your owner's manual.

*** Weather Codes: C-Clear, PC-Partly Cloudy, CI-Cloudy, R-Rain, S-Snow/Sleet, W-Windy

3/14/03

FORM SLUR-2

Slurry and Sludge Application Field Records
One Form for Each Field per Crop Cycle

Tract #

Field Size(Wetted Acres)=**(A)**

Farm Owner

Owner's Address

Owner's Phone #

Field #

Facility Number -

Spreader Operator

and Address

Operator's Phone #

From Animal Waste Management Plan

Crop Type

Recommended PAN Loading (lb/acre) = **(B)**

(1) ****Nutrient Source	(2) Date (mm/dd/yr)	(3) Number of Loads per Field	(4) Volume of each Load* (gallons)	(5) Total Volume (gallons) (2) x (3)	(6) Volume per Acre (gallons/acre) (4) / (A)	(7) Waste Analysis PAN** (lb/1000 gal)	(8) PAN Applied (lb/acre) (6) x (5) / 1000	Nitrogen Balance*** (lb/acre) (B) - (7) B=
Crop Cycle Totals:								

Owners Signature _____

Certified Operator (print) _____

Spreader Operator's Signature _____

Operator Certification No. _____

* Can be found in operator's manual for the spreader. Contact a local dealer if you do not have your owner's manual.
** See your waste management plan for sampling frequency. At a minimum, waste analysis is required within 60 days of land application events.
***Enter the value received by subtracting column (7) from (B). Continue subtracting column (7) from column (8) following each application event.
***Enter nutrient source (ie. Lagoon/Storage Pond ID, commerical fertilizer, dry litter, etc.)

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Attachment 7

FORM SOLID-1

Manure Solids Application Field Record
For Recording Manure Solids Applicaton Events on Different Fields

Farm Owner _____

Spreader Operator _____

Facility Number _____ - _____

Attachment 7

Tract & Field #	Date (mm/dd/yr)	***Weather Code	Crop Type	Field Size (acres)	Application Method*	Number of Loads per Field	Volume of each Load** (tons)

* SI = soil incorporated (disked); BR = broadcast (surface applied).

** Can be found in operator's manual for the spreader. Contact a local dealer if you do not have your owner's manual.

*** Weather Codes: C-Clear, PC-Partly Cloudy, CI-Cloudy, R-Rain, S-Snow/Sleet, W-Windy

3/14/03

FORM SOLID-2

Manure Solids Application Field Records
One Form for Each Field per Crop Cycle

Attachment 7

Tract #		Field #	
Field Size (Acres) = **(A)**		Facility Number	-
Farm Owner		Spreader Operator	
Owner's Address		and Address	
Owner's Phone #		Operator's Phone #	

From Animal Waste Management Plan

Crop Type		Recommended PAN Loading (lb/acre) = **(B)**	

(1) ****Nutrient Source	Date (mm/dd/yr)	(2) Number of Loads per Field	(3) Weight of each Load* (tons)	(4) Total Weight (tons) (2) x (3)	(5) Weight per Acre (tons/acre) (4) / **(A)**	(6) Waste Analysis PAN** (lb/ton)	(7) PAN Applied (lb/acre) (6) x (5)	(8) Nitrogen Balance*** (lb/acre) (B) - (7) B=
Crop Cycle Totals:								

Owners Signature _____ Spreader Operator's Signature _____

Certified Operator (print) _____ Operator Certification No. _____

* Can be found in operator's manual for the spreader. Contact a local dealer if you do not have your owner's manual.
** See your waste management plan for sampling frequency. At a minimum, waste analysis is required within 60 days of land application events.
***Enter the value received by subtracting column (7) from (B). Continue subtracting column (7) from column (8) following each application event.
***Enter nutrient source (ie. Lagoon/Storage Pond ID, commerical fertilizer, dry litter, etc.)

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FORM STOCK-1

Average Stocking and Mortality Record

Farm Owner

Facility Number -

Operator

*Date (mm/dd/yyyy)	(1) Previous Stocked #	(2) Placement Stocked #	(3) Stock Shipped #	(4) Mortality #	(5) **Total Stock #	(6) ***Average Stock #	(7) ****Average Mortality #

Attachment 7

* At a minimum, records must be kept monthly.

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** Total Stocked (5): equals (1) + (2) - (3) - (4)

*** Average Stocked (6): Add previous 12 months of Total Stocked (5) and divide by # of entries.

**** Average Mortality (7): Add previous 12 months Mortality (4) and divide by # of entries.

FORM TRAN-1

Animal Waste Transfer Record
Record Each Transfer of Waste Between Lagoons or Third Party

Facility Number [ ] - [ ]

Farm Owner		Irrigation Operator	
Owner's Address		Irrigation Operator's Address	
Owner's Phone #		Operator's Phone #	

Date	Time	Nutient Analysis	Transfer From (lagoon ID)	Transfer To (lagoon ID or third party)	*Volume Transferred	**Third Party Information		
						Permit #	Name	Phone #

Attachment 7

*Volume Transferred must be recorded in gallons, tons, or cubic yards.

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**Third Party must be provided with nutrient analysis.

Waste Transfers over 4 cubic yards must be accepted by a permitted facility or a field in the permittee's WUP.

FORM CROP-1

CROP YIELD RECORD

Farm Owner

Operator

Facility Number -

Date (mm/dd/yyyy)	Field/Pull ID	Crop	(1) Yield (Bales or Bushels)	Bale Size (if applicable)	(2) Field/Pull Size (wetted acres)	(3) *Yield per Acre (Bale or Bushel/Ac)

Attachment 7

* (3) Yield/Acre = (1) Yield divided by (2) Field/Pull Size. (3)=(1)/(2)

3/14/03

March 25, 2004 ERC Meeting
EXHIBIT K

Report on the Activities and Recommendations of the Chronic Rainfall Working Group

NC Division of Water Quality
March 25, 2004

Introduction

- The Chronic Rainfall Working group was established to resolve issues related to NOVs and NODs due to freeboard violations during chronic rainfall conditions
- The working group was convened under the direction of the ERC

Background

- In April 2003, DWQ issued approximately 385 Notices of Violation (NOV) to animal facilities with high freeboard levels
- A June 25, 2003 memo from Secretary Ross (DENR) initiated a working group to resolve the issue of high freeboard enforcement during chronic rainfall events
- The Chronic Rainfall Working Group met five times between October 28, 2003 and March 15, 2004

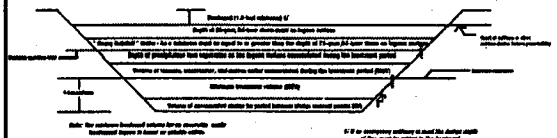
Working Group Stakeholders

DWQ	NCSU
DENR	NC Climate Office
Murphy-Brown	NC Environmental Defense
Goldsboro Hog Farm	Frontline Farmers
Coharie Farms	NC Sierra Club
Prestage Farms	Waterkeeper Alliance
NC Pork Council	Southern Environmental Law Center
NC Farm Bureau	Alliance for a Responsible Swine Industry
NCDA&CS	

Major Discussion Items

- Lagoon Design
- DWQ Enforcement guidance utilized after Secretary Ross' memo
- Conditions in the DWQ guidance

Lagoon Design



DWQ Enforcement Guidance

- DWQ enforcement guidance implemented after the Secretary's memo was similar to what would satisfy the working group process
- This guidance included a review of records and contained the possibility for issuance of a NOD
- Through a thorough review of facility operation and maintenance, "chronic rainfall" would not have to been defined
- DWQ formalized this guidance as a working document for the group

Conditions in the DWQ Guidance

- Examples were produced of what constituted proper operation and maintenance
- Plan of Action forms were provided and submission of these forms is included as a guidance criteria
- Previous history is a guidance criteria, one NOV or two or more NODs are considered as a previous history. Receipt of a second NOD in three years will trigger a review of the CAWMP

Conditions (continued)

- Regular reporting intervals are required by facilities that are out of compliance. Weekly for storm storage, Daily for structural
- Only one compliance action can be taken against a facility during a single rainy period, this period determined by the Director and should not normally exceed 365 days
- Any action taken by DWQ prior to the effective date of the new guidance must be considered as though they were based on the new guidance

Example from the Guidance

- If lagoon/storage pond's available storage capacity is greater than 12 inches (for structural stability) but less than that required to also retain the 25 year-24 hour rainfall event:
  - Notice of Deficiency if the following criteria are met:
    - The producer contacted DWQ to report the inadequate storage in a lagoon/storage pond, and
    - The producer has been effectively operating and maintaining their waste treatment system, and
    - The producer has no previous NOV(s) or no more than one (1) NOD for freeboard violations resulting from events less than 25 year-24 hour storm events in the past three years, and
    - The producer has submitted to the DWQ Regional Office within 48 hours (two business days) a Plan of Action as to how they propose to lower and maintain the lagoon level to a point below that needed for both structural stability and the 25 year-24 hour rainfall event within 30 days.

Summary

- The Chronic Rainfall Working Group reached consensus on resolving issues related to chronic rainfall conditions
- The resulting recommendation sets a clear, consistent, and fair guidance for making enforcement determinations
- The recommended guidance will replace the Freeboard section of the current DWQ Compliance/Enforcement Procedures dated April 2, 2003

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

FINAL REPORT ON THE RESOLUTION OF ISSUES RELATED TO NOTICES OF VIOLATION AND NOTICES OF DEFICIENCY DUE TO LAGOON FREEBOARD VIOLATIONS DUE TO CHRONIC RAINFALL CONDITIONS

MARCH 25, 2004

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Attachments

Attachment 1 – Memo from Secretary Ross (DENR) dated June 25, 2003
Attachment 2 – Lagoon Design Fact Sheet and Diagram
Attachment 3 – Examples of Proper Operation and Maintenance
Attachment 4 – Examples of NOD Issuance
Attachment 5 – Recommended DWQ Guidance

FINAL REPORT ON THE ACTIVITIES AND RECOMMENDATIONS OF THE CHRONIC RAINFALL WORKING GROUP

I. Introduction

This document contains the final written report of the proceedings and findings of the Chronic Rainfall Working Group. This Working Group was established to resolve issues related to Notices of Violation and Notices of Deficiency due to inadequate lagoon freeboard levels related to chronic rainfall conditions. The Division of Water Quality (DWQ) participated in the Working Group as requested by the Secretary of the Department of Environment and Natural Resources (DENR) in a memo to the Director of DWQ dated June 25, 2003 and prepared this report. The Working Group was convened under the direction of the Environmental Review Commission (ERC).

II. Background

As the result of the heavy rainfall received in North Carolina during the period starting in October 2002 and ending in September 2003, many animal facilities experienced lagoon freeboard levels in violation of their permits. In April 2003, DWQ issued approximately 385 Notices of Violation (NOV) to facilities with inadequate lagoon freeboard levels. These NOVs were issued by DWQ consistent with the Compliance/Enforcement Procedures guidance document signed and dated April 2, 2003 by the Director of DWQ.

The 2003 Compliance/Enforcement Procedures guidance document changed the way DWQ issued enforcement for inadequate freeboard levels. The previous guidance document dated September 6, 2000, had provisions for issuing Notices of Deficiencies (NOD) for inadequate freeboard if a facility met certain requirements. The 2003 guidance document discontinued the use of NODs in an effort to insure consistency among the different regional offices and water quality permitting programs.

The change in the DWQ enforcement guidance and subsequent issuance of NOVs for inadequate freeboard caused many facility owners to feel that they had been treated unfairly. As a result, the Secretary of DENR issued a memo, dated June 25, 2003, to the Director of DWQ directing the reclassification of NOVs sent in April 2003 as NODs if the violation would have been addressed through an NOD based on the September 2000 guidance document (memo provided as an attachment to this report). In the same memo, the Secretary instructed DWQ of the pending Chronic Rainfall Working Group under the direction of the ERC. This working group was intended as an informal process to evaluate DWQ's enforcement policy during rainy periods.

The following stakeholders were typically represented in the working group meetings:

DWQ	NC Climate Office
DENR	NCSU
Murphy-Brown, LLC	NC Environmental Defense
Goldsboro Hog Farms	Frontline Farmers
Coharie Farms	Waterkeeper Alliance
NC Pork Council	NC Sierra Club
NC Farm Bureau	Prestage Farms
NCDA&CS	Southern Environmental Law Center
Alliance for a Responsible Swine Industry	

The Chronic Rainfall Working Group met on five occasions between October 28, 2003 and March 15, 2004.

III. Major Discussion Items and Recommendations

The following is a synopsis of the major items reviewed and discussed by the Chronic Rainfall Working Group. The recommendations presented represent the consensus of the working group.

Lagoon Design

Animal facility treatment/storage lagoons are designed based on North Carolina Natural Resource Conservation Service (NRCS) Standard 359. All lagoons are designed to contain at least a permanent treatment volume, a temporary storage volume, a 25-year 24-hour storm volume, and one foot of structural freeboard. Lagoons designed after September 1996 must be constructed with an additional heavy rainfall factor. Lagoons can be designed with an emergency spillway that protects the one-foot of structural freeboard. A small percentage of lagoons in use in North Carolina have been constructed with the heavy rainfall factor or emergency spillway. The compliance level is the 25-year, 24-hour storm volume plus the one-foot of structural freeboard. The compliance level is typically 19 inches from the top of the lagoon dike wall. This information was presented to the working group as a fact sheet and lagoon design diagram and is provided as an attachment to this report.

DWQ Enforcement after Secretary's Memo

Industry representatives stated that they were not seeking to change the 19-inch standard, but rather not be issued NOVs or civil penalties during rainy periods that preclude proper land application (given that the facility is following proper management). The DWQ enforcement guidance, following the Secretary's June 25th memo, was very similar to what the industry representatives had stated. This guidance included a review of the facility's records to determine if proper operation and maintenance was followed, a review of the facility's previous compliance history, and review of the facility's proper notification to DWQ. If the facility had met the criteria, a NOD could be issued rather than an NOV. The industry representatives agreed that the

post June 25th memo guidance was fair and equitable. The environmental advocacy groups agreed that this guidance would fit the industry requests, but added that a mechanism for determining the necessary actions of the operators to satisfy issuance of a NOD still needed to be discussed.

There was group consensus that formalizing the current DWQ guidance could satisfy the working group process without defining "chronic rainfall". This could be achieved because it is implied that through proper operation and maintenance only a "chronic rainfall" or 25-year 24-hour storm could cause an inadequate freeboard level. DWQ agreed to provide the current guidance as a working document.

Conditions in the DWQ Guidance

The DWQ enforcement guidance listed proper operation and maintenance as criteria for determining the response to inadequate freeboard levels. There was discussion within the working group surrounding the characterization of proper operation and maintenance. A formal definition was not possible because of the site-specific variability of each facility. DWQ provided examples of facility records that would indicate how operation and maintenance could be used in making a determination for enforcement. Three examples of facility records were provided with a narrative, one each for a facility that was issued a NOD, NOV, and NOV with consideration for civil penalty. These examples are provided as an attachment to this report.

The DWQ enforcement guidance referenced a Plan of Action as a required submission for facilities with inadequate freeboard. There were questions from the working group as to what constituted a Plan of Action, when must the Plan of Action be submitted, and what were the consequences for non-submittal. DWQ provided the working group with the approved Plan of Action forms, these forms are included as an attachment to this report. It was agreed that the Plan of Action must be submitted with two business days for facilities in the storm storage and one business day for facilities in the structural freeboard. The submittal of the Plan of Action was included in the review criteria for making an enforcement determination.

The DWQ enforcement guidance referenced NOVs issued during the last three years for consideration as previous a compliance history. There was discussion within the working group as to when to consider NODs as a previous compliance history. In keeping with the need to project a clear incentive to self-report, it was decided that NODs would be considered as a previous history only when two or more NODs for freeboard violations had been issued during the last three years. In addition, after issuance of a second NOD within three years, the facility will be required to obtain a review of the Certified Animal Waste Management Plan (CAWMP) by a Technical Specialist and submit this review to DWQ. Multiple NODs can indicate that there is an ongoing issue with the facility that can be reviewed and corrected to prevent future freeboard violations. An example of the instances requiring a CAWMP review and NOD versus NOV issuance due to previous history is included as an attachment to this report.

The working group discussed the issue of a facility's reporting requirements. In order for DWQ to have current information regarding a facility's freeboard levels, a regular reporting requirement was needed. Conditions were added to the guidance that required weekly freeboard

level updates to DWQ for freeboard levels that were in the storm storage and daily updates for freeboard levels in the structural freeboard.

The working group discussed the issue of the appropriate length of a rainy period for consideration of a compliance action. It was agreed that only one action should be taken against a properly operated and maintained facility during a single rainy period. There was additional discussion about the Director's discretion of the effective timeframe of the rainy period. The industry representatives felt that there should not be a limit to the timeframe, whereas, the environmental advocacy groups felt that a maximum limit should be set. Consensus was reached by stating that the maximum duration of a rainy period should not normally exceed 365 days.

It was decided that when making a determination for the appropriate response to inadequate freeboard levels, any action taken by DWQ prior to the effective date of the new guidance must be considered as though they were based on the new guidance.

IV. Summary

The Chronic Rainfall Working Group, convened under the direction of the ERC, reached consensus on resolving issues related to Notices of Violation and Notices of Deficiency due to inadequate lagoon freeboard levels related to chronic rainfall conditions. The resulting report sets a clear, consistent, and fair guidance for making a determination as to the appropriate response to inadequate lagoon freeboard levels. The final recommended guidance will replace Section 4. Freeboard of the current Compliance/Enforcement Procedures dated April 2, 2003. The final recommended guidance is included as an attachment to this report.

ATTACHMENT 1

NCDENR
North Carolina Department of Environment and Natural Resources
Michael F. Easley, Governor
William G. Ross Jr., Secretary

TO: Alan Klimek, Director
Division of Water Quality

FROM: William G. Ross, Jr. WGRjr

RE: Notice of Violation Letters for Swine Farms

DATE: June 25, 2003

I appreciate the Division of Water Quality (DWQ) staff's hard work and quick response to the problems of high lagoon levels resulting from a rainy spring. As we have discussed, actual rainfall amounts have varied from place to place, but some locations have experienced one of the wettest springs on record. Your staff's diligence, with the cooperation of farmers who met their responsibility to report high lagoon levels, kept the number of discharges to a minimum and almost certainly averted further impacts on water quality.

In April, DWQ began sending "Notice of Violation" letters rather than "Notice of Deficiency" letters to farmers with freeboard violations in an effort to insure consistency among the different regional offices and water quality permitting programs. I understand that the difference in language does not reflect any change in enforcement policy or in the farmers' responsibilities with respect to management of lagoons. Since 1993, farmers have had an obligation – reflected in state rules and in the permits for animal operations – to maintain 19 inches of freeboard in the lagoons except in the event of a 25-year storm.

Even so, the change from sending "Notice of Deficiency" (NOD) letters to sending "Notice of Violation" (NOV) letters for freeboard violations caused many farmers to feel angry and upset. In the absence of any communication about the reason, farmers viewed it as a major change in enforcement policy. Not having advance notice of the change also caused farmers to feel that they had been treated unfairly. The fact that the change occurred in the midst of a wet spring when many farmers were having difficulty managing lagoon levels probably aggravated those concerns.

It is my understanding that there will be further stakeholder discussion of the chronic rainfall issue under the direction of the Environmental Review Commission (ERC). The stakeholder group will be asked to report back to the ERC by November 1, 2003 on alternatives for managing lagoon levels with respect to chronic rainfall. I have

committed to begin implementing, by January 1, 2004, any consensus recommendations of the stakeholder group that can be implemented without further legislative action.

In order to have the benefit of that discussion and address concerns about the meaning of the change to NOVs, I am directing that DWQ reclassify violation letters sent between January 1, 2003 and today as a Notice of Deficiency if the violation would previously have been addressed through an NOD. From this date forward, DWQ should also send Notices of Deficiency for violations that would have resulted in a Notice of Deficiency prior to April 1, 2003. This approach should continue until recommendations have been received from the stakeholder group. Before implementing any changes in the use of NODs and NOVs based on stakeholder recommendations, farmers should be given notice of the proposed change.

Returning to use of NODs does not alter the rules applicable to animal operations, the content of the permits, or enforcement policy. I expect DWQ to continue to pursue appropriate enforcement action with respect to any violation already identified or identified in the future. You have told me that the Division is exercising its enforcement discretion with respect to whether a violation requires a civil penalty. I agree with your judgment that among the factors to be considered in making that decision should be the farmer's reporting of high lagoon levels; timely action to reduce lagoon levels; and the responsible operation and maintenance of the animal waste management system in the preceding weeks and months. I understand that, in deciding whether a system has been responsibly operated and maintained, DWQ considers whether unusually heavy local rainfall limited the farmer's opportunities to spray in the preceding weeks or months.

I believe that allowing this additional time for discussion of the issues will allow DWQ to move beyond this controversy and again focus on the more important matters of insuring proper management of these systems and taking strong, fair and effective enforcement action when appropriate. This additional time will also provide the Division an opportunity to have further discussion of strategies to manage chronic rainfall that will be consistent with requirements of the Clean Water Act.

Thanks to you and to the Division staff for all of your efforts to resolve this controversy in a fair and even-handed way.

Cc: Senator Charlie Albertson
Representative Pryor Gibson
Rann Carpenter, N.C. Pork Council
Molly Diggins, N.C. Sierra Club

ATTACHMENT 2

October 28, 2003

LAGOON DESIGN

Prepared for:
Chronic Rainfall "605" Stakeholder Workgroup

1. Animal facility treatment/storage lagoons are designed based on NRCS Standards.

2. All lagoons are designed to hold:

    a. A permanent storage volume for sludge storage and treatment volume (both based on the number and types of animals at the facility), plus

    b. Temporary storage used to hold the waste generated over the design period for the facility (usually from 90-180 days) and the excess rainfall (precipitation minus evaporation) for the design period, plus

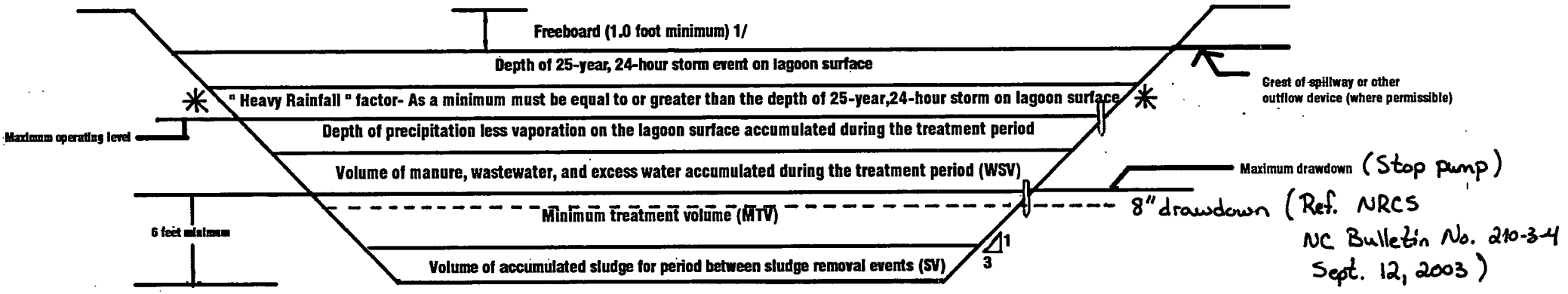
    c. A storage volume large enough to hold the 25 year, 24 hour storm event (to be used only during the period of the 25 year, 24 hour storm), plus

    d. One foot of freeboard that should always be free of liquid due to structural stability issues (cannot be considered storage). Lagoons can crest without encroaching the one foot of freeboard if designed with a spillway (small percentage with spillways).

3. Lagoons designed after September 1996 must be constructed with an additional heavy rainfall factor. This was intended to be a chronic rainfall factor, but since agreement could not be reached in 1996 on what qualified as chronic rainfall, the term heavy rainfall factor was used. Also since the volume of excess rainfall attributed to chronic rainfall was not determined in 1996, the heavy rainfall factor was defined as equal to another 25 year, 24 hour storm event. The majority of permitted facilities do not have the "Heavy Rainfall" factor designed into the lagoon.

4. Lagoon dimensions are relative to the operation type and size of the facility that it is designed for, however, a typical lagoon ranges from 10 to 13 feet deep.

* "Heavy Rainfall" factor added to lagoons designed after September 1996.



Note: The minimum treatment volume for an anaerobic waste treatement lagoon is based on volatile solids.

1/ If an emergency spillway is used the design depth of flow must be added to the freeboard.

Figure A- Anaerobic Lagoon Cross Section

NRCS, NC
January, 1998
Rev. 4

ATTACHMENT 3

February 9, 2004

Subject: Compliance/Enforcement 2002-2003 Examples
Inadequate Lagoon/Storage Pond Freeboard Levels

Based on questions raised during the 14 January 2004 "Chronic Rainfall" Working Group meeting, the Division of Water Quality is providing examples of facilities that were evaluated for compliance enforcement due to inadequate freeboard levels during the period around April 2003. Three examples are being provided that show a facility that received a Notice of Deficiency, a Notice of Violation, and a Notice of Violation with consideration for civil penalty. Information was gathered from records submitted by the facilities and transferred to typed forms for easier viewing. Brief explanations for each facility are as follows:

Notice of Deficiency- Feeder to Finish Swine-2,320 head

This facility was out of compliance for freeboard levels on March 28, 2003 and back into compliance on April 4, 2003. Examination of the freeboard levels from March 2002 through April 2003 indicate that the facility was near stop pump level for the lagoon in July, August, and November 2002. Examination of the land application records for April 2002 through October 2002 indicate that this facility utilized all fields in the Waste Utilization Plan. Land application was done fairly uniformly across these fields. No waste applications were made outside of the allowed pumping windows or in excessive amounts. This facility had no previous history is the past three years of inadequate freeboard levels and the facility notified DWQ of the inadequate freeboard level.

Notice of Violation- Feeder to Finish Swine-3,520 head

This facility was out of compliance for freeboard levels on March 19, 2003 and April 12, 2003. Examination of the freeboard levels from May 2002 through May 2003 indicate that the facility was closest to stop pump level for the lagoon in July 2003, still 16 inches from the stop pump level. Examination of the land application records for April 2002 through September 2002 indicate that this facility had additional PAN that could have been applied during Summer 2002. Several fields were not used during Summer 2002 for land application. No waste applications were made outside of the allowed pumping windows or in excessive amounts. This facility had no previous history in the past three years of inadequate freeboard levels and the facility notified DWQ of the inadequate freeboard level. A NOV was issued to this facility due to improper operation and maintenance because of the lack of pumping in Summer 2002 and freeboard levels not lowered to near stop pump level in Summer 2002.

Notice of Violation w/ consideration for penalty- Feeder to Finish Swine-6,700 head

This facility was out of compliance for freeboard levels on March 17, 2003 through April 28, 2003 and on April 7, 2003 and April 14, 2003 the freeboard levels were in the structural stability area. Examination of the freeboard levels from April 2002 through April 2003 indicate that the facility was closest to stop pump level for the lagoon in June 2002, still 14 inches from the stop pump level. Examination of the land application records for March 2002 through April 2003 indicate that this facility had additional PAN that could have been applied during Summer 2002. Approximately 25 acres of land application fields were not utilized during Summer 2002. Land application occurred on several instances outside of the allowed dates in the Waste Utilization Plan. This facility had no previous history of inadequate freeboard levels and the facility notified DWQ of the inadequate freeboard level. A Plan of Action form was also submitted to DWQ. A NOV with consideration for civil penalty was issued to this facility due to improper operation and maintenance because of the lack of pumping in Summer 2002 and freeboard levels not lowered to near stop pump level in Summer 2002. This facility was also in the structural level of the lagoon and did not properly follow the application windows in the Waste Utilization Plan.

Example NOD

Waste Structure Freeboard and Daily Precipitation Record

Facility Type: Feeder to Finish Swine- 2,320 head

Facility Number: ____ - ____

Operator: ____

Date (mm/dd/yy)	Freeboard (inches) # 1	#	Date (mm/dd/yy)	Freeboard (inches) #	#		*Precipitation (inches)	Initials
3/1/2002	34		10/4/2002	36				
3/8/2002	32		10/11/2002	37				
3/15/2002	30		10/18/2002	42				
3/22/2002	29		10/25/2002	45				
3/29/2002	28		11/1/2002	44				
4/5/2002	27		11/8/2002	44				
4/12/2002	26		11/15/2002	43				
4/19/2002	28		11/22/2002	42				
4/26/2002	28		11/29/2002	41				
5/3/2002	27		12/6/2002	38				
5/10/2002	25		12/13/2002	31				
5/17/2002	25		12/20/2002	33				
5/24/2002	32		12/27/2002	33				
5/31/2002	36		1/3/2003	32				
6/7/2002	42		1/10/2003	32				
6/14/2002	42		1/17/2003	32				
6/21/2002	38		1/24/2003	32				
6/28/2002	36		1/31/2003	31				
7/5/2002	40		2/7/2003	31				
7/12/2002	44		2/14/2003	30				
7/19/2002	40		2/21/2003	27				
7/26/2002	35		2/28/2003	27				
8/2/2002	33		3/7/2003	25				
8/9/2002	33		3/14/2003	23				
8/16/2002	45		3/21/2003	21				
8/23/2002	46		3/28/2003	18				
8/30/2002	42		4/4/2003	19				
9/6/2002	39		4/11/2003	25				
9/13/2002	36		4/18/2003	24				
9/20/2002	37		4/25/2003	22				
9/27/2002	37							

agoon freeboard is the difference between the lowest point of a lagoon embankment and the level of liquid.

For lagoons with spillways, the difference between the level of liquid and the bottom of the spillway should be recorded.

2. Freeboard plus available storage capacity must be recorded at least weekly.

Example NOD

Lagoon Liquid Irrigation Fields Record
For Recording Irrigation Events on Different Fields

Facility: Feeder to Finish Swine- 2,320 head

Facility Number: ____ - ____

Operator: ____

Tract & Field #	Applications (#)	Dates (mm/dd/yr)	Crop Type	Field Size (acres)	Total Application			PAN Balance (lb/acre)	Operator Initials
					Minutes	Gallons	PAN (lb/acre)		
1	8	4/9/02-8/19/02	Bahaia	0.75	480	34,080	86.0	114.0	
2	4	10/1/02-10/9/02	Fescue	1.62	335	42,813	52.8	132.2	
3	4	10/1/02-10/9/02	Fescue	1.32	335	42,813	52.8	132.2	
4	12	4/6/02-8/19/02	Coastal	1.03	960	95,424	172.0	103.0	
5	12	4/6/02-8/19/02	Fescue	1.03	960	95,424	172.0	14.0	
6	12	4/5/02-8/21/02	Coastal	1.33	1,215	155,227	222.4	52.6	
7	12	4/5/02-8/21/02	Coastal	1.33	1,215	155,227	222.4	52.6	
8	3	8/7/02-8/11/02	Coastal	1.7	680	88,400	103.8	131.2	
9	9	4/17/02-8/8/02	Coastal	3.9	3,480	452,400	220.4	54.6	

*PAN: Plant Available Nitrogen

*PAN Balance: Amount of PAN remaining from total in Waste Utilization Plan

Example NOV

Waste Structure Freeboard and Daily Precipitation Record

Farm Owner: Feeder to Finish - 3520 head

Facility Number: ____ - ____

Operator: ____

Date (mm/dd/yy)	Freeboard (inches) #1	#2	Date (mm/dd/yy)	Freeboard (inches) #1	#2		Date (month-yy)	Precipitation (inches)
5/14/2002	27	30	2/10/2003	21	21		Nov. 02	2.5
5/21/2002	27	30	2/17/2003	22	21		Dec. 02	2
5/30/2002	27	30	2/24/2003	25	21		Jan. 03	1.83
6/7/2002	26	29	3/5/2003	23	20		Feb. 03	1.85
6/19/2002	28	30	3/12/2003	21	21		Mar. 03	7.16
6/26/2002	28	30	3/19/2003	19	18		Apr. 03	5.5
7/2/2002	25	30	3/26/2003	22	21			
7/17/2002	27	28	4/2/2003	23	22			
7/24/2002	30	27	4/9/2003	20	19			
7/31/2002	28	24	4/12/2003	18	17			
8/7/2002	26	25	4/19/2003	22	20			
9/2/2002	24	24	4/26/2003	28	22			
9/17/2002	26	27	5/3/2003	20	21			
10/1/2002	26	27	5/9/2003	21	21			
10/7/2002	25	27						
10/14/2002	28	27						
10/22/2002	27	24						
10/30/2002	25	20						
11/6/2002	23	19						
11/14/2002	22	20						
11/20/2002	22	21						
11/28/2002	21	22						
12/6/2002	23	20						
12/14/2002	20	20						
12/20/2002	20	21						
12/28/2002	20	22						
1/4/2003	21	22						
1/10/2003	22	22						
1/18/2003	21	21						
1/25/2003	21	21						
2/1/2003	25	21						

agoon freeboard is the difference between the lowest point of a lagoon embankment and the level of liquid.

For lagoons with spillways, the difference between the level of liquid and the bottom of the spillway should be recorded.

2. Freeboard plus available storage capacity must be recorded at least weekly.

Example NOV

Lagoon Liquid Irrigation Fields Record
For Recording Irrigation Events on Different Fields

Farm Owner: Feeder to Finish - 3520 head

Facility Number: ____ - ____

Operator: ____

Tract & Field #	Applications (#)	Dates (mm/dd/yr)	Crop Type	Field Size (acres)	Total Application			PAN Balance (lb/acre)	Operator Initials
					Minutes	Gallons	PAN (lb/acre)		
10	2	8/22/02-8/23/02	Bermuda	4	255	45,900	20.7	208.1	
1	3	5/6/02-8/7/2002	Bermuda	4	420	75,600	38.1	172.1	
8	1	8/2/2002	Bermuda	2.4	120	21,600	16.2	190.1	
11	2	7/11/2002	Bermuda	5	360	64,800	23.3	205.4	
7	6	4/6/02-9/3/02	Bermuda	4.3	1,050	189,000	87.3	140.7	
3	4	4/22/02-6/25/02	Bermuda	11	1,350	243,000	45.7	156.0	
5	9	4/30/02-9/13/02	Bermuda	9.7	2,700	486,000	93.5	112.8	
9	2	4/12/02-5/20/2002	Bermuda	1	180	32,400	66.4	162.4	

*PAN: Plant Available Nitrogen

*PAN Balance: Amount of PAN remaining from total in Waste Utilization Plan

Example NOV/NOI

Waste Structure Freeboard and Daily Precipitation Record

Facility Type: Feeder to Finish Swine- 6,700 head Facility Number: ____ - ____

Operator: ____

Date (mm/dd/yy)	Freeboard (inches) # 1	# 2	Date (mm/dd/yy)	Freeboard (inches) # 1	# 2		Date (month-yy)	*Precipitation (inches)
4/7/2002	27	27	11/11/2002	24	24		April-02	0.5
4/14/2002	27	28	11/18/2002	24	24		May-02	3.75
4/21/2002	29	30	11/25/2002	24	24		June-02	2.5
4/28/2002	31	30	12/2/2002	24	25		July-02	4
5/5/2002	30	30	12/9/2002	23	26		August-02	2.5
5/12/2002	30	30	12/16/2002	24	25		September-02	3.5
5/14/2002	30	27	12/23/2002	24	25		October-02	0.5
5/21/2002	31	25	12/30/2002	22	23		November-02	1
6/2/2002	32	27	1/6/2003	22	22		December-02	2
6/9/2002	31	27	1/13/2003	22	22		January-03	1
6/16/2002	32	25	1/20/2003	22	22		February-03	1
6/23/2002	32	25	1/27/2003	22	22		March-03	9.5
6/30/2002	30	25	2/3/2003	22	21		April-03	7.5
7/7/2002	30	25	2/10/2003	22	21			
7/15/2002	27	27	2/17/2003	23	22			
7/22/2002	28	27	2/24/2003	23	22			
7/25/2002	28	26	3/3/2003	23	23			
8/5/2002	26	25	3/10/2003	20	20			
8/13/2002	26	25	3/17/2003	18	18			
8/19/2002	26	25	3/24/2003	15	15			
8/26/2002	27	24	3/31/2003	16	13			
9/2/2002	26	24	4/7/2003	21	11			
9/9/2002	26	25	4/14/2003	17	10			
9/16/2002	26	26	4/21/2003	19	16			
9/23/2002	25	27	4/28/2003	20	18			
9/30/2002	25	27						
10/7/2002	25	27						
10/14/2002	25	27						
10/21/2002	25	27						
10/28/2002	25	26						
11/4/2002	24	25						

agoon freeboard is the difference between the lowest point of a lagoon embankment and the level of liquid.
For lagoons with spillways, the difference between the level of liquid and the bottom of the spillway should be recorded.

2. Freeboard plus available storage capacity must be recorded at least weekly.

Example NOV/NOI

Lagoon Liquid Irrigation Fields Record
For Recording Irrigation Events on Different Fields

Facility: Feeder to Finish Swine- 6,700 head

Facility Number: ____ - ____

Operator: ____

Tract & Field #	Applications (#)	Dates (mm/dd/yr)	Crop Type	Field Size (acres)	Total Application			PAN Balance (lb/acre)	Operator Initials
					Minutes	Gallons	PAN (lb/acre)		
4	4	5/15/02-7/6/02	Matua	15.5	960	192,000	33.2	166.8	
4	4	11/28/02-4/22/03	Rye	15.5	780	156,000	19.0	31.0	
5	6	3/26/02-9/24/02	Matua	11.5	1,680	336,000	72.9	127.1	
5	11.5	10/21/02-4/23/03	Rye	11.5	1,320	264,000	41.8	8.2	
6	16	12/31/02-4/29/03	Wheat	23.54	3,360	672,000	57.0	63.0	
7	18	1/17/03-4/29/03	Wheat	25.54	3,750	750,000	57.7	62.3	

*PAN: Plant Available Nitrogen

*PAN Balance: Amount of PAN remaining from total in Waste Utilization Plan

ATTACHMENT 4

March 17, 2004

Subject: Compliance/Enforcement NOD Examples
Inadequate Lagoon/Storage Pond Freeboard Levels

Based on questions raised during Chronic Rainfall Working Group meeting, the Division of Water Quality is providing examples of situations when NODs should be issued for inadequate freeboard. The following are three examples of a facility that has inadequate freeboard levels during subsequent rainy periods:

1. If a producer entered a rainy period without a NOD from a previous rainy period and the lagoon's available storage capacity is greater than 12 inches but less than 19 inches. If following the new guidance:
    a. The producer reported the freeboard violation to DWQ, and
    b. The producer was properly operating and maintaining the facility, and
    c. The producer had submitted an adequate POA, then

   DWQ should issue a NOD to this facility.

2. If a producer entered a rainy period with a NOD from a previous rainy period and the lagoon's available storage capacity is greater than 12 inches but less than 19 inches. If following the new guidance:
    a. The producer reported the freeboard violation to DWQ, and
    b. The producer was properly operating and maintaining the facility, and
    c. The producer had submitted an adequate POA, then

   DWQ should issue a second NOD to this facility and the facility would be required to obtain a review of the CAWMP.

3. If a producer entered a rainy period with two NODs from previous rainy periods and the lagoon's available storage capacity is greater than 12 inches but less than 19 inches. If following the new guidance:
    a. The producer reported the freeboard violation to DWQ, and
    b. The producer was properly operating and maintaining the facility, and
    c. The producer had submitted an adequate POA, then

   DWQ should issue a NOV to this facility.

ATTACHMENT 5

DRAFT

March 17, 2004

Subject: Compliance/Enforcement Procedures
Inadequate Lagoon/Storage Pond Freeboard Levels
Animal Waste Management Facilities

In order to insure consistency throughout the state, the following compliance and enforcement guidelines are to be implemented by both the central office and the regional office staff when working with inadequate freeboard levels on animal waste facilities.

Whenever a high freeboard is identified at an animal facility, the producer will be given the opportunity to provide information to the Division of Water Quality (DWQ) that will enable DWQ to make a determination as to the appropriate response to the incident. This request for information may be either in the form of a Request for Information Letter or the DWQ staff may meet with the producer at the facility. Once any additional information has been evaluated, the producer will be issued a Notice of Deficiency (NOD), a Notice of Violation (NOV), and/or a Civil Penalty Assessment. DWQ may also initiate other enforcement actions as appropriate.

The guidelines to be followed in making the determination as to the appropriate response will be as follows:

A) **If lagoon/storage pond's available storage capacity is greater than 12 inches (for structural stability) but less than that required to also retain the 25 year-24 hour rainfall event:**

1. Notice of Deficiency if the following criteria are met:
   a. The producer contacted the Division of Water Quality (DWQ) to report the inadequate storage in a lagoon/storage pond, **and**
   b. The producer has been effectively operating and maintaining their waste treatment system, **and**
   c. The producer has no previous NOV(s) or no more than one (1) NOD for freeboard violations resulting from events less severe than 25 year-24 hour storm events in the past three years, **and**
   d. The producer has submitted to the DWQ Regional Office with 48 hours (two business days) a Plan of Action as to how they propose to lower and maintain the lagoon level to a point below that needed for both structural stability and the 25 year-24 hour rainfall event within 30 days.

2. Notice of Violation if the following criteria are met:
   a. The producer contacted DWQ to report the inadequate storage in a lagoon/storage pond, **and either of the following:**
      i. The producer has not been effectively operating and maintaining their waste treatment system, **or**
      ii. The producer has previous NOV(s) or two (2) or more NODs for freeboard violation resulting from events less severe than 25 year-24 hour storm events in the past three years, **or**
      iii. The producer has not submitted to the DWQ Regional Office with 48 hours (two business days) a Plan of Action as to how they propose to lower and maintain the lagoon level to a point below that needed for both structural stability and the 25 year-24 hour rainfall event within 30 days.

3. Notice of Violation with consideration for civil penalty if any of the following criteria are met:
   a. Any time that DWQ becomes aware of inadequate storage in a lagoon/storage pond that was not reported by the producer or their representative, **or**
   b. DWQ may also initiate additional enforcement actions including but not limited to Civil Penalties based on the severity of the operation and maintenance problems and/or the history of previous high freeboards.

4. Facilities will be required to submit weekly freeboard level updates to the Regional Office until the lagoon/storage pond levels are back into compliance. Failure to submit the updates will be an aggravating factor in consideration for civil penalty assessment.

5. Upon receipt of a second NOD for high freeboard within a three-year period, the permittee will be required to obtain a review of the CAWMP by a Technical Specialist. This review must be submitted to the appropriate DWQ Regional Office in writing within 60 days of receipt of the second NOD. The review must contain any corrective action taken or proposed to be taken to improve the facility's compliance.

B) **If the lagoon/storage pond's storage capacity is less than 12 inches (for structural stability):**

1. Notice of Violation if the following criteria are met:
   a. The producer contacted the Division of Water Quality (DWQ) to report the inadequate storage in a lagoon/storage pond, **and**
   b. The producer has been effectively operating and maintaining their waste treatment system, **and**
   c. The producer has no previous NOV(s) or no more than one (1) NOD for freeboard violations resulting from events less severe than 25 year-24 hour storm events in the past three years, **and**
   d. The producer has submitted to the DWQ Regional Office within 24 hours (one business day) a Plan of Action as to how they propose to lower and maintain the lagoon level to a point below that needed for structural stability within 5 days.

2. Notice of Violation with consideration for civil penalty if any of the following criteria are met:
   a. At any time that DWQ becomes aware of inadequate storage in a lagoon/storage pond that was not reported by the producer or their representative, **or**
   b. The producer has not been effectively operating and maintaining their waste treatment system, **or**
   c. The producer has previous NOV(s) or two (2) or more NODs for freeboard violations resulting from events less severe than 25 year-24 hour storm events in the past three years, **or**
   d. The producer has not submitted to the DWQ Regional Office within 24 hours (one business day) a Plan of Action as to how they propose to lower and maintain the lagoon level to a point below that needed for structural stability within 5 days.

3. Memo to the Director requesting that the Attorney General review facility file for a Temporary Restraining Order or other Injunctive Relief:
   a. If the submitted Plan of Action is deemed not adequate, **or**
   b. Plan of Action is not promptly implemented, **or**
   c. Immediate Threat to the Environment.

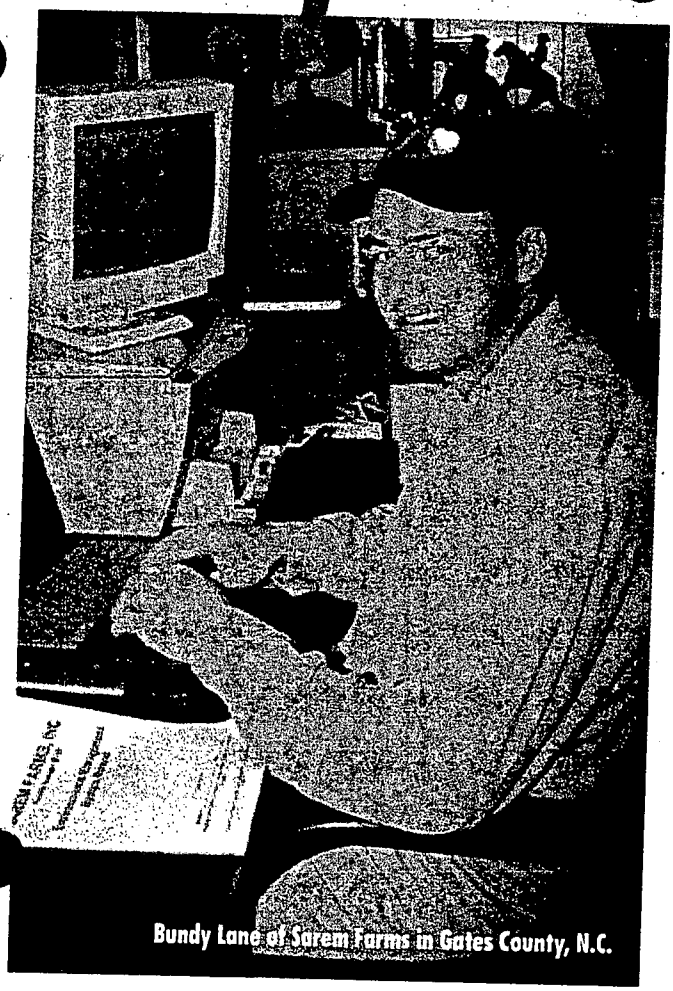
4. Facilities will be required to submit daily freeboard level updates to the Regional Office until the lagoon/storage pond levels are below 12 inches (for structural stability). Facilities will then be required to submit weekly freeboard level updates until the lagoon/storage pond levels are back into compliance. Failure to submit the weekly updates will be an aggravating factor in consideration for civil penalty assessment.

C) Only one (1) compliance action for inadequate freeboard levels should be taken against a properly operated and maintained facility during a single rainy period. The effective timeframe of a single rainy period will be determined at the Director's discretion based on cumulative rainfall amount, duration, and seasonal variability. The maximum duration of a single rainy period should not normally exceed 365 days.

D) When making a determination for the appropriate response to inadequate freeboard levels after (effective date), any action taken by DWQ prior to (effective date) must be considered as though they were based on the guidance set forth in this document.

March 25, 2004 ERC Meeting
EXHIBIT L

EMS Offers Multiple Payoffs



Bundy Lane of Sarem Farms in Gates County, N.C.

"My business management and herd performance have improved since implementing our Environmental Management System," says Bundy Lane of Sarem Farms in Gates County, N.C. He has a 4,800-sow operation that produces feeder pigs on contract with Murphy-Brown.

"While designed primarily to protect the environment, an EMS applies to all aspects of a livestock operation. The basic goal is to protect the environment, but an EMS goes far beyond that," says Lane.

Simply put, "an EMS is a tool that allows an organization to apply the proven business managemnet approach – plan, do, check and act – to environmental considerations that affect producers' operations," says Lesa Call, director of EMS' for Environmental management Solutions, Des Moines, Iowa.

Lane developed the first pilot EMS in North Carolina, for which he received a $3,000 state grant. Nationwide, he was among the first 10 livestock producers to implement an EMS.

Working on his EMS plan at night off and on for 2 years, he admits the process took longer than he expected it would.

"It was good to step back and take a close look at all aspects of our hog operation. I spotted and fixed quite a few little things to improve efficiency and performance," says Lane. "Details make the difference between producing 18 pigs per sow per year and 22.5."

He points to water use as a specific example where the EMS project improved the operation's efficiency. Since implementing the system Lane and his employees are paying closer attention to water used within the operation and they are taking steps to reduce waste.

A side benefit of the process is the peace of mind that all employees are familiar with the EMS plan. Because of this, Lane knows they can carry on appropriately when he is away. "Should something happen to me, it would not be devastating to the operation," he notes.

Having more structured operating procedures has improved communication with employees. He says his 13 employees like the EMS plan because it gives each one direction for his or her job.

"In 3 or 4 weeks," he adds, "a new employee can learn most of a job's procedures because the steps are spelled out in the manual." In the past, it used to take at least 6 months.

By having the manual on his computer, Lane can easily make changes as needed and print out hard copies for employees.

"Following an EMS that includes odor control improves neighbor relations," he adds. "I firmly believe if every producer in the country had an EMS plan and followed it, the pork industry's image with

the general public would improve dramatically."

For fellow producers who are interested in developing an EMS, Lane suggests taking a close look at the process and your operation. Recognize that it will take some time and concentration. But he adds, that the process has become more user friendly since the time that he prepared his.

Here are some questions to ask yourself before delving into an Environmental Management System for your operation.

- Do you have the time and patience to develop it?
- Will you follow it as much as possible and practical?
- Are you willing to make changes in your operation?
- Can you convince others in your operation to follow it?

"It's our own plan and we are not required to follow it. We can do what we want with it. We could toss it out if we ever became so inclined." Lane says he intends to continue following his EMS plan religiously. ■

By Bill Raufer

Finding EMS Help

A step-by-step method of creating an Environmental Management System for your swine operation is now available free on the Internet. The package includes instructions, worksheets, checklists and a fill-in-the-blanks computer template. It also provides answers to a number of "what-if" scenarios that may occur along with appropriate responses.

The tool was developed jointly by the North Carolina state environmental agency, Department of Environment and Natural Resources, and Murphy-Brown. It is a management aid, covering all aspects of a hog operation — not just environmental management. The on-line package is designed to fit a swine farm operated by one or two people.

You can access the do-it-yourself EMS package on the North Carolina DENR's Web site at *www.p2pays.org*. Click on "Hot Topics." If you have questions, call (919) 715-6500. The package also is available at these Web sites: *www.smithfieldfoods.com* (Murphy-Brown), and *www.ncpork.org* (North Carolina Pork Council).

While this tool is a starting point, there is still a lot of uncertainty in terms of what an effective EMS program needs to include on a state or national level, says Lesa Call, director of EMS for Environmental Management Solutions.

"Several states and private companies are working on programs for livestock. Producers should watch what's happening in their state," says Call. For example, Environmental Management Solutions is working with the state of Missouri on a pork-specific pilot project.

There is not yet a unified approach to EMS plans for livestock. A national project involving nine states will offer a report this month in Washington, D.C. The "Agricultural Environmental Management Systems" project worked specifically on dairy, beef and poultry needs. You can go to *www.uwex.edu/AgEMS* for more information on that project.

Missing Something?

"Swine Health Information a Click Away"
"Excel Plant Suspends Slaughter"
"Smithfield Wins Bid for Farmland"

Pork Alert subscribers didn't miss out on these or any other hot headlines. **Every Tuesday morning** they get the latest industry news **online** with short, quick reads including full stories without having to click. It's how they gain a competitive edge.

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APPLY TO THE PROGRAM

Environmental Partner applications can be submitted at any time and are reviewed quarterly, during the first month of each quarter. Applications must be received at least two weeks preceding the first day of each review month to be considered during that review cycle. Specific dates may be found on the Web site. Steward applications are accepted in April (beginning on Earth Day) each year for a 2-month period.

You can find both the Environmental Partner and Environmental Steward applications at: **http://www.p2pays.org/esi/apply.htm#apply**

MORE INFORMATION

For a list of current Partner and Steward participants or more detailed program information, please visit our Web site at **http://www.p2pays.org/esi/** or contact:

Beth Graves
EMS Coordinator
N.C. Division of Pollution Prevention and Environmental Assistance
1639 Mail Service Center
Raleigh, NC 27699-1639
(800) 763-0136 or (919) 715-6500
Fax: (919) 715-6794
beth.graves@ncmail.net.

NORTH CAROLINA DIVISION OF POLLUTION PREVENTION AND ENVIRONMENTAL ASSISTANCE

N.C. Department of Environment and Natural Resources
Michael F. Easley, Governor • William G. Ross Jr., Secretary

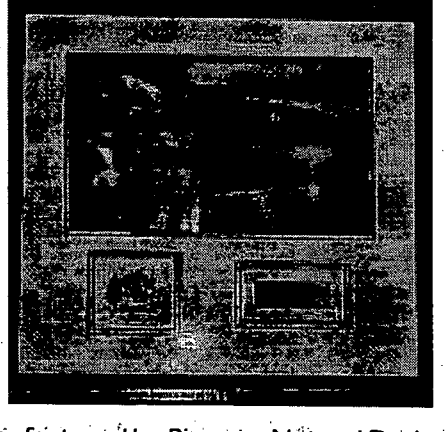
DPPEA-FY03-11

A SUSTAINABLE AWARD

In keeping with the spirit of the ESI, Environmental Stewards are presented with an award that is unique both for its content as well as its construction. The award is constructed from 100 percent reclaimed wood. The antique poplar frame is carefully salvaged from abandoned barns, kiln-drained, re-sawn and re-milled in preparation for its new purpose. Nail holes, wormholes, and other signs of wear enhance the frame's appearance. The frame's paint is an oil-based finish made from naturally derived raw materials. The raw materials for this finish are low in toxic substances, renewable and have a minimal environmental impact.

The mat boards are made from reclaimed wood pulp fibers, and the middle boards have the highest percentage of recycled fibers available.

The photo displays Polk County's Pearson's Falls, the Linn Cove Viaduct on the Blue Ridge Parkway, and a sunrise taken at Atlantic Beach. (Courtesy of N.C. Division of Tourism, Film and Sports Development)



(Manufactured by Rivanna Natural Designs)

N.C. DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

"IN AN IDEAL WORLD, REGULATION IS REPLACED BY STEWARDSHIP; AN INHERENT RESPECT FOR THE ENVIRONMENT. IN THIS CONCEPT OF STEWARDSHIP, EVERYONE TAKES RESPONSIBILITY FOR THEIR ACTIONS AND THE USE OF RESOURCES FOR THE BENEFIT OF THE COMMUNITY."

- excerpt from Department of Environment and Natural Resources Principles of Enforcement

www.p2pays.org/esi

What is the Environmental Stewardship Initiative?

The Environmental Stewardship Initiative (ESI) is designed to promote and encourage superior environmental performance by North Carolina's regulated community. This voluntary program establishes incentives and seeks to reduce the impact on the environment beyond measures required by any permit or rule, producing a better environment, conserving natural resources and resulting in long-term economic benefits.

The ESI has 2 levels of participation – Partner and Steward. Each level has its own criteria for participation and benefits. Both Partners and Stewards agree to report annually on progress towards the organization's environmental performance goals, net reductions of releases, emissions and disposal, use of energy and water, and any reportable non-compliance events.

"We're looking to recognize companies that integrate the environment into their day-to-day business practices. We view companies that seek to go beyond compliance and move toward environmental sustainability as true stewards who know that in return these practices save money, materials and resources"

- DENR Secretary William G. Ross Jr.

THE ENVIRONMENTAL PARTNER

The "Environmental Partner" level is designed for regulated organizations interested in developing a systematic approach to improving their environmental performance.

WHAT DOES IT TAKE TO BECOME A PARTNER?

An organization must:

- Not be under any environmental criminal indictment or conviction;
- Document commitment to compliance;
- Set environmental performance goals that include pollution prevention; and
- Commit to developing, implementing and maintaining an environmental management system (EMS) based on ISO 14001 or a functionally equivalent model.

WHAT ARE THE BENEFITS OF BECOMING A PARTNER?

- Technical assistance on developing an EMS, pollution prevention approaches, environmental management and treatment technologies, and achieving/maintaining compliance with local, state and federal regulations;
- Networking opportunities;
- Specialized training;
- Access to Environmental Steward mentors;
- Recognition of program participation;
- Coverage by U.S. EPA and DENR self-reporting policies;
- Single point of contact within DENR; and
- Other benefits as deemed appropriate by the Secretary based on recommendations from the advisory workgroup

THE ENVIRONMENTAL STEWARD

The "Environmental Steward" level is for those organizations that already display a commitment to exemplary environmental performance beyond what is required by law and have implemented an EMS.

WHAT DOES IT TAKE TO BECOME A STEWARD?

An organization must:

- Set aggressive environmental performance goals;
- Have a functional EMS based on ISO 14001 or a functionally equivalent model;
- Not have had any significant violations in the preceding two years;
- Have an interactive process for communicating with the local community on program activities and progress towards performance goals; and
- Demonstrate how the EMS is integrated into core business functions.

WHAT ARE THE BENEFITS OF BECOMING A STEWARD?

- All Partner benefits;
- Formal public recognition from the governor/Secretary of DENR including use of a program logo, an award ceremony, and public announcements/press releases;
- Participation in the ESI Forum chaired by the Secretary and including key department policy makers;
- Established time frames for permit decisions, (does not change existing public comment opportunities); and
- Consideration for regulatory innovations.

DPPEA is a ***non-regulatory*** agency that provides ***free*** technical assistance.

Please contact DPPEA if you are:

- Interested in receiving more information about EMS,
- Have questions on how to use the online tools, or
- If you would like to create an EMS for your organization.

For More Information, contact:
Jamie Ragan
1639 Mail Service Center
Raleigh, NC 27699-1639
(919) 715-6519
Jamie.ragan@ncmail.net

http://www.p2pays.org/porktool/

Environmental Management Systems for Pork Producers

N.C. Division of Pollution Prevention and Environmental Assistance
Department of Environment and Natural Resources

Environmental Management Systems for Pork Producers

What is an EMS?

An environmental management system (EMS) is an organized approach to managing and preventing environmental impacts through a continual cycle of planning, implementing, reviewing and improving all farm activities. An EMS is ***voluntary*** and ***non-regulatory*** assistance is available.

How can an EMS benefit my operation?

- Helps organize regulatory requirements;
- Aids in NOV and NOD reductions;
- Encourages pollution prevention;
- Addresses all environmental impacts;
- Improves record-keeping;
- Helps prevent environmental accidents;
- Advances overall administrative efficiency;
- Reduces potential liability;
- Streamlines everyday activities;
- Increases employee awareness/accountability;
- Improves public image;
- Strengthens community relationships;
- Enhances customer trust;
- Reduces operating costs; and
- Increases access to international markets.

"Although the EMS has not instantaneously corrected all of my problems, it has given me the vision needed to address environmental impacts related to my farm. I feel confident that my overall operation will be dramatically enhanced by the implementation of an EMS."

Chuck Stokes
Little Creek Hog Farms

EMS Assistance Tools

The Division of Pollution Prevention and Environmental Assistance (DPPEA) created an online guidance tool to assist pork producers with EMS development. This tool includes:

- EMS explanation;
- Step-by-step instructions;
- Sample standard operation procedures (SOPs);
- Checklists; and
- Sample EMS manual to customize with your farm's information.

The online guidance also includes the **Aspects/Impacts Manager (AIM)**. Using AIM, a producer can identify all the farm activities that impact the environment. From that, a table is created to rank the most significant environmental impacts from highest to lowest. Identification of the significant impacts of your operations is an important building block for the EMS. This prioritization is essential in identifying the activities of farm operations where you will need to focus improvement efforts.

Visit: http://xapps.enr.state.nc.us/survey/index.jsp

Documents in the online guidance can be downloaded from a computer and customized to your specific operation. These tools were developed from working with eight North Carolina pork producers who voluntarily designed and implemented an EMS on their farm.

Visit: http://www.p2pays.org/porktool/

Compliance and Inspection Reports

NC Division of Water Quality
March 25, 2004

As many of you will recall, the Division of Water Quality has responsibility for providing you with annual reports on the status of permitting and compliance for both the Animal Feeding Operations and the National Pollutant Discharge Elimination System for wastewater dischargers. In addition, we are responsible for reporting on the sanitary sewer or wastewater collection system program. This presentation will encompass all those reports.

Animal Feeding Operations

- Animal Operations 2461
- Inspections Completed 1800
- Inspections w/Identified Problems 878
  - Discharges 103/50 to surface waters
  - Inadequate freeboard 537
  - Evidence of over application 145
  - Crops different than approved 70

I am going to start my report by talking about the animal operations. This slide shows a brief overview of the statistics for 2003. We obviously were significantly under the required number of inspections. There are multiple reasons, significant wet weather issues requiring that we focus our resources on the facilities with problems, and we were down 50% of staffing in the animal inspectors in 2003. We are still short three inspectors at the regional office.

Of the 1800 inspections, we only managed to do ~1400 routine inspections

As you can see, we devoted the bulk of our time to working with the problems that arose last year as a result of the extremely wet weather. I have broken down the identified problems into the major problem areas that we saw. The number of discharges from these systems is the highest we have seen since 2000. Of the 537 facilities with inadequate freeboard, 93 had less than a foot of freeboard (into the structural integrity).

Animal Waste Notices

- 4th Quarter 2002
  - Notices of Deficiency (NOD): 7
  - Notices of Violation (NOV): 32
  - NOV / Notices of Intent for Enforcement: 6
- Calendar Year 2003
  - Notices of Deficiency (NOD): 309
  - Notices of Violation (NOV): 205
  - NOV / Notices of Intent for Enforcement: 89

As you are well aware, the wet weather problems that we saw in 2003 really started in the last quarter of 2002.

I am going to try to not repeat the previous discussion on the chronic rainfall.

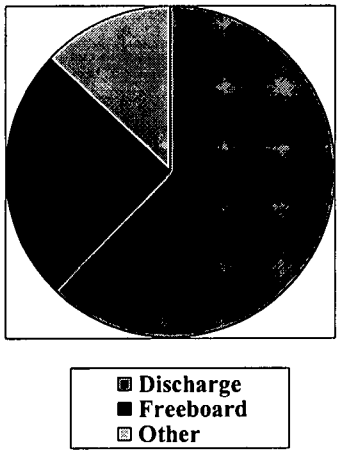
I am showing the 4th quarter of 2002 as that is the start of the prolonged period of above average rainfall. Farms should have gone into this period with low levels in their lagoons. As you can see by the numbers of notices of deficiencies and violations, some farms entered that period without the appropriate level of storage capacity. It is interesting to note that despite the prolonged wet weather from October to June, only 439 facilities (less than 20%) got into the "red", had less than the minimum required freeboard. Of those 439, 72% had been properly operating their farms (including having pumped down to the stop pump elevation). 110 farms had not done so.

6 Enforcements: 4 were for discharges, 1 failure to notify freeboard, 1 long list of permit violations,

89 Failure to report, discharges

2003 Animal Enforcement Cases

(By Type of Case)



77 Total Cases

- 48 Discharge
- 19 Freeboard Violations without Discharge
- 10 Other Violations

Of the 89 notices of Intent for enforcement, 77 enforcement actions were taken. There are several potential reasons why a notice on enforcement does not result in a civil penalty action. For example, the permittee may provide information that was not previously available to the inspector that after consideration results in the cessation of the enforcement action. Of the 48 discharges, 44 were to surface waters. Of the 19 freeboard violations, 15 did not notify us. The total civil penalties assessment was $356,972. Ranging from $500 to ~$22,000 (multiple discharges from the facility). Of the $356,972 assessed, ~$150,000 has been collected. The remainder are under payment plans, have requested remission from the EMC or have contested the penalty through the Office of Administrative Hearings (the largest penalty case has been paid).

The other types of violations include such things as over application of wastewater (exceeding the nitrogen loading on the crops), failure to maintain records, ponding and application to saturated fields, incorrect crops.

2003 Animal Operations Freeboard Letters

- Total Notices of Deficiency (NOD): 316
- Total Notices of Violation (NOV): 110
- Total Considerations for Assessment: 13

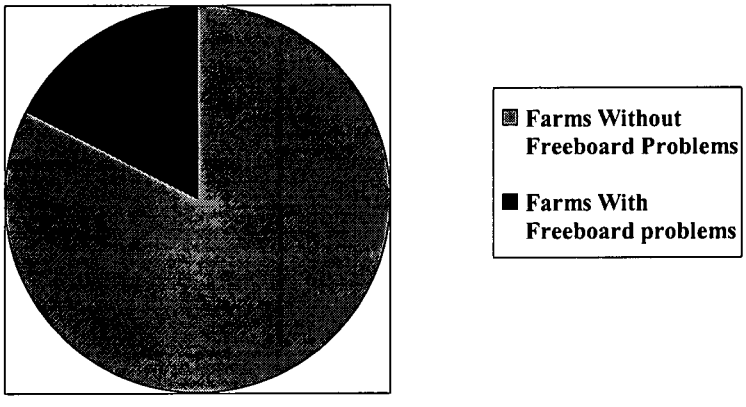
Paul has described the process by which the Division determined whether to issue an NOD or NOV, so I am not going to repeat that presentation. I just wanted to briefly mention that during this period of wet weather, the regional staff reviewed all the farm records from 439 farms, to determine whether the operator had appropriately lowered the lagoons going into the wet winter months, and had then taken appropriate actions as weather allowed to applying during the wetter periods. The 13 cases considered for further enforcement were situations where the operator of the system neglected to exercise care and due diligence in managing the farm.

Breakdown of NODs and NOVs

Swine: 407 / Cattle: 18 / Poultry: 1

All Considerations for Assessment are Swine Farms

Farms with Freeboard Problems in 2003



Less than 20% of the permitted facilities had freeboard problems in 2003.

This slide is a pictorial representation of the same information I have been presenting. As a percentage of the whole, about 17% of the facilities had freeboard problems. A high percentage of those with the problems called the regions to advise of the problems. In fact, we have record of 1253 calls with respect to freeboard problems. As you can see by that number and the number of farms that had insufficient freeboard (537), the regional inspectors worked closely with the facilities in their management of the problems.

The Historical Perspective

	2000	2001	2002	2003
Inspections	3162	2610	2760	1800
Discharges	152	58	51	103
Freeboard Violations	285	102	49	537
Civil Penalties	$404,850	$149,500	$107,440	$356,972

The number of freeboard violations increased dramatically in 2003, as a result of the extended wet weather period. The freeboard violations were also high in 2000, these numbers reflect both the aftermath of Hurricane Floyd and the large winter storms that we had in 1999-2000. However, the positive point I wanted to make was that while the freeboard violations were significantly higher in 2003, the numbers of discharges were not as high that year as the year 2000. We believe this to be a result of the continued efforts from the operators to manage the farms and the continued compliance oversight efforts.

National Pollutant Discharge Elimination System Permits
(NPDES)

• Major Municipalities	149
• Major Industries	94
• Minor Municipalities	158
• Minor Non-Municipalities	1053
»**TOTAL**	1454

The National Pollutant Discharge Elimination System Program is the Clean Water Act permitting program for facilities that discharge wastewater to surface waters. I am capturing here the universe of permitted facilities.

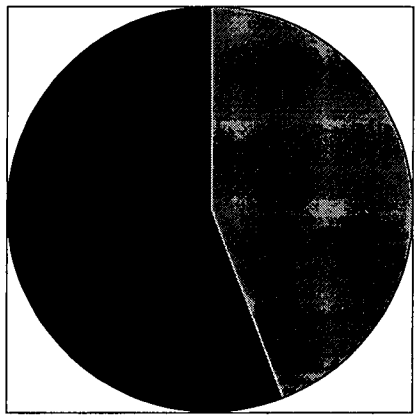
These numbers are the numbers of individually permitted wastewater treatment plants. The minor municipalities are usually small towns and they have permitted flows of less than 1 million gallons and minimal to no industrial contribution to their waste stream. Larger municipalities have permits ranging up to 64 MGD.

Minor non-municipal systems serve such entities as school systems, mobile home parks, subdivisions, shopping centers, rest homes, etc.

The number of permitted facilities at the end of 1998 was 1629 (a reduction in 175 facilities at the end of 2003). The numbers of discharging facilities are dropping through consolidation of facilities, eliminating through other options (non-discharge), electing to drop permits, etc.

Many of our compliance problems come from the smaller facilities – they have less resources to manage their systems and lesser

Breakdown of Assessment Cases



Total Assessments: 838
Municipalities: 371
Other: 467

The 838 civil penalty assessments totaled $954,248 in 2003. $557,663 of those penalties were assessed against municipalities (55% of the overall penalties assessed against NPDES facilities). 73% of the overall penalties have been collected. During the same period, the Division performed 846 inspections of NPDES facilities.

Problem facilities – small municipalities and private package plants serving subdivisions, schools, ...

The Historical Perspective

	2001	2002	2003
# Permits	1485	1444	1454
Inspections	1172	1100	846
Penalties	$828,470	$856,832	$954,248

Come back to the issue of the declining number of inspections.

Sanitary Sewer Permitting

- 130 Active Collection System Permits
  - 20 Issued in 2003
- 156 Additional System Permits Required
- Subject Systems Permitted by June 30, 2005

From the discharge arena, I want to jump to the issue of sanitary sewer overflows and collection system permitting. This is truly a significant issue for the state from a water quality perspective to an economic growth perspective. Our sewer infrastructure in North Carolina is facing some serious challenges. This issue is a challenge to us all. In round numbers, North Carolina has approximately 30,000 miles of sanitary sewer in the ground and is growing on a daily basis. We handle about 1300 permitting requests per year for extensions to that system. Just for comparison sake, we have approximately 100,000 miles of paved roads in North Carolina. The sewer system is mainly out of sight and for that reason, has also been a lower priority in past years. However, with the number of spills that have been occurring from these systems, that is no longer the case. Many towns are finding that they have large sewer trunk line systems that are at their hydraulic capacity and overflowing with large rain events. Additionally, they are finding older systems are in terrible shape and needing to be replaced as they can no longer carry the flow to the treatment plant. In addition, our behavior, as citizens, is creating problems by the flushing of grease and objects down sinks and toilets that creates clogs in the lines and geysers in someone else's back yard. How big is the problem?

How Big is the Problem?

- 2,000 – 3,000 spills per year
- Infrastructure Needs (2000 Survey)
  - Infiltration/Inflow Repair $291 Million
  - Sewer System Replacement $205 Million
  - New Interceptors $1.535 Billion
  - New Collection Systems $1.725 Billion

The problem is big. In 2003, we had 3206 reported spills. An estimated 151 million gallons spilled.

These numbers, both the spills and infrastructure needs are very large.

So what is being done about this problem?

Permit Conditions for Collection Systems

- Operation to prevent overflows
- Compliance Schedules
- Moratoriums
- Capital Improvement Plans
- Contingency planning and minimum maintenance requirements

I mentioned the permits just a moment ago, in terms of the number of permits we have issued for collection systems. I wanted to talk about what those permits contain, how they are assisting us in addressing the problems. The permits being issued to collection system owners contain a myriad of conditions aimed at maintenance and operation of the systems. I have highlighted a few to bring to your attention. The permits require that they system be effectively managed to prevent sanitary overflows from the system. In cases where there are identified problems, compliance schedules are being developed to require the owners to address the identified problems with specific actions and within specified timelines. Failure to meet the requirements may result in a moratorium being placed on the town, preventing them from being able to add additional wastewater to the system, until it is capable of handling the volume without overflows. Of the 130 permits, 60% (78) of them contain schedules to address problems that have been identified.

Moratoriums are another tool that we have used to address systems with continuing sanitary sewer overflow problems, particularly when they are in repeat locations and no actions are being taken to address the problem. Currently there are a total of 34 moratoriums imposed. These may be partial within a specific sewer-shed of a municipality or system-wide, depending on the extent of the problems. 19 of these moratoriums are related to sewer over flows, the remainder have been instituted as a result of capacity issues at the wastewater treatment plant itself.

Permittees are also required to adopt and implement a Capital Improvement Plan designating funding for reinvestment into the infrastructure of the collection system. The permit requires that the plan address the short term and long term needs (3-5 years).

Other conditions of the permit require contingency planning for pump failure at each pump station and a minimum of 10% cleaning of the lines each year.

What Actions Are Being Taken?

- Improved tracking of spills
- Increased compliance oversight emphasis
- Municipal actions
  - Comprehensive assessments
  - Increased emphasis on cleaning & repairs
  - Dramatically increased pace

We have been working on a data management tool to collect better information on the sanitary sewer overflows. Additionally, we are in process of launching a web interactive process for the municipalities to be able to log the information in electronically themselves on the size, location, cause, etc. This will give us all better to tools to assess the problems more quickly and determine if additional actions might be needed in specific locations.

We sent a letter to all owners of the collection systems this fall, detailing that every sanitary overflow is a violation and makes them subject to potential enforcement action – notice of violation, civil penalty action and potential moratorium. The reporting requirements have gotten more stringent (in terms of having to speak to a live person and the timing of follow up). You will have noticed on earlier slides that our number of inspections of WWTP's is down. This is due to several things, staff turnover has been significant for us in the past several years. However, we are also devoting more time to addressing the sanitary sewer overflow problems. These are complex issues both for us and for the owners of the system to sort through. However, we are making progress and the regional office staff advise that they see the towns are taking this issue more seriously than ever in the past with performing comprehensive assessments of the systems, putting more emphasis on cleaning and repairs and increasing dramatically the pace at which they pursuing improvements. As an example, Greensboro is spending over $42 million to repair their system and replacing entire sewer mains; Eden is proceeding with upgrades to three of their pump stations; High Point has completed several phases of mainline replacement and is in the midst of several others, Wadesboro has upgraded a pump station, several thousand feet of line and removed roof drains and eliminated their recurring sanitary sewer overflows.

Questions?

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: George Givens
Environmental Review Commission Counsel

Jim Johnson
Director of Fiscal Research

FROM: William G. Ross, Jr.

DATE: December 4, 2003

RE: Status Report on Individually Permitted Discharging Systems
Beginning July 1, 2002 and Ending June 30, 2003
Fiscal Year 2002-2003

Pursuant to G.S. 143-215.9A, the Department of Environment and Natural Resources submits the subject fiscal year report.

The enclosed report details the inspections completed and the enforcement actions taken in North Carolina during fiscal year 2002-2003 by the Division of Water Quality. In addition, information on Special Orders by Consent is included. The report also includes a table showing the number of permits issued by region.

The enclosed tables list totals for each of the Department's regional offices as well as State totals. The regional offices are noted as follows:

- ARO – Asheville Regional Office
- FRO – Fayetteville Regional Office
- MRO – Mooresville Regional Office
- RRO – Raleigh Regional Office
- WARO – Washington Regional Office
- WIRO – Wilmington Regional Office
- WSRO – Winston-Salem Regional Office

If any additional information or clarification is needed, please do not hesitate to contact us.

ATTACHMENTS

Cc: Alan W. Klimek, P.E.

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Table 1 Enforcement actions taken, Civil Penalties assessed and collected, and Remissions Requested from July 1, 2002 through June 30, 2003.

Table 2 Permits Issued and Inspections completed from July 1, 2002 through June 30, 2003.

Table 3 Special Orders by Consent (SOCs) active and pending from July 1, 2002 through June 30, 2003.

Addendum Support information

Table 1

For the Period Beginning July 1, 2002 and Ending June 30, 2003*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total Number Of Enforcement Actions Assessed	87	95	137	161	57	66	263	866
Total Number Of Enforcement Actions Assessed By The Director	3	1	3	3	0	0	1	11
Total Number Of Enforcement Actions Assessed By The Regional Supervisors	84	94	134	158	57	66	262	855
Enforcement Actions Generated From Limit &/or Monitoring Violations	82	90	126	154	54	62	256	824
Enforcement Actions Generated From Other Permit Condition Violations	5	5	11	7	3	4	7	42
Total Civil Penalties Assessed	$76,521.59	$120,032.86	$135,245.74	$202,569.02	$49,382.77	$68,416.94	$281,654.24	$933,823.16
Total Civil Penalties Collected	$94,256.88	$81,909.04	$134,760.14	$291,237.42	$46,710.27	$136,474.09	$263,013.14	$1,048,360.98
Remission & Contested Case Responses to Enforcement Actions								
Total Number Of Remission Requests	11	21	26	22	4	14	38	136
Total Number Of Enforcement Actions With Partial Or Full Remission By The Director	7	5	14	5	0	2	4	37
Total Number Of Remission Requests Pending The Director's Decision	17	19	38	36	6	16	45	177
Total Number Of Remission Requests Pending The EMC's Final Agency Decision	21	16	33	57	6	19	32	184
Total Number Of Contested Cases (known at this time)	0	1	1	4	0	0	2	8

* Fiscal Year numbers are reported as of 10/14/2003 and may vary from actual due to delays in data entry.

Table 2
For the Period Beginning July 1, 2002 and Ending June 30, 2003*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total Number Of Individually Permitted Facilities	302	97	276	204	149	139	287	1454
Major Municipal Permitted Facilities	19	18	28	31	15	13	25	149
Major Non-Municipal Permitted Facilities	19	11	22	9	12	13	8	94
Minor Municipal Permitted Facilities	25	23	28	17	24	16	25	158
Minor Non-Municipal Permitted Facilities	239	45	198	147	98	97	229	1053
Number Of NPDES Permits Issued	57	13	15	27	32	39	34	217
Major Municipal Permits Issued	2	7	6	11	4	6	10	46
Major Non-Municipal Permits Issued	1	2	2	2	2	5	4	18
Minor Municipal Permits Issued	7	0	0	2	11	1	1	22
Minor Non-Municipal Permits Issued	47	4	7	12	15	27	19	131
Total Number Of Compliance Evaluation Inspections Completed	154	49	170	131	78	64	133	779
Total Number Of Other Inspections Completed	40	8	37	58	13	7	31	194

Table 3
Status of Special Orders By Consent (SOCs)
For the Period Beginning July 1, 2002 and Ending June 30, 2003*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total Number of Individually Permitted Facilities With Active SOCs	1	3	2	2	5	1	1	15
Total Number of Individually Permitted Facilities Requesting New or Amended SOCs	2	1	1	2	5	2	9	22

* Fiscal Year numbers are reported as of 10/14/2003 and may vary from actual due to delays in data entry.

ADDENDUM

The following is provided to support the information in the above status report.

- The Division of Water Quality does not have the data or management system in place to currently track information on the number of violations found during each inspection, the date of the violation, or the nature of the violation. A Basinwide Information Management System is, however, under development to address these needs. Funding has been allocated for the initial development phase. Completion of the system will require further funding. Therefore, at this time, the Division is unable to provide such information as requested in the amended G.S. 143-215.9A(a)(3).
- As found in Table 2, "Other Inspections" include:
  - **Audit Inspections**, a comprehensive review of all elements of a municipal's pretreatment program including a records review & an inspection of an industrial facility conducted once every 5 years;
  - **Bioassay Compliance Inspections**, evaluates the biological effect of a permittee's effluent discharge on test organisms using acute and chronic toxicity testing;
  - **Compliance Sampling Inspections**, a sampling inspection designed to verify the permittee's compliance with applicable permit self-monitoring requirements -- analytical results from representative samples collected during the inspection are used to evaluate the permittee's compliance;
  - **Diagnostic Inspections**, focuses on Publicly Owned Treatment Works that have not achieved permit compliance – the purpose is to identify the causes of noncompliance, suggest immediate remedies, and support current or future enforcement action;
  - **Operation & Maintenance Inspections**, focuses on the operation and maintenance aspect of a facility;
  - **Performance Audit Inspections**, inspections that include actual observation of the permittee performing the self-monitoring process from sample collection and flow measurements through laboratory analyses, data work-up and reporting;
  - **Pre-Treatment Inspections**, an annual inspection of a municipal's pretreatment program; and
  - **Toxicity Sampling Inspections**, same as CSI – however, increased emphasis is placed on toxic substances regulated by the NPDES Permit.
- Effective July 1, 1998, the Director of the Division of Water Quality delegated each Regional Water Quality Supervisor the authority to sign all Civil Penalty Assessments for fast-track enforcement actions for violations of NPDES Permit effluent limitations and/or monitoring frequencies in accordance with NCGS 143-215.6A.
- As found in Table 1, "Other Permit Condition Violations" may include
  - discharge violations (resulting from collection system overflows);
  - submitting late Discharge Monitoring Reports;
  - submitting late Toxicity Tests; and
  - permit condition violations (examples, violations of pre-treatment program, improper operation & maintenance of treatment works, or by-pass of treatment works)
- Due to the length of the post assessment process, total civil penalties assessed and total civil penalties collected will not coincide.

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: Jim Johnson
Director, Fiscal Research Division

George Givens
Environmental Review Commission Counsel

FROM: William G. Ross Jr., Secretary

DATE: October 2, 2003

RE: Status of permitting and inspecting animal waste management systems/Animal Waste Compliance Report for Period Beginning January 1, 2002 and Ending June 30, 2003

Pursuant to G.S. 143-215.10M, the Department of Environment and Natural Resources submits the subject annual report.

This report details the inspections and operational reviews completed in North Carolina during the year 2002 and the first two quarters of 2003 for both the Division of Water Quality and the Division of Soil and Water Conservation. The tables show the type of inspection and the number of inspections completed quarterly and year to date. The Pilot Project conducted by the Division of Soil and Water Conservation is still in effect for 2003. The tables also show the number of permits issued as well as violations and deficiencies by region.

The enclosed tables list totals for each of the Department's Regional Offices as well as state totals. The Regional Offices are noted as follows: ARO – Asheville Regional Office, FRO – Fayetteville Regional Office, MRO – Mooresville Regional Office, RRO – Raleigh Regional Office, WARO – Washington Regional Office, WIRO – Wilmington Regional Office, and WSRO – Winston-Salem Regional Office.

If there is a need for any additional information or clarification, please do not hesitate to contact us.

WGR/kts

Attachment

cc: Alan W. Klimek, P.E.

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Year to Date Totals for 2003*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total number of Animal Operations Requiring Inspections and Operation Reviews during 2003	32	751	99	257	551	680	109	2479
DWQ Total number of inspections completed**	16	197	34	136	67	132	57	639
Routine DWQ annual compliance inspections	14	164	34	86	22	52	45	417
Inspections conducted due to complaints	0	11	0	6	3	16	7	43
Follow-up of previous review or inspection	2	6	0	17	2	5	5	37
Emergency notification	0	5	0	1	4	11	0	21
Lagoon Evaluation	0	0	0	25	35	1	0	61
Other inspections	0	11	0	1	1	47	0	60
DSWC Total number of compliance inspections completed** (Brunswick, Columbus, and Jones County Only)	-	-	-	-	5	23	-	28
Routine DSWC annual compliance inspections	-	-	-	-	0	0	-	0
Inspections conducted due to complaints	-	-	-	-	0	2	-	2
Follow-up of previous review or inspection	-	-	-	-	0	7	-	7
Emergency Notification	-	-	-	-	1	1	-	2
Other inspections	-	-	-	-	4	13	-	17
DSWC Total number of operation reviews completed***	0	257	58	130	274	320	26	1065
Routine operation reviews	0	247	57	128	261	315	25	1033
Inspections conducted due to complaints	0	0	0	0	0	0	0	0
Follow-up of previous review or inspection	0	8	0	0	6	1	1	16
Emergency Notification	0	2	0	0	0	0	0	2
Other inspections	0	0	1	2	7	4	0	14
Other Agency Total number of operation reviews completed****	0	0	0	5	0	0	17	22
Routine operation reviews	0	0	0	5	0	0	17	22

*Year to date numbers are reported as of 6/30/03 and may vary from actual due to delays in data entry and continued refinements to database.

**Pilot Project. Compliance Inspections will normally only be conducted in Brunswick, Columbus, and Jones County by DSWC. Operation reviews are normally conducted in the Pilot Counties in the spring and compliance inspections in the fall. As of July 1, 1999, Brunswick County became part of the Pilot Project.

***Inspections and operation reviews may include facilities that are no longer in operation and/or multiple inspections or operation reviews at one facility.

****Other Agencies include Soil and Water Conservation Districts and NRCS.

Average time to complete a compliance inspection or operation review is approximately 6 hours. It is anticipated that this time will increase as the number of farms that have certified animal waste management plans and permits increases.

Year to Date Totals for 2003

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Number of Permits Issued to Animal Operations	16	746	103	253	549	679	102	2448
Swine	1	740	13	198	545	679	25	2201
Cattle	15	4	87	41	3	0	76	226
Poultry	0	2	3	14	1	0	1	21

Year to Date Totals for 2003

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Deficiencies and Violations[1] found during DSWC operation reviews and DWQ inspections*	9	198	13	102	170	229	59	780
Number of facilities receiving a deficiency or violation from inspections	2	149	3	64	124	187	27	556
Enforcement actions initiated for violations noted in 2003 Calendar Year**	0	3	0	16	14	24	4	61

*Violation totals include violations noted during both operation reviews and compliance inspections and may include multiple violations at a single facility. 456 of the deficiencies and violations were self-reported high-freeboard and not the result of an inspection.

**Enforcement actions being developed by the regional staff are normally not shown as actions initiated during that quarter. These actions will be included in the next year to date totals.

Deficiencies and Violations Identified[1]	Total number of inspections with identified problem	Percent of total problems identified	Percent of total inspections completed (1,754)
Discharges from Animal Waste Management System	59	7.6	3.4
Of the total discharges identified, the number of discharges that reached surface waters of the state	(29)***	(3.7)	(1.7)
Inadequate Freeboard	610****	78.2	34.8
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(72)	(9.2)	(4.1)
No Certified Operator in Charge	11	1.4	0.6
Evidence of over application	67	8.6	3.8
Does not meet setbacks	1	0.1	0.1
Inadequate land	3	0.4	0.2
Crop differs from that stated in Certified Animal Waste Management Plan	29	3.7	1.7
Totals	780*****	100	

***Of the discharges to surface waters, 5 were from cattle operations, 19 were from swine operations and 5 were from poultry operations.

****456 of the Inadequate Freeboard violations were self-reported and not the result of an inspection.

*****1,754 inspections and reviews were conducted. There were 7 potential problems evaluated on each report. Therefore the total possible deficiencies and violations that could have been noted was 12,278. The 780 problems identified represents 6.4% of the total potential number.

Year to Date Totals for 2003*

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM								
Deficiencies and Violations[1] Identified	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Discharges from Animal Waste Management Systems	2	7	1	16	11	14	8	59
Of the total discharges identified, the number of discharges that reached surface waters of the state	(2)	(3)	(0)	(11)	(6)	(7)	(0)	(29)
Inadequate Freeboard	1	169	9	72	135	190	34	610
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(1)	(6)	(0)	(23)	(26)	(8)	(8)	(72)
No Certified Operator in Charge	0	0	0	4	1	1	5	11
Evidence of over application	2	16	1	2	17	23	6	67
Does not meet setbacks	0	0	0	1	0	0	0	1
Inadequate land	2	0	0	1	0	0	0	3
Crop differs from that stated in Certified Animal Waste Management Plan	2	6	2	6	6	1	6	29
Totals	9	198	13	102	170	229	59	780

*Year to date numbers are reported as of 6/30/03 and may vary from actual due to delays in data entry and continued refinements to database.

Year to Date Totals for 2003*

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM					
Deficiencies and Violations Identified[1]	Swine	Cattle	Poultry	Horses	State Totals
Discharges from Animal Waste Management System	42	11	6	0	59
Of the total discharges identified, the number of discharges that reached surface waters of the state	(19)	(5)	(5)	(0)	(29)
Inadequate Freeboard	562	41	7	0	610
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(58)	(9)	(5)	(0)	(72)
No Certified Operator in Charge	5	3	3	0	11
Evidence of over application	59	8	0	0	67
Does not meet setbacks	0	1	0	0	1
Inadequate land	0	2	1	0	3
Crop differs from that stated in Certified Animal Waste Management Plan	20	8	1	0	29
Totals	688	74	18	0	780

*Year to date numbers are reported as of 6/30/03 and may vary from actual due to delays in data entry and continued refinements to database.

[1] From the period of 1/1/03 through 6/30/03, DWQ has issued roughly 264 Notice of Deficiencies, approximately 225 Notice of Violations, and 74 Requests for Information. This number can only be estimated due to the ongoing review of freeboard caes.

Totals for 2002

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total number of Animal Operations Requiring Inspections and Operation Reviews during 2002	35	756	103	265	555	687	111	2512
DWQ Total number of inspections completed*	41	793	111	334	616	723	142	2760
Routine DWQ annual compliance inspections	39	763	108	274	563	637	115	2499
Inspections conducted due to complaints	0	7	0	9	1	12	6	35
Follow-up of previous review or inspection	1	8	0	26	28	46	20	129
Emergency notification	0	6	0	0	9	4	1	20
Other inspections	1	9	3	25	15	24	0	77
DSWC Total number of compliance inspections completed** (Brunswick, Columbus, and Jones County Only)	-	-	-	-	49	75	-	124
Routine DSWC annual compliance inspections	-	-	-	-	41	63	-	104
Inspections conducted due to complaints	-	-	-	-	0	6	-	6
Follow-up of previous review or inspection	-	-	-	-	7	4	-	11
Emergency notification	-	-	-	-	1	1	-	2
Other inspections	-	-	-	-	0	1	-	1
DSWC Total number of operation reviews completed*	26	628	107	201	547	670	91	2270
Routine operation reviews	26	627	106	201	521	654	91	2226
Inspections conducted due to complaints	0	0	1	0	0	0	0	1
Follow-up of previous review or inspection	0	0	0	0	18	8	0	26
Emergency notification	0	1	0	0	1	0	0	2
Other inspections	0	0	0	0	7	8	0	15
Other Agency Total number of operation reviews completed***	12	0	6	82	44	43	24	211
Routine operation reviews	12	0	6	82	44	41	24	209
Follow-up of previous review	0	0	0	0	0	2	0	2

*Inspections and operation reviews may include facilities that are no longer in operation and/or multiple inspections or operation reviews at one facility.

**Pilot Project. Compliance Inspections will normally only be conducted in Brunswick, Columbus, and Jones County by DSWC. Operation reviews are normally conducted in the Pilot Counties in the spring and compliance inspections in the fall. As of July 1, 1999, Brunswick County became part of the Pilot Project.

***Other Agencies include Soil and Water Conservation Districts and NRCS.

Average time to complete a compliance inspection or operation review is approximately 6 hours. It is anticipated that this time will increase as the number of farms that have certified animal waste management plans and permits increases.

Totals for 2002

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Number of Permits Issued to Animal Operations	3	76	8	24	29	61	12	213
Swine	0	75	3	29	29	61	3	190
Cattle	3	0	5	3	0	0	9	20
Poultry	0	1	0	1	0	0	0	2
Horses	0	0	0	1	0	0	0	1

Totals for 2002

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Deficiencies and Violations[1] found during DSWC operation reviews and DWQ inspections*	23	84	17	52	109	98	45	428
Number of facilities receiving a deficiency or violation from inspections	8	51	2	34	50	83	33	261
Enforcement actions initiated for violations noted in 2002 Calendar Year**	0	10	2	7	0	4	1	24

*Violation totals include violations noted during both operation reviews and compliance inspections and may include multiple violations at a single facility.

**Enforcement actions being developed by the regional staff are normally not shown as actions initiated during that quarter. These actions will be included in the next year to date totals.

Deficiencies and Violations Identified[1]	Total number of inspections with identified problem	Percent of total problems identified	Percent of total inspections completed (5,365)
Discharges from Animal Waste Management System	65	15.2	1.2
Of the total discharges identified, the number of discharges that reached surface waters of the state	(29)***	(6.8)	(0.5)
Inadequate Freeboard	74	17.3	1.4
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(35)	(8.2)	(0.7)
No Certified Operator in Charge	45	10.5	0.8
Evidence of over application	146	34.1	2.7
Does not meet setbacks	5	1.2	0.1
Inadequate land	8	1.9	0.2
Crop differs from that stated in Certified Animal Waste Management Plan	85	19.9	1.6
Totals	428****	100	

***Of the discharges to surface waters, 5 were from cattle operations, 24 were from swine operations and 0 were from poultry operations.

****5,365 inspections and reviews were conducted. There were 7 potential problems evaluated on each report. Therefore the total possible deficiencies and violations that could have been noted was 37,555. The 428 problems identified represents 1.1% of the total potential number.

Totals for 2002

[1] From the period of 01/01/02 through 12/31/02, DWQ issued 71 Notice of Deficiencies and 262 Notice of Violations.

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM								
Deficiencies and Violations[1] Identified	**ARO**	**FRO**	**MRO**	**RRO**	**WARO**	**WIRO**	**WSRO**	**State Totals**
Discharges from Animal Waste Management Systems	5	16	1	11	15	11	6	65
Of the total discharges identified, the number of discharges that reached surface waters of the state	(2)	(7)	(0)	(4)	(8)	(5)	(3)	(29)
Inadequate Freeboard	9	4	3	13	22	14	9	74
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(9)	(0)	(2)	(13)	(2)	(2)	(7)	(35)
No Certified Operator in Charge	5	8	0	11	11	9	1	45
Evidence of over application	1	43	3	10	43	39	7	146
Does not meet setbacks	0	1	0	2	1	1	0	5
Inadequate land	0	3	0	0	0	4	1	8
Crop differs from that stated in Certified Animal Waste Management Plan	3	9	10	5	17	20	21	85
Totals	23	84	17	52	109	98	45	428

Totals for 2002

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM					
Deficiencies and Violations Identified[1]	**Swine**	**Cattle**	**Poultry**	**Horses**	**State Totals**
Discharges from Animal Waste Management System	51	14	0	0	65
Of the total discharges identified, the number of discharges that reached surface waters of the state	(24)	(5)	(0)	(0)	(29)
Inadequate Freeboard (Certified Farms)	49	20	5	0	74
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(12)	(20)	(3)	(0)	(35)
No Certified Operator in Charge	37	7	1	0	45
Evidence of over application	136	10	0	0	146
Does not meet setbacks	4	0	1	0	5
Inadequate land	7	1	0	0	8
Crop differs from that stated in Certified Animal Waste Management Plan	51	31	1	2	85
Totals	335	83	8	2	428

[1] From the period of 01/01/02 through 12/31/02, DWQ has issued roughly 71 Notice of Deficiencies and approximately 262 Notice of Violations

Compliance and Inspection Reports

NC Division of Water Quality
March 25, 2004

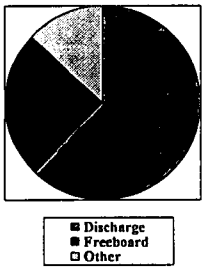
Animal Feeding Operations

- Animal Operations 2461
- Inspections Completed 1800
- Inspections w/Identified Problems 878
  - Discharges 103/50 to surface waters
  - Inadequate freeboard 537
  - Evidence of over application 145
  - Crops different than approved 70

Animal Waste Notices

- 4th Quarter 2002
  - Notices of Deficiency (NOD): 7
  - Notices of Violation (NOV): 32
  - NOV / Notices of Intent for Enforcement: 6
- Calendar Year 2003
  - Notices of Deficiency (NOD): 309
  - Notices of Violation (NOV): 205
  - NOV / Notices of Intent for Enforcement: 89

2003 Animal Enforcement Cases
(By Type of Case)



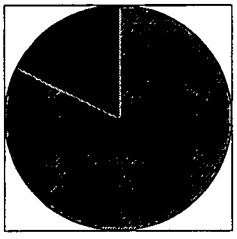
77 Total Cases

- 48 Discharge
- 19 Freeboard Violations without Discharge
- 10 Other Violations

2003 Animal Operations Freeboard Letters

- Total Notices of Deficiency (NOD): 316
- Total Notices of Violation (NOV): 110
- Total Considerations for Assessment: 13

Farms with Freeboard Problems in 2003



Less than 20% of the permitted facilities had freeboard problems in 2003.

The Historical Perspective

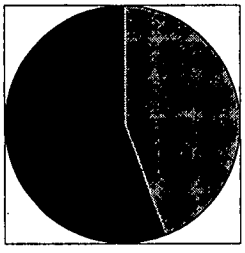
	2000	2001	2002	2003
Inspections	3162	2610	2760	1800
Discharges	152	58	51	103
Freeboard Violations	285	102	49	537
Civil Penalties	$404,850	$149,500	$107,440	$356,972

National Pollutant Discharge Elimination System Permits
(NPDES)

- Major Municipalities 149
- Major Industries 94
- Minor Municipalities 158
- Minor Non-Municipalities 1053

»**TOTAL** 1454

Breakdown of Assessment Cases



Total Assessments: 838
Municipalities: 371
Other: 467

The Historical Perspective

	2001	2002	2003
# Permits	1485	1444	1454
Inspections	1172	1100	846
Penalties	$828,470	$856,832	$954,248

Sanitary Sewer Permitting

- 130 Active Collection System Permits
  - 20 Issued in 2003
- 156 Additional System Permits Required
- Subject Systems Permitted by June 30, 2005

How Big is the Problem?

- 2,000 – 3,000 spills per year
- Infrastructure Needs (2000 Survey)
  - Infiltration/Inflow Repair $291 Million
  - Sewer System Replacement $205 Million
  - New Interceptors $1.535 Billion
  - New Collection Systems $1.725 Billion

Permit Conditions for Collection Systems

- Operation to prevent overflows
- Compliance Schedules
- Moratoriums
- Capital Improvement Plans
- Contingency planning and minimum maintenance requirements

What Actions Are Being Taken?

- Improved tracking of spills
- Increased compliance oversight emphasis
- Municipal actions
  - Comprehensive assessments
  - Increased emphasis on cleaning & repairs
  - Dramatically increased pace

Questions?

Interim Report on the Effectiveness of the Surface Water Identification Training and Certification Program

N.C. Division of Water Quality
March 25, 2004

Background

- Surface Water Identification and Certification (SWITC) Program established HB 1257 in 2001
- Require training and certification of state DWQ and DFR staff
- Require training and certification of local delegated programs

Training Classes Held

- Four classes for agencies in 2002 and 2003
  - Twice each in Kinston and Crossnore
    - DWQ - 45 certified
    - DFR - 27 certified
    - Orange County - 4 certified
    - DOT - 34 trained
    - Others - 8 trained
    - **Total 118 individuals**

Training Classes held (cont.)

- Two classes held for private sector in 2002-2003
  - Same class as for private sector
  - Taught in conjunction with NCSU - Educational Outreach
  - Classes in Raleigh and Lenior
  - about 60 students trained

Future classes

- Public agencies - fall 2004?
- Private individuals - summer 2004
- Other local government staff
  - For future delegated programs
  - Local stream buffer protection programs
  - Phase II and other state rules

Other benefits of SWITC

- Encourage local governments to use State's methodology
- US Army Corps of Engineers has agreed to use State's methodology

Stream Mapping Effort

- Joint effort of DOT and DWQ to improve quality of stream maps in NC.
- Purpose - develop computer map of stream locations for planning and mitigation purposes.
- Useful for various local, state and federal agencies.

Outline of Planned Work

• DOT and DWQ funding	Completed
• Steering committee meet	Meet monthly, twice to date
• Hire DWQ staff	Done
• Establish Advisory Committee	Spring 2004
• Hire and train contractors	Winter 2004
• Map stream origins	Spring 2004
– Initially for 1/8 of state	

Outline of Planned Work (cont.)

• Prepare computer models	Summer 2004
• Determine accuracy of models	Fall 2004
• Determine other funding sources	Summer 2004
• Prepare final map	Winter 2004
• Begin phase II of mapping	Winter 2004
• Complete stream map for state	Summer 2006?
• Maintain and update map	Ongoing

Questions?

Michael F. Easley, Governor

William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P. E. Director
Division of Water Quality

Coleen H. Sullins, Deputy Director
Division of Water Quality

To: Environmental Review Commission (ERC)
From: Alan W. Klimek, P.E.
Re: Surface Water Identification Training and Certification (SWITC) Program, 2001 & 2002 Report
Date: September 18, 2003

Background –

The Division of Water Quality (DWQ) was mandated under House Bill 1257 (HB1257), Session Law 2001-404, General Statute 143-214.25 to develop the Surface Water Identification Training and Certification (SWITC) Program. The SWITC Program was developed to train and certify individuals to determine the presence of surface waters that would require the application of rules adopted by the Commission for the protection of riparian buffers. These rules include the Neuse River Riparian Buffer Protection Rules (15A NCAC 2B .0233, the Tar-Pamlico Riparian Buffer Protection Rules (15A NCAC 2B .0259), the Randleman Lake Riparian Buffer Protection Rules (15A NCAC 2B .0250) and the Catawba River Basin Riparian Buffer Protection Rules (15A NCAC 2B .0243).

Classes held during 2002 and 2003-

A total of three classes have been held for this training in response to House Bill 1257 including classes in Kinston and Crossnore. Another class will be held in Crossnore from September 14 –18, 2003 mainly for DWQ and DOT staff. To date, these classes have trained and certified a total of 112 individuals as follows: NC Division of Water Quality – 38; NC Division of Forest Resources – 29; NC Department of Transportation – 33; Orange County – 5; Town of Cary – 5; North Carolina State University – 1; US Environmental Protection Agency – 1; NC Division of Land Quality – 1; and NC Wildlife Resources Commission – 1. These individuals have all taken and passed a written and field test for the training although some individuals had to retake the field and/or written test. Those individuals that are allowed to be certified by House Bill 1257 have been certified while the others have received Certificates of Training.

The class drew a great amount of outside interest from the private environmental consultants and engineers. In response to this demand, Dr. James Gregory developed (with DWQ oversight and participation) a 4-day course at NCSU based on the SWITC Program. The course was taught once in January 2003 (New Bern, NC) to 36 students. DWQ personnel assisted in teaching the course. Dr. Gregory intends to teach the course again in October 2003 in Lenoir, NC.

Division of Water Quality (DWQ) staff–

HB1257 required that DWQ staff be trained and certified to make surface water determinations along with staff from the DFR and delegated local governments. The majority of the DWQ staff trained and certified under the SWITC Program already had years of experience making surface water determinations and implementing the rules. Therefore, the training that they received through the SWITC Program was mostly a refresher course for them. However, the SWITC Program provided an opportunity to ensure better coordination on the implementation of the rules and surface water determinations.

Division of Forest Resources (DFR) staff–

The majority of the individuals within the DFR trained under the SWITC Program were Water Quality Foresters already familiar with the DWQ rules. These individuals already worked very closely with the DWQ. Since the SWITC Program became operational in February 2002, the DFR has conducted 105 surface wat determinations that would have otherwise been conducted by the DWQ staff. Sixty-one of these determinations were in the Neuse River basin and forty-four were in the Tar-Pamlico basin. Counties which had the most stream determinations made for forestry purposes were Nash (19), Craven (10), Wilson (9) and Johnston (9).

This delegation of authority has relieved the DWQ workload significantly. Also this certification process was helpful to landowners requesting DFR assistance with their Forest Management Plans since DWQ staff no longer had to verify stream determinations made by the DFR. It also prevented the DFR from having to visit a site on more than one occasion.

Delegated Local Governments –

To date only one local government (Orange County) has requested delegation of the Neuse or Tar-Pamlico Buffer Rule. In October 2001, the N.C. Environmental Management Commission (EMC) delegated implementation of the Neuse Buffer Rule to Orange County. Approximately half of Orange County lies within the Neuse River Basin. The other half is within the Cape Fear River Basin (which currently doesn't have DWQ implemented buffer rules). Since the implementation of the SWITC Program, Orange County has evaluated nine (9) sites for the presence of surface waters subject to the Neuse Buffer Rule in 2002 and six (6) sites in 2003. The delegation of the buffer rule to Orange County did not relieve a great amount of workload from DWQ staff. However, Orange County has done an excellent job implementing the Rule. Training received through the SWITC Program and additional County specific training provided by DWQ has benefited their implementation of the Rule by integrating these rules into their land use management programs such as zoning and site plan approval. Indirectly, the training that Orange County received unde the SWITC Program has lead towards re-evaluation of their existing programs and some of the local municipalities' programs (such as the Town of Chapel Hill) have pursued measures to further protect the waters of NC.

Other municipalities (such as the Town of Cary) have evaluated their potential for delegation of the rules, but have not yet requested delegation from the EMC. The training received by staff of the Town of Cary under the SWITC Program has been positive in that it has aided in the implementation of the Neuse Buffer Rule within the Town's jurisdiction through improved correspondence between the Town and DWQ staff.

Department of Transportation Staff

Although HB1257 did not authorize the certification of DOT staff in making determinations for the presence of surface waters, providing training to the DOT through the SWITC Program has directly improved coordination between DWQ and DOT staff with respect to stream protection since DOT staff better understands what surface waters are protected under the rules. This has prevented unnecessary site visits that would have been requested by DOT prior to receiving this training. It has also aided the DOT in understanding how surface waters are regulated under other DWQ regulations (such as the 401 Certification Program).

Randleman Buffer Rule –

The Randleman Buffer Rule was created in response to the reclassification of waters within the watershed to "Water Supply" (WS). It is part of a unique management strategy to address the potential for nutrient problems within the watershed. The Rule was based on a previous version of the Neuse Buffer Ru that has since been modified. It does not include many of the practicable allowances as does the current version of the Neuse Buffer Rule. The Rule is in the process of being modified to resemble the Neuse Buffer

Rule. Currently, only the DWQ has the authority under the Rule to determine the presence of surface waters even though the local municipalities were required to create water supply ordinances including protected buffers. Once the Rule is changed to resemble the current Neuse Buffer Rule, then we expect that additional training of the local government officials will be necessary.

Other Local Buffer Protection Programs –

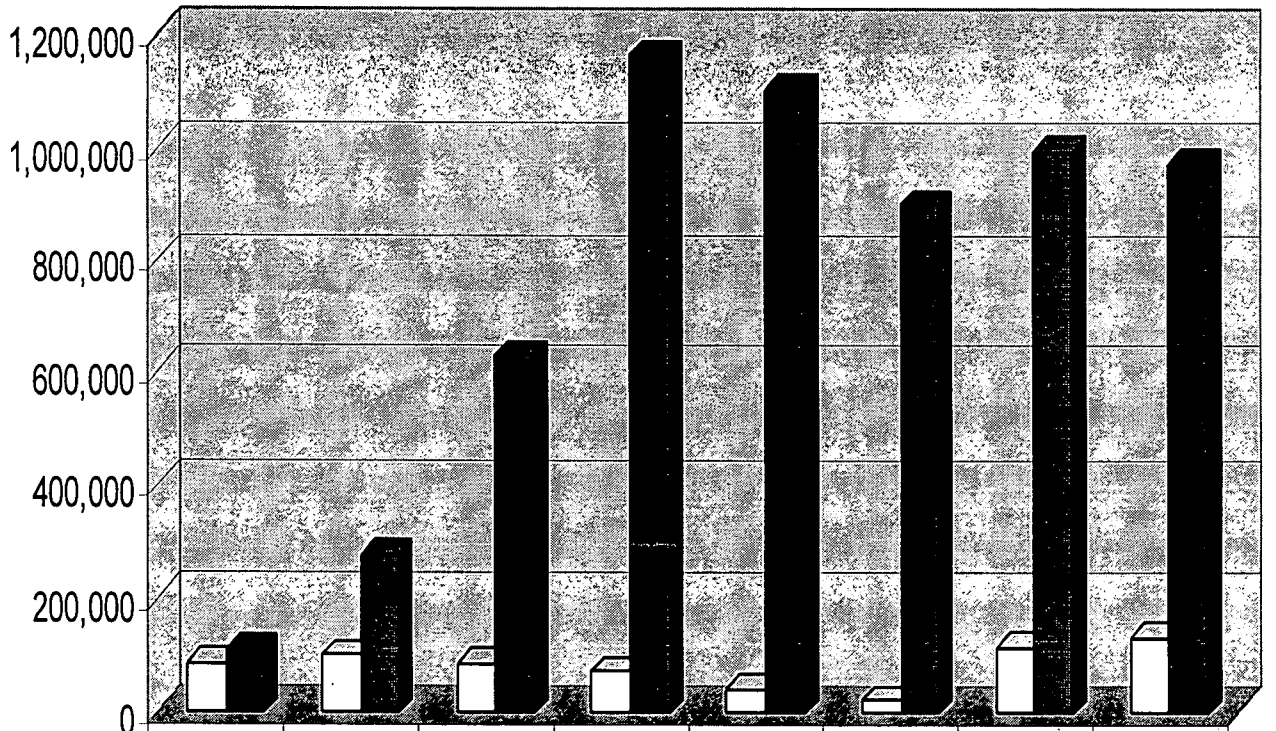
Other municipalities (notably Hendersonville, Cary, Durham and Charlotte) have developed and implemented stream buffer protection programs over the past several years. In addition, other municipalities (such as Monroe and Union County and Greensboro and Guilford County) are working with DWQ to develop buffer protection programs in order to address cumulative impacts from large development projects. There will be a real need for DWQ to train staff of these local governments using the SWITC program in order to keep the stream identification method consistent across the state. This effort will take considerable amounts of DWQ staff time in the next year.

Conclusions and Recommendations:

The SWITC Program successfully trained and certified 112 individuals within the DWQ, DFR and delegated local governments (Orange County) as well as other agencies on how to determine the presence of surface waters subject to the Neuse, Tar-Pamlico and Randleman Buffer Rules. In addition, the SWITC Program trained individuals within the DOT, EPA and potential, future delegated local governments and led to the development of an independent course taught at NCSU for private environmental consultants and engineers. DWQ intends to conduct a more detailed evaluation of the SWITC Program in the Winter of 2003/2004. DWQ intends to conduct detailed reviews of determinations made of individuals certified under the SWITC Program. As a direct result of HB 1257, the NC Division of Forest Resources has made over one hundred stream determinations for the Neuse and Tar-Pamlico Basin buffer rules. This has relieved DWQ staff of a significant workload and provided a rapid response to the needs of the forestry community.

DWQ believes that the SWITC Program has successfully fulfilled the requirements mandated under HB1257. In addition, DWQ believes that an additional staff position would be needed to expand this (and other) training programs in order to more fully implement the SWITC program. This position could provide needed on-going training of DWQ regulations and implementation procedures to the regulated public, local governments and other interested groups across the State. The DWQ currently does not have funds or positions specifically set aside to meet such a demand. As such, existing state wetland and stream regulatory programs have already been affected by having to devote resources towards the implementation of the SWITC Program.

Waste Imports and Exports FY 2002-2003

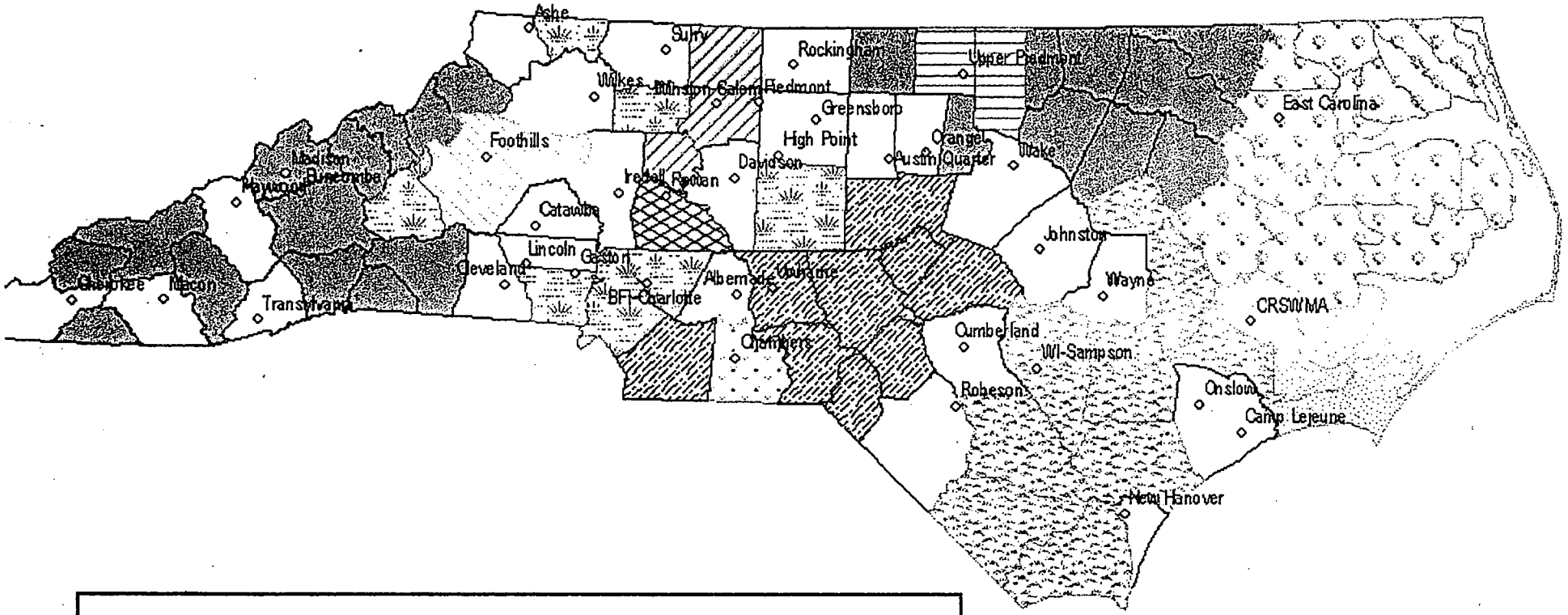


	FY 95-96	FY 96-97	FY 97-98	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03
□ Imports	88,982	103,510	87,393	74,185	41,840	21,614	117,981	133,145
■ Exports	111,097	280,400	629,415	1,166,875	1,106,897	900,743	994,678	971,286

March 25, 2004 ERC Meeting
EXHIBIT O

MSW Landfills Used by NC Counties According to Primary Facility Used

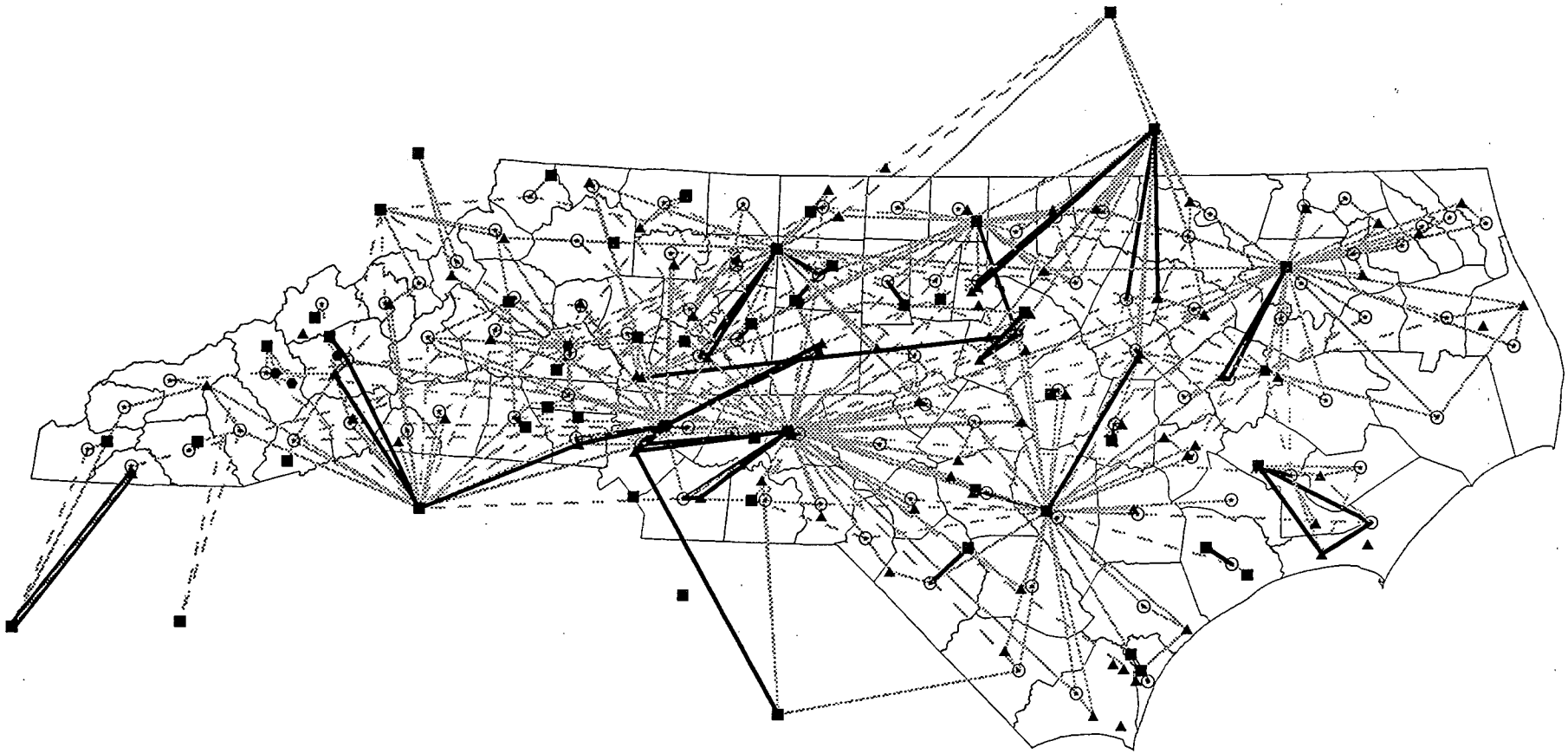
Primary=>50% of Tons
Capacity= Years Remaining at the Current Rates



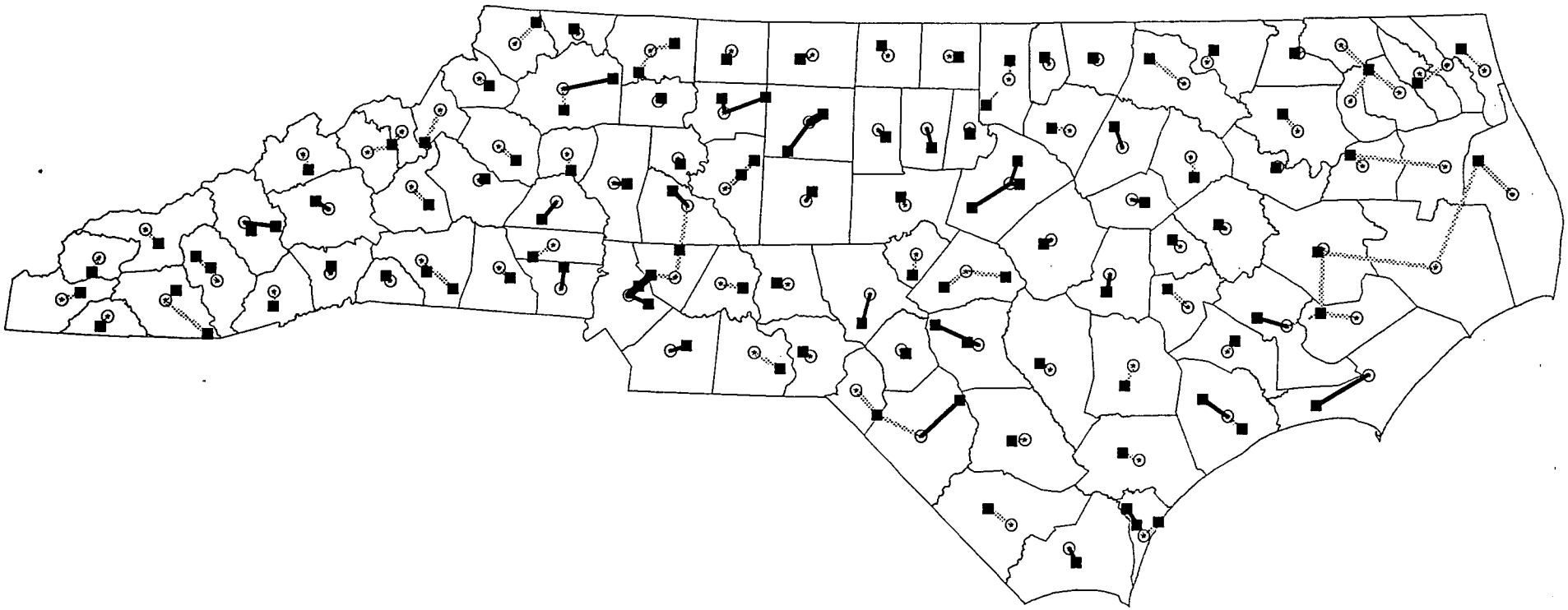
Single County	Chambers	Upper Piedmont
Out of State	East Carolina	Uwharrie
BFI-Charlotte	Foothills	WI-Sampson
CRSWMA	Piedmont	Winston Salem

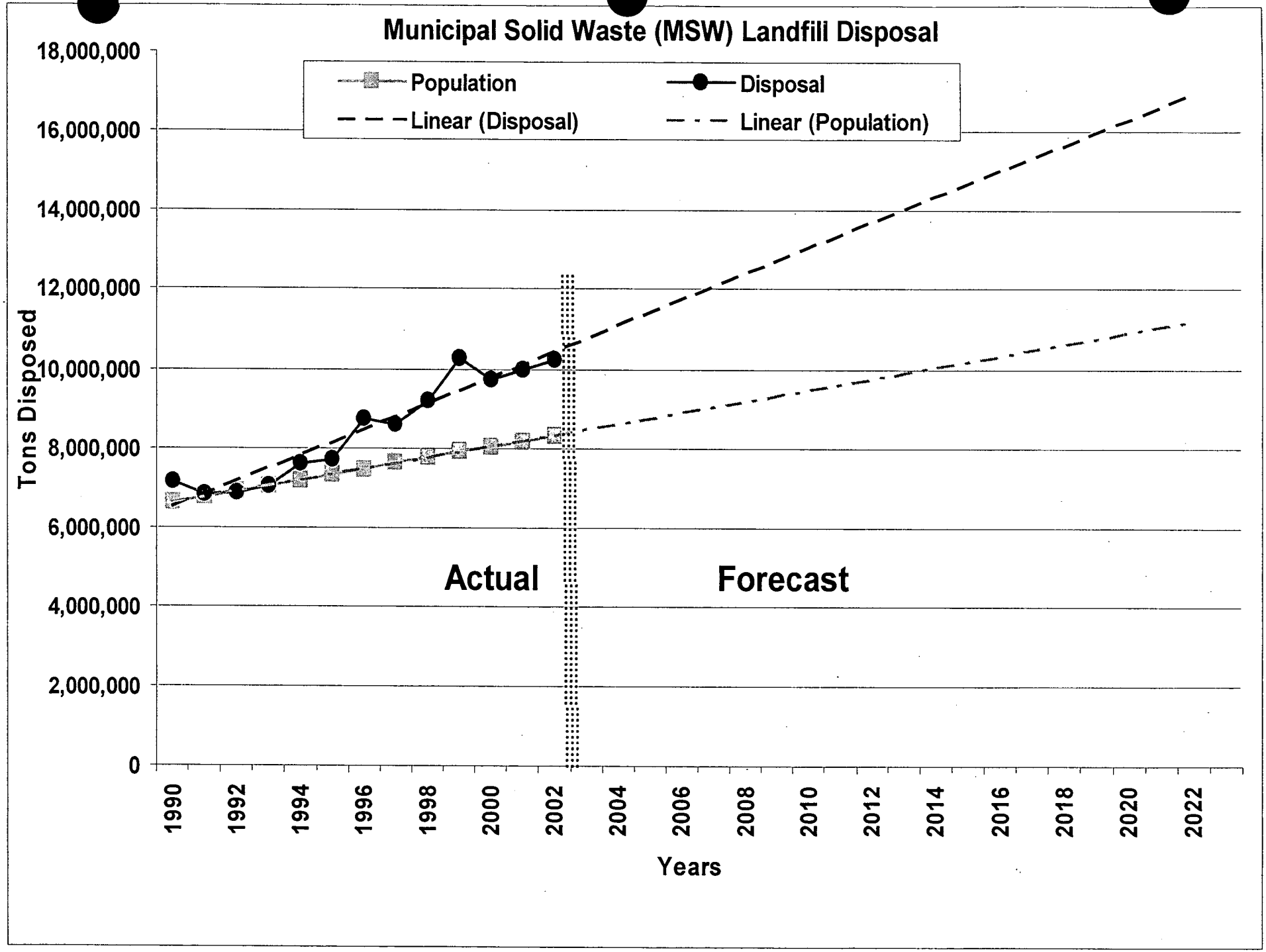
Map Creator Erin Rainey

Municipal Solid Waste Flow Fiscal Year 2000-2001



Municipal Solid Waste Flow FY 1990-1991




Municipal Solid Waste (MSW) Landfill Disposal
Population
Disposal
Linear (Disposal)
Linear (Population)
Tons Disposed
18,000,000
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
Actual
Forecast
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
Years

Formula: ***Total Tons Disposed ÷ Population = Per Capita Disposal Rate***

Fiscal Year	Tons Disposed	Population	Per Capita Disposal Rate	Change from 1991-1992
2002-2003	10,236,960	8,323,375	1.23	14%
2001-2002	9,999,284	8,188,008	1.22	13 %
2000-2001	9,752,510	8,049,313	1.21	12%
1999-2000 (adjusted*)	9,937,355	7,938,062	1.26	16 %
1999-2000	10,267,137	7,938,062	1.30	20 %
1998-1999	9,214,323	7,797,501	1.19	10 %
1997-1998	8,607,578	7,645,512	1.13	5 %
1996-1997 (adjusted*)	8,041,734	7,490,812	1.08	0 %
1996-1997	8,741,727	7,490,812	1.17	8 %
1995-1996	7,722,795	7,336,228	1.06	-2 %
1994-1995	7,624,144	7,180,525	1.07	-1 %
1993-1994	7,038,505	7,036,927	1.00	-7 %
1992-1993	6,890,818	6,892,673	1.00	-7 %
1991-1992 (managed**)	7,257,428	6,781,321	(Base Year Rate) 1.08	
1991-1992	6,822,890	6,781,321	1.01	
1990-1991	7,161,455	6,632,448	1.08	

*The 1996-1997 and 1999-2000 fiscal years are adjusted by subtracting the tonnage estimated to be a result of Hurricanes Bertha, Fran (1996-1997) and Floyd (1999-2000).

**The tons managed figure was determined by adding the total amount of municipal solid waste disposed in landfills and incinerators to the amount of waste managed through local governments' recycling, composting and mulching efforts in FY 91-92. Recycling, composting and mulching were added to the tons disposed in recognition of the fact that some local governments had begun waste reduction before 1991.

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

TOTAL LANDFILL CAPACITY FOR NORTH CAROLINA

Date Landfill Operation Began:

Date of Survey:

County:

Volume Airspace Used (yd^3)	83,439,238.00
Tons Disposed	47,936,314.57
2002-2003 Tons Disposed	7,258,143.68
Months of Operation	
Utilization Factor ($tons/yd^3$)	0.57
Lifetime Ave. Tons Disposed Per Month	537,311.92
2002-2003 Ave. Tons Disposed Per Month	604,845.31

	Permitted	*Total*
Original Available Airspace (yd^3)	125,748,044.00	289,211,652.00
Remaining Airspace (yd^3)	42,308,806.00	205,772,414.00
Remaining Capacity for Tonnage (tons)	24,306,648.55	118,217,416.69
Remaining Capacity in Months	40.19	195.45
Remaining Capacity in Years	3.35	16.29

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

AVERAGE LANDFILL CAPACITY FOR A NORTH CAROLINA LANDFILL

Date Landfill Operation Began:

Date of Survey:

County:

Volume Airspace Used (yd^3)	2,035,103.37
Tons Disposed	1,169,178.40
2002-2003 Tons Disposed	177,027.89
Months of Operation	
Utilization Factor ($tons/yd^3$)	0.57
Lifetime Ave. Tons Disposed Per Month	13,105.17
2002-2003 Ave. Tons Disposed Per Month	14,752.32

	Permitted	*Total*
Original Available Airspace (yd^3)	3,067,025.46	7,053,942.73
Remaining Airspace (yd^3)	1,031,922.10	5,018,839.37
Remaining Capacity for Tonnage (tons)	592,845.09	2,883,351.63
Remaining Capacity in Months	40.19	195.45
Remaining Capacity in Years	3.35	16.29

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

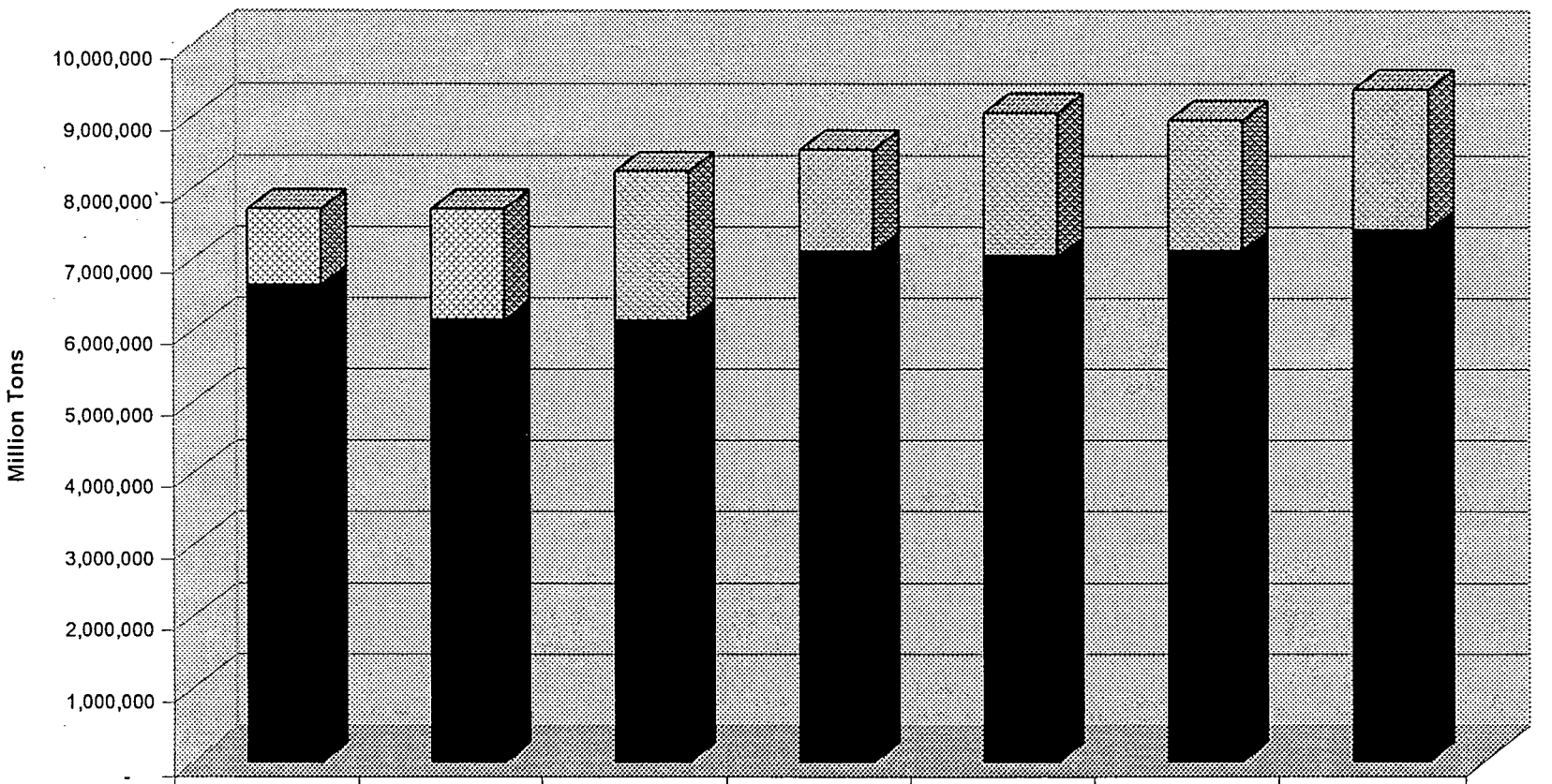
Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

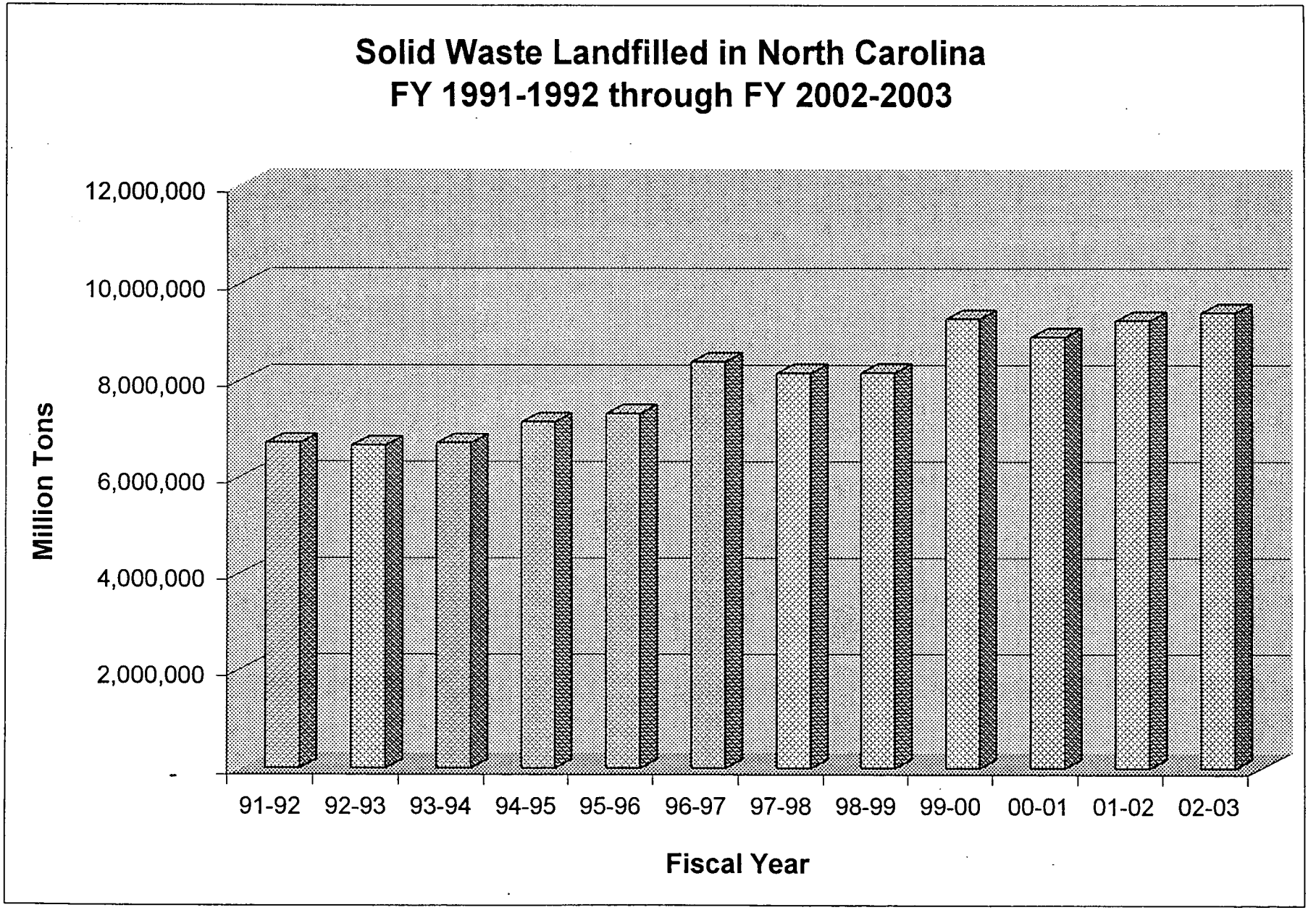
Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Construction and Demolition and Municipal Solid Waste Landfill Disposal
FY 1996-1997 through 2002-2003

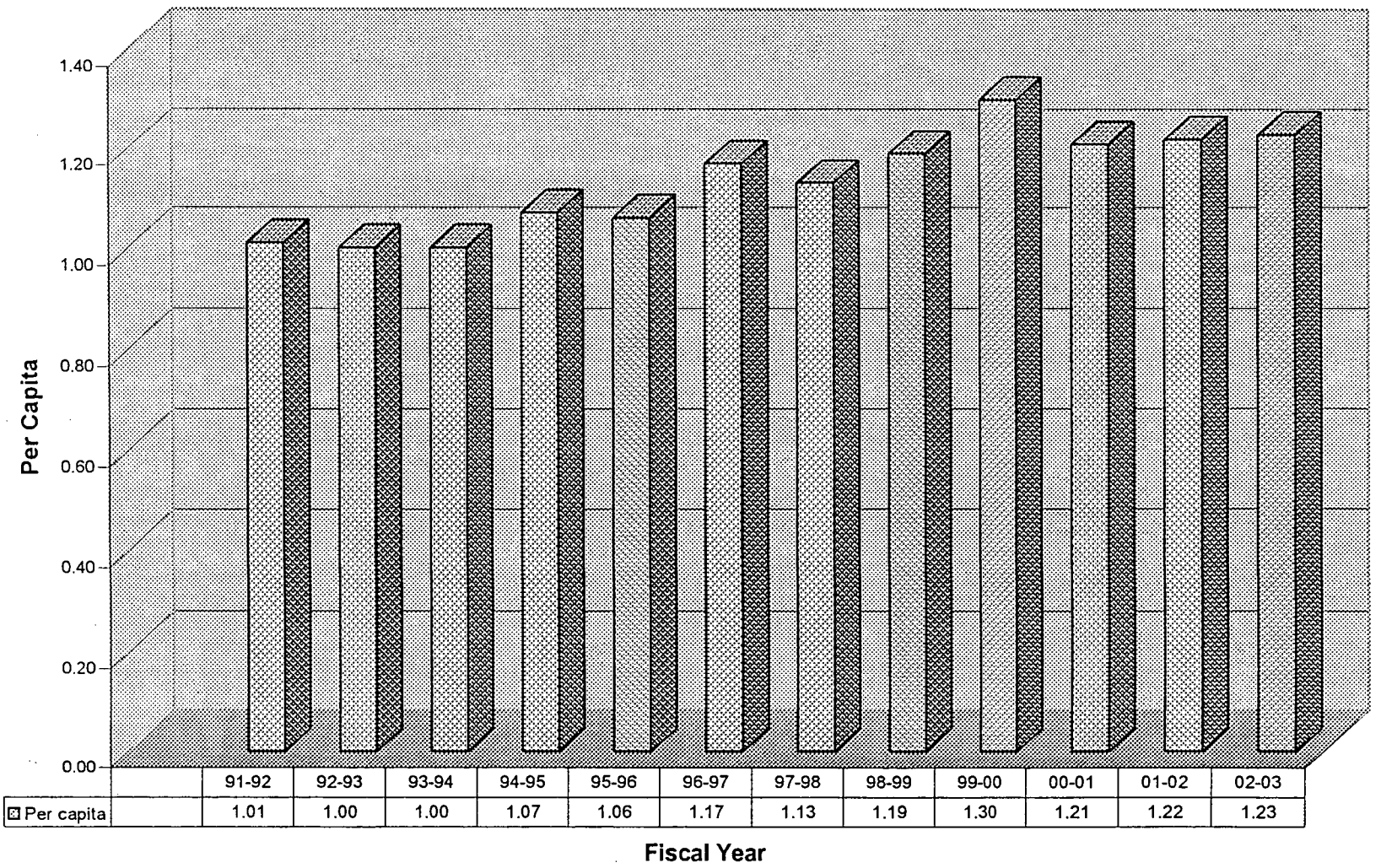


	FY 1996-1997	FY 1997-1998	FY 1998-1999	FY 1999-2000	FY 2000-2001	FY 2001-2002	FY 2002-2003
TOTAL C&D	1,076,968	1,563,964	2,102,294	1,435,410	2,019,385	1,836,892	1,966,789
TOTAL MSW	6,647,313	6,163,781	6,152,554	7,116,536	7,049,124	7,133,737	7,432,630

Fiscal Year

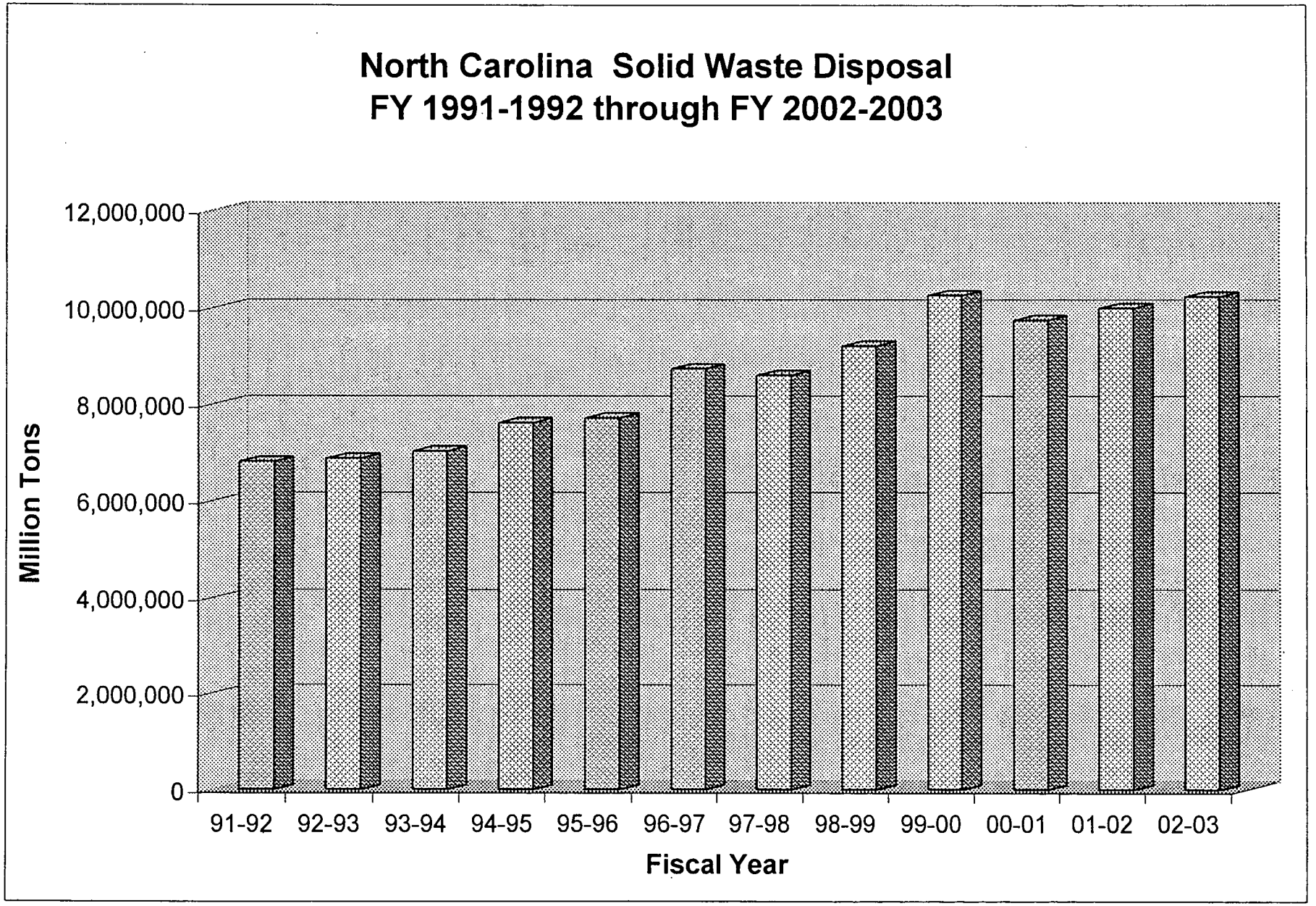

Solid Waste Landfilled in North Carolina
FY 1991-1992 through FY 2002-2003
Million Tons
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
-
91-92
92-93
93-94
94-95
95-96
96-97
97-98
98-99
99-00
00-01
01-02
02-03
Fiscal Year

North Carolina Per Capita Solid Waste Disposal
FY 1991-1992 through 2002-2003



	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03
Per capita	1.01	1.00	1.00	1.07	1.06	1.17	1.13	1.19	1.30	1.21	1.22	1.23

Fiscal Year


North Carolina Solid Waste Disposal
FY 1991-1992 through FY 2002-2003
Million Tons
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
91-92
92-93
93-94
94-95
95-96
96-97
97-98
98-99
99-00
00-01
01-02
02-03
Fiscal Year

North Carolina

SOLID WASTE MANAGEMENT

Annual Report

JULY 1, 2002 - JUNE 30, 2003

State of North Carolina
Michael F. Easley, Governor

Department of Environment and Natural Resources
William G. Ross Jr., Secretary

Reduce--Reuse--Recycle

Acknowledgements

This is the thirteenth annual status report prepared by the Solid Waste Section, Division of Waste Management and the Business and Community Assistance Section, Division of Pollution Prevention and Environmental Assistance. This report could not have been completed without staff assistance. Special thanks go to the following staff for providing data and information for this annual report:

Jim Coffey, Solid Waste Section, Chief
Paul Crissman, Solid Waste Section, Branch Head
Mark Fry, Solid Waste Section
Cheryl Hannah, Solid Waste Section
Jim Hickman, Pollution Prevention & Environmental Assistance
Brian Ketchem, Department of Transportation
Dexter Matthews, Division of Waste Management, Director
Pam Moore, Solid Waste Section
Scott Mouw, Community & Business Section, Chief
Bill Patrakis, Solid Waste Section
Percy Richardson, Department of Administration
Brent Rockett, Solid Waste Section
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FISCAL YEAR 2002-2003

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CHAPTER 1
PAST, PRESENT AND FUTURE: SOLID WASTE FINDINGS AND RECOMMENDATIONS

This Consolidated Annual Report is required by the North Carolina General Assembly in G.S. 130A-309.06, as amended in 2001. The information presented is from 521 (100 county and 421 municipal) local government annual reports, 310 (including 12 out-of-state) permitted solid waste management facilities and 191 state agencies, institutions and schools. These reports represent activities related to the management of solid waste for the period July 1, 2002 through June 30, 2003.

This report combines several annual reports that were once issued separately by the Department of Environment and Natural Resources. The reports were the Comprehensive Solid Waste Management Report, the Scrap Tire Disposal Account Report, the White Goods Management Report and the Solid Waste Management trust fund Report. This report also includes information from the Department of Transportation regarding its use of recycled materials in contracts and data from the Department of Administration on bid procedures, the purchase of materials with recycled content and a summary of items purchased with recycled content.

Key Findings

- The state per capita disposal rate was 1.23 tons per person per year, a 1 percent increase over the 1.22 rate from last fiscal year or an increase of 14 percent from the base year of FY 91-92.
- North Carolina disposed of 10,236,960 tons of waste in North Carolina and out-of-state facilities. This represents an increase of 237,676 tons from the previous fiscal year.
- A total of 9,399,418 tons of solid waste was received at North Carolina permitted solid waste management landfills during FY 02-03. Almost 133,145 tons originated from other states, an increase of 15,164 import tons over the previous period. South Carolina and Virginia accounted for all imported waste.
- Ten North Carolina counties accounted for 49 percent of the solid waste disposed in the state. Sixty-one counties exported waste to landfills in Virginia, South Carolina, Tennessee and Georgia.
- Major materials recovered by North Carolina local governments during FY 02-03 were paper (57%), metals (23%) and glass (11%).

Recommendations

Once again, most North Carolina counties have not halted the trend of increased waste generation and disposal. The state has moved forward with improvements to the state's solid waste management methods. Gains include better record keeping, the ability to calculate landfill capacity, enhanced public participation and more strategic planning. However, no overall progress has been made toward the primary goal of decreasing per capita waste disposal. For this reason, the recommendations in this report are the same as those in last year's report. These goals must be achieved to decrease future waste disposal.

- Increase source reduction, municipal solid waste recycling and source-separated composting of organics to reduce the need for additional municipal solid waste disposal capacity as the population grows and predicted per capita disposal amounts increase.
- Enhance infrastructure and markets to increase source reduction and both MSW and special waste recycling to reduce the need for additional disposal capacity.
- Reissue and enforce Executive Order 156 [http://www.p2pays.org/ref/03/02221.pdf], which first passed in July 1999.

Solid Waste Disposal

This past year, the amount of waste disposed in North Carolina increased as it has for the past nine years. Despite the long trend, the increase was surprising because waste disposal amounts typically

decrease during economic recessions. This did not happen. Both the total amount of waste disposed and the amount disposed on a per capita basis increased.

The state measures changes in waste disposal rates by comparing the current per capita waste disposal base year (FY 91-92) per capita rate. (**Formula: Total Tons Disposed ÷ Population = Per Capita Disposal Rate**). Negative numbers indicate a decrease in the per capita disposal rate; positive numbers an increase. Changes from year to year are no longer measured as waste reduction, but as a change from the base year. As seen in the following table, North Carolina continues to increase the absolute amount of waste disposed. The per capita increases have continued for *seven consecutive years*.

Fiscal Year	Tons Disposed		Population	Per Capita Disposal Rate		Change from 1991-1992
2002-2003		10,236,960	8,323,375		1.23	14 %
2001-2002		9,999,284	8,188,008		1.22	13 %
2000-2001		9,752,510	8,049,313		1.21	12 %
1999-2000	(adjusted*)	9,937,355	7,938,062		1.26	16 %
1999-2000		10,267,137	7,938,062		1.30	20 %
1998-1999		9,214,323	7,797,501		1.19	10 %
1997-1998		8,607,578	7,645,512		1.13	5 %
1996-1997	(adjusted*)	8,041,734	7,490,812		1.08	0 %
1996-1997		8,741,727	7,490,812		1.17	8 %
1995-1996		7,722,795	7,336,228		1.06	-2 %
1994-1995		7,624,144	7,180,525		1.07	-1 %
1993-1994		7,038,505	7,036,927		1.00	-7 %
1992-1993		6,890,818	6,892,673		1.00	-7 %
1991-1992	(managed**)	7,257,428	6,781,321	(Base Year Rate)	1.08	
1991-1992		6,822,890	6,781,321		1.01	
1990-1991		7,161,455	6,632,448		1.08	

*The 1996-1997 and 1999-2000 fiscal years are adjusted by subtracting the tonnage estimated to be a result of Hurricanes Bertha, Fran (1996-1997), and Floyd (1999-2000).

**The tons managed figure was determined by adding the total amount of municipal solid waste disposed in landfills and incinerators to the amount of waste managed through local governments' recycling, composting and mulching efforts in FY 91-92. Recycling, composting and mulching were added to the tons disposed in recognition of the fact that some local governments had begun waste reduction before 1991.

Statewide solid waste disposal reporting began in FY 90-91. The state made slight reductions in per capita waste rates in the early 1990s. Several factors caused this reduction. Tipping fees were established and the additional cost created an incentive to explore alternatives to municipal solid waste or construction and demolition landfills. Strong public and private interest helped local governments start recycling and waste reduction programs in response to state mandates and a perceived disposal crisis. During the early part of the decade, the state and country were in recession. Many waste professionals cite the depressed economy as the primary cause of the waste reduction.

In the mid 1990s, state waste disposal rates increased significantly. Even when allowances for two natural disasters were factored in, the disposal increase was considerable. The rebounding economy was one cause, but when both the state and nation entered a recession the expected waste reduction did not occur. The reporting period that ended on June 30, 2003 closed with a 238,000-ton increase over the previous period. The recession analysis model no longer appears useful when analyzing waste management changes.

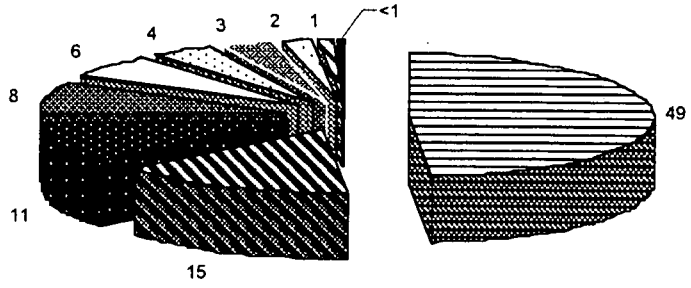
The estimated amount of waste attributed to Hurricane Fran in FY 96-97 was based upon past waste and per capita disposal trends. Counties reported actual totals following Hurricane Floyd in FY 99-00, so the figure is more precise. Hurricane Isabel debris data will appear in the next Annual Report because landfall occurred in September 2003.

In FY 99-00, a total of 329,782 tons of disaster debris was reported. After reviewing 13 years of waste disposal data, the adjusted figures for FY 99-00 still remain higher than expected. The discrepancy is probably due to under-reporting of hurricane-related disposal amounts.

No discernible pattern appeared when individual counties' year-to-year trends were analyzed. In FY 02-03, the 10 North Carolina counties that hold 41 percent of the state's population produced nearly 49 percent of the waste. These large counties dramatically impact North Carolina disposal totals.

Four counties disposed of less waste this reporting period than last. Cumberland was close to a 20 percent decrease. The decrease is attributed to an 80,000 ton drop in construction and demolition material from military base renovations and a substantial military deployment.

North Carolina Waste Distribution by County FY 2002-2003



Counties grouped into 10 county increments by descending order of waste disposal

Ten Largest Waste Producing Counties Ranked by Volume

County	Tons Disposed FY 00-01	Tons Disposed FY 01-02	Tons Disposed FY 02-03	Percent N.C. Waste FY 02-03	Cumulative Percent FY 02-03	Change From FY 01-02	Percent Change
MECKLENBURG	1,233,824	1,279,090	1,278,129	12.49%	12.49%	(961.16)	-0.1%
WAKE	926,504	880,136	856,043	8.36%	20.85%	(24,093.20)	-2.8%
GUILFORD	730,012	755,566	709,579	6.93%	27.78%	(48,986.94)	-6.9%
FORSYTH	465,134	447,508	501,034	4.89%	32.68%	53,526.58	10.7%
CUMBERLAND	351,620	403,476	337,375	3.30%	35.97%	(66,101.53)	-19.6%
DURHAM	238,894	260,680	298,420	2.92%	38.89%	37,740.13	12.6%
BUNCOMBE	251,472	247,830	255,112	2.49%	41.38%	7,282.25	2.9%
NEW HANOVER	259,305	241,951	250,327	2.45%	43.83%	8,375.90	3.3%
CABARRUS	187,508	203,981	250,162	2.44%	46.27%	46,181.50	18.5%
GASTON	215,226	214,185	216,267	2.11%	48.38%	2,081.99	1.0%
TOTAL	4,859,499	4,937,403	4,952,448	48.38%	48.38%	15,045.52	
TOTAL N.C. COUNTIES	9,762,510	9,999,284	10,236,960	100.00%	100.00%	237,676.00	

Landfill Capacity Needs

North Carolina has 41 operational MSW landfills. The total capacity of all North Carolina landfills measures approximately 206 million cubic yards with room for approximately 118 million tons of MSW waste. The estimate was obtained using the state's average utilization factor of .57 tons of waste per cubic yard of air space. The estimate does not include waste exported to other states.

If North Carolina's rate of landfill use remains steady at last year's rate of 605,000/tons per month, one might assume the state has 16 years of landfill capacity. However, the capacity figure is misleading. (Please see the next table) Much of the state's capacity is not widely available due to permit conditions, franchise arrangements, political decisions and distance.

Limiting factors include the fact that the Camp Lejeune landfill is for Marine Corps base use only; the Alamance County landfill is permitted to accept only Alamance County waste; and the Upper Piedmont landfill is permitted for a maximum 600 tons per day. Many landfills' franchise agreements only allow them to accept waste from a particular distance around the landfill; other landfills chose not to accept waste from other jurisdictions, although their permit and franchise allow it. Additionally, landfill owner/operators may elect not to construct or use all of their permitted space.

The primary limiting factor is accessibility. In North Carolina the maximum distance that waste travels averages just under 100 miles one-way. Minor exceptions exist, but the average is supported by an examination of "waste sheds" or service areas that was developed from 2001-2002 data.

Clearly, the concept of statewide capacity does not translate into statewide access. Regions of the state have limited capacity. If out-of-state capacity is eliminated, the capacity numbers shrink further. At present, statewide capacity does not appear to be a problem. However, regions may experience disruptions and additional costs as facilities close, open, change jurisdictions or alter the average distance waste is transferred.

The last "new" landfills permitted by the state *that are still in operation* received permits in 2000. They are located in Anson, Sampson and Mecklenburg Counties. One landfill that was permitted in 2003 is under construction in Lenoir County. No other landfill permits issued since 2000 have resulted in a landfill being constructed and becoming operational.

Total MSW Landfill Capacity Analysis for North Carolina

Volume Airspace Used (yd^3)	83,439,238.00
Tons Disposed	47,936,314.57
2002-2003 Tons Disposed	7,258,143.68
Months of Operation	
Utilization Factor (tons/yd^3)	0.57
Lifetime Ave. Tons Disposed Per Month	537,311.92
2002-2003 Ave. Tons Disposed Per Month	604,845.31

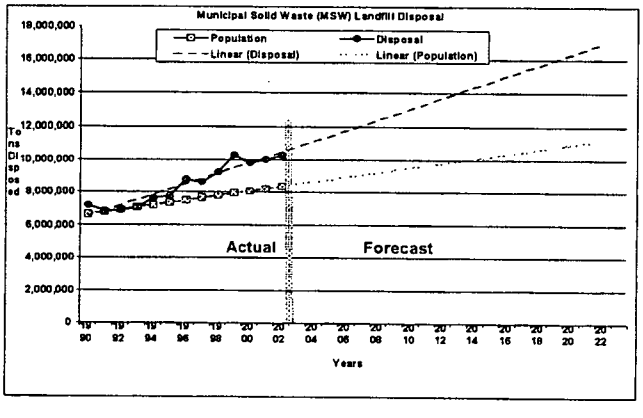
	Permitted	*Total*
Original Available Airspace (yd^3)	125,748,044.00	289,211,652.00
Remaining Airspace (yd^3)	42,308,806.00	205,772,414.00
Remaining Capacity for Tonnage (tons)	24,306,648.55	118,217,416.69
Remaining Capacity in Months	40.19	195.45
Remaining Capacity in Years	3.35	16.29

Includes data from the forty-one active MSW landfills in the state

Calculations

- Avg. Tons Disposed Per Month = Tons Disposed / Months of Operation
- 2002-2003 Avg. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months
- Utilization Factor = Tons Disposed / Volume of Airspace Used
- Remaining Airspace = Original Available Airspace – Volume of Airspace Used
- Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor
- Remaining Capacity in Months = Remaining Capacity for Tonnage / 02-03 Avg. Tons Disposed Per Mo.
- Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Note: See capacity analysis for state and each MSW landfill at end of this report.

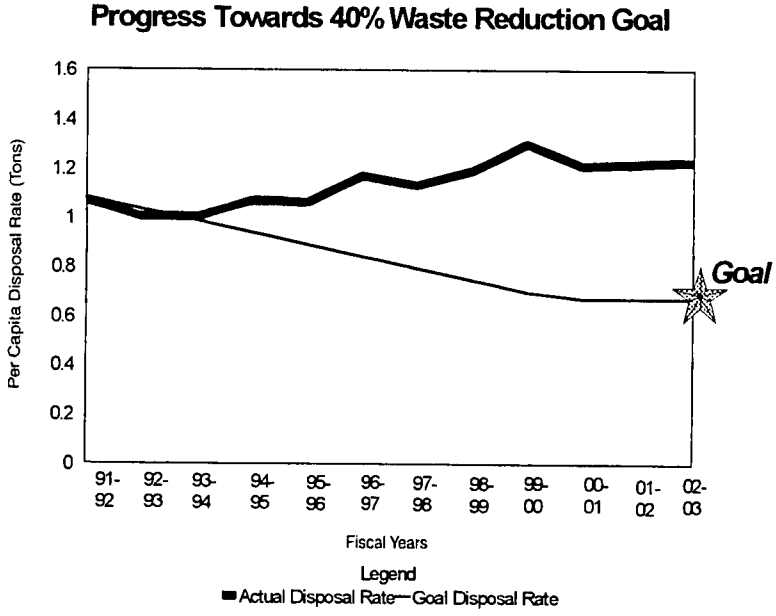


Future Waste Disposal Needs

Future waste disposal forecasts are created by regression analysis. In other words, historical trends are used to predict future amounts. When absolute population growth is factored in, North Carolina is predicted to dispose of approximately 14 million tons in 10 years and close to 18 million in 20 years. This amount equals nearly a ton and a half of waste for every resident by 2012. The forecast does not include the impact of natural disasters, such as hurricanes. The obvious implication of this trend is that demand for landfill space will increase with time.

State Waste Reduction Goal

The 1991 amendment to the Solid Waste Management Act of 1989 (Senate Bill 111), established a statewide goal to reduce the amount of waste landfilled 40 percent by 2001. This reduction was to be measured on a per capita basis from FY 91-92. Since then, *waste disposal has increased 14 percent - from 1.08 to 1.23 tons per person per year.* The statewide goal was not met and the state per capita rate continues to increase, although several counties achieved the state's waste reduction goal.



Alleghany, Cleveland, Martin and Orange counties all recorded 40 percent or better reductions from the base year of FY 91-92. Orange County's reduction is remarkable because its population numbers over 100,000, the area is part of the rapidly growing Research Triangle Park, and it has achieved large waste reductions over a long period of time. This county, and the municipalities in the county, have very aggressive, long-standing recycling and waste reduction programs that divert a variety of materials. Some innovative programs include providing local bars and restaurants with a recycling service, salvaging construction and demolition waste, banning non-residential corrugated cardboard from the landfill and a food waste diversion program. The other counties that reached the goal do not appear to have aggressive programs, but they have experienced decreased economic activity. In the absence of aggressive recycling programs, the goal may have been attained through reduced economic activity or the counties' base year data may not be accurate.

Statewide, the reasons for not achieving the goal are complex and interrelated. Three fundamental reasons that contributed to the failure are: changes in the dynamics of waste disposal, a lack of commitment to waste diversion, and economics.

Waste management dynamics changed dramatically after the goal was established. Alternative technologies, such as incineration and mixed waste composting, did not develop as anticipated. Despite a great deal of interest and significant investment in these technologies, they did not impact landfill disposal as expected. Additionally, the U.S. Supreme Court overturned legislation on flow control and prohibited local governments from directing waste to certain disposal facilities. Waste is legally considered a commodity and must be allowed free movement.

The commitment to reduce waste has waned over the years. The 40 percent goal came to be perceived as "just a goal" and not a mandate. Funding and resources for waste reduction activities never occurred at the levels required or anticipated for waste reduction success. Also, anticipated landfill bans did not get enacted. Other environmental issues took center stage as the "solid waste crisis" of the late 1980s appeared to be solved.

The economics of landfill disposal have changed since the goal was adopted. As more private landfill owners competed for tonnages, tipping fees remained low. Landfills did not become as expensive to operate as initially projected. Landfill customers readily adapted to the tip fees and did not pursue waste reduction as a way to control costs. The combination of the strong state and national economies of the early 90s, coupled with moderate disposal costs, reduced the motivation to divert materials from landfills. Surprisingly, the recent economic downturn did not result in a statewide waste disposal decrease.

Landfills Remain Difficult to Site

Efforts to gain local government approval to site or expand landfills continue to be difficult. Despite the fact that landfills are an essential component of any comprehensive program that safely and economically manages solid waste, recent decisions for new MSW landfills have been challenged under various legal procedures. For many years, North Carolina's landfills were mostly county owned and operated. These facilities primarily served the county where they were located. Today, most of North Carolina's municipal solid waste goes to regional landfills located inside or outside of the state. These regional landfills may be owned by local governments, private waste management companies, or a combination of the two. Compared to local landfills, they serve much larger geographic areas.

Current requirements to obtain a landfill permit require local governments to certify to the state that they have jurisdiction over the proposed location and that they have given approval for the facility. The local approval process includes a number of opportunities for public participation. The state permit review process, which follows local approval, considers the local government approval process. The state also conducts additional review procedures. These review considerations make up a significant portion of the legal challenges.

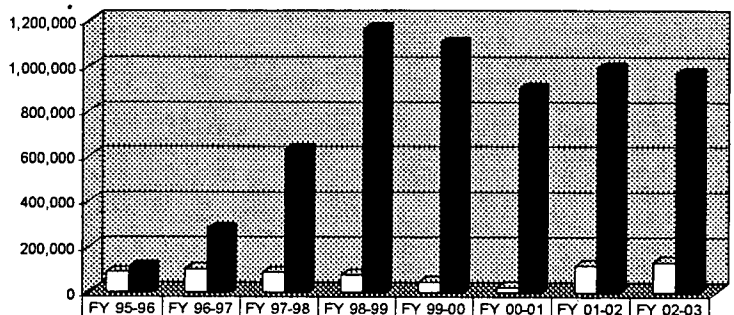
Public response to landfills is intensely negative, especially from citizens who would neighbor proposed sites. The response is consistent and applies equally to regional facilities and "local" facilities that only serve the county where they are located. Most local, elected officials cite negative public response as their primary reason for denying approval for proposed landfills.

The Solid Waste Section has initiated a program to offer residents - especially those impacted by a potential landfill permit decision - more opportunities to participate in the permitting process. After the section receives a site suitability application or a request to modify an existing permit, it holds a series of public meetings. The process has two steps. The first meeting is open to residents and businesses that neighbor the landfill. The goal is to reduce the large crowds that commonly attend public meetings so that neighbors can ask questions and engage in dialogue with permitting staff. The second, larger meeting targets the entire county. Where necessary, concerns expressed in the meetings are forwarded to the appropriate government or non-government agency.

Imports & Exports

North Carolina continues to export more waste than it imports. Approximately 9.5 percent, or a total of 971,286 tons of the total waste disposed in FY 02-03, was exported. This 23,000 ton drop compared to FY 01-02 represents a minor decrease.

Waste Imports and Exports FY 2002-2003



	FY 95-96	FY 96-97	FY 97-98	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03
Imports	88,982	103,510	87,393	74,185	41,840	21,614	117,981	133,145
Exports	111,097	280,400	629,415	1,166,875	1,106,897	900,743	994,678	971,286

In FY 95-96, North Carolina exported waste to one South Carolina landfill. Now, sixty-one North Carolina counties export waste to eleven out-of-state landfills and two transfer stations. Back and forth movement - where waste leaves the state only to re-enter it - has continued for the second consecutive year. A transfer station in South Carolina received 77,217 tons of waste from Mecklenburg County, then sent the waste back to North Carolina for disposal. For this reason, the amount has not been included in the report's import or export totals. Imports continued to increase because some North Carolina landfills are located near state borders. In FY 95-96 only one landfill located in Forsyth County received imported waste. Currently nine landfills in North Carolina receive some out-of-state waste. North Carolina transfer station reports and voluntary reports from out-of-state facilities provide the data used to track imports.

CHAPTER 2
GOVERNMENT WASTE REDUCTION ACTIVITIES

Local governments provide annual reports on source reduction, reuse, recycling and composting activities statewide. They also provide data on other aspects of solid waste management. The data are used to determine the scope and effectiveness of North Carolina's waste reduction efforts. It also helps planners spot trends in program implementation.

Source Reduction and Reuse Programs

The number of local governments with source reduction and/or reuse programs increased slightly from 109 to 112. The minor increase is probably due to fluctuations in reporting methods. The stagnation shows reduction and reuse programs continue to be overlooked by most governments as cost-effective components of a comprehensive waste reduction program.

On a more positive note, the number of swap shop programs in North Carolina has grown consistently over the past six years, although the FY 02-03 total dropped by one. Again, the fluctuation is probably due to inaccurate reporting. One government reported adding a swap shop program, but the Division of Pollution Prevention and Environmental Assistance found two local governments had improperly reported operating swap shop programs.

Currently, 33 local government programs host 69 swap shops. These swap shops account for almost 1,400 tons of cost-effective reuse each year. Although the number of swap shop programs has been steady in recent years, a new DPPEA grant round should increase the number of programs over the next few years.

Source Reduction and Reuse Programs Operated By Local Governments

Program Type	FY 96-97	FY 97-98	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03
Source Reduction Programs							
Backyard Composting	82	81	53	59	64	67	69
Grass Cycling	41	43	41	36	35	29	38
Xeriscaping	11	13	12	11	8	8	11
Junk Mail Reduction	56	55	57	64	64	61	65
Enviroshopping	36	35	35	32	31	27	32
Promotion of Non-toxics	39	35	30	31	33	27	27
Other	9	1	5	6	3	4	2
Reuse Programs							
Swap Shops	10	17	22	23	28	34	33
Paint Exchange	28	25	27	23	19	19	19
Waste Exchange	11	14	8	8	4	3	4
Pallet Exchange	N/A	N/A	7	7	9	6	5
Other	4	6	15	10	8	9	11
Local Governments Programs	104	116	123	110	117	109	112

Local Government Recovery Programs

Despite a drop in the number of curbside and drop-off recycling programs, material recovery grew 23.6 percent in FY 02-03. Most growth is related to increased yard waste recovery, but the non-yard waste category grew almost 6 percent compared to population growth of 1.65 percent. The bulk of the non-yard waste increase was due to more pallets being ground for boiler fuel. The two ice storms in the last fiscal year had a significant impact. Organic material recovery rose over 220,000 tons. Yard waste, which includes ice storm debris, and pallets are reported under the organics category.

Paper product recovery grew by roughly 2.5 percent in FY 02-03. With five years of continued growth, paper is definitely the bellwether commodity of local government programs. The strong market infrastructure for paper commodities should allow continued growth at a similar rate.

Metal recovery decreased slightly. White goods stockpiled during 2000 appear to have been processed during FY 01-02, which created an artificial spike. Metal recovery returned to more normal levels in FY 02-03. Plastics and other recyclable were the only other two categories to decline in FY 02-03.

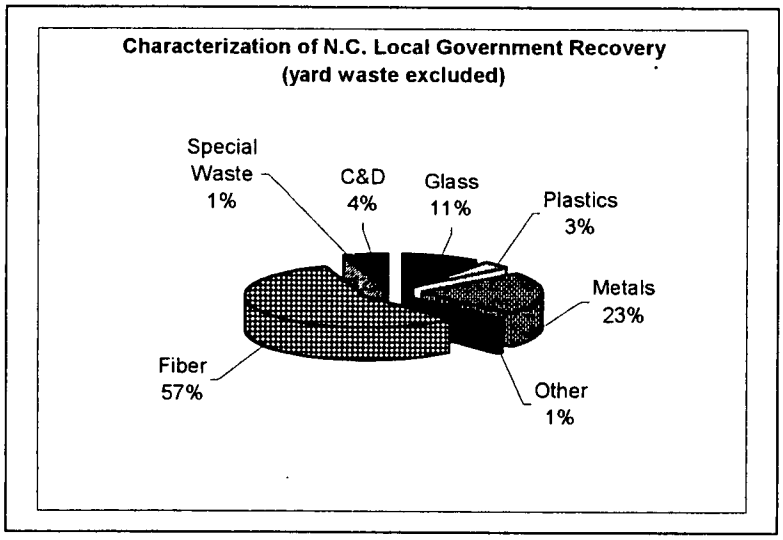
Local Government Recovery (Tons) and Performance Measures

Material	FY 93-94	FY 94-95	FY 95-96	FY 96-97	FY 97-98
Total Paper	164,806	185,270	212,577	228,025	216,121
Total Glass	37,537	38,088	49,601	44,978	43,449
Total Plastics	9,797	12,339	16,253	13,699	14,399
Total Metal*	51,468	59,483	65,977	77,252	81,262
Total Organics**	350,142	495,034	498,583	640,410	504,554
Special Wastes***	2,106	2,466	3,212	3,230	3,527
C & D Debris	N/A	N/A	N/A	N/A	N/A
Other	16,387	5,987	333	12,762	35,977
Totals	**632,243**	**798,667**	**846,536**	**1,020,356**	**899,290**
Per Capita Recovery (lbs.)	**182.00**	**226.19**	**235.59**	**279.19**	**242.03**
Recovery Ratio (Recycling:Disposal)	**0.09**	**0.10**	**0.11**	**0.13**	**0.11**

Material	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03
Total Paper	233,339	241,859	263,365	267,840	275,538
Total Glass	41,623	41,826	46,936	49,891	51,433
Total Plastics	14,835	14,474	15,062	17,269	16,807
Total Metal*	77,564	86,480	92,634	114,786	109,723
Total Organics**	525,033	638,757	540,582	468,901	689,027
Special Wastes***	3,817	4,907	4,947	5,426	5,926
C & D Debris	N/A	59,598	15,406	17,648	20,002
Other	63,794	5,329	6,120	5,896	4,626
Totals	**960,005**	**1,093,032**	**985,052**	**947,657**	**1,173,082**
Per Capita Recovery (lbs.)	**254.40**	**285.61**	**243.66**	**231.47**	**281.88**
Recovery Ratio (Recycling:Disposal)	**0.10**	**0.11**	**0.10**	**0.10**	**0.11**

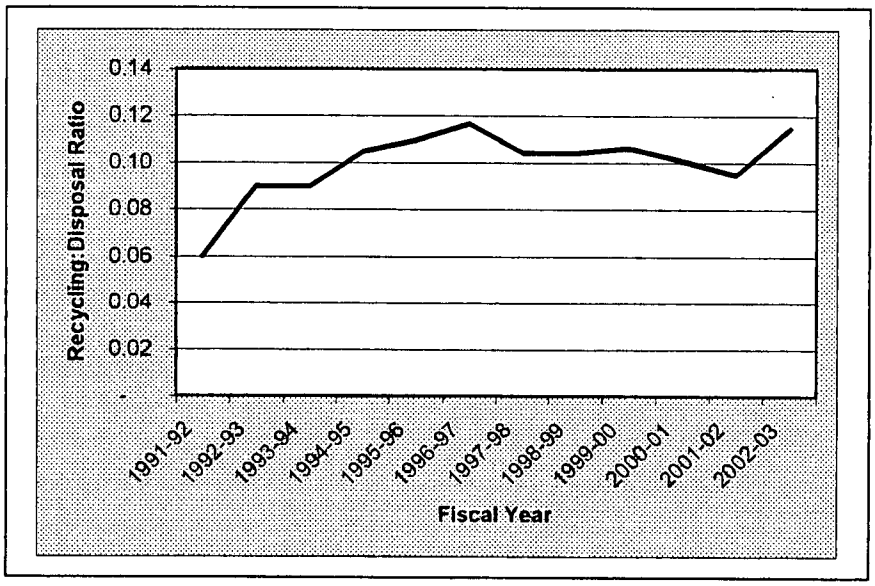
* Includes white goods, aluminum cans, steel cans and other metals.
** Includes yard waste, pallets and wood waste.
*** Includes electronics, used oil, oil filters, antifreeze and batteries.

For a breakdown of materials recovered by local governments during FY 02-03, excluding yard waste, see the following figure. Fiber (paper products) makes up 57 percent of the material recovered by local governments. Metals comprise about 23 percent of the mix. The metals category includes white goods, which account for more than 65 percent of local government metal recovery. The third largest category is glass, followed by construction & demolition, plastics, special wastes - like electronics and used oil – and other wastes.



The ratio of recycling to disposal increased this year to slightly more than 0.11. An increasing slope in the figure below indicates that recycling grew more than disposal on a percentage basis. The sharp increase in this year's ratio is due to the high quantities of yard waste managed after two ice storms. A similar spike occurred in 1996-97 following Hurricane Fran.

Ratio of Recycling to Disposal – FY 91-92 to FY 02-03



North Carolina's top 10 waste producing counties continued to represent almost half of all waste disposed in the state. Although recycling dropped slightly, these counties represent 44.6 percent of all local government recycling. Of the top 10, only Guilford, Durham and Buncombe counties contributed a greater percentage of state's recycled tonnage than their share of the disposed tonnage, in part because of excellent municipal programs in those counties.

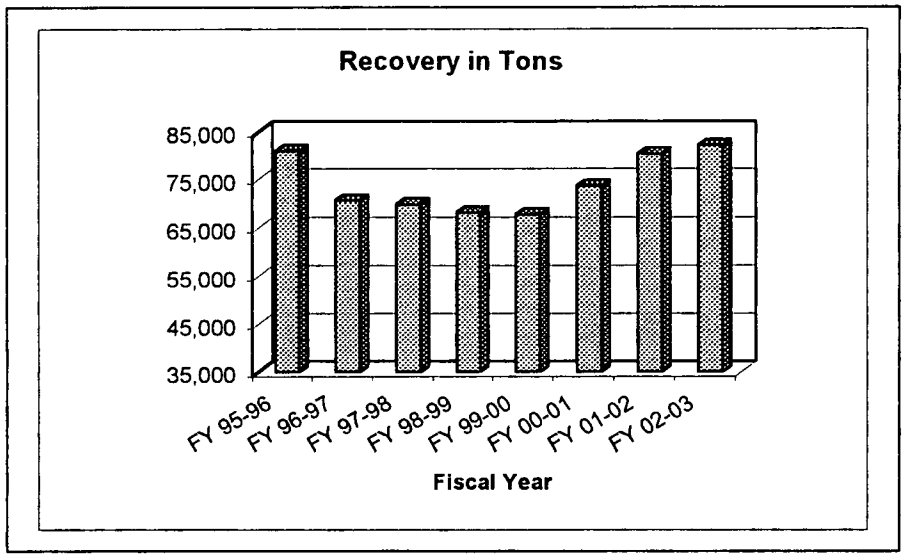
Disposal vs. Recycling in Ten Largest Waste Producing Counties FY 02-03

County	Disposal	Recycling	Contribution to Disposal	Contribution to Recycling*
Mecklenburg	1,278,129	52,084	12.5 %	10.0 %
Wake	856,043	39,612	8.4 %	7.6 %
Guilford	709,579	45,828	6.9 %	8.8 %
Forsyth	501,034	19,193	4.9 %	3.7 %
Cumberland	337,375	2,675	3.3 %	0.5 %
Durham	298,420	18,673	2.9 %	3.6 %
Buncombe	255,112	35,310	2.5 %	6.8 %
New Hanover	250,327	8,655	2.4 %	1.7 %
Cabarrus	250,162	5,336	2.4 %	1.0 %
Gaston	216,267	4,813	2.1 %	0.9 %
Total	**4,952,448**	**232,179**	**48.4 %**	**44.6 %**

*Includes recovery from county and municipal sources. Yard waste and special waste (e.g., used oil) recycling are excluded.

Recovery of Traditional Materials

Container recovery (glass, plastic and metal) grew by more than two percent in FY 02-03. This represents the third consecutive year of growth in this category and indicates good program participation. At 82,210 tons, container recovery finally surpassed the all-time high reported in FY 95-96. Despite this positive trend, recovery rates closely matched population growth. This indicates that population growth, instead of increased recovery, is the most likely reason for the increase.



Despite positive trends in the recovery of traditional materials, there is significant concern that falling participation rates have seriously hurt local government recovery efforts. Statewide, the average participation rate for curbside recycling programs is 56.3 percent. An increase to 70 or 75 percent would greatly improve recovery and local programs' cost-effectiveness.

Local Government Recycling Program Management

Citing continued fiscal concerns, 15 local governments dropped curbside recycling programs in FY 02-03. Seven local governments discontinued drop-off location programs. The programs account for almost 2,000 tons of material that might have been recovered if the programs were operating.

Contributions from curbside and drop-off recycling programs changed slightly during FY 02-03. After years of steady numbers, overall contribution to recycling by curbside programs dropped from 42 to 38 percent, but drop-off contributions to recycling tonnages increased from 40 to 44 percent. This change is likely due to the decrease in curbside recycling programs and improved white goods recycling reports. The amounts recovered by other programs (17 percent) and mixed waste processing (1percent) stayed steady.

Counties continue to rely on publicly operated drop-off collection systems and municipalities routinely use curbside collection programs. Of the 94 reported county drop-off programs, 50 percent were publicly operated, 33 percent contracted operations and 17 percent were a hybrid of public and contracted operations. Most municipal curbside programs (77 percent) are operated by contractors.

Local recovery fluctuations were minimal during FY 02-03. Fifty-eight percent of local governments with recycling programs collected roughly the same amount this period as last. The remaining 42 percent collected less than the previous year.

Total Recovery by Program Type

Program Type	Total Tons		% of Total Recovery	
	FY 01-02	FY 02-03	FY 01-02	FY 02-03
Curbside	204,173	198,432	42%	38%
Drop-off	198,516	227,838	40%	44%
Mixed Waste Processing	3,544	3,545	1%	1%
Other Programs	83,934	89,765	17%	17%

Special Waste Management

FY 02-03 saw slow growth in the collection of special wastes like motor oil, oil filters, lead acid batteries, and household hazardous waste (HHW). Although local government programs make a significant contribution, many North Carolina residents are unserved or underserved with regard to the collection of these materials. In eight North Carolina counties, no oil recycling programs exist. In 29 counties, only one collection site exists. Very few jurisdictions collect oil filters and antifreeze. Residents in more than 70 counties have no alternative to landfilling or stockpiling their household hazardous wastes.

On a more positive note, 68 local governments reported FY 02-03 participation in the North Carolina Department of Agriculture & Consumer Services' pesticide container recycling program. Another 25 communities collected paint, although they did not accept any other HHW waste.

Local Government Special Waste Management, FY 98-99 - FY 02-03

	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03
Used Motor Oil					
Number of programs	127	126	125	127	125
Gallons collected	736,436	873,548	839,234	903,951*	907,123
Oil Filters					
Number of programs	11	14	18	20	21
Tons collected	6.61	10.34	16.15	17.79	18.64
Antifreeze					
Number of programs	46	49	54	56	58
Gallons collected	9,568	15,977	33,304	27,668	26,308
Lead Acid Batteries					
Number of programs	79	90	90	86	86
Number collected	58,237	74,737	82,043	80,912	92,292
Household Haz. Waste					
Number of programs	17	24	24	28	31
Number of permanent sites	10	13	12	17	17
HHW tons collected	1,017.78	931.82	1315.3	1483.97	1540.59
Total cost reported	**$1,672,271 ($1,643/ton)**	**$1,644,818 ($1,765/ton)**	**$1,792,125 ($1,363/ton)**	**$2,180,355 ($1,469/ton)**	**$2,161,359 ($1,403/ton)**

*Data adjusted from FY 01-02 Annual Report.
Conversion Key: Oil, 1 gallon = 7.4 lbs.; Antifreeze, 1 gallon = 8.42 lbs.; Lead Acid Battery, 1 battery = 35.9 lbs.

Yard Waste Management

The two large ice storms in FY 02-03 caused yard waste totals to explode. The difference between this year and last was increased by the FY 01-02 drought, which resulted in the lowest yard waste totals in seven years. The table below shows overall FY 02-03 tonnages and the 42 percent increase from the previous year. Ice storms hit the western Piedmont particularly hard – Winston-Salem reported handling more than four times its usual tonnage of yard waste. Increases in other urban areas, such as Greensboro and Orange County, were matched by the impacts on many small and medium-sized towns.

Due to the excellent infrastructure developed in response to the long-standing yard waste disposal ban, the vast majority of ice storm debris was diverted to mulch and composting operations. However, perhaps because local capacities were overtaxed, private facilities also reported a sizable FY 02-03 rise in the amount of locally collected yard waste.

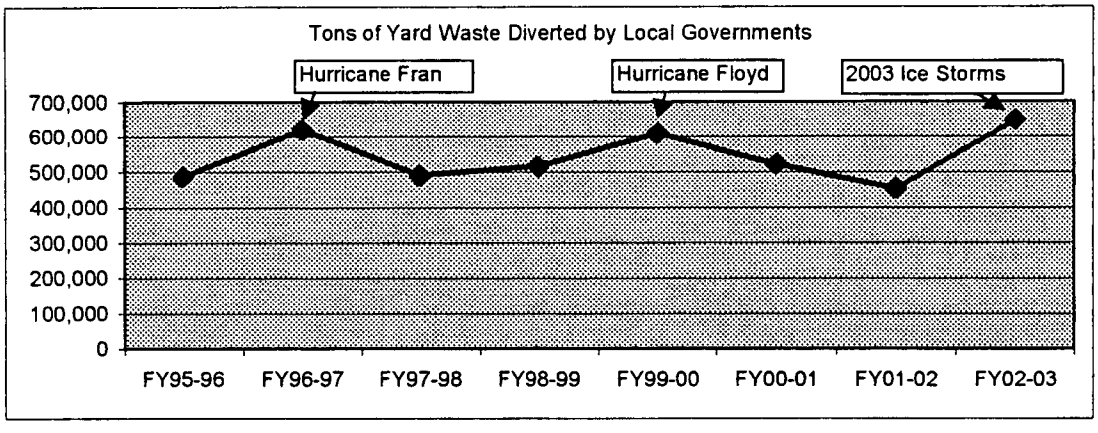
Local Government Yard Waste Management FY 01-02 and FY 02-03

Destination of Materials	FY 01-02 tons managed	FY 02-03 tons managed	% Change
End Users (direct delivery)	31,151	64,164	106%
Local mulch/compost facility	421,340	582,677	38%
TOTAL DISPOSAL DIVERSION	**452,491**	**646,841**	**43%**
Other Public Facility*	87,112	125,990	45%
Private Facility*	49,691	152,567	207%
LCID Landfill*	153,320	133,505	-13%
YARD WASTE TOTALS**	**655,502**	**932,913**	**42%**

* Land Clearing and Inert Debris. The tonnages are not included in the "Total Disposal Diversion" figure to avoid duplicate reporting and due to uncertainty about the wastes' disposal.

** Yard Waste Totals do not include tonnage attributed to "other public facilities" to avoid duplicate reporting.

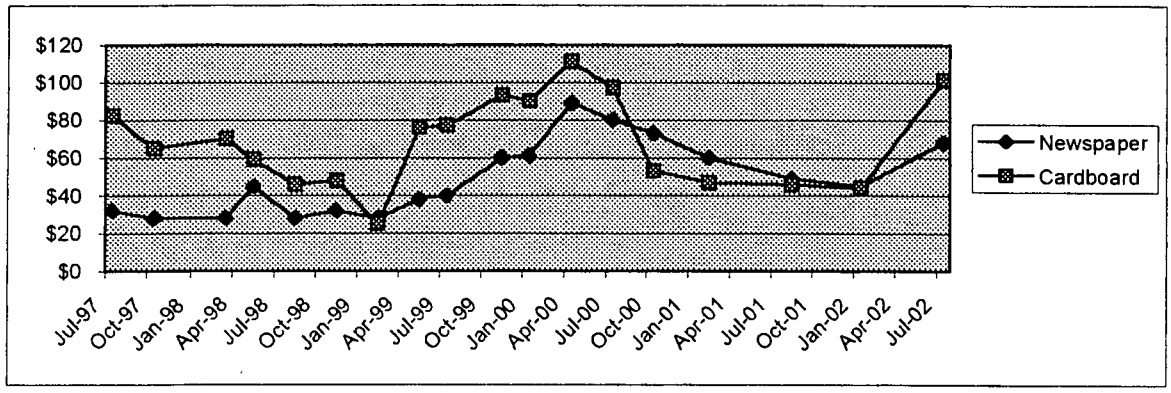
Yard Waste Diverted from Disposal by Local Governments, FY 95-96 – FY 02-03



Recycling Markets, Prices, and Related Developments

Recycling markets for commonly collected materials remained stable in FY 02-03. The following table shows the material price trends experienced by three major processing centers in eastern, central and western North Carolina. The fluctuations noted are normal for recyclable material pricing; no materials experienced major price swings.

Material Price Trends – Price Per Ton, Baled



Green glass remains the only material where the market charges a price to accept material. Glass generally poses a problem for recycling markets located in remote areas of the state. Problems arise due to the high cost of transport relative to the sales price. New Hanover County processes glass on-site for use as aggregate in its landfill. They are the only county known to do this, but the program may begin a trend that saves other community recycling programs money over time.

Composite Recycling Market Prices Received by Major N.C. Processors, FY 02-03

Materials	Summer 2002	Fall 2002	Summer 2003
Aluminum cans, Lbs., loose	$ .45	$ .46	$ .47
Steel cans, Gross Tons, baled	$ 21.00	$ 29.00	$ 40.00
PETE*, Lbs., baled	$ .60	$ .60	$ .90
HDPE**, Lbs., baled	$ .12	$ .12	$ .10
Newsprint, Ton, baled	$ 68.00	$ 79.00	$ 60.00
Corrugated, Ton, baled	$101.00	$ 66.00	$ 73.00
Office paper, Ton, baled	$123.00	$132.00	$127.00
Mixed paper, Ton, baled	$ 48.00	$ 39.00	$ 32.00
Clear glass, Ton	$ 23.00	$ 23.00	$ 18.00
Brown glass, Ton	$ 15.00	$ 15.00	$ 26.00
Green glass, Ton	-$ 4.00	-$ 4.00	-$ 4.00

* Polyethylene teraphalate
** High density polyethylene

There are indications that some areas of the state underutilized their processing capacity for recyclable materials. Material recovery facilities (MRFs) in Greenville and Jacksonville state they could handle additional material. The Greensboro MRF was recently upgraded, and two new MRFs opened in Raleigh and the Asheville area, respectively. However, other areas in the state need processing capacity to foster increased recycling. Fayetteville cites the lack of a nearby MRF as one factor inhibiting them from starting curbside recycling.

Organics recycling received a major boost in FY 02-03 when a large composting facility opened in the Triangle area. Wood fuel users in eastern North Carolina and the upper Piedmont also indicate a healthy demand for material – at times, they struggled to get an adequate supply.

Some significant additions to the state's recycling infrastructure are anticipated in FY 03-04. A glass end-user is scheduled to begin operating in Pasquotank County, a construction waste recycling facility is planned for High Point, and a large composting facility is due to open in the Greenville area. Early indications show that markets for curbside materials will remain stable in FY 03-04. Stable market conditions should give local governments steady demand for their recyclables.

CHAPTER 3
LOCAL GOVERNMENT ASSISTANCE

Solid Waste Management Trust Fund

This report details FY 02-03 Solid Waste Management trust fund activities and expenditures. The trust fund is administered by the Division of Pollution Prevention and Environmental Assistance (DPPEA) in the Department of Environment and Natural Resources. It was created by the Solid Waste Management Act of 1989 (SB 111) and is funded by partial proceeds from a fee on the sale of new tires, a tax on virgin newsprint, and an advance disposal fee (ADF) on white goods (appliances). Additional revenues can come from appropriations and contributions. The purpose of the trust fund is to support a range of solid waste management activities including: technical assistance to local governments, businesses, and other entities on solid waste issues; public educational programs; research and demonstration projects; and recycling market development (G.S. 130A- 309.12).

The Solid Waste Management trust fund received revenues totaling $961,392 in FY 02-03. When added to the beginning balance on July 1, 2002 of $1,694,112, a total of $2,655,504 was managed in the trust fund during FY 02-03. Actual expenditures totaled $503,140, which left a fund balance of $2,152,364 on June 30, 2003. The balance held $527,560 in encumbrances for standing grant contracts (the grants are paid periodically on a reimbursement basis). The unencumbered balance was $1,624,804.

The relatively large, unencumbered balance in the trust fund at the end of FY 02-03 is unusual. It reflects a slowdown or cancellation of normally scheduled grant cycles for the fiscal year. This is a direct result of state budget problems. DPPEA did not proceed with a normal level of grant-making to preserve trust fund assets in the event they were needed to cover overall budgetary shortfalls. Because the trust fund was not used for that purpose, the large end-of-year balance resulted. In normal budgetary circumstances, grant cycles reduce the balance for the fiscal year by at least $600,000. A grant cycle that helped fund local government recycling initiatives was completed in late FY 02-03, but the encumbrances for that cycle did not take place until early FY 03-04.

Trust Fund Expenditures and Revenues

Funds	Total FY 02-03
Beginning Balance	$ 1,694,112
+ Revenue	$ 961,392
- Expenditures	$ 503,140
Ending Balance	$ 2,152,364
Encumbrances	$ 527,560
"Uncommitted" funds - 6/30/03	$ 1,624,804

Trust Fund Revenue Sources

Revenue Source	Total FY 02-03
Tire Tax	$ 543,253
White Goods ADF	$ 356,653
Newsprint Tax	$ 486
Appropriations	$ 0
Contributions and Misc.	$ 61,000
Total Revenues	$ 961,392

Trust Fund Revenue Sources

FY 02-03 trust fund revenues came from four of five possible sources identified in the General Statutes. Activity for each revenue source is described below:

- **2 percent Tire Tax** – Revenues from the tax on new tire sales totaled $543,253, just more than 56 percent of total trust fund revenues in FY 02-03 and up slightly from $536,119 in FY 01-02.
- **White Goods Tax** – Proceeds from the ADF on white goods accounted for $356,653, slightly more than 37 percent of total revenues for FY 02-03. White goods proceeds were 2.7 percent higher in FY 02-03 than in FY 01-02.
- **Virgin Newsprint Tax** – North Carolina newspaper publishers that fail to meet state-required purchasing goals for recycled content newsprint must pay a $15 per ton tax on the virgin newsprint they consume. The law allows wide exemptions for companies unable to purchase recycled content newsprint due to availability or pricing constraints, or who actively recover newspaper for recycling. During FY 02-03, $485.82 was received from this tax. Compliance with the law has been consistent. In 10 years, the annual revenue from the newsprint tax has never been higher than $3,000.

- **General Appropriations** – When the trust fund was first established in 1989, a one-time appropriation of $300,000 was allocated to provide an initial fund balance. There have been no further appropriations since 1989.
- **Contributions to the trust fund and miscellaneous revenues** – DPPEA continued a recycling promotion campaign in FY 02-03 that entailed cost-sharing partnerships with local governments and private sector contributors. Local governments contributed $48,500 toward the campaign and private sources provided $12,500. The list of Recycle Guys partners is provided in Attachment A.

Trust Fund Expenditures

Continuing state budget problems in FY 02-03 confined DPPEA to only one grant cycle. Grant funds awarded in FY 02-03 are actually encumbered in early FY 03-04. The completed grant round is described below. Other major FY 02-03 expenditures fell into two categories: 1) continuing the Recycle Guys promotional campaign and 2) delivering technical assistance to North Carolina communities, recycling businesses and waste generators. These activities are two explicit purposes noted for the trust fund in G.S. 130A- 309.12.

Solid Waste Reduction Assistance Grants

The Solid Waste Reduction Assistance Grants (SWRAGs) are a standard annual grant cycle DPPEA offers to local government and nonprofit recycling programs. The grants support specific projects that enhance the effectiveness of local and nonprofit recovery efforts. SWRAGs usually include targeted grant categories that increase activity in certain program areas or increase the recycling of certain commodities.

The FY 02-03 SWRAGs began when a Request for Proposals was sent to local governments and nonprofit agencies involved in waste reduction. Funding categories included Swap Shops, Backyard Composting, Paper Reduction and Recycling, Mercury Recovery, Buy Recycled activities, Construction & Demolition Salvage and Reuse, Material Recovery Facility funding, and a General category. Nineteen proposals were received and evaluated through "blind vote" scoring that uses specific point criteria. The seventeen proposals selected received a total of $249,222 in grant awards. One grant of $50,000 for MRF development was withdrawn when the grantee's project proved untenable, leaving a total of $199,222 in grant awards for the 2003 cycle. These grants were encumbered and put under contract in early FY 03-04.

Recycle Guys Campaign

In FY 02-03, North Carolina continued the "Recycle Guys" educational campaign to recapture public enthusiasm for recycling and boost participation rates. The Recycle Guys television commercials on cable television make up the foundation of the campaign. Using cable allows specific demographic groups to be targeted. The broadcasts are co-funded by DPPEA and by local government partners. Local governments contributions totaled $48,500 in FY 02-03, which made a $118,000 broadcast contract possible. The commercials will run through March 2004.

DPPEA also used trust fund resources in FY 02-03 to provide local governments with integrated media campaign materials so they could fully implement the Recycle Guys program on a local level. Supported by a generous $12,500 donation from the North Carolina Soft Drink Association, the funds were used to print and distribute Recycle Guys trading cards, which are very popular with children.

After three years, DPPEA and its funding partners are seeing a payoff on the substantial resources invested in the campaign. Both DPPEA and local governments continually receive anecdotal evidence that the characters and their message are widely recognized and understood. When DPPEA surveyed children in classrooms and other group settings where the ads were broadcast, they found an astounding recognition rate of 81 percent, with some classes at 90 to 100 percent. Many children could recite specific messages from the ads. The survey documented a high degree of excitement and enthusiasm

for the campaign. Even if local governments do not see immediate changes in recycling participation rates, the educational component of the Recycle Guys campaign has proven its effectiveness.

Technical Assistance Activities

North Carolina General Statutes direct DPPEA to use trust fund monies to generally promote waste reduction and recycling, generally and specifically provide technical assistance to local governments, and to build recycling markets. Here is a summary of DPPEA's FY 02-03 activities that meet these requirements.

- **Waste Reduction Partners Program**

The Waste Reduction Partners (WRP) is highly successful. It uses retired engineers and business professionals to provide environmental technical assistance to companies and local governments in western North Carolina. In a continuation of funding from FY 00-01 and FY 01-02, DPPEA provided $25,000 to WRP in FY 02-03 to support industrial solid waste audits and other recycling activities. With this funding, WRP helped western North Carolina businesses and other entities divert 13,500 tons of solid waste from landfills. The $25,000 was leveraged to yield estimated savings of $1.3 million in disposal costs. During FY 02-03, WRP conducted solid waste reduction work in 13 western counties.

- **Staff Support**

To accomplish its statutory technical assistance, public education and recycling market development requirements, the trust fund was used to support DPPEA staff positions. A total of $130,769 was paid for salaries, benefits, and limited operational support. The positions are:

Recycling Market Development Specialist- This position provides marketing assistance to local governments and others involved in recyclable materials collection. As a part of DPPEA's Recycling Business Assistance Center, this person strengthens recycling capacity for secondary materials collected statewide. This employee also manages the recycling markets directory required by state statute and performs other duties.

Waste Management Analyst- In addition to work with local recycling coordinators, this position also develops educational materials and programs on solid waste issues for school age to adult audiences. The position implements the integrated "Recycle Guys" campaign statewide to boost North Carolina's recycling participation rates.

Waste Management Analyst- This position provides technical assistance to local governments' waste reduction programs, including solid waste planning and full cost accounting (statutory requirements for local governments). The position also manages recycling program data from state-mandated local waste reduction reports. The data is used to complete the N.C. Solid Waste Management Annual Report.

Organics Recycling Specialist- This position provides technical assistance to local governments, recycling businesses, waste generators and the general public on how to reduce and compost organic waste streams, including yard waste, which is banned from disposal by state statute.

- **Graduate Intern Program**

Through a contract with the Water Resources Research Institute (WRRI) of the University of North Carolina, DPPEA hires student interns for a full year. Student projects in FY 02-03 included: 1) assessing the Recycle Guys campaign, 2) developing best management case studies on local recycling programs, 3) revamping and updating the local government recycling Web page, 4) establishing re-refined oil on state term purchasing contracts, and 5) helping to develop recycling markets and improve local programs.

Product Stewardship Initiative Support

"Product Stewardship" is a growing movement by state and local governments to increase manufacturers' responsibility for their products environmental impacts. Product stewardship includes diverting those products to recycling. Greater manufacturer responsibility for end-of-life products reduces tax burdens on state and local governments who currently manage the waste. In FY 02-03, North Carolina joined the Product Stewardship Institute, the lead coalition of state and local governments working on this issue. DPPEA also providing nominal support for the Carpet America Recovery Effort (CARE), a negotiated national agreement between state governments and the carpet industry that promotes carpet recycling.

Temporary Assistance

North Carolina statutes require solid waste management annual reports from all counties and municipalities. The data is used to create the Solid Waste Management Annual Report. North Carolina Statutes also require operating a recycling market directory. DPPEA hired temporary labor to manage the large set of data required to perform these tasks. The additional staff also allowed DPPEA to increase the amount of technical assistance resources available to local governments.

Publications and Outreach Efforts

DPPEA used trust fund resources for a number of technical assistance and outreach activities. Some of the activities were: printing and distributing the *Recycling Works* newsletter and other fact sheets; conducting workshops and sessions at the Carolina Recycling Association and North Carolina Chapter of the Solid Waste Association of North America conferences; and travel costs incurred so technical assistance could be provided to local governments and trust fund grantees. DPPEA normally uses appropriated funds for these items, but state budget shortfalls eliminated that resource.

Planned Expenditures for FY 03-04

In FY 03-04, the Solid Waste Management trust fund will continue to support local government recycling programs and expand the Recycle Guys campaign. DPPEA will also resume its normal grant cycles, with an emphasis on improving and increasing recycling businesses' capacity to process and use additional materials. The trust fund will also support western North Carolina's Waste Reduction Partners program, and funds will be used to help North Carolina participate in national coalitions that promote product stewardship.

For more information about the North Carolina Solid Waste Management trust fund, contact Scott Mouw, Chief, Community and Business Assistance Section, Division of Pollution Prevention and Environmental Assistance, at (919) 715-6512.

ATTACHMENT A: TRUST FUND REVENUE SOURCES

The North Carolina Solid Waste Management trust fund received 88 percent of its revenues in FY 02-03 from two sources: statewide fees on the purchase of new tires and white goods. The trust fund only receives a small portion of these fees.

Scrap Tire Tax - During this reporting period, a 2 percent fee was levied on the purchase of new tires.

- 68 percent of the revenues were distributed to counties on a per capita basis to pay for proper discarded tire management.
- 27 percent was credited to the Scrap Tire Disposal Account for local government grants and nuisance tire site cleanups.
- 5 percent went to the Solid Waste Management trust fund.

White Goods Tax - During this reporting period, a $3 fee was levied on major appliance purchases.

- 72 percent of revenues were distributed to counties on a per capita basis for proper white goods management.
- 20 percent was credited to the White Goods Management Account for local government grants to manage discarded white goods.
- 8 percent went to the Solid Waste Management trust fund.

FUNDING PARTNERS FOR THE FY 02-03 RECYCLE GUYS CAMPAIGN

Partner Name	Amount Given
Mecklenburg County	$10,000
Town of Cary	$5,000
City of Greensboro	$5,000
City of Winston-Salem	$5,000
City of Raleigh	$5,000
Wake County	$5,000
Davidson County	$2,500
Orange County	$1,000
Johnston County	$5,000
City of Durham	$2,500
City of Burlington	$2,500
North Carolina Soft Drink Association	$12,500
TOTAL	**$61,000**

ATTACHMENT B: 2003 SOLID WASTE REDUCTION ASSISTANCE GRANT PROJECTS

Grant Recipient	Award	Grant Description
Food Bank of North Carolina	$16,770	The Food Bank of North Carolina will purchase equipment to improve sorting efficiency and increase the volume of foodstuffs they distribute to four food bank warehouses throughout the state.
Bladen County	$10,500	Bladen County will install swap shops at several convenience centers.
Coastal Regional Solid Waste Management Authority	$10,200	CRSWMA will implement a latex paint recovery program in Carteret, Pamlico and Craven counties.
Greene County	$15,540	Greene County will purchase new recycling containers and increase signage and educational materials at county convenience sites.
The Scrap Exchange	$11,350	The Scrap Exchange will host a reuse craft booth at the N.C. State Fair to educate visitors about waste reduction.
Classroom Central	$6,420	Classroom Central will purchase equipment to turn reused and donated materials into usable educational tools for needy school children in Mecklenburg County.
New Hanover County	$20,000	New Hanover County and the Town of Wrightsville Beach will add mixed paper to the materials collected at convenience centers.
Town of Kernersville	$19,842	This project will use 35 eight cubic-yard containers to collect cardboard from commercial customers.
Pasquotank County	$19,800	Pasquotank County will install equipment to improve the efficiency of its commercial paper recycling programs. The change allows the county to collect more material and reduce operating costs.
Carolina Recycling Association	$9,800	CRA will develop and conduct three workshops on how to implement local electronics recycling programs.
Town of Beaufort	$4,000	The Town of Beaufort will conduct a reduced-price backyard compost distribution program for town residents.
Wake County	$20,000	Wake County will expand its electronics recycling program to include new items.
Caldwell County	$7,000	Swap sheds will be constructed at three staffed collection centers. The sheds will accept reusable household goods.
Cabarrus County	$4,000	Cabarrus County will hold a compost bin truckload sale, offer composting classes, and upgrade the existing demonstration site.
Albemarle Resource Conservation & Development Council	$20,000	Chowan, Gates, Bertie, Hertford and Northampton counties will participate in an oil recycling program that distributes 85 double-walled plastic recycling containers to area farms. U.S. Filter will pick up the oil directly from the farms.
Keep Gastonia Beautiful	$4,000	KGB will develop a compost demonstration site with educational signage, construct two portable vermicomposting bins and corresponding classroom education materials, and conduct a truckload sale of a minimum of 100 compost bins.

CHAPTER 4
STATE AGENCY WASTE REDUCTION EFFORTS

Executive Order 156,signed in 1999 in support of North Carolina Project Green, the state environmental sustainability initiative, was an update and strengthening of the original initiative of Executive Order 8, signed in 1993.[1] State agencies are directed to use products containing recycled materials by state law and executive order. Purchasing recycled and other environmentally preferable products strengthens recycling markets, helps reduce environmental impacts from waste, and saves energy and natural resources. Many state agencies and local school districts help achieve these goals through thoughtful purchasing decisions and the use of recycled products.

North Carolina state government continues to make progress toward environmental sustainability by offering recycled and environmentally preferable products at affordable prices on state contract. Currently, 11 product categories are available on state term contract that offer products with recycled content materials. Several more available products offer some sort of environmentally preferable attribute, including recycled content packaging or energy efficiency. State agencies and others who can use state term contracts, such as local governments, find they offer a variety of high quality, cost-effective recycled products. The list of products is at http://www.doa.state.nc.us/PandC/recycled.htm.

This chapter summarizes state agencies' efforts to purchase recycled products. The compilation includes purchasing reports required from 28 state government departments and offices, 18 constituent institutions of the University of North Carolina, 58 community colleges, and 117 local public school administrative units. Agency reports meet the reporting mandate of N.C. General Statute 143-58.2(f).

In FY 02-03, 86 percent of agencies (191 out of 221) reported their purchases. With 24 additional agencies reporting, the group of respondents grew by 10 percent. Nine agencies that reported in two previous years did not report for FY 02-03. Most non-reporting agencies have not complied with the regulations for the past four years or longer. Reports were collected online to save paper and postage.

The Division of Pollution Prevention and Environmental Assistance has been charged with compiling the data and publishing an annual summary. To view purchasing reports, visit www.p2pays.org/buyrecycled, call (919) 715-6505 or (800) 763-0136.

Purchases of Recycled Products

Paper and Paper Products- Reported agency purchases for all office paper and paper products (recycled and non-recycled) in FY 02-03 totaled $41,284,807. In FY 01-02, agency purchases were reported at $25,781,557 – a significant decrease from past years. After review and correction, the revised FY 01-02 total was $34,158,947, which is eight percent less than the previous fiscal year. Since FY 99-00, paper purchases have declined steadily, primarily due to waste reduction and increased electronic communication. Spending constraints from the state's budget crisis also played a role in the decrease. This year's total is 17 percent higher than the previous year. Part of the increase is due to better reporting, but it possibly also reflects fewer purchasing restrictions in FY 02-03.

Recycled paper purchases, which totaled $32,420,289, rose 19 percent from the past period. Recycled paper made up 79 percent of all reported paper purchases – a two-year gain over the previous period's revised total. The increase is gradual and may not reflect the changes made on term contracts last year. Last year, all term contracts offered recycled content paper. Purchasers may not have been aware of the 100 percent recycled content offerings. In the next fiscal year, virgin paper will reappear on state term contracts due to a one-dollar per ream price difference. The price difference could easily be neutralized with waste reduction techniques, such as double-sided printing and using one-sided pages for fax

[1]North Carolina Department of Pollution Prevention & Environmental Assistance, Environmental Statutes /Executive Orders for State Agencies, "Executive Order 156, Governor Jim Hunt (1996). <www.p2pays.org/ref/03/02221.pdf> [2 Feb 2004].

machines. Making the virgin paper available once again could significantly hinder the state's effort to reach the goals set in Executive Order 156.

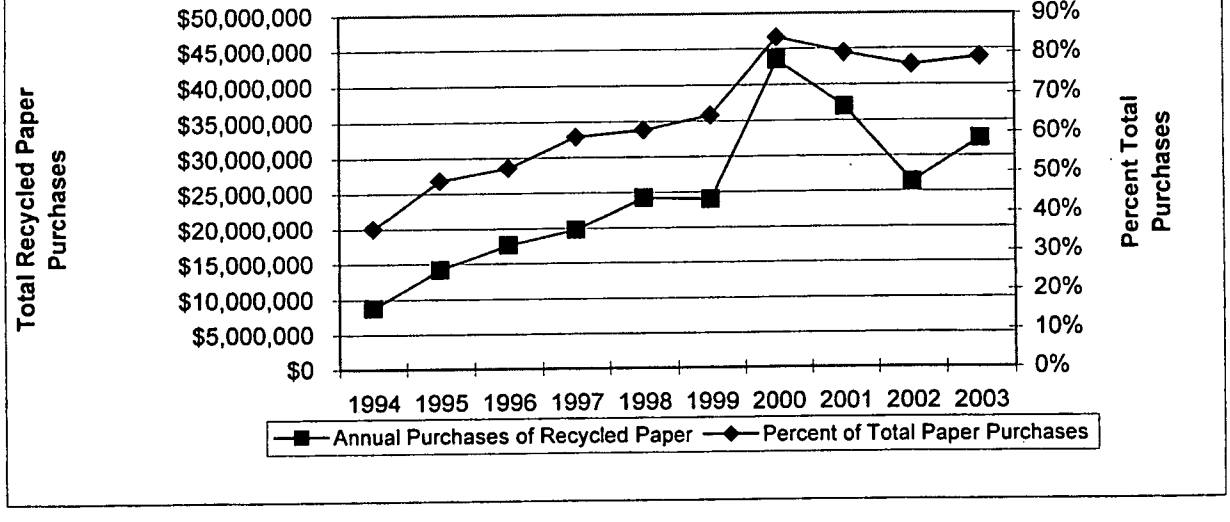
Fiscal Year 02-03 was the second year that agencies failed to meet Executive Order 156's goal, "State agencies shall attempt to meet the goal that, as of Fiscal Year 00-01, 100 percent of the total dollar value of expenditures for paper and paper products be toward purchases of paper and paper products with recycled content."[2] Twenty-three agencies reached the 100 percent goal this fiscal year for all paper purchases; two more than last year. Another 36 agencies achieved recycled content paper purchasing rates of 95 percent or higher; 48 percent had a 90 percent rate - a 5 percent increase over last year. Less than one-fifth of reporting agencies purchased only office paper containing recycled content. Over one-third of the reporting agencies bought recycled content towel/tissue products exclusively.

Of the miscellaneous paper purchased - including legal pads, file folders, labels and continuous feed forms – 50 percent contained recycled content. This percentage could easily grow with education, given many of the same products with recycled content are available on term contracts. Office paper and towel/tissue purchases with recycled content had higher percentages of 84 and 88, respectively.

Reporting agencies also report on whether they specifically request recycled content paper in contracted printing work. Only 53 percent did this consistently in FY 02-03, 15 percent less than in 1997. Reported spending on outside print orders increased 20 percent from the previous year. Of the $14,814,280 reported, 65 percent was spent on jobs using recycled paper, a 2 percent increase over the previous period.

Figure 1 illustrates purchasing trends for overall dollar amounts and percentages of recycled paper purchases over the past 10 fiscal years. The data show greater efforts are needed to achieve the 100 percent goal across all agencies. If top management displayed a renewed emphasis and commitment to meet the statutory and executive goals, compliance would probably rise. Targeted outreach campaigns to agencies using quantities of virgin paper purchased would also help.

Figure 1. State Agency Purchases of Recycled Paper and Paper Products Fiscal Years 1994-2003

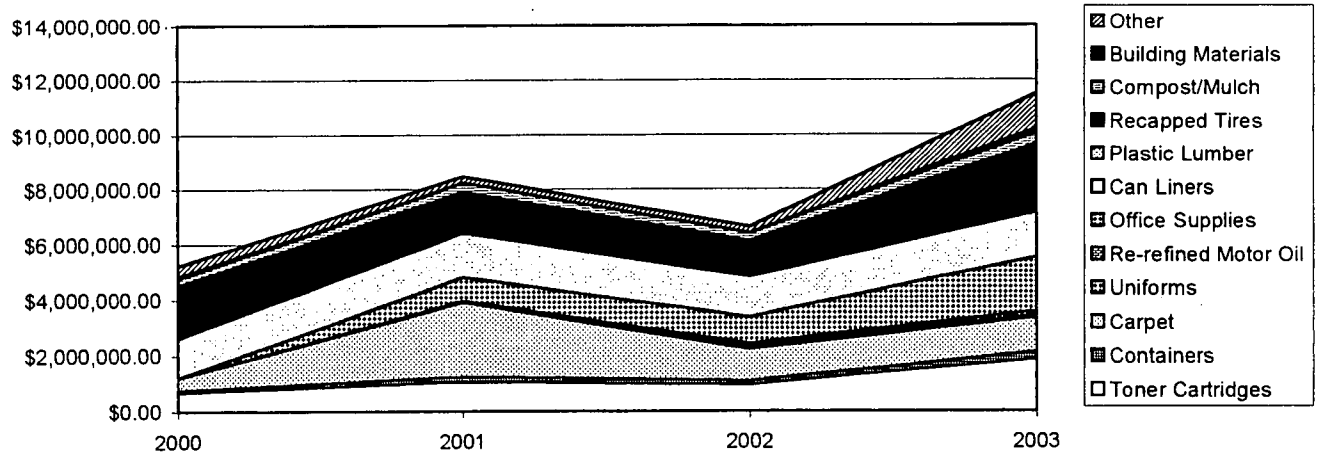


Policy and Administrative Support- When agencies were surveyed regarding buy recycled policies or goals, 36 percent reported having a policy or goal. Agencies also reported fewer administrators communicate the importance of purchasing recycled content products. This finding is consistent with last year's data, when less than two-thirds of agencies reported receiving this information. This percentage is 15 percent lower than that for 1997. Lead coordinators for buy-recycled efforts are also on the decline, with less than half reported in place this year. While agencies are not required to develop a policy by the

general statutes or executive order, such policies could be an effective first step to improve the state's efficiency in recycled content product purchases. However, agencies are specifically required to purchase recycled content products and designate a lead coordinator. Executive Order 156 also requires administrator encouragement, a key component in successful recycled content procurement programs. Improving these factors could significantly increase participation levels.

Non-Paper Products- Agencies report spending $11,486,122 for non-paper recycled products in FY 02-03, a 42 percent gain over the previous period. Figure 2 displays the array of recycled products purchased by agencies: remanufactured laser toner cartridges, plastic can liners, recapped tires, plastic lumber, compost and mulch, re-refined motor oil, carpet and uniforms are a few major categories. Category spending levels reach all-time highs with the exception of carpet, which gained slightly over last year, and uniforms, which were purchased in abundance last fiscal year.

Figure 2. Agency Purchases of Non-Paper Recycled Content Products, FY 2000-2003



Conclusion

Purchasing recycled content products is now a well-established state government practice supported by statutory and executive order requirements. State term contracts offer agencies a number of high quality, affordable choices. However, agencies have not fully complied with the 100 percent recycled content paper goal. Now that 48 percent of state agencies have met their goal, it has been proven feasible with management support and increased awareness of requirements and products.

A few key agencies could substantially increase the state's performance by altering a few significant purchasing decisions. Converting the $8.8 million currently spent on virgin paper to recycled paper purchases would allow state government to substantially improve recycling market strength. State government is a major player among those who collect paper for recycling and could directly benefit from improved markets. Using recycled products also helps North Carolina reach its environmental goals to reduce natural resource, energy and water usage, and to prevent air and water pollution. Re-refined motor oil is an excellent example because the product meets virgin oil specifications exactly, engine manufacturers support its use, and its state contract cost is comparable to virgin oil. Agencies should make purchasing re -refined oil products a standard operating procedure.

The following recommendations may increase future recycled content purchasing and help state government meet the goals set forth in Executive Order 156 and general statutes.

Recommendations

I. Reissue and enforce Executive Order 156. Reissuance will heighten awareness and support recycled content purchasing. It also strengthens DPPEA's ability to collect and manage data related to state agency purchases. Strong and active gubernatorial support will help the state meet its executive and legislatively mandated goals.

II. Increase administrative support and educational programs. Agencies vary wildly in the degree of support and routine communication they receive from top management on this issue. The lack of communication may be the most significant barrier to increased agency participation. Administrative support is crucial to the successful implementing agency sustainability plans under North Carolina Project Green. The plans incorporate waste reduction, recycling and environmentally preferable procurement. Agencies that have not yet made waste reduction and buying recycled a priority should:

- Implement and adhere to the goals of Executive Order 156, which states that all paper purchased will have a minimum of 30 percent post-consumer content by FY 00-01.
- Issue and enforce internal policies, official memoranda and formal declarations that demonstrate administrative leadership and support for buying recycled and Executive Order 156.
- Develop and implement ongoing outreach and education programs for employees and visitors.
- Join North Carolina Project Green and pledge to achieve its goals as part of the agency's overall commitment to environmental sustainability.

III. Increase Procurement of Non-Paper Recycled Content Products. Expenditures for non-paper recycled products continue to lag behind paper purchases. The federal government's purchasing regulations under Executive Order 13101A makes it apparent a wide variety of products with recycled content materials are available. Federal Comprehensive Procurement Guidelines feature over 50 items in eight categories. Categories include paper, non-paper office, construction, landscaping, park and recreational, transportation, vehicles and miscellaneous products. To see the list, visit http://www.epa.gov/cpg/. Purchasing an array of recycled content products strengthens North Carolina recycling markets and helps agencies fulfill their obligation to become more environmentally sustainable. State agencies should take the following steps to improve overall buy recycled efforts:

- Expand the quantity and variety of non-paper recycled products purchased through agency convenience contracts and state term contracts.
- Enforce purchasing rules that mandate buying from state term contract above in-house delegations.
- Establish or upgrade electronic tracking systems for all recycled product purchases.
- Specify or encourage the use of recycled materials and supplies by contracted services, especially in construction, housekeeping and printing.

IV. Base Purchasing Decisions On Full Environmental Impact Versus One-Time Cost. To determine the full environmental impact of a product or service, its full life cycle must be analyzed. The analysis helps state agencies begin purchasing items of benefit in both the short and long term.

- Examine products in terms of broad environmental impacts that include: durability, energy efficiency, performance, recycled content and recyclability, toxicity, biodegradability, manufacturer location (local availability), and packaging.
- Develop guidelines and checklists for purchasing and contractual services that consider environmental impact.
- Reassess accounting procedures so agencies that practice environmental purchasing receive credit for doing so.

Agencies that Purchased 100 Percent Recycled Paper in FY 02-03

Alexander County Schools*
Appalachian State University*
Asheboro City Schools*
Central Piedmont Community College*
Edenton-Chowan Schools
Franklin County Schools
Guilford County Schools*
Madison County Schools*
Mitchell County Schools
Nash/Rocky Mount Schools*
Northampton County Schools
Office of the Governor*
Pamlico County Schools*
Pembroke State University*
Pender County Schools
Piedmont Community College
Rowan-Cabarrus Community College
Sampson County Schools
Southwestern Community College
Stokes County Schools*
UNC-Greensboro*
Wilkes County Schools
Wilson Technical Community College

* Indicates at least three consecutive years of reaching this goal.

Agencies that Failed to Report Data for FY 02-03

Bertie County Schools
Brunswick County Schools
Carteret County Schools
Caswell County Schools
Catawba County Schools
Chapel Hill-Carrboro City Schools
Cherokee County Schools
Clay County Board of Education
Clinton City Schools
Coastal Carolina Community College
Columbus County Schools
Dare County Schools
Edgecombe County Schools
Elizabeth City State University
Harnett County Schools
Hoke County Board of Education
Kings Mountain District Schools
Lenoir County Public Schools
Lieutenant Governor's Office
Pamlico Community College
Pasquotank County Schools
Perquimans County Schools
Robeson County Public Schools
Thomasville City Schools
UNC Hospitals
Wake Technical Community College
Warren County Schools
Watauga County Schools
Whiteville City School

CHAPTER 5
WHITE GOODS MANAGEMENT

"White goods" are defined in G.S. 130A-290 (a)(44) as, "refrigerators, ranges, water heaters, freezers, unit air conditioners, washing machines, dishwashers, and clothes dryers and other similar domestic and commercial large appliances."

This interim report is based on information supplied by counties' Annual Financial Information Reports. AFIRs are submitted to the Office of State Treasurer. AFIRs are due by December 1st, but only 70 counties had submitted AFIRs at the time this report was prepared, February 9, 2004. A final, revised report will be issued when the remaining counties submit their AFIRs. It should be noted that, aside from many AFIRs from counties being late, many have blank or erroneous entries.

Counties that did not report as of February 9, 2004

Beaufort	Dare	Jackson	Pamlico	Stokes
Bertie	Durham	Lincoln	Pender	Vance
Caswell	Gates	Macon	Polk	Wake
Chowan	Haywood	Madison	Robeson	Wayne
Columbus	Hertford	Martin	Rutherford	Yadkin
Currituck	Hoke	Montgomery	Sampson	Yancey

Financial Update

- **The white goods management account no longer runs a large surplus**. The number of counties that forfeit their tax proceeds declined while grant requests increased. In FY 98-99, 42 counties forfeited tax proceeds. However, by the fourth quarter of FY 02-03, only 15 counties forfeited their proceeds.
- The amount of forfeited funds available for redistribution dropped 75 percent at the same time that county requests for cost overrun grants doubled - from $450,000 to over $900,000 - per grant cycle. Many counties that allowed reserve funds to accrue in the past are now depleting those funds to pay for daily operations and program infrastructure.

Advance Disposal Fee

Net white goods ADF collections in FY 02-03 totaled $4,460,998.04. Funds were dispersed to:

$ 3,050,499.99	Allocated for direct distribution to counties
$ 847,361.12	Allocated for white goods management account
$ 367,944.43	Solid Waste Management trust fund
$ 184,795.00	N. C. Revenue Department cost of collections
$ 2,146,053.05	Actual amount distributed directly to counties
$ 904,446.94	Forfeited by ineligible counties

Although $3,050,499.99 (72 percent of the net disposal fee collections) was allotted for distribution, ineligible counties forfeited $904,446.94. The forfeited funds went to the white goods management account, which receives 20 percent of net collections.

White Goods Management Account

The White Goods Management Account was established to help counties whose costs exceed their share of ADF revenue. The account receives 20 percent of white goods ADF revenues. It also receives funds forfeited by counties whose surplus exceeds the threshold amount. By the end of FY 02-03, the account balance of $1,075,089.55 was slightly higher than the starting balance of $979,084.93. This account is used to fund counties that incur deficits in their white goods accounts. All but $9,235.50 of this balance was committed for county grants. The counties did not receive all of the proceeds designated for distribution in FY 02-03.

WHITE GOODS DISPOSAL ACCOUNT BALANCE FY 02-03

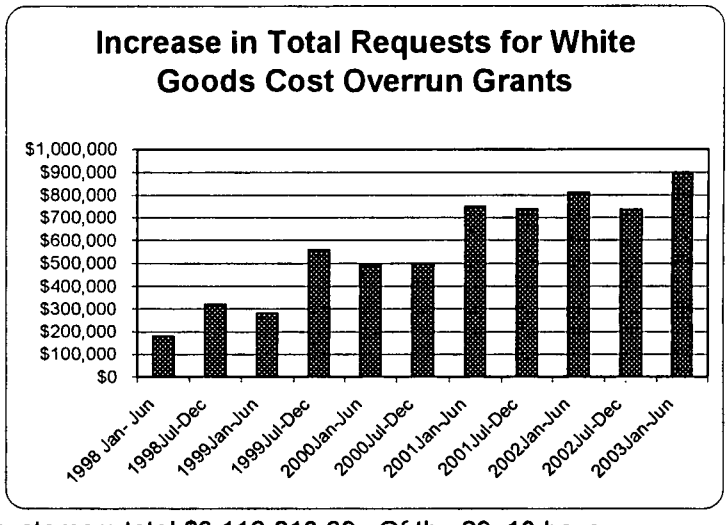
Beginning Balance (July 1, 2002)	$ 979,084.93
Funds Received during FY 02-03	$ 1,403,781.15
Cost Overrun Grants Awarded FY 02-03	$ 1,276,370.70
Ending Balance (June 30, 2003)	$ 1,075,089.55
Monies Reserved for Future Grant Awards*	$ 1,065,854.00
Unencumbered Ending Balance (June 30, 2003)	$ 9,235.50

*Includes $540,854 reserved for capitol improvement grants and $524,000 reserved for next round of overrun grants.

White Goods Management Account Grants

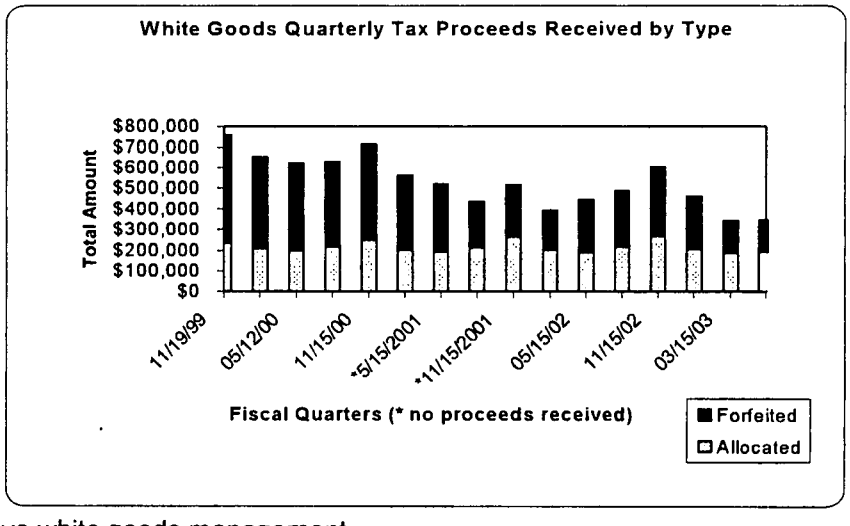
Over $524,000 in grants went to 42 counties for losses incurred January-June 2003; $584,000 was distributed to 34 counties for losses incurred July-December 2002 (Tables 1 and 2).

Capital improvement grants totaling $755,000 were awarded to 15 counties (Table 3). *In FY 02-03, counties requested $2,431,410.97 in cost overrun and capitol improvement grants, but only $1,403,781.15 in revenues was received.*



Very few counties use the grant program to upgrade their infrastructure. Twenty-nine counties repeatedly access the program. To date, program grant awards to "repeat" county customers total $3,116,013.69. Of the 29, 13 have received more than $100,000, and four counties were awarded over $200,000.

As the first graph shows, the total of the amounts requested has significantly increased in recent years. However, as the next graph depicts, the amount of available funds dropped at the same time requests rose.



Program Results

Grant and ADF funding made it possible to clean up illegal dumpsites. Previously, many counties gave white goods a low priority and underfunded their management. The white goods account makes it possible for counties to obtain the specialized equipment or collection/loading areas needed to improve white goods management.

In FY 02-03, 35 county collection sites took in 30,457 tons, or an estimated 761,417 appliances. This compares to the 25,749 tons, or 644,000 appliances, collected in FY 91-92. Without the program, large numbers of appliances would have likely been dumped or stockpiled.

White Goods Management by County Governments

White goods were banned from landfills in 1989 to encourage recycling and better management. Comprehensive white goods management laws enacted in 1993 included an ADF. In 1998, Senate Bill 124 extended the fee for three years but reduced it from $10 to $3. In 2000, the sunset on the fee was removed.

The major accomplishment of the program is a drastic reduction in illegal white goods dumping. The critical factor was requiring local governments to provide collection sites at no cost to the disposers. Counties can use ADF proceeds to clean sites dependent on the percentage of white goods at the site.

Another accomplishment came when counties implemented proper management practices to capture and recycle CFCs. The practice avoids illegal venting into the atmosphere, but also creates a potential profit center.

Though the white goods program has had many accomplishments, some problems remain; these include the limited accountability by counties to assure that tax disbursements and grants are being used exclusively for the management of white goods.

Many local governments are privatizing their white goods management. Overall, privatization does not necessarily mean that programs are more efficient. In many instances privatized white goods management is incorporated into a more comprehensive solid waste contract between a local government and a private firm, making it more difficult to measure program efficiency.

Counties That Forfeited Funds

Counties That Became Ineligible for Advance Disposal Fees In March 2003
(Based on FY 01-02 AFIR Reports)

Alleghany	Franklin	Richmond
Bertie	Guilford	Rowan
Cherokee	Jackson	Sampson
Clay	Jones	Tyrrell
Cumberland	Martin	Wake
Currituck	Mecklenburg	Wilkes
Forsyth	Polk	Yadkin

Counties That Will Become Ineligible for Advance Disposal Fees In March 2004
(Based on FY 02-03 AFIR Reports)

Counties that will not receive ADF distributions because undesignated balances exceed their threshold.

Forsyth	Richmond
Franklin	Tyrrell
Granville	Wilkes
Jones	

Counties that do not submit their AFIR by March 1, 2004 will be ineligible to receive tax proceeds.

White Goods Management Costs

Counties can use the white goods ADF proceeds disbursed quarterly by the Department of Revenue for daily expenses incurred to recycle white goods. Funds can also be used for one-time expenses, such as purchasing specialized equipment and making site improvements for better management. Most county programs are not self-sustaining and require subsidies. Expenses for these programs include fuel, labor and the cost of associated items.

The 70 reporting counties spent $4,331,831 in FY 02-03. Of this total, $3,598,878 was for daily operations, $597,429 for capital improvements, and $144,602 to clean up illegal disposal sites.

Counties with high per unit costs usually have strong programs, a cost allocation plan, lack a strong market, or have a combination of these factors. Counties with little or no disposal costs tend to have minimal programs, poor record keeping, access to a strong market or a combination of these factors. Only a few counties have metals recyclers willing to provide free pickup from county collection sites and/or provide CFC recovery in exchange for access to the scrap metal.

Highest Operating Costs Reported

County	Cost per ton	Cost per appliance*
Wilkes	$561.38	$22.45
Gaston	$410.08	$16.40
Washington	$223.21	$ 8.92
Alexander	$220.88	$ 8.83
Mecklenburg	$214.19	$ 8.56
Graham	$183.93	$ 7.35
Cumberland	$182.02	$ 7.28
Nash	$171.13	$ 6.85
Northampton	$163.34	$ 6.53
Perquimans	$141.17	$ 5.64

Lowest Operating Costs Reported

County	Cost per ton	Cost per appliance*
Transylvania	$25.50	$1.02
Guilford	$23.87	$0.95
Caldwell	$22.97	$0.91
New Hanover	$21.16	$0.84
Cabarrus	$20.89	$0.83
Cherokee	$19.89	$0.79
Person	$17.58	$0.70
Henderson	$14.67	$0.58
Swain	$11.91	$0.47
Wilson	$10.91	$0.43
Surry	$ 9.86	$0.39

*Estimate assumes an average appliance weight of 80 pounds.

Outsourcing loading and transport to the recycler can reduce costs. Other counties use in-house labor to sort and segregate metals, recover CFCs or extract motors or oil.

Tonnage Collected by Counties

In FY 02-03, 70 counties reported processing 52,117 tons of white goods. This translates into 1,302,914 individual appliances (assuming 25 appliances per ton), or about .16 appliances per person in North Carolina.

This map illustrates that operating costs by counties do not seem restricted by geography. Instead, the map suggests that a correlation to distance to markets, extent of programs, record keeping, and cost allocation plans among counties have a greater effect on county costs.

Number of White Goods Cost Overrun Grants Awarded to Counties since 1998

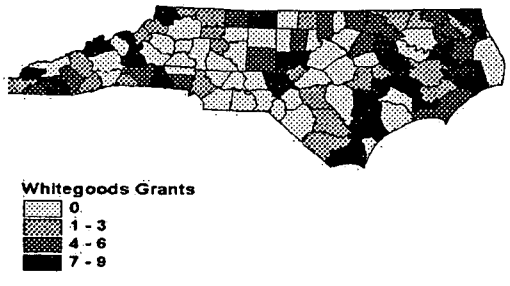


Table 1
Grant Requests & Awards from the White Goods Disposal Account for Losses Incurred January-June 2003

County	ADF Proceeds Received For 6 Month Period	Grant Request For Cost Over-Run	Amount Of Grant Awards
Ashe	$4,105.35	$5,632.24	$2,816.12
Avery	$2,920.74	$9,893.34	$2,775.22
Beaufort	$7,533.48	$58,572.44	$29,287.22
Bladen	$5,402.00	$5,406.00	$5,405.90
Brunswick	$12,550.30	$32,000.84	$32,000.84
Camden	$1,162.00	$2,202.00	$2,202.36
Carteret	$9,932.28	$19,067.72	$9,533.86
Chatham	$8,380.33	$24,406.04	$18,074.18
Cleveland	$16,122.74	$85,218.12	$40,998.11
Craven	$15,304.24	$67,501.36	$40,070.36
Cumberland	$50,447.00	$30,110.00	$15,055.17
Currituck	$1,557.82	$9,206.18	$7,579.42
Duplin	$8,246.71	$41,677.41	$22,505.12
Edgecombe	$9,197.33	$16,673.84	$14,284.05
Gaston	$31,836.00	$41,045.00	$5,288.98
Graham	$1,400.00	$20,673.00	$10,129.03
Granville	$8,209.48	$12,735.21	$1,500.74
Halifax	$9,547.39	$2,698.79	$2,698.79
Hyde	$967.29	$3,181.71	$1,590.86
Jackson	$2,834.99	$14,085.52	$14,086.27
Lenoir	$9,921.72	$36,050.60	$26,378.28
Macon	$5,034.75	$3,716.43	$2,233.68
Madison	$3,291.71	$3,903.00	$3,901.34
McDowell	$7,101.93	$5,695.23	$5,695.23
Mitchell	$2,632.71	$18,422.45	$9,211.23
Moore	$12,631.15	$14,983.24	$14,983.24
Nash	$14,674.20	$104,728.22	$38,295.35
Northampton	$3,678.14	$22,841.00	$11,420.64
Orange	$19,990.28	$58,538.47	$20,359.24
Pe/Ch/Ga	$6,095.12	$38,961.88	$19,480.94
Pender	$6,954.84	$30,670.70	$30,670.70
Pitt	$22,462.01	$15,978.02	$15,978.02
Randolph	$21,945.50	$1,741.60	$1,741.60
Rockingham	$15,330.38	$970.68	$970.68
Rutherford	$10,541.10	$13,439.97	$13,439.97
Stokes	$7,516.00	$6,146.63	$5,734.97
Transylvania	$4,900.82	$370.92	$370.92
Tyrrell	$0.00	$2,944.00	$1,127.05
Warren	$2,763.90	$3,249.65	$2,672.97
Washington	$1,167.71	$9,265.13	$8,155.89
Yadkin	$6,093.88	$1,277.57	$1,277.57
Yancey	$2,988.11	$12,390.57	$12,390.57
Totals	**$395,373.43**	**$908,272.72**	**$524,372.68**

Table 2
Grant Requests & Awards from the White Goods Disposal Account for Losses Incurred July - December 2002

County	ADF Proceeds Received For 6-Month Period	Grant Request For Cost Over-Run	Amount Of Grant Awards
Ashe	$5,131.66	$5,508.16	$5,528.16
Avery	$3,662.87	$13,132.05	$8,722.93
Bladen	$6,706.00	$5,068.00	$5,067.85
Brunswick	$15,909.25	$31,935.41	$31,934.75
Camden	$1,453.00	$1,020.00	$1,019.93
Carteret	$12,329.75	$18,195.25	$18,195.25
Chatham	$10,540.93	$19,348.68	$5,145.36
Cleveland	$20,026.82	$78,369.71	$78,369.14
Craven	$19,025.98	$67,907.07	$41,274.07
Davie	$3,259.80	$4,114.44	$4,114.44
Duplin	$10,260.21	$37,349.29	$21,958.00
Gaston	$39,535.00	$56,521.00	$9,698.00
Graham	$1,400.00	$20,673.00	$20,911.20
Granville	$10,275.00	$5,649.00	$2,584.37
Greene	$3,930.57	$3,281.73	$3,281.73
Halifax	$11,819.39	$2,189.92	$2,189.92
Hertford	$0.00	$2,826.50	$2,826.50
Hyde	$1,187.86	$9,333.94	$9,333.94
Jackson	$6,962.68	$28,907.32	$28,907.32
Lee	$10,224.84	$6,489.70	$6,489.70
Lenoir	$12,265.83	$25,749.40	$25,749.40
Macon	$6,294.70	$3,078.61	$3,078.61
Madison	$5,439.32	$1,921.28	$3,268.68
McDowell	$8,861.14	$5,211.74	$5,211.74
Mitchell	$3,283.89	$19,895.90	$19,895.90
Moore	$15,796.31	$8,385.21	$8,385.01
Orange	$25,021.52	$116,015.72	$89,708.78
Pe/Ch/Ga	$7,799.00	$31,426.00	$31,426.00
Pender	$8,699.16	$31,266.84	$31,266.84
Pitt	$27,914.43	$32,038.91	$32,038.91
Rockingham	$18,992.05	$1,128.34	$1,128.34
Rutherford	$13,114.42	$12,644.97	$3,467.23
Stokes	$17,707.74	$5,543.45	$1,133.89
Warren	$4,133.71	$1,133.89	$1,133.89
Washington	$1,223.25	$9,859.21	$8,269.42
Yancey	$3,726.16	$11,638.98	$11,638.98
Totals	**$373,914.24**	**$734,758.62**	**$584,354.18**

Table 3
Grant Awards & Reserved Funds From the White Goods Disposal Account for Capital Improvements in FY 02-03

County	Grant Amount	Explanation
Ashe	$30,400	Road tractor --- (Paid)
Avery	107,500	Concrete pad – Reserved
Cherokee	$98,000	Used semi & roll-off trailer -- Reserved
Edgecombe	$104,700	Concrete pad --- Reserved
Graham	$4,700	Storage Building, CFC unit, concrete pad - Reserved
Jackson	$108,120	Concrete pad --- (Paid)
Lee	$85,000	Knuckleboom loader –Reserved
Macon	$713	Concrete pad – Reserved
Madison	$14,400	Repair trackhoe—Reserved
Mitchell	$18,746	Repair truck, concrete pad --- (Paid)
Pasquotank	$32,000	Pup trailer – Reserved
Perquimans/Gates/Chowan	$36,418	Concrete pad --- (Paid)
Stokes	$46,547	Repair front loader & metal building--Reserved
Swain	$30,000	Road tractor- Reserved
Warren	$38,000	Illegal dump clean up --- (Paid)
Totals	**$755,244.00**	

CHAPTER 6
SCRAP TIRE MANAGEMENT

Scrap Tire Disposal Account

The Scrap Tire Disposal Account (STDA) was created by the 1993 General Assembly. It receives 27 percent of its revenues from the Scrap Tire Disposal Tax initiated on October 1, 1993. During the 2002 Session of the General Assembly, the sunset was removed on the Scrap Tire Disposal Tax.

Beginning in October 1992, 25 percent of the STDA fund was allocated for cost overrun grants to counties and 75 percent was allocated for clean up of nuisance tire sites. Starting with the August 12, 1997 distribution, 50 percent of the fund is allocated for cost overrun grants, 10 percent for clean up of nuisance tire sites and 40 percent for processed tire material market development grants.

FY 02-03 Balances

Balance of Funds as of July 1, 2002	$3,666,424.80
Deposits Received FY 2002-2003	$2,246,818.01
Total Funds in Account	$5,913,242.81
Grants to County Scrap Tire Programs	$1,642,268.32
Nuisance Tire Site Cleanup Program	$225,051.75
Processed Tire Material Grants	$501,684.19
Balance of Funds as of June 30, 2003	$3,544,238.55
Obligated funds as of June 30, 2003*	$2,677,398.84
Net Balance of Funds as of June 30, 2003	$866,839.71

* $2,677,398.84 obligated: $338,547.89 for tire cleanup, $2,338,850.95 for tire recycling grants under contract and under negotiation

Tire Tax Distribution

Of the state's 2 percent tire disposal tax revenue, initiated October 1993, 68 percent is distributed to counties on a per capita basis. In the past year, the total amount distributed was $7,491,899.76. This subsidized tire disposal costs for the counties, but did not cover many counties' total expenses. The total distributed to the counties represented 78 percent of the total reported disposal costs of $9,664,630.84. This provided an average of 78 cents for each of the 9.6 million scrap tires handled by the counties.

On January 1, 1994, counties stopped charging fees to dispose of tires that were certified as generated in North Carolina (per G.S. 130A-309.58). Counties may charge a fee for tires presented for disposal that do not present a scrap tire certification form verifying the tires were generated in North Carolina.

Counties whose scrap tire costs exceed the amount they receive in their allocation of the tire tax, can apply for a grant to cover the deficit. For the first grant cycle of FY 02-03, 57 counties requested $1,052,145 and were awarded $820,685. In the second grant cycle, 60 counties requested $1,011,560 and were awarded $821,583.

Historically, the amount of grant funds requested by counties has surpassed availability. Scrap tire legislation requires the waste management division to consider county efforts to avoid free, out-of-state tire disposal and county program efficiency when making decisions about grant awards. The amounts requested and awarded are as follows.

Grant Period	4/97 – 9/97	10/97 – 3/98	4/98 – 9/98	10/98 – 3/99	4/99 - 9/99	10/99 - 3/00
Funds Available	$655,226.57	$976,245.51	$687,847.37	$633,761.66	$699,950.87	$663,467.43
Funds Awarded	$592,165.00	$602,778.28	$644,334.67	$583,093.00	$666,042.36	$786,511.24
Grant Requests	42	41	45	46	56	53
Funds Requested	$665,177.91	$677,682.00	$761,308.00	$781,603.00	$816,004.63	$842,931.37

Grant Period	4/00 – 9/00	10/00 – 3/01	4/01 – 9/01	10/01 – 3/02	4/02 - 9/02	10/02 - 3/03
Funds Available	$751,295.88	$700,221.11	$ 0*	$ 0*	$792,399.37	$694,963.10
Funds Awarded	$799,500.85	$709,226.95	$804,004.00	$811,050.00	$820,685.00	$821,583.00
Grant Requests	53	51	56	53	57	60
Funds Requested	$898,907.67	$730,709.37	$992,564.00	$1,024,935.00	$1,052,145.00	$1,011,560.00

*Used balance in other STDA fund.

Grants Awarded

The goal of the waste management division's grant program is to make scrap tire recycling sustainable in North Carolina. This goal can be met. We anticipate awarding additional grants for manufacturing rubber products such as mats, auto parts, gaskets, flooring material, tire derived fuel, new tire manufacturing and other applications in FY 03-04.

The Processed Scrap Tire Material Market Development Grants program received its first allocation of funding in August 1997. Grants awarded to date are:

- Roll-Tech, Inc., Hickory, N.C. $212,420
  Construct additional molds to increase hard rubber tire manufacture
  COMPLETED
- Continental Tire, Inc., Charlotte, N.C. $1,520,000
  Develop "tire to tire" technology with 25 percent recycled content goal
- Jackson Paper, Inc., Sylva, N.C. $377,000
  Boiler modifications for tire derived fuel
  COMPLETED
- N.C. State University, Raleigh, N.C. $38,291
  Tooling development for scrap tire recycling
  COMPLETED
- TIRES, Inc., Winston Salem, N.C. $320,000
  Produce playground/industrial mats

Within the next year, we anticipate awarding grants to Texas Encore Materials LLC for $983,000 and to Roll-Tech Inc. for $850,000.

Tire Cleanup Program

A total of 357 nuisance tire sites have been identified in North Carolina; 330 have been cleaned and 22 sites have cleanups underway. The remaining five sites are either under investigation or enforcement action. Counties are encouraged to locate and clean all small tire sites through countywide cleanup activities.

Status	Number of Sites	Total Known Tires	Total Tires	Cleared Tires
Cleaned Up	330	7,329,561	96%	7,329,561
Under Clean Up	22	235,990	3%	143,882
Remaining Sites	5	27,500	1%	0
TOTAL	**357**	**7,593,051**	**100%**	**7,473,443**

General Statute 130A 309.50 requires the waste management division to first address nuisance tire sites that pose the greatest threat to public health and the environment. At the program's start, efforts and actions to clean top priority sites were developed and initiated as funds were available. As cleanup funds were received through quarterly distributions, additional priority sites were cleaned.

The division has established and implemented a specific cleanup plan for each known nuisance tire site. As new sites are discovered, prompt investigation leads to a cleanup plan for each site within 30 days. The plan is implemented as soon as possible to minimize potential threats to human health and the environment.

The division is committed to the North Carolina Big Sweep program, with reimbursements going to counties that request funds to dispose of scrap tires collected by the statewide event.

To date 167 nuisance tire sites were cleaned using STDA funds. Cost recovery efforts collected $352,587.19 from responsible parties for nine of these sites. Three sites are under cost recovery action.

As a cost saving measure, minimum-security inmates have removed over 600,000 tires from nuisance sites. Counties utilizing inmate labor in nuisance tire cleanups are: Anson, Bladen, Buncombe, Burke, Camden, Chatham, Chowan, Cleveland, Columbus, Craven, Davidson, Halifax, Harnett, Iredell, Lee, Moore, New Hanover, Northampton, Onslow, Perquimans, Richmond, Robeson, Rockingham, Rutherford, Stokes, Surry, Washington and Yadkin.

Scrap Tire Generation

The U.S. EPA standard to estimate scrap tire generation is one tire per person, per year.[2] The 2002 North Carolina population was about 8.3 million, so it is estimated an equal number of tires were generated. This includes passenger, truck, and tires for special uses, such as off-road equipment and tractors. Counties report tires received in either tons or the number of tires. Tons can be converted to number of tires. A ton of tires consists of 100 passenger tires, 20 truck tires, or four off-road tires (tractors and other large off-road equipment).

In FY 02-03, counties reported receiving tires in three size categories: 81 percent passenger car tires, 15 percent heavy truck tires and 4 percent off-road tires. During FY 02-03 counties disposed of approximately 9,645,000 tires (9,144,000 passenger, 471,000 heavy truck and 30,000 off-road). Comparing tire generation to population results in 1.16 scrap tires per person.

Tire Volume

All counties are required to provide facilities for scrap tire disposal and to report on their management programs. A summary of this data is presented in the Appendix.

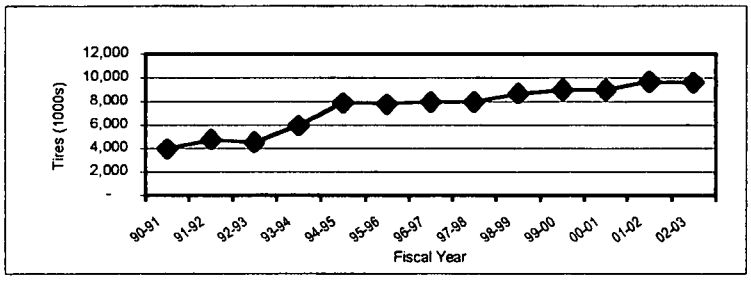
In FY 02-03, North Carolina businesses and individuals disposed of approximately 124,000 tons of tires. These tires were managed by county disposal facilities and private processing facilities as follows:

123,661 tons	Managed by counties and shipped to three processing firms
1,591 tons	Managed by counties and shipped out-of-state
9,000 tons	Tires taken directly to processing firms (not managed by counties)
134,252 tons	**Total**

Counties report receiving approximately 125,000 tons of the total 134,000 tons from North Carolina disposers. The counties shipped about 124,000 tons to three private recycling facilities; the remaining 1,600 tons were shipped to out-of-state processors.

Three private North Carolina processing firms received 125,000 tons from county tire programs and an additional 9,000 tons directly from disposers not participating in county tire programs. These may be individuals involved in privately-funded cleanups or tire dealers not participating in a county program.

Volume of Disposed Tires
FY 90-91 - FY 02-03



[2] "Markets for Scrap Tires," 1991. U.S. EPA, Office of Solid Waste. EPA/530-SW-90-074A. Washington, DC.

The tire program's success is proven by the increase in the number of tires disposed during the past eleven years. Almost all disposed tires are being handled at regulated disposal facilities. However, since free disposal was implemented in 1994, a problem has emerged with illegal disposal of out-of-state tires at county collection sites. The waste management division's Solid Waste Section estimates counties spend about $600,000 per year to manage out-of-state tires that are inappropriately disposed as North Carolina tires.

This cost estimate is based on disposal costs in counties with tire volumes greater than 120 percent of the county population (1.2 tires per person). Some counties are regional retail centers or have other factors that cause them to receive an excess volume of tires.

The waste management division assists counties to help them avoid fraudulent disposal of out-of-state tires. County efforts to deter disposal of out-of-state tires is an eligibility factor when awarding grants from the STDA to cover cost over-runs.

County Tire Disposal Costs

There are 96 county programs, including three regional programs [Carteret, Craven and Pamlico (CRSWMA); Chowan, Perquimans and Gates; Mitchell and Yancey Counties]. These counties report spending a total of $9,664,630.84 for scrap tire disposal. The reported costs for scrap tire disposal varied greatly. Some counties only report disposal costs while other counties include associated costs, such as personnel or equipment. Counties with unusually low costs may stockpile tires during the year rather than sending them for processing. Some of the fluctuation is probably due to recordkeeping errors or county reporting errors. Also, some counties manage tires inefficiently. For example, counties that allow citizens to dispose tires in "green boxes" incur increased labor costs to recover and load tires into trailers.

Tire disposal costs charged by processors are very competitive. North Carolina processors report that county contracts typically charge $70-$80 per ton, including transportation and trailer rental costs. Counties at a distance from processing facilities may pay as much as $80-$100 per ton. The average tire disposal cost in FY 02-03 was $83 per ton.

CHAPTER 7
DEPARTMENT OF TRANSPORTATION

This section summarizes the North Carolina Department of Transportation's recycling and solid waste management efforts for FY 02-03. General Statute 136-28.8(g) mandates that the department prepare an annual report on the amounts and types of recycled materials specified or used in contracts during the previous fiscal year. The types of recycled materials noted in the projects would normally contribute to the consumer and industrial waste streams, compounding the problem of declining space in landfills. All applications of recycled materials are consistent with economic feasibility and applicable engineering and environmental quality standards.

Efforts to use recycled and solid waste materials are in response to G.S. 136-28.8 that specifically mandates the following in highway construction projects:

- rubber from tires for pavements, subbase materials and other appropriate applications,
- general recycled materials for guardrail posts, right of way fenceposts and sign supports,
- recycling technology, including but not limited to, hot in-place recycling.

Highway Construction Projects

- One project let by Division 10 used 754,516 scrap chipped tires as embankment fill material.
- Division 14 re-used 80,000 pounds of steel beams.
- One Division 10 project used 500,000 cubic meters of fly ash as embankment fill.
- The number of recycled plastic offset blocks continues to grow; this year's total is 78,025.
- Pavement marking used 163 tons of recycled glass beads.
- New data capture methods increased the amount of fly ash reported in concrete mixes for bridge approach slabs and other applications. This year's total of 327 tons is a substantial increase over any previous reports. The figure is expected to grow with increased use and improved data collection.
- Fly ash is increasingly used as an alternate borrow material. This year's total of 500,000 cubic meters is much larger than typical and only represents one project.
- The recycling of millings is now being partially calculated using actual mix designs and recycling percentages stated in these designs. This method is more accurate and captures more statewide asphalt recycling for both construction and maintenance operations.
- Products reused in maintenance applications include: 1,200 feet of silt fence and posts; 1,840 feet of reinforced concrete pipe; and 1,250 tons of stockpiled soil, gravel and rubble. These numbers are expected to grow as reporting and tracking systems improve.

Attachment 1 at the end of this report list the quantities of recycled materials used in FY 02-03. Attachment 2 lists the quantities used from 1989 to June 30, 2003.

Next year's report will discuss the development and release of a new, Web-based reporting structure. The system offers user-friendly data entry options and accepts values in several common units. This will simplify data collection and greatly increase the power and flexibility of the final annual report.

Continuous Process Improvement

Four entries were submitted for the 2001 CPI Awards in the Environmental Sustainability category.

- **Early Seeding & Mulching** – The Guilford Bridge Department in Division 7 has been seeding and mulching the area of impact at each bridge replacement site immediately after work completion. This reduces the time Roadside Environmental normally requires to do the work. This process covers disturbed areas faster and speeds germination to reduce erosion and sediment issues or impacts.
- **Recycled Appliances and Cross Line Pipes** – Due to a large reduction in Alamance County litter patrol crews, the Alamance Maintenance and Bridge Unit increased collection and disposal operation efficiency. The unit discovered they could save time by locating a scrap metal collection facility along their litter route. This permitted metal recycling, reduced driving time, and combines scrap metal

cross line pipes from other units. By expanding recycling options, DOT saves money in tip fees and helps extend landfill life.

- **Median Guardrail Turf Conversion** – Placing guardrails in grass medians created new challenges for maintenance crews. The traditionally established turf is Kentucky 31, which requires mowing seven times per year. Division 14's Roadside Environmental Unit 14 identified a more desirable mix of hard fescue and bluegrass. The blend fit their climate and environmental conditions better and the mix provides a pleasing dark green color, good stand density and drought tolerance. It requires mowing half as often as traditional methods, so the DOT saves money and reduces the environmental impact of maintenance activities.
- **Secondary Roads Paving Standards, Context Sensitive Solutions** – The Division 14 Maintenance Unit received frequent inquiries from property owners, local advocacy groups and environmental agencies regarding their secondary pavement standards. All vied for an opportunity to affect the current project's development. The Division needed to establish safe and effective uniform standards that minimized property disturbance and environmental impacts. A team of Division 14 engineers developed a document entitled, "Secondary Road Paving Standards." This document guides engineers to select the least disruptive section that also provides adequate service. This result saves time after standards are established, reduces environmental impacts, and lowers construction costs for secondary roads.

For up-to-date information on North Carolina DOT's use of recycled materials, visit http://www.doh.dot.state.nc.us/preconstruct/highway/dsn_srvc/value/recycle/

CHAPTER 8
DEPARTMENT OF ADMINISTRATION

The Department of Administration continues its efforts to promote the purchase and use of reusable, refillable, repairable, more durable, and less toxic supplies and products. Department progress has allowed more of these products to be added to statewide term contracts, agency specific term contracts, as well as open market bid awards. For more information, visit DOA's Web site at http://www.doa.state.nc.us/PandC/.

Efforts Taken To Comply With The Session Laws 1993 {G.S. 130a-309.14(Al)}

Bids currently advertised in the Division of Purchase and Contract contain a Recycling and Source Reduction paragraph in item #10 of Instructions to Bidders. When developing bid invitation language, requirements and specifications, purchasers continue to look at alternative methods and products. The emphasis is on waste reduction and practicable and cost-effective procurement. More specifically, the Division of Purchase and Contract has taken the following steps.

E-Procurement Project

This multi-agency project strives to incorporate a single statewide business and purchasing module. E-procurement allows individuals to select needed items from an electronic catalog. They can then requisition the item; obtain the necessary approvals (including funds checking); order the item and receive it -- all electronically in a secure system.

E-quote is a tool that enables vendors or prospective suppliers to electronically receive and respond to requests for quotations from North Carolina state agencies and many other public sector buying entities in the country. E-quote is most appropriate for suppliers of goods. For agencies, it eliminates faxing/mailing request-for-quotes; for vendors, it eliminates submitting and mailing hard copies of quotes.

Environmental Benefits

Environmental benefits include:
- Reduction in paper and mailing expenses incurred during non-electronic business transactions.
- Cost reduction to vendor by printing fewer catalogs.
- Elimination of many vendor expenses associated with non-electronic business transactions.

Interactive Purchasing System

The Division of Purchase and Contract continues to promote electronically posting (advertising) IFBs and RFPs. Vendor Link allows vendor registration to receive electronic notification of advertised bids.

Open Market Awards

- Office Panel Systems-It is standard procedure to incorporate refurbished language in the bid document for refurbished panel systems.
- Food Product Packaging- Wooden pallets used for cases of food are exchanged. Also, all cardboard cases are recyclable.
- Used Paint Booth, Bid #200936, $49,519 – 100% Reusable
- Aluminum Stair & Ramp Systems, Bid #201458, $23,217 – 45% Aluminum – Recyclable
- Prefabricated Mobile Homes, Bid #200826 (ASTC), $4,370,150 to $14,553,300 – 70% Wood – Recyclable
- Metal Storage Buildings, Bid #300063 (ASTC), $107,568 –75% Aluminum - Recyclable

Statewide Term Contracts

As existing term contracts are re-bid and new term contracts are developed, the Division of Purchase and Contract continues to improve the contracts by offering more sustainable or environmentally friendly products. These term contracts are listed below:

- **Oil Filters, 060c** - Allows for multipacking, which reduces the number of filters individually boxed. This reduces trash that would otherwise be generated.
- **Domestic Appliances, 045a** - All refrigerators, washers and dishwashers are "Energy Star" qualified. The Department of Energy monitors this stringent measurement of energy efficiency. The payoff is a more efficient appliance, which use less energy over the product's lifetime.
- **Office Paper, 645a** - Contains both 100 percent and 50 percent post consumer and chlorine-free copy paper. In addition, Section 9A is virgin paper and the balance of the contract is recycled paper and envelopes.
- **Remanufactured Toner Cartridges, 207a** - Refillable to avoid being added to the waste stream.
- **Storage Batteries, 060b** - Casings are made from recycled material (80 to 82 percent).
- **Floor Maintenance Machines, 365a** - Includes a category for automatic scrubbers using gel sealed batteries. Gel-sealed batteries exhaust 1/40th the amount of hydrogen and sulfuric acid gases compared to wet-lead batteries. Gel-sealed batteries operate 2 ½ - 3 times longer than the wet/lead acid variety and are less toxic.
- **Lateral Filing Cabinets, 425f** - Cabinets contain five percent recycled content. Corrugated boxes have a minimum 50 percent post consumer waste and are recyclable. Contractors purchase back files at end of their use.
- **Vertical Filing Cabinets, 425g** – Classes B and C cabinets have 10 percent recycled content. Corrugated cardboard boxes contain 50 percent post consumer waste and are 100 percent recyclable after use. Class A cabinets contain 29 percent recycled content, 3 percent post consumer recycled content and are 96 percent recyclable after use.
- **Wood Library Furniture, 420d** - Contractors support sustainability through different practices, even when end products do not contain recycled content but are made from renewable sources. Packaging is recycled and recyclable; wood scraps are turned into mulch; blanket wrapping is used for shipping and the wood is recycled into particleboard. Solid wood furniture is also more durable.
- **Ammunition, 680a** - Brass shell casings can be saved and recycled; others can be reloaded.
- **External Defibrillators, 465b** - Packaging material can be recycled and the defibrillators can be refurbished. This is a co-op contract with the State of South Carolina.
- **Musical Instruments, 580b** - All items, with the exception of rivets, can be recycled at the end of use. Instruments can be traded-in for reconditioning and one company donates trade-ins to the Links Program for the needy. Corrugated containers are 100 percent recyclable.
- **Calculators, 600a** - Packaging material may be recycled.
- **Carpet, 360a** - Contains carpets with recycled content. All carpet that removed per this contract will be recycled or non-landfilled.
- **Cleaning Implements, 485g** – Cotton mops are made of cotton waste. Wooden handles can be re-used as dowels, gardening stakes and banner holders. Shipping cartons are recycled and recyclable.
- **Large & Specialty Lamps, 285a** – Encourages the use of energy-efficient fluorescent lamps and lists products that meet or exceed Federal Energy Management Program recommendations. A link is provided to FEMP that illustrates return-on-investment for retrofitting energy efficient lamps and ballasts. Some lamps contain 65 percent recycled content, are low mercury (TCLP compliant) and non-hazardous. Packaging can contain 73 percent recycled content.
- **Ballasts, 285b** - Encourages the use of energy efficient fluorescent lamps and lists products that meet or exceed FEMP recommendations. A link is provided to FEMP that illustrates return-on-investment for retrofitting energy efficient lamps and ballasts. Ballast contains no PCBs and can be disposed of in the trash. Reduced form factor to minimize packaging.
- **Material Handling Carts/Trucks, 560a** – Very few products are made from virgin steel. Products are not shipped in cartons.
- **Dictation/Transcription Equipment, 600c** – Vendors use recycled items (approx. 10 percent) and comply with the 9000 guideline in the International Organization for Standardization. Packaging contains from 60-100 percent recycled content.

- **Laminators & Laminating Film, 665a** – Some film contains 5 percent post consumer content. Packaging contains 25-80 percent post consumer content.
- **Bio-Diesel Fuel, 405L** - B20 blended fuel contains 80 percent diesel fuel and 20 percent virgin soy or reprocessed vegetable oil.
- **Cameras, Digital & Film, 655A** – The metal camera bodies can be salvaged and reused. Plastic bodies and parts can be recycled. All packaging materials are recyclable.
- **Gasohol, 405M** – E-10 blended fuel contains 90 percent unleaded gasoline and 10 percent ethanol.
- **Passenger Cars, 070A; Law Enforcement Vehicles, 070B; Trucks/Vans/Utility Vehicles, 070G –** Bids included an AFV (alternate fuel vehicle) category for each line item. Three bid lines are solely dedicated to AFV. According to the Steel Recycling Institute, 67.7 percent of a vehicle is steel or iron. Of that steel or iron, 26.6 percent is post consumer material. Therefore, 18 percent of a vehicle is made from post-consumer recycled material.
- **Wiping Cloths, 735A** – All items are second-hand textiles. Reclaimed wiping cloths are offered as well as new cloths. Vendors resell waste instead of sending it to landfills. Vendors use low alkaline content wastewater. All recycled textile rags can be sold to make paper products. All rags can be re-laundered.
- **Furniture, Desks (Wood), Credenzas, Conference Tables, Etc., 425B** – Contractors support sustainability through different practices. Mechanical parts can be recycled or replaced – extending service of item. Packaging is recycled and recyclable. Products may be ground up into particleboard.
- **Office Supplies, 615A** – Contractors are required, to the extent feasible and practical, to offer recycled products and packaging; especially with post-consumer waste content. Wherever possible and practical, products should be identified as such.
- **Chalkboards, Tack boards and Erasers, 785A** – The product packaging has recycled content.

Items Aiding Waste Reduction Purchased By State Agencies through Term Contracts and Open Market

The following items purchased by state agencies meet the criteria to reduce waste by being reusable, refillable, repairable, more durable and/or less toxic than their traditional counterparts:

Reusable
Ammunition, cartridge refills
Digital cameras (reduces need for film & chemicals)
Freon recovery system (reusable filters)
Musical instruments
Plastic tableware
Re-chargeable drycell batteries
Recycled carpet and virgin carpet
Recycled paper
Recycled content furniture (not traditional wood)
Remanufactured toner cartridges for laser printers
Solvent degreaser (reuses solvent)
Tire recapping & repairing service
Uniforms
Vacuum bags
Wiping cloths

Refillable
Ammunition, cartridge refills
Batteries, vehicle & storage
Calendars
Drums, steel
Fire extinguishers
Mechanical pencils/pens

Repairable
Defibrillators
Musical instruments
Pencil sharpeners
Tire recapping & repairing services

More Durable
Above-ground vaulted fuel storage tanks
Classroom furniture
Electronic lamps & ballast
Electronic vacuum cleaners
Flags
Grader blades
Grader slope attachment
Kindergarten furniture
More Durable (continued)
Paint bushes
Plastic lumber
Plastic tableware
Rubber bands
Staplers
Vertical file cabinets
Wood casegoods
Wood library furniture

Less Toxic
Alternative fuel vehicles
Correction fluid
Electronic lamps & ballasts
Fertilizers/farm chemicals
Floor maintenance machine batteries
Inks for printing (non-petroleum-based inks)
Instructional art materials
Markers
Scientific Products (eliminating freon)

Longer Lasting
Floor maintenance machine batteries
Library furniture
Pens

Recyclable
Pens
Carpet
Mops & brooms
Vehicle steel & tires
Vertical filing cabinets
Wiping cloths
Wood casegoods
Wood library furniture

Washable
HVAC filters
Wiping cloths

Attachment #1

N.C. DEPARTMENT OF TRANSPORTATION
RECYCLING & SOLID WASTE MANAGEMENT FY 02-03

Description	Usage	Quantity
Waste Scrap Tires		
Chipped Tires	Roadbed Embankment Component	754,516 TIRES
Tire Sidewalls	Drum Ballasts	2,904 EA
Glass		
Glass Beads	In Paint & Long life pavement markings	163 TONS
Plastic	Guardrail Offset Blocks	78,025 EA
	Plastic Pipe	13,589 LF
	Type III Barricade	720 LF
Fly Ash	Concrete Mix Additive	327 TONS
	Road Embankment Component	500,000 CM
	Flowable Fill	100 CY
Recycled Asphalt Pavements	Asphalt Pavement Millings	3,774,720 SY
	Beneficial Fill Material	191,933 CY
	Cement	23,208 TONS
	ABC	138,675 TONS
Class B Stone	Erosion Control Stone	220 CY
Bark Mulch	Soil Amendment	4,550 CY
	Mulch	200 TONS
*** Recycled Steel**	Steel Beams	80,000 LBS
	Guardrail	235 FT
***Reused Materials**	Silt Fence and Posts	1200 FT
	Reinforced Concrete Pipe	1840 FT
	Gravel and Rubble	1250 TONS

*These items were salvaged and re-used by maintenance operations.

Attachment #2

N.C. DEPARTMENT OF TRANSPORTATION
RECYCLING & SOLID WASTE MANAGEMENT
JANUARY, 1989 THROUGH JUNE, 2003

Description	Usage	Quantity
Waste Scrap Tires		
Chipped Tires	Roadbed Embankment Component	11,187,655 TIRES
Crumb Rubber	Crack Sealant Soil Amendment	500 LB 20 TONS (app. 2,025 TIRES)
Chipped Tires	Sound Wall Panels	8,000 TIRES
Tire Sidewalls	Ballast for Traffic Drums	51,535 EA
Lightweight Fill Chipped Tire Material	Soil substitute in culvert backfill	47,211 TIRES
Crumb (Ground) Rubber	Asphalt pavement component	124,512 TIRES
Whole Tires	Retaining Wall	2,500 TIRES
Rubber Mulch	Wood Mulch	8 TONS (app. 800 TIRES)
		Total 11,424,238 TIRES
Plastics		
Plastic Lumber	Guardrail Offset Block	193,448 EA
Plastic Lumber	Type III Barricades	1320 FT
Recycled Plastic Fence Posts	Right of Way Fencing	7,600 EA
Recycled Plastic Delineator Posts	Roadside Safety Delineators	676 EA
Recycled Plastic Pipe	Subsurface Drain Pipe	32,458 LF
Recycled Plastic Pipe	Fittings (Y, T, & L's)	76 EA
Recycled Plastic Pipe	Temporary Slope Drain	4,723 LF
Recycled Plastic Traffic Separators	Railroad Safety Device	2,922 LF
Glass		
Glass Beads	In Paint & pavement markings	52,292 TONS
Crushed Glass	Aggregate backfill for subdrainage pipe	95 CY
Crushed Glass	Pipe Foundation Conditioning	333 TONS
Crushed Glass	Aggregate Base	203 TONS
Fly Ash	Roadbed Embankment Component	865,186 CY
	Additive to asphalt pavement	40,800 TONS
	Concrete Mix Additive	2,138,398 LB
	Flowable Fill	126 CY
	Sign post w/concrete core	1,350 EA
Steel Slag	Aggregate Stone Base	224 TONS
Bottom Ash	Borrow	2,707 CY
Recycled Asphalt Pavement	Asphalt Mix Additive	1,022, 084 TONS
	Hot-in-Place Recycling	1,459,869 SY
	AC from RAP	140,450 TONS
	ABC	23,208 TONS

Asphalt Pavement Millings	Asphalt Mix Additive	222,299 CY
Asphalt Shingles	Asphalt Mix Additive	13,825 TONS
Processed Silica	Borrow	46,072 CY
Recycled Aggregate Base Coarse	Aggregate Base Coarse	850 TONS
Recycled Polyester Resin	Weedmat	963 SM
Recycled Polyester & Hog Hair	Cold Mix Asphalt Patching Material	20 LB
Unclassified Excavation	Fill Material	4,859,476 CY
18" Corrugated Metal Pipe	18" Corrugated Metal Pipe	40 LF
Berm Ditch	Borrow	483 LF
Recycled Asphalt Cement	Asphalt Cement	4,676 TONS
Refurbished Traffic Signal Heads	Traffic Signal Heads	11 EA
Type IV Double Faced Concrete Barrier	Concrete Barrier	4,171 LF
	Retaining Wall	3,100 LF
Wooden Breakaway Posts	Reuse - Guardrail Offset Blocks	11,409 EA
Concrete		
Recycled Concrete	Pavement Base Course Material	3,400 TONS
Crack and Seat Concrete	Similar to Rubblizing	260,778 TONS
Rubblized Concrete	Reuse as pavement base course	211,050 TONS
Concrete Pipe	Reuse as Concrete Pipe	2,940 LF
Recycled Concrete	RCA Shoulders	21,505 TONS
Recycled Concrete	Fill Material	18,337 CY
Steel (reused)		
Beams	Beams	80,000 LB
Guardrail	Guardrail	1,235 LF
Landscaping/Wildflowers/Roadside		
Lime-Stabilized Municipal Sludge	Soil amendment for wildflower beds	704 TONS
Hydromulch	Mulch for grass establishment	38 TONS
Aged Leaf Mold & Yard Debris	Soil amendment	2,370 TONS 1,000 CY
Mallinckrodt Ammonium Sulfate Liquid	Topdressing Fertilizer	420,948 GAL
Soil Derived from Demolition Debris	Soil Amendment	1,742 TONS
Nuggets of Broken Brick	Mulch	1,000 BAGS
Calcium/Sulfur Supplement	Soil Amendment to acidic soils	3 TONS
Bioremediated Petroleum Affected Soils	Soil Amendment	920 CY
Vegetative Clearing Debris	Erosion Control mulch	27 AC
Hog Waste Compost	Fertilizer	25 C Y
Cotton Gin Waste	Soil Amendment	7,130 CY
Clearing Debris	Mulch	327 CY
Hurricane Fran Mulch	Soil Amendment	200,000 CY

Bark Mulch	Soil Amendment	8,658 TONS/ 258,262 CY
Advanced Alkaline Sludge	Soil Amendment	495 TONS 414 AC
Municipal Sludge	Soil Amendment for Vegetative Cover	141.5 AC 8,610 TONS 200 CY
Swine Waste	Bio Soil Research/Experimentation	900 Lb.
Poultry Litter	Fertilizer	425 TONS 11,734 CY

APPENDIX TABLE 1
COUNTY WHITE GOODS PROGRAM DESCRIPTIONS

County	Tons	Operating Costs	Cost Per Ton	Capital Improvements	Cleanup Costs	Contractor
Alamance	922	$36,000	$39.05	$0	$0	DH Griffin
Alexander	80	$17,671	$220.89	$0	$711	State Line Scrap Metal
Alleghany	470	$13,846	$29.46	$0	$0	Gordon Iron & Metal
Anson	323	$8,787	$27.20	$0	$0	Metal Recycling Svcs/
Ashe	354	$37,059	$104.69	$0	$5,050	Elizabethton Iron & Metal Co.
Avery	463	$33,590	$72.55	$0	$0	Johnson City Herb & Metal
Beaufort	0	$0	No Data	$0	$0	
Bertie	0	$0	No Data	$0	$0	
Bladen	449	$26,604	$59.25	$0	$0	State Line Scrap Tire
Brunswick	1421	$99,524	$70.04	$0	$0	East Coast Mobile Recyclers
Buncombe	1827	$0	$0.00	$0	$0	Stateline Scrap Metals
Burke	1760	$52,697	$29.94	$3,890	$0	Stateline Scrap Metals
Cabarrus	674	$14,080	$20.89	$0	$0	State Line Scrap Dealers
Caldwell	1262	$28,997	$22.98	$0	$0	
Camden	0	$5,837	No Data	$0	$0	
Carteret	436	$59,525	$136.53	$0	$0	Waste Industries
Caswell	0	$0	No Data	$0	$0	
Catawba	1073	$51,184	$47.70	$0	$0	Tri-State Scrap Metal
Chatham	1199	$77,006	$64.23	$0	$0	Stateline Scrap Metal
Cherokee	147	$2,925	$19.90	$0	$0	Jack Millsaps
Chowan	0	$0	No Data	$0	$0	
Clay	150	$7,953	$53.02	$0	$0	Cleveland Ward JR
Cleveland	1866	$218,764	$117.24	$0	$0	Carolina Recycling Group
Columbus	0	$0	No Data	$0	$0	
Craven	2401	$176,912	$73.68	$0	$0	A Dixon /Carolina Salvage
Cumberland	1048	$190,757	$182.02	$0	$0	U.S. Salvage
Currituck	0	$0	No Data	$0	$0	
Dare	0	$0	No Data	$0	$0	
Davidson	801	$21,647	$27.02	$28,650	$0	Pugh Auto
Davie	237	$13,400	$56.54	$0	$0	
Duplin	739	$99,317	$134.39	$0	$0	Meshaw Bros
Durham	0	$0	No Data	$0	$0	
Edgecombe	1077	$42,051	$39.04	$0	$0	United Auto Salvage
Forsyth	2270	$62,942	$27.73	$0	$0	Pugh Auto Crushing
Franklin	0	$14,070	No Data	$0	$0	
Gaston	412	$168,915	$409.99	$0	$5,629	Webb Metals;Bruce's Iron & Metal
Gates	0	$0	No Data	$0	$0	
Graham	343	$63,089	$183.93	$1,398	$0	Johnson City Iron & Metal Co
Granville	597	$33,224	$55.65	$0	$0	United Salvage
Greene	0	$12,696	No Data	$0	$0	
Guilford	1476	$35,237	$23.87	$182,558	$98,149	DH Griffin Wrecking Co
Halifax	0	$15,434	No Data	$0	$0	
Harnett	710	$54,280	$76.45	$0	$0	Dunn Scrap Iron,Tart's Salvage
Haywood	0	$0	No Data	$0	$0	
Henderson	2384	$34,995	$14.68	$0	$0	Stateline Scrap Metals
Hertford	0	$0	No Data	$0	$0	
Hoke	0	$0	No Data	$0	$0	
Hyde	200	$7,200	$36.00	$0	$0	GDS Inc.
Iredell	470	$28,969	$61.64	$57,730	$0	L. Gordon Iron & Metal
Jackson	0	$0	No Data	$0	$0	
Johnston	559	$35,279	$63.11	$68,874	$0	Atlantic Scrap
Jones	58	$4,554	$78.52	$0	$0	A Dixon
Lee	616	$30,396	$49.34	$3,100	$0	State Line Scrap Metal

County	Tons	Operating Costs	Cost Per Ton	Capital Improvements	Cleanup Costs	Contractor
Lenoir	1432	$112,650	$78.67	$0	$0	Fussell Salvage
Lincoln	0	$0	No Data	$0	$0	
Macon	0	$0	No Data	$0	$0	
Madison	0	$0	No Data	$0	$0	
Martin	0	$0	No Data	$0	$0	
McDowell	675	$32,099	$47.55	$0	$0	
Mecklenburg	1978	$423,786	$214.25	$0	$0	Southern Metals,Metals Recovery
Mitchell	420	$48,212	$114.79	$0	$0	JC Iron & Metal Co
Montgomery	0	$0	No Data	$0	$0	
Moore	1364	$57,427	$42.10	$1,360	$0	Sandhills Recycling Co
Nash	1077	$184,316	$171.14	$0	$0	United Salvage Auto
New Hanover	1021	$21,600	$21.16	$0	$0	Southern Metals
Northampton	278	$45,410	$163.35	$0	$0	United Salvage
Onslow	555	$41,565	$74.89	$110,090	$0	East Coast Mobile Recycling
Orange	866	$121,740	$140.58	$105,031	$0	DH Griffin
Pamlico	0	$0	No Data	$0	$0	
Pasquotank	587	$29,085	$49.55	$0	$0	United Auto Salvage
Pender	0	$0	No Data	$0	$0	
Perquimans	597	$84,282	$141.18	$0	$0	
Person	212	$3,728	$17.58	$0	$0	
Pitt	1786	$51,866	$29.04	$0	$0	ECVC
Polk	0	$0	No Data	$0	$0	
Randolph	1078	$43,427	$40.28	$0	$0	Pugh Auto Crushing
Richmond	132	$9,349	$70.83	$0	$0	Stateline Scrap Metals
Robeson	0	$0	No Data	$0	$0	
Rockingham	1448	$42,870	$29.61	$1,000	$1,748	DH Griffin
Rowan	154	$20,647	$134.07	$6,683	$0	Tri -State Scrap,C&D Salvage
Rutherford	0	$0	No Data	$0	$0	
Sampson	0	$0	No Data	$0	$0	
Scotland	0	$36,950	No Data	$0	$0	
Stanly	1172	$34,102	$29.10	$0	$0	Stateline Scrap Metal
Stokes	0	$0	No Data	$0	$0	
Surry	887	$8,752	$9.87	$0	$0	Pugh Auto Crushing
Swain	723	$8,618	$11.92	$0	$0	Phillips Metals
Transylvania	238	$6,070	$25.50	$5,315	$5,315	Stateline
Tyrrell	15	$3,918	$261.20	$0	$0	
Union	0	$41,700	No Data	$21,750	$0	Stateline
Vance	0	$0	No Data	$0	$0	
Wake	0	$0	No Data	$0	$0	
Warren	155	$13,353	$86.15	$0	$28,000	United Auto Salvage
Washington	351	$78,349	$223.22	$0	$0	
Watauga	522	$43,848	$84.00	$0	$0	Johnson City Iron & Metal
Wayne	0	$0	No Data	$0	$0	
Wilkes	44	$0	$0.00	$0	$0	Stateline
Wilson	1076	$11,746	$10.92	$0	$0	Harper Auto Crusher
Yadkin	0	$0	No Data	$0	$0	
Yancey	0	$0	No Data	$0	$0	
Totals	**52,117**	**$3,598,878**		**$597,429**	**$144,602**	

APPENDIX TABLE 2
COUNTY WHITE GOODS PROGRAM ALLOCATIONS

County	Distribution	Proceeds Rec'd	Undesignated Ending Balance
Alamance	$49,727.37	$49,727.37	($11,097.00)
Alexander	$12,671.95	$0.00	$418.00
Alleghany	$3,096.76	$2,220.98	$0.00
Anson	$9,461.97	$9,461.97	$1,875.00
Ashe	$9,237.01	$9,237.01	$0.00
Avery	$6,583.61	$6,583.61	($36,730.00)
Beaufort	$16,911.39	$16,911.39	$0.00
Bertie	$7,409.02	$0.00	$0.00
Bladen	$12,108.25	$12,108.25	($6,293.00)
Brunswick	$28,459.55	$28,459.55	($86,303.00)
Buncombe	$77,812.20	$77,812.20	$0.00
Burke	$33,302.98	$33,302.98	($580.00)
Cabarrus	$50,560.63	$50,560.63	$7,573.00
Caldwell	$28,997.40	$28,997.40	$0.00
Camden	$2,614.71	$2,614.71	($31,254.00)
Carteret	$22,262.03	$22,262.03	($35,894.00)
Caswell	$8,848.56	$8,848.56	$0.00
Catawba	$53,979.27	$53,979.27	$0.00
Chatham	$18,921.26	$18,921.26	$0.00
Cherokee	$9,203.01	$5,110.14	$510.00
Chowan	$5,432.67	$5,432.67	$0.00
Clay	$3,351.62	$3,351.62	$0.00
Cleveland	$36,149.56	$36,149.56	$0.00
Columbus	$20,487.50	$20,487.50	$0.00
Craven	$34,330.22	$34,330.22	$0.00
Cumberland	$112,735.29	$50,446.67	($65,666.00)
Currituck	$6,991.83	$5,297.11	$0.00
Dare	$11,570.56	$11,570.56	$0.00
Davidson	$55,593.76	$55,593.76	$0.00
Davie	$13,434.23	$9,198.22	($2,555.00)
Duplin	$18,506.92	$18,506.92	$0.00
Durham	$84,912.00	$84,912.00	$0.00
Edgecombe	$16,050.88	$16,050.88	$0.00
Forsyth	$115,673.10	$0.00	$432,720.00
Franklin	$18,131.11	$18,131.11	$13,689.00
Gaston	$71,371.52	$71,371.52	($326,741.00)
Gates	$3,944.28	$3,944.28	$0.00
Graham	$2,999.27	$2,999.27	($58,729.00)
Granville	$18,484.80	$18,484.80	$10,395.00
Greene	$7,102.35	$7,102.35	($3,300.00)
Guilford	$158,340.83	$87,720.16	$0.00
Halifax	$21,366.78	$21,366.78	$0.00
Harnett	$34,822.82	$15,442.26	($63,005.00)
Haywood	$20,365.36	$20,365.36	$0.00
Henderson	$34,042.51	$34,042.51	($65,788.00)
Hertford	$8,316.00	$8,316.00	$0.00
Hoke	$12,944.60	$5,736.37	$0.00
Hyde	$2,155.15	$2,155.15	($3,723.00)
Iredell	$47,405.90	$47,405.90	$0.00
Jackson	$12,542.44	$9,796.92	$0.00
Johnston	$47,343.94	$47,343.94	($118,741.00)
Jones	$3,857.03	$0.00	$17,678.00
Lee	$18,451.30	$18,451.30	($5,172.00)

County	Distribution	Proceeds Rec'd	Undesignated Ending Balance
Lenoir	$22,187.55	$22,187.55	$0.00
Lincoln	$24,326.86	$24,326.86	$0.00
Macon	$11,329.45	$11,329.45	$0.00
Madison	$7,383.63	$7,383.63	($2,119.00)
Martin	$9,488.89	$0.00	$0.00
McDowell	$15,963.07	$15,963.07	$0.00
Mecklenburg	$265,564.21	$117,903.41	($37,763.00)
Mitchell	$5,916.60	$5,916.60	$47,577.00
Montgomery	$10,069.39	$10,069.39	($71,810.00)
Moore	$28,427.46	$28,427.46	$0.00
Nash	$32,950.47	$32,950.47	($60,470.00)
New Hanover	$60,995.17	$60,995.17	($38,303.00)
Northampton	$8,230.96	$8,230.96	$0.00
Onslow	$55,511.40	$24,800.48	($88,464.00)
Orange	$45,011.80	$45,011.80	$0.00
Pamlico	$4,809.68	$4,809.68	($220,418.00)
Pasquotank	$13,084.38	$13,084.38	$0.00
Pe/Ch/Ga	$6,095.12	$6,095.12	($52,307.00)
Pender	$15,654.00	$15,654.00	$0.00
Perquimans	$4,293.82	$4,293.82	($38,866.00)
Person	$13,466.76	$13,466.76	$2,860.00
Pitt	$50,376.44	$50,376.44	$79.00
Polk	$6,999.24	$6,999.24	$0.00
Randolph	$49,281.31	$49,281.31	($16,963.00)
Richmond	$17,401.22	$0.00	$27,573.00
Robeson	$46,346.95	$20,669.64	$0.00
Rockingham	$34,322.43	$34,322.43	($8,752.00)
Rowan	$49,138.53	$0.00	$0.00
Rutherford	$23,655.52	$23,655.52	$0.00
Sampson	$22,727.57	$0.00	$0.00
Scotland	$13,375.93	$13,375.93	($39,540.00)
Stanly	$21,926.82	$21,926.82	($39,540.00)
Stokes	$16,879.42	$16,879.42	$0.00
Surry	$26,680.59	$26,680.59	$4,369.00
Swain	$4,913.85	$4,913.85	$0.00
Transylvania	$10,972.30	$10,972.30	$1,944.00
Tyrrell	$1,548.22	$1,548.22	$3,219.00
Union	$48,729.23	$48,729.23	($27,592.00)
Vance	$16,276.51	$16,276.51	$0.00
Wake	$243,880.68	$0.00	$0.00
Warren	$7,475.29	$7,475.29	($4,744.00)
Washington	$5,089.99	$5,089.99	($170,181.00)
Watauga	$15,961.67	$15,961.67	($38,738.00)
Wayne	$42,313.11	$42,313.11	$0.00
Wilkes	$24,670.92	$0.00	$59,207.00
Wilson	$27,761.56	$27,761.56	($197,188.00)
Yadkin	$13,662.68	$6,093.88	$0.00
Yancey	$6,714.27	$6,714.27	$0.00

APPENDIX TABLE 3
COUNTY TIRE DISPOSAL ACTIVITIES

County	Tax Revenue	Total Costs	Net	Cost/Ton	Contractor
Alamance	$122,115.67	$111,462.37	$10,653.30	$71.95	CCTD
Alexander	31,127.25	35,425.25	(4298.00)	80.15	UST
Alleghany	9,848.83	17,069.00	(7220.17)	108.35	UST
Anson	17,450.70	19,876.30	(2425.61)	27.88	UST
Ashe	22,684.39	28,479.00	(5794.61)	60.00	UST
Avery	16,165.41	25,865.82	(9700.41)	103.54	UST
Beaufort	41,540.06	90,736.13	(49,196.07)	99.59	CCTD
Bladen	29,746.17	45,786.93	(16,040.76)	73.45	CCTD
Brunswick	69,841.12	117,329.08	(47,487.96)	100.00	CCTD
Buncombe	191,131.86	183,816.00	7,315.86	72.00	UST
Burke	81,829.02	85,202.49	(3,373.47)	68.20	UST
Cabarrus	124,111.44	114,346.57	9,764.87	62.58	UST
Caldwell	71,238.75	95,373.50	(24,134.75)	60.28	UST
Camden	6,421.00	9,946.00	(3,525.00)	155.94	CCTD
Caswell	21,735.71	11,933.22	9,802.49	97.64	CCTD
Catawba	132,547.21	202,017.01	(69,469.80)	70.55	UST
Chatham	46,452.22	68,464.00	(22,011.78)	103.58	CCTD
Cherokee	22,602.24	32,045.50	(9443.26)	106.65	UST
Clay	8,229.17	15,104.75	(6875.58)	38.25	UST
Cleveland	88,805.35	154,694.30	(65,888.95)	95.33	UST
Columbus	50,333.71	84,239.00	(33,905.20)	71.38	CCTD
CRSWMA	150,842.13	190,792.74	(39,950.61)	99.60	CCTD
Cumberland	277,031.74	281,742.00	(4,710.26)	71.27	CCTD
Currituck	17,164.07	21,328.19	(4,164.12)	95.69	WMgt
Dare	28,400.75	18,077.88	10,322.87	23.08	CCTD
Davidson	136,548,45	131,977.38	4,571.07	103.55	UST
Davie	32,975.69	23,426.55	9,549.14	67.50	UST
Duplin	45,460.51	58,951.65	(13,491.14)	116.20	CCTD
Durham	208,522.42	232,925.19	(24,402.77)	87.93	CCTD
Edgecombe	50,416.74	50,750.00	(333.26)	74.38	CCTD
Forsyth	284,104.50	415,602.35	(131,497.85)	76.72	UST
Franklin	44,513.26	42,476.98	2,036.28	83.16	CCTD
Gaston	175,333.57	167,678.93	7,654.64	77.19	UST
Graham	7,367.95	8,750.00	(1,382.05)	100.16	CCTD
Granville	45,392.19	60,759.38	(15,367.19)	75.55	CCTD
Greene	17,449.80	18,659.38	(1,209.58)	84.47	CCTD
Guilford	388,981.93	636,687.71	(247,705.78)	72.80	CCTD
Halifax	52,498.96	63,562.20	(11,063.24)	82.30	CCTD
Harnett	85,500.75	85,218.00	219.75	66.80	CCTD
Haywood	50,023.74	86,638.95	(36,615.21)	99.26	WRec
Henderson	83,589.16	150,241.32	(66,652.16)	106.48	UST
Hertford	20,441.23	34,476.80	(14,035.57)	101.99	CCTD
Hoke	31,780.96	27,706.67	4,074.29	70.56	CCTD
Iredell	116,358.08	195,393.92	(79,035.84)	73.22	UST
Jackson	30,806.67	47,730.60	(16,923.93)	96.43	WMgt
Johnston	116,199.42	124,704.97	(8,505.55)	72.71	CCTD
Jones	9477.94	13,462.46	(3,984.52)	75.27	CCTD
Lee	45,326.20	34,075.34	11,250.86	52.94	CCTD

County	Tax Revenue	Total Costs	Net	Cost/Ton	Contractor
Lenoir	54,519.48	66,382.40	(11,862.92)	78.90	CCTD
Lincoln	59,734.66	96,193.60	(36,458.94)	74.55	UST
Macon	27,822.74	50,183.15	(22,360.41)	88.82	UST
Madison	18,138.00	23,932.00	(5,794.00)	106.19	UST
Martin	23,318.10	23,639.00	(320.90)	74.10	CCTD
McDowell	39,206.06	66,176.14	(26,970.08)	94.72	UST
Mecklenburg	652,112.57	806,352.28	(154,239.71)	66.19	UST
Mitchell	14,531.64	36,432.75	(21,892.11)	93.88	UST
Montgomery	24,736.64	23,076.67	1,659.97	119.95	CCTD
Moore	69,810.88	48,074.34	21,736.54	66.60	CCTD
Nash	80,935.34	109,254.68	(28,319.34)	82.00	CCTD
New Hanover	149,790.20	231,526.95	(81,736.75)	83.00	CCTD
Northampton	20,223.90	21,717.60	(1,493.70)	66.80	CCTD
Onslow	72,129.75	116,394.65	(44,264.90)	79.11	CCTD
Orange	110,532.99	133,065.36	(22,532.37)	122.52	CCTD
Pasquotank	32,144.47	71,357.28	(39,212.81)	101.05	CCTD
Pender	38,442.04	62,749.45	(24,307.41)	96.43	CCTD
PeGaCh	33,582.65	61,712.00	(28,129.35)	90.62	CCTD
Person	33,075.50	43,095.00	(10,019.50)	88.86	CCTD
Pitt	123,752.21	213,905.90	(90,153.69)	77.36	CCTD
Polk	17,185.49	20,915.00	(3729.51)	45.27	UST
Randolph	121,047.58	212,568.62	(91,521.04)	89.62	CCTD
Richmond	42,751.33	46,000.00	(3,248.67)	51.68	CCTD
Robeson	113,855.78	95,523.30	18,332.48	69.42	CCTD
Rockingham	84,328.34	96,307.52	(11,979.18)	77.51	CCTD
Rowan	120,699.91	203,495.17	(82,795.26)	77.88	UST
Rutherford	58,107.62	106,118.30	(48,010.68)	90.94	UST
Sampson	55,826.04	75,356.00	(19,529.96)	82.27	CCTD
Scotland	32,868.88	34,838.56	(1,969.68)	66.74	CCTD
Stanly	53,858.00	96,023.42	(42,165.42)	107.27	UST
Stokes	41,459.93	34,522.64	6,937.29	73.46	UST
Surry	65,549.76	113,366.21	(47,816.45)	77.38	CCTD
Swain	12,067.11	12,675.00	(607.89)	86.53	UST
Transylvania	26,958.30	31,744.50	(4,786.20)	93.03	UST
Tyrell	3,803.05	2,707.22	1,095.83	95.16	CCTD
Union	119,540.69	116,002.26	3,538.43	66.00	UST
Vance	39,972.61	96,467.14	(56,494.53)	142.45	CCTD
Wake	598,550.82	629.670.37	(31,119.55)	75.77	CCTD
Warren	18,367.75	25,996.50	(7,628.75)	75.90	CCTD
Washington	12,507.59	35,971.32	(23,463.73)	85.70	CCTD
Watauga	39,217.39	56,414.00	(17,196.61)	88.28	UST
Wayne	103,962.05	130,863.00	(26,900.95)	58.50	CCTD
Wilkes	60,603.07	95,482.80	(34,879.73)	95.46	UST
Wilson	68,195.60	138,622.60	(70,427.00)	59.98	CCTD
Yadkin	33,564.05	35,435.66	(1,871.61)	61.86	UST
Yancey	16,491.08	30,526.87	(14,035.79)	97.00	UST
TOTAL	**$7,491,899.76**	**$9,664,630.84**			

CCTD – Central Carolina Tire Disposal
UST – U.S. Tire Disposal
WMgt – Waste Management
Wrec – Waste Recovery

APPENDIX A-1: PUBLIC AND PRIVATE MUNICIPAL SOLID WASTE LANDFILLS (INCLUDES CONSTRUCTION AND DEMOLITION LANDFILLS*), DESCENDING ORDER OF TONS, FY 2002-2003

PERMIT #	FACILITY	TONS						FACILITY TYPE
		1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	
1304	BFI-CHARLOTTE MTR SPEEDWAY LANDFILL V	875,286	941,848	1,101,304	1,000,909	1,026,065	1,116,525	MSWLF
6204	UWHARRIE ENV. REG. LANDFILL	293,753	547,286	531,407	685,584	671,808	700,619	MSWLF
8202	WI-SAMPSON COUNTY DISPOSAL INC	385,527	574,579	577,190	447,290	613,534	775,052	MSWLF
0803	EAST CAROLINA REG LANDFILL	365,737	411,117	504,330	447,290	443,058	396,601	MSWLF
9209	WAKE COUNTY LANDFILL-NORTH		533,345	598,202	589,252	375,365	349,902	MSWLF
3406	PIEDMONT SANITARY LANDFILL	551,748	379,945	348,182	292,808	341,056	292,828	MSWLF
3402	HANES MILL ROAD LANDFILL			301,098	323,049	287,953	274,119	MSWLF
4112	GREENSBORO, CITY OF	192,362	250,375	275,061	269,228	259,080	251,505	MSWLF
7304	UPPER PIEDMONT REG LANDFILL	104,026	256,943	248,401	220,253	217,643	239,251	MSWLF
0403	CHAMBERS DEVELOPMENT MSWLF				49,979	216,576	225,788	MSWLF
4103	GREENSBORO, CITY OF	29,319	45,292	140,184	162,592	201,856	162,190	CDLF
6013	NORTH MECKLENBURG C&D LANDFILL	246,232	228,934	269,545	206,805	181,045	192,669	CDLF
2509	CRSWMA- INTERIM REGIONAL LANDFILL			117,751	167,504	174,864	183,703	MSWLF
1403	FOOTHILLS ENVIRONMENTAL LANDFILL		106,779	173,271	165,086	170,687	198,767	MSWLF
1803	CATAWBA COUNTY LANDFILL	184,526	165,360	173,722	174,900	164,469	165,142	MSWLF
9214	BFI-HOLLY SPRINGS DISPOSAL INC	254,901	310,069	161,772	25,251	150,523	36,146	CDLF
4104	HIGH POINT CITY OF - LANDFILL	110,687	117,836	151,049	148,349	148,546	156,155	MSWLF
1107-P0701	BUNCOMBE COUNTY MSW LANDFILL	85,466	109,734	120,143	122,333	146,690	160,863	MSWLF
2608	FORT BRAGG C&D LANDFILL	33,104	61,263	101,102	91,743	138,914	50,441	CDLF
2601	CUMBERLAND COUNTY LANDFILL		138,603	131,134	132,410	129,407	130,812	MSWLF
5504	BFI-LAKE NORMAN LANDFILL		6,766	61,317	103,598	121,364	74,612	CDLF
4903	IREDELL COUNTY SANITARY LF	119,003	118,742	111,914	121,341	121,253	128,291	MSWLF
6505-I	NEW HANOVER WASTE-TO-ENERGY FACILITY	129,200	127,589	112,132	108,381	120,751	123,823	MSWLF

APPENDIX A-1: PUBLIC AND PRIVATE MUNICIPAL SOLID WASTE LANDFILLS (INCLUDES CONSTRUCTION AND DEMOLITION LANDFILLS*), DESCENDING ORDER OF TONS, FY 2002-2003

PERMIT #	FACILITY	TONS						FACILITY TYPE
		1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	
6504	NEW HANOVER COUNTY LANDFILL	155,442	101,105	163,860	148,792	117,637	117,867	MSWLF
6709	ONSLOW COUNTY SUBTITLE D LANDFILL	47,458	105,477	118,411	103,057	104,967	107,639	MSWLF
3412	OLD SALISBURY ROAD CDLF	84,509	89,920	77,372	93,100	104,808	103,277	CDLF
2906-P0487	DAVIDSON CO MSW LINED LANDFILL	79,403	95,524	101,864	101,991	100,991	93,351	MSWLF
5103	JOHNSTON COUNTY LANDFILL	61,933	96,923	94,599	89,683	93,267	97,593	MSWLF
0104-P0486	AUSTIN QUARTER SWM FACILITY	69,765	79,128	85,040	94,979	90,027	97,059	MSWLF
9606	WAYNE COUNTY LANDFILL	37,216	99,601	106,239	79,809	88,437	88,943	MSWLF
7803-P0854	ROBESON COUNTY LANDFILL OPEN		90,378	96,147	96,089	86,678	93,423	MSWLF
6019	MECKLENBURG COUNTY LANDFILL			14,972	135,498	82,031	93,011	MSWLF
7904	ROCKINGHAM COUNTY LANDFILL	69,056	83,155	80,379	80,402	79,675	79,800	MSWLF
0105	COBLE'S C&D LANDFILL		14,111	40,488	99,226	79,036	78,328	CDLF
9209	WAKE COUNTY CDLF					76,594	39,153	CDLF
3606	GASTON COUNTY LANDFILL	150,775	111,395	77,839	67,901	72,704	86,228	MSWLF
2301-P0922	CLEVELAND COUNTY LANDFILL OPEN		62,479	70,776	70,845	69,495	86,717	MSWLF
8003	ROWAN COUNTY LANDFILL	71,762	63,812	80,714	69,471	69,131	73,350	MSWLF
9203	WAKE COUNTY CDLF	20,879	57,933	122,476	156,378	68,236	42,148	CDLF
9704	WILKES COUNTY MSWLF	58,196	63,217	71,136	59,143	60,635	60,114	MSWLF
1306	HIGHWAY 49 C&D LANDFILL AND RECYCLING			11,586	57,101	57,453	61,571	CDLF
6801	ORANGE COUNTY LANDFILL	59,305	60,368	62,404	58,955	56,597	56,925	MSWLF
8606	SURRY COUNTY MSWLF	26,855	21,660	51,075	56,947	50,087	51,565	MSWLF
4407	HAYWOOD CO WHITE OAK LANDFILL	42,899	44,023	47,187	43,260	48,893	49,580	MSWLF
6708	CAMP LEJEUNE MSW LANDFILL	19,629	58,694	36,652	39,653	47,433	40,054	MSWLF
4903	IREDELL COUNTY C&D UNIT	30,620	45,471	50,585	47,735	43,806	43,783	CDLF
5101	JOHNSTON COUNTY C&D LANDFILL		4,494	33,842	37,728	42,548	38,774	CDLF

APPENDIX A-1: PUBLIC AND PRIVATE MUNICIPAL SOLID WASTE LANDFILLS (INCLUDES CONSTRUCTION AND DEMOLITION LANDFILLS*), DESCENDING ORDER OF TONS, FY 2002-2003

PERMIT #	FACILITY	TONS						FACILITY TYPE
		1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	
5503	LINCOLN COUNTY LANDFILL	35,391	38,438	40,065	38,481	41,231	44,125	MSWLF
8401	ALBEMARLE, CITY OF-LANDFILL	29,748	4,488	39,920	38,251	40,397	41,494	MSWLF
3606	GASTON COUNTY C&D LANDFILL			45,837	35,091	39,604	33,799	CDLF
9601	WAYNE COUNTY CDLF	5,154	17,630	38,342	30,838	39,537	31,563	CDLF
5403	LENOIR COUNTY CDLF	15,832	18,104	40,664	37,223	39,373	31,680	CDLF
6403	NASH COUNTY C&D LANDFILL					38,963	14,925	CDLF
9801	WILSON COUNTY CDLF	11,973	19,352	39,785	39,464	37,336	31,249	CDLF
5703-P0172	MACON COUNTY LANDFILL OPEN	27,205	36,130	36,844	36,510	37,041	38,145	MSWLF
9228	RED ROCK DISPOSAL, LLC					33,984	166,165	CDLF
1007	BRUNSWICK COUNTY CDLF	14,254	26,865	59,996	26,231	31,829	42,009	CDLF
9001	UNION COUNTY C&D		15,481	33,670	28,546	31,443	27,498	CDLF
1302	CABARRUS COUNTY CDLF	5,107	19,236	26,292	32,294	29,666	31,622	CDLF
3901	GRANVILLE COUNTY CDLF	7,744	20,656	23,445	22,122	29,599	24,128	CDLF
8401	ALBEMARLE, CITY OF, CDLF	10,173	28,651	23,903	24,370	28,262	29,362	CDLF
6801	ORANGE COUNTY C&D UNIT	30,168	33,667	30,515	33,471	27,729	20,231	CDLF
6301	MOORE COUNTY C&D LANDFILL			31,849	31,144	26,675	24,807	CDLF
7407	C & D LANDFILL INC.				2,981	25,687	39,769	CDLF
8301	SCOTLAND COUNTY CDLF	12,058	28,212	26,785	28,446	24,867	23,613	CDLF
2803	DARE COUNTY C&D LANDFILL	20,469	21,788	32,495	25,215	24,306	31,038	CDLF
1107-P0825	BUNCOMBE COUNTY C&D UNIT	15,089	30,899	43,147	43,370	24,238	8,209	CDLF
9226	SHOTWELL LANDFILL INC.				1,902	22,919	21,946	CDLF
0501	ASHE COUNTY LANDFILL		17,877	19,454	24,833	22,598	22,528	MSWLF
8807	TRANSYLVANIA COUNTY LANDFILL	14,082	15,585	18,439	20,186	22,495	24,034	MSWLF
9003	GRIFFIN FARMS C&D LANDFILL	36,460	40,951	40,658	24,088	20,763	26,604	CDLF

APPENDIX A-1: PUBLIC AND PRIVATE MUNICIPAL SOLID WASTE LANDFILLS (INCLUDES CONSTRUCTION AND DEMOLITION LANDFILLS*), DESCENDING ORDER OF TONS, FY 2002-2003

PERMIT #	FACILITY	TONS						FACILITY TYPE
		1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	
1203	BURKE COUNTY CDLF	4,647	12,738	13,938	20,712	19,314	14,348	CDLF
2002	CHEROKEE COUNTY MSW FACILITY	8,248	18,374	19,470	20,138	19,179	18,977	MSWLF
3301	EDGCOMBE COUNTY CDLF	5,878	18,935	86,968	44,236	18,507	18,639	CDLF
8103	RUTHERFORD COUNTY C&D	8,527	9,559	12,102	14,963	18,291	16,316	CDLF
8602	SURRY COUNTY C&D LANDFILL		19,488	16,745	15,951	17,403	13,910	CDLF
4302	HARNETT COUNTY CDLF	3,066	7,208	18,472	14,109	16,291	15,766	CDLF
2301-P0797	CLEVELAND COUNTY CDLF	5,857	13,069	13,238	14,790	14,913	62,119	CDLF
5503	LINCOLN COUNTY C&D UNIT	5,411	4,341	6,874	11,404	14,635	18,730	CDLF
2601	CUMBERLAND COUNTY C&D UNIT	23,674	36,381	21,377	16,314	14,024	13,506	CDLF
4501	HENDERSON COUNTY C&D LANDFILL			11,258	11,780	13,082	13,378	CDLF
7803	ROBESON COUNTY CDLF			7,315	18,990	10,922	10,946	CDLF
5704	HIGHLANDS C&D LANDFILL	4,531	7,018	6,968	7,274	8,962	11,075	CDLF
5301	LEE COUNTY C&D LANDFILL	6,833	9,537	9,708	7,987	7,868	8,114	CDLF
4303	HARNETT CO ANDERSON CRK C&D LANDFILL		9,737	7,872	5,928	7,690	6,751	CDLF
7606	GOLD HILL ROAD C&D DEBRIS LANDFILL					7,471	9,980	CDLF
07A	BEAUFORT COUNTY DEMO LANDFILL		8,914	10,140	6,944	6,909	6,788	CDLF
0905	BLADEN COUNTY C&D LANDFILL			358	5,635	6,859	4,562	CDLF
7002	PASQUOTANK COUNTY C&D LANDFILL	8,606	8,276	6,895	6,490	6,753	12,575	CDLF
5803-P0715	MADISON COUNTY C&D UNIT	1,378	4,083	3,414	3,421	5,501	3,933	CDLF
0104-P0563	AUSTIN QUARTER C&D UNIT	10,499	10,240	8,079	7,324	5,319	4,735	CDLF
3003	DAVIE COUNTY C&D LANDFILL	6,528	4,518	4,018	3,072	4,947	864	CDLF
8603	SURRY COUNTY C&D LANDFILL				873	4,308	3,245	CDLF
2906-P1051	DAVIDSON COUNTY CDLF					3,670	8,077	CDLF
0201	ALEXANDER COUNTY CDLF	1,448	2,840	4,189	4,000	3,664	4,435	CDLF

APPENDIX A-1: PUBLIC AND PRIVATE MUNICIPAL SOLID WASTE LANDFILLS (INCLUDES CONSTRUCTION AND DEMOLITION LANDFILLS*), DESCENDING ORDER OF TONS, FY 2002-2003

PERMIT #	FACILITY	TONS						FACILITY TYPE
		1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	
5901	MARTIN COUNTY C&D LANDFILL	9,189	9,775	10,828	3,759	3,572	3,829	CDLF
4204-P0802	HALIFAX COUNTY CDLF	2,591	3,765	5,220	4,588	3,481	4,451	CDLF
5803	MADISON COUNTY LANDFILL	4,683	4,642	6,759	8,299	3,308	361	MSWLF
0603	AVERY COUNTY C&D LANDFILL	1,077	879	3,320	3,478	3,164	2,472	CDLF
10002	YANCEY-MITCHELL C&D LANDFILL	2,831	3,477	6,327	3,751	2,809	3,443	CDLF
8202	WI-SAMPSON COUNTY C&D UNIT	25,712	32,414	103,942	21,618	2,724	9,666	CDLF
4002	GREENE COUNTY CDLF	554	6,051	5,569	4,541	2,446	1,837	CDLF
9902	YADKIN COUNTY C&D LANDFILL	4,026	4,004	3,340	3,435	2,188	2,177	CDLF
9404	WASHINGTON COUNTY C&D LANDFILL	509	1,454	1,119	764	973	1,116	CDLF
	NORTHAMPTON CO. C&D STOCKPILE	916	964	2,137	708	672	882	CDLF
7502	POLK COUNTY C&D LANDFILL						2,347	CDLF
9230	HWY 55 C & D LANDFILL, LLC						41,177	CDLF
1803	CATAWBA COUNTY C&D UNIT						27,291	CDLF
TOTAL TONS		**5,494,707**	**7,587,964**	**9,135,921**	**8,886,016**	**9,236,031**	**9,399,418**	

***CD = Construction and Demolition Waste**

APPENDIX A-2: SCRAP TIRE MONOFILLS , DESCENDING ORDER OF TONS, FY 2002-2003

		TONS					
PERMIT #	**FACILITY**	**1997-1998**	**1998-1999**	**1999-2000**	**2000-2001**	**2001-2002**	**2002-2003**
1303	US TIRE DISPOSAL	67,182	76,297	84,735	89,426	92,866	152,432
4304	CENTRAL CAROLINA TIRE MONOFILL	41,188	50,801	51,801	61,104	66,010	71,112
TOTAL TONS RECEIVED		**108,370**	**127,098**	**136,536**	**150,530**	**158,876**	**223,544**

APPENDIX A-3: INCINERATION FACILITIES, DESCENDING ORDER OF TONS, FY 2002-2003

PERMIT #	FACILITY	TONS 1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003
6505-I	NEW HANOVER WASTE-TO-ENERGY FACILITY	129,200	127,589	112,132	108,381	120,751	123,823
TOTAL TONS		**129,200**	**127,589**	**112,132**	**108,381**	**120,751**	**123,823**

APPENDIX A-4: PRIVATE INDUSTRIAL LANDFILLS, DESCENDING ORDER OF TONS, FY 2002-2003

		TONS					
PERMIT #	FACILITY	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003
7302	CAROLINA POWER & LIGHT CO	631,416	496,305	588,129	637,626	587,579	604,673
1804	DUKE POWER/MARSHALL STEAM PLT		288,556	376,809	231,476	1,497	520
2402	INTERNATIONAL PAPER	64,987	234,794	329,954	423,709	563,087	410,897
4406	BLUE RIDGE PAPER PRODUCTS, INC.	324,005	242,312	252,790	254,825	238,262	248,125
8503	DUKE POWER/BELEWS CREEK ST PLT	79,015	83,909	138,846	204,415	273,667	274,974
2302	CLEVELAND CONTAINER SERVICE		93,788	120,141	101,102	69,954	17,723
9401	WEYERHAEUSER	84,432	76,147	73,672	69,697	88,631	94,243
3405	R J REYNOLDS	40,309	39,021	47,378	52,166	41,243	23,707
1102	BASF CORPORATION	12,514	12,716	12,441	10,490	3,926	1,251
2502	WEYERHAEUSER	20,410	14,601	10,472	13,773	16,653	1,494
8805	ECUSTA LANDFILL	5,250	5,981	6,276	3,791	3,022	293
4204-P0830	HALIFAX COAL ASH LANDFILL		47,995	4,837	5,713	1,303	4,061
9703	LOUISANA-PACIFIC CORPORATION	3,937	3,607	3,771	2,918	3,289	3,607
5603	COLLINS & AIKMAN	2,647	2,796	2,211	2,988	1,465	4,748
6004	DUKE POWER COMPANY	189	3,260	1,673	2,187	1,065	2,954
7602	EVEREADY BATTERY	290	451	520	616	676	849
9210	CAROLINA POWER & LIGHT CO		126	68	11	3	410
TOTAL TONS		**1,269,401**	**1,646,365**	**1,969,987**	**2,017,504**	**1,895,321**	**1,694,528**

APPENDIX A-5: TRANSFER STATIONS AND MIXED WASTE PROCESSING FACILITIES, FY 2002-2003

PERMIT #	FACILITY	2002-2003	DISPOSAL DESTINATION	PERMIT #
0202-T	ALEXANDER CO. TRANSFER STATION	21,505	FOOTHILLS ENVIRONMENTAL LANDFILL	1403
0303-T	ALLEGHANY COUNTY TRANSFER FACILITY	8,175	BFI-CHARLOTTE MTR SPEEDWAY LANDFILL V	1304
0703-T	ARS - BEAUFORT TRANSFER STATION	48,806	EAST CAROLINA REG LANDFILL	0803
0602-T	AVERY COUNTY TRANSFER STATION	12,979	BRISTOL LANDFILL, VA	
0904-T	BLADEN COUNTY TRANSFER STATION	33,839	WI-SAMPSON COUNTY DISPOSAL INC	8202
1010-T	BRUNSWICK COUNTY TRANSFER STATION	68,470	WI-SAMPSON COUNTY DISPOSAL INC	8202
1108-T	BUNCOME COUNTY TRANSFER STATION	37,020	BUNCOMBE COUNTY MSW LANDFILL	1107-P0701
1205-T	BURKE COUNTY TRANSFER FACILITY	59,350	FOOTHILLS ENVIRONMENTAL LANDFILL	1403
1604	CARTERET COUNTY TRANSFER STATION	22,084	CRSWMA- INTERIM REGIONAL LANDFILL	2509
1604	CARTERET COUNTY TRANSFER STATION	66,281	CRSWMA- INTERIM REGIONAL LANDFILL	2509
9211-T	CARY TOWN OF - TRANSFER STATION	17,445	BRUNSWICK LANDFILL, VA	
9211-T	CARY TOWN OF - TRANSFER STATION	966	WAKE COUNTY LANDFILL-NORTH	9209
2510-T	CHERRY POINT TRANSFER STATION	7,648	CRSWMA- INTERIM REGIONAL LANDFILL	2509
7605-T	CITY OF ASHEBORO RECYCLING/SOLID WASTE TRA	20,023	UWHARRIE ENV. REG. LANDFILL	6204
3212-T	CITY OF DURHAM TRANSFER STATION	161,089	BRUNSWICK LANDFILL, VA	
2609	CITY OF FAYETTEVILLE/ WASTE INDUSTRIES TRANS	29,361	WI-SAMPSON COUNTY DISPOSAL INC	8202
6405-T	CITY OF ROCKY MOUNT TRANSFER STATION #2	107,766	BRUNSWICK LANDFILL, VA	
2202-T	CLAY COUNTY TRANSFER STATION	4,792	PINEBLUFF LANDFILL, GA	
2403-T	COLUMBUS COUNTY TRANSFER STATION	31,773	WI-SAMPSON COUNTY DISPOSAL INC	8202
2703-T	CURRITUCK TRANSFER STATION	34,591	EAST CAROLINA REG LANDFILL	0803

APPENDIX A-5: TRANSFER STATIONS AND MIXED WASTE PROCESSING FACILITIES, FY 2002-2003

PERMIT #	FACILITY	2002-2003	DISPOSAL DESTINATION	PERMIT #
9224	D.H. GRIFFIN RECLAMATION CENTER	14,900	RED ROCK DISPOSAL, LLC	9228
9224	D.H. GRIFFIN RECLAMATION CENTER	18,607	COBLE'S C&D LANDFILL	0105
9224	D.H. GRIFFIN RECLAMATION CENTER	950	BFI-HOLLY SPRINGS DISPOSAL INC	9214
2804-T	DARE COUNTY TRANSFER STATION	54,829	EAST CAROLINA REG LANDFILL	0803
3002-T	DAVIE CO C&D TRANSFER FACILITY	3,875	ROWAN COUNTY LANDFILL	8003
3002-T	DAVIE COUNTY MSW TRANSFER STATION	14,277	HANES MILL ROAD LANDFILL	3402
3102	DUPLIN COUNTY TRANSFER STATION	25,129	WI-SAMPSON COUNTY DISPOSAL INC	8202
5407-T	DUPONT KINSTON TRANSFER FACILITY	376	EAST CAROLINA REG LANDFILL	0803
5407-T	DUPONT KINSTON TRANSFER FACILITY	16,706	WI-SAMPSON COUNTY DISPOSAL INC	8202
5407-T	DUPONT KINSTON TRANSFER FACILITY	751	LENOIR COUNTY LANDFILL	5403
8004-T	EAST SPENCER WASTE TRANSFER FACILITY	13,056	PIEDMONT SANITARY LANDFILL	3406
8004-T	EAST SPENCER WASTE TRANSFER FACILITY	64,341	BFI-CHARLOTTE MTR SPEEDWAY LANDFILL V	1304
7903-T	EDEN, CITY OF TRANSFER STATION	10,097	ROCKINGHAM COUNTY LANDFILL	7904
3302-T	EDGCOMBE COUNTY TRANSFER STATION	34,398	EAST CAROLINA REG LANDFILL	0803
7406-T	EJE RECYCLING TRANSFER STATION	8,013	EAST CAROLINA REG LANDFILL	0803
2606-T	FORT BRAGG TRANSFER STATION	33,215	UWHARRIE ENV. REG. LANDFILL	6204
	FORT MILL TRANSFER STATION	345	BFI-LAKE NORMAN LANDFILL	5504
	FORT MILL TRANSFER STATION	66,246	BFI-CHARLOTTE MTR SPEEDWAY LANDFILL V	1304
	FORT MILL TRANSFER STATION	59,746	CHAMBERS DEVELOPMENT MSWLF	0403
3502-T	FRANKLIN COUNTY TRANSFER STATON	13,697	UPPER PIEDMONT REG LANDFILL	7304

APPENDIX A-5: TRANSFER STATIONS AND MIXED WASTE PROCESSING FACILITIES, FY 2002-2003

PERMIT #	FACILITY	2002-2003	DISPOSAL DESTINATION	PERMIT #
3502-T	FRANKLIN COUNTY TRANSFER STATON	29,890	BRUNSWICK LANDFILL, VA	
1805	GDS RECYCLING SERVICES	10,638	CATAWBA COUNTY LANDFILL	1803
9607-T	GOLDSBORO TRANSFER STATION	11,870	WAYNE COUNTY LANDFILL	9606
	GRAHAM COUNTY TEMPORARY TRANSFER STATION	2,789	PINEBLUFF LANDFILL, GA	
4307-T	HARNETT CNTY-DUNN/ERWIN TRANSFER STATION	37,886	UWHARRIE ENV. REG. LANDFILL	6204
4305-T	HARNETT COUNTY TRANSFER STATION	8,599	UWHARRIE ENV. REG. LANDFILL	6204
4409-TP	HAYWOOD COUNTY C&D MRF (stockpiled 1999)	5,366	HAYWOOD CO WHITE OAK LANDFILL	4407
4408	HAYWOOD COUNTY MWP FACILITY	44,214	HAYWOOD CO WHITE OAK LANDFILL	4407
4504-T	HENDERSON COUNTY TRANSFER FACILITY	49,257	PALMETTO LANDFILL, SC	
4602-T	HERTFORD COUNTY TRANSFER STATION	1,405	EAST CAROLINA REG LANDFILL	0803
4702	HOKE COUNTY TRANSFER STATION	25,984	UWHARRIE ENV. REG. LANDFILL	6204
4904-T	IREDELL COUNTY TRANSFER STATION	37,810	IREDELL COUNTY SANITARY LF	4903
4904-T	IREDELL COUNTY TRANSFER STATION	1,963	IREDELL COUNTY C&D UNIT	4903
5003-T	JACKSON COUNTY SCOTT CREEK TRANSFER STATIO	2,048	R&B LANDFILL	
5405-T	LENOIR COUNTY TRANSFER FACILITY	40,097	WI-SAMPSON COUNTY DISPOSAL INC	8202
5803-T	MADISON COUNTY TRANSFER	8,278	BFI, CARTER VALLEY	
5602-T	McDOWELL CO TRANSFER FACILITY	29,345	BFI-CHARLOTTE MTR SPEEDWAY LANDFILL V	1304
8005-TP	MILLER, C&D RECYCLING	95	ROWAN COUNTY LANDFILL	8003
9232	N.C.STATE TRANSFER STATION	3,365	WAKE COUNTY LANDFILL-NORTH	9209
5408-T	ONSLOW CONTAINER SERVICE, INC.	18,524	EAST CAROLINA REG LANDFILL	0803

APPENDIX A-5: TRANSFER STATIONS AND MIXED WASTE PROCESSING FACILITIES, FY 2002-2003

PERMIT #	FACILITY	2002-2003	DISPOSAL DESTINATION	PERMIT #
3416-T	OVERDALE ROAD TRANSFER STATION	65,091	UWHARRIE ENV. REG. LANDFILL	6204
6903-T	PAMLICO COUNTY TRANSFER STATION	5,084	CRSWMA- INTERIM REGIONAL LANDFILL	2509
6903-T	PAMLICO COUNTY TRANSFER STATION	1,082	CRSWMA- INTERIM REGIONAL LANDFILL	2509
7003-T	PASQUOTANK COUNTY TRANSFER STATION	27,411	EAST CAROLINA REG LANDFILL	0803
9227-T	PCM CONSTRUCTION SERVICE- N RALEIGH C&D TRA	46,099	RED ROCK DISPOSAL, LLC	9228
9229	PCM CONSTRUCTION SERVICES-APEX TRANSFER ST	20,383	RED ROCK DISPOSAL, LLC	9228
7103-T	PENDER CO TRANSFER STATION	23,993	WI-SAMPSON COUNTY DISPOSAL INC	8202
7202-T	PERQUIMANS-CHOWAN-GATES TRANSFER	21,511	EAST CAROLINA REG LANDFILL	0803
7404-T	PITT COUNTY TRANSFER STATION	53,309	EAST CAROLINA REG LANDFILL	0803
7404-T	PITT COUNTY TRANSFER STATION	52,448	WI-SAMPSON COUNTY DISPOSAL INC	8202
7503-T	POLK COUNTY TRANSFER STATION	3,699	PALMETTO LANDFILL, SC	
6014	QUEEN CITY TRANSFER STATION	162,326	UWHARRIE ENV. REG. LANDFILL	6204
7603-T	RANDOLPH COUNTY TRANSFER FACILITY	74,301	BFI-CHARLOTTE MTR SPEEDWAY LANDFILL V	1304
9608	RECYCLED MATERIALS, INC.	2	WAYNE COUNTY LANDFILL	9606
7902-T	REIDSVILLE, CITY OF TRANSFER FACILITY	6,650	PIEDMONT SANITARY LANDFILL	3406
7902-T	REIDSVILLE, CITY OF TRANSFER FACILITY	36	ROCKINGHAM COUNTY LANDFILL	7904
7703-T	RICHMOND COUNTY TRANSFER STATION	46,296	UWHARRIE ENV. REG. LANDFILL	6204
6402-T	ROCKY MOUNT TRANSFER STATION	400	BRUNSWICK LANDFILL, VA	
8104-T	RUTHERFORD COUNTY TRANSFER FACILITY	47,375	PALMETTO LANDFILL, SC	
8302-T	SCOTLAND COUNTY T.S.	27,232	UWHARRIE ENV. REG. LANDFILL	6204

APPENDIX A-5: TRANSFER STATIONS AND MIXED WASTE PROCESSING FACILITIES, FY 2002-2003

PERMIT #	FACILITY	2002-2003	DISPOSAL DESTINATION	PERMIT #
2705	SOUNDSIDE RECYCLING & MATERIALS, INC	851	EAST CAROLINA REG LANDFILL	0803
2705	SOUNDSIDE RECYCLING & MATERIALS, INC	2,617	JOHN C. HOLLAND ENTERPRISES	
9221-T	SOUTH WAKE TRANSFER STATION	124,983	WAKE COUNTY LANDFILL-NORTH	9209
3214-T	STONE PARK COURT TRANSFER STATION	46,977	WI-SAMPSON COUNTY DISPOSAL INC	8202
3214-T	STONE PARK COURT TRANSFER STATION	17,039	RED ROCK DISPOSAL, LLC	9228
3214T	STONE PARK COURT TRANSFER STATION (ORANGE	438	RED ROCK DISPOSAL, LLC	9228
8603-T	SURRY COUNTY TRANSFER STATION	11,693	SURRY COUNTY MSWLF	8606
2101-T	TOWN OF EDENTON TRANSFER STATION	6,121	EAST CAROLINA REG LANDFILL	0803
	TRIBAL TRANSFER STATION	23,133	PALMETTO LANDFILL, SC	
9005-T	UNION COUNTY TRANSFER STATION	13,306	CHAMBERS DEVELOPMENT MSWLF	0403
9005-T	UNION COUNTY TRANSFER STATION	53,715	UWHARRIE ENV. REG. LANDFILL	6204
6302	UWHARRIE ENV INC/MOORE CTY TRANSFER STATIO	55,925	UWHARRIE ENV. REG. LANDFILL	6204
6202-MRF	UWHARRIE ENVIRONMENTAL MRF	16,532	UWHARRIE ENV. REG. LANDFILL	6204
9302-T	WARREN COUNTY TRANSFER STATION	7,648	BRUNSWICK LANDFILL, VA	
9302-T	WARREN COUNTY TRANSFER STATION	319	UPPER PIEDMONT REG LANDFILL	7304
9217	WASTE INDUSTRIES CROSSWINDS PARK TRANSFER	96,257	WI-SAMPSON COUNTY DISPOSAL INC	8202
9808-T	WASTE INDUSTRIES- BLK. CRK. RD. TRANSFER	75,324	WI-SAMPSON COUNTY DISPOSAL INC	8202
9808-T	WASTE INDUSTRIES- BLK. CRK. RD. TRANSFER	33,379	BRUNSWICK LANDFILL, VA	
9102-T	WASTE INDUSTRIES-VANCE COUNTY	45,677	UPPER PIEDMONT REG LANDFILL	7304
9102-T	WASTE INDUSTRIES-VANCE COUNTY	7,127	BRUNSWICK LANDFILL, VA	

APPENDIX A-5: TRANSFER STATIONS AND MIXED WASTE PROCESSING FACILITIES, FY 2002-2003

PERMIT #	FACILITY	2002-2003	DISPOSAL DESTINATION	PERMIT #
1903-T	WASTE MAN. - CHATHAM CO TRANSFER STATION	29,705	UWHARRIE ENV. REG. LANDFILL	6204
5304-T	WASTE MAN. - LEE CO.TRANSFER STATION	60,566	UWHARRIE ENV. REG. LANDFILL	6204
1104	WASTE MANAGEMENT OF ASHEVILLE	126,930	PALMETTO LANDFILL, SC	
3608	WASTE MANAGEMENT OF CAROLINAS	93,668	PALMETTO LANDFILL, SC	
3608	WASTE MANAGEMENT OF CAROLINAS	52,565	BFI-CHARLOTTE MTR SPEEDWAY LANDFILL V	1304
9215-T	WASTE MANAGEMENT OF RAL-DUR	53,119	BRUNSWICK LANDFILL, VA	
9215-T	WASTE MANAGEMENT OF RAL-DUR	72,060	UPPER PIEDMONT REG LANDFILL	7304
9215-T	WASTE MANAGEMENT OF RAL-DUR	5,389	WI-SAMPSON COUNTY DISPOSAL INC	8202
9503-T	WATAUGA CO TRANSFER FACILITY	39,054	IRIS GLEN LANDFILL, TN	
4205-T	WELDON, TOWN OF, TRANSFER STATION	49,957	ATLANTIC WASTE DISPOSAL INC.	
4205-T	WELDON, TOWN OF, TRANSFER STATION	6,052	AMELIA LANDFILL	
9903-T	YADKIN COUNTY TRANSFER FACILITY	17,515	BFI-CHARLOTTE MTR SPEEDWAY LANDFILL V	1304
10003-T	YANCEY-MITCHELL TRANSFER STATION	22,020	PALMETTO LANDFILL, SC	
TOTAL TONS		**3,569,322**		

APPENDIX B: COUNTY POPULATION, WASTE DISPOSAL, PER CAPITA RATE AND PERCENT REDUCTION, FY 2002-2003

COUNTY	POPULATION	MSW TONS MANAGED	MSW TONS DISPOSED				BASE YEAR PER CAPITA	PER CAPITA RATE	%CHANGE FROM 1991-1992
	JULY 2002	1991-1992	1999-2000	2000-2001	2001-2002	2002-2003	1991-1992	2002-2003	2001-2002**
ALAMANCE	136,144	99,302	135,310	142,244	143,394	144,913	0.91	1.06	17%
ALEXANDER	34,224	25,716	23,657	24,636	25,017	27,834	0.90	0.81	-10%
ALLEGHANY	10,860	14,131	8,187	8,160	8,027	8,249	1.45	0.76	-48%
ANSON	25,358	14,229	18,443	19,471	23,145	29,544	0.61	1.17	91%
ASHE	24,734	18,089	22,176	24,903	22,881	22,587	0.81	0.91	13%
AVERY	17,946	11,130	17,343	16,724	16,673	16,251	0.74	0.91	22%
BEAUFORT	45,672	41,796	58,264	51,840	56,663	67,593	0.99	1.48	49%
BERTIE	19,807	17,372	28,265	21,319	27,614	22,622	0.86	1.14	33%
BLADEN	32,656	25,048	55,779	35,536	37,480	44,554	0.86	1.36	59%
BRUNSWICK	79,054	78,123	126,699	87,059	103,367	120,506	1.48	1.52	3%
BUNCOMBE	210,550	159,040	247,300	251,472	247,830	255,112	0.90	1.21	35%
BURKE	89,354	78,006	85,490	88,239	86,459	81,642	1.02	0.91	-10%
CABARRUS	140,176	95,215	160,186	187,508	203,981	250,162	0.94	1.78	90%
CALDWELL	78,234	65,532	100,327	91,387	86,065	88,730	0.92	1.13	23%
CAMDEN	7,328	1,850	2,314	2,872	3,033	3,630	0.31	0.50	60%
CARTERET	60,064	86,894	84,521	78,191	80,691	88,515	1.52	1.47	-9%
CASWELL	23,718	5,136	9,853	11,250	9,486	9,116	0.25	0.38	54%
CATAWBA	146,548	151,559	155,849	156,951	165,509	192,830	1.26	1.32	4%
CHATHAM	52,582	33,235	34,670	28,377	28,155	40,298	0.84	0.77	-9%
CHEROKEE	25,080	16,020	19,470	20,209	19,108	18,977	0.78	0.76	-3%
CHOWAN	14,304	13,692	15,808	16,804	15,429	16,621	0.99	1.16	17%
CLAY	9,216	4,172	4,572	4,480	4,848	4,792	0.57	0.52	-9%
CLEVELAND	97,271	73,138	84,685	87,224	84,793	150,089	0.86	1.54	79%
COLUMBUS	54,890	45,199	41,240	42,526	38,628	32,431	0.91	0.59	-35%
CRAVEN	91,902	86,549	94,903	92,746	87,056	88,270	1.05	0.96	-9%
CUMBERLAND	305,851	227,302	389,287	351,620	403,476	337,375	0.81	1.10	36%

APPENDIX B: COUNTY POPULATION, WASTE DISPOSAL, PER CAPITA RATE AND PERCENT REDUCTION, FY 2002-2003

COUNTY	POPULATION	MSW TONS MANAGED	MSW TONS DISPOSED				BASE YEAR PER CAPITA	PER CAPITA RATE	%CHANGE FROM 1991-1992
	JULY 2002	1991-1992	1999-2000	2000-2001	2001-2002	2002-2003	1991-1992	2002-2003	2001-2002**
CURRITUCK	19,632	13,792	28,875	26,241	26,943	31,116	1.00	1.58	58%
DARE	32,177	51,300	80,713	73,445	75,809	96,697	2.23	3.01	35%
DAVIDSON	150,799	139,617	134,640	137,460	125,040	139,610	1.08	0.93	-14%
DAVIE	36,770	19,348	26,766	33,288	35,279	37,735	0.68	1.03	51%
DUPLIN	50,612	33,310	50,075	37,909	45,558	43,416	0.82	0.86	5%
DURHAM	233,548	218,972	267,300	238,894	260,680	298,420	1.17	1.28	9%
EDGECOMBE	54,945	71,471	157,397	113,185	89,138	60,805	1.25	1.11	-11%
FORSYTH	314,853	304,290	422,828	465,134	447,508	501,034	1.14	1.59	40%
FRANKLIN	50,326	28,702	47,991	47,554	52,775	47,668	0.76	0.95	25%
GASTON	191,874	165,100	260,383	215,226	214,185	216,267	0.93	1.13	21%
GATES	10,708	5,897	4,806	5,044	5,426	5,250	0.63	0.49	-22%
GRAHAM	8,030	4,508	5,368	7,724	6,845	7,681	0.62	0.96	54%
GRANVILLE	51,540	54,548	61,397	61,014	71,174	68,759	1.39	1.33	-4%
GREENE	19,471	7,428	9,397	7,636	5,677	5,942	0.48	0.31	-36%
GUILFORD	428,794	471,541	756,755	730,012	758,566	709,579	1.35	1.65	23%
HALIFAX	57,105	54,907	40,831	50,389	50,486	53,760	0.98	0.94	-4%
HARNETT	96,152	69,073	77,364	70,712	74,032	73,593	1.01	0.77	-24%
HAYWOOD	55,114	57,842	48,376	44,448	50,438	51,047	1.21	0.93	-23%
HENDERSON	92,988	81,498	94,280	95,443	97,650	104,249	1.14	1.12	-2%
HERTFORD	23,863	14,288	19,580	20,659	19,315	21,206	0.63	0.89	41%
HOKE	36,000	18,331	18,543	19,977	22,426	28,027	0.80	0.78	-3%
HYDE	5,846	2,762	4,970	5,086	4,739	4,296	0.50	0.73	47%
IREDELL	130,362	114,539	180,237	174,900	169,967	174,819	1.19	1.34	13%
JACKSON	34,132	18,661	26,026	40,476	38,542	39,230	0.68	1.15	69%
JOHNSTON	132,660	74,169	147,009	136,796	159,475	176,576	0.88	1.33	51%
JONES	10,243	4,360	4,168	1,647	2,488	2,725	0.47	0.27	-43%

APPENDIX B: COUNTY POPULATION, WASTE DISPOSAL, PER CAPITA RATE AND PERCENT REDUCTION, FY 2002-

COUNTY	POPULATION	MSW TONS MANAGED	MSW TONS DISPOSED				BASE YEAR PER CAPITA	PER CAPITA RATE	%CHANGE FROM 1991-1992
	JULY 2002	1991-1992	1999-2000	2000-2001	2001-2002	2002-2003	1991-1992	2002-2003	2001-2002**
LEE	49,810	48,341	71,824	67,018	61,739	67,648	1.16	1.36	17%
LENOIR	59,294	67,693	114,094	93,061	99,163	89,576	1.17	1.51	29%
LINCOLN	66,598	44,442	64,593	70,311	82,695	82,930	0.87	1.25	43%
MACON	30,936	19,738	30,366	30,009	32,483	35,825	0.82	1.16	41%
MADISON	19,856	11,676	10,175	12,464	14,863	13,056	0.68	0.66	-3%
MARTIN	25,082	30,112	28,257	18,475	18,804	17,458	1.19	0.70	-42%
MCDOWELL	42,960	29,180	36,120	38,015	36,698	38,321	0.82	0.89	9%
MECKLENBURG	734,365	677,573	1,282,196	1,233,824	1,279,090	1,278,129	1.29	1.74	35%
MITCHELL	15,934	15,768	13,561	16,287	17,120	13,865	1.11	0.87	-22%
MONTGOMERY	27,282	28,873	30,066	29,567	38,236	45,267	1.23	1.66	35%
MOORE	77,424	74,062	99,851	94,265	89,503	84,819	1.23	1.10	-11%
NASH	89,185	84,594	101,733	59,396	101,051	103,213	1.09	1.16	6%
NEW HANOVER	166,072	157,647	275,930	259,305	241,951	250,327	1.28	1.51	18%
NORTHAMPTON	21,773	19,528	22,798	13,204	10,757	19,271	0.94	0.89	-6%
ONSLOW	152,424	158,344	154,486	144,917	157,279	149,346	1.04	0.98	-6%
ORANGE	119,746	131,067	99,661	103,344	98,415	89,547	1.36	0.75	-45%
PAMLICO	13,024	8,541	8,763	7,357	8,060	8,359	0.75	0.64	-14%
PASQUOTANK	35,816	30,150	35,017	32,065	35,131	37,123	0.97	1.04	7%
PENDER	43,135	18,188	30,993	21,718	27,351	29,063	0.60	0.67	12%
PERQUIMANS	11,607	7,520	7,577	7,969	8,348	9,396	0.73	0.81	11%
PERSON	36,764	24,249	33,173	32,938	32,430	35,017	0.80	0.95	19%
PITT	137,901	132,896	209,768	137,342	152,049	152,459	1.21	1.11	-9%
POLK	18,866	9,327	12,359	14,079	10,988	14,001	0.63	0.74	18%
RANDOLPH	133,836	78,663	103,031	105,189	115,987	120,390	0.73	0.90	23%
RICHMOND	46,721	60,752	37,753	38,877	55,651	64,246	1.35	1.38	2%
ROBESON	125,206	104,700	96,641	128,176	117,366	126,032	0.99	1.01	2%

APPENDIX B: COUNTY POPULATION, WASTE DISPOSAL, PER CAPITA RATE AND PERCENT REDUCTION, FY 2002-2003

COUNTY	POPULATION	MSW TONS MANAGED	MSW TONS DISPOSED				BASE YEAR PER CAPITA	PER CAPITA RATE	%CHANGE FROM 1991-1992
	JULY 2002	1991-1992	1999-2000	2000-2001	2001-2002	2002-2003	1991-1992	2002-2003	2001-2002**
ROCKINGHAM	92,589	71,481	97,577	97,313	94,982	100,478	0.83	1.09	31%
ROWAN	132,921	90,081	142,071	142,801	139,616	135,552	0.80	1.02	27%
RUTHERFORD	63,345	89,175	59,312	59,837	65,080	63,608	1.56	1.00	-36%
SAMPSON	61,768	33,545	59,098	45,333	47,453	52,657	0.70	0.85	22%
SCOTLAND	35,766	39,867	42,477	45,983	36,428	42,092	1.17	1.18	1%
STANLY	58,974	69,288	71,556	69,654	73,494	74,341	1.32	1.26	-5%
STOKES	45,355	17,976	12,554	12,716	15,657	16,223	0.47	0.36	-24%
SURRY	72,028	73,595	68,131	73,848	71,956	68,830	1.18	0.96	-19%
SWAIN	13,287	5,651	7,514	7,334	9,132	8,286	0.50	0.62	25%
TRANSYLVANIA	29,400	30,072	26,975	28,103	29,180	30,539	1.16	1.04	-10%
TYRRELL	4,170	2,985	2,359	2,186	2,361	3,021	0.79	0.72	-8%
UNION	138,928	77,842	184,549	171,781	165,366	166,558	0.90	1.20	33%
VANCE	44,378	43,267	56,097	55,625	56,260	52,119	1.11	1.17	6%
WAKE	679,510	569,622	958,832	926,504	880,136	856,043	1.29	1.26	-2%
WARREN	20,000	10,978	8,991	9,518	8,685	10,996	0.63	0.55	-13%
WASHINGTON	13,600	11,699	20,362	9,859	13,346	12,692	0.84	0.93	11%
WATAUGA	42,892	36,755	45,453	47,220	49,014	50,099	0.99	1.17	18%
WAYNE	113,844	106,149	145,394	112,683	133,568	124,473	1.00	1.09	9%
WILKES	66,660	58,818	71,148	59,147	60,671	60,189	0.97	0.90	-7%
WILSON	75,374	120,870	141,988	129,960	133,235	138,607	1.82	1.84	1%
YADKIN	36,958	20,779	18,995	19,795	19,767	20,212	0.67	0.55	-18%
YANCEY	17,944	15,576	14,243	12,091	11,718	11,912	1.01	0.66	-34%
NC STATE	**8,323,375**	**7,257,428**	**10,267,137**	**9,752,510**	**9,999,284**	**10,236,960**	**1.08**	**1.23**	**14%**
TOTAL ADJUSTED FOR HURRICANE DEBRIS (e.g. FRAN, FLOYD)			**9,937,355**						

***See Appendix B-Contd. for counties using alternate base year**

*** Percent Change formula: (current year per capita minus base year per capita) divided by base year per capita*

Appendix C
Imports and Exports
FY 1995-1996 through FY 2002-2003

Fiscal Year	Total Tons Exported	Receiving Facility	Distribution of Tons Received	Total Tons Imported	Receiving Facility	Distribution of Tons Received
2002-2003	971,286**	Amelia Landfill, VA	10,887	133,145**	BFI- Charlotte Motor Speedway**	66,246
		Atlantic Waste, VA	61,912		Chambers Development, Anson Co.**	91,990
		BFI, Carter Valley, TN	8,746		Gaston Co. Landfill	127
		Bristol Landfill, VA	13,000		Griffin Farms C&D Landfill, Union Co.	201
		Brunswick Landfill, VA	396,386		Mecklenburg Co. Landfill	1,181
		Iris Glenn Landfill, TN	41,384		New Hanover Waste to Energy	1
		Lee Co. Landfill, SC	31,084		Piedmont Sanitary Landfill, Forsyth Co.	37,264
		Palmetto Landfill, SC	395,418		Upper Piedmont Regional Landfill, Person Co.	10,949
		Pinebluff Landfill, GA	9,839			
		R&B Landfill, GA	2,030		Waste Management of Carolinas, Gaston Co.	2,403
		John C. Holland Enterprises , VA	600			
2001-2002	882,247*	Amelia Landfill, VA	8,844	117,981*	BFI- Charlotte Motor Speedway	11,645
		Atlantic Waste, VA	36,290		Chambers Development, Anson Co.	48,368
		BFI, Carter Valley, TN	4,789		Gaston Co. Landfill	199
		Bristol Landfill, VA	12,584		GDS Recycling Services, Catawba Co.	486
		Brunswick Landfill, VA	420,627		Griffin Farms C&D Landfill, Union Co.	60
		Danville Transfer, VA	5,327		Mecklenburg Co. Landfill	888
		Iris Glenn Landfill, TN	44,548		Piedmont Sanitary Landfill, Forsyth Co.	49,305
		Lee Co. Landfill, SC	28,515		Upper Piedmont Regional Landfill, Person Co.	2,784
		Palmetto Landfill, SC	312,013			
		Pinebluff Landfill, GA	6,683		Waste Management of Carolinas, Gaston Co.	4,246
		R&B Landfill, GA	2,027			
2000-2001	900,743	Brunswick Landfill, VA	436,264	21,614	Chambers Development Landfill, Anson Co.	10,328
		Palmetto Landfill, SC	340,782			
		Iris Glenn Landfill, TN	44,863		Waste Management, Gaston Co. (transfer)	4,659
		Atlantic Waste, VA	30,275		Addington Upper Piedmont Landfill, Person Co.	2,417
		Amelia Landfill, VA	18,541			
		Bristol Landfill, VA	13,121		Mecklenburg Co. Landfill (CDLF)	2,407
		Lee Co. Landfill, SC	9,912		Gaston Co. Landfill	664
		Pinebluff Landfill, GA	6,809		Griffin Farms C&D Landfill, Union Co.	639
		R & B Landfill, GA	176		GDS Recycling Services, Catawba Co.	441
					Uwharrie Env. MRF, Montgomery Co.	59
1999-2000	1,106,897	Palmetto Landfill, SC	463,587	41,840	Addington Upper Piedmont Landfill, Person Co.	32,976
		Brunswick Landfill, VA	432,645			
		Lee Co. Landfill, SC	148,412		Piedmont Sanitary Landfill, Forsyth Co.	7,158
		Iris Glenn Landfill, TN	43,680		Gaston Co. Landfill	640
		Bristol Landfill, VA	14,001		Griffin Farms C&D Landfill, Union Co.	565
		Pinebluff Landfill, GA	4,572		GDS Recycling Services, Catawba Co.	377
					Uwharrie Env. MRF, Montgomery Co.	101
					Mecklenburg Co. Landfill	15
					Uwharrie Env. Landfill, Montgomery Co.	8
1998-1999	1,166,875	Palmetto Landfill, SC	446,858	74,185	Addington Upper Piedmont Landfill, Person Co.	53,798
		Brunswick Landfill, VA	382,479			
		Lee Co. Landfill, SC	277,246		Piedmont Sanitary Landfill, Forsyth Co.	19,251
		Iris Glenn Landfill, TN	41,612		Griffin Farms C&D, Union Co.	594
		Bristol Landfill, VA	14,766		Gaston Co. Landfill	418
		Pinebluff Landfill, GA	3,914		Uwharrie Env. MRF, Montgomery Co.	67
					New Hanover Waste to Energy	57

1997-1998	**629,415**	Palmetto Landfill, SC Brunswick Landfill, VA Lee Co. Landfill, SC	422,248 190,890 16,277		**87,393**	Piedmont Sanitary Landfill, Forsyth Co. Addington Upper Piedmont Landfill, Person Co. Union Co. Landfill	80,570 6,194 [redacted]
1996-1997	**280,400**	Palmetto Landfill, SC	280,400		**103,510**	Piedmont Sanitary Landfill, Forsyth Co. Union Co. Landfill	103,120 390
1995-1996	**111,097**	Palmetto Landfill, SC	111,097		**88,982**	Piedmont Sanitary Landfill, Forsyth Co.	88,982

*Not including 73,911 tons from Mecklenburg County that were exported to S.C. (Fort Mill Transfer Station) then imported to a landfill in N.C.

** Not including 77,217 tons from Mecklenburg County that were exported to S.C. (Fort Mill Transfer Station) then imported to landfills in N.C.

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

TOTAL LANDFILL CAPACITY FOR NORTH CAROLINA

Date Landfill Operation Began:

Date of Survey:

County:

Volume Airspace Used (yd^3)	83,439,238.00
Tons Disposed	47,936,314.57
2002-2003 Tons Disposed	7,258,143.68
Months of Operation	
Utilization Factor ($tons/yd^3$)	0.57
Lifetime Ave. Tons Disposed Per Month	537,311.92
2002-2003 Ave. Tons Disposed Per Month	604,845.31

	Permitted	*Total*
Original Available Airspace (yd^3)	125,748,044.00	289,211,652.00
Remaining Airspace (yd^3)	42,308,806.00	205,772,414.00
Remaining Capacity for Tonnage (tons)	24,306,648.55	118,217,416.69
Remaining Capacity in Months	40.19	195.45
Remaining Capacity in Years	3.35	16.29

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

AVERAGE LANDFILL CAPACITY FOR A NORTH CAROLINA LANDFILL

Date Landfill Operation Began:

Date of Survey:

County:

Volume Airspace Used (yd^3)	2,035,103.37
Tons Disposed	1,169,178.40
2002-2003 Tons Disposed	177,027.89
Months of Operation	
Utilization Factor ($tons/yd^3$)	0.57
Lifetime Ave. Tons Disposed Per Month	13,105.17
2002-2003 Ave. Tons Disposed Per Month	14,752.32

	Permitted	*Total*
Original Available Airspace (yd^3)	3,067,025.46	7,053,942.73
Remaining Airspace (yd^3)	1,031,922.10	5,018,839.37
Remaining Capacity for Tonnage (tons)	592,845.09	2,883,351.63
Remaining Capacity in Months	40.19	195.45
Remaining Capacity in Years	3.35	16.29

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

AUSTIN QUARTER SWM FACILITY

Date Landfill Operation Began: 3/18/1994

Date of Survey: 2/2/2003

County: Alamance

Volume Airspace Used (yd^3)	1,099,371.00
Tons Disposed	693,231.00
2002-2003 Tons Disposed	97,059.19
Months of Operation	106.49
Utilization Factor ($tons/yd^3$)	0.63
Lifetime Ave. Tons Disposed Per Month	6,509.61
2002-2003 Ave. Tons Disposed Per Month	8,088.27

	Permitted	*Total*
Original Available Airspace (yd^3)	1,350,000.00	10,000,000.00
Remaining Airspace (yd^3)	250,629.00	8,900,629.00
Remaining Capacity for Tonnage (tons)	158,039.27	5,612,474.72
Remaining Capacity in Months	19.54	693.90
Remaining Capacity in Years	1.63	57.83

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

CHAMBERS DEVELOPMENT MSWLF

Date Landfill Operation Began: 12/12/2000

Date of Survey: 4/23/2003

County: Anson

Volume Airspace Used (yd^3)	808,833.00
Tons Disposed	495,868.49
2002-2003 Tons Disposed	225,787.59
Months of Operation	28.36
Utilization Factor ($tons/yd^3$)	0.61
Lifetime Ave. Tons Disposed Per Month	17,483.65
2002-2003 Ave. Tons Disposed Per Month	18,815.63

	Permitted	*Total*
Original Available Airspace (yd^3)	3,300,000.00	19,310,000.00
Remaining Airspace (yd^3)	2,491,167.00	18,501,167.00
Remaining Capacity for Tonnage (tons)	1,527,251.26	11,342,447.38
Remaining Capacity in Months	81.17	602.82
Remaining Capacity in Years	6.76	50.24

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

ASHE COUNTY LANDFILL

Date Landfill Operation Began: 11/1/1993

Date of Survey: 5/20/2003

County: Ashe

Volume Airspace Used (yd^3)	308,453.00
Tons Disposed	144,643.50
2002-2003 Tons Disposed	22,527.50
Months of Operation	114.63
Utilization Factor ($tons/yd^3$)	0.47
Lifetime Ave. Tons Disposed Per Month	1,261.88
2002-2003 Ave. Tons Disposed Per Month	1,877.29

	Permitted	*Total*
Original Available Airspace (yd^3)	427,000.00	2,340,000.00
Remaining Airspace (yd^3)	118,547.00	2,031,547.00
Remaining Capacity for Tonnage (tons)	55,590.49	952,657.52
Remaining Capacity in Months	29.61	507.46
Remaining Capacity in Years	2.47	42.29

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

EAST CAROLINA REGIONAL LANDFILL

Date Landfill Operation Began: 8/6/1993

Date of Survey: 4/23/2003

County: Bertie

Volume Airspace Used (yd^3)	5,164,205.00
Tons Disposed	3,633,959.00
2002-2003 Tons Disposed	396,601.07
Months of Operation	116.56
Utilization Factor ($tons/yd^3$)	0.70
Lifetime Ave. Tons Disposed Per Month	31,176.94
2002-2003 Ave. Tons Disposed Per Month	33,050.09

	Permitted	*Total*
Original Available Airspace (yd^3)	6,400,000.00	11,000,000.00
Remaining Airspace (yd^3)	1,235,795.00	5,835,795.00
Remaining Capacity for Tonnage (tons)	869,606.91	4,106,544.91
Remaining Capacity in Months	26.31	124.25
Remaining Capacity in Years	2.19	10.35

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

BUNCOMBE COUNTY MSW LANDFILL

Date Landfill Operation Began: 9/29/1997

Date of Survey: 5/6/2003

County: Buncombe

Volume Airspace Used (yd^3)	1,141,719.00
Tons Disposed	743,071.00
2002-2003 Tons Disposed	160,862.52
Months of Operation	67.23
Utilization Factor ($tons/yd^3$)	0.65
Lifetime Ave. Tons Disposed Per Month	11,052.63
2002-2003 Ave. Tons Disposed Per Month	13,405.21

	Permitted	*Total*
Original Available Airspace (yd^3)	1,900,000.00	6,803,056.00
Remaining Airspace (yd^3)	758,281.00	5,661,337.00
Remaining Capacity for Tonnage (tons)	493,516.02	3,684,597.83
Remaining Capacity in Months	36.82	274.86
Remaining Capacity in Years	3.07	22.91

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

BFI-CHARLOTTE MTR SPEEDWAY LANDFILL V

Date Landfill Operation Began: 3/6/1992

Date of Survey: 4/12/2003

County: Cabarrus

Volume Airspace Used (yd^3)	17,241,485.00
Tons Disposed	7,928,408.03
2002-2003 Tons Disposed	1,116,525.07
Months of Operation	157.20
Utilization Factor ($tons/yd^3$)	0.46
Lifetime Ave. Tons Disposed Per Month	50,436.01
2002-2003 Ave. Tons Disposed Per Month	93,043.76

	Permitted	*Total*
Original Available Airspace (yd^3)	19,500,000.00	19,500,000.00
Remaining Airspace (yd^3)	2,258,515.00	2,258,515.00
Remaining Capacity for Tonnage (tons)	1,038,566.48	1,038,566.48
Remaining Capacity in Months	11.16	11.16
Remaining Capacity in Years	0.93	0.93

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

FOOTHILLS ENVIRONMENTAL LANDFILL

Date Landfill Operation Began: 8/26/1998

Date of Survey: 4/23/2003

County: Caldwell

Volume Airspace Used (yd^3)	1,443,221.00
Tons Disposed	791,619.00
2002-2003 Tons Disposed	198,767.03
Months of Operation	55.92
Utilization Factor ($tons/yd^3$)	0.55
Lifetime Ave. Tons Disposed Per Month	14,156.01
2002-2003 Ave. Tons Disposed Per Month	16,563.92

	Permitted	*Total*
Original Available Airspace (yd^3)	2,800,000.00	9,680,000.00
Remaining Airspace (yd^3)	1,356,779.00	8,236,779.00
Remaining Capacity for Tonnage (tons)	744,204.83	4,517,943.37
Remaining Capacity in Months	44.93	272.76
Remaining Capacity in Years	3.74	22.73

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

CATAWBA COUNTY LANDFILL

Date Landfill Operation Began: 1/1/1998

Date of Survey: 6/18/2003

County: Catawba

Volume Airspace Used (yd^3)	1,798,069.00
Tons Disposed	920,257.24
2002-2003 Tons Disposed	165,141.58
Months of Operation	65.56
Utilization Factor ($tons/yd^3$)	0.51
Lifetime Ave. Tons Disposed Per Month	14,037.04
2002-2003 Ave. Tons Disposed Per Month	13,761.80

	Permitted	*Total*
Original Available Airspace (yd^3)	2,240,000.00	4,515,000.00
Remaining Airspace (yd^3)	441,931.00	2,716,931.00
Remaining Capacity for Tonnage (tons)	226,181.64	1,390,533.64
Remaining Capacity in Months	16.44	101.04
Remaining Capacity in Years	1.37	8.42

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

CHEROKEE COUNTY MSW FACILITY

Date Landfill Operation Began: 1/9/1998

Date of Survey: 5/15/2003

County: Cherokee

Volume Airspace Used (yd^3)	211,430.00
Tons Disposed	102,853.00
2002-2003 Tons Disposed	18,977.39
Months of Operation	64.20
Utilization Factor ($tons/yd^3$)	0.49
Lifetime Ave. Tons Disposed Per Month	1,602.14
2002-2003 Ave. Tons Disposed Per Month	1,581.45

	Permitted	*Total*
Original Available Airspace (yd^3)	249,760.00	1,127,940.00
Remaining Airspace (yd^3)	38,330.00	916,510.00
Remaining Capacity for Tonnage (tons)	18,646.15	445,848.76
Remaining Capacity in Months	11.79	281.92
Remaining Capacity in Years	0.98	23.49

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

CLEVELAND COUNTY LANDFILL

Date Landfill Operation Began: 7/27/1998

Date of Survey: 5/14/2003

County: Cleveland

Volume Airspace Used (yd^3)	696,247.00
Tons Disposed	348,041.84
2002-2003 Tons Disposed	86,716.69
Months of Operation	57.56
Utilization Factor ($tons/yd^3$)	0.50
Lifetime Ave. Tons Disposed Per Month	6,046.68
2002-2003 Ave. Tons Disposed Per Month	7,226.39

	Permitted	*Total*
Original Available Airspace (yd^3)	996,580.00	1,613,364.00
Remaining Airspace (yd^3)	300,333.00	917,117.00
Remaining Capacity for Tonnage (tons)	150,131.28	458,450.94
Remaining Capacity in Months	20.78	63.44
Remaining Capacity in Years	1.73	5.29

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

CRSWMA LANDFILL

Date Landfill Operation Began: 8/25/1999

Date of Survey: 7/3/2003

County: Craven

Volume Airspace Used (yd^3)	915,777.00
Tons Disposed	594,034.00
2002-2003 Tons Disposed	183,702.95
Months of Operation	46.26
Utilization Factor ($tons/yd^3$)	0.65
Lifetime Ave. Tons Disposed Per Month	12,840.33
2002-2003 Ave. Tons Disposed Per Month	15,308.58

	Permitted	*Total*
Original Available Airspace (yd^3)	1,790,881.00	9,580,040.00
Remaining Airspace (yd^3)	875,104.00	8,664,263.00
Remaining Capacity for Tonnage (tons)	567,650.78	5,620,218.47
Remaining Capacity in Months	37.08	367.13
Remaining Capacity in Years	3.09	30.59

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

CUMBERLAND COUNTY LANDFILL

Date Landfill Operation Began: 12/17/1997

Date of Survey: 6/4/2003

County: Cumberland

Volume Airspace Used (yd^3)	1,375,290.00
Tons Disposed	796,663.00
2002-2003 Tons Disposed	130,812.00
Months of Operation	65.59
Utilization Factor ($tons/yd^3$)	0.58
Lifetime Ave. Tons Disposed Per Month	12,145.71
2002-2003 Ave. Tons Disposed Per Month	10,901.00

	Permitted	*Total*
Original Available Airspace (yd^3)	2,350,400.00	5,782,175.00
Remaining Airspace (yd^3)	975,110.00	4,406,885.00
Remaining Capacity for Tonnage (tons)	564,851.09	2,552,772.31
Remaining Capacity in Months	51.82	234.18
Remaining Capacity in Years	4.32	19.51

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

DAVIDSON CO MSW LINED LANDFILL

Date Landfill Operation Began: 10/1/1994

Date of Survey: 6/2/2003

County: Davidson

Volume Airspace Used (yd^3)	1,665,011.00
Tons Disposed	814,908.00
2002-2003 Tons Disposed	93,351.13
Months of Operation	104.03
Utilization Factor ($tons/yd^3$)	0.49
Lifetime Ave. Tons Disposed Per Month	7,833.18
2002-2003 Ave. Tons Disposed Per Month	7,779.26

	Permitted	*Total*
Original Available Airspace (yd^3)	2,425,000.00	2,425,000.00
Remaining Airspace (yd^3)	759,989.00	759,989.00
Remaining Capacity for Tonnage (tons)	371,962.18	371,962.18
Remaining Capacity in Months	47.81	47.81
Remaining Capacity in Years	3.98	3.98

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

HANES MILL ROAD LANDFILL

Date Landfill Operation Began: 4/7/1997

Date of Survey: 2/2/2003

County: Forsyth

Volume Airspace Used (yd^3)	2,892,905.00
Tons Disposed	1,715,189.00
2002-2003 Tons Disposed	274,119.27
Months of Operation	69.86
Utilization Factor ($tons/yd^3$)	0.59
Lifetime Ave. Tons Disposed Per Month	24,553.47
2002-2003 Ave. Tons Disposed Per Month	22,843.27

	Permitted	*Total*
Original Available Airspace (yd^3)	3,786,300.00	3,786,300.00
Remaining Airspace (yd^3)	893,395.00	893,395.00
Remaining Capacity for Tonnage (tons)	529,689.46	529,689.46
Remaining Capacity in Months	23.19	23.19
Remaining Capacity in Years	1.93	1.93

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

PIEDMONT SANITARY LANDFILL

Date Landfill Operation Began: 6/15/1990

Date of Survey: 6/9/2003

County: Forsyth

Volume Airspace Used (yd^3)	6,609,721.00
Tons Disposed	4,606,787.00
2002-2003 Tons Disposed	292,827.52
Months of Operation	155.82
Utilization Factor ($tons/yd^3$)	0.70
Lifetime Ave. Tons Disposed Per Month	29,564.35
2002-2003 Ave. Tons Disposed Per Month	24,402.29

	Permitted	*Total*
Original Available Airspace (yd^3)	6,820,520.00	6,820,520.00
Remaining Airspace (yd^3)	210,799.00	210,799.00
Remaining Capacity for Tonnage (tons)	146,920.89	146,920.89
Remaining Capacity in Months	6.02	6.02
Remaining Capacity in Years	0.50	0.50

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

GASTON COUNTY LANDFILL

Date Landfill Operation Began: 7/1/1997

Date of Survey: 3/20/2003

County: Gaston

Volume Airspace Used (yd^3)	822,600.00
Tons Disposed	499,179.80
2002-2003 Tons Disposed	86,228.42
Months of Operation	68.63
Utilization Factor ($tons/yd^3$)	0.61
Lifetime Ave. Tons Disposed Per Month	7,274.02
2002-2003 Ave. Tons Disposed Per Month	7,185.70

	Permitted	*Total*
Original Available Airspace (yd^3)	1,428,000.00	7,441,200.00
Remaining Airspace (yd^3)	605,400.00	6,618,600.00
Remaining Capacity for Tonnage (tons)	367,375.94	4,016,376.64
Remaining Capacity in Months	51.13	558.94
Remaining Capacity in Years	4.26	46.58

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

GREENSBORO, CITY OF

Date Landfill Operation Began: 12/9/1997

Date of Survey: 7/12/2003

County: Guilford

Volume Airspace Used (yd^3)	2,397,300.00
Tons Disposed	1,451,055.62
2002-2003 Tons Disposed	251,505.34
Months of Operation	67.10
Utilization Factor ($tons/yd^3$)	0.61
Lifetime Ave. Tons Disposed Per Month	21,625.69
2002-2003 Ave. Tons Disposed Per Month	20,958.78

	Permitted	*Total*
Original Available Airspace (yd^3)	5,113,682.00	5,113,682.00
Remaining Airspace (yd^3)	2,716,382.00	2,716,382.00
Remaining Capacity for Tonnage (tons)	1,644,191.95	1,644,191.95
Remaining Capacity in Months	78.45	78.45
Remaining Capacity in Years	6.54	6.54

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

HIGH POINT CITY OF - LANDFILL

Date Landfill Operation Began: 10/1/1993

Date of Survey: 7/25/2003

County: Guilford

Volume Airspace Used (yd^3)	2,191,826.00
Tons Disposed	1,219,994.00
2002-2003 Tons Disposed	156,155.00
Months of Operation	117.79
Utilization Factor ($tons/yd^3$)	0.56
Lifetime Ave. Tons Disposed Per Month	10,357.41
2002-2003 Ave. Tons Disposed Per Month	13,012.92

	Permitted	*Total*
Original Available Airspace (yd^3)	3,442,281.00	3,442,281.00
Remaining Airspace (yd^3)	1,250,455.00	1,250,455.00
Remaining Capacity for Tonnage (tons)	696,016.74	696,016.74
Remaining Capacity in Months	53.49	53.49
Remaining Capacity in Years	4.46	4.46

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

HAYWOOD COUNTY WHITE OAK LANDFILL

Date Landfill Operation Began: 10/15/1993

Date of Survey: 5/16/2003

County: Haywood

Volume Airspace Used (yd^3)	865,890.00
Tons Disposed	433,890.00
2002-2003 Tons Disposed	49,579.91
Months of Operation	115.03
Utilization Factor ($tons/yd^3$)	0.50
Lifetime Ave. Tons Disposed Per Month	3,771.88
2002-2003 Ave. Tons Disposed Per Month	4,131.66

	Permitted	*Total*
Original Available Airspace (yd^3)	1,819,337.00	8,335,231.00
Remaining Airspace (yd^3)	953,447.00	7,469,341.00
Remaining Capacity for Tonnage (tons)	477,764.06	3,742,822.26
Remaining Capacity in Months	115.63	905.89
Remaining Capacity in Years	9.64	75.49

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

IREDELL COUNTY SANITARY LANDFILL

Date Landfill Operation Began: 10/8/1993

Date of Survey: 6/24/2003

County: Iredell

Volume Airspace Used (yd^3)	2,204,235.00
Tons Disposed	1,161,405.00
2002-2003 Tons Disposed	128,291.46
Months of Operation	116.53
Utilization Factor ($tons/yd^3$)	0.53
Lifetime Ave. Tons Disposed Per Month	9,966.89
2002-2003 Ave. Tons Disposed Per Month	10,690.96

	Permitted	*Total*
Original Available Airspace (yd^3)	3,863,570.00	6,661,380.00
Remaining Airspace (yd^3)	1,659,335.00	4,457,145.00
Remaining Capacity for Tonnage (tons)	874,298.78	2,348,456.72
Remaining Capacity in Months	81.78	219.67
Remaining Capacity in Years	6.81	18.31

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

JOHNSTON COUNTY LANDFILL

Date Landfill Operation Began: 10/1/1997

Date of Survey: 6/4/2003

County: Johnston

Volume Airspace Used (yd^3)	1,159,199.00
Tons Disposed	557,991.00
2002-2003 Tons Disposed	97,593.16
Months of Operation	68.10
Utilization Factor ($tons/yd^3$)	0.48
Lifetime Ave. Tons Disposed Per Month	8,193.86
2002-2003 Ave. Tons Disposed Per Month	8,132.76

	Permitted	*Total*
Original Available Airspace (yd^3)	3,628,755.00	7,176,074.00
Remaining Airspace (yd^3)	2,469,556.00	6,016,875.00
Remaining Capacity for Tonnage (tons)	1,188,743.28	2,896,277.60
Remaining Capacity in Months	146.17	356.12
Remaining Capacity in Years	12.18	29.68

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

LINCOLN COUNTY LANDFILL

Date Landfill Operation Began: 10/4/1993

Date of Survey: 4/1/2003

County: Lincoln

Volume Airspace Used (yd^3)	964,055.00
Tons Disposed	393,108.00
2002-2003 Tons Disposed	44,124.98
Months of Operation	113.92
Utilization Factor ($tons/yd^3$)	0.41
Lifetime Ave. Tons Disposed Per Month	3,450.71
2002-2003 Ave. Tons Disposed Per Month	3,677.08

	Permitted	*Total*
Original Available Airspace (yd^3)	1,270,000.00	4,889,800.00
Remaining Airspace (yd^3)	305,945.00	3,925,745.00
Remaining Capacity for Tonnage (tons)	124,753.70	1,600,781.87
Remaining Capacity in Months	33.93	435.34
Remaining Capacity in Years	2.83	36.28

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

MACON COUNTY LANDFILL

Date Landfill Operation Began: 5/1/1992

Date of Survey: 6/11/2003

County: Macon

Volume Airspace Used (yd^3)	610,378.00
Tons Disposed	303,557.50
2002-2003 Tons Disposed	38,145.46
Months of Operation	133.33
Utilization Factor ($tons/yd^3$)	0.50
Lifetime Ave. Tons Disposed Per Month	2,276.76
2002-2003 Ave. Tons Disposed Per Month	3,178.79

	Permitted	*Total*
Original Available Airspace (yd^3)	1,279,949.00	2,723,049.00
Remaining Airspace (yd^3)	669,571.00	2,112,671.00
Remaining Capacity for Tonnage (tons)	332,995.78	1,050,688.47
Remaining Capacity in Months	104.76	330.53
Remaining Capacity in Years	8.73	27.54

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

MADISON COUNTY LANDFILL

Date Landfill Operation Began: 9/13/1993

Date of Survey: 7/24/2003

County: Madison

Volume Airspace Used (yd^3)	127,702.00
Tons Disposed	63,851.00
2002-2003 Tons Disposed	361.29
Months of Operation	118.36
Utilization Factor ($tons/yd^3$)	0.50
Lifetime Ave. Tons Disposed Per Month	539.46
2002-2003 Ave. Tons Disposed Per Month	30.11

	Permitted	*Total*
Original Available Airspace (yd^3)	128,300.00	128,300.00
Remaining Airspace (yd^3)	598.00	598.00
Remaining Capacity for Tonnage (tons)	299.00	299.00
Remaining Capacity in Months	9.93	9.93
Remaining Capacity in Years	0.83	0.83

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

MECKLENBERG COUNTY LANDFILL

Date Landfill Operation Began: 4/11/2000

Date of Survey: 3/23/2003

County: Mecklenberg

Volume Airspace Used (yd^3)	561,228.00
Tons Disposed	325,512.00
2002-2003 Tons Disposed	93,011.00
Months of Operation	35.39
Utilization Factor ($tons/yd^3$)	0.58
Lifetime Ave. Tons Disposed Per Month	9,196.62
2002-2003 Ave. Tons Disposed Per Month	7,750.92

	Permitted	*Total*
Original Available Airspace (yd^3)	2,400,000.00	14,000,000.00
Remaining Airspace (yd^3)	1,838,772.00	13,438,772.00
Remaining Capacity for Tonnage (tons)	1,066,486.97	7,794,482.01
Remaining Capacity in Months	137.59	1,005.62
Remaining Capacity in Years	11.47	83.80

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

UWHARRIE ENV LANDFILL

Date Landfill Operation Began: 12/11/1995

Date of Survey: 4/23/2003

County: Montgomery

Volume Airspace Used (yd^3)	5,577,236.00
Tons Disposed	3,315,101.00
2002-2003 Tons Disposed	648,174.68
Months of Operation	88.39
Utilization Factor ($tons/yd^3$)	0.59
Lifetime Ave. Tons Disposed Per Month	37,503.38
2002-2003 Ave. Tons Disposed Per Month	54,014.56

	Permitted	*Total*
Original Available Airspace (yd^3)	7,889,000.00	14,402,000.00
Remaining Airspace (yd^3)	2,311,764.00	8,824,764.00
Remaining Capacity for Tonnage (tons)	1,374,109.17	5,245,426.94
Remaining Capacity in Months	25.44	97.11
Remaining Capacity in Years	2.12	8.09

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

NEW HANOVER COUNTY LANDFILL

Date Landfill Operation Began: 8/24/1981

Date of Survey: 5/14/2003

County: New Hanover

Volume Airspace Used (yd^3)	3,835,016.00
Tons Disposed	2,942,937.00
2002-2003 Tons Disposed	117,867.00
Months of Operation	260.66
Utilization Factor ($tons/yd^3$)	0.77
Lifetime Ave. Tons Disposed Per Month	11,290.42
2002-2003 Ave. Tons Disposed Per Month	9,822.25

	Permitted	*Total*
Original Available Airspace (yd^3)	4,740,020.00	5,666,734.00
Remaining Airspace (yd^3)	905,004.00	1,831,718.00
Remaining Capacity for Tonnage (tons)	694,487.26	1,405,634.47
Remaining Capacity in Months	70.71	143.11
Remaining Capacity in Years	5.89	11.93

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

CAMP LEJEUNE MARINE CORPS BASE

Date Landfill Operation Began: 1/1/1998

Date of Survey: 6/10/2003

County: Onslow

Volume Airspace Used (yd^3)	643,307.00
Tons Disposed	373,118.00
2002-2003 Tons Disposed	40,053.65
Months of Operation	65.30
Utilization Factor ($tons/yd^3$)	0.58
Lifetime Ave. Tons Disposed Per Month	5,714.25
2002-2003 Ave. Tons Disposed Per Month	3,337.80

	Permitted	*Total*
Original Available Airspace (yd^3)	702,000.00	4,089,000.00
Remaining Airspace (yd^3)	58,693.00	3,445,693.00
Remaining Capacity for Tonnage (tons)	34,041.93	1,998,501.62
Remaining Capacity in Months	10.20	598.75
Remaining Capacity in Years	0.85	49.90

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

ONSLOW COUNTY SUBTITLE D LANDFILL

Date Landfill Operation Began: 1/1/1998

Date of Survey: 4/15/2003

County: Onslow

Volume Airspace Used (yd^3)	950,410.00
Tons Disposed	560,397.36
2002-2003 Tons Disposed	107,639.29
Months of Operation	63.46
Utilization Factor ($tons/yd^3$)	0.59
Lifetime Ave. Tons Disposed Per Month	8,830.64
2002-2003 Ave. Tons Disposed Per Month	8,969.94

	Permitted	*Total*
Original Available Airspace (yd^3)	1,311,908.00	4,357,173.00
Remaining Airspace (yd^3)	361,498.00	3,406,763.00
Remaining Capacity for Tonnage (tons)	213,152.77	2,008,755.16
Remaining Capacity in Months	23.76	223.94
Remaining Capacity in Years	1.98	18.66

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

ORANGE COUNTY LANDFILL

Date Landfill Operation Began: 7/1/1995

Date of Survey: 8/20/2003

County: Orange

Volume Airspace Used (yd^3)	911,250.00
Tons Disposed	479,275.00
2002-2003 Tons Disposed	59,007.05
Months of Operation	97.66
Utilization Factor ($tons/yd^3$)	0.53
Lifetime Ave. Tons Disposed Per Month	4,907.69
2002-2003 Ave. Tons Disposed Per Month	4,917.25

	Permitted	*Total*
Original Available Airspace (yd^3)	1,604,000.00	1,604,000.00
Remaining Airspace (yd^3)	692,750.00	692,750.00
Remaining Capacity for Tonnage (tons)	364,354.19	364,354.19
Remaining Capacity in Months	74.10	74.10
Remaining Capacity in Years	6.17	6.17

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

UPPER PIEDMONT REG LANDFILL

Date Landfill Operation Began: 7/30/1997

Date of Survey: 4/23/2003

County: Person

Volume Airspace Used (yd^3)	2,083,092.00
Tons Disposed	1,239,569.00
2002-2003 Tons Disposed	236,454.00
Months of Operation	68.27
Utilization Factor ($tons/yd^3$)	0.60
Lifetime Ave. Tons Disposed Per Month	18,157.75
2002-2003 Ave. Tons Disposed Per Month	19,704.50

	Permitted	*Total*
Original Available Airspace (yd^3)	2,100,000.00	8,500,000.00
Remaining Airspace (yd^3)	16,908.00	6,416,908.00
Remaining Capacity for Tonnage (tons)	10,061.31	3,818,458.44
Remaining Capacity in Months	0.51	193.79
Remaining Capacity in Years	0.04	16.15

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

ROBESON COUNTY LANDFILL

Date Landfill Operation Began: 1/1/1998

Date of Survey: 6/6/2003

County: Robeson

Volume Airspace Used (yd^3)	901,782.00
Tons Disposed	498,531.00
2002-2003 Tons Disposed	93,422.87
Months of Operation	65.16
Utilization Factor ($tons/yd^3$)	0.55
Lifetime Ave. Tons Disposed Per Month	7,650.35
2002-2003 Ave. Tons Disposed Per Month	7,785.24

	Permitted	*Total*
Original Available Airspace (yd^3)	2,000,000.00	6,000,000.00
Remaining Airspace (yd^3)	1,098,218.00	5,098,218.00
Remaining Capacity for Tonnage (tons)	607,126.46	2,818,441.39
Remaining Capacity in Months	77.98	362.02
Remaining Capacity in Years	6.50	30.17

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

ROCKINGHAM COUNTY LANDFILL

Date Landfill Operation Began: 5/5/1995

Date of Survey: 3/24/2003

County: Rockingham

Volume Airspace Used (yd^3)	1,168,500.00
Tons Disposed	563,879.00
2002-2003 Tons Disposed	79,800.10
Months of Operation	94.63
Utilization Factor ($tons/yd^3$)	0.48
Lifetime Ave. Tons Disposed Per Month	5,959.09
2002-2003 Ave. Tons Disposed Per Month	6,650.01

	Permitted	*Total*
Original Available Airspace (yd^3)	1,865,268.00	5,870,000.00
Remaining Airspace (yd^3)	696,768.00	4,701,500.00
Remaining Capacity for Tonnage (tons)	336,236.92	2,268,786.58
Remaining Capacity in Months	50.56	341.17
Remaining Capacity in Years	4.21	28.43

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

ROWAN COUNTY LANDFILL

Date Landfill Operation Began: 12/1/1989

Date of Survey: 7/4/2003

County: Rowan

Volume Airspace Used (yd^3)	1,853,684.00
Tons Disposed	973,285.00
2002-2003 Tons Disposed	73,350.22
Months of Operation	163.10
Utilization Factor ($tons/yd^3$)	0.53
Lifetime Ave. Tons Disposed Per Month	5,967.46
2002-2003 Ave. Tons Disposed Per Month	6,112.52

	Permitted	*Total*
Original Available Airspace (yd^3)	2,112,400.00	6,000,000.00
Remaining Airspace (yd^3)	258,716.00	4,146,316.00
Remaining Capacity for Tonnage (tons)	135,839.98	2,177,041.59
Remaining Capacity in Months	22.22	356.16
Remaining Capacity in Years	1.85	29.68

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

WI-SAMPSON COUNTY DISPOSAL INC

Date Landfill Operation Began: 3/1/2000

Date of Survey: 6/27/2003

County: Sampson

Volume Airspace Used (yd^3)	2,545,912.00
Tons Disposed	1,742,073.00
2002-2003 Tons Disposed	777,547.63
Months of Operation	39.86
Utilization Factor ($tons/yd^3$)	0.68
Lifetime Ave. Tons Disposed Per Month	43,709.99
2002-2003 Ave. Tons Disposed Per Month	64,795.64

	Permitted	*Total*
Original Available Airspace (yd^3)	7,800,000.00	31,450,000.00
Remaining Airspace (yd^3)	5,254,088.00	28,904,088.00
Remaining Capacity for Tonnage (tons)	3,595,177.23	19,777,993.62
Remaining Capacity in Months	55.48	305.24
Remaining Capacity in Years	4.62	25.44

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

ALBERMARLE, CITY-OF-LANDFILL

Date Landfill Operation Began: 5/20/1999

Date of Survey: 5/20/2003

County: Stanly

Volume Airspace Used (yd^3)	271,910.00
Tons Disposed	159,550.00
2002-2003 Tons Disposed	41,493.80
Months of Operation	48.00
Utilization Factor ($tons/yd^3$)	0.59
Lifetime Ave. Tons Disposed Per Month	3,323.96
2002-2003 Ave. Tons Disposed Per Month	3,457.82

	Permitted	*Total*
Original Available Airspace (yd^3)	683,555.00	4,970,844.00
Remaining Airspace (yd^3)	411,645.00	4,698,934.00
Remaining Capacity for Tonnage (tons)	241,543.01	2,757,217.17
Remaining Capacity in Months	69.85	797.39
Remaining Capacity in Years	5.82	66.45

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

SURRY COUNTY MSWLF

Date Landfill Operation Began: 12/1/1998

Date of Survey: 5/20/2003

County: Surry

Volume Airspace Used (yd^3)	558,592.00
Tons Disposed	278,103.00
2002-2003 Tons Disposed	51,564.93
Months of Operation	53.63
Utilization Factor ($tons/yd^3$)	0.50
Lifetime Ave. Tons Disposed Per Month	5,186.07
2002-2003 Ave. Tons Disposed Per Month	4,297.08

	Permitted	*Total*
Original Available Airspace (yd^3)	1,301,000.00	5,212,000.00
Remaining Airspace (yd^3)	742,408.00	4,653,408.00
Remaining Capacity for Tonnage (tons)	369,618.42	2,316,765.59
Remaining Capacity in Months	86.02	539.15
Remaining Capacity in Years	7.17	44.93

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

TRANSYLVANIA COUNTY LANDFILL

Date Landfill Operation Began: 6/13/1990

Date of Survey: 7/28/2003

County: Transylvania

Volume Airspace Used (yd^3)	311,640.00
Tons Disposed	206,443.80
2002-2003 Tons Disposed	24,034.30
Months of Operation	157.49
Utilization Factor ($tons/yd^3$)	0.66
Lifetime Ave. Tons Disposed Per Month	1,310.81
2002-2003 Ave. Tons Disposed Per Month	2,002.86

	Permitted	*Total*
Original Available Airspace (yd^3)	522,000.00	522,000.00
Remaining Airspace (yd^3)	210,360.00	210,360.00
Remaining Capacity for Tonnage (tons)	139,351.55	139,351.55
Remaining Capacity in Months	69.58	69.58
Remaining Capacity in Years	5.80	5.80

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

WAKE COUNTY LANDFILL – NORTH

Date Landfill Operation Began: 7/1/1998

Date of Survey: 7/3/2003

County: Wake

Volume Airspace Used (yd^3)	4,810,104.00
Tons Disposed	2,896,112.00
2002-2003 Tons Disposed	349,902.36
Months of Operation	60.07
Utilization Factor ($tons/yd^3$)	0.60
Lifetime Ave. Tons Disposed Per Month	48,215.67
2002-2003 Ave. Tons Disposed Per Month	29,158.53

	Permitted	*Total*
Original Available Airspace (yd^3)	7,900,000.00	7,900,000.00
Remaining Airspace (yd^3)	3,089,896.00	3,089,896.00
Remaining Capacity for Tonnage (tons)	1,860,393.22	1,860,393.22
Remaining Capacity in Months	63.80	63.80
Remaining Capacity in Years	5.32	5.32

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

WAYNE COUNTY LANDFILL

Date Landfill Operation Began: 1/26/1998

Date of Survey: 1/15/2003

County: Wayne

Volume Airspace Used (yd^3)	703,681.00
Tons Disposed	462,887.36
2002-2003 Tons Disposed	88,943.14
Months of Operation	59.66
Utilization Factor ($tons/yd^3$)	0.66
Lifetime Ave. Tons Disposed Per Month	7,759.03
2002-2003 Ave. Tons Disposed Per Month	7,411.93

	Permitted	*Total*
Original Available Airspace (yd^3)	1,100,000.00	5,000,000.00
Remaining Airspace (yd^3)	396,319.00	4,296,319.00
Remaining Capacity for Tonnage (tons)	260,702.02	2,826,155.26
Remaining Capacity in Months	35.17	381.30
Remaining Capacity in Years	2.93	31.77

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

Municipal Solid Waste Landfill Capacity

Analysis Date: November 1, 2003

WILKES COUNTY MSWLF

Date Landfill Operation Began: 10/7/1993

Date of Survey: 3/11/2003

County: Wilkes

Volume Airspace Used (yd^3)	1,036,972.00
Tons Disposed	505,976.03
2002-2003 Tons Disposed	60,114.14
Months of Operation	113.13
Utilization Factor ($tons/yd^3$)	0.49
Lifetime Ave. Tons Disposed Per Month	4,472.46
2002-2003 Ave. Tons Disposed Per Month	5,009.51

	Permitted	*Total*
Original Available Airspace (yd^3)	1,406,578.00	3,473,509.00
Remaining Airspace (yd^3)	369,606.00	2,436,537.00
Remaining Capacity for Tonnage (tons)	180,344.09	1,188,874.26
Remaining Capacity in Months	36.00	237.32
Remaining Capacity in Years	3.00	19.78

Calculations

Ave. Tons Disposed Per Month = Tons Disposed / Months of Operation

2002-2003 Ave. Tons Disposed Per Month = 2002-2003 Tons Disposed / 12 months

Utilization Factor = Tons Disposed / Volume of Airspace Used

Remaining Airspace = Original Available Airspace – Volume of Airspace Used

Remaining Capacity for Tonnage = Remaining Airspace x Utilization Factor

Remaining Cap. in Mos. = Remaining Cap. for Tonnage / 02-03 Ave. Tons Disposed Per Mo.

Remaining Capacity in Years = Remaining Capacity in Months / 12 months

March 25, 2004 ERC Meeting

ENVIRONMENTAL REVIEW EXHIBIT P

PRESENTATION N

MARCH 25, 2004

DIVISION OF WASTE MANAGEMENT
JIM COFFEY, CHIEF, SOLID WASTE SECTION

STATUS OF MUNICIPAL SOLID WASTE LANDFILLS: UNLINED AND LINED LANDFILLS

INTRODUCTION: A perspective on reaching the goal of closing all unlined municipal solid waste landfills and replacing them with lined landfills by January 1, 1998. A brief history of regulations governing landfills:

In March of 1971, the state adopted the first standards for "sanitary" landfills-as a result about 500 old dump sites were closed. In 1982, the state adopted the first comprehensive solid waste management regulations, specifically the requirements for sanitary landfills. These rules reflected the initiatives of EPA and the state of NC in the late 1970s and early 1980s to ensure sanitary conditions at landfills and to address specific health issues such as disease-carrying rats and insects and to prohibit open burning at landfills. Those regulations reflected the concept, commonly held at the time, that as a result of natural dilution and attenuation by the soil and ground water beneath the landfill, the leachate leaving the landfill would not adversely impact the ground water surrounding the landfill.

In 1991, the so-called "98 rule" was adopted. This rule required all new landfills and lateral expansions of existing landfills to be designed with a liner, leachate collection and final cover system and that after Jan 1, 1998, all active sanitary landfills shall be equipped with liners, leachate collection and final cover systems. This rule became necessary because of increasing information based on EPA's national studies and NC own studies that natural dilution and attenuation was not effective at protecting ground water and that the ground water was being seriously contaminated by unlined landfills.

In 1993, based on data published in a final report by EPA that unlined MSWLFs were contaminating ground water, the EPA revised the federal criteria for MSWLFs. The state of NC, in accordance with revised EPA criteria, drafted a new Section .1600 of the rules specifically for MSWLFs. Along with the health issues previously addressed, these comprehensive new rules addressed major environmental concerns, in particular air, ground and surface water impacts, by requiring a high-tech, containment landfill design for MSWLFs.

SLIDES

Slide (1) graphically reflects the impact of these rules and the progress we have made from 1990 to 2003:

LINED LANDFILL DESIGN CONCEPT:

Slide (2) is a diagram of a base liner and leachate collection system at a typical NC landfill—

The two- component base liner system consists of a synthetic liner overlying a compacted clay liner-the system provides containment of contaminated liquid from the decomposition of waste within the landfill cell

Above the base liner system is the leachate collection system, at least 2 foot thick, which consists of a drainage layer and collection pipes – the system collects leachate within the landfill

and removes it from the landfill before it reaches I foot in depth, and transports it to a wastewater treatment plan-

Slide (3) is a cross section of a lined landfill showing the landfill once it has reached capacity and the final cap system has been installed.

When the landfill is active, the base liner system is very important, however; when the landfill is closed, a final cap system consisting of a synthetic liner overlying a clay layer and a vegetative layer overlying the liner greatly minimizes the amount of rain water entering the landfill, decreasing generation of leachate and reducing leachate level in landfill, If the liner was to fail completely at this point, the amount of leachate released to the ground water would be minimal.

This slide also shows the 4-foot vertical separation between waste and ground water and the 300-foot horizontal buffer between the edge of the waste disposal area and property boundary. These buffers create a zone of dilution, attenuation, and monitoring, and if necessary, corrective action should the liner system fail.

The rules also require that an owner/operator have a financial assurance mechanism in place to ensure that the financial resources will be available to cap and close landfill, maintain post-closure (min 30 years) maintenance and, if necessary, for corrective action,

Slide (4) indicates the status of the 128 unlined landfills closed since 1990 and strongly supports NC's decision to close them

Slide (5) indicates the status of 42 lined landfills:

Slide (6) gives us specific information regarding the 8 lined landfills that have detected chemical constituents in ground water monitoring wells:

CONCLUSIONS:

Are lined landfills working? Yes
Are they a big improvement over unlined landfills? Yes
Are they more protective of the public health and environment than unlined landfills? Yes
Are lined landfills fail-safe? No
Is there a contingency plan if liners fail? Yes
As stated earlier, a 300-foot buffer is required from the edge of waste to the property boundary. Ground-water monitoring wells are located midway in the buffer to detect any contaminated ground water leaking out of the landfill. The wells are sampled frequently and if contamination is detected, the rules require assessment and if necessary, corrective action. Since the wells are located midway in a 300-foot buffer, there should be sufficient lead time and area available to prevent the migration of contamination off the landfill property.
Should we continue to look for improvements to landfills? Yes
The Section continues to evaluate failures of lined landfills when they occur and will recommend changes to the rules if necessary to provide better protection to the public health and environment.

RECOMMENDATIONS

The lined landfill concept is sound, a big improvement over unlined landfills, however, they are not perfect-as always we must continue to improve. It is obvious that the landfill performance monitoring systems are working.

- Problems occur when the landfill is not constructed or operated in accordance with the rules
    - Consider strengthening leachate transportation and storage requirements

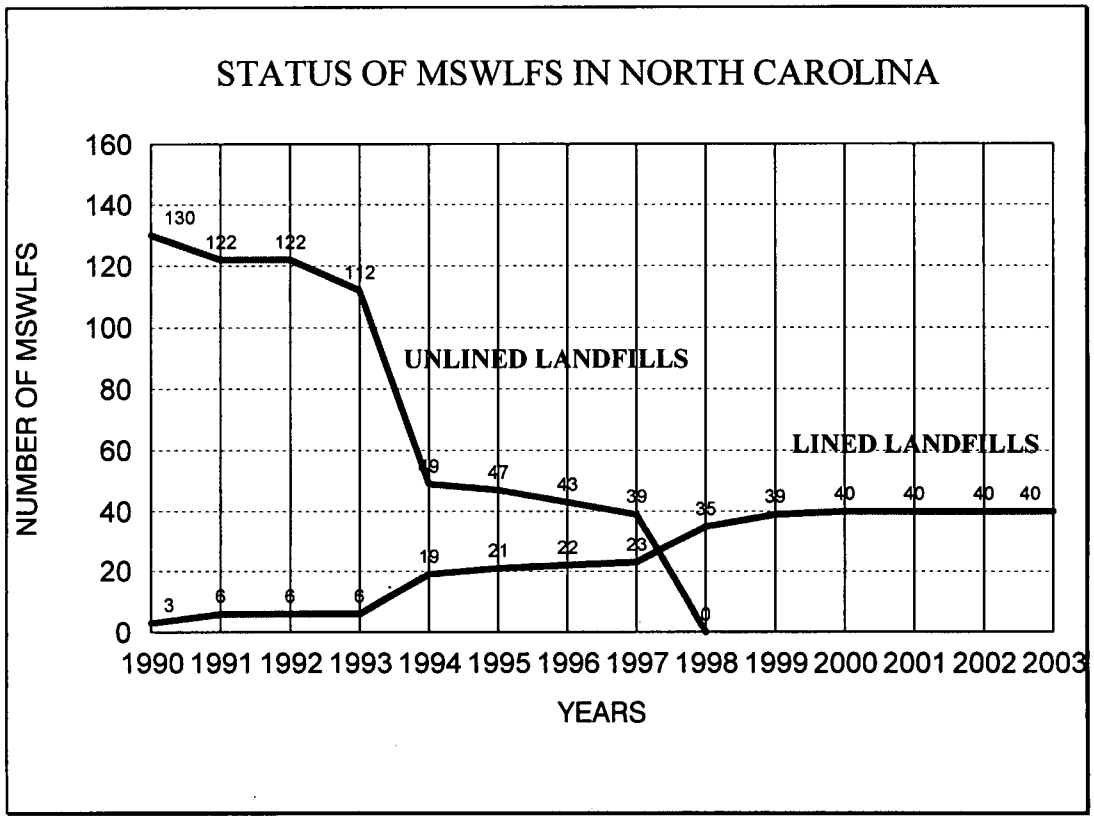
    - Consider strengthening the construction quality assurance requirements:
    - Third-party monitoring of construction
- Consider improving landfill technology such as bioreactor

UPDATE ON PROPOSED CONSTRUCTION AND DEMOLITION LANDFILL RULES:

The Division has decided to make substantial changes to the proposed C&DLF rules 15A NCAC 13B .0531-.0547. Consequently, the Division will not ask the Commission for Health Services to consider adoption of these rules at the May meeting, nor the General Assembly to approve them in this session.

These changes are a result of comments received during the public participation process. As a consequence of the changes to the proposed rules, we will republish the proposed rules with the changes and hold another formal public hearing. No date for publication and the formal hearing has been set though publication of the revised proposed rules is expected to be in late spring or early summer. We anticipate that informal meetings will be held to discuss and hear comments on the revised proposed rules prior to the formal hearing.

Slide 1



*This **first slide (1)** graphically reflects the impact of these rules and the progress we have made —The slide reflects a time period from 1990 to 2003-The red line indicates the number of unlined landfills and the blue line the number of lined landfills. Prior to the adoption of liner requirements in 1991, there were 133 landfills in NC--- 130 unlined and 3 lined. When the more stringent rules, based on the revised federal rules, became effective in 1993, the total number of landfills dropped by almost one half to 68---49 unlined and 19 lined. In 1998 when all unlined landfill were required to close the total number of landfills dropped to 35 all of which were lined. Currently there are 40 lined MSWLFs in operation.*

Slide 2

UNLINED LANDFILLS

- **128 Landfills closed since 1990**
- **122 Landfills with chemical contaminants detected in ground water monitoring wells**
- **71 Landfills with chemical contaminants detected at property boundary**

*This **next slide (4)** indicates the status of the unlined landfills closed since 1990 and strongly supports NC's decision to close them. Of the 128 most recently closed unlined landfills, ground water monitoring wells at 122 of these landfills, which is over 90% of them, have detected chemical contaminants around the landfills. More importantly, 71 0f the128 landfills have contaminated ground water at or beyond the property boundary, necessitating some form of future corrective action.*

Slide 3

LINED LANDFILLS

- **42 Landfills currently monitored (40 operating)**
- **8 Landfills with chemical contaminants detected in ground water monitoring wells**
- **1 Landfill with chemical contaminants detected at property boundary ***

  *** Pre .1600 rules landfill design and construction, 100 foot buffer**

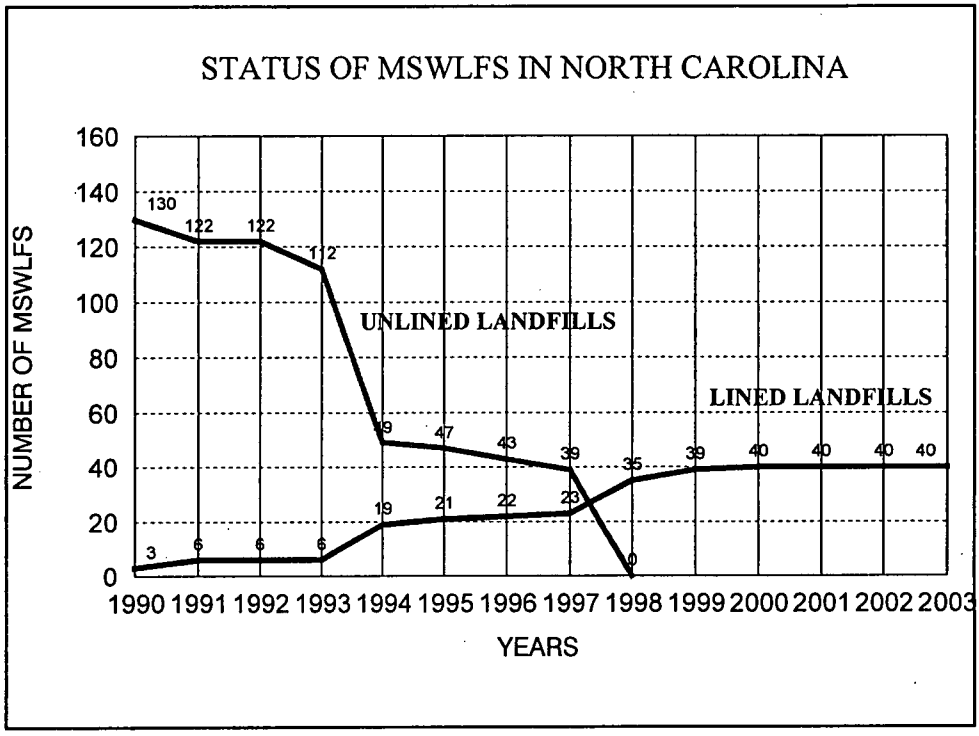
*The **next slide (5)** indicates the status of lined landfills: Of the 42 lined landfills currently being monitored, ground water monitoring wells at 8 have detected chemical contaminants around these landfills. Of these only 1 landfill has detected chemical contaminants at the property boundary. Even though this is a lined landfill, it began operation in 1989 and was not designed or constructed under the current rules. Also, the horizontal buffer from waste to property boundary is only 100 feet, not 300 feet.*

Slide 4

LINED LANDFILLS WITH DETECTED CONTAMINANTS (8)

- **2 leaks in leachate transportation and storage system**
- **2 sources other than landfill**
- **3 assessment monitoring to determine source (2 pre .1600 rule design and construction)**
- **1 chemical contaminants detected at property boundary**

*The **next slide (6)** gives us specific information regarding the 8 lined landfills that have detected chemical constituents in ground water monitoring wells: 1 had a leak in the leachate lagoon and 1 had a leak in the pipe transporting leachate to the lagoon-both have been successfully remedied. In 1 landfill, the contamination was determined to be from an adjacent unlined landfill and 1 from a preexisting source of contamination. 3 landfills are currently in assessment monitoring to determine the source of contamination. Of these 3, only 1was designed and constructed under the .1600 rules*



UNLINED LANDFILLS

- **128 Landfills closed since 1990**
- **122 Landfills with chemical contaminants detected in ground water monitoring wells**
- **71 Landfills with chemical contaminants detected at property boundary**

LINED LANDFILLS

- 42 Landfills currently monitored (40 operating)
- 8 Landfills with chemical contaminants detected in ground water monitoring wells
- 1 Landfill with chemical contaminants detected at property boundary *

* Pre .1600 rules landfill design and construction, 100 foot buffer

LINED LANDFILLS WITH DETECTED CONTAMINANTS (8)

- 2 leaks in leachate transportation and storage system
- 2 sources other than landfill
- 3 assessment monitoring to determine source (2 pre .1600 rule design and construction)
- 1 chemical contaminants detected at property boundary

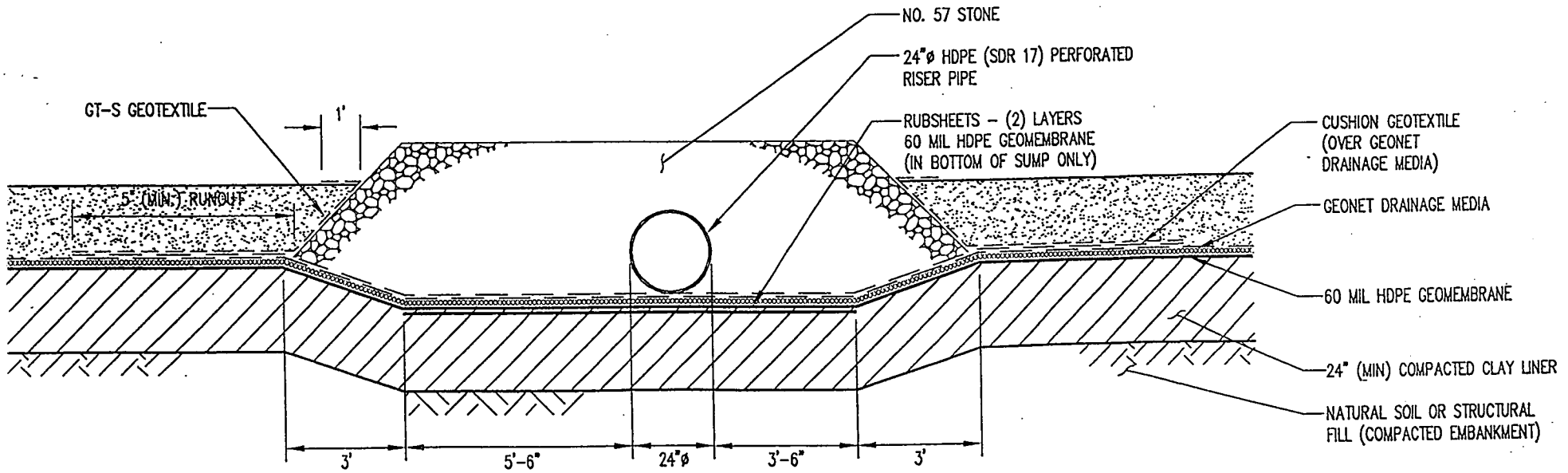
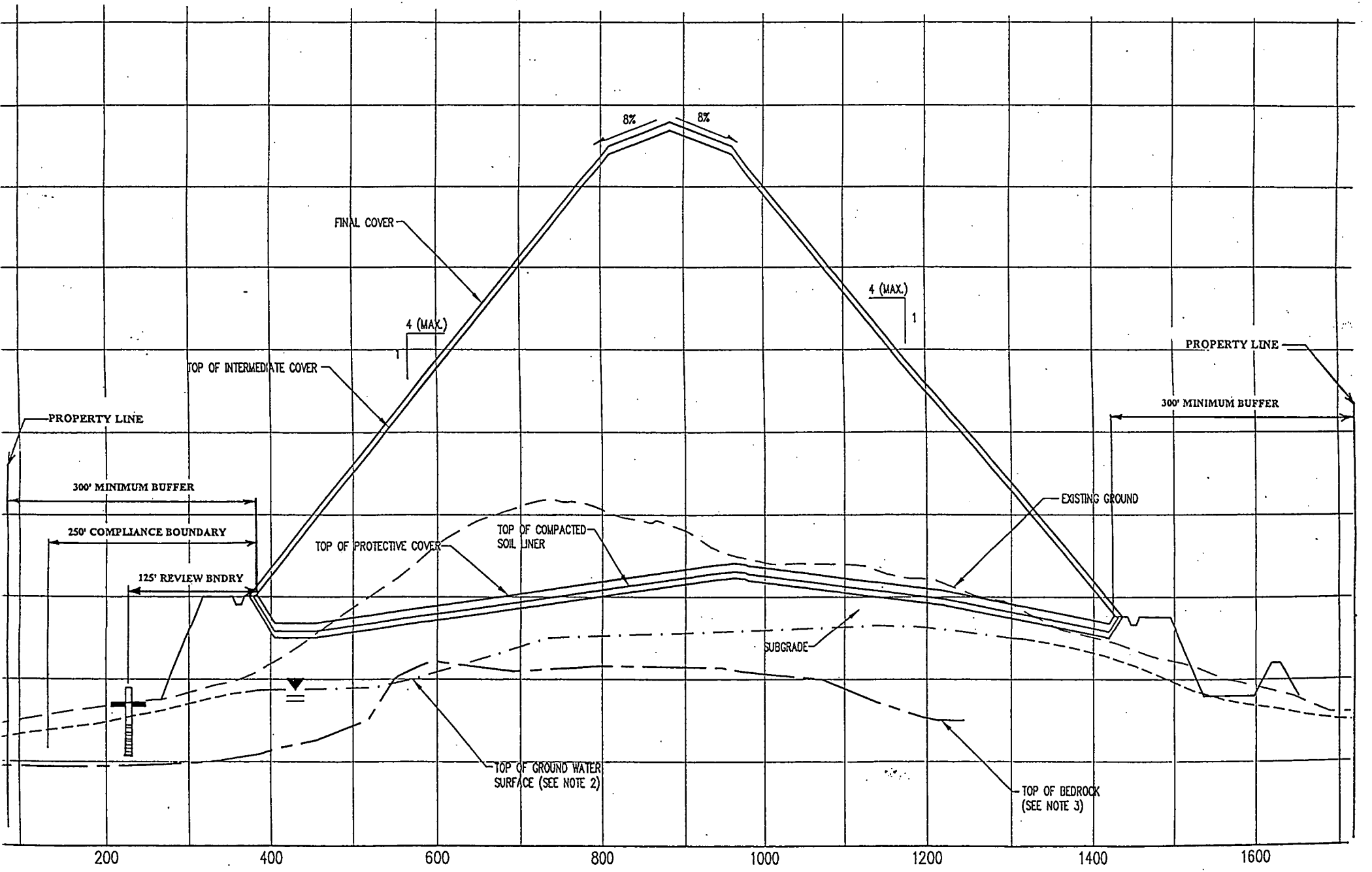


DIAGRAM: BASE LINER AND LEACHATE COLLECTION SYSTEM

CROSS-SECTION: LINED LANDFILL AND BUFFER ZONES



Options For Reducing Waste in North Carolina

- Enact disposal bans on materials with ample markets.
- Increase local recycling program performance.
- Provide increased financing and financial incentives through tipping fee surcharge.
- Implement recycling mandates on private haulers.
- Enact advanced recycling fees (ARFs) on specific products.

Enact Disposal Bans on Materials with Ample Markets

- Excellent candidates for ban: Clean Wood and Pallets
- Potential diversion – up to 500,000 tons/year.
- Markets adequate and growing.
- Examples of users needing more material:
  - McGill Environmental, Delway and Moncure
  - Corn Products, Winston-Salem
  - Pallet recyclers across NC (average 37 jobs per company):
    - 62 percent plan to expand operations
    - 86 percent could sell more recycled pallets if they had them
- Wide range of uses for pallets and wood wastes.

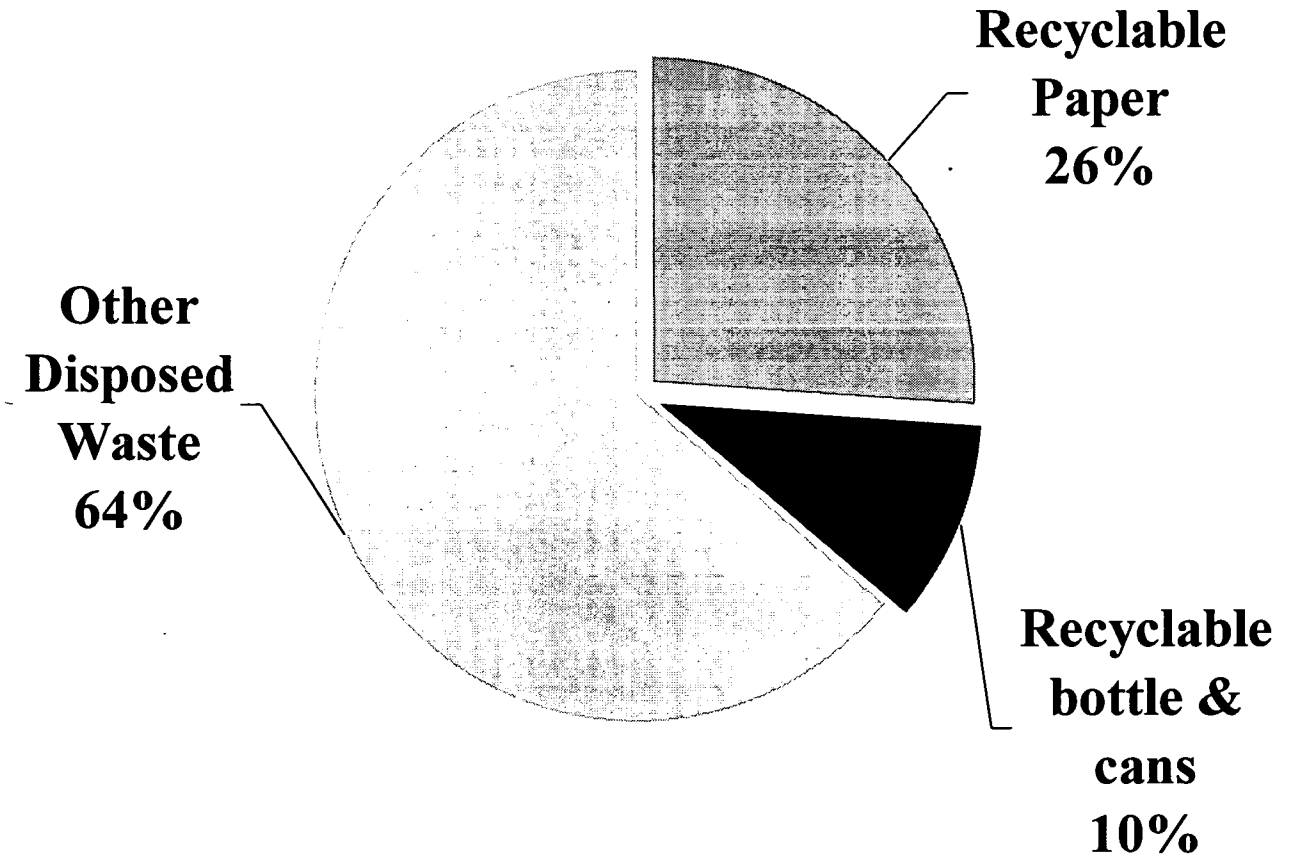
Increase Local Recycling Program Performance

- Uneven level of recycling effort among cities and counties in North Carolina.
- Examples show that it is possible for even small communities to run good programs:
  - Swain and Duplin Counties
  - Nashville, Whiteville, Snow Hill, Lewisville, Laurinburg
- Markets are healthy and stable for household recyclables.
- All communities should be able to achieve a minimum standard of per capita recycling.

Policy Option: Hold Communities to Minimum Recycling Targets

- Consider requiring cities and counties to meet 60 lb. per capita recovery target.
- Annual target of 60 lbs. per capita is achievable:
  - Current municipal average: 92 lbs.
  - Current county average: 79 lbs.
- Could have reduced target for the smaller communities.
- Increase recovery targets 5 lbs. per capita per year.

Over one third of residential waste still disposed could be recycled.



Option: Provide Increased Financing and Incentives with Tip Fee Surcharge

- Surcharge would increase cost of disposal and provide funding for range of uses.
- Proceeds can help fund efforts to achieve per capita recycling targets.
- Proceeds can also help address impact of old landfills, the issue of litter, illegal disposal, permitting, and increasing recycling markets.
- Surcharge can also improve the competitiveness of recycling companies against low tipping fees.

Option: Implement Planning and Recycling Mandates on Private Haulers

- Private haulers not held to same standards or mandates as local governments.
- Private waste facilities can have big impact on ability of communities to meet goals and needs.
- Private haulers are capable of providing the same recycling services as local governments.
- Consider requiring haulers to offer recycling services and to submit solid waste plans
- Would hold haulers to same standards as local governments and close service gaps.

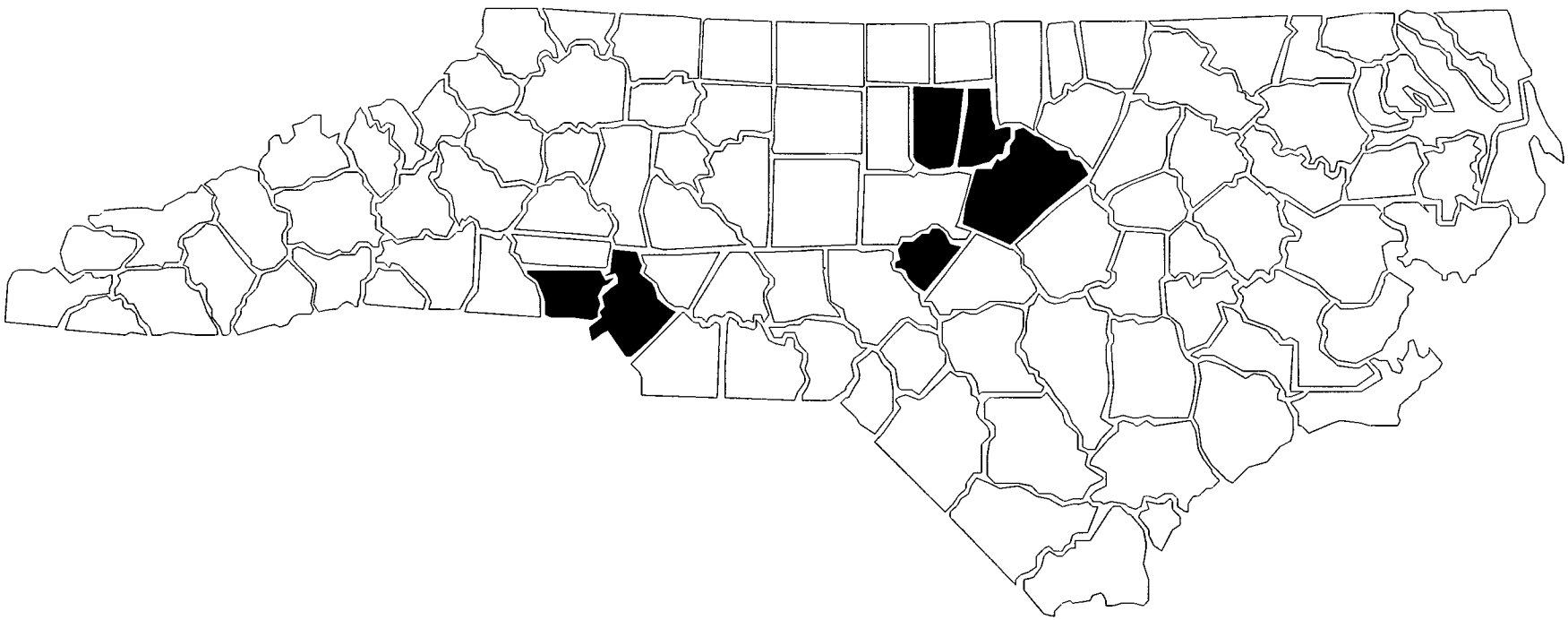
Enact Advanced Recycling Fees (ARFs) on Specific Products: Electronics

- Small but growing and complex waste stream.
- Costly for local communities to handle.
- Most communities will not offer recycling services unless there is a funding sources.
- North Carolina has had notable success with ARFs to address these kinds of waste streams.
- Widespread recovery of electronics will result in environmental and economic benefits.

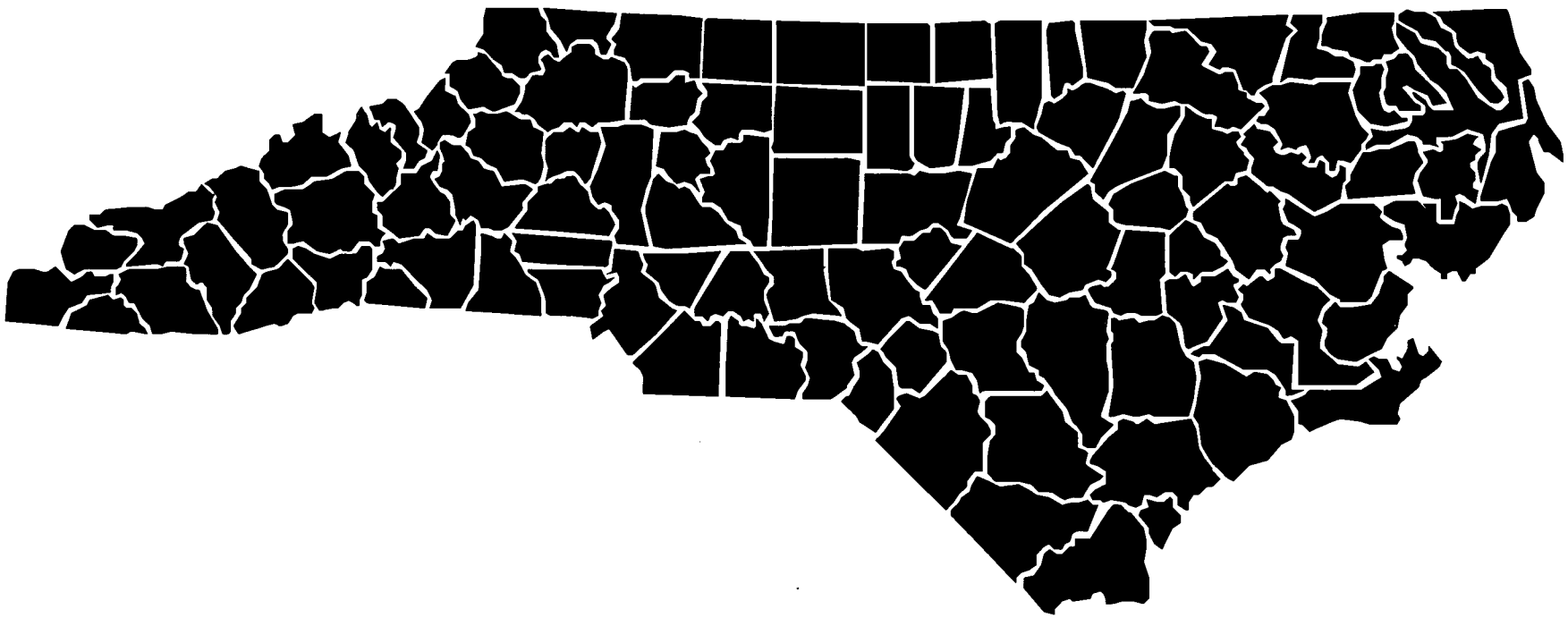
NC Estimate of Use and Generation of Electronics

- Overall generation - 50,000 tons/year.
- 6.3 million televisions in use in households.
- 1.7 million PCs in use in households.
- Between 11,000 and 13,350 tons of CRTs ready for discard annually by households.
- Estimated 320,000 televisions and 170,000 monitors ready for discard by HHs annually.

Counties with Permanent Electronics Collection Programs



Counties with Permanent White Goods and Tire Collection Programs



Another Side of Recycling: Economic Benefits

- Over 12,000 North Carolinians are employed in over 500 different recycling companies.
- Between 1967 and 2000, recycling jobs nationally sustained an annual growth rate of 8.3% (compared to general annual job growth of 2.1%).
- International Association of Electronics Recyclers expect capacity to grow by a factor of 4 or 5 by 2010.
- Biggest challenges for recyclers:
  - Cheap competing disposal rates
  - Supply, supply, supply.

Examples of NC Manufacturers Relying on Recycled Materials

- St. Gobain, Wilson – glass plant
- Jackson Paper, Sylva – paper mill
- Owen-Illinois, Winston-Salem – glass plant
- Weyerhaeuser, Plymouth – paper mill
- Nucor, Cofield – steel mill
- Caraustar, Charlotte – paper mill
- Laurel Hill Paper, Cordova – paper mill
- Paramount Paper, Maxton – paper mill

Examples of NC Companies Needing More Recycled Materials

- Union Gypsum, Marshville
- Nationwide Recyclers, Polkton
- Synergy, Mayodan
- US Green Fiber, Charlotte
- Green Power, Kenansville
- Pallet One, Butner, Mocksville, and Siler City
- Coastal Enterprises, Jacksonville
- Kamlar, Rocky Mount
- Profile Products, Conover
- Paperstock Dealers, Winston-Salem

North Carolina
State Energy Plan
June, 2003

Prepared for the

North Carolina Energy Policy Council

By the

State Energy Office
North Carolina Department of Administration
And
Appalachian State University Energy Center

North Carolina State Energy Plan

Executive Summary

North Carolina's General Assembly established the Energy Policy Council in 1975 as a means of addressing state-specific energy issues and concerns. The 1992 North Carolina Energy Plan was the Energy Policy Council's last examination of energy use, energy production, and environmental concerns in our state. As state and national energy issues have changed in the past 10 years, a more recent and detailed version of North Carolina's energy plan was requested by the Energy Policy Council.

As a starting point, the Energy Policy Council formed a working group from among its members, representing key energy and environmental interests, to develop updated energy policy and program recommendations. The Energy Policy Working Group began by adopting a set of objectives (listed in the sidebar). North Carolinians from all walks of life provided input to the Energy Policy Working Group in the following ways:

- Nine days of sessions featuring state energy experts, as well as regional and national specialists, on specific energy issues;
- Input from over 25 stakeholders affected by energy consumption and supply, including members of industry, low-income groups, homebuilders, community planners, petroleum suppliers, automobile retailers, bankers, renewable energy experts, and farmers; and
- Written and verbal comments on energy issues from about 300 North Carolinians via 4 public input sessions held across the state.

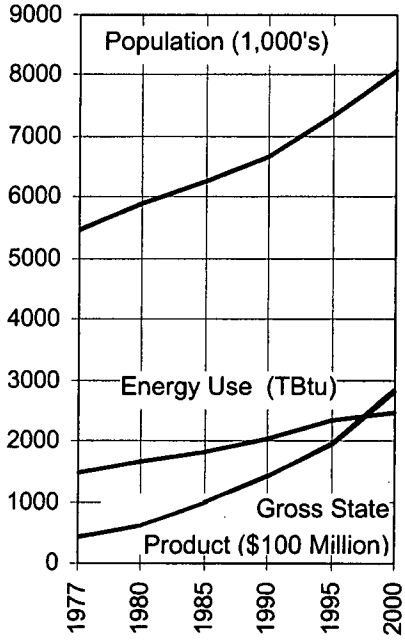
The Energy Policy Working Group recorded and organized the input received and, after months of extensive deliberation, provided a draft set of recommended policies and programs to the Energy Policy Council in January, 2003. The Council discussed the recommended policies and programs and approved 93 measures, as set forth herein, that meet the plan's objectives. The policies and programs approved by the Energy Policy Council primarily addressed the following sectors and issues in the state:

- Energy, Economics, and the Environment
- Fossil and Nuclear Fuels
- Electric Utilities and Energy Use
- Alternative Fuels from Biomass
- Alternative Energy Sources
- Energy Use in the Public Sector

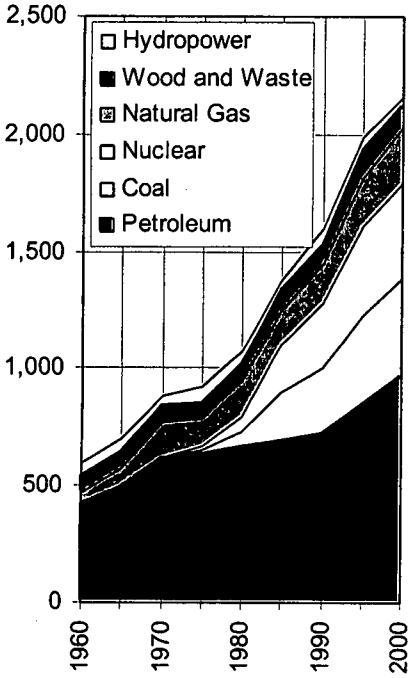
Objectives of the North Carolina State Energy Plan

- Insure energy reliability for North Carolinians;
- Improve the public health and environmental quality of our state;
- Develop policies that promote wise land use;
- Implement strategies supportive of a sound North Carolina economy;
- Develop an achievable sustainable energy strategy for North Carolina; and
- Implement a strategy by which the state can lead by example.

NC Energy Use, Population & Gross State Product



Historic Energy Use in North Carolina by Fuel (TBtu)



- Energy Use in the Residential Sector
- Energy Use in the Commercial Sector
- Energy Use in the Industrial Sector
- Energy Use in the Transportation Sector
- Energy Education and Research
- Funding for Energy Policies and Programs

Immediate Action Items

The Energy Policy Council reviewed the entire list of 93 policies and programs to determine which measures would require action by the Governor, North Carolina General Assembly, North Carolina Utilities Commission, or other regulating or administrative agency. From the entire list, the Energy Policy Council recommends the following 15 key legislative, regulatory, and administrative policies for action in 2003 and 2004:

Energy, Economic, and Environmental Issues

Exec-1 The North Carolina Department of Commerce and the State Energy Office should encourage and support economic development of energy-related enterprises whose products are intended to increase energy efficiency or use renewable resources, such as providers of specialized insulation and window products, heating and air conditioning equipment and controls, distributed generation equipment, solar and wind energy equipment, and fuel cells.

Exec-2 The State Energy Office should communicate the energy research being performed in the state to the North Carolina Department of Commerce for its recruiting and economic development strategy.

Exec-3 The North Carolina Department of Environment and Natural Resources should create a greenhouse gas registry to track emissions of carbon dioxide and other greenhouse gases, to establish baseline greenhouse gas emissions, and to demonstrate reductions in greenhouse gas emissions for potential greenhouse gas trading systems depending upon the availability of funding.

Alternative Fuels from Biomass

Exec-4 North Carolina should support the development of an alternative fuel industry through dedicated funding and grant matching of promising alternative fuel projects. These efforts should include agricultural waste processing facilities, biodiesel and ethanol

refineries, fueling stations for alternative-fueled vehicles, production incentives for farmers and refiners, incentives for highly efficient or alternative-fueled vehicles, and education and awareness programs. Developmental efforts should focus on raising feedstock production levels and insuring all 100 counties in the state have alternative fueling infrastructure by 2007. In particular, the Energy Policy Coun cil supports a state program to pay for alternative fuels development via a $1 to $2 fee applied to annual vehicle registration fees.

Exec-5 Based on the results of ongoing research and development studies, the North Carolina General Assembly should pursue strategies that convert animal waste into environmentally sound energy sources.

Alternative Energy Sources

Exec-6 The General Assembly should consider adopting net metering for application to all electric utilities in the state.

Exec-7 The General Assembly should evaluate a renewable portfolio standard (RPS) that complements the NC GreenPower program and fosters the development of a renewable electricity market. The RPS would require that all electric utilities increase the percentage of total distributed electricity that comes from renewable sources, such as hydroelectric, wind, solar, waste-derived fuels, and agricultural fuels.

Exec-8 The General Assembly should reexamine the Mountain Ridge Protection Act as it pertains to wind energy while still protecting North Carolina's natural beauty.

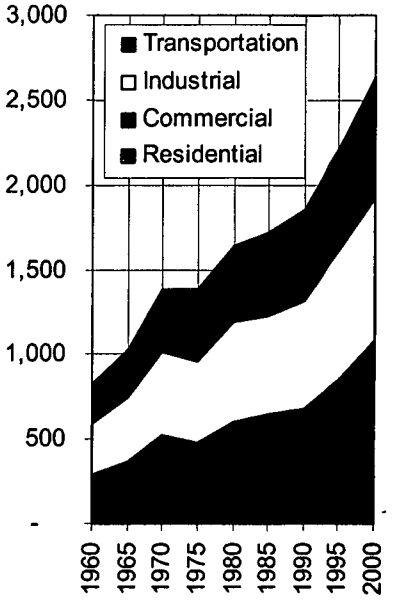
Exec-9 The State Energy Office should assess and propose incentives and regulatory or administrative measures for development of renewable electricity generation facilities, solar water heating, passive and active solar space heating, and daylighting.

Exec-10 The General Assembly should require that all electric utilities in North Carolina provide generation disclosure of fuel mix percentages and emissions statistics on sulfur dioxide, nitrogen oxides, carbon dioxide, and mercury annually by bill insert and via website. The disclosure information should clarify to the consumer the environmental impact of residential electricity use.

Energy Use in the Public Sector

Exec-11 State agencies and universities, with coordination by the North Carolina Department of Administration, should reduce energy

Historic Energy Use in North Carolina by Sector (TBtu)



The largest single sector in terms of total energy use (including the energy consumed to generate electricity for the sector) is industrial at 31% of the total. Transportation is second largest with 28% of total energy use. The residential (23%) and commercial (18%) sectors, if combined, would demonstrate that the largest energy use in the state is in buildings at 41%.

Energy efficiency, although not specifically an energy source, is projected to have reduced national energy needs by 31% between 1975 and 1999.

consumption in existing state buildings to save 20% by 2008, 4% per year or more for the next 5 years. The State Energy Office should submit an annual report to the Energy Policy Council, the Governor's Office, the State University System and other major energy users in North Carolina that provides data on energy saved in state buildings and universities by source and cost, energy efficiency activities undertaken in these buildings, the approximate investment in energy efficiency measures, and the overall economic costs and benefits of the program.

Exec-12 Working in conjunction with the State Construction Office, the State Energy Office should monitor, analyze, and report on the energy savings attributed to the new requirements on life-cycle cost analyses of the $3.1 billion higher education building program currently underway across the state, as well as future projects. The State Energy Office should be responsible for maintaining records that track the consequences of subjecting new public facilities to the newer life-cycle cost procedure.

Exec-13 North Carolina should facilitate efforts of local governments to finance energy efficiency and renewable energy projects; specifically, allow bundling of multi-jurisdictional energy efficiency projects to achieve economies of scale and improve opportunities for financing, restructure the underwriting provisions of the State Energy Office's low-interest energy loan program, and provide training in energy efficiency measures to building managers in local government buildings.

Energy Use in the Residential Sector

Exec-14 North Carolina State Government should continue to support a strong low-income weatherization program. The state should review the effectiveness of energy conservation programs conducted through the weatherization program and analyze opportunities for improvements. The State Energy Office should develop programs, in addition to weatherization, to address energy-efficient housing in the low-income sector.

Funding for Energy Programs

Exec-15 The General Assembly should review options, such as a Public Benefits Fund or other means, to enable funding of the basic services provided by the State Energy Office and the recommendations in the State Energy Plan.

DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
April 20, 2004

The Environmental Review Commission (ERC) met on Tuesday 20 April 2004 at 9:00 a.m. in Room 1228 of the Legislative Building.

Representative Pryor Gibson presided over the 20 April 2004 meeting. The following members were present: Senators Clodfelter, Dorsett, Forrester, Horton, Kinnaird, and Weinstein, and Representatives Fox, Gibson, Hackney, Justice, LaRoque, McComas, Weiss and Williams. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Jennifer McGinnis, Assistant Commission Counsel, Tim Dodge, Research Assistant, and Mary Watson, Commission Clerk were also present.

On 6 April 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Representative Gibson called the meeting to order and welcomed members and visitors attending the meeting.

George Givens, Commission Counsel, was asked to explain the agenda. He asked members to sign their reimbursement forms and asked visitor to sign the attendance sheet.

Mr. Givens said that he had distributed to each member, copies of read only reports that are required by law to be made to the Commission. These reports are listed as **Exhibit D**.

Mr. Givens said that the agenda item on the NC GreenPower Program deferred from 25 March 2004 would be presented at the 5 May 2004 meeting.

Mr. Givens announced that the next meeting of the ERC would be held in Asheville on 22 April 2004 at 1:30 p.m. at the Holiday Inn Asheville Airport. A revised itinerary was handed out to members. Mr. Givens said that the meeting would focus primarily on matters related to land conservation and preservation of open space.

Mr. Givens said that the next business meeting in Raleigh would be on Wednesday 5 May 2004 at 9:30 a.m. in Room 643 of the Legislative Office Building.

Representative Gibson called on Senator Horton to give a report on the Friday 26 March 2004 site visit to Belews Creek Stream Station.

Senator Horton said that the Belews Creek facility is the size of a small skyscraper and is operated by no more than 23 people. The plant brings in 200 railway cars a day. Those railway cars are emptied and returned. These 200 cars produce enough electricity to provide for 2.4 million houses daily.

Dr. David H. Moreau, Chairman, Environmental Management Commission (EMC) gave a quarterly report by the EMC as to its operations, activities, programs, and progress. A copy of his report is listed as **Exhibit E**.

Dr. Moreau said that he had been asked to speak to two issues: hydrogen sulfide and the Swift Creek issue.

Dr. Moreau said there were two items of concern on the Air Quality agenda. A number of minor correction to a long list of regulations included particulates in concrete batch plants, external roof tanks for petroleum storage, changes to the open burning rule, minor changes on the nitrogen oxide rules. Most of these were minor, non-controversial issues.

Dr. Moreau said that there was a change dealing with the effective date for compliance for municipal waste combustors moving from March 2003 to December 1, 2004.

Dr. Moreau said there were no significant groundwater actions during this quarter. The surface water actions were taken to approve the third round of the Tar Pamlico River Basin water quality plan and send to public hearing a proposed rule that deals with the whole issue of ?

Dr. Moreau said it was taken out of the earlier rules because of lack of clarity about exactly what they were. It was decided to come back and deal with all rules.

Dr. Moreau said that the control of hydrogen sulfide comes under North Carolina's toxic air pollutant regulations which covers hydrogen sulfide and 104 other chemicals.

Dr. Moreau said that in 1986, the acceptable ambient level was set at 2,100 micrograms per cubic meter of air. In 2001, the North Carolina Science Advisory Board recommended that the ambient level be changed to between 56 and 120 micrograms per cubic meter. That would have set the level at somewhere between 2.7 and 5.7 percent of the level that was set in 1986.

Dr. Moreau said that the EMC set the entire range from 56 to 120 to public hearing, the hearing officers recommended they adopt the 120 standard over a 24-hour period and this level was adopted unanimously by the EMC.

Dr. Moreau said there was a second issue involved in the hydrogen sulfide that has to do with the exemption of wastewater treatment plants at pulp and paper mills. The toxicant pollution rules provide for the exemption of certain sources or categories of sources to set them aside.

Dr. Moreau said there are two primary sources of hydrogen sulfide in North Carolina. Emissions inspections project that 56 percent of the hydrogen sulfide is emitted from fertilizer plants, 44 percent is emitted from pulp and paper mills. The range of emission from pulp and paper mills is between 50 and 97 percent from the wastewater treatment plants at those facilities.

Dr. Moreau said that the model analysis indicated that we had a maximum concentration at the property line of about 2,600 micrograms per cubic meter, which is 20 times the acceptable ambient level.

Dr. Moreau said that the modeling studies are done strictly as a screening device to indicate whether or not further field study is needed. These levels indicated that further study was necessary, along with how long to grant for that study to be done, what protection there would be for the industry while the study is being conducted and what happens when the results of that study are reported.

Dr. Moreau said that the majority of the hearing officers were convinced that the study should be allowed and completed by the end of calendar year 2008. They were also convinced that the exemption for wastewater treatment plants should be permanent but that the matter should be reviewed after the completion of the study. The EMC adopted that rule by an 11 to 5 vote.

Dr. Moreau said that the opponents of the exemption argued that the exemption should be temporary with an automatic expiration date that could be extended by rulemaking after the study was completed.

Dr. Moreau said that the EMC decided that if there were any evidence produced out of field study that action is necessary, the EMC would have to initiate rulemaking in 2009 to remove that exemption.

Dr. Moreau said there was not much disagreement on setting the acceptable ambient level and the argument as to whether it should be 56 or 120 was judged to be less important than moving from 2100 down to 120.

Dr. Moreau said that if the studies indicate that there is a serious exposure to hydrogen sulfide, there is authority to move on the basis of an emergency situation to deal with that.

Senator Albertson asked if hydrogen sulfide levels were checked out beyond the property lines.

Dr. Moreau said that they levels were not check out beyond the property lines. The issue was what existed at the property line but someone who did the modeling could better answer the question.

Senator Kinnaird asked Dr. Moreau if anyone had considered what the quality of life is for the people living around the property lines.

Dr. Moreau said that the EMC's authority is to determine whether or not any control is necessary for the protection of public health. The assumption is

made is if you meet the standard at the property line, you will meet it beyond the property line because of dilution and dispersion.

Senator Forrester asked Dr. Moreau if any of the contamination from hydrogen sulfide comes from out of state.

Dr. Moreau said that his limited reading on this is that hydrogen sulfide is eventually transformed into sulfuric acid and other products, that it is stable for two or three days, which would suggest that it is not being transported in that form over long distances.

Senator Horton asked about the 2009 completion date of the study and asked why it takes so long for these studies to be completed and what is the lack of urgency.

Dr. Moreau said that the studies have to be done in steps. First, you have to design the sampling program, then you have to do data collection and with the variable atmospheric conditions, you need more than just a one-year period to get a representative picture of what is going on. Then, there is some time built in for the analysis of that data and a report to the Commission.

Dr. Moreau said that there was some disagreement about that timeline and some felt that it should be shortened. Underlying that was the knowledge that both the CDC study and the industry-sponsored study would be underway and if it shows that we have a severe problem, then action could be taken under other authority.

Senator Horton asked Dr. Moreau what the position of the Department with regards to the timeline.

Dr. Moreau said that the recommendation that came from the staff at DENR was to have the study completed by 2007.

Senator Albertson asked Dr. Moreau if the property line is standard as far as air quality is concerned.

Dr. Moreau answered in the affirmative. It is for toxic air pollutants that an effect on the immediate neighborhood of the facility.

Dr. Moreau said that the EMC was also addressing the special management strategies for Swift Creek.

Dr. Moreau said that in July 2004, the EMC approved a 14-mile portion of the Swift Creek watershed in Nash County to be classified as outstanding resource waters. That came to the General Assembly in 2003 and the provision upstream of State Road 1003 was upheld. The provisions downstream of S.R. 1003 were held in advance and the ERC was then authorized to identify and evaluate options for consideration in the upcoming Short Session.

Dr. Moreau said that the water quality committee of the EMC took it upon itself to ask staff to make recommendations for the ERC's consideration. They are not the subject of rulemaking and have not gone to public hearing.

Dr. Moreau said that two key problems in dealing with the section of endangered species are the sediment load that comes in on that stream and the maintenance of adequate flow rates to protect habitat.

Dr. Moreau said there are four recommendations, which consist of a site-specific buffer enhancement, extending the protection throughout the 50 foot buffer to enhance or protect the stream flows, a recommendation on point source control that no new or expanded sources be added to that segment and a recommendation to enhance sediment control by adding to the existing controls certain provisions dealing with ground cover and the time they ground can be exposed to disturbance.

Senator Albertson asked Dr. Moreau if a vote had been taken on these recommendations.

Dr. Moreau said that the vote passed the water quality committee but not the EMC.

Mr. Thomas P. Augspurger, Ecologist, United States Fish and Wildlife Service (USFWS), gave a report on and discussion of options to protect water quality and endangered species in the portion of Swift Creek that is located east of Nash County Road 1003. A copy of Mr. Augspurger's PowerPoint presentation and a handout of ESA Basics are listed as **Exhibit F**.

Mr. Augspurger said that species get on the federal endangered list in one of two ways; either the USFWS can propose them for listing based on information they receive from other agencies or by petition.

Mr. Augspurger said there are two or three publications in the federal register that list endangered species on a species by species basis. The two that are required are the draft rule that requires a 60-day comment period and a final rule.

Mr. Augspurger said that there are 1,260 species on the Federal endangered species list and 68 of them are in North Carolina. Northing has been added to the endangered species list since 2000.

Mr. Augspurger said there is a permit process in the Endangered Species Act that lets people obtain permits for scientific collections for museums and research.

Mr. Augspurger said that the Fish and Wildlife Service really believes in Swift Creek and have provided the State with written statements on its water quality and its diversity of fish and mussels and the importance of trying to protect these waters.

Mr. Augspurger said that he had reviewed the plan that the Division of Water Quality was presenting today and thinks it is based on sound science and that they support its recommendations.

Senator Forrester asked Mr. Augspurger if the plants included on the endangered species list include the Venus flytrap.

Mr. Augspurger said there are 27 plants on the endangered list in North Carolina.

Representative McComas asked Mr. Augspurger if he could provide members with a list of all endangered species in the United States.

Mr. Augspurger said that he would be glad to provide the list.

Representative McComas asked about threatened species.

Mr. Augspurger said that for purposes of regulatory review, endangered and threatened species get the same review.

Senator Kinnaird asked if the Venus flytraps you see sold in stores are propagated or are they illegally harvested.

Mr. Augspurger said it was probably both. He said there is also legal propagation of endangered plants that can be offered for sale legally.

Mr. Scott Van Horn, Research Supervisor, Division of Inland Fisheries, Wildlife Resources Commission (WRC), gave a report on the State listing process and Swift Creek. A copy of his report is listed as **Exhibit G**.

Mr. Van Horn said that the WRC administers the North Carolina State species-listing program and addresses only those portions of a species population that exists within the boundaries of North Carolina.

Mr. Van Horn said that virtually any interested party could propose a listing of species in North Carolina of a "D" listing. The WRC takes those proposals and turns them over to their non-game advisory committee. This committee maintains a number of scientific councils that are structured around types of species. It is at this level where the technical review of the merits of the proposal is presented. This proposal is approved by the WRC and then goes to rulemaking.

Mr. Van Horn said that a fundamental difference between the Fish and Wildlife conservation listing program and the State program is that the State Program provides for no protections for listed animals other than a requirement that allows permitting of a collection. The only protection of species gained by being listed under the State program is the condition that the WRC is given permission to issue permits if you want to collect the animals.

Mr. Van Horn said that the purpose of the State listing process is to help conservation agencies and communities understand where the conservation-needy organisms are located.

Mr. Van Horn said that Swift Creek is a high quality habitat location with 14 mussel species. It is the quality of the habitat that also allows excellent game fish population to exist.

Senator Horton asked Mr. Van Horn to name some other habitats in North Carolina that are similar to Swift Creek in their diversity.

Mr. Van Horn said that in the western part of the State, the Little Tennessee River is another spot where there is a perfusion of mussels, fish and crayfish. Also, Lake Waccamaw is another example of a variety of specie richness.

Senator Kinnaird asked Mr. Van Horn if we are talking about the same area that the legislature enacted last year.

Mr. Van Horn said that the issue is the bottom third of Swift Creek and any resource waters designation was approved for the upper two thirds of the basin.

Senator Kinnaird asked Mr. Givens if Swift Creek was the legislation passed last year that allowed for development of Swift Creek and to take away protection.

Mr. Givens said that the EMC adopted rules to provide protections for Swift Creek on the basis of classifying those waters as outstanding resource waters (ORW). Those rules were subject to legislative review during the 2003 legislative session. Pursuant to the Administrative Procedure Act, a bill was introduced to disapprove the rules. That bill passed the House prior to the crossover deadline and was received in the Senate. The Senate's action was to divide the question and to decline to disapprove or to allow the rules to go into effect with regard to the upper two thirds of the watershed and to disapprove the rule with respect to the lower one-third, which is where the opposition arose. Our discussion today is with regard to the lower one-third. In order to change any decision from last year, the General Assembly would have to enact legislation, which would originate from the ERC, to be considered in the Short Session.

Senator Kinnaird asked if we could undo the legislation passed last year if we put in new legislation this year.

Mr. Givens said that the ERC could recommend legislation that would make it eligible and it would be up to the General Assembly to act on that legislation. One of the possibilities would be to allow the ORW rule to go into effect with respect to the lower third.

Senator Albertson asked if the recommendations from Dr. Moreau were the changes that need to be made in the lower third of Swift Creek.

Mr. Givens said that Dr. Moreau was reporting on the recommendations from the water quality committee of the EMC. The specifics of those recommendations would be the subject of the next presenter, Mr. Reeder. Those recommendations are not to reverse the decisions of last year but to proceed in a different fashion. Both sides would be heard on in this issue.

Senator Albertson asked how many miles are being talked about where they are recommending that we make a change.

Mr. Tom Reeder said that the entire watershed is 270 square miles or about 90 miles in length and the bottom one-third that did not get the ORW is about 30 miles in length or about 90 square miles.

Mr. Thomas A. Reeder Supervisor, Classification and Standards Unit, Division of Water Quality, DENR, gave a slide presentation on a plan that DWQ came up with to protect the federally listed tar spinney mussel in the downstream portion of the Swift Creek watershed. A copy of Mr. Reeder's presentation is listed in two handouts as **Exhibit H**.

Mr. Reeder said the Swift Creek watershed runs from Henderson to Tarboro, a total of 270 square miles.

Mr. Reeder said that in order to classify waters as ORW, there have to meet two criteria. There has to be excellent water quality and there have to be some sort of outstanding resource value.

Mr. Reeder said that only 14 miles of Swift Creek from S.R. 1004 to S.R. 1003 had the excellent water quality necessary with rare and endangered species, including the Tar Spinymussel. The EMC proposed to reclassify the 14 miles to ORW and to provide the ORW protective measure, or the ORW management strategy, to the entire watershed to protect the endangered species located there. This went through the Rules Review Commission and HB 566 was introduced. This bill allowed the ORW protection measure to be implemented in the upper two-thirds of the watershed and directed DWQ to develop a site-specific recommendation to protect the lower one-third.

Senator Kinnaird asked if the single creature, being picked singled out for protection, as opposed to jobs for development, is interfering with everything else and we are missing the entire enriched area. We have to get our emotions down and talk about what it means in the larger arena to protect these areas with enriched species.

Representative Weiss asked Mr. Reeder if the recommendations shown today were adopted would Swift Creek continue to protect the whole ecosystem.

Mr. Reeder said that he believes it would go a long way in protecting it.

Representative Weiss asked what is happening with the bottom third until action is taken and if development was being allowed.

Mr. Reeder said that anything could be done that is allowable with the nutrient sensitive waters rules.

Representative Gibson said that part of the negotiations was as much the concern to protect creatures in the creek, as it was a sincere concern to protect the whole area.

Representative LaRoque asked Mr. Reeder what the spiny mussel does and what benefit is it to the environment.

Mr. Gibson answered Representative LaRoque's question by saying that mussels in general are one of the best indicators of overall water quality because they are filter feeders.

Senator Albertson asked if mussels played the same role in water quality as oysters do in salt water.

Mr. Gibson said this was correct.

Representative Williams asked if there was a great density of wetlands in the lower one-third of Swift Creek.

Mr. Reeder said it is pretty well spread out over the watershed. The whole 100-year floodplain for this creek is basically wetlands.

Representative McComas asked if Mr. Reeder if he could be specific as to the names of the landowners along the Swift Creek.

Mr. Reeder said he could not tell who the landowners were but there is a lot of agriculture off on the tributaries.

Representative Gibson said there were a lot of different landowners along Swift Creek, mostly farmers with land handed down from generation to generation.

Representative McComas asked if there was any one individual landowner who owned the majority of land along Swift Creek.

Representative Gibson said that there was not anyone in particular in the lower third and he believed that Nash County was the largest single owner of property along the bank.

Senator Kinnaird said that when the negotiations were being debated on the floor about the upper two-thirds of Swift Creek, she believed that the county commissioners were against taking away the protections and so were a lot of the other governments.

Representative Gibson said that he thought there were people on both sides of the issue. He asked the presenters to provide him copies on disk to forward to Senator Swindell and Representative Tolson who represent the district in which the lower part of Swift Creek is located.

Because of a time constriction on the part of Dr. Leah M. Devlin, D.D.S., M.P.H. State Health Director, Division of Public Health, Department of Health and Human Services, Dr. Devlin was allowed to present her comments on the proposed modification of the rule setting out the acceptable ambient levels (AAL) for hydrogen sulfide under rules adopted by the Environmental Management Commission that govern the emission of toxic air pollutants out of order on the agenda. A copy of her comments is listed as **Exhibit I**.

Dr. Devlin recognized Dr. Dave Campbell, who heads up the Environmental Epidemiology Section of DHHS, who would be present to answer questions after her report.

Dr. Devlin said that the North Carolina Division of Public Health was glad to see the EMC action to lower the ALL for hydrogen sulfide from the current level of 2100 micrograms per cubic meter to 120 micrograms per cubic meter. Lowering the AAL does reduce the health problems in that area, particularly with asthmatics and eye irritation in the general public.

Dr. Devlin said that the Division had recommended to the EMC that all major sources of hydrogen sulfide, including pulp and paper mills and wastewater treatment plants be required to comply with the hydrogen sulfide AAL standard. Based on the DAQ data, pulp and paper mill wastewater treatment systems are responsible for perhaps as much as 90 percent of the hydrogen sulfide emissions from permitted air pollution sources in the state.

Dr. Devlin said the EMC does need to consider other factors in addition to health when it sets its standards.

Dr. Devlin said that the Division of Public Health is currently collaborating with the U.S. Department of Health and Human Services, the Agency for Toxic Substances and Disease Registry to do a study in North Carolina at one pulp and paper mill. They hope to start this study by fall and have data on the ground at that site in 9 to 12 months.

Dr. Devlin said that her commitment to the ERC was that she would bring that data before the Commission as soon as possible.

Ms. Lisa D. Martin, Director of Regulatory Affairs, North Carolina Home Builders Association, continued the discussion on buffer enhancements to protect water quality and endangered species in the portion of Swift Creek.

Ms. Martin said there is currently a 50-foot buffer requirement in the Tar Pamlico Basin on all perennial and intermittent streams. The local governments have the authority to increase those protections.

Ms. Martin said that sedimentation requirements have gone from a 30-day groundcover requirement to 15 days in the last three years. There is legislation pending that has 10 working days as a requirement.

Ms. Martin said that the State Sediment Pollution Control Act is a purview of the Sediment Control Commission, not the EMC.

Ms. Martin said there is no reason to pursue any further protection of Swift Creek until information shows that it is needed.

Mr. Derb S. Carter, Senior Attorney, Southern Environmental Law Center, said he was here to convey the consensus opinion of the state level environmental organizations that have been involved in the Swift Creek debate going back 10 to 12 years when the Tar Pamlico River Foundation first advocated enhanced river protection.

Mr. Carter said that what they are really talking about is a handful of streams in North Carolina have escaped all of the impacts of 200 years of agriculture sediment industry in the state in which there are few species that are clinging to their last hope for existence.

Mr. Carter said that federal actions in North Carolina include federal highway money that is expended for road construction. This requires compliance with the Endangered Species Act, federal water funding coming down from EPA for water and sewer infrastructure, and reaches private development through federal permits under Section 404.

Mr. Carter said and all of these issues will continue to arise and would do so in a total conflict that will pit endangered species against development with some extremely strong federal law behind it that says the species wins.

Mr. Carter said that Swift Creek is not immune from this. The current proposal in the lower section of Swift Creek in Edgecombe County to extend 100-mile water supply line in the Swift Creek watershed and it is colliding directly with the needed protection of the Tar River spiny mussel that has federal protection.

Mr. Carter said that he feels there is a better way to approach these problems by being proactive. A minimum amount of protection should be put on these waters on the ground against which all of these development proposals would be evaluated. If that protection exists, the issues will not arise as to whether or not it jeopardizes the species in the stream because the protections are fording a baseline that evaluates a project that says there will be no jeopardy. The alternative is to have project after project that goes through years of debate and potential litigation conflict regarding whether they are complying with the protection that is required by federal law.

Mr. Carter said that the ORW rule would allow 12 percent impervious surface or one house per acre lot in the entire watershed with no limit or no requirement to control stormwater. Higher density development could be done if measures were installed to control the first inch of storm.

Mr. Carter said that the correct approach would be to take a look at the entire watershed and put measures into place that left the buffer requirements the way they currently exist under the Tar Pamlico buffer rules, and not put controls on development in the watershed, counting on that buffer to intercept the pollution that is coming off from the development occurring in the surrounding land.

Mr. Carter said that his view is that either way there would be some comparable level of protection. With the new approach, there would be years of rulemaking and investigation and process before these measures would ultimately be put into place.

Senator Forrester asked if there was a proposal to use Swift Creek for a new water supply for a new community and what impact would that have if that were the case.

Mr. Carter said there is a current proposal to extend a 100-mile line to provide water from an existing facility that would extend into the lower part of Swift Creek to existing homes and any new development that may occur in that area. The concern is that with extension of water lines, it facilitates new development in that area and the agencies are saying that we do not have adequate controls on how that development occurs in that area to assure that the runoff from the development, the pollution that is delivered by that development would not adversely affect Swift Creek. This conflict could be resolved if these measures are put into place where agencies could be in a position to say that adequate measures in place on Swift Creek to provide protection so they could allow this water line to go through.

Senator Albertson asked if the ORW rules allowed one house per acre.

Mr. Carter said that under the ORW rules, which were also the basis for management strategy, determined that only the 14-mile segment met the criteria for outstanding resource water. However, because they found the resources upstream and downstream from this 14 mile segment, the proposed applying the same ORW requirements to the other sections. Those requirements are: no new or expanded discharges within that watershed and development limitations for either low density development in which impervious surfaces are kept to 12 percent, or one house per acre, or higher density development if a stormwater control system is installed.

Senator Albertson asked if either of those standards would meet the federal requirement and is this part of the resources available to the state.

Mr. Carter said that what is needed is to put measures in place on like the strategies that you get a consensus from those agencies that make the decisions, especially the Fish and Wildlife Service.

Agenda Item 7, an update on the status of designation of nonattainment areas to comply with the revised national ambient air quality

standard (NAAQS) for ozone (the 8-hour standard) was deferred to a later meeting.

Mr. Jeff Hudson, Assistant Commission Counsel, explained an Effective Date Timeline for Hydrogen Sulfide Rules. A copy of his handout is listed as **Exhibit J.**

Mr. Hudson explained that on April 8, 2004, the EMC adopted the hydrogen sulfide rules. The Administrative Procedures Act requires that within 30 days of this adoption, the EMC must submit these rules to the Rules Review Commission for their review. So, the EMC needs to get the rules to the RRC by May 7, 2004. If those rules were submitted by the EMC to the RRC on or before April 20, 2004 at 5:00 p.m., the RRC would have to review those rules at its May meeting. If, however, those rules are not submitted until after today, the RRC can wait until its June meeting to review those rules.

Mr. Hudson said if the RRC approves the rules at its May meeting and does not receive 10 or more objections from people opposing the rules, within six days of the RRC's approval, the hydrogen sulfide rules would become effective on June 1, 2004. If, however, the RRC approves the rules and receives 10 or more objections from persons within six days of RRC approval, the rules would be subject to legislative disapproval. This period of legislative disapproval would not be during the 2004 Short Session, but because of the lateness of the RRC, it would be held over to the 2005 Long Session.

Mr. Hudson said that the earliest date that the hydrogen sulfide rules could become effective is the 31st legislative day of the 2005 General Assembly, assuming that no bills to disapprove the rules is introduced during the Long Session. If that takes place, the rule would become effective either on the day that unfavorable final action is taken on a bill to disapprove the rule or the General Assembly adjourns without approving the rule.

Mr. Hudson said that another possible complication could be that the Board of Ethics was asked to give an opinion and while they are awaiting an answer from the Board of Ethics, no rules would be reviewed from EMC and Board of Pharmacy which both have lawsuits pending against the RRC. The EMC said they hope to hear from the Board of Ethics before their May meeting.

Mr. Hudson said if the RRC continues this policy beyond its May meeting, it is unclear as to when they would get to the hydrogen sulfide rules.

Mr. Hudson asked the staff director to attend today's meeting and report on the Commission's actions; however, because the Commission had not issued a letter to the Board of Ethics.

Mr. Hackney asked Mr. Hudson if the RRC were taking a position that if anyone sued them, they would stop business.

Mr. Hudson said he was not comfortable speaking for the RRC but he was told that they have sought an opinion from the Board of Ethics on this issue to determine if there is a conflict of interest issue.

Senator Kinnaird asked what would happen if somebody sued the ?

Mr. Hudson said that based on their action, even the hydrogen sulfide rules would not be voted on by the Board of Ethics because they are EMC rules.

Representative Weiss asked Mr. Hudson to explain what the rule that was passed says.

Representative Gibson said that the next presenter would cover this in his comments.

Mr. B. Keith Overcash, Director, Division of Air Quality, DENR, gave some background on the air toxics rule and on the Scientific Advisory Board that helps develop standards they work with. A copy of Mr. Overcash's comments is listed in **Exhibit K**.

Mr. Overcash said that air toxics programs have been around since 1990 by executive order from the Governor to develop the program in the late 1980s. Legislation (SB324) was passed and directed the EMC to go forward in developing an air toxics program. Regulations were put into place in May 1990 for 84 toxic air pollutants and 21 additional carcinogenic pollutants were put into effect in May 1, 1991 for a total of 105. Acceptable ambient limits were established for all 105.

Mr. Overcash said that the toxics program standard is to control the toxic air pollutants for the protection of public health. It is both a proactive and a reactive program.

Mr. Overcash said that features of the toxics program are computer modeling, through screening levels, technical infeasibility and economic hardship provisions and site-specific risk assessment provisions where facilities may need relief.

Mr. Overcash said that the air toxics program is implemented through air permits. Once a facility is triggered into the program, they need a permit from DAQ that have certain limits in them to make sure that compliance standards are met. These permits are based on emissions from that facility.

Mr. Overcash said that DAQ does the screening modeling for the companies that are triggered into the program. If it goes beyond a screening model to a more complex model, the facility is required to cover the cost for the screening.

Mr. Overcash said that the toxics protection branch does community assessment studies, evaluations of control of toxic air pollutants and keep information and the rule updated.

Mr. Overcash said that the Scientific Advisory Board (SAB) is a board established by the Secretary of DENR when the rule went into place in the early 1990s.

Mr. Overcash said that in 1997, there was a working group established by ERC that looked at what that SAB was supposed to do and there was consensus reached on several items, which were brought back to the ERC at that time.

Mr. Overcash said that consensus was reached on the SAB providing a mechanism for bringing good science into air toxics risk assessment.

Mr. Overcash said that the role of the SAB is advisory and not regulatory and its principal function is to conduct risk assessments of compounds and pollutants and bring recommendations to DAQ who in turns brings their recommendations to EMC for appropriate action.

Mr. Overcash said that SAB provides an analysis of the science and may also provide analysis for a single chemical. That is actually what happened with hydrogen sulfide. The SAB brought several different analyses to the Air Quality Committee and EMC based on the different effects that hydrogen sulfide has.

Mr. Overcash said that the final use of the analysis is the responsibility of the EMC.

Mr. Overcash said that the SAB is a voluntary, seven-member body, made up of doctoral level toxicologists, occupational epidemiologist and public health scientists.

Mr. Overcash said that the majority of the air pollutant levels have not been updated; however, a process has been started to re-evaluate levels that the SAP has recommended.

Mr. Overcash said there is some questions as to the validity of the factors being used to calculate these numbers. So, the EMC has approved a study to develop better emissions data from the wastewater lagoons.

Mr. Overcash said that on April 8, 2002, the EMC unanimously voted to change the old AAL from 1500 parts per billion for a one-hour average to 83 parts per billion (120 micrograms per cubic meter) for a 24-hour average.

Mr. Overcash said that, under majority vote, the EMC exempted wastewater treatment lagoons at pulp and paper mills for the toxic air pollutants of hydrogen sulfide and methyl mercaptan.

Mr. Overcash said that the EMC call for further study to better develop the emissions inventory from the wastewater lagoons. The industry will be required to do some testing and measuring to try to develop an emissions standard or to verify the current standard. They will be required to submit that

information to DAQ who will evaluate whether they have done the proper testing and measuring and then it will be determined whether or not they are in compliance.

Mr. Overcash said that if a facility fails to show compliance, there is a requirement in the new rule that requires them to set up a monitoring system to monitor off-site to determine what the effects are on the community. They will bring the results of that study back to the Director in February 2009 for review. The Director will then make a report to the EMC for consideration on the rule at that time.

Senator Forrester asked Mr. Overcash if second hand smoke is considered as one of the 105 toxic pollutants.

Mr. Overcash said that it was not.

Representative Fox asked Mr. Overcash what the change in the AAL's mean.

Mr. Overcash said that the changes make the levels more stringent than before. To put a one-hour number with the 82 would be hard to do, but 83 on a 24-hour average is much tougher than the 1500 was on one-hour.

Representative Fox asked Mr. Overcash if he could give a ballpark number.

Mr. Overcash said it would be tough to do.

Representative Gibson said that it was approximately 3.5 times as stringent.

Representative Weiss asked Mr. Overcash what the percentage of H2S pollution is that is currently coming from the pulp and paper mill industry in North Carolina.

Mr. Overcash said that if you include the wastewater lagoons, it is about 90 percent of the H2S from the permitted facilities.

Representative Weiss asked Mr. Overcash if there was any difference in the health effect of H2S that comes out of pulp and paper mill lagoons in relation to the other 10 percent that comes from other sources.

Mr. Overcash said that it was the same H2S.

Representative Weiss asked if the EMC was presented evidence of the health impacts that H2S would have on our population.

Mr. Overcash said that DHHS did present information throughout the rulemaking process.

Representative Hackney asked Mr. Overcash to name the members on the SAB.

Mr. Overcash said that the Chairman was Dr. George Lucier, and members included Dr. Woodall Stopford, and Dr. Tom Starr, Dr. Ronald Milnick, Dr. Man-Sung Yim, Dr. Elaina M. Kenyon and Dr. Jerry W. Spoo.

Representative Hackney asked if all of these members were academics.

Dr. Lori Cherry, DHHS, Division of Public Health, said that they were not all academics, that some were epidemiologists and family physicians.

Dr. Campbell, head of Occupational and Environmental Epidemiology Branch of Division of Public Health, said that his department was involved in doing the health and risk assessment of these different compounds, along with Air Quality.

Dr. Campbell said that the health effects at the old level were a respiratory irritant, a skin irritant and mucus membrane irritant. H2S also has an objectionable odor.

Dr. Campbell said that the largest concern was that H2S produces asthma symptoms at the old level. At the new level, these concerns are a lot more protected.

Representative Weiss asked Dr. Campbell if any evidence was given to the EMC about the cost of hospital visits for asthmatics. It seems like we have shifted a burden here.

Dr. Campbell said that this was a concern; however, there was no data to support this. However, they would like to conduct a study around one of the pulp and paper mills as to the effects of H2S on asthmatics.

Representative Weiss asked Mr. Overcash if there was any incentive for industry to comply with standards.

Mr. Overcash said that there was no end date for exemptions; however, if the study being done by ATSDR indicates that there are problems, there is ability in the rule for the Director to make a call and decide that something needs addressing immediately. Rulemaking could then be initiated to take action.

Representative Weiss expressed concern that, even with the concerns of health risks associated with H2S, exemptions were still made to 90 percent of the violators.

Mr. Overcash said that it was felt that it was necessary to get more information on the emissions from those plants before they put more money into controls.

Representative Gibson said that there is really no way to measure ambient HS2 effectively--what we are able to measure and what is actually occurring.

Representative McComas asked what constitutes a high level of H2S.

Representative Gibson said that there is no clear answer to this question.

Representative McComas asked Mr. Overcash what counties the paper mills are located that are emitting high levels of H2S.

Mr. Overcash said that the papers mill in question is located in Washington County.

Representative McComas asked if there was any scientific data to look at in other states that have heavy concentrations of H2S.

Mr. Overcash said that staff had looked at data from other states. H2S is treatable; however, the problem with the plants in North Carolina is that the wastewater lagoons are so larger and spread out that it is hard to capture the H2S and treat it. New wastewater treatment plants would have to be built to put in a more activated wastewater treatment system.

Representative Gibson said that given the economics, these plants would have to go overseas where there are no regulations.

Mr. Overcash said that some of the plants have marginal operations and the estimates on what it would cost to do the modifications at these facilities are high.

Representative Williams said that if there is a negative effect on asthma sufferers, have studies been done in other parts of the country that we could base our decisions on or are we going to be the first state to study this.

Dr. Campbell said that there are a lot of studies that have been done but it is difficult to measure H2S by itself because it is usually emitted with other things. Most of the studies done are to look at asthma visits to hospitals around an emitter of H2S and other things.

Representative Williams asked if the data is not accurate in other parts of the country, how could it be accurate in North Carolina.

Dr. Campbell said that other compounds would have to be measured along with H2S.

Mr. Givens added, that with regard to H2S, there is not regulated under the Federal Clean Air Act but under the State Air Toxics Program, a health based program. The federal program is a technology-based program.

Mr. Givens said that Agenda items 7 and 9 were going to be deferred until the 5 May 2004 meeting.

Mr. Michael Shore, Southeast Air Quality Manager, Environmental Defense, addressed concerns about the Hydrogen Sulfide Rulemaking (H2S). A copy of his handout is listed as **Exhibit L**.

Mr. Shore said that not only does H2S trigger asthma attacks or cause eye and skin irritation, it smells really bad and is an embarrassment to our state.

Mr. Shore said that the SAB and the Division of Public Health recommended one standard and the EMC opted for a weaker standard. However, this is not the reason that the rule failed to strike an appropriate balance. The environmental community accepts those as a compromise.

Mr. Shore said that the EMC has failed to protect public health because of its permanent exemption of the wastewater treatment ponds at paper mills. It is one thing to provide the paper mills time to come into compliance or to provide an exemption with a sunset; however, a permanent exemption sells the people of North Carolina short.

Mr. Shore said that he acknowledges the economic issues and that is why the EMC process takes the economics takes into account with the air toxics rule. There is an economic provision in the air toxics rules that states if a company does not meet the standards, it has an opportunity to come to DAQ and negotiate a plant-specific standard. There is a long window for companies to meet the standards.

Mr. Shore said that we, in this state, could have started a long and reasonable process to reduce H2S from the major source of this pollution in a way to be considerate of economic issues. Instead, we have sold the public short with the blessing of the EMC.

Mr. A. Preston Howard, Jr., P.E., President, Manufacturers and Chemical Industry Council of North Carolina, gave a slide presentation on Acceptable Ambient Level Hydrogen Sulfide (H2S). A copy of Mr. Howard's slides and a letter from Dr. Roy N. Everett, Eastern Carolina Internal Medicine, PA, to Mr. Thomas C. Allen, Division of Air Quality, are listed as **Exhibit M**.

Mr. Howard said that the six affected MCIC Members sites, all in economically depressed regions, are Blue Ridge Paper Company in Canton, International Paper in Regal Wood and Roanoke Rapids, PCS Phosphate in Aurora, and Weyerhaeuser in New Bern and Plymouth.

Mr. Howard said that he believes the EMC reached the right decision. All of these facilities are economic hubs. They directly employ from 500 to 1200 people and collectively provide for a total of 9,000 jobs with an annual payroll of $494 million.

Mr. Howard said that there has been much debate about the regulated sources. A large percentage, about 85 percent, of H2S being emitted in this state comes from sources other than the four companies he represents.

Mr. Howard said that the hearing officers for the EMC were Dr. Delila Blanks, UNC-Wilmington, Dr. Frank Shaw, M.D., Fayetteville and Mr. Tommy Jenkins, former State Senator deliberated long and hard about the recommendations to the EMC.

Mr. Howard said that the EMC based their recommendations for a lower AAL on the Jappinen study. The SAB interpreted the results of the Jappinen study by saying there was an asthmatic response.

Mr. Howard made reference to the letter in Exhibit M, from Dr. Roy Everett. He encouraged members to read the letter to see the compelling evidence that the EMC ultimately adopted.

Mr. Howard said there had been 11 different studies on respiratory health residents living near pulp mills and refineries, two of the largest sources of H2S in our country. In those 11 studies, none of them found any evidence of significant increase of asthma or asthma like symptoms due to H2S exposure.

Mr. Howard said that MCIC's position is that there is no scientific evidence to suggest that current AAL's has any impact on the public's health, yet they endorse one of the recommendations that came from the SAB, the reduction of the AAL standard.

Mr. Howard concluded by saying that in the absence of an exemption, we would have to abandon the treatment technologies and build new systems. The cost to do this is about $360 million. This is neither technologically or economically affordable.

Mr. Howard said that studies are being done to conduct air dispersion modeling to determine predicted concentrations beyond the property lines of these plants.

Mr. Howard said that what is missing in the debate is what the real emissions from these lagoons actually are. All the data we have is based on someone's estimates.

Mr. Howard concluded by saying that the SAB are the risk assessors. MCIC thinks that they have weighed all of the merits and looked at the studies done for entire regions of our state and assigned an AAL that affords adequate protection for public health without unnecessarily jeopardizing the working families in our state.

Senator Horton asked Mr. Howard if he would suggest treating all of the hog lagoons with exemptions from regulations as the wastewater treatment lagoons are being exempted.

Mr. Howard said that he was not implying that H2S was not a dangerous chemical. It is indeed dangerous at high concentrations. Whether you choose to regulate the unregulated sources of H2S across our state is the decision of our legislators. However, they believe that the controls are reasonable under the circumstances and are going to do their best to comply with them.

Senator Horton said that if wastewater treatment plants are going to be exempt, maybe we should consider exempting other treatment plants.

Mr. Howard said that the other sources are already exempted from the air toxics rule.

Senator Horton asked who would be subject to the 120 standard.

Mr. Howard said that it would be anybody who holds an air permit would be subject to these standards including chemical and asphalt plants. The only sources exempted are the emissions off the wastewater lagoons. In the actual paper plant operation, there are plants sources of emission that have to be controlled.

Mr. Howard said that PCS Phosphate is probably going to spend more money than any of them to comply with the standards because they do not operate a lagoon. They operate a fertilizer plant that generates the states largest concentration quantity of H2S emissions.

Senator Horton asked why the hog farmers are not exempt.

Mr. Howard said that they are exempt.

Senator Horton asked who isn't exempt.

Representative Gibson said that unless you are a permitted facility, you are not eligible for exemption.

Senator Horton asked if there was any lagoon anywhere in the state that isn't exempt.

Mr. Howard said that there might not be any other lagoon in the state that isn't exempt.

Mr. Howard added that with regard to permanent versus temporary exemptions, there are 28 exemptions to the State Air Toxics Program. None of them have a sunset date in them. They are all permanent as long as the EMC does not ask to amend them.

Mr. Howard said that MCIC's members supported a provision in the draft rule that the hearing officers brought forward that would have mandated a review of these rule in 2009. The EMC chose not to do this.

Senator Kinnaird asked Mr. Howard if the lagoons are ongoing or are they continuing to receive affluent from these facilities.

Mr. Howard said that these lagoons operate every day.

Representative Gibson asked how PCS Phosphate's emissions are measured.

Mr. Howard said that PCS Phosphate's emissions are all through point sources, through emissions scattered throughout a plant.

Representative Williams asked Mr. Howard if MCIC's studies are the only ones that showed no regulatory affect going on.

Mr. Howard said that it was one of two studies done.

Representative LaRoque said that he believes that the members of the MCIC are people who start off with an unbiased opinion.

Representative Weiss asked Mr. Howard if there was anything in this new rule that specified that new companies could not build lagoons. Has anything been done in this state to promote new technology available.

Mr. Howard said that there were give different options that went to public hearing. One of those options would have differentiated the standard for the AAL between the new facilities and existing facilities. The EMC chose not to make that differentiation.

Representative asked if it was possible that a new manufacturing process with create a choice between new technology and retrofitting existing operations.

Mr. Howard said that the EMC only exempted paper mill lagoons. There will be no more paper mills built in the state and we will not see them build this technology if they do build.

Mr. Short added that there were considerable difference in his presentation and Mr. Howard's presentation and he wanted to underscore the poor decision that the EMC made. They all agreed that H2S is a threat and that the 120 standard is a reasonable standard to meet.

Mr. George J. Kapetanakis, Litter Programs Coordinator, Office of Beautification Programs, Department of Transportation, gave a Semiannual report on agency litter enforcement, litter prevention, and litter removal efforts. A copy of his report and a copy of the 2003 Interagency Report on Litter Cleanup, Education/Prevention and Enforcement are listed as **Exhibit N**.

Senator Kinnaird asked Mr. Kapetanakis if his division had considered a bottle deposit/refund program as well as a packaging return program.

Mr. Kapetanakis said that these were good suggestions and he would consider them as good recommendations.

Representative Fox asked why there were less than 60 percent convictions made on littering offenses.

Mr. Kapetanakis said that officers were so busy that they did not show up for the court dates.

Mr. Givens distributed a memorandum to members inviting them to participate in a Phase II Stormwater Management Working Group on 27 April 2004. A copy of this memo is listed as **Exhibit O**.

The meeting was adjourned at 12:50 p.m.

Representative Pryor Gibson Presiding Co-Chair	Mary R. Watson Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Reports that are required by law to be made to the Commission – read only
EXHIBIT E:	Handout: Quarterly report given by Dr. David Moreau on the EMC's operations, activities, programs, and progress
EXHIBIT F:	Handout: Report given by Mr. Thomas P. Augspurger, Ecologist, United States Fish and Wildlife Service (USFWS), on options to protect water quality and endangered species in the portion of Swift Creek that is located east of Nash County Road 1003
EXHIBIT G:	Handout: Mr. Scott Van Horn, Research Supervisor, Division of Inland Fisheries, Wildlife Resources Commission (WRC), report on the State listing process and Swift Creek
EXHIBIT H:	Handout: Slide presentation by Mr. Thomas A. Reeder Supervisor, Classification and Standards Unit, Division of Water Quality, DENR, on a plan that DWQ came up with to protect the federally listed tar spinney mussel in the downstream portion of the Swift Creek watershed
EXHIBIT I:	Handout: Dr. Leah M. Devlin, D.D.S., M.P.H. State Health Director, Division of Public Health, Department of Health and Human Services, Dr. Devlin, comments on the proposed modification of the rule setting out the acceptable ambient levels (AAL) for hydrogen sulfide under rules adopted by the Environmental Management Commission that govern the emission of toxic air pollutants
EXHIBIT J:	Handout: Mr. Jeff Hudson on Effective Date Timeline for Hydrogen Sulfide Rules
EXHIBIT K:	Handout: Mr. Keith Overcash on background on the air toxics rule and on the Scientific Advisory Board
EXHIBIT L:	Handout by Mr. Michael Shore, Southeast Air Quality Manager, Environmental Defense addressing concerns about the Hydrogen Sulfide Rulemaking (H2S)

EXHIBIT M:	Handout: Slide presentation on Acceptable Ambient Level Hydrogen Sulfide (H2S) by Preston Howard and a copy of letter from Dr. Roy N. Everett, Eastern Carolina Internal Medicine, PA, to Mr. Thomas C. Allen, Division of Air Quality
EXHIBIT N:	Semiannual report on agency litter enforcement, litter prevention, and litter removal efforts and a copy of the 2003 Interagency Report on Litter Cleanup, Education/Prevention and Enforcement
EXHIBIT O:	Handout: Memo inviting members and interested parties to participate in a Phase II Stormwater Management Working Group on 27 April 2004

April 20, 2004 ERC Meeting
EXHIBIT A

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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6 April 2004

TO: Interested Parties – Environmental Review Commission

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meetings - 20 April and 22 April 2004; Additional Information**

COMMISSION MEETING – 20 APRIL 2004:

The Environmental Review Commission will meet at 9:00 a.m. on Tuesday 20 April 2004 in Room 1228 of the Legislative Building in Raleigh. Please note the change in time and location from the normal meeting schedule.

At this meeting, the Commission will hear reports from State agencies, consider studies for which the Commission is responsible, discuss topics to be considered at future meetings, and attend to other matters. The meeting is expected to conclude around 12:00 noon. Listed below are potential agenda topics for this meeting. More specific information regarding the agenda for the 20 April meeting of the Commission will be developed at the public staff planning meeting.

1) Report on options to protect water quality and endangered species in the portion of Swift Creek that is located east of Nash County Road 1003 (S.L. 2003-433, Sec. 3)

2) Update on issues related to the Phase II stormwater rules

3) Discussion on the proposed modification of the rule setting out the acceptable ambient level (AAL) for hydrogen sulfide under rules adopted by the Environmental Management Commission that govern the emission of toxic air pollutants

4) Status report on the One-Stop Permit Assistance and Coordination Program. (S.L. 2001-424, Sec. 19.6)

5) Report on the Express Review Pilot Program and whether the Pilot Program be continued or expanded (S.L. 2003-284, Sec. 11.4A(e))

6) Annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund (G.S. 143-215.94M)

7) Report on issues related to the Leaking Petroleum Underground Storage Tank Cleanup Program (S.L. 2003-352, Sec. 12.(a))

8) Information item on the Transportation Demand Management Program

9) Semiannual report on agency litter enforcement, litter prevention, and litter removal efforts (G.S. 147-12(b))

10) Annual report on recycling efforts of public schools in the State (S.L. 2001-512, Sec. 11)

11) Information item on the NC GreenPower Program

12) Other matters related to the Commission's powers and duties under G.S. 120-10.43

SPECIAL BUSINESS MEETING – 22 APRIL 2004:

The Commission will hold a special business meeting at the Holiday Inn, Asheville Airport in Fletcher, North Carolina at 1:30 p.m. on Thursday 22 April 2004. This special meeting will focus primarily on various matters related to land conservation and preservation of open spaces and will be held in connection with a tour of Gorges State Park and Dupont State Forest on Thursday 22 April 2004 and Friday 23 April 2004. Listed below are potential agenda topics for this meeting.

1) Annual Report on allocations from the Parks and Recreation Trust Fund from the prior fiscal year (G.S. 113-44.15(c))

2) Annual Report on acquisitions made with funds from the Natural Heritage Trust Fund (G.S. 113-77.9(e))

3) Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands (G.S. 113A-241(c))

4) Annual report on implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR (G.S. 113A-235(c))

5) Annual Report on implementation of the Clean Water Management Trust Fund (G.S. 113-145.6A(a))

6) Report by the Land for Tomorrow Coalition on the results of its conservation needs assessment

7) Report on the designation of the Blue Ridge National Heritage Area (S.L. 2001-491, Sec. 18.10)

8) Report on the Waste Reduction Partners Program

9) Other matters related to the Commission's powers and duties under G.S. 120-10.43

Directions to the Holiday Inn, Asheville Airport: From Asheville, take Interstate 26 south to exit 40 (formerly exit 9). At the top of the off ramp, turn left over the bridge. The Holiday Inn will be visible on the left. The hotel telephone number is (828) 684-1213.

PLANNING MEETING:

To facilitate development of the agenda for the 20 April and 22 April meetings of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel will hold an informal public planning meeting at **10:00 a.m. on Tuesday 13 April 2004 in Room 605 of the Legislative Office Building**. Persons who wish to participate in the development of the agenda for meetings of the Commission, or who are interested in any matter before the Commission, are invited to attend. Commission members are not expected to attend these meetings.

FUTURE MEETINGS:

The Commission will hold a regular business meeting at **9:30 a.m. on Wednesday 5 May 2004 in Room 643 of the Legislative Office Building.**

The 2004 Regular Session is scheduled to begin at 12:00 noon on Monday 10 May. The Commission normally meets shortly after the beginning of the session to complete work on legislative proposals prior to the commission/ committee bill request deadline, which in 2004 is 4:00 p.m. Wednesday 12 May. A Commission meeting at 2:30 p.m. on Tuesday 11 May is tentatively scheduled for this purpose.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Leaking Petroleum Underground Storage Tank Working Group
2:00 p.m. Monday 19 April 2004– 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel at (919) 733-2578.

April 20, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 4/20/04
Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
LINDA RIMER	US EPA
Jeb Allen	Allen Associates
John Szydlowski	Moore + Van Allen
PGP	NCFB
Coleen Sullins	NC DWQ
Kelley Dennings	Wake County Env. Services
Doug Howey	NCPMA
Gary Harris	NCPMA

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — April 20, 2004

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Tom Augspurger	US Fish and Wildlife Service, Raleigh, NC
Tom Reeder	NC Environmental Defense
Dave Moreau	NC Envr Mngmt Comm
T Reeder	DWQ
Angie Rodgers	NC Wildlife Resources Commission
Scott VanHorn	NCWRC
Fred Harris	NCWRC
Jennifer Haygood	FRD
Deb Carter	SOK
Everett Clendenin	CC&PS
Casandra Skinner	CCPS

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 4/20/04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Keith Overcash	NC DAQ
Lori Cherry	NC Division of Air Quality
DONNIE REDMOND	NC DAQ
Nadia Mickey	BREAL
Keith Templeton	NC Wildlife, Enforcement Division
John Troy	" "
Steve Wall	DENR
Preston Howard	MGZC
Mildred Spearman	NCDOC
DAVID OSBORNE	NC DOC - PRISONS
Tim Moose	NC DOC - DCC

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 4/20/04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Grady McLallin	N.C. Conservation Network.
Christine Wunsche	NC PIRG
R. Paul Wilms	NCHBA
Lisa Martin	NC Home Builders Assoc.
Doug Lassiter	NCSTA
Doug Campbell	NC DHHS
Bill Pate	NC DHHS
Leah Devlin	NC DHHS
Chris Hoke	NC DHHS.
DAVID BARNES	Poyner + Spruill
Kathy Hawkins	Progress Energy

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 4/20/04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
David Knight	NC Sierra Club, NCWF
John McHugh	Governor's
Rob Lamm	HHS
Luanne Williams	DHHS
Amber Lynn Munger	Environmental Defense
Nancy Thompson	USMC
R Rogers	DENR
Elizabeth Ouzts	NCPIRG
Steve Woodson	NC Farm Bureau
Beth Warren	AG's Office
Edyta McKay	DENR

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 4/20/02

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
CAMERON WEAVER	DENR
JOHN GOODMAN	ALLEY ASSOCIATES
Rick Zechini	NCAR
MICHAEL NELSON	CCNR
Brock Nicholson	DENR - DAQ
Michael Shore	ENVIRONMENTAL DEFENSE
Pricey Harrison	
Robin Smith	DENR
Sandra Rng	Martin Marietta
Jane Preyer	Environtl Defense

April 20, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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AGENDA
9:00 a.m. Tuesday 20 April 2004
Room 1228 Legislative Building

1. Call to order
   Representative Pryor A. Gibson, Presiding

2. Introductory remarks by Cochairs
   Representative Pryor A. Gibson
   Representative Daniel F. McComas
   Senator Charles W. Albertson
   Senator Daniel G. Clodfelter

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Report on the Friday 26 March 2004 site visit to Belews Creek Steam Station
   Senator Hamilton C. Horton, Jr.

5. Quarterly report by the Environmental Management Commission (EMC) as to its operations, activities, programs, and progress (G.S. 143B-282(b))
   Dr. David H. Moreau, Chairman
   Environmental Management Commission

6. Report on and discussion of options to protect water quality and endangered species in the portion of Swift Creek that is located east of Nash County Road 1003 (S.L. 2003-433, Sec. 3)
   Thomas P. Augspurger, Ecologist
   United States Fish and Wildlife Service

   Scott Van Horn, Research Supervisor
   Division of Inland Fisheries, Wildlife Resources Commission

   Thomas A. Reeder, Supervisor
   Classification and Standards Unit, Division of Water Quality, DENR

Lisa D. Martin, Director of Regulatory Affairs
North Carolina Home Builders Association

Derb S. Carter, Senior Attorney
Southern Environmental Law Center

7. Update on the status of designation of nonattainment areas to comply with the revised national ambient air quality standard (NAAQS) for ozone (the 8-hour standard)
Brock M. Nicholson, Deputy Director
Division of Air Quality, DENR

8. Discussion of the proposed modification of the rule setting out the acceptable ambient level (AAL) for hydrogen sulfide under rules adopted by the Environmental Management Commission that govern the emission of toxic air pollutants
Jeff W. Hudson, Assistant Commission Counsel

B. Keith Overcash, Director
Division of Air Quality, DENR

Leah M. Devlin, D.D.S., M.P.H., State Health Director
Division of Public Health, Department of Health and Human Services

Michael Shore, Southeast Air Quality Manager
Environmental Defense

A. Preston Howard, Jr., P.E., President
Manufacturers and Chemical Industry Council of North Carolina

9. Report on the Express Review Pilot Program and whether the Pilot Program should be continued or expanded (S.L. 2003-284, Sec. 11.4A(e)); Report on the One-Stop Permit Assistance and Coordination Program (S.L. 2001-424, Sec. 19.6)
Edythe McKinney, Director
Customer Service Center, DENR

10. Semiannual report on agency litter enforcement, litter prevention, and litter removal efforts (G.S. 147-12(b))
George J. Kapetanakis, Litter Programs Coordinator
Office of Beautification Programs, Department of Transportation

11. Commission discussion and announcements

12. Adjourn

SCHEDULE OF FUTURE MEETINGS:

Thursday 22 April and Friday 23 April 2004 – Special business meeting in Asheville; Site visit to Gorges State Park and Dupont State Forest
The Commission will hold a special business meeting at 1:30 p.m. on Thursday 22 April 2004 at the Holiday Inn, Asheville Airport. This special meeting will focus primarily on various matters related to land conservation and preservation of open spaces. The meeting will be held in conjunction with a tour of Gorges State Park on Thursday 22 April 2004 and a tour of Dupont State Forest on Friday 23 April 2004.

Wednesday 5 May 2004 -- Regular Business Meeting
Time: 9:30 a.m.
Location: 643 Legislative Office Building

Tuesday 11 May 2004 -- Regular Business Meeting
Time: 2:30 p.m. (tentative)
Location: 643 Legislative Office Building

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. 4 May 2004 – 605 Legislative Office Building

Stormwater Management Working Group
2:00 p.m. 27 April 2004 – 605 Legislative Office Building

PUBLIC SCHOOLS (
STATE BOARD OF EDUCATION :: Howard N. Lee, *Chairman* WWW.NCPUBLICSCHOOLS.ORG
DEPARTMENT OF PUBLIC INSTRUCTION :: Michael E. Ward, *State Superintendent*

December 31, 2003

MEMORANDUM

TO: The Honorable Douglas Yongue, Co-Chair
The Honorable Robert Grady, Co-Chair
The Honorable Steve Metcalf, Co-Chair
Joint Legislative Education Oversight Committee
Members, Joint Legislative Education Oversight Committee

FROM: Howard N. Lee, Chairman

RE: **Attached Required Report – Strengthen Littering Laws**

S.L. 2001-512, sec. 11 requires the State Board of Education to report to the Joint Legislative Education Oversight Committee and the Environmental Review Commission on the recycling efforts of the public schools in the state.

The attached report was provided to the State Board of Education in an informational mailing in November 2003.

Thank you for your continued service to our State and support for our public schools.

HNL:tlr

Attachment

C: Adam Levinson
Robin Johnson
Sara Kamprath
Shirley Iorio
Drupti Chauhan

OFFICE OF THE STATE BOARD OF EDUCATION
6302 Mail Service Center :: Raleigh, North Carolina 27699-6302 :: 919.807.3304 :: Fax 919.807.3408 or 919.807-3198
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Public Schools of North Carolina
State Board of Education
Department of Public Instruction

Report to the Joint Legislative Education Oversight Committee

Report on Strengthen Littering Laws SL2001-512, sec. 11

Senate Bill 1014

Date Due December 15, 2003
Report #24 in 2003-2004
DPI Chronological Schedule

State Board of Education

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Chairman
Raleigh

Jane P. Norwood
Vice Chair
Charlotte

Kathy A. Taft
Greenville

Michelle Howard-Vital
Wilmington

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Wayne McDevitt
Asheville

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Raleigh

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301 North Wilmington Street • Raleigh, North Carolina 27601-2825 • Website: www.ncpublicschools.org

RECYCLING QUESTIONNAIRE RESPONSES

SUMMARY PAGE

Senate Bill 1014 directed the State Board of Education to report to the Joint Legislative Education Oversight Committee and the Environmental Review Commission on the number and types of recycling programs in the public schools of North Carolina.

Number of LEAs Recycling	**103**	**88%**
Number of LEAs Not Recycling	**14**	**12%**

Summary of Recylced Items

Item Recycled	LEA Participation	% of LEAs
Cans	90	77%
Cardboard	73	62%
Computer hard drive	43	37%
Computer keyboard	41	35%
Cooking oil	57	49%
CRT Monitor	30	26%
Glass bottles	23	20%
Motor oil	77	66%
Newspapers	73	62%
Other glass containers	16	14%
Paper	80	68%
Plastic bottles	48	41%
Plastic cafeteria plates/cups	15	13%
Plastic cafeteria utensils	10	9%
Printer	40	34%
Tires	72	62%
Other Items (i.e. ink cartridges, light bulbs, etc.)	64	55%

RECYCLING QUESTIONNAIRE RESPONSES[1]

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
10	Alamance-Burlington	Yes	School (33)[2]	newspapers, other glass containers, cardboard, cans, motor oil, paper, plastic bottles, glass bottles, tires	Sale of computer hard drive, computer keyboard, printer	Working on recycling cooking oil
20	Alexander	Yes	School (10)	newspapers, cardboard, cans, printer, paper	printer cartridges, cans at football games collected by local citizen	
30	Alleghany	Yes	School (4)	(1) newspapers, (1) cardboard, (1) cans, (1) printer, (1) paper, (1) plastic bottles, (1) cooking oil		Alleghany High School is the only school with a recycling program. One school is exploring ways to reinstate a recycling plan for cans, glass & cardboard. One school has boy scouts collecting cans for fund raising. One school has had a recycling program but it has been inactive for three years. The Student Council is interested in starting it back up and are in the process of purchasing bins.
40	Anson	No	School (9)	cans, motor oil, cooking oil, tires	toner cartridges, computer components	Paper - no local sources will take recycled paper products; Computers - the number is too small
50	Ashe	Yes	School (6)	(3) newspapers, (5) cardboard, (2) cans, (3) paper	computers reused for parts only; tires are capped;Central Office recycles paper (not included in school count)	
60	Avery	Yes	School (9) & LEA	(1) newspapers, (1) computer hard drive, (1) computer keyboard, (6) cans, (1) CRT monitor, (4) paper	Copier ink cartridges, telephone books	
70	Beaufort	Yes	School (14)& LEA	Paper	Printer Cartridges	
80	Bertie	Yes	School (10) & LEA	(9) newspapers, (2) computer hard drive, (2) computer keyboard, (5) cans, (2) motor oil, (3) paper, (9) cooking oil, (2) tires	(10) printer cartridges	
90	Bladen	No	(14)			Bladen County does not have recycling plant. No place to process. No program or vendor around.
100	Brunswick	No	School (16)	(1) newspapers, (1) cans, motor oil, (3) paper, (3) plastic bottles, tires	Metal, ink cartridges, flourescent light bulbs, petroleum based fluids	A recycling program has not been implemented system wide due to lack of necessary resources.

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
110	Buncombe	Yes	School (41)	newspapers, computer hard drive, computer keyboard, other glass containers, cardboard, cans, motor oil, CRT monitor, paper, plastic bottles, glass bottles, cooking oil, tires	Scrap metal from maintenance, transportation and vocational classes.	
111	Asheville City	Yes	LEA (8)	computer hard drive, computer keyboard, cardboard, cans, printer, CRT monitor, paper		
120	Burke	Yes	LEA (25)	cardboard, cans, motor oil, paper		
130	Cabarrus	Yes	School (28) & LEA	computer hard drive, computer keyboard, (13) cardboard, printer, motor oil, CRT monitor, (13) paper, (26) cooking oil, tires	Printer cartridges	
132	Kannapolis City	Yes	School (7)	newspapers, computer hard drive (re-use), computer keyboard (re-use), (1) cardboard, (7) cans, (7) paper, (2) cooking oil, motor oil, CRT monitor, tires	Printer ink cartridges, phone books, fluorescent light bulbs	We have begun the process of organizing recycling at the LEA level
140	Caldwell	Yes	LEA (25)	cardboard, cans, paper, plastic bottles		
150	Camden	Yes	LEA (3)	newspapers, cardboard, cans, motor oil, paper, cooking oil, tires	printer ribbons, aluminum cans, motor oil	
160	Carteret	Yes	LEA (16)	(16) cardboard, (1) cans, (16) paper, (16) cooking oil, motor oil, tires		
170	Caswell	Yes	School (6) & LEA	cans (drink - some schools), motor oil, tires		We are exploring options at this time
180	Catawba	Yes	School (25)	(4) newspapers, (12) cardboard, (12) cans, (23) paper, (4) plastic bottles	Ink/toner cartridges (4 schools)	
181	Hickory City	Yes	School (10)	(4) newspapers, (1) other glass containers, (6) cardboard, (5) alum. cans, (2) other cans, (8) paper, (3) plastic bottles, (1) glass bottles, computer hard drive, computer keyboard, printer, CRT monitor, motor oil, tires	Computer items are sold by auction or state surplus; Motor oil and tires are recycled by the vehicle maintenance vendors	
182	Newton-Conover City	Yes	LEA (6)	newspapers, cardboard, cans, motor oil, paper, plastic bottles, glass bottles, tires	Toner cartridges	
190	Chatham	Yes	School (15) & LEA	newspapers, cardboard, cans, motor oil, paper, cooking oil		
200	Cherokee	Yes	School (13)	newspapers, computer hard drive, computer keyboard, other glass containers, cardboard, cans, printer, motor oil, paper, plastic bottles, glass bottles, tires		
210	Edenton/Chowan	Yes	School (4)	newspapers, cardboard, motor oil, paper, tires		
220	Clay	Yes	School (3)	cans, printer, paper, tires	Printer cartridges	
230	Cleveland	Yes	LEA (12)	cardboard, cans, motor oil, tires	Printer cartridges	
231	Kings Mountain City	Yes	LEA (9)	(2) cardboard, (9) cans, (8) cooking oil		

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
232	Shelby City	No	(7)	Not a formal program. Groups involved on a sporadic basis for cans, plastic bottles, other glass containers		Attempts have been made in the past to develop a more comprehensive effort, but resources are not available. City does not collect recycled materials - merely has a drop off point; inadequate for school use. Is the state surveying/encouraging/requiring municipalities to promote/support recycling? If not, why would the legislature expect schools to be able to implement a successful program if the municipality can't accomodate the recycled materials?
240	Columbus	Yes	School (19)	newspapers, plastic cafeteria plates/cups, cardboard, cans, printer, motor oil, cooking oil, tires	bulbs - ballast	
241	Whiteville City	Yes	School (5) & LEA	(LEA) newspapers, (LEA) computer hard drive, (LEA) computer keyboard, (LEA) cardboard, (4) cans, (LEA) printer, (1) motor oil, (LEA) CRT monitor, (LEA) paper, (4) cooking oil		
250	Craven	Yes	LEA (22)	newspapers, cardboard, cans, motor oil, paper, cooking oil, tires	Take computer equipment to a site the county owns. We think they recycle.	
260	Cumberland	Yes	School (85) & LEA	cardboard, cans, motor oil		
270	Currituck	No	School (8) & LEA	cardboard, cans, printer, motor oil, paper, plastic bottles, glass bottles, tires		
280	Dare	Yes	School (9)	(4) newspapers, (1) other glass containers, (3) cardboard, (2) cans, (1) motor oil, (5) paper, (1) plastic bottles, (1) glass bottles, (8) cooking oil, (1) tires	Ink cartridges, toner cartridges, aluminum pop tops, antifreeze	
290	Davidson	Yes	School (29)	newspapers, cardboard, cans, paper		
291	Lexington City	Yes	School (6)	newspapers, cardboard, cans, printer		
292	Thomasville City	Yes	School (4) & LEA	newspapers, computer hard drive, computer keyboard, other glass containers, cardboard, cans, printer, motor oil, paper, plastic bottles, glass bottles, cooking oil	white paper	

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
300	Davie	Yes	Private business (9)	cardboard, motor oil, tires		County commissioners did away with recycling program as of 9/20/03 and dismissed all employees and inmates. It's a shame! We were recycling cans, paper, plastic, metals and glass. Have no one to pick it up; told to put everything in dumpsters. I am very disappointed. Please help.
310	Duplin	Yes	LEA (15)	newspapers, cardboard, cans, motor oil, paper, cooking oil, tires	copier ink cartridges	
320	Durham	Yes	School (43) & LEA	newspapers, plastic cafeteria plates/cups, other glass containers, cardboard, cans, motor oil, paper, plastic bottles, glass bottles, cooking oil, tires		
330	Edgecombe	Yes	School (15)	(15) computer hard drive, (15) computer keyboard, (4) cans, (15) printer, (1) motor oil, (1) paper, (1) tires	Batteries, printer ink cartridges	
340	Winston-Salem/Forsyth	Yes	LEA (69)	newspapers, cardboard, cans, motor oil, paper, plastic bottles, cooking oil, tires		
350	Franklin	Yes	School (14) & LEA	(4) newspapers, (1) plastic cafeteria plates/cups, (1) plastic cafeteria utensils, (1) computer hard drive, (1) computer keyboard, cardboard, cans (aluminum), (1) printer, (5) paper, (2) plastic bottles, (3) glass bottles	(3) Printer/Toner cartridges; Maint. Shop - oil filters, oil, coolant; Cafeteria - cans, steel	We are looking to expand paper to all 14 schools this fall.
360	Gaston	Yes	LEA (52)	plastic cafeteria plates/ cups, computer hard drive, computer keyboard, cardboard, cans, printer, motor oil, CRT monitor, cooking oil, tires		
370	Gates	Yes	LEA (5)	cardboard, cans, printer, motor oil, paper, cooking oil, tires		
380	Graham	Yes	School (3) & LEA	computer hard drive, computer keyboard, motor oil, tires		
390	Granville	Yes	School (14) & LEA	(8) newspapers, (LEA) computer hard drive, (LEA) computer keyboard, (8) cans, (LEA) printer, (LEA) motor oil, (LEA) CRT monitor, (5) paper, (LEA) tires	(LEA) Printer cartridges, computer CPUs, batteries, freon	
400	Greene	Yes	School (4)	newspapers, cardboard, cans, motor oil, cooking oil, tires		
410	Guilford	Yes	School (105)	newspapers, cardboard, cans, motor oil, paper, plastic bottles, cooking oil, tires	computer ink cartridges	Organized by individual schools, administered by school system.
420	Halifax	Yes	LEA (15)	motor oil, tires	print cartridges	

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
421	Roanoke Rapids City	No	School (4)	(1) plastic cafeteria plates/cups, (1) plastic cafeteria utensils, (4) cans	(2) printer ink cartridges	Do not have a comprehensive recycling program. Have just begun a districtwide project called Green Schools. Each school has a team that is coordinating the study of energy conservation in core academic subjects with authentic projects on their school campuses. Several recycling efforts are part of this project.
422	Weldon City	Yes	LEA (3)	computer hard drive, computer keyboard, printer, motor oil, CRT monitor, cooking oil, tires		
430	Harnett	No	(25)			We do not have a recycling program in Harnett County; therefore, we do not have the capability.
440	Haywood	Yes	LEA (15)	newspapers, cardboard, cans, motor oil, paper, plastic bottles, tires	Cafeteria cooking oil, plastic cafeteria food/beverage containers	
450	Henderson	Yes	School (21) & LEA	(4) newspaper, cardboard, (5) cans, motor oil, paper, (2) plastic bottles, (1) glass bottles, cooking oil, tires	Anti-freeze, oil filters, grease, beverage tabs, styrofoam	The recycling program beings with the actions of the LEA. The LEA provides every school 3 diffferent solid waste large containers properly labeled. The containers are for general trash, cardboard and mixed paper. Each school has the responsibility to organize and ensure the proper waste is placed in the containers. The system has the responsibility to contract with a company to have the different waste types removed appropriately. Some individual school are recycling other items other than paper and cardboard.
460	Hertford	Yes	School (5) & LEA	newspapers, computer hard drive, computer keyboard, cans, motor oil, paper, plastic bottles, cooking oil, tires		
470	Hoke	Yes	LEA (11)	computer hard drive, computer keyboard, cardboard, cans, printer, motor oil, CRT monitor, cooking oil, tires		
480	Hyde	Yes	School (4)	newspapers, plastic cafeteria plates/cups, plastic cafeteria utensils, cans, paper, plastic bottles		
490	Iredell-Statesville	Yes	School (32)	newspapers, cardboard, paper, tires		
491	Mooresville City	Yes	School (6)	newspapers, cardboard, cans, cooking oil	Printer cartridges	

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
500	Jackson	No	School (7)			The county has been in transition; changing solid waste disposal and recycling. They are willing to work with us to reinstate a program to haul recyclables.
510	Johnston	Yes	School (34) & LEA	(22) newspapers, (18) cans, (1) paper, (3) plastic bottles.	(10) ink cartridges, (3) magazines	LEA picks up cardboard from all 38 sites. The Bus Garage and Facilities Services pick up all tires and motor oil for LEA.
520	Jones	Yes	LEA (6)	motor oil, cooking oil, tires	Some schools recycle printer cartridges	We contract solid waste. Have only one container at each location. Motor oil and cooking oil at LEA level.
530	Lee	Yes	School (12)	(3) newspapers, (5) cardboard, (11) cans, (2) paper, (1) plastic bottles	(1) Ink cartridges, (1) printer cartridges	
540	Lenoir	Yes	LEA (19)	paper (Central Office), motor oil (bus garage)		
550	Lincoln	Yes	School (21)	newspapers, cans, motor oil, paper	Printer cartridges	
560	Macon	Yes	School (10)	newspapers, computer hard drive, computer keyboard, cardboard, motor oil, paper, cooking oil, tires		
570	Madison	Yes	LEA (6)	newspapers, computer hard drive, computer keyboard, cardboard, cans, printer, motor oil, CRT monitor, paper, plastic bottles, tires		
580	Martin	Yes	School (12) & LEA	newspapers, computer hard drive, computer keyboard, cans, motor oil, paper, cooking oil, tires		
590	McDowell	Yes	School (11)	(4) newspapers, (2) computer hard drive, (2) computer keyboard, (6) cardboard, (7) cans, (3) printer, (2) motor oil, (2) CRT monitor, (5) paper, (2) plastic bottles, (2) glass bottles, (3) cooking oil	Cell phones, printer cartridge, waste paper, pop tops of drink cans, printer ribbons	
600	Charlotte-Mecklenburg	Yes	School (137) & LEA	newspapers, computer hard drive, computer keyboard, cardboard, (15) cans, printer, motor oil, CRT monitor, paper, (15) plastic bottles, cooking oil, tires	Phone books, magazines, catalogs, brochures, post-it notes, file folders, colored paper, stapled paper, junk mail, blueprints. Construction and demolition materials, toner cartridges	The Charlotte-Mecklenburg Bd. Of Ed. and Mecklenburg Co. Bd. Of Commissioners have an Interlocal Agreement for recycling services. (See additional notes on form). The CMS Recycling Program is recognized as a model for school recycling in North Carolina.
610	Mitchell	Yes	LEA (8)	newspapers, cardboard, cans, motor oil, paper, plastic bottles, glass bottles, cooking oil, tires	Any total metal object	
620	Montgomery	Yes	LEA (10)	motor oil, tires		Have checked with BFI about recycling cardboard and newspapers. They do not offer the service in this area.
630	Moore	Yes	School (22)	motor oil, paper, cooking oil, tires		

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
640	Nash-Rocky Mount	Yes	School (29) & LEA	(5) newspapers, (1) plastic cafeteria plates/cups, (1) plastic cafeteria utensils, (4) computer hard drive, (4) computer keyboard, (1) other glass containers, (12) cardboard, (20) cans, (2) printer, (1) motor oil, (3) CRT monitor, (5) paper, (1) plastic bottles, (1) glass bottles), (5) cooking oil, (1) tires	(11) printer cartridges, (1) telephone books, (1) softdrink pop tops	
650	New Hanover	Yes	School (34) & LEA	(7) newspapers, (1) plastic cafeteria plates/cups, (1) plastic cafeteria utensils, (37) computer hard drive, (37) computer keyboard, (3) cardboard, (15) cans, (37) CRT monitor, (13) paper, (6) plastic bottles, (1) glass bottles), (37) cooking oil	(1) Plastic 6-pack rings, (2) telephone books, (1) pop top rings off cans, (3) batteries, (1) aluminum products, (2) cell phones, (1) eye glasses	LEA recycles computers, keyboards, CRT monitors, printer cartridges, and cooking oil on system-wide basis. Several schools recycle additional products on a school level.
660	Northampton	No	School (10)	cans, motor oil, plastic bottles, glass bottles, cooking oil, tires	Printer ink	Some schools recycle. Mostly a club activity. Recycle programs have been investigated and found to be cost prohibiting. ARS, trash collection company for this area, has a charge for service; we cannot afford to pay. Technology dept. does a good job of recycling tech. items. In order for rural areas to address the recycling effort in an effective way there needs to be a program that would not be costly to the school system.
670	Onslow	Yes	School (33) & LEA	(5) newspapers, computer hard drive, computer keyboard, (1) other glass containers, (1) cardboard, (10) cans, printer, motor oil, CRT monitor, (3) paper, tires	Cell phones, printer cartridges	
680	Orange	Yes	School (11) & LEA	newspapers, plastic cafeteria plates/cups, plastic cafeteria utensils, computer hard drive, computer keyboard, other glass containers, cardboard, cans, printer, motor oil, CRT monitor, paper, plastic bottles, glass bottles, cooking oil, tires	All bus batteries and all dry cell batteries	
681	Chapel Hill-Carrboro City	Yes	School (16)	newspapers, computer hard drive, computer keyboard, other glass containers, cardboard, cans, printer, CRT monitor, paper, plastic bottles, cooking oil		District wide program
690	Pamlico	Yes	School (4) & LEA	(CO+ 4) newspapers, (CO+ 4) other glass containers, (LEA+2) cans, (CO+LEA) motor oil, (CO+ 4) paper, (2) glass bottles, (CO+LEA) cooking oil, (CO) tires, (LEA) cardboard		CO - Central Office

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
700	Elizabeth City/Pasquotank	Yes	School (12) & LEA	newspapers, computer hard drive, computer keyboard, cardboard, cans, printer, motor oil, CRT monitor, cooking oil, tires		
710	Pender	Yes	School (15)	newspapers, computer hard drive, computer keyboard, cardboard, cans, printer, cooking oil, tires	Ink printer cartridges, ink and toner copier cartridges.	Amount and consistency varies between schools. Computer hard drives, keyboards, etc. are reused in different schools or used in the classroom for students to learn how to repair computers and to problem-solve computer difficulties.
720	Perquimans	Yes	School (4)	newspapers, computer hard drive, computer keyboard, cardboard, cans, printer, motor oil, CRT monitor, paper, cooking oil		
730	Person	Yes	LEA (10)	newspapers, cardboard, cans, motor oil, paper, plastic bottles, cooking oil, tires, plastic cafeteria plates/cups, plastic cafeteria utensils	printer cartridges, anti-freeze, oil filters	
740	Pitt	Yes	LEA (33)	cardboard, cans, motor oil, paper, cooking oil, tires	oil filters, anti-freeze, batteries	
750	Polk	Yes	School (6)	newspapers, cans, motor oil (bus garage only), tires (bus garage only)		The county does not have a recycling program of any consequence. It makes it very difficult for us to have a broader program.
760	Randolph	Yes	School (28) & LEA	(LEA) newspapers, (LEA) cardboard, (School) cans, (LEA) motor oil, (LEA) paper, (LEA) cooking oil/grease, (LEA) tires recapped	(School) printer cartridges; (LEA) oil filters	We are looking into recycling computers and their components. Currently we sell them as surplus material. We are looking into recycling plastic bottles.
761	Asheboro City	Yes	School (8) & LEA	(5) newspapers, (8 & LEA) cardboard, (7) cans, (2) paper, (1) plastic bottles	(1) magazines, (1) plastic bags, (3) drink top tabs, (1) ink cartridges.	Cardboard at LEA level. All other efforts at school level.
770	Richmond	Yes	School (18) & LEA	cans, motor oil, tires	All refuse in Richmond Co. is sent to a recycling center to be sorted.	
780	Robeson	Yes	School (41)	newspapers, computer hard drive, computer keyboard, cardboard, cans, printer, motor oil, plastic bottles, cooking oil, tires	Metal scrap items from Plant Operations, tin, motors, wood items from remodeling projects	
790	Rockingham	No	(25)			Local schools participate in individually designed site based programs
800	Rowan-Salisbury	Yes	School (30)	newspapers, plastic cafeteria plates/cups, plastic cafeteria utensils, cans, paper, plastic bottles		

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
810	Rutherford	Yes	School (18) & LEA	(10) newspapers, (21) computer hard drive, (21) computer keyboard, (11) cardboard, (11) cans, (21) printer, (3) motor oil, (10) paper, (9) plastic bottles, (20) cooking oil, (1) tires	Tires and motor oil recycled by Transportation Dept. Two high school auto mechanics class recycle motor oil.	LEA level has scheduled pickup. Schools recycle.
820	Sampson	No	(16)			A recycling program has not been formulated as of this time, but Sampson Co. Schools always purchase recycled products whenever possible.
821	Clinton City	Yes	School (4)	cardboard, cans, motor oil, paper, cooking oil		
830	Scotland	Yes	School (15) & LEA	newspapers, other glass containers, cardboard, cans, motor oil, plastic bottles, glass bottles, tires	Automobile batteries, Inkjet cartridges	
840	Stanly	Yes	School (22)	(3) newspapers, (1) plastic cafeteria plates/cups, (2) cardboard, (7) cans, (3) paper, (1) plastic bottles	Ink cartridges, soup labels	
850	Stokes	Yes	School (18) & LEA	(5) newspapers, (LEA) computer hard drive, (LEA) computer keyboard, (6) cardboard, (9) cans, (LEA) printer, (LEA) motor oil, (LEA) CRT monitor, (3) paper, (1) plastic bottles, (1) glass bottles, (LEA) tires		
860	Surry	Yes	School (16) & LEA	newspapers, cmputer hard drive, cardboard, cans, printer, motor oil, CRT monitor, paper, tires	Telephone directories	
861	Elkin City	Yes	LEA (2)	cardboard, cans, paper, cooking oil, tires	Wood pallets	
862	Mount Airy City	Yes	School (4)	newspapers, plastic cafeteria plates/cups, computer hard drive, computer keyboard, cans, printer, paper, plastic bottles		
870	Swain	Yes	School (5) & LEA	cardboard, paper, plastic bottles, glass bottles, other glass containers		
880	Transylvania	Yes	School (9)	cardboard, paper	Printer cartridges	
890	Tyrrell	Yes	School (3) & LEA	newspapers, computer hard drive, computer keyboard, cans, printer, motor oil, CRT monitor, paper, cooking oil, tires	Printer cart	
900	Union	No	School (34)	(7) newspapers, (3) plastic cafeteria plates/cups, (1) plastic cafeteria utensils, (4) computer hard drive, (4) computer keyboard, (5) cardboard, (20) cans, (4) printer, (1) CRT monitor, (6) paper, (5) plastic bottles, (1) glass bottles, (1) cooking oil	(9) Printer/toner cartridtges, (3) cell phones, (1) drink tabs	Left up to individual schools.
910	Vance	Yes	LEA (15)	computer hard drive, computer keyboard, printer, motor oil, CRT monitor, paper, tires	inkjet and laser printer cartridges	

LEA #	LEA	Recycling Program	School or LEA Level	Items Recycled (Number of schools that are recycling in parenthesis)	Other Items	Comments and/or Reason for not Recycling
920	Wake	Yes	School (126) & LEA	newspapers, computer hard drive, computer keyboards, other glass containers, cardboard, cans, printers, motor oil, CRT monitors, paper, plastic bottles, cooking oil, tires	Anti-freeze, ballasts, batteries from backup lights, bricks, curb & paving materials, fluorescent tubes, gypsum, light bulbs, metal, polystyrene, printer cartridges, sheet rock, stone, vehicle batteries	Items are recycled by and on behalf of entire system of 107 schools and 4 administrative sites
930	Warren	No	(6)		Printer ink cartridges	
940	Washington	No	(5)		Printer, computer ink cartridges	No conscious decision was made. We hope to begin a recycling program soon. Please send us guidelines to help us organize our program.
950	Watauga	Yes	School (9) & LEA	newspapers, computer hard drive, computer keyboards, cardboard, cans, printer, motor oil, CRT monitor, paper, cooking oil, tires		
960	Wayne	Yes	School (31) & LEA	other glass containers, cans, motor oil, plastic bottles, glass bottles, cooking oil, tires		We recycle some items but not all (still in progress). We stopped our total recycling program four years ago because local schools did not follow directions as well as the community used our trash bins on the weekends. Constant fines received from the local land fill.
970	Wilkes	Yes	School (24)	newspapers, plastic cafeteria plates/cups, plastic cafeteria utensils, computer hard drive, computer keyboard, cardboard, cans, printer, motor oil, CRT monitor, paper, plastic bottles, tires		
980	Wilson	Yes	LEA (23)	cardboard, motor oil, cooking oil, tires		
990	Yadkin	Yes	School (11)	newspapers, cardboard, motor oil, paper, plastic bottles, cooking oil, tires	Bi-metal	Organized at the school level.
995	Yancey	Yes	School (9)	(3) newspapers, (1) cardboard, (3) cans, (1) motor oil, (2) paper, (1) plastic bottles, (1) tires	Printer cartridges	

[1]Senate Bill 1014 directed the State Board of Education to provide the number and types of recycling programs in the public schools of North Carolina.
[2]Number in parenthesis indicates the number of schools in each LEA

April 20, 2004 ERC Meeting
EXHIBIT E

QUARTERLY REPORT

TO THE

ENVIRONMENTAL REVIEW COMMISSION

ON

ENVIRONMENTAL MANAGEMENT COMMISSION ACTIVITIES

April 2004

YEAR 2003 – 2004 THIRD QUARTER REPORT TO ERC

I. Quarterly Report On **Air Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

II. Quarterly Report On **Ground Water Quality** Activities

A. Future EMC And Committee Agenda Items

III. Quarterly Report On **Surface Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

I. AIR QUALITY ACTIVITIES

Agenda Item:

Hearing Officers' report on Amendments and Adoption of Air Quality Rules on Special Orders, Notification in Non-Zone Areas, Ethylene Oxide, And Permit Fees

Explanation:

On October 30 and November 5, 2003, Dr. Delilah Blanks, Dr. Frank S. Shaw, and Mr. Thomas K. Jenkins held public hearings on the adoption of and amendments to various air quality rules.

15A NCAC 2D .0538, Control of Ethylene Oxide Emissions, establishes maximum feasible control technology for facilities that use ethylene oxide as a sterilant in the production or packaging of medical devices (does not apply to hospitals and medical facilities) so that they could avoid having to demonstrate compliance with the air toxic rules for ethylene oxide. Currently, the Rule requires a demonstration of a 99 percent reduction by weight of ethylene oxide emissions. EPA Method 18 has a detection limit of one part per million. Some facilities are unable to demonstrate a 99 percent reduction of ethylene oxide emissions by weight emission concentrations. One of the amendments provide an alternative emission limit for ethylene oxide emission concentrations from all sterilizer unload and backdraft valve exhausts, and degassing rooms of not more than one part per million by volume. Further, the Rule is amended to allow facilities to model all plant ethylene oxide emissions to demonstrate compliance with acceptable ambient levels, and thus avoid compliance with specific standards in the Rule.

One comment was received asking that the require facilities be required to meet both compliance conditions. The purpose of the new option is to allow facilities with after control emissions that are below the EPA Method 18 detection limit to demonstrate compliance. Thus, no change has been made in response to this comment.

15A NCAC 2D .2201 through 15A NCAC 2D .2205 are new rules that define and list requirements for issuing Special Orders. The purpose of writing

the new rules is to rewrite 15A NCAC 2H.1200, Special Orders, used by the old Division of Environmental Management, and that DAQ currently uses to comply with G.S. 143-215.110.

15A NCAC 2Q .0113, Notification In Areas Without Zoning, is a new rule that places an additional permit application requirement on new or expanding facilities located in non-zoned areas in the State. Its purpose is to provide the public living in areas without zoning regulations with notification of a planned plant expansion or new plant construction prior to the facility submitting permit applications. The following rules are required to be amended to include the new Rule requirements: 15A NCAC 2Q .0304, Applications; 15A NCAC 2Q .0305, Application Content; 15A NCAC 2Q .0505, Application Content; and 15A NCAC 2Q .0507, Application. One hearing comment was received that asked for both the notice in newspapers and signage to be required in the new Rule. The proposed Rule does requires a facility to both publish a legal notice and to post a sign on the property.

15A NCAC 2Q .0202, Definitions, is amended to include definitions of "minor modification" and "significant modification" for permit fee purposes. The purpose is to remove uncertainty experienced during interpretation of the meaning of minor and significant modification. No hearing comment was received concerning this Rule.

15A NCAC 2Q .0203, Permit And Application Fees, is amended to correct column titles. Two of the titles in the permit application fee table in .0203 are reversed. "New or Significant Modification", which is the current title of the second column, should be the title of the third column. "New or Modification", which is the current title of the third column, should be the title of the second column. In addition to the phrase "2Q.0300 or" in the forth column is eliminated. Fees for modifications to permitted non-Title V facilities (2Q .0300 facilities) are under the column title "New or Modification."

No hearing comment was received concerning this Rule.

A record of Hearing Two was sent to you earlier.

Recommendation: The Hearing Officers recommend that the proposed new rules and amendments in Chapter II of the hearing record be adopted by the Environmental Management Commission.

EMC Action: EMC adopted amendments and new rules.

Agenda Item: Hearing Officers' Report on Amendments to and Adoption of Air Quality Rules on Concrete Batch Plants, Volatile Organic Compounds, Nitrogen Oxides, Open Burning, and Cotton Gins

Explanation: On October 30 and November 5, 2003, Dr. Delilah Blanks, Dr. Frank S. Shaw, and Mr. Thomas K. Jenkins held public hearings on the adoption of and amendments to various air quality rules. Only four of the 18 proposed amended and new rules included in this hear record generated comments.

A new rule, 15A NCAC 2D .0543, Particulates From Concrete Batch Plants, is proposed to control particulate emissions from concrete batch plants. As a result of this proposed adoption, a definition for $PM_{2.5}$ is proposed to be added to the definition rule (15A NCAC 2D .0101). Also, the visible emission rule (15A NCAC 2D .0521) is proposed to be amended to exempt concrete batch plants as the new rule contains visible emission limits for them.

Seventeen people commented that the new opacity limits will be too expensive to meet without a commensurate environmental benefit. As a result of these comments, the requirement of 15A NCAC 2D .0515 is reinstated, the opacity limit for process emissions and other sources are increased to 20 percent opacity, and opacity requirement for fugitive non-process emissions is replaced by requirement to comply with 15A NCAC 2D .0540.

Laboratory VOC exemption applicability (15A NCAC 2D .0902) is proposed to be modified to change the exemption to be consistent with 15A NCAC 2Q .0102.

The rule for petroleum liquid storage in external floating roof tanks (15A NCAC 2D .0933) is proposed to be amended to clarify the treatment of metallic-type shoe primary seals with shoe-mounted secondary seals.

Several clarifications and other changes are proposed to be made to the open burning rule

(Section 15A NCAC 2D .1900). Purpose, Scope, And Permissible Open Burning (15A NCAC 2D .1901) has been expanded. Several new definitions are proposed (15A NCAC 2D .1902). A prohibition of most types of open burning on days forecast to be code orange or above is also proposed (15A NCAC 2D .1903 and .1904). The new source performance standards for air curtain burners covered under these standards are added to the air curtain burner rule (15A NCAC 2D .1904). These requirements have already been adopted under the new source performance standard rule (they are added here for clarity). The need for temporary air curtain burners to have a certified visible emissions reader onsite is proposed to be removed.
Delegation to County Governments (15A NCAC 2D .1906) has been modified to preclude municipal governments from issuing permits to permanent sited air curtain burners.

Twenty commenters indicated that the amended Rule will require specific permission from State agencies to conduct agriculture or forest management open burning, that State agency anticipated visits to each site will cause unwarranted delays and lost time, and that open burning may require an air quality permit. In addition, many commenters believe they will face an additional liability if they conduct open burning without first verifying that the open burning process is a recommended practice for their particular application.

The proposed rules do not require pre-approval of an open burn or an air quality permit. Regarding additional liability by open burning, using an acceptable versus a recommended practice, a complaint will cause the Division of Air Quality to make an inquiry to establish if open burning for the particular application is a recommended practice. If it is a recommended practice, no further action will be taken. If not, DAQ would take appropriate action.

A new exclusionary rule (15A NCAC 2Q .0809) is proposed for concrete batch plants. This rule

declares concrete batch plants that produce less than 1,210,000 wet cubic yards of concrete to be small for permitting purposes. One commenter asked that the term "wet" be added to each "cubic yards of concrete" phrase used. The term has been added. The commenter asked that an owner or operator of each facility operating under the Rule be required to notify the Director. 15 NCAC 2Q.0801(b) requires written notification from facility not to be covered. Additionally, the commenter asked for a copy of the calculations that document the exemption production limit. A copy of the calculations is included as Attachment 15 of the hearing record.

Seven nitrogen oxide rules are recommended to be amended to make clarifications. The U.S. Environmental Protection Agency has asked for several clarifications to the nitrogen oxide rules. Clarifications are being made for monitoring requirements (15A NCAC 2D .1404), stationary internal combustion engines (15A NCAC 2D .1409), new emission sources (15A NCAC 2D .1418), using the trading program (15A NCAC 2D .1419), and using the compliance supplement pool (15A NCAC 2D .1422). Three corrections are also proposed to be made. They are correcting the location of Duke's Cliffside plant, the name of a boiler at Blue Ridge Paper Products, and an allocation for a combustion turbine at Butler Warner Generating.

The exclusionary rule for cotton gins (15A NCAC 2Q .0806) is proposed to be amended to remove specifying the ginning seasons and the requirement for the Commissioner of Agriculture to request extending the ginning season if it exceeds the length specified in the rule. One commenter pointed out a typographical error that has been corrected.

A record of Hearing Four was sent to you earlier.

Recommendation:

The Hearing Officers recommend that the proposed new rules and amendments as presented in Chapter II of the hearing record be adopted by the Environmental Management Commission, and that

the Chairman be authorized to sign the certification forms on behalf of the Commission.

EMC Action: EMC adopted amendments and new rules — except for amendments to open burning rule, which were postponed until April.

Agenda Item _____: Hearing Officers' Report on an Amendment to the Municipal Waste Combustor Air Quality Rule

Explanation:

On October 30 and November 5, 2003, Dr. Delilah Blanks, Dr. Frank S. Shaw, and Mr. Thomas K. Jenkins held public hearings on the adoption of and amendments to various air quality rules.

In rule 15A NCAC 2D .1205, Municipal Waste Combustors, the final compliance date for small municipal waste combustors is proposed to be changed from March 1, 2003 to December 1, 2004. This change is being made as a result of Session Law 2002-24, Section 2.

The EMC adopted a temporary rule on February 13, 2003, which became effective on March 1, 2003, to change the final compliance date to December 1, 2004. The proposed amendment considered at the public hearing will make permanent the December 1, 2004, final compliance date.

One person opposed changing the final compliance date from March 1, 2003 to on or after December 1, 2004. He questioned the need for the rule change and the legality of the rule as it applies to only one facility. This rule change is being made to comply with Session Law 2202-24, Section 2, which requires the EMC to change the final compliance date for small municipal waste combustors to no earlier than December 1, 2004. Additionally, The EMC has the legal authority to adopt rules that affect only one facility. It has done so on several occasions.

A record of Hearing Four was sent to you earlier.

Recommendation:

The Hearing Officers recommend that the proposed amendment to 15A NCAC 2D .1205, Municipal Waste Combustors, be adopted by the Environmental Management Commission as presented in Chapter II of the hearing record.

EMC Action: EMC adopted amendment.

Future EMC and Air Quality Committee Agenda Items

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Apr 04	-Implementation of New Authority: Banking and Trading and Credit for Early Reductions (323c)	-To Revise PSD Rule (393) -Clarification of Facility Permit Exemption in 2Q .0102 (402) -Change Daily Opacity Exceedances for COM from 10 to 4 in 2D .0521 (417)	Adoption -Open Burning Revisions (254, 272, 288) -Revision of AAL for Hydrogen Sulfide and Exempting Wastewater Treatment Systems at Paper Mills (378, 400) Hearing Request -Correct Testing Date for CISWI (413) -Correct Cross-Reference in 2D .1208 (389) -Correct Cross-Reference in 2D .0519 (391) -Portable Crushers (385) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level Should Be Changed in a Permit (396) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386)
May 04			Hearing Request -To Revise PSD Rule (393) -Clarification of Facility Permit Exemption in 2Q .0102 (402) -Change Daily Opacity Exceedances for COM from 10 to 4 in 2D .0521 (417)
July 04		-Amend Definition of AApplicable Requirement@ to add reference to 2D .900,.1400, and .1200 (334)	

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		-Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361)	
July 04 cont.		-Permit Exemption for County Grain Elevators and Mills (325) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Revision of Ranking of Incinerators in 2D .1201 (403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405)	

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		-Correct Washington Regional Office Address in 2D .1905 (410) -Make Emission Inventory Part of Permit Application (411) -Leaks at Gasoline Terminal Clarification (412) -Implementation of New Authority: Banking and Trading and Credit for Early Reductions (323c)	
Sept 04		-Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299)	Hearing Request -Amend Definition of "Applicable Requirement" to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1)
Sept 04 cont.		-AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)	-Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Provide Option for Missing Data Requirements in

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Dec 04			<u>Adoption</u> -Amend Definition of AApplicable Requirement@ to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d)
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Feb 05		-Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility@ and ASynthetic Minor Facility@ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules	<u>Adoption</u> -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		(364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)	
Mar 05			<u>Hearing Request</u> -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility@ and ASynthetic Minor Facility@ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)
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II. GROUNDWATER ACTIVITIES

GROUNDWATER GWC/EMC FUTURE AGENDAS*

	Committee Agenda	EMC Agenda
April 2004	• Meeting cancelled.	• No items scheduled at this time.
May 2004	>DWM-UST SECTION ITEMS< 1. **Request for Approval to Proceed with Temporary and Permanent Rulemaking to Implement Statutory Changes Regarding Cleanup of Co-Mingled Plumes of Petroleum.** 2. Information on Legislation to Require Secondary Containment for Non-Tank Components of a UST System. 3. Status of the State Trust Fund for Cleanup of Underground Storage Tanks.	• No items scheduled at this time.
June 2004	• No meeting scheduled.	• No meeting scheduled.
July 2004	>DWQ-GWS ITEM< 1. **Request to APPROVE Changes to 33 groundwater Quality Standards in 15A NCAC 2L .0202.**	>DWM-UST SECTION ITEM< 1. **Request for Approval to Proceed with Temporary and Permanent Rulemaking to Implement Statutory Changes Regarding Cleanup of Co-Mingled Plumes of Petroleum.**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

	Committee Agenda	EMC Agenda
Aug 2004	• No meeting scheduled.	• No meeting scheduled.
Sept 2004	>DWQ-GWS ITEMS< 1. **Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202.** 2. **Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards.** >DWM-SUPERFUND SECTION ITEM< 1. **Request to Proceed with the Implementation of New Rules from the Dry-Cleaning Solvent Cleanup Fund and to Proceed to Public Notice and Hearing.**	>DWQ-GWS ITEM< 1. **Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.**

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

SURFACE WATER QUALITY ACTIVITIES

Agenda Item:

Request for Approval of the Final Tar-Pamlico River Basinwide Water Quality Plan

Explanation:

The *Tar-Pamlico River Basinwide Water Quality Plan* is in the third cycle of basinwide plans that the Division is preparing for all 17 of the state's major river basins.

The draft Tar-Pamlico River Basinwide Water Quality Plan was approved by the Water Quality Committee in October 2003 to be taken to public meetings. Four public meetings were held throughout the basin; Washington, Greenville Louisburg and Nashville in December 2003 with approximately 73 people in attendance. Revisions were made and some information was added to the draft plan based on comments. Copies of the revised plans were sent to EMC members in the EMC package.

This Basinwide Water Quality Plan is a planning document that will guide the Division's management actions in this river basin over the next five years and beyond. The management actions are based on existing rules and policy. Therefore, approval and endorsement of this plan by the Commission would affirm that the management actions set forth in this plan are consistent with the rules adopted by the Commission and with the decision-making policies under which the Division has acted in the past.

Recommendation:

It is recommended that the *Tar-Pamlico River Basinwide Water Quality Plan* be approved and endorsed by the Commission as a guide to water quality program management and implementation by the Division of Water Quality as it carries out its Water Quality Program duties and responsibilities in this river basin.

EMC ACTION:

The EMC approved the *Tar-Pamlico River Basinwide Water Quality Plan* as recommended.

Agenda Item:

Request for Permission to Proceed to Public Hearing with Proposed Division of Water Quality (DWQ) Exceptions Rule

Explanation:

The Environmental Management Commission (EMC) directed DWQ Staff to draft an Exceptions Rule that would establish a uniform set of procedures to provide exceptions from specific DWQ Rules to affected, qualifying parties. Accordingly, staff drafted several versions of a proposed Exceptions Rule, which were presented to the Water Quality Committee (WQC) at its December Meeting. The WQC voted to pass several of the proposed versions on to the full Commission for further consideration. Three versions, or options, of this proposed rule are now provided to the EMC for review. All three of these options contain the following provisions:

- These exception procedures would apply only to DWQ Rules that specifically refer to the proposed Exceptions Rule in their text.
- Local authorities could be delegated the authority to make exception decisions on a case-by-case basis under the authority of this proposed rule.
- "Automatic" exceptions are provided to certain, qualifying DOT projects.

The major differences in the three options are presented below:

Option 1: This is the "basic" version and does not address "vested rights."

Option 2: This version provides an "automatic" exception to projects with vested rights.

Option 3: This version allows projects with vested rights to apply for an exception to the DWQ Director.

Recommendation:

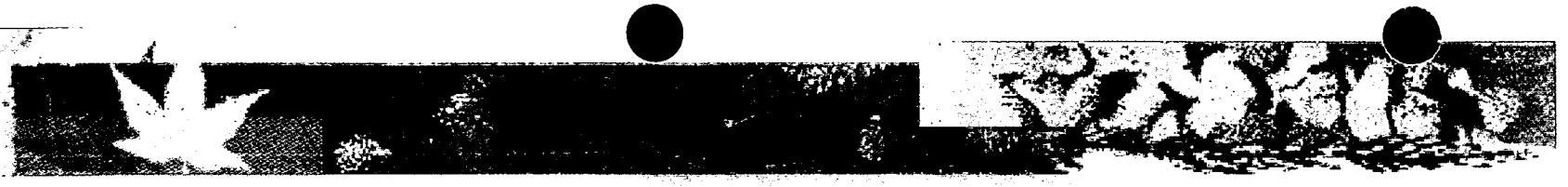
That the EMC determine which of the proposed versions is most appropriate and authorize DWQ Staff to notice the selected text in the *North Carolina Register* and proceed to public hearing.

EMC ACTION:

The EMC authorized DWQ Staff to proceed to public hearing with all three proposed versions of the DWQ Exceptions Rule. The Commission will make its final determination as to which of the proposed versions to adopt as rule based upon the comments received through the formal hearing and comment process.

SURFACE WATER QUALITY WQC/EMC FUTURE AGENDAS

	WQC Agenda	EMC Agenda
April 2004	• WQC Meeting cancelled.	• Request for Adoption of the Proposed Permanent Rules Amending the Sandy Creek and Swift Creek ORW Reclassification as Specified in House Bill 566.
May 2004	▪ Information on possible non-discharge rule changes. ▪ Information on Using Swamp Criteria. ▪ Information on Findings from the Mercury Study (Joint meeting with Air Quality Committee). ▪ Update on the Coastal Habitat Protection Plan. ▪ Request for Approval to Proceed with the Draft Catawba River Basin Plan to Public Meetings.	• No items scheduled at this time.
June 2004	• No meeting scheduled.	• No meeting scheduled.



Endangered Species Act of 1973

Purpose: protect species heading toward extinction and provide a means to conserve their ecosystems.

Species listed on the basis of "the best scientific and commercial data available" regarding biological status and threats.

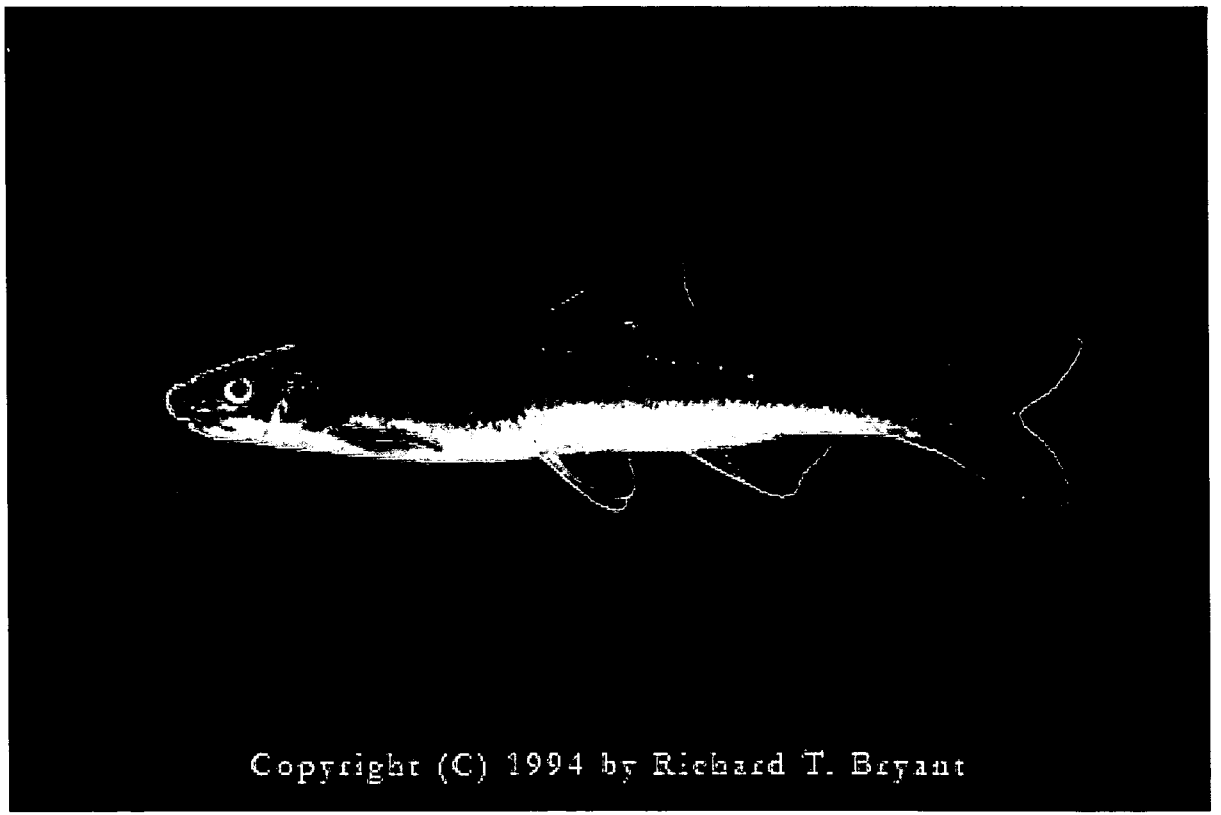
Listings decided using sound science, peer review, public rule-making.

April 20, 2004 ERC Meeting
EXHIBIT F

Federally-listed T/E Species in NC

Mammals	12
Birds	5
Reptiles	7
Insects and spiders	3
Fish	4
Mussels	7
Snails	1
Plants	27

Spotfin chub



Once listed, ESA provides for…

FWS and others to develop / implement recovery plans

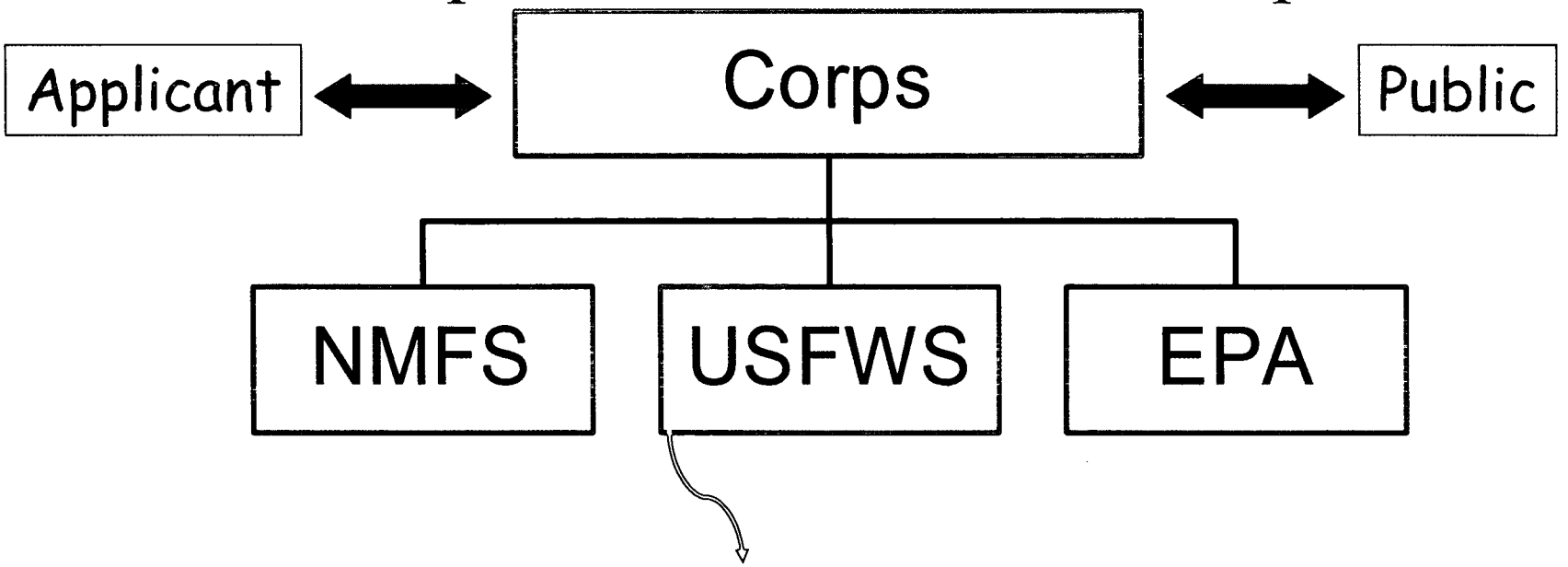
Assistance to States, private landowners

Federal agencies to consult with FWS to ensure actions they authorize, fund, or carry out will not jeopardize species

Prohibition on un-authorized "take" (harass, harm, hunt, pursue, shoot, wound, kill, trap, capture, or collect)

Consultation process, applies when…

- Federal land involved
- Federal money involved
- Federal permit or authorization required:



Including Endangered Species Review

Tar spinymussel

Listed as endangered in 1985

Revised recovery plan in 1992

> 1.4 USFWS should work with North Carolina agencies to "Encourage establishment of mussel sanctuaries, high quality water designations, stream buffer zones, and other protection strategies as a means of protecting present and reintroduced populations."

Known in 7 NC streams, Swift Creek is the best

U.S. Fish & Wildlife Service

ESA Basics

Over 25 years of protecting endangered species

Introduction
When the Endangered Species Act (ESA) was passed in 1973, it represented America's concern about the decline of many wildlife species around the world. It is regarded as one of the most comprehensive wildlife conservation laws in the world.

The purpose of the ESA is to conserve "the ecosystems upon which endangered and threatened species depend" and to conserve and recover listed species. Under the law, species may be listed as either "endangered" or "threatened". Endangered means a species is in danger of extinction throughout all or a significant portion of its range. Threatened means a species is likely to become endangered within the foreseeable future. All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened.

As of August 31, 2002, 1,818 species are listed, of which 1,260 are U.S. species. The list covers mammals, birds, reptiles, amphibians, fishes, snails, clams/mussels, crustaceans, insects, arachnids, and plants. Groups with the most listed species are (in order) plants, mammals, birds, fishes, reptiles, and clams/mussels.

The law is administered by the Interior Department's U.S. Fish and Wildlife Service (FWS) and the Commerce Department's National Marine Fisheries Service. The FWS has primary responsibility for terrestrial and freshwater organisms, while the National Marine Fisheries Service's responsibilities are mainly for marine species such as salmon and whales.

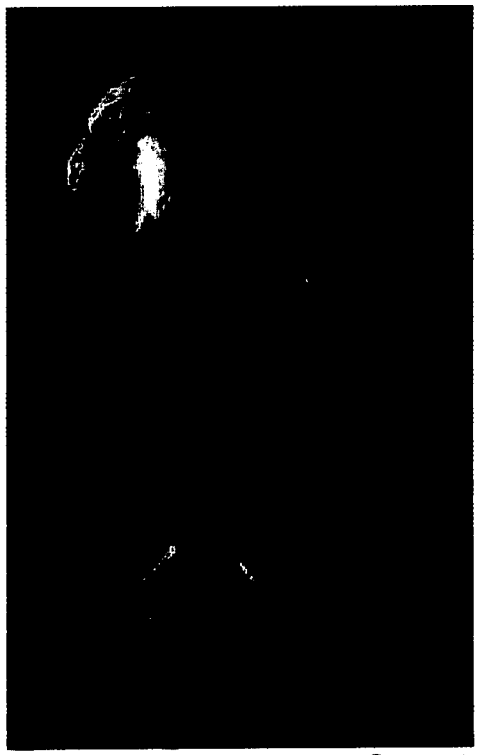
Legislative History
The 1973 Endangered Species Act replaced earlier laws enacted in 1966 and 1969, which provided for a list of endangered species but gave them little meaningful protection. The 1973 law has been reauthorized seven times and amended on several occasions, most recently in 1988. The Endangered Species Act was due for reauthorization again in 1993, but legislation to reauthorize it has not yet been enacted. The Endangered Species program has continued to receive appropriations while Congress considers reauthorization, allowing conservation actions for threatened and endangered species to continue.

The ESA
The Endangered Species Act is a complex law with a great deal of built-in flexibility. Some basics of the law include:

Purpose
When Congress passed the Endangered Species Act in 1973, it recognized that many of our nation's native plants and animals were in danger of becoming extinct. They further expressed that our rich natural heritage was of "esthetic, ecological, educational, recreational, and scientific value to our Nation and its people." The purposes of the Act are to protect these endangered and threatened species and to provide a means to conserve their ecosystems.

Federal Agencies
All federal agencies are to protect species and preserve their habitats. Federal agencies must utilize their authorities to conserve listed species and make sure that their actions do not jeopardize the continued existence of listed species. The FWS and the National Marine Fisheries Service work with other agencies to plan or modify federal projects so that they will have minimal impact on listed species and their habitat.

Working with States —Section 6
The protection of species is also achieved through partnerships with the States. Section 6 of the law encourages each State to develop and maintain conservation programs for resident federally-listed threatened and endangered species. Federal financial assistance and a system of incentives are available to attract State participation. Some State laws and regulations are even more restrictive in granting exceptions or permits than the current ESA.



Bald eagle
Corel Corp. photo

Working with non-Federal landowners, the Service provides financial and technical assistance to landowners to implement management actions on their lands to benefit listed and nonlisted species.

Local Involvement
The protection of federally listed species on Federal lands is the first priority of the FWS, yet, many species occur partially, extensively or, in some cases, exclusively on private lands. Policies and incentives have been developed to protect private landowners' interests in their lands while encouraging them to manage their

lands in ways that benefit endangered species. Much of the progress in recovery of endangered species can be attributed to public support and involvement.

Listing —Section 4
Species are listed on the basis of "the best scientific and commercial data available." Listings are made solely on the basis of the species' biological status and threats to its existence. In some instances, a species which closely resembles an endangered or threatened species is listed due to similarity of appearance. The FWS decides all listings using sound science and peer review to ensure the accuracy of the best available data.

Candidate Species —Section 4
The FWS also maintains a list of "candidate" species. These are species for which the Service has enough information to warrant proposing them for listing as endangered or threatened, but these species have not yet been proposed for listing. The FWS works with States and private partners to carry out conservation actions for candidate species to prevent their further decline and possibly eliminate the need to list them as endangered or threatened.

Recovery —Section 4
The law's ultimate goal is to "recover" species so they no longer need protection under the Endangered Species Act. The law provides for recovery plans to be developed describing the steps needed to restore a species to health. Appropriate public and private agencies and institutions and other qualified persons assist in the development and implementation of recovery plans. Involvement of the public and interested "stakeholders" in development of recovery plans is encouraged. Recovery teams may be appointed to develop and implement recovery plans.

Consultation —Section 7
The law requires federal agencies to consult with the Fish and Wildlife Service to ensure that the actions they authorize, fund, or carry out will not jeopardize listed species. In the relatively few cases where the FWS determines the proposed action will jeopardize the species, they must issue a "biological opinion" offering "reasonable and prudent alternatives" about how the proposed action could be modified to avoid jeopardy to listed species. It is a very rare exception where projects are withdrawn or terminated because of jeopardy to a listed species.

Critical Habitat —Section 4
The law provides for designation of "critical habitat" for listed species when judged to be "prudent and determinable". Critical habitat includes geographic areas "on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection." Critical habitat may include areas not occupied by the species at the time of listing but that are essential to the conservation of the species. Critical habitat designations affect only federal agency actions or federally funded or permitted activities.

International Species —Section 8
The Endangered Species Act is the law that implements U.S. participation in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), a 130-nation agreement designed to prevent species from becoming endangered or extinct because of international trade. The law prohibits trade in listed species except under CITES permits.

Exemptions —Section 10
The law provides a process for exempting development projects from the restrictions of the Endangered Species Act. This process permits completion of projects that have been determined to jeopardize the survival of a listed species, if a Cabinet-level "Endangered Species Committee" decides the benefits of the project clearly outweigh the benefits of conserving a species. Since its creation in 1978, the Committee has only been convened three times to make this decision.

Habitat Conservation Plans —Section 10
This provision of the ESA is designed to relieve restrictions on private landowners who want to develop land inhabited by endangered species. Private landowners who develop and implement an approved "habitat conservation plan" providing for conservation of the species can receive an "incidental take permit" that allows their development project to go forward.

Definition of "Take" —Section 9
Section 9 of the Endangered Species Act makes it unlawful for a person to "take" a listed species. The Act says "The term take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The Secretary of the Interior, through regulations, defined the term "harm" in this passage as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

Compliance with Other Laws
The Endangered Species Act is not the only law to protect species of wild mammals, birds, reptiles, amphibians and fishes, clams, snails, insects, spiders, crustaceans, and plants. There are many other laws with enforcement provisions to protect declining populations of rare species and their habitat, such as the Marine Mammal Protection Act, the Migratory Bird Treaty Act, and the Anadromous Fish Conservation Act. The Lacey Act makes it a federal crime for any person to import, export, transport, sell, receive, acquire, possess, or purchase any fish, wildlife, or plant taken, possessed transported or sold in violation of any Federal, State, foreign or Indian tribal law, treaty, or regulation.

For More Information
For additional information about threatened and endangered species and current recovery efforts, contact the U.S. Fish and Wildlife Service at the address below. Additional materials and the current U.S. List of Endangered and Threatened Wildlife and Plants is also available over the Internet at *http://endangered.fws.gov.*

US. Fish & Wildlife Service
Endangered Species Program
4401 N. Fairfax Drive, Room 420
Arlington, VA 22203
703/358 2390
http://endangered.fws.gov
October 2002

April 20, 2004 ERC Meeting
EXHIBIT G

North Carolina Wildlife Resources Commission

Charles R. Fullwood, Executive Director

April 20, 2004

TO: Members of the North Carolina Environmental Review Commission

FROM: Division of Inland Fisheries

Comments on the Presence of Listed Species in the Lower Swift Creek, Tar River Basin, N. C.

The State of North Carolina has a listing process that indicates endangered, threatened, and special concern status for given species. For example, Swift Creek has four state endangered mussels, four state threatened mussels, and one state special concern mussel.

The state listing process is administered by the NC Wildlife Resources Commission (WRC). Any "interested individual" (which is usually a scientific or conservation organization), can petition for listing with the state. The WRC refers the request to its Non Game Advisory Committee which usually directs the request to a Scientific Council with expertise on that particular species. This Council determines the scientific merits of the request and makes its recommendation to the Non-Game Advisory Committee. In turn, the Advisory Committee provides a recommendation to the WRC, which then votes to accept or reject. If the recommendation is accepted, the WRC advances the proposal through normal rule making processes, which provide opportunities for public comment.

The state law authorizing the listing process provides no special protection for state listed species except to regulate their collection. *No project in this state has ever been denied or delayed due to state listing of any species.* The state listing is useful primarily as a mechanism to identify species needing special conservation measures to ensure their continued existence in North Carolina.

High quality streams (free from sedimentation, poor water quality, physical habitat alterations, modified stream flows, etc.) support diverse biological communities rich in numbers of animals and species. Swift Creek supports at least 14 freshwater mussel species. This number comprises nearly a third of the total mussels recognized in all Atlantic slope rivers across the country making Swift Creek a regionally significant mussel habitat. More than mussels benefit from this high habitat quality. There are seven species of crayfish, 300+ species of aquatic insects, 13 species of snails, and around 60 species of fish which inhabit Swift Creek.

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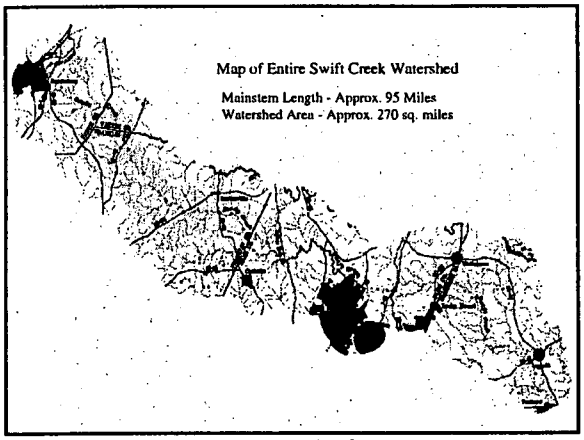
The Tar spiny mussel's presence in lower Swift Creek provides a point of emphasis that a regionally important biological community is present in the stream.

The biological diversity present in the lower Swift Creek provides a reliable, stable aquatic ecosystem that supports a healthy community of animals such as game fish, furbearers and waterfowl. The continued presence of this wildlife population is an important contribution to the quality of human life in our state from both recreational and economic perspectives.

The best chance to conserve the balance that ecology of the habitats requires depends upon managing selected streams for continued high habitat and water quality. Such a strategy applied to the lower Swift Creek could provide important biological, societal, and ultimately economic benefits.

Downstream Swift Creek Site Specific Management Plan

Environmental Review Commission
March 25, 2004

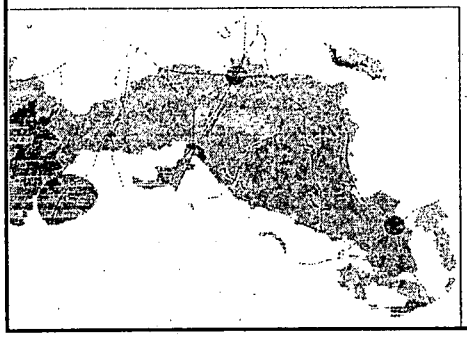


Introduction

- HB 566 allowed downstream protection measures approved by 2004 Session of GA.
- ERC may identify and evaluate protection measures for Swift Creek downstream of SR 1003.
- In September 2003, Water Quality Committee (WQC) directed DWQ to develop plan for submission to ERC.

Swift Creek Watershed - Downstream of SR 1003

Mainstem Length - 33 Miles
Watershed Area - Approx. 90 sq. miles



Plan Development

- Proposed plan developed by:
  - Tom Augspurger - US Fish & Wildlife Service
  - Cam McNutt - NC Division of Water Quality
  - Sarah McRae - NC Natural Heritage Program
  - Judy Ratcliffe - NC Natural Heritage Program
  - Angie Rodgers - NC Wildlife Resources Comm
  - Sara Ward - US Fish & Wildlife Service

Overview of Site-Specific Water Quality Management Strategy for Swift Creek East of SR 1003

Elements of Site-Specific Plan Development

- Issues to consider:
  - What are you trying to protect?
  - Where are you trying to protect it?
  - What are the threats to the species in question?
  - What protection measures are already in place?
- Analysis of these issues results in recommendations for enhanced protection measures.

Tar Spinymussel

(*Elliptio steinstansana*)

- Approximately 2.5 inches in length
- Preferred Habitat: Fast-flowing, well-oxygenated water.
- Adults live on stream bottom in substrate of silt-free, uncompacted gravel & sand.
- Known to occupy 2 river systems in the world: Tar-Pam and Neuse.
- Swift Creek watershed supports the best, remaining population of Tar Spinymussel.

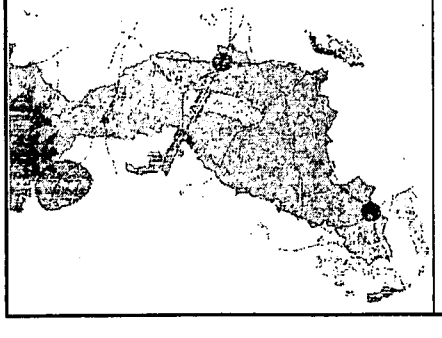
Freshwater mussel life cycle

Mussel larvae (glochidia) on fish gill

Recent Records of Tar Spinymussel in Downstream Swift Creek

SR 1003	July 1989	21 shells between SR 1003 and NC 48
	June 1990	11 shells between SR 1003 and I-95
	August 1990	103 shells upstream and downstream of SR 1003
	August 1990	4 shells between SR1003 and NC 48 following
	May 1991	6 shells between SR 1003 and NC 48
	August 1991	4 live and 29 shells between SR 1003 and NC
	July 1992	3 shells between SR 1003 and NC 48
	June 1996	1 live downstream of SR 1003
	July 1997	1 live and 4 shells between SR 1003 and NC 48
NC 48	June 1991	1 live upstream of NC 48
	July 1995	2 live and 2 shells upstream of the NC 48 xing
NC 97	June 1991	1 live downstream of the NC 97 crossing

Downstream Swift Creek



Species in Downstream Swift Creek

- Besides the Tar Spinymussel other rare aquatic species in Downstream Swift Creek include:
  - 8 other freshwater mussels with varying federal and State designations
  - 1 rare fish - the Carolina Madtom
  - 1 rare amphibian - the Neuse River Waterdog
  - A rare crayfish
- Protection measures developed for the Tar Spinymussel will also benefit these species.

Special Considerations for Endangered Mussels

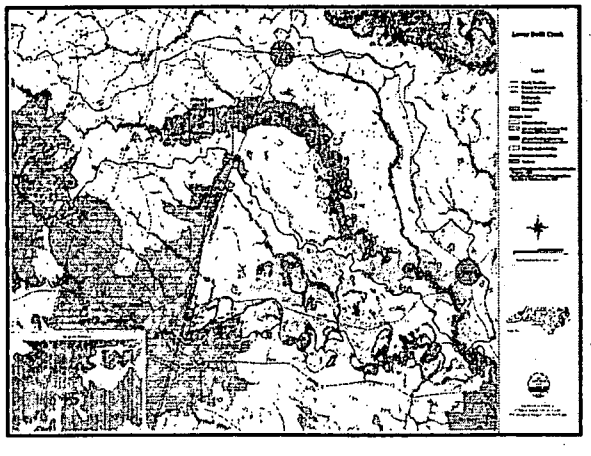
- Sediment
  - Excessive sedimentation smother mussels, affects biological processes & alters habitat.
- Flows
  - Impoundments result in loss of riffle and shoal habitats & exacerbate drought conditions.
  - Spinymussel needs fast-flowing, well-oxygenated water.

Special Considerations for Endangered Mussels

- **Riparian Buffers**
  - Buffers reduce sedimentation & other runoff.
  - Insufficient info exists to definitively state buffer requirements to ensure survival of Tar Spinymussel.
- **Ammonia**
  - Ammonia is extremely toxic to mussels.
  - Concentrations in Downstream Swift Creek are below levels of concern.

Existing Water Quality Protection Measures

- Nutrient Sensitive Waters (NSW) Strategy
  - 50-foot riparian buffers
  - NSW Stormwater Control Program
- Wetland/401 Rules - 15A NCAC 2H .0506
  - prohibits downstream cumulative impacts



Water Quality Management Plan Recommendations

Note: Scientifically-based proposed protection measures that have not been submitted to public review or hearing.

Proposed Protection Measures

- Flow Maintenance
  - No dams or impoundments within the Swift Creek mainstem or named tributaries.
  - No water withdrawals within the Swift Creek mainstem or named tributaries.
- Point Source Controls
  - No new or expanded discharges.
  - Encourage removal of existing point sources.

Proposed Protection Measures

- Sedimentation Control - For all projects that require Stormwater General Construction Permit:
  - Ground cover shall be established on all cleared areas within 7 calendar days of clearing.
  - Point or concentrated discharges to filter strips or protected buffers shall be avoided.
  - Same as sedimentation control requirements in DWQ 401 Certifications for mountain trout streams.

Proposed Protection Measures

- Buffer Enhancements
  - Silviculture: Only allow removal of individual "high value" trees throughout entire 50-foot buffer.
  - Encourage expansion of riparian buffer protection.

Why are some of these proposals different than the Outstanding Resource Waters (ORW) Strategy?

- ORW is a management strategy developed for Statewide implementation and based on the body of knowledge available in the 1980's.
- ORW is intended to protect *water quality.*
- This plan was developed at the request of the Water Quality Committee to protect an individual species (Tar Spinymussel) in a specific watershed.

Next Steps?

- Introduce legislation that would task the Environmental Management Commission to conduct a review of these (and other) proposals and then initiate rulemaking to implement those measures deemed appropriate.

Site-Specific Water Quality Management Strategy for the Swift Creek (East of State Road 1003 in Nash County), Tar-Pamlico Basin

I. Introduction

Swift Creek is generally recognized as having excellent water quality based on chemical and biological measurements (NCDWQ 2002, 2003). In addition, the waters of Swift Creek have been documented as containing a number of unique aquatic species, including one federally and State-listed endangered species. In July, 2002 the North Carolina Environmental Management Commission (EMC) approved a 14-mile portion of the watershed (between SR 1004 and 1003 in Nash County) to be reclassified as an Outstanding Resource Water (ORW), and also approved special protection and management strategies to be implemented throughout the entire Swift Creek watershed. For areas west of SR 1003 (Red Oak Road, Nash County), those rules and management strategies became effective August 1, 2003. Regarding that portion of the watershed east of SR 1003, Session Law (SL) 2003-433 (House Bill 566) allowed only the implementation of those water quality and endangered species protection measures as the 2004 Regular Session of the 2003 General Assembly may provide by law. Furthermore, SL 2003-433 authorized the Environmental Review Commission (ERC) to identify and evaluate options to protect water quality and endangered species in the portion of Swift Creek and its watershed in the Tar-Pamlico River Basin that are located east of Nash County State Road 1003. According to SL 2003-433, the ERC may report its findings, together with any recommended legislation, to the 2004 Regular Session of the 2003 General Assembly. In an effort to facilitate the ERC's evaluation of potential options for the protection of the water quality and endangered species in the Swift Creek watershed east of SR 1003, the EMC directed the Division of Water Quality (DWQ) to develop a site-specific water quality management strategy for those waters that would be protective of both the existing water quality and the endangered species contained within. This document represents the site-specific management strategy developed by the Division to fulfill that tasking.

This strategy presents existing knowledge regarding five important issues: 1) the federally-listed endangered species in Swift Creek; 2) the water quality conditions in the lower portion of Swift Creek; 3) the numeric or narrative standards to be attained for effective water quality management; 4) the existing water quality management framework; and, 5) the overall site-specific water quality management strategy to maintain water quality and protect aquatic life. Each of these factors is discussed below with reference to existing data and studies for brevity.

II. Tar Spinymussel

Because this plan is specifically intended to protect endangered species in the lower portion of the Swift Creek watershed, a summary of information on the listed species in Swift Creek is appropriate. The Swift Creek watershed supports the federally-listed as endangered and State critically endangered Tar spinymussel (*Elliptio steinstansana*). The Tar spinymussel (Figure 1) is a medium-sized mussel reaching about 2.5 inches in length (Johnson and Clarke 1983).

Juveniles may have as many as 12 spines, 6 on each valve. However, adult specimens tend to lose their spines as they mature, and some large adult specimens may not have shell spines (USFWS 1992). The preferred habitat of the Tar spinymussel appears to be relatively fast-flowing, well-oxygenated water, in sites with a substrate comprised of relatively silt-free, uncompacted gravel and coarse sand (USFWS 1992).

Figure 1. Tar spinymussel (*Elliptio steinstansana)*, a federally- and North Carolina-listed endangered freshwater mussel.

Like other freshwater mussels, the Tar spinymussel feeds by filtering food particles from the water column. The specific food habits of the species are unknown, but other freshwater mussels have been documented to feed on detritus, diatoms, phytoplankton, and zooplankton. The reproductive cycle of the species is likely similar to that of other native freshwater mussels. Males release sperm into the water column; the sperm are then taken in by the females through their siphons during feeding and respiration. The females retain fertilized eggs in their gills until the larvae, known as glochidia, fully develop. The mussel glochidia are released into the water, and within a few days they must attach to the appropriate species of fish, which are then parasitized for a short time while the glochidia develop into juvenile mussels. Juvenile mussels then detach from their "fish host" and sink to the stream bottom where they continue to develop, provided they land in a suitable substrate with the correct water conditions. The Tar spinymussel's life span, the fish host species, and many other aspects of its life history are unknown (Bogan 2002).

The Tar spinymussel is known to occupy two river systems in North Carolina. Populations exist in the Tar River (Nash and Edgecombe Counties), Swift Creek and Sandy Creek (Franklin, Nash, and Edgecombe Counties), Little Fishing Creek (Halifax County), Shocco Creek (Warren and Franklin Counties), and Fishing Creek (Warren County). The species has also been documented at one site in the Little River (Johnston County) in the Neuse River system (Bogan 2002, USFWS 2003b).

Swift Creek supports the best remaining population of the Tar spinymussel. Tar spinymussels have been found throughout the lower portion of Swift Creek which is the subject of the current plan (east of SR 1003). Live Tar spinymussels have been recorded in recent surveys of the upper portions of this reach (1 live individual and 4 shells found at the NC48 crossing in July 1997) and in the most recent surveys of the lower portions of this reach (1 live individual found at the NC97 crossing in June 1991) (Alderman et al 1993). Table 1 lists the recent occurrence records for the Tar spinymussel in Swift Creek, with emphasis on those in the lower reach.

Table 1. Recent occurrence records for the Tar spinymussel in Swift Creek, with emphasis on those in the lower portions (east of SR 1003).

Location	Date	Tar spinymussel Records
Upper Swift Creek		
	Pre-2002	36 individual survey records totaling 42 live individuals and over 100 shells found between 1987 and 2002 upstream of SR 1003
	June 2002	1 live downstream from SR 1310
	July 2002	2 shells upstream from SR 1003
Downstream of SR 1003		
SR 1003	July 1989	21 shells between SR 1003 and NC 48
	June 1990	11 shells between SR 1003 and I-95
	August 1990	103 shells upstream and downstream of SR 1003 following a mussel die-off
	August 1990	4 shells between SR1003 and NC 48 following a mussel die-off
	May 1991	6 shells between SR 1003 and NC 48
	August 1991	4 live and 29 shells between SR 1003 and NC 48
	July 1992	3 shells between SR 1003 and NC 48
	June 1996	1 live downstream of SR 1003
	July 1997	1 live and 4 shells between SR 1003 and NC 48
NC 48	June 1991	1 live upstream of NC 48
	July 1995	2 live and 2 shells upstream of the NC 48 crossing (between here and SR 1310)
NC 97	June 1991	1 live downstream of the NC 97 crossing

Historically, the Tar spinymussel likely once existed throughout much of the Tar River system. A decline in the populations likely resulted from water quality degradation in some parts of the system, land clearing for agriculture, impoundments, poor erosion control structures, and point and nonpoint source discharges (USFWS 1994). The Tar River spinymussel was designated as

endangered throughout its entire range in North Carolina in 1985 (USFWS 1985). A recovery plan addressing the Tar spinymussel was originally approved in 1987 and a revised recovery plan was approved in 1992 (USFWS 1987, 1992).

Given the small size of the Tar River and Shocco Creek populations, any factor that adversely modifies habitat or water quality in the short river reaches that the species inhabits could threaten its survival in these areas. In addition, the mainstem population in the Tar River is threatened by sediment loading, point source discharges, and urban runoff from a large upstream community (Rocky Mount). The Little River drainage is subject to declining habitat quality due to extensive timber harvesting resulting in sediment loading, stream bank instability, and deterioration of riparian buffers (NatureServe 2003).

III. A. Lower Swift Creek

The entire Swift Creek subbasin covers approximately 270 square miles and includes about 207 stream miles. About a third of the entire watershed is east of SR 1003 which is the subject of this plan. Land uses and cover types have been listed by others (McGrath 1992, Alderman et al. 1993, NCDWQ 2002, 2003) as have the outstanding ecological resources of the basin (Alderman et al 1993, Smith et al. 1993, NCDWQ 2002). The mainstem of Swift Creek in this reach is part of the Swift Creek Aquatic Habitat, a natural heritage area of national significance as recorded by the North Carolina Natural Heritage Program. In addition, the lower portion of Swift Creek contains the Swift Creek Swamp Forest, an approximately 2,000 acre natural area of regional significance, and a wading bird rookery recognized as an important animal habitat in the region.

Lower Swift Creek and its riparian habitat support significantly rare fish, mussels, and plants in addition to the Tar spinymussel. The federal species of concern and State endangered Atlantic pigtoe (*Fusconaia masoni*), yellow lance (*Elliptio lanceolata*), and yellow lampmussel (*Lampsilis cariosa*) are known to occur in the lower reaches of Swift Creek. Other mussels known from this reach include the State-listed as threatened triangle floater (*Alasmidonta undulata*), creeper (*Strophitus undulatus*), Roanoke slabshell (*Elliptio roanokensis*) and eastern lampmussel (*Lampsilis radiata)*, as well as the notched rainbow (*Villosa constricta*), a State species of concern. A rare fish, the Carolina madtom (*Noturus furiosus*), the Neuse River waterdog (*Necturus lewisi*), a rare crayfish, and two significantly rare insects have also been documented in this portion of the subbasin (Judy Ratcliffe, Natural Heritage Program, pers. comm.). While the site-specific water quality management strategies proposed in this document are aimed at the Tar spinymussel, they will also benefit other rare species in this watershed.

III. B. Water Quality Parameters of Concern in the Lower Swift Creek Subbasin

Swift Creek is generally recognized as having excellent water quality based on chemical and biological measurements (NCDWQ 2002, 2003). The EMC approved a 14-mile portion of the watershed (between SR 1004 and 1003 in Nash County) to be reclassified as an Outstanding

Resource Water (ORW), and they approved special protection and management strategies to be implemented throughout the watershed (NCDWQ 2003). For areas west of SR 1003, those rules and management strategies became effective August 1, 2003. Water quality ratings less than excellent in the lower reaches of Swift Creek (east of SR 1003) ultimately led to a stay on implementing ORW management strategies in those waters. That water quality upstream of SR 1003 is excellent has not been questioned; an examination of data available for areas downstream of SR 1003 is in order.

There is no systematic ambient chemical monitoring of water quality in the lower portion of Swift Creek. The nearest water quality monitoring station is about five miles upstream of State Road 1003 at State Road 1310 near Hilliardston where water quality has routinely been rated excellent.

There are only two small permitted discharges into the lower portion of Swift Creek: 1) Edgecombe County Schools / Phillips Middle School WWTP (NC0050415), a 0.01 million gallon per day (MGD) facility which discharges to Moccasin Creek, east of Battleboro; and, 2) Edgecombe County / North Edgecombe County High School WWTP (NC0050431), a 0.02 MGD facility which discharges into Swift Creek near Leggett. Both of these facilities have a history of violating permit limits, but neither of them conduct water quality monitoring in Swift Creek whereby the significance of those violations could be assessed.

There are very few recent water quality ratings for the lower portion of Swift Creek. A site near the upstream property line for Wake Stone (near I-95) that previously was rated excellent was surveyed by the NCDWQ in 1996. It received a rating of good in 1996, and the difference in ratings from upstream to this site was attributed to winter high flows scouring and burying habitat (NCDWQ 1998). Also, the numerical rating at this site was high within the range of ratings that classify as good (i.e., water quality here was at the upper end of the good range).

More recently, a benthic macroinvertebrate based water quality rating was applied to the downstream portion of lower Swift Creek at State Road 1253, (near NC 97, and near Swift Creek's confluence with the Tar River). This site was also previously rated as excellent (in 1989 and 1997), but it received a good bioclassification after the July 2002 sampling event (NCDWQ 2003). In 2002, however, limited flow and a low dissolved oxygen concentration were observed as this sampling was conducted during a drought. The 2002 good rating was very close to excellent; there was no difference in the EPT metric and a very small difference in the BI score. The drought of 2002 was the suspected cause for the lower water quality rating at State Road 1253 (NCDWQ 2003). Best professional judgment (Dave Lenat, NCDWQ Environmental Science Branch, pers. comm., Trish MacPhearson, NCDWQ Environmental Science Branch, pers. comm.) is that the 2002 rating, because it can be attributed to drought flows, should not be interpreted as a long term change in water quality from excellent to good.

Supporting data for that point are two-fold. First, the drought was significant and short-term impacts to instream fauna following droughts are not unexpected. A good illustration of this

point comes from the best long-term water quality monitoring record for Swift Creek -- that for Hilliardston, a site within the area already designated as ORW. Water quality at that site also was rated as good during a drought, but follow-up sampling in 2003 indicated it returned to excellent. Second, although dissolved oxygen concentrations were very low during the summer 2002 drought, there is no long term decline in dissolved oxygen in Swift Creek (Figure 2). Also, the low dissolved oxygen in Swift Creek in 2002 was no lower than other streams in the area (Figure 3).

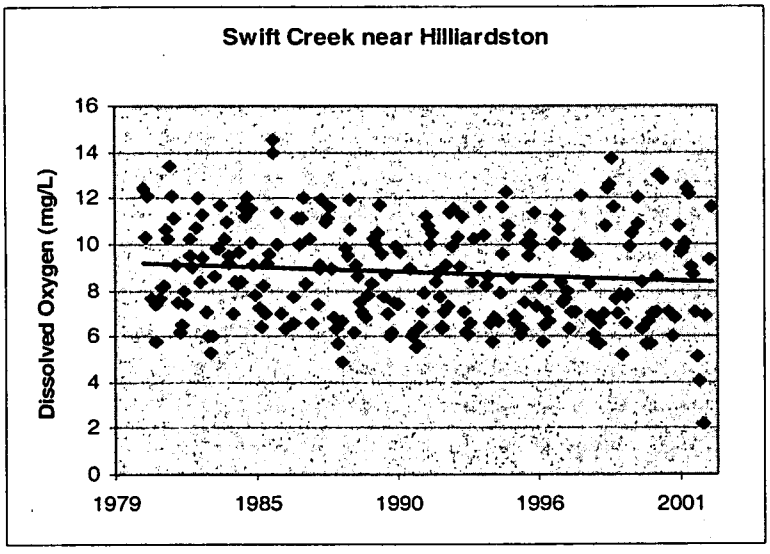


Figure 2. Although very low dissolved oxygen concentrations were recorded in the drought of 2002, there is no long term trend of declining dissolved oxygen in Swift Creek.

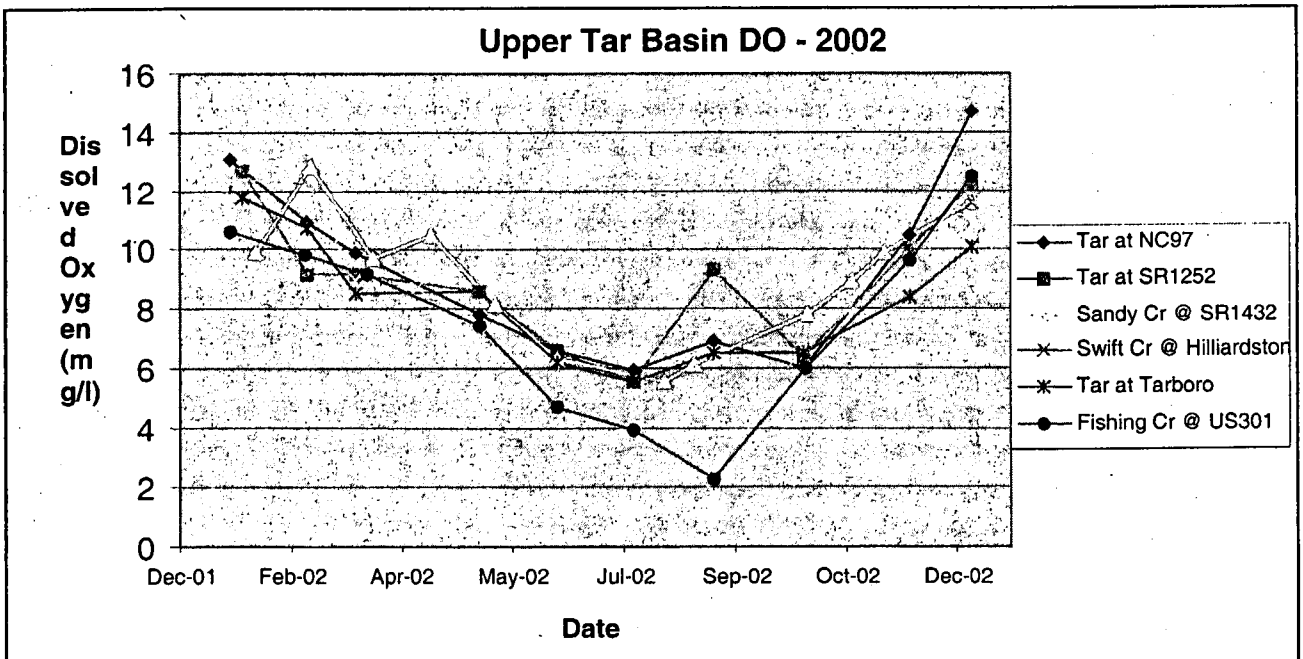


Figure 3. Low dissolved oxygen concentrations observed in Swift Creek during the drought of 2002 were observed in creeks throughout the basin (and not indicative of a local source of impairment).

Based on review of existing data, the 2002 rating of good at State Road 1253, which was attributed to drought conditions, and the 1996 rating of good near Wake Stone, which was attributed to winter flow scour, should not be interpreted as indicative of long term changes in water quality. The data do point to the need to maintain an adequate flow regime for mussels and other benthos, and the site-specific management strategy will be focused on maintaining existing water quality and quantity in the lower portion of Swift Creek.

IV. Special considerations for the endangered mussels

Many factors are cited in the decline of freshwater mussels in North America and for the listing of greater than 70% of native mussels as endangered, threatened, or of special concern (Williams et al. 1993, Neves et al. 1997). Habitat alteration, introduction of exotic species, over-utilization, disease, predation, and pollution are considered causal or contributing factors to the decline of mussel populations in many areas of the United States (Fuller 1974, Havlik and Marking 1987, Richter 1997, Neves 1997, National Native Mussel Conservation Commission 1998). Several aspects of water quality and quantity that will be important to consider in the conservation of the Tar spinymussel in Swift Creek are outlined here.

Flows

Neves et al. (1997) and Watters (2000) reviewed the specific effects of impoundments on freshwater mollusks. Impoundments result in the elimination of riffle and shoal habitats and the subsequent loss of mussel resources. Most of a river's ecological processes are also disrupted, for example, by modifying flood pulses, controlling impounded water elevations, increasing depth, decreasing habitat heterogeneity, and altering water flow, sediment, nutrients, energy input and output (Watters 2000, USFWS 2003a). In additions to permanent changes in hydrology from impoundments, water withdrawals are also a flow concern. Upstream man-induced water diversions, especially during low flow periods, exacerbate natural drought conditions of receiving waters.

Sediment

Sedimentation is the process by which eroded soil is deposited into waters. Soil erosion, transport, and redeposition are among the most essential natural processes occurring in watersheds. However, land-disturbing activities such as the construction of roads and buildings, crop production, livestock grazing, and timber harvesting can accelerate erosion rates by causing more soil than usual to be detached and moved by water, especially during stormwater flows.

Two aspects of sedimentation are important relative to mussels. First, suspended sediment can scour habitat and physically abrade mussels and their fish host species. Also, reduction in water clarity from suspended sediment can limit the ability of sight-feeding fish to find food (Henley et al. 2000). Second, the sediment that settles to, and accumulates on, the bottom of streams can

smother aquatic life and adversely affect the local habitat. Specific biological impacts on mussels from excessive sediment include reduced feeding and respiratory efficiency from clogged gills, disrupted metabolic processes, reduced growth rates, increased substrate instability, limited burrowing activity, and physical smothering (Waters 2000).

The physical characteristics of stream channels are affected when large quantities of sediment are added or removed (Watters 2000). The effects of sediment on mussel habitat have been reviewed by Brim Box and Mossa (1999). Mussels are potentially impacted by changes in suspended and bed material load, bed sediment composition associated with increased sediment production and runoff in the watershed, channel changes in form, position, and degree of stability; actively filling or scouring channels; and changes in channel position that may leave mussels exposed (Brim Box and Mossa 1999, USFWS 2003a). Interstitial spaces in mixed substrates may become clogged with sediment. When clogged, interstitial flow rates and spaces may become reduced, reducing habitat for juvenile mussels and some adults as well.

Sedimentation can be exacerbated when riparian vegetation is not present to filter run off water or when the streambank itself is eroding and contributing sediment to the waterbody. While not specific to the lower portion of Swift Creek, Kenney (1998) reports that sediment loading appeared to be the most widespread cause of water quality concerns in the Upper Tar River basin and the Swift Creek subbasin. Similarly, Paulson (2000) identified sediment from nonpoint sources as the most significant stress to freshwater bivalves in the Upper Tar River basin.

Riparian Buffers

Maintaining vegetated riparian buffers is a well-known method of reducing stream sedimentation and other runoff. Riparian buffers are particularly important for freshwater mussels (Neves et al. 1997). Several recent reviews of riparian buffer widths, extent, and vegetation are available to guide evaluation of buffer design and efficacy (Dodd et al. 1993, Palone and Todd 1998, Wenger 1999, North Carolina Wildlife Resources Commission 2002).

For Swift Creek in particular, Prince (2003) recommended a selectively harvested buffer of 200-feet with a no harvest zone 50-feet in width or greater to prevent sediment export into stream channels. Baker (1999) utilized existing GIS coverages in addition to data gathered through field surveys (along perpendicular transects away from the Swift Creek) for application of three separate models (universal soil loss equation, Detention Time Model, and the Hydraulic Model) to determine appropriate site-specific buffer widths for filtration of nonpoint source runoff in the Swift Creek subbasin. Results indicated that the Piedmont portion of Swift Creek subbasin experiences increased erosion rates based on soil types and current land use. Baker used a reference buffer approach in the Detention Time Model to generate buffer width estimates for each land parcel within 300-feet of streams in the subbasin. Model output indicates that the average buffer required for 90 percent nitrate filtration was approximately 216-feet for the lower (Nash and Edgecombe Counties) Swift Creek Subbasin. Results of the Hydraulic Model used to estimate buffer effectiveness for 90 percent nitrate filtration indicate that a 200-feet buffer would

be adequate for most of the subbasin; however, larger buffers would be necessary along some land parcels in the Piedmont portion of the watershed.

In a recent review of literature and application of professional judgment for protecting North Carolina's endangered fauna, the Wildlife Resources Commission (2002) and partners concluded that insufficient information exists to definitely state the minimum buffer widths needed to ensure the continued survival of federally endangered and threatened aquatic species. They recommended a 200-feet native, forested buffer on perennial streams and a 100-feet forested buffer on intermittent streams, or the full extent of the 100-year floodplain, be required for new developments. They noted that minimum buffer widths may actually need to be more or less stringent depending on local conditions. Other aspects of watershed management were reviewed in that document which influence buffer efficacy (e.g., development densities, stormwater controls, drainage system management, etc).

Ammonia

Ammonia is a natural degradation product of nitrogenous organic matter; significant sources of enrichment include industrial waste, municipal wastewater treatment plants, and agricultural run-off (animal wastes as well as chemical fertilizers). Ammonia is a very important pollutant of waters due to its relatively high toxicity to aquatic life and its relative ubiquity (Russo 1985). Sediment pore water concentrations of ammonia typically exceed those of overlying surface water (Frasier et al. 1996), thereby placing freshwater mussels, which burrow in sediment, in the environmental compartment where ammonia concentrations are frequently elevated. Additionally, freshwater mussels appear very sensitive to ammonia toxicity (Horne and McIntosh 1979, Wade 1992, Goudreau et al. 1993, Sheller 1997, Myers-Kinzie 1998, Augspurger et al. 2003, Mummert et al. 2003). Because it is extremely toxic to mussels, ammonia merits priority attention among the many chemicals to evaluate for effects on mussels.

North Carolina currently does not have a state water quality standard or action level for ammonia, but the concentrations in Swift Creek at Hilliardston are currently well below those of concern (Augspurger et al. 2003) for mussels. Data for the lower portion of the creek are needed to determine if water quality there differs (which is not expected) before any additional point or nonpoint source ammonia controls are recommended.

V. Existing Water Quality Management Framework

A thorough understanding of the existing water quality management framework for the Swift Creek watershed is imperative to determine if any additional water quality management structure is needed. Several NCDWQ water quality classifications and standards apply to Swift Creek, and they are summarized here.

V. A. Nutrient Sensitive Waters Strategy

In December 1989, the EMC designated the Tar-Pamlico River basin as Nutrient Sensitive Waters (NSW). This designation required the State to develop a nutrient management strategy for the basin (and all of Swift Creek lies within this basin).

V.A.1. NSW Strategy - Phase I

The first phase of the strategy largely targeted wastewater treatment plants and other point sources. The Phase I Agreement, from 1990 through 1994, included an innovative nutrient 'trading' program between point and nonpoint sources that served as a nationwide benchmark. A coalition of twelve point source dischargers called the Tar-Pamlico Basin Association (Association), comprising approximately 90 percent of permitted point source flows, agreed to a collective annual, incrementally decreasing, combined nitrogen and phosphorus loading cap.

V.A.2. NSW Strategy - Phase II

Adopted by the EMC in December 1994, Phase II covered the period 1995-2004. A 30 percent reduction in total nitrogen loads to the estuary from 1991 conditions was set as an interim goal for Phase II, along with no increase in phosphorus loads. Based on these goals, the Association received separate, steady nitrogen and phosphorus caps for the duration of Phase II. The Phase II Agreement also placed restrictions on dischargers who chose not to join the Association. Nonpoint sources were also addressed in Phase II through a "voluntary plan" to achieve the goal for nine different nonpoint source categories.

V.A.3. Nonpoint Source Rules

In July 1998, after two years of implementing the voluntary nonpoint source plan, the EMC adopted a series of nonpoint source rules addressing riparian buffers, nutrient management, stormwater management, and agriculture.

Riparian Buffer Rules

A set of three buffer rules was adopted. The main buffer protection rule requires that existing vegetated riparian buffers in the basin be protected and maintained on both sides of intermittent and perennial streams, lakes, ponds, and estuarine waters. This rule does not establish new buffers unless the existing use in the buffer area changes. The footprints of existing uses such as agriculture, buildings, commercial and other facilities, maintained lawns, utility lines, and on-site wastewater systems are exempt. A total of 50-feet of riparian area is required on each side of waterbodies. Within this 50-feet, the first 30-feet (Zone 1) is to remain undisturbed with the exception of certain activities. The outer 20-feet (Zone 2) must be vegetated, but certain additional uses are allowed. Specific activities are identified in the rule as "exempt", "allowable", "allowable with mitigation" or "prohibited". The mitigation rule defines the process applicants would follow

to gain approval for activities that are identified in the buffer protection rule as "allowable with mitigation". The delegation rule lays out the criteria and process for local governments to obtain authority to implement the buffer rules within their jurisdictions.

Nutrient Management Rule

The nutrient management rule requires people who apply fertilizer in the basin, except residential landowners who apply fertilizer to their own property, to either take state-sponsored nutrient management training or have a nutrient management plan for the lands to which they apply fertilizer.

Local Government Stormwater Rule

The stormwater rule requires six municipalities (Greenville, Henderson, Oxford, Rocky Mount, Tarboro, and Washington) and five counties (Beaufort, Edgecombe, Franklin, Nash, and Pitt) in the Tar-Pamlico Basin to develop and implement stormwater programs within two and a half years. The local programs must also identify and remove illicit discharges, educate developers, businesses, and homeowners, and make efforts toward treating runoff from existing developed areas.

Agriculture Rules

The main agriculture rule details the process and options for achieving the nutrient goals which include 1) a 30 percent reduction in nitrogen loading from 1991 baseline levels within five to eight years of the rule's effective date; and 2) control of phosphorus levels at or below 1991 levels within four years of the approval of a phosphorus accounting method called for in the rule. Farmers who are involved in the commercial production of crops or horticultural products, or whose livestock or poultry holdings exceed specified numbers, are subject to the rule. The delivery mechanism to achieve load reductions include application of agricultural best management practices with the assistance of local area committees.

V. B. Stormwater Programs

Stormwater programs affecting the Swift Creek subbasin (03-03-02) include NPDES Phase I and II, ORW stormwater requirements, Tar-Pamlico River basin NSW stormwater requirements (discussed in section V.A.2), and requirements associated with the Water Supply Watershed program.

V.B.1. NPDES - Phase I

Phase I required NPDES permit coverage to address stormwater runoff from medium and large stormwater sewer systems serving populations of 100,000 or more people. Phase I also required ten categories of industrial sources to be covered under stormwater permits and construction activities disturbing greater than five acres to obtain a NPDES stormwater permit. There is 1

individual stormwater permit and 29 facilities that have general permit coverage in the Swift Creek subbasin.

V.B.2. NPDES - Phase II

The Phase II stormwater program extends the Phase I program to include permit coverage for smaller municipalities and covers construction activities disturbing greater than one acre. Three municipalities (Greenville, Rocky Mount, Winterville) and three counties (Edgecombe, Nash, Pitt) are automatically required to obtain a NPDES stormwater permit under the Phase II rules.

V.B.3. Water Supply Watershed Program Stormwater Requirements

The segment of Swift Creek from State Road (SR) 1409 to the Tar River is within the WS-IV protected area for the Tarboro intake. Low density options in this portion of the watershed include 1 dwelling unit / 0.5 acre or 24% built upon area (for projects requiring a sedimentation and erosion control plan) or 1/3 acre lot or 36% built upon area is allowed for projects without a curb and gutter street system. High density development requires control of runoff from the first one inch of rainfall through use of engineered stormwater controls. High density development options allow 24-70% built upon area. Local governments must assume ultimate responsibility for operation and maintenance of stormwater controls. A 30-feet vegetated stream setback for development of low density options is required. High density development requires a 100-foot vegetative setback.

V.B.4. ORW Stormwater Requirements

High density development, which exceeds 12% or 1 dwelling unit per acre, requires control of runoff from the first one inch of rainfall through use of engineered stormwater controls. In Swift Creek, a 30-feet vegetated stream setback for development of low density options is required for areas upstream of State Road 1003.

VI. Water Quality Management Plan Recommendations

The recommendations presented in this plan are proposed only for the lower portion of Swift Creek, to achieve a management objective of protecting local water quality and therefore the Tar spinymussel. The primary goal of this plan and these recommendations is to maintain all water quality parameters, with a particular emphasis on hydraulic loading and sediments that become entrained following excessive hydraulic loading. Accordingly, specific additional water quality management strategies are proposed, and they are outlined here. Note: These recommended management strategies are scientifically-based measures intended to provide additional

protections for the Tar Spinymussel. These proposals have not been submitted to any form of public review or hearing.

VI. A. Proposed Site-Specific Buffer Enhancements

1. To enhance the efficiency and protective aspects of the existing 50 foot riparian buffers, the following additional measure is recommended:

Regarding forest harvesting, in order to maintain the integrity of the buffer in lower Swift Creek it is recommended that the provisions in 15 NCAC 2B .0259(11)(b)(iv)(A) be applied to the entire 50 foot buffer zone. This would allow only the removal of individual "high value" trees in the 50 foot riparian buffers provided that no trees with exposed primary roots visible in the streambank be cut.

2. Encourage expansion of riparian buffer protection. The literature on buffer design indicates that buffers wider than the 50-feet have some water quality and well-recognized wildlife habitat related benefits. Expansion of buffers beyond the existing 50-feet or the extent of the functional floodplain, through voluntary actions, conservation cost sharing programs, and purchase is encouraged. No new rules are proposed for this recommendation which can be pursued via coordination among riparian landowners, private and government natural resources management agencies, and local and county governments.

VI. B. Proposed Maintenance of Instream Flows. Maintaining normal flow regimes appears to be a critical component of sustaining the excellent water quality and related high biological diversity of this system. Based on historic data, the only biological diversity ratings less than excellent have been attributed to extreme flow conditions. While these are relatively infrequent occurrences from which the system can recover, permanent changes in flow characteristics are not prudent here.

1. No dams or other structures that would impound waters on the Swift Creek mainstem or named tributaries within or upstream of this reach should be permitted. The lentic conditions of an impounded reach are not favorable for Tar spinymussel survival and productivity. Further, the physical obstruction generated by any instream structure is not compatible with the survival, reproduction and movement of this species.

2. No water withdrawals from the Swift Creek mainstem or named tributaries should be permitted within or upstream of this reach. Water withdrawal needs are often greatest during extremely dry periods when instream flow conditions are unable to support any additional reduction in water quantity or flow. Given that the Tar spinymussel requires adequate flow for feeding and respiratory needs, maintenance of the natural flow condition is essential to its survival.

VI. C. Proposed Point Source Pollution Controls

1. No new or expanded discharges should be permitted. Existing surface water discharge regulations applicable to these waters, including those already made to address nitrogen reduction goals in the Tar-Pamlico Basin through an offset program, will not be sufficient to maintain the chemical quality of the waters of lower Swift Creek that have fostered excellent water quality ratings. The only ratings below excellent have been attributed to flow related issues and are addressed with the site specific rules proposed above for hydraulic loadings. To maintain the chemical integrity of the waters of lower Swift Creek, no new or expanded surface water discharges should be permitted.

2. Encourage removal of existing point sources. The existing point source discharges in the lower portion of Swift Creek are small and not known to be a concern for water quality. Exceedences of permit limits and noncompliance have been documented, however, for both facilities. Efforts to remove these individual discharges, such as by connection to larger POTWs, are encouraged. In the interim, implementation of additional permit limits for parameters of concern for freshwater mussels is recommended. Downstream monitoring for dissolved oxygen, ammonia, metals and chlorine should also be added as permit conditions to help gauge the significance of permit violations on receiving water quality. No new rules are proposed for this recommendation which can be pursued via coordination between facility owners / operators, water quality permitting agencies, and other stakeholders.

VI. D. Proposed Sediment Controls: The effective control of excessive sedimentation is a critical component in the preservation of the aquatic environment in the lower Swift Creek watershed. Numerous studies have demonstrated that one of the most effective sedimentation controls is the expeditious application of ground cover on disturbed areas. Therefore, for all projects in the lower portion of the Swift Creek watershed that require a Stormwater General Construction Permit from the Division of Water Quality the following additional sedimentation control measures shall be required:

1. Ground cover shall be established on all cleared areas within 7 calendar days of clearing. Hydromulch and/or netting shall be used on all slopes. Matting or gravel cover shall be used for all roads. In areas where straw is applied it must be applied at a rate of at least 4000 lbs. of straw per acre. Mulch may be used in lieu of straw. Sod may be used in lieu of the above ground covers, and

2. Point or concentrated discharges to filter strips or protected buffers shall be avoided. Flow must be diffused throughout the entire filter strip or buffer. This may be achieved using level spreaders on slopes of less than 6% or, on steeper slopes, by using erosion control fencing at intervals of 10 feet perpendicular to the flow. Each end of the fencing shall be turned up slope for a distance necessary to cover one vertical foot of contour to prevent bypass. The erosion control fencing shall be adequately anchored to prevent stormwater from passing beneath.

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April 20, 2004 ERC Meeting
EXHIBIT I

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Michael F. Easley, Governor
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Leah Devlin, DDS, MPH
State Health Director

Comments to the Environmental Review Commission

Leah M. Devlin, DDS, MPH
State Health Director
April 20, 2004

Senator Albertson, Senator Clodfelter, Representative Gibson, Representative McComas, and Commission Members:

The North Carolina Division of Public Health is pleased that the EMC has taken action to lower the Acceptable Ambient Level (AAL) for hydrogen sulfide from the current level of 2,100 mcg/m^3 to the new level of 120 mcg/m^3. This is tremendous progress. Lowering the AAL reduces the risk of health problems including eye irritation and aggravation of health symptoms for people with asthma. We appreciate the opportunity to work with the EMC and to make comment at the public hearings. We had recommended a lower level but again we feel that the 120 mcg/m^3 is significant progress.

The Division of Public Health also recommended to the EMC that all major sources of hydrogen sulfide including pulp and paper mill wastewater treatment systems be required to comply with the hydrogen sulfide AAL. Based on the NC Division of Air Quality data, pulp and paper mill wastewater treatment systems are responsible for more than 90% of the hydrogen sulfide emissions from permitted air pollution sources in North Carolina. However, we recognize the EMC's need to consider other issues besides health in setting the AAL's.

The Division of Public Health is currently collaborating with the US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry to plan a study to measure actual hydrogen sulfide concentrations near a North Carolina pulp and paper mill. The first phase of this project should be completed within nine to twelve months. Our commitment to the EMC and to you is to make the data available to you as soon as possible.

Again, I'd like to thank the EMC for their work and look forward to continuing to work with them on this issue and others in the future as we seek together to shape sound public policy.

April 20, 2004 ERC Meeting
EXHIBIT J

Effective Date Timeline for Hydroge

Environmental Review Commission
Jeff Hudson, Assistant Commission Counsel

The Environmental Management Commission (EMC) adopted the Hydrogen Sulfide Rules (H2S Rules) on April 8, 2004.

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The EMC must submit the H2S rules to the Rules Review Commission (RRC) by May 7, 2004. (G.S. 150B-21.2(g))

↓

If the H2S Rules are submitted to the RRC <u>on or before April 20</u>, the RRC must review the rules at its May meeting.
(G.S. 150B-21.9(b))

↓

If the RRC approves the H2S Rules at its May meeting and the RRC <u>DOES NOT</u> receive written objections from 10 or more persons within 6 days* of RRC approval, the rules become effective on June 1, 2004.
(G.S. 150B-21.3(b) and (b2))

If the H2S Rules are submitted to the RRC <u>after April 20</u>, the RRC must review the rules at its June meeting.
(G.S. 150B-21.9(b))

↓

If the RRC approves the H2S Rules at its June meeting and the RRC <u>DOES NOT</u> receive written objections from 10 or more persons within 6* days of RRC approval, the rules become effective on July 1, 2004. (G.S. 150B-21.3(b) and (b2))

If the RRC approves the H2S Rules at its May or June meeting and the RRC <u>DOES</u> receive objections from 10 or more persons within 6* days of RRC approval, the rules would be subject to legislative disapproval during the <u>2005 Regular Session</u> of the General Assembly and could not become effective before the 31st legislative day of the 2005 Regular Session.
(G.S. 150B-21.3(b2) and (b1))

↓

If a bill to disapprove the rules is introduced in either house of the General Assembly before the 31st legislative day of the 2005 Regular Session, the rules become effective on the earlier of either the day an unfavorable final action is taken on the bill or the day that session of the General Assembly adjourns without ratifying a bill that disapproves the rule.
(G.S. 150B-21.3(b1))

*Due to a perceived ambiguity in the time frame for receipt of written objections, the RRC established a policy of accepting written objections up to 6 days after RRC approval.

April 20, 2004

Report to the Environmental Revie

Update on Hydrogen Sulfide (H_2S) Acceptable Ambient Level (AAL) Rulemaking

B. Keith Overcash, Director
Division of Air Quality
April 20, 2004

Basic Background Information on the State's Air Toxics Program

- Established via Governor's executive order March 1, 1989 ***AND*** Senate Bill 324 amending North Carolina General Statute 159-96 § 45(a). (This amendment was placed in the revenue bonds section of the G.S. where notation was made that revenue bonds were not to be used for the financing of the low-level radioactive waste management authority or its commission.)
- Regulations effective May 1, 1990 for 84 toxic air pollutants
- Regulations effective May 1, 1991 for 21 carcinogenic pollutants (total = 105)
- Acceptable Ambient Limits (AALs) established for all 105 pollutants
- In 1993 Program was modified to let the Federal Program achieve its control goals first, with the state program being used to
  - o 'fill in the gaps' (federal program misses many small emitters)
  - o 'solve problems' (federal program not designed to address local issues)
  - o 'address excess emissions' that would otherwise not be addressed in a timely manner. (federal program was untimely and uncertain)
- The toxics program's standard is the control of toxic air pollutants for the protection of public health. It is a ***proactive*** program as well as a ***reactive*** program.
- Features screening levels, technical infeasibility and economic hardship provisions and site-specific risk assessment provisions for situations where facilities may need relief.
- It is implemented through air permits, it does air monitoring for toxic air pollutants, it performs community assessment studies, evaluates equipment to control toxic air pollutants and it keeps information in the rule updated

Scientific Advisory Board on Toxic Air Pollutants

- In 1997 consensus was achieved by a working group established by the Environmental Review Commission to study the State and Federal air toxic programs that the role and activities of the Scientific Advisory Board on Toxic Air Pollutants (SAB) are:
  - o The SAB provides a mechanism for bringing good science into air toxics risk assessment. The scientific methodology by which chemicals are evaluated and recommendations made is open and appropriate
  - o The role of the SAB is advisory and not regulatory and its principal function is to conduct risk assessments for adverse health effects of chemicals selected by DENR. The SAB is also available to DENR to assess risks to human health in situations where there is or may be an existing human health threat.
  - o The SAB provides an analysis of the science. It may also provide several analyses for a single chemical depending upon what the science shows. The final use of these analyses is the responsibility of the Environmental Management Commission.

- SAB is a seven-member group composed of nationally recognized, Doctoral level toxicologists, an occupational physician, an epidemiologist, or public health scientists.
- SAB is all-volunteer. The cost to the state was less than $1,000 during the last full year that the SAB met.
- The latest Charter was signed by Secretary Ross on October 3, 2003, and the newest SAB was appointed earlier this month.
- SAB's work is fundamental to the air toxics program. When there is a change in the science upon which one of the toxic air pollutant levels is based, it is the SAB that evaluates the data in conjunction with the Division of Air Quality to determine if a new AAL should be established.
- Since 1993, the majority of the toxic air pollutant levels have not been updated, but the science has. Many of these levels need to be re-evaluated.

Hydrogen Sulfide

- Division determined that the science supporting the old acceptable air toxic pollutant level had changed and requested that the Scientific Advisory Board review the new literature. The old level was based on data from 1986.
- The SAB reviewed the peer-reviewed data that was available. Three analyses of these data were provided to the Division. Each analysis included the health effect that resulted from the study, how the study compared to possible human exposure and the SAB's degree of confidence in the study.
- Nearly simultaneous with the SAB's review, the Division of Air Quality received complaints about foul odors stemming from a liquid asphalt distribution terminal and was requested to investigate further.
- Studies revealed, among other toxic air pollutants, that hydrogen sulfide was being emitted in the largest quantity. The Division took action that required the facility to install control equipment and update its air permit.
- Further evaluation of the emissions inventory for hydrogen sulfide in North Carolina revealed that some facilities that emitted hydrogen sulfide had not been reporting all of these emissions to the state as required.
- The discovery of these new emission sources revealed that an impact of a new hydrogen sulfide AAL would be significant from a technical, economic and emissions control standpoint for a certain industry sector.
- All the information collected was reported to the Environmental Management Commission (EMC) through the Air Quality Committee. Hydrogen sulfide data were presented at committee meetings beginning in March 2002.
- On April 8, the Environmental Management Commission unanimously voted to change the old AAL from 1500 parts per billion for a one-hour average to 83 parts per billion (120 micrograms per cubic meter)for a 24-hour average.
- Additionally, under majority vote, the EMC exempted wastewater treatment lagoons at pulp and paper mills for the toxic air pollutants of hydrogen sulfide and methyl mercaptan.
- The EMC also called for further study by the pulp and paper industry into offsite impacts of hydrogen sulfide by requesting an air dispersion modeling study report to be submitted by July1, 2006, followed by the Director's assessment of that report two months later. If the report is "not favorable", an air monitoring study would be required to be conducted and the results reported to the EMC by February 28, 2009 for further consideration.

April 20, 2004 ERC Meeting
EXHIBIT L

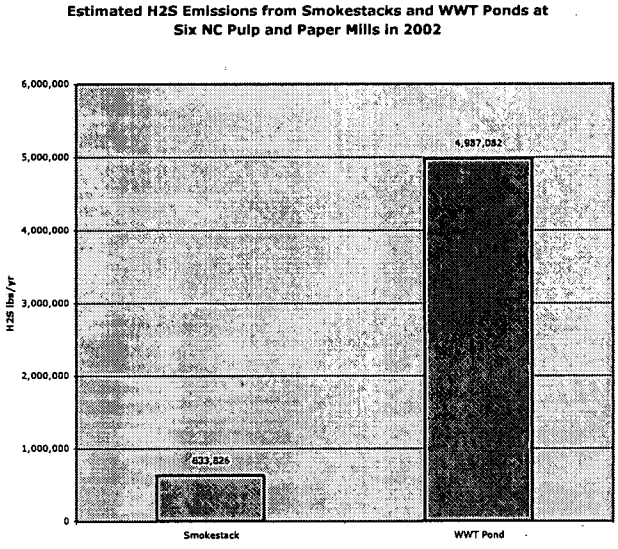
Addressing Concerns about the Hydrogen Sulfide Rulemaking
Environmental Defense- January 5, 2004

1. ***Will setting a health protective standard for hydrogen sulfide (H_2S) place an economic overburden on the pulp and paper industry?***

- No. The Environmental Management Commission (EMC) rules have safeguards in place so that setting a health protective standard does not place an economic overburden on an industry. EMC rules provide economic or technological infeasibility options to the effect that, if an industry (or a facility) can demonstrate that meeting the new standard would be detrimental to the industry's financial well-being, the standard may be relaxed for that particular industry. The Division of Air Quality (DAQ) can develop recommendations for affordable technology for the pulp and paper industry so that this industry can lower their emissions in the most economical way while still providing a public health benefit. This process has been used by DAQ for two other air toxics and can be used for H_2S.
- While EMC rules provide for industries that are unable to meet a new standard, it is the responsibility of the EMC to have the standard in place for those facilities who are able to meet the requirement, or so that all facilities might meet the standard at a later date.
- Paper mills in Canada and six US states, including North Carolina's Blue Ridge Paper plant, have found it advantageous to invest in and have been able to bear the costs of switching to activated sludge systems.

2. ***Why is it important that wastewater treatment (WWT) processes at pulp and paper mills ultimately be required to comply with an Acceptable Ambient Level (AAL) for H_2S?***

- The majority of H_2S emissions from the pulp and paper industry (about 89%) are emitted from WWT ponds. The goal of a tighter AAL for H_2S is not to reduce emissions from one source or another, it is to protect public health from the harmful effects of the toxic pollutant H_2S. Further reducing emissions from industrial sources responsible for only 11% of emissions while letting the sources responsible for 89% of the emissions go unchecked will not protect public health.
- H_2S emissions pose a health threat to NC citizens, regardless of the source. The human respiratory and nervous systems do not differentiate between sources of hydrogen sulfide at a facility and neither should the EMC.



WWT ponds account for an average of 89% of H2S emissions at pulp and paper mills.

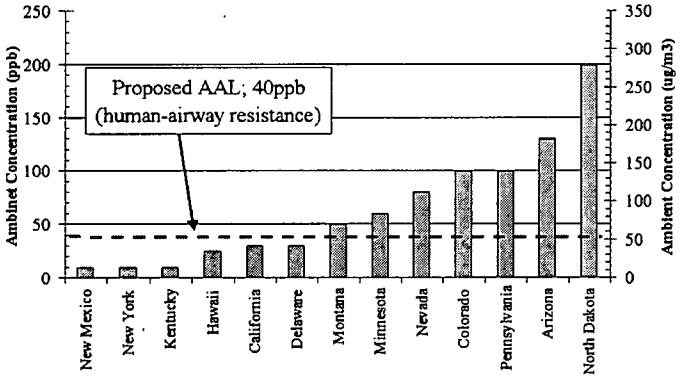
- ***EMC actions to exempt WWT ponds in this rulemaking will simultaneously exempt the ponds from having to meet standards for other dangerous air toxics.***

3. *How do the proposed standards for H_2S compare with standards for H_2S in other states?*

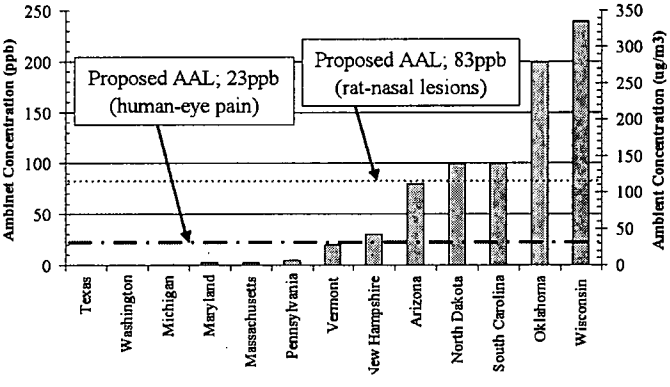
According to DAQ, there are 32 other states with H_2S standards. They vary in averaging times from instantaneous to chronic one-year exposure. The standards that Environmental Defense endorses are the standards recommended by both the Scientific Advisory Board (SAB) and the NC Department of Health and Human Services (NCDHHS): 23 ppb 24-hour and 40 ppb 1-hour. **These standards fall right in the middle of the standards that exist in other states:**

- Of the 13 states that have one-hour averaging standards, 6 have more stringent rules than have been proposed in NC and 7 have less stringent rules (See figure below).
- Of the 12 states that regulate with 24-hour standards, 7 states have more stringent rules than the SAB proposed standard of 23 ppb and 5 have less stringent rules (See figure below).

States with 1-hour standards and proposed NC standard (DAQ)



States with 24-hour standards and proposed NC standard (DAQ)



The dashed lines in the above graphs represent the standards proposed by both the SAB and DHHS (40 ppb and 23 ppb) and the standard proposed only by the SAB (83 ppb). These graphs illustrate that there are many other states with tighter standards than the ones proposed by both the SAB and DHHS. In fact, the NC proposed standards fall right in the middle of the standards that are set in other states.

4. *How can we justify regulating industrial sources of H_2S but not other sources such as hog farms?*

- As indicated by DAQ, most emissions of H_2S in North Carolina are emitted from pulp and paper mills and PCS Phosphate. Emissions of H_2S from the NC hog farming industry are <u>not</u> a major concern. The Manufacturer and Chemical Industry Council (MCIC) erroneously overestimated hog farm H_2S emissions to be roughly 30 million lb/year, or 85% of statewide levels. Since the MCIC's use of the EPA emission factors in February, discussion with EPA indicates that they are in the process of revising the H_2S hog farm emission factors in light of other data. Recent USDA data is consistent with DAQ data indicating that NC statewide hog farm H_2S emissions are <u>less than 850,000 lb/year, or less than 7% of statewide levels.</u> In June 2003 DAQ commissioned NC State University to conduct a study for determining H_2S emissions from a representative hog farm. NCSU expects to report the study results later this year.
- <u>All</u> significant H_2S sources will be subject to the rule, except those exempted by the EMC and those already immune due to other provisions in the toxics program rule. If EMC does not feel comfortable about the gaps and exemptions in its own rules, then EMC clearly has the authority to make whatever changes it feels are warranted. But the rule should not be weakened for other industries simply because some sources are exempted for economic or other reasons.

Acceptable Ambient Level Hydrogen Sulfide

Environmental Review Commission
by
Preston Howard, President
Manufacturers & Chemical Industry Council of North Carolina

MCIC

6 Affected MCIC Members Sites - All in Economically Depressed Regions

- Blue Ridge Paper - Canton
- International Paper
  - Riegelwood
  - Roanoke Rapids
- PCS Phosphate - Aurora
- Weyerhaeuser
  - New Bern
  - Plymouth

MCIC

All are Major Economic Hubs

- Directly employ from 500 to 1200 on-site
- Statewide 9000 total jobs
- Thousands of "spin-off" jobs
- Annual payroll $494 Million
- $750 Million in purchases from NC vendors

MCIC

Regulated Sources

- Six sites owned by MCIC member companies = 14% of all H_2S emissions in NC
- 86% of H_2S emissions would not be subject to the new AAL
- Is it prudent to spend $500 Million to control 14% of the emissions?

MCIC

Jappinen et al. 1990

- "to assess the possible effects of low concentrations of H_2S on respiratory function"
- Exposed 10 asthmatics to 2 ppm for 30 min.
- 2 ppm = 2700 ug/m3
- current AAL is 2100 ug/m3

MCIC

Conflicting Interpretations of Jappinen's results

- SAB
  - Concluded that the bronchial obstruction experienced by 2 of the 10 asthmatics constituted an asthmatic response
- Jappinen
  - noted that the "increase [in bronchial obstruction] was not statistically significant and did not result in clinical symptoms"

MCIC

Bruce Dalton, MD

- "Jappinen study findings are consistent with population studies of residents living near industrial sources of hydrogen sulfide"
- "the SAB's recommendations are based on interpretations of the Jappinen study that are inconsistent with the data as published"

MCIC

Roy N. Everett, MD

- Board certified pulmonologist at ECIM
- Over 40 physicians - practice since 1984
- Receives all respiratory referrals
- "never seen a case of occupationally - related asthma due to employment at Weyerhaeuser"
- "nor have I seen any geographic predilection for asthma in the surrounding area of the plant"

MCIC

"Real world" studies...

- 11 different studies on respiratory health of residents near pulp mills and refineries
- 11 studies found no evidence of significantly increased incidence of asthma or asthma-like symptoms due to hydrogen sulfide exposure

MCIC

MCIC Position

- No scientific evidence to suggest current health impacts at current AAL
- One SAB option - 24 hr AAL of 120 ug/m3
- Almost a 95% reduction from the existing
- Scientifically supportable
- Not out of sync with our closest competitors (SC-140; VA-n/a; TN-n/a)
- Economically achievable

MCIC

Exemption for Wastewater Lagoons at pulp mills

- 100+ acre lagoons
- Must cover lagoons to capture and treat emissions
- Not technically or economically achievable
- Only current option is to abandon lagoons and build new WWTP

MCIC

Study

- Quantify emissions from lagoons
- Conduct air dispersion modeling to determine predicted concentrations beyond the property line
- If model "predicts" violations, install offsite monitors to measure actual off-site H2S concentrations
- None of the exemptions in the rule are "permanent"
- Revisit the exemption in 2009

MCIC

EMC Performed its Job as the "RISK MANAGER"

- Weighed the merits of the scientific arguments and assessed the scientific uncertainty and disagreement
- Considered the significant economic implications for the 4 companies as well as for entire regions of North Carolina
- Assigned an AAL that affords adequate protection for the public health without unnecessarily jeopardizing the jobs of working families

MCIC

Eastern Carolina
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[redacted]ISTRATOR
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November 13, 2003

Mr. Thomas C. Allen
Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641

Dear Mr. Allen:

This letter is in follow-up to my oral presentation at the Pitt Community College on October 30, 2003 regarding the public hearing as it specifically relates to proposed rule changes regarding acceptable ambient levels of hydrogen sulfide.

First, let me disclose that I have no financial interest in Weyerhaeuser nor do I own any stock. I have never been employed or retained by Weyerhaeuser, and I am not personal friends with any management or employees.

As a board certified pulmonologist, I have been practicing in Eastern North Carolina since 1984, and I am employed by Eastern Carolina Internal Medicine. We are a large multispecialty group that employees over 40 physicians and has 56 providers. Essentially, all significant respiratory disease is referred to me for evaluation. I have personally never seen a case of occupationally-related asthma due to employment at Weyerhaeuser, nor have I seen any geographic predilection for asthma in the surrounding area of the plant.

In addition to my anecdotal observations, the current scientific literature does not suggest an increased incidence of asthma or respiratory disease in pulp mill workers. In trying to determine why the advisory board indicates that hydrogen sulfide at the current levels exacerbates asthma, they refer to a study done by Jappinen et al, which was published in 1990. This study was performed in Finland with the subjects consisting of 26 male pulp workers, including smokers, and 10 documented asthmatic

subjects. The pulp mill workers had their spirometric lung parameters measured before work and then measured following exposure to hydrogen sulfide at their workplace. There was essentially no change in the spirometric parameters before and after exposure, with these parameters including the forced vital capacity and the forced expiratory volume at one second. These are the standard parameters used to measure airway obstruction and airway responsiveness. Additionally in this study, they took 10 documented asthmatic subjects, removed their medication from them for two days, and then exposed them to a known concentration of hydrogen sulfide at two parts per million which is equivalent to 2700 $\mu g/m^2$. This is 600 μg higher than the current acceptable ambient levels of hydrogen sulfide. The pre and post exposure spirometric values were virtually identical in the asthmatic group.

In the asthmatic subjects only, a parameter called "airway resistance and airway conductance" was measured by using a body plethysmograph. This was not performed on the pulp mill workers. In two subjects, the airway resistance rose by greater than 30 percent. To someone not experienced in respiratory physiology, this would sound like a tremendous increase. However, airway resistance by body plethysmography is a very sensitive tool that has very poor specificity and generally has little clinical usefulness. To put this in context, a normal individual's airway resistance measured pre and post exercise can rise by as much as 50 percent. The authors of this study specifically concluded that exposure to low concentrations of hydrogen sulfide did not cause any noticeable effects on respiratory function both in pulp mill workers and in asthmatics.

It is my suspicion that some of our scientific advisory board members are looking at this term of airway resistance and simply falsely interpreting its significance. In my opinion, it is irresponsible for the scientific advisory board to recommend these dramatic reductions in hydrogen sulfide given their profound economic consequences and the total lack of objective data supporting any adverse outcomes based on current exposure levels.

Sincerely,

Roy N. Everett, MD, FCCP

RNE/dey

April 20, 2004 ERC Meeting
EXHIBIT N

2003

North Carolina Interagency Report

on

Litter Cleanup, Education/Prevention and Enforcement

This report provides statistics for the year 2003.

March 31, 2004

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Litter Report 2003

This report is prepared pursuant to Session Law 2001-512, Sections 9 and 10[1] and provides information describing the outcome of North Carolina's 2003 anti-litter campaign.

The state's 2003 anti-litter campaign brings together three components:

- Litter cleanup
- Education/prevention
- Enforcement

2003 Litter Report Summary

Statewide roadside litter cleanups collected more than nine million pounds during 2003. The large amount of litter collected indicates a litter problem still exists in North Carolina. More litter would have been picked up if the crews and volunteers were not hampered by bad weather. This past year, the state experienced an extremely wet spring season and a hurricane in the fall. These two weather conditions limited statewide litter pick-up during the state's major litter pick-up initiatives - Spring and Fall Litter Sweep.

During 2003, the North Carolina Department of Transportation (NCDOT), its Office of Beautification Programs and other state agencies collectively supported statewide anti-litter initiatives. The other agencies included the Administrative Office of the Courts, Departments of Correction, Crime Control and Public Safety, and Environmental and Natural Resources.

The NCDOT maintains 78,500 state roadway miles, and in 2003 it picked up litter on 59,909 shoulder miles. More than $13.9 million was spent to cleanup the roadside litter found on state maintained roadsides.

Anti-litter education/prevention activities continued even though budget restraints were still in effect. The Office of Beautification Programs promoted and supported anti-litter projects through various channels. These channels included enhancements to its Internet home page, participation on various statewide organizational boards, promoting anti-litter information at conferences and the state fair, and supplying anti-litter promotional items to a multitude of local organizations. It also completed work on an anti-litter radio campaign scheduled to begin in January 2004, and sought to upgrade hardware and software to its Adopt-A-Highway hotline reporting system.

Law enforcement was near the pace with that of previous years in the number of charges for littering violations. A 2003 recap from the Administrative Office the Courts shows the number of charges and convictions by offense code, by county and by type of law enforcement officers. In addition, the Conference of the District Court Judges provided an alternative to first time offenders charged with littering of less than 15 pounds. It gives these offenders a means to pay a litter fine without going through the judicial process (effective 1 January 2004). It's similar to paying for a parking ticket.

[1] See Attachment A - page 37

Statewide Roadside Litter Cleanup 2003

North Carolina Department of Transportation

The North Carolina Department of Transportation (NCDOT) maintains 78,500 state roadway miles. In order to maintain environmentally and aesthetically clean, safe and attractive roadsides, the NCDOT has built relationships with citizens, other agencies, local governments and organizations/industries. Examples include the Adopt-A-Highway (AAH) volunteers, an alliance with the Department of Correction (DOC), participating on organizational boards as that of Keep America Beautiful and Big Sweep, and working with the North Carolina Soft Drink Association.

NCDOT Adopt-A-Highway Program

The NCDOT through its Office of Beautification Programs continues to administer the Adopt-A-Highway (AAH) program. It's a partnership endeavor between community volunteers and the NCDOT. The volunteer groups are primarily made up of school, civic, business, professional, religious and social groups, although many individuals and families also adopt roadside sections.

The AAH program is a fine example of state government working with citizens to improve the cleanliness and quality of life in communities across North Carolina. To assist with the local AAH roadside adoption, the NCDOT has 56 AAH Coordinators who oversee the adoption process in their assigned counties. The program cost $293,357 in 2003 versus $590,092 spent in 2002. The lower cost amount is attributed to the new BISIPS data entry process.

Citizens of North Carolina continue to support local roadside litter cleanup by adopting a two-mile stretch of roadside and volunteering their time to pick up litter. In 2003, the AAH program had some 6,000 groups who had adopted approximately 12,000 roadside miles. The volunteer cleanup efforts of the AAH program saved the state's taxpayers $3.2 million dollars in cleanup costs in 2003, and over the last three years, the AAH program has had cumulative savings of more than $11 million dollars in roadside litter cleanup costs.

Annual Comparison of AAH program Taxpayer Savings:

	Hours Worked	Cleanup Cost Savings
2003	326,776	$3.2 million
2002	384,248	$3.8 million
2001	402,335	$4.0 million

When it comes to the amount of litter collected, the actual number may be higher than what was reported by AAH groups. Some litter is not counted, as automobile components and construction debris that are too large or too heavy to fit into the bags. There were also times when the AAH volunteers would do the cleanup, but fail to report their participation and consequently the reported amount of litter picked up could be less than the actual amount.

In addition, the Office of Beautification Programs AAH reporting system experienced occasional downtime due to the age of the hardware and software used in gathering cleanup report data. The data not collected in 2003 would have increased the number of hours worked and the amount of litter

collected. To remedy the situation of AAH groups not being able to call in their reports, both the hardware and software have been scheduled for an upgrade in early 2004.

The table below provides data representing the amount of litter collected annually through the AAH program over the last three years.

Year	Total Pounds Collected Statewide by Adopt-A-Highway Groups
2003	3,649,360
2002	4,241,100
2001	4,379,760

As mentioned previously, the lower amount collected during 2003 is due to the effects of a wet spring and the fall hurricane. Of the 3.6 million pounds collected, the AAH groups also recycled 383,380 pounds as follows: 168,660 lbs. of metal, 121,200 lbs. of glass and 93,520 lbs. of plastic.

The NC Department of Transportation (NCDOT) also sponsored Litter Sweep, the biannual roadside litter cleanup. Litter Sweep is typically held the last two weeks of April and September. Volunteers are asked on a statewide basis to contribute their time for roadside litter pick up. During Litter Sweep, the NCDOT provides volunteers safety vests, gloves and bags for roadside litter cleanups. It also provides additional manpower to ensure full bags are picked up for immediate disposal.

NCDOT and Department of Correction (DOC)

The NCDOT alliance with the DOC is critical in keeping roadside litter to a minimum on many heavily traveled routes throughout the state. This alliance makes it possible to have 1,360 inmates performing litter pick up on a daily basis (weather permitting).

The wet spring hampered DOC inmate crews in their litter pick up efforts, and after the hurricane, many eastern North Carolina counties suspended litter cleanup activities in lieu of storm damaged road maintenance and storm debris removal. Even so, there was a still a substantial amount of litter picked up during each Litter Sweep. The number of pounds collected does not include items which did not fit within a bag i.e. tire and construction debris.

Here is the breakdown and description of the inmate crews:

110 Medium Custody Eight-man Road Squads

- Armed DOC staff is required to supervise these inmates (two officers to eight inmates).
- NCDOT transfers $10,170,000 to the DOC for medium custody inmate labor for roadside litter cleanup. Approximately 90% of all medium custody inmate labor were spent on litter pick-up.
- An additional $27,878 was expended for support cost related to working with DOC officers on work assignments.

60 Minimum Custody Highway Work Crews.

- Correctional officers supervised minimum custody inmates (one officer per eight inmates).
- Assigned primary responsibility for removing litter from major highways statewide.
- The labor cost for these crews is included in the NCDOT $10,170,000 transfer to the DOC.

Minimum Custody Road Squads

- NCDOT staff, trained by the DOC, supervised minimum custody inmates.
- Inmate labor was billed at $1 per day per inmate for litter cleanup. In 2003 there were 11,905 man-days at a charge of $11,905.
- NCDOT spent and additional $79,346 for supervision and transportation costs.

115 Governor's Community Work Program (CWP) crews.

- Through this program, a correction officer supervises a crew of up to 10 minimum-custody inmates on short-term, manual labor projects for local governments and state agencies.
- These crews are dedicated to litter pick up during Litter Sweep.
- There is no charge for this labor.

During the 2003 Spring and Fall Litter Sweep, the NCDOT picked up 455,490 pounds of litter versus 847,545 pounds in 2002, and expended approximately 21,548 man-days of its employees and inmates for picking up litter on 16,553 highway miles. The amount of litter picked up during both the 2003 Spring and Fall Litter Sweep by the DOC inmates was 2,123,601 pounds versus 2,680,635 pounds in 2002.

NCDOT and DOC Inmate Litter Sweep Roadside Cleanup Comparison:

	Pounds Collected
2003	2,579,091
2002	3,919,590
2001	3,558,885

Community Service Work Programs (CSWP).

- Members of these work crews are not in the prison system, but are citizens who have been assigned community service through the court system.
- CSWP is a sentencing option operated by the Division of Community Corrections (DCC). The Courts order, as a condition of either supervised or unsupervised probation, lower risk offenders to perform community service hours.
- DCC-CSWP maintains agreements with local government or non-profit agencies statewide where offenders are placed to perform the community service hours. Offenders perform work that benefits the agency and the community, with many agencies supervising Litter Cleanup projects.
- For calendar year 2003, approximately 202,493 hours were worked and 3,222,675 pounds of litter collected.

CSWP Annual Roadside Litter Cleanup Comparison

	Pounds Collected
2003	3,222,675
2002	4,498,590
2001	4,121,325

The DOC inmate crews and the CSWP litter pickups are performed separately and independently of one another. The pounds of litter reported above represent the litter pick up efforts of each separately.

2003 Roadside Litter Pick Up Summary - NCDOT, AAH, DOC and CSWP

Roadside Litter Cleanup Recap and Comparison:

Litter Amounts Picked Up In Pounds by Year				Three-year Cumulative Amount by Group
	2003	2002	2001	
NCDOT *	455,490	847,545	1,620,900	2,923,935
DOC *	2,123,601	2,680,635	1,547,550	6,351,786
Other volunteers *	382,590	391,410	390,405	781,815
AAH**	3,649,360	4,241,325	4,379,760	12,270,445
CSWP**	3,222,675	4,498,590	4,121,325	11,842,590
Sum	9,833,716	12,659,505	12,059,940	34,553,161

* Litter Sweep (only) litter pick up amount

**Annual litter pick up amount

The three-year cumulative amount of 34,553,161 pounds of litter equates to 2,303,544 bags of litter based on the average bag weighing 15 pounds.

NCDOT 2003 Roadside Litter Pick Up Expenditure

NCDOT Litter Cleanup Expenditure Recap By Year			
	2003	2002	2001
NCDOT Employees	$3,328,699	$4,324,947	$4,098,679
Adopt-A-Highway	293,357	590,092	543,213
DOC (Medium and Minimum Custody Inmates)	10,289,129	10,457,854	6,342,509
Expenditures by year:	$13,911,185	$15,372,893	$10,984,401

Department Of Environmental and Natural Resources

Division of Parks and Recreation 2003 Litter Cleanup Summary

Everyday, staff at each state park, spends four to eight man-hours, on average, emptying trashcans and picking up litter. In addition, all units of the state parks system hold litter cleanup days with the help of various community volunteers. During 2003, approximately 120 volunteer litter cleanups were held across the state park system. Ten of these cleanups were part of the annual Big Sweep event occurring on September 20, 2003. Volunteers during these cleanups collected approximately 17,500 pounds of trash. There were also 700 bags and 10 truckloads which were not weighed.

Over the course of 2003, approximately 35,000 pounds of materials were collected for recycling in North Carolina's parks: 5,343 pounds of aluminum; 3,488 pounds of plastic; 4,322 pounds of glass; 5,350 pounds of paper; and 16, 427 pounds of other materials. This is versus 41,000 pounds in 2002 which included 6,900 pounds of metals; 3,200 pounds of plastic; 13,200 pounds of glass; and 8,000 pounds of paper. Ice storms, spring flooding and the aftermath of Hurricane Isabel closed some of the parks for several weeks in 2003, which may account for the smaller amounts of recycling in 2003 versus 2002.

Division of Parks and Recreation – Litter Cleanup Efforts – January–December 2003

Note: "No activity" means that there were no *additional* litter cleanups *beyond* the daily litter collection done by park staff. For example, at a small park, such as Pilot Mountain, the park staff often picks up a total of 300 bags of trash during one year.

Park	Date	# volunteers	# bags of trash or # man-hours	# lbs. of trash
CABE	7-31-03 8-05-03 8-14-03 11-03-03 11-06-03	2 2 1 1 2	5.5 man-hours 5.5 man-hours 2 man-hours 2.75 man-hours 5.5 man-hours	
CLNE	No activity			
CRMO	Roadside cleanups every two weeks 9-20 Big Sweep	Com. Service workers, 1-2 each time 22	16 bags 8 bags	**104 lbs.** total (26# glass, 45# plastic, 20# Aluminum, and 13# other)
ENRI	9-20 Big Sweep	43	27 bags	150
FALA	8-03-03 9-20 Big Sweep	25 boy scouts 11	15 bags 15 bags	
FOFI	No activity			
FOMA	No activity			
GOCR	5-03-03 10-19-03	7 7 (Goose Creek Foundation)	 13 bags 13 bags	
GORG	Total for period	Not recorded	106 bags	
HABE	Huggins Island Cleanup	Not recorded	25 bags	
HARO	No activity			

Park	Date	# volunteers	# bags of trash or # man-hours	# lbs. of trash
	9-28-03	1	1 bags	
	10-04-03	1	2 bags	
JORI	10-13-03	15	4 bags	
JONE	Various dates	Comm. Service workers	17 bags	
	Spring Flooding Cleanups	Park staff and volunteers	10 truck loads	Not weighed
JORD	8-23-03	22	132 man-hours	
KELA	9-20 Big Sweep	33	41 bags	530
LAJA	No activity			
LANO	No activity			
LAWA	9-20 Big Sweep	20	72 bags & 1 tire	1,460
LURI	9-20 Big Sweep	94	225 bags	7,000
MEMI	Various dates	Community Service Workers	28 bags	
	02-24-03	8 Comm. Service Workers	48 bags	
	12-28-03	1	8 bags	
MEMO	12-29-03	1	12 bags	
MOMO	9-20 Big Sweep	105	60 bags	?
MOJE/NERI	9-20 Big Sweep	unknown		Approx. 3.5 tons
MOMI	No activity			
PETT	Total for period	Park staff and volunteers	NA	5,000
PIMO	Various dates	Community Service Workers	92 bags	
	4-12-03	Spring Sweep	5 bags	
	4-24-03	School Project	4 bags	
	07-26-03	10 boy scouts	4 bags	
	9-20 Big Sweep	20	30 bags	Plus 70# scrap metal
RARO	9-21 Big Sweep	7	31 bags and 2 tires	1,160
SILA	No activity			
SOMO	No activity			
STMO	No activity			
WEWO	Total for the period	21 Comm. Serv. Workers & Volun.	140 bags	
WIUM	3-18-03	12	8 bags	
	3-19-03	11	16 bags	
	3-21-03	?	35 man-hours	Approx. 60 pounds
	4-24-03	?	3 man-hours	
	5-29-03	?	8 man-hours	
	10-24-03	10	11 bags	
	10-31-03	14	10 bags	

The above information describes the Division of Parks and Recreation litter cleanup efforts. During 2003, approximately 120 litter cleanups were held across the state park system, beyond the normal daily maintenance carried out by staff. As mentioned previously, a total of 17,500 pounds of trash was collected. There were also 700 bags and 10 truckloads that were not weighed.

The Division of Parks and Recreation Recycling Recap:

Number of Pounds Recycled		
Item	2003	2002
Aluminum	5,343	
Plastic	3,448	3,200
Glass	4,322	13,200
Metal		6,900
Paper	5,350	8,000
Other	16,427	
Total	34,760	41,000

The 2003 recycling totals above are listed by park in the following recap.

Park	# of Sites	Location of Sites	Aluminum	Plastic	Glass	Paper	Other	(#lbs.) Collected
Carolina Beach			585	0	0	0	0	585
Cliffs of the Neuse	5	Campground	350	100	150	0	250	850
		Lake Area						
		Picnic Area						
		Concession						
		Picnic Area (WAYN)						
Crowders Mountain	6	Linwood Road Access	134	382	143	180	0	839
		Main Trailhead						
		Park Facilities						
		Lake Area						
		#1 Picnic Parking Area						
		#2 Picnic Parking Area						
Eno River	1	Few's Ford	249	488	918	0	0	1,655
Falls Lake	15	Hwy 50 Boat Launch	135	85	151	0	0	371
		Sandling Beach						
		Beaverdam						
		Holly Point Campground						
		Shinleaf Prim. Campground						
		Rollingview						
		BW Wells						
Fort Fisher	1	Refreshment Stand	237	0	0	0	0	237
Fort Macon	0	N/A	0	0	0	0	0	0
Goose Creek	10	Picnic Area 2	156	60	25	120	0	361
		Campground 2						

Park	# of Sites	Location of Sites	Aluminum	Plastic	Glass	Paper	Other	(#lbs.) Collected
		Park Shop 1						
		Environmental Ed/VC 4						
		Dinah's Landing Access						
Gorges	3	Park Office	79	72	48	145	96	440
		Highway 281 Access Area						
		Frozen Creek Access Area						
Hammocks Beach	4	Visitor Center	25	51	0	240	110	426
		Island Waiting Station						
		Bathhouse						
		Office						
Hanging Rock	6	Campground	173	150	180	0	0	503
		Parking Areas						
		Picnic Areas						
		Park Maintenance Facilities						
		Group Camp						
		Lake Area						
Jockey's Ridge	2	Picnic Area	343	261	210	209	0	1,023
		Maintenance Shop						
Jones Lake	2	Picnic Area	132	0	0	0	0	132
		Shop Area						
Jordan Lake	17	Boat Ramps	500	300	200	0	0	1,000
		Picnic Areas						
		Park Office						
		Campgrounds						
		Maintenance Area						
Kerr Lake	7	All areas	25	10	30	0	100	165
Lake James	1	Day Use Area (Office, Restroom, Concession Stand)	31	18	75	112	0	236
Lake Norman	2	Swimming Area Campground	205	284	372	2304	2776	5,941
Lake Waccamaw	0							
Lumber River	1	Princess Anne	130	0	0	0	0	0

Park	# of Sites	Location of Sites	Aluminum	Plastic	Glass	Paper	Other	(#lbs.) Collected
Medoc Mountain	3	Picnic Area	75	0	0	0	0	75
		Park Office						
		Campground						
Merchants Millpond	5	Family Campground	62	0	0	0	0	62
		Picnic Area						
		Canoe Area						
		Walk-in Group Sites						
		Shop						
Morrow Mountain	8	Camp Loop A Washhouse	75	0	0	0	0	75
		Camp Loop B Washhouse						
		Camp Loop C Washhouse						
		Mtn. Top & Lower Picnic Areas						
		Boathouse & Boatlaunch Areas						
		Office Area						
Mount Mitchell	2	Summit Area	200	250	250	0	4000	4,700
		Personnel barracks						
Mount Jefferson/	5	MOJE	250	500	425	0	600	1,775
New River		NERI - US 221 Access						
		NERI - Wagoner Road Access						
		NERI - Alleghany Co Access						
		NERI - Scenic Corridor						
Pettigrew	9	Picnic Area	300	0	0	0	5780	6,080
		Campground						
		Cypress Point Restrooms						
		Cypress Point Pier						
		Boat Ramp						
		Brumsey Woods						
		Blair Tract						
		Bee Tree Overlook						
Pilot Mountain	5	Shinny Creek Picnic Area	325	0	0	0	0	325
		Jacob Fork Picnic Area						
		Picnic Shelter						
		Park Office						
		Residenses (3)						
Raven Rock	1	Refreshment Stand	125	100	0	90	2280	2,595

Park	# of Sites	Location of Sites	Aluminum	Plastic	Glass	Paper	Other	(#lbs.) Collected
Singletary Lake	2	Ipecac	0	0	0	0	0	0
		Loblolly						
South Mountains	5	Shinney Creek Picnic Area	65	42	220	0	0	327
		Jacob Fork Picnic Area						
		Picnic Shelter						
		Park Office						
		Residences (3)						
Stone Mountain	3	Picnic Area	120	0	0	0	135	255
		Campground						
		Group Campground						
Weymouth Woods	2	Visitor Center	200	250	500	750	0	1,700
		Roadside						
Wm. B. Umstead	13	Group Camps	42	25	425	0	0	492
		Picnic Areas						
		Tent & Trailer						
		Residences						
Yorkshire Center	1	Ground Floor	15	20	0	1200	300	1,535
		TOTALS	**5,343**	**3,448**	**4,322**	**5,350**	**16,427**	**34,760**

Other Statewide Litter Cleanups

North Carolina Big Sweep

1n 1989 North Carolina Big Sweep, Inc became a 501(c)(3) nonprofit organization whose purpose is to promote environmental education, and to plan and coordinate the annual waterway cleanup, including watershed areas. Its origins go back to 1987, when Dr. Lundie Spence, of the NC Sea Grant College Program founded it. More information can be found through its Internet address www.ncbigsweep.org.

NC Big Sweep's 2003 Litter Pickup Results (December 8, 2003)

Counties	Sites	Volunteers	Miles	Tires	Bags	Pounds
Alamance	3	91	3	4	52	1,220
Alexander/Catawba	4	115	18	12	180	4,540
Alleghany/Ashe	28	311	70	322	500	22,000
Anson	1	6	5		37	740
Beaufort	1	8	2	1	12	1,500
Bertie						
Bladen	1	1				
Brunswick	1	551	1		421	8,420
Buncombe	1	130	1		417	8,350
Burke	1	3	1		10	200
Cabarrus	7	208	4	323	102	8,500
Caldwell	14	298	17	83	743	22,755
Camden						
Carteret	2	22	2		356	575
Caswell	2	40	13	3	20	460
Chatham	1	60	3		74	850
Cherokee	2	110	11			
Chowan						
Clay	1	1				
Cleveland	3	57	13	1	171	3,420
Columbus	2	28	20	0	40	2,040
Craven	14	93	11		59	1,707
Cumberland	8	240	13	20	600	12,400
Currituck	1	1				
Dare	1	236	50	0	250	5,000
Davidson	1	475	12	37	520	11,140
Davie	1	30	2	0	45	900
Duplin	1	90	2	680	738	53,940
Durham	10	347	35		370	7,542
Forsyth	37	2,314	58	0	1,150	36,200
Franklin	2	32	5	3	18	420
Gaston	15	526	30	58	957	20,300

Counties	Sites	Volunteers	Miles	Tires	Bags	Pounds
Gates						
Graham	1					
Granville	1	6	2		30	800
Greene						
Guilford	2	749	1		150	3,000
Halifax						
Harnett	3	7	7	2	31	760
Haywood	1	70	5	7	93	5,580
Henderson	20	139	15	60	224	4,800
Hertford						
Hoke						
Hyde	1	25	5		55	550
Iredell	8	165	40	61	320	12,220
Jackson	1	10	8		30	600
Johnston	8	128	7	29	229	4,620
Jones						
Lee	3	88	5	20	60	1,840
Lenoir	1	19	7	4	77	1,970
Lincoln	1					
Macon	3	96	2	4	67	1,420
Madison	1	36	20	23	117	2,800
Martin						
McDowell	1	200	60	25	450	9,000
Mecklenburg	21	849	99	50	1,216	33,325
Mitchell	2	26	1		32	1,800
Montgomery	1	99	14	8	120	2,560
Moore	1	10	3	0	12	150
Nash/Edgecombe	2	58	3	8	138	1,660
New Hanover	2	40	1	0		
Northampton						
Onslow	1	157	45		190	6,800
Orange	3	111	19	3	69	1,440
Pamlico	0	0	0	0	0	0
Pasquotank	2	15	4		32	640
Pender	1	428	31		134	913
Perquimans						
Person	1	34	5		40	362
Pitt						
Polk	1	15	8	2	50	1,000
Randolph	4	80	12	1	27	560
Richmond	3	33	5	0	25	500
Robeson	1	94	9	10	225	7,000

Counties	Sites	Volunteers	Miles	Tires	Bags	Pounds
Rockingham	67	1,016	213	158	1,299	37,500
Rowan	1	140	4	20	115	2,700
Rutherford	7	55	32	142	84	4,800
Sampson	6	68	18	44	60	4,000
Scotland						
Stanly	2	105	15	1	60	1,220
Stokes	25	588	45	16	1,132	23,000
Surry	1	47	1		300	6,000
Swain	1	25	35	8	88	1,500
Transylvania	1	68	8	33	58	1,820
Tyrrell						
Union	1	14	2	1	20	420
Vance	1	14	9	0	13	260
Wake	27	710	48	44	554	15,000
Warren	1	11	2	0	5	100
Washington	1	13	2		10	84
Watauga/Avery	1	115	7	3	90	1,800
Wayne	16	283	13	0	191	3,340
Wilkes	1	245	4	12	90	2,040
Wilson	1	6	1	0	10	200
Yadkin	1	23	1		54	1,500
Yancey						
	Sites	Volunteers	Miles	Tires	Bags	Pounds
2003 TOTALS	430	13,757	1,305	2,346	16,318	451,073

NC Big Sweep is normally held the third Saturday in September. For 2004 the date of the annual litter pick up has been changed to October 2, 2004. The reason is to avoid the inclement weather, which is usually present during September.

NC Keep America Beautiful

North Carolina Keep America Beautiful (NCKAB) is a nonprofit public education organization dedicated to enhancing the natural beauty of North Carolina communities, improving waste handling practices and empowering individuals to take greater responsibility for improving community environments. NCKAB is comprised of local, independent affiliates located in communities all across North Carolina.

The KAB Affiliates participated in their 2003 Great American Cleanup™. This cleanup ran from March to the end of May. The volunteers worked on a number of projects such as litter pick up, removing debris and junk cars, eliminating illegal dumps, restoring playgrounds and planting trees, flowers and bulbs. They had 32,677 volunteers that expended more than 130,700 hours in these various initiatives, and overall saved the state's taxpayers in equivalent labor costs through all their volunteer efforts. The reported amount of litter picked up during their NC Great American Cleanup was 1,176,478 pounds.

Volunteers by KAB Affiliate - All Projects

KAB Affiliate	Number of Volunteers	Number of Volunteer Hours All Projects	2003 NC Great American Cleanup Litter Amount Picked Up In Pounds
Charlotte	115	460	47,608
Asheville	150	600	12,400
Belmont	45	180	5,940
Brunswick	500	2,000	4,340
Moore	600	2,400	43,180
Gastonia	1,900	7,600	1,600
Wayne	224	896	7,360
Duplin	190	760	150,940
Scotland	200	800	330,000
McDowell	960	3,840	26,320
High Point	302	1,208	3,260
Onslow	350	1,400	5,500
Nash/Edgecombe	438	1,752	150,000
Shelby	35	140	1,500
Wake	4,854	19,416	204,380
Wilmington	4,575	18,300	162,000
Winston-Salem	17,239	68,956	20,150
Totals	32,677	130,708	1,176,478

Anti-Litter Education/Prevention – 2003

Department of Environmental and Natural Resources (DENR)

Division of Pollution Prevention and Environmental Assistance (DPPEA)

The DPPEA distributed more than 10,000 recycling activity books as well as 100,000 Recycle Guys packets to schools local governmental and civic organizations in 2003. The campaign promoted waste reduction and recycling. More information about teaching aids and educational efforts can be found through their web site at www.p2pays.org.

In addition to this, the DPPEA had anti-litter ads, which reached 60% of the counties in North Carolina through the cable network. The ads promoted anti-litter behavior through recycling.

Division of Parks and Recreation

Each unit in the state park system provides an adequate number of trashcans in convenient locations to encourage visitors to keep the parks clean and provides at least one recycling center for visitors and campers.

The Division of Parks and Recreation also seeks to exemplify and encourage good stewardship of natural resources by reducing, reusing and renewing materials where possible. To reduce the amount of paper that might become litter, the Division uses Internet servers instead of printed materials where possible. Park maps and other information can be viewed online, or via computer interactive exhibits in park offices. In 2003, 15 citations were written for littering within North Carolina State Parks and Recreation areas.

Division of Marine Fisheries - Marine Patrol

The Division of Marine Fisheries' Marine Patrol Officers patrol the waters of North Carolina working to control the discharge of litter into the state's coastal waterways along with their other patrol duties. Officers are stationed along the coastal counties from the Virginia state line to South Carolina state line and as part of their daily patrol, officers ensure the disposal of trash, discarded equipment and abandoned fishing gear is done properly.

NC Wildlife Resources Commission

The Division of Engineering Services maintains 191 boating access areas and 36 public fishing access areas across the state. Approximately 3,500 hours was spent policing and removing litter form these sites. "Littering is Illegal" signs are maintained on all sites.

The Division of Wildlife Management reports 120 hours of general litter pick-up on game lands across the state. The Division of Enforcement Officers participated in numerous public service announcements pertaining to the proper disposal of lawfully taken wildlife.

NCDOT - Office of Beautification Programs

During 2003 the Office of Beautification Programs placed emphasis on enhancing their web site to promote anti-litter education. Currently the Union County - Yes! Yes! We Can Stop Littering Campaign and the Gaston County - 2003-2004 Beautification and Environmental Education Programs are provided in their entirety. The intent of this site is to be a resource for educators in need of classroom curriculum material. The information can be found at the Office of Beautification Programs web site homepage at www.ncdot.org/~beautification through the NCDOT Anti-Litter Efforts link. The curriculums can be downloaded for classroom usage.

In addition, the Office of Beautification provided a variety of educational materials for schools, civic groups and others. This included anti-litter stickers, decals, pencils, car litterbags, temporary tattoos, leaflets and Swat-A-Litterbug cards. Other items available through their Internet web site included links i.e. to Swat-A-Litterbug, Adopt-A-Highway, Litter Sweep, printable activity pages, and litter activity book with lessons and activities for 2nd and 3rd grades and information about NCDOT's fight against litter.

The Office of Beautification Programs also distributed car litterbags in the tens of thousands through rest areas, welcome centers and the NC State Fair and on request to numerous groups.

Annual Litter Prevention Awards Contest: The NCDOT, along with the Office of the Governor and the NC Soft Drink Association, sponsors a litter prevention awards contest annually. Eligible categories are as follows: Government Agencies, Schools/Youth Groups and Nonprofits. Each category offers first place prizes of $1,000 and second place prizes of $500. Winning groups are required to use their winnings to expand existing litter prevention programs. Winners are posted to the Office of Beautification Programs web site's Litter Prevention Contest link.

Yes! Yes! We Can Stop Littering Campaign: An alliance between the Union County Rotary Clubs, the Union County Public School System, county charter and private schools, local businesses and the NCDOT to prevent littering. The overall purpose over a five-year period is to cultivate a cultural change to stop littering in Union County and the state. The program is in its third year with approximately 6,000 students having participated. It's estimated that these 6,000 students by sharing their experiences have increased awareness to over 20,000 people.

The objectives are to promote awareness, change attitudes through enhancing pride in a clean environment and creating a positive action by citizens to prevent littering and polluting the environment. The Union County Rotary Clubs are the major drivers of this initiative with other sponsors providing various assists as the program moves forward. The NCDOT Office of Beautification Programs for example, provides items as litterbags, stickers and tattoos with anti-littering messages, promotional pencils and plaques to support the "Yes! Yes! We Can Stop Littering Campaign".

Swat-A-Litterbug program: The Office of Beautification Programs continues to administer the Swat-A-Litterbug program. Through this program those who are observed littering can be reported on-line through the Office of Beautification Programs web site at www.ncdot.org/~beautification, or through the mail (Swat-A-Litterbug cards), or by calling *HP or calling the NCDOT Customer Service Office at 1-877-DOT-4YOU.

The information required in a Swat-A-Litterbug report is the vehicle license plate number, time, date, street, city, county, and a description of the littering offense. In 2003, more than 6,000 Swat-A-Litterbug letters were mailed to those observed littering. In 2002 there were 5,000 letters mailed.

Swat-A-Litterbug is viewed as an educational tool, which informs those observed violating the litter law. The letters, which are signed by the Colonel of the State Highway Patrol, inform recipients of their littering, that littering is illegal and the penalties they could receive if convicted. Those submitting the license plate numbers are anonymous. There are no citations or warnings issued from these reports and no record is kept regarding who receives the letter. Again, this is mainly a tool to help educate those observed littering.

Litter License Plate: The General Assembly approved the Anti Litter License plate during the 2000 session. The initial 300 plates were sold in 2001 and the plate became available through the tag agencies by the beginning of 2002. Ten dollars of each plate sold will be diverted to a "Litter Prevention Fund" on a quarterly basis. The remainder of the money is used to help support other statewide anti litter efforts. As of this report date, there have been 425 plates issued.

Litter Enforcement – 2003 Summary

Department of Crime Control and Public Safety

In 2003, the State Highway Patrol issued 683 tickets for littering. The State Highway Patrol also cooperates with NC Department of Transportation (NCDOT) to offer the *HP as an option for reporting littering activity on the highways. Information provided by callers is captured by the State Highway Patrol and when appropriate it is submitted to the NCDOT Swat-A-Litterbug program for processing.

State Highway Patrol Recap of Litter Charges G.S. 14-399 and local ordinances:

Year	Number of Charges
2003	683
2002	699
2001	748

The Division of Motor Vehicle (DMV) Enforcement Officers were transferred from the NCDOT to the Department of Crime Control and Public Safety State Highway Patrol in January of 2003. In the table below the tickets issued for G.S. 20-116(g) violations during 2003 represent the combined tickets issued by the State Highway Patrol and the DMV enforcement officers. The other years are the DMV only.

DMV's Enforcement Section Recap of Improper Loading/covering of Vehicle G.S. 20-116(g):

Year	Number of Charges
2003 *	1,161
2002	1,066
2001	1,683

* Combined DMV and SHP

Division of Parks and Recreation

Each unit in the state park system provides an adequate number of trashcans in convenient locations to encourage visitors to keep the parks clean and provides at least one recycling center for visitors and campers.

The Division of Parks and Recreation also seeks to exemplify and encourage good stewardship of natural resources by reducing, reusing and renewing materials where possible. To reduce the amount of paper that might become litter, the Division uses Internet servers instead of printed materials where possible. Park maps and other information can be viewed online, or via computer interactive exhibits in park offices. In 2003, 15 citations were written for littering within North Carolina State parks and recreation areas.

Division of Marine Fisheries - Marine Patrol

Marine Patrol Officers issued 5 citations and four warning citations with 54 hours spent on these cases in 2003. Officers issued 11 citations and six warning citations with 53 hours spent on these cases in 2002. In 2001 there were19 citations and one warning citation issued with 10.5 hours spent on those cases.

Marine Patrol Citation Recap

Year	Citations	Warnings	Time Spent
2003	5	4	54 hours
2002	11	6	53 hours
2001	19	1	10.5 hours

NC Wildlife Resources Commission

The Division of Engineering Services maintains 191 boating access areas and 36 public fishing access areas across the state. Approximately 3,500 hours was spent policing and removing litter form these sites. "Littering is Illegal" signs are maintained on all sites.

The Division of Wildlife Management reports 120 hours of general litter pick-up on game lands across the state.

The Division of Enforcement Officers participated in numerous public service announcements pertaining to the proper disposal of lawfully taken wildlife. There were six charges and three convictions in violations of G.S. 75A-10c (littering the state's waterways)..

Wildlife Resources Commission (WRC) Recap of Litter Charges G.S. 14-399 and local ordinances:

Year	Charges
2003	646
2002	748
2001	866

ADMINISTRATIVE OFFICE OF THE COURTS
Research and Planning Division

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REPORT ON LITTERING CHARGES AND CONVICTIONS

Pursuant to Session Law 2001-512, Section 9

February 1, 2004

This report provides detailed information about littering offenses for calendar year 2003.

Data are presented on the number of charges and convictions by county and charges by law enforcement agency. The data are from the Administrative Office of the Courts (AOC) Automated Criminal/Infraction System.

Data are provided for the following eleven offenses:

Offense Code		
4425	Improper Loading/Covering of Vehicle	§ 20-116(g)
5370	Commercial Littering	§ 14-399(e)
5371	Littering Hazardous Waste	§ 14-399(e)
5372	Littering not more than 15 pounds	§ 14-399(c)
5373	Littering more than 15 but less than 500 pounds	§ 14-399(d)
5374	Littering more than 500 pounds	§ 14-399(e)
5375	Unintentional Littering not more than 15 Pounds	§ 14-399(c1)
5376	Unintentional Littering more than 15 but less than 500 Pounds	§ 14-399(d1)
5377	Unintentional Littering more than 500 Pounds	§ 14-399(e1)
6248	Litter Gameland/Access Area	§ 113-264(a)
8514	Littering Beer/Wine Container	local ordinance

Calendar 2003

NUMBER OF LITTERING CHARGES AND CONVICTIONS BY COUNTY AND CHARGING AGENCY

The following data are from the AOC's Automated Criminal/Infraction System for the most recent calendar year. The number of charges and convictions represents totals from district and superior court filings. Some of the defendants have other charges in addition to a littering offense. It is possible for a defendant to be charged in one calendar year and convicted in the next. Thus, for any given calendar year, the defendants convicted are not necessarily the same defendants charged in that year.

With respect to the charging agency, "Other" represents only those cases in which clerks did not indicate the charging agency or an invalid agency name was entered. All littering offense codes are listed for the statewide data. County data include only the codes for which there were any charges.

					Number Of Charges By Charging Agency							
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
STATEWIDE				STATEWIDE								
20-116(g)	4425	1453	968	4425			267	16	19	1145	1	5
14-399(e)	5370	12	4	5370			1		7			4
14-399(e)	5371	1	0	5371			1					
14-399(c)	5372	2757	1499	5372	10	47	1273	2	230	661	377	157
14-399(d)	5373	107	49	5373		1	28		34	5	7	32
14-399(e)	5374	35	3	5374			7		21		2	5
14-399(c1)	5375	21	12	5375			5		4	10	2	
14-399(d1)	5376	3	2	5376					1	1		1
14-399(e1)	5377	1	1	5377			1					
113-264(a)	6248	257	194	6248							250	7
local ordinance	8514	72	40	8514		2	44		6	6	8	6
Total		4719	2772	Total	10	50	1627	18	322	1828	647	217

Three-year Comparison

			Number Of Charges By Charging Agency							
	Number of Charges	Number of Convictions	ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
2003 Totals	3266*	1804	10	50	1360	2	303	683	646	212
2002 Totals	3601	1951	8	64	1480	23	323	699	748	256
2001 Totals	4059	2219	5	44	1633	53	404	748	866	484

* Totals are less the 20-116 (g) charges and convictions

				Number Of Charges By Charging Agency								
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Alamance: 59	4425	22	15	Alamance			2			20		
	5372	31	17				18		5	7		1
	5373	3	1									3
	5374	1	0						1			
	8514	2	2				2					
Alexander: 14	4425	2	1	Alexander				1		1		
	5372	9	6				3		2	3		1
	6248	3	3								3	
Alleghany: 10	4425	3	3	Alleghany						3		
	5372	6	6				1				5	
	5373	1	1									1
Anson: 24	4425	3	2	Anson						3		
	5372	13	6				3		1	3	6	
	6248	7	8								7	
	8514	1	0				1					
Ashe: 13	4425	11	9	Ashe						11		
	5372	2	2				1			1		
Avery: 3	5372	3	4	Avery			1			1	1	
Beaufort: 35	4425	14	7	Beaufort			1			13		
	5372	21	11				8		1	10	1	1
Bertie: 22	4425	5	1	Bertie						5		
	5372	11	9							2	7	2
	5373	4	0									4
	6248	1	0								1	
	8514	1	1				1					
Bladen: 35	4425	5	4	Bladen			1			4		
	5372	30	14				5		3	10	12	
Brunswick: 49	4425	29	25	Brunswick			1			28		
	5372	20	10		1		1			2	13	3
	5373	0	1									
Buncombe: 92	4425	30	22	Buncombe			3		1	26		
	5372	59	31			2	44		1	6	5	1
	5373	1	1				1					
	8514	2	1				1			1		

					Number Of Charges By Charging Agency							
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Burke: 53	4425	15	11	Burke			1			14		
	5372	30	28				15		2	6	4	3
	5373	1	0									1
	5374	1	0									1
	6248	6	4								6	
Cabarrus: 95	4425	44	34	Cabarrus			3	1	1	39		
	5372	51	40				14		11	26		
Caldwell: 30	4425	6	4	Caldwell			2			4		
	5372	7	5				4		1	2		
	6248	17	15								16	1
Camden: 4	4425	2	2	Camden						2		
	5372	1	3								1	
	5373	1	0						1			
Carteret: 69	4425	14	11	Carteret			6			8		
	5372	52	22				21			25	1	5
	5373	1	1						1			
	5375	1	0							1		
	6248	1	1								1	
Caswell: 16	4425	5	4	Caswell						5		
	5372	10	4						5	3	1	1
	5373	1	1						1			
Catawba: 94	4425	18	12	Catawba			3		1	14		
	5372	45	24				26		5	11	3	
	5373	3	1						1			2
	6248	27	20								27	
	8514	1	0				1					
Chatham: 41	4425	5	3	Chatham			1			4		
	5372	32	16				1		3	2	21	5
	5375	1	1						1			
	6248	3	2								3	
Cherokee: 13	4425	0	1	Cherokee								
	5372	9	5				5			1	3	
	5375	0	2									
	5376	0	1									
	6248	4	4								4	
Chowan: 18	4425	1	1	Chowan						1		
	5372	15	11				2	1	3	3	6	
	5373	2	1							1	1	

				Number Of Charges By Charging Agency								
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Clay: 3	5372	2	1	Clay						1	1	
	6248	1	1								1	
Cleveland: 42	4425	13	8	Cleveland						13		
	5372	24	14				9		5	9		1
	5373	0	1									
	5374	3	0						3			
	8514	2	2								2	
Columbus: 33	4425	13	7	Columbus						13		
	5372	14	9				4		2	5	2	1
	8514	6	0				4		1	1		
Craven: 92	4425	12	9	Craven			2		8	2		
	5372	77	34				49		2	22	2	2
	6248	2	2								2	
	8514	1	1				1					
Cumberland: 114	4425	60	39	Cumberland			8			52		
	5370	1	3						1			
	5372	47	16		1		27		2	9	7	1
	5373	4	1		1		2			1		
	5374	1	0				1					
	6248	1	1								1	
Currituck: 30	4425	3	2	Currituck						3		
	5372	9	9			1			3	1	4	
	5373	2	1								2	
	5374	12	2						10			2
	6248	2	2								2	
	8514	2	2									2
Dare: 75	4425	14	9	Dare			1	3		10		
	5372	40	26			2	19		6	3	5	5
	5373	3	1				2			1		
	5374	2	0								2	
	6248	7	5								6	1
	8514	9	7			2	4		3			
Davidson: 86	4425	38	26	Davidson			3			35		
	5372	40	16				11		7	5	8	9
	5373	4	0						1	1		2
	5374	2	0						2			
	5375	2	0						2			
Davie: 36	4425	10	4	Davie						10		
	5372	26	17				4		4	7	11	
	5375	0	1									

				Number Of Charges By Charging Agency								
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Duplin: 17	4425	10	5	Duplin						10		
	5372	7	2							7		
Durham: 83	4425	20	15	Durham			12			8		
	5370	1	0									1
	5372	52	28		2	1	39		2			8
	5373	1	0				1					
	6248	9	6								7	2
Edgecombe: 44	4425	5	5	Edgecombe			2			3		
	5372	33	11				22		2	9		
	6248	5	2								5	
	8514	1	1									1
Forsyth: 141	4425	62	42	Forsyth			11			51		
	5372	74	35		2	1	43		3	6	19	
	5373	2	1				1		1			
	8514	3	1				3					
Franklin: 23	4425	3	2	Franklin						3		
	5372	13	6				6			3	3	1
	5373	5	4				1		4			
	5375	2	0							2		
Gaston: 174	4425	32	16	Gaston			3			28		1
	5370	4	0				1					3
	5372	111	57				34		3	43	12	19
	5373	3	2				1					2
	5374	1	0				1					
	5376	0	1									
	6248	23	17								23	
Gates: 7	5372	6	3	Gates						5		1
	8514	1	1						1			
Graham: 2	6248	1	1	Graham					1			
	8514	1	0								1	
Granville: 18	4425	4	2	Granville			2			2		
	5370	2	0						2			
	5372	8	6				1		1	3	3	
	5373	1	1									1
	6248	2	1								2	
	8514	1	0							1		
Greene: 15	4425	5	1	Greene					2	3		
	5372	8	5						4	3	1	
	5373	2	1						1			1

				Number Of Charges By Charging Agency								
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Guilford: 134	4425	51	36	Guilford			18	5		27		1
	5372	81	16			1	46		13	4		17
	5373	2	1				1		1			
Halifax: 41	4425	10	5	Halifax			2			8		
	5372	27	9				6		2	8	10	1
	5373	1	0								1	
	6248	3	1								3	
Harnett: 46	4425	13	9	Harnett			1		1	11		
	5372	32	16				10		2	10	9	1
	5373	0	1									
	8514	1	1				1					
Haywood: 20	4425	2	1	Haywood			1		1			
	5370	1	0						1			
	5372	14	8				1		1	7	5	
	5374	2	0						2			
	6248	1	1							1		
Henderson: 27	4425	10	8	Henderson			3			7		
	5372	13	8				8		3	1	1	
	6248	4	2								4	
Hertford: 9	4425	1	2	Hertford						1		
	5370	1	0						1			
	5372	6	4				3			2	1	
	5374	1	0						1			
Hoke: 18	4425	3	3	Hoke				1		2		
	5372	12	5				3		1	5	1	2
	5373	3	1				1		2			
Hyde: 4	4425	1	0	Hyde						1		
	5372	3	2						1		2	
Iredell: 78	4425	45	20	Iredell			6		2	37		
	5372	29	19			3	12		4	5	5	
	5373	1	0									1
	6248	2	2								2	
	8514	1	1							1		
Jackson: 14	5372	12	9				1		1	2	8	
	6248	2	1								2	
Johnston: 60	4425	39	21	Johnston			6			33		
	5372	21	5		3		8		1	8		1

					Number Of Charges By Charging Agency							
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Jones: 12	5372	9	3	Jones			1			8		
	5373	1	0						1			
	6248	2	2								2	
Lee: 15	4425	9	4	Lee			4		1	4		
	5372	6	2				3		1		2	
Lenoir: 42	4425	14	8	Lenoir			3			11		
	5372	25	16				12		3	10		
	5373	1	1				1					
	8514	2	1				2					
Lincoln: 16	4425	6	1	Lincoln					1	5		
	5372	10	5				5		2	2	1	
Macon: 14	4425	4	4	Macon			2		1	1		
	5372	9	6				3				6	
	5373	1	0						1			
Madison: 15	4425	1	1	Madison						1		
	5372	13	9				1		2	4	6	
	5374	1	0									1
Martin: 22	4425	3	3	Martin						3		
	5372	16	5				2			12	2	
	5373	1	0						1			
	6248	2	2								2	
McDowell: 28	4425	6	5	McDowell						6		
	5372	19	13				3		3	6	6	1
	6248	2	2								2	
	8514	1	1				1					
Mecklenburg: 391	4425	139	104	Mecklenburg			21		1	117		
	5372	229	101		2	1	187		3	33	1	2
	5373	5	3				5					
	5375	1	2							1		
	6248	1	0								1	
	8514	16	7				16					
Mitchell: 9	4425	1	1	Mitchell							1	
	5372	6	3				2			2	1	1
	5373	2	0								1	1
Montgomery: 24	4425	3	3	Montgomery						3		
	5372	7	2				3		3			1
	6248	14	9								14	

					Number Of Charges By Charging Agency							
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Moore: 22	4425	7	3	Moore			4			3		
	5372	14	6		1		5		3	3	1	1
	5373	1	0						1			
Nash: 73	4425	34	25	Nash			5		1	28		
	5372	36	11		2		8	1	1	22	1	1
	5373	1	0									1
	5375	1	0						1			
	6248	1	2								1	
New Hanover: 133	4425	58	37	New Hanover			10		2	46		
	5372	68	32			4	42		15	4		3
	5373	2	0				2					
	5375	1	0				1					
	8514	4	0				3					1
Northampton: 9	4425	4	2	Northampton						4		
	5372	5	4							4	1	
Onslow: 44	4425	16	14	Onslow			3			13		
	5372	25	19				1			20	3	1
	5375	1	0						1			
	5376	2	0						1			1
Orange: 46	4425	23	16	Orange			14			9		
	5372	21	8				14					7
	5373	2	2						2			
Pamlico: 9	4425	2	0	Pamlico						2		
	5372	2	2							1		1
	5374	2	0						2			
	5375	2	1							2		
	6248	1	1								1	
Pasquotank: 24	4425	7	6	Pasquotank						7		
	5372	13	7			2	5				6	
	6248	4	3								4	
Pender: 22	4425	10	9	Pender			1			9		
	5372	11	5				2			9		
	8514	1	0							1		
Perquimans: 10	4425	4	2	Perquimans			4					
	5372	4	4						1	1	2	
	6248	2	2								2	

				Number Of Charges By Charging Agency								
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Person: 25	4425	6	4	Person			1			5		
	5370	1	0						1			
	5372	9	10						2		6	1
	5373	3	2						1			2
	6248	6	4								4	2
Pitt: 58	4425	19	15	Pitt			7			12		
	5372	38	20		2	5	15		1	13	2	
	5373	1	0								1	
Polk: 72	4425	2	0	Polk						2		
	5372	10	9				4		2	2	2	
	5375	1	0								1	
	5377	0	1									
	6248	59	46								59	
Randolph: 26	4425	9	3	Randolph			6			3		
	5372	17	4				4		3	7		3
Richmond: 35	4425	2	4	Richmond			1					1
	5372	25	15				2		8	7	7	1
	5373	2	1						1		1	
	5375	0	1									
	6248	6	2								6	
Robeson: 78	4425	12	9	Robeson			4			8		
	5372	52	35				12		6	18	13	3
	5373	10	5						3	1		6
	5375	1	1								1	
	6248	3	3								3	
Rockingham: 25	4425	7	6	Rockingham			1			6		
	5372	17	16				3		2	2	9	1
	5373	1	0									1
Rowan: 72	4425	26	18	Rowan			3			23		
	5372	44	30				8		2	16	18	
	5373	2	2						2			
	8514	0	1									
Rutherford: 58	4425	7	6	Rutherford				1		6		
	5372	46	33				12		10	15	9	
	5373	1	2						1			
	5374	1	0				1					
	5375	1	0							1		
	8514	2	3								2	

				Number Of Charges By Charging Agency								
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Sampson: 26	4425	16	8	Sampson				2		14		
	5372	9	5				5			3	1	
	5373	1	0						1			
Scotland: 29	4425	1	2	Scotland						1		
	5372	27	23				12		3	4	8	
	5373	1	0						1			
Stanly: 62	4425	18	9	Stanly			2			16		
	5372	35	24				14		2	7	12	
	5373	2	1						2			
	5375	1	0				1					
	6248	5	5								5	
	8514	1	0									1
Stokes: 18	4425	4	1	Stokes			1			3		
	5372	14	3				5			4	4	1
Surry: 24	4425	9	8	Surry			2			7		
	5372	15	11				12			2	1	
Swain: 8	4425	2	2	Swain						2		
	5372	6	9						1	2	3	
Transylvania: 18	4425	3	1	Transylvania			1	1		1		
	5372	6	3				3				3	
	6248	9	6								9	
Tyrrell: 12	5372	12	6	Tyrrell					3	7	2	
Union: 69	4425	32	18	Union			5		1	26		
	5370	1	1						1			
	5372	34	16				15		3	13	1	2
	5373	1	0									1
	8514	1	0								1	
Vance: 36	4425	15	8	Vance						15		
	5372	18	9			2	5		3	8		
	5373	3	1						1			2
Wake: 512	4425	137	94	Wake			51		1	83		2
	5372	355	220			14	252		11	41	6	31
	5373	6	2				6					
	5374	5	1				4					1
	5375	5	3				3			2		
	5376	1	0							1		
	5377	1	0				1					
	6248	1	1									1
	8514	1	2									1

					Number Of Charges By Charging Agency							
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
Charges By County				By County								
Warren: 9	4425	4	3	Warren						4		
	5372	5	3			2			2	1		
Washington: 8	4425	5	4	Washington						5		
	5372	3	2							3		
Watauga: 28	4425	5	4	Watauga				1		4		
	5372	20	12				15		1	1	2	1
	5373	1	1				1					
	8514	2	0				2					
Wayne: 47	4425	13	3	Wayne			7			6		
	5372	33	13				16		4	10	1	2
	6248	1	1								1	
Wilkes: 23	4425	7	5	Wilkes						7		
	5372	9	10				2		1	3	3	
	5373	1	1				1					
	6248	2	0								2	
	8514	4	3							1	3	
Wilson: 53	4425	20	11	Wilson			4			16		
	5372	29	13				13		1	10	5	
	5373	1	0				1					
	6248	2	1								2	
	8514	1	1				1					
Yadkin: 27	4425	6	4	Yadkin						6		
	5371	1	0				1					
	5372	19	11				5		4	6	4	
	5373	1	1						1			
Yancey: 6	4425	2	1	Yancey						2		
	5372	4	1								4	

Court Costs Associated with Disposing of Littering Charges

Calendar 2003

I. PUNISHMENT LEVEL

(1) Class I Felony

The following three littering offenses are punishable as Class I felonies:

5370	Commercial Littering	§ 14-399(e)
5371	Littering Hazardous Waste	§ 14-399(e)
5374	Littering more than 500 pounds	§ 14-399(e)

(2) Class 3 Misdemeanor

The following four littering offenses are punishable as Class 3 misdemeanors:

5372	Littering not more than 15 pounds	§ 14-399(c)
5373	Littering more than 15 but less than 500 pounds	§ 14-399(d)
6248	Litter Gameland/Access Area	§ 113-264(a)
8514	Littering Beer/Wine Container	local ordinance

(3) Infraction

The following four offenses are punishable as infractions:

4425	Improper loading/covering of vehicle	§ 20-116(g)
5375	Unintentional Littering not more than 15 Pounds	§ 14-399(c1)
5376	Unintentional Littering more than 15 but less than 500 Pounds	§ 14-399(d1)
5377	Unintentional Littering more than 500 Pounds	§ 14-399(e1)

II. COSTS OF DISPOSITION

These estimates do not purport to represent the cost of operating the court system. The estimates here include only the personnel-related costs for court personnel who are active participants in courtroom proceedings. These estimates do not include costs for appeals, indigent defense, support staff who are not actually present in the courtroom, bailiffs and facilities (as these are county expenses), or operating expenses such as equipment and supplies.

A. GUILTY PLEA

Class I felony plea in superior court: AOC data indicate that processing each guilty plea for a Class I felony requires an average of 0.36 hours of in-court time at an average cost of $91.

Class 3 misdemeanor plea in district court: AOC data indicate that processing each guilty plea for a Class 3 misdemeanor requires an average of 0.22 hours of in-court time at an average cost of $41.

Infraction waiver: AOC's best estimate is that processing each waiver requires a minimum of 10 minutes of a deputy clerk's time. At a rate of $15.60 per hour for a clerk's time, processing each waiver costs approximately $2.60 in clerk time.

B. TRIAL

Class I felony trial in superior court: AOC data indicate that each Class I felony trial in superior court lasts an average of 1.62 days of in-court time at an average cost of $2,974.

Class 3 misdemeanor bench trial in district court: AOC data indicate that each Class 3 misdemeanor disposition in district court requires an average of 0.77 hours of in-court time at an average cost of $862.

Infraction: AOC's best estimate is that disposing of each infraction in district court requires a minimum of 10 minutes of in-court time and 5 minutes of a clerk's time to process the file, for a total of approximately $32.

C. DISMISSAL

AOC's best estimate is that it requires a minimum of 5 minutes of a clerk's time to process a dismissal without trial. At a rate of $15.60 per hour for a clerk's time, processing each dismissal of any of the littering offenses above would cost approximately $1.30 in clerk time.

WAIVER OF LITTERING OFFENSES

A defendant charged with littering in an amount not exceeding 15 pounds and not for commercial purposes under NCGS 14-399(c) may waive his court appearance and pay a $250 fine plus court costs.

Effective January 1, 2004, a defendant charged with unintentional littering in an amount not exceeding 15 pounds under NCGS 14-399(c1) may waive his court appearance and pay a fine of $25 plus court costs. The Conference of Chief District Court Judges added this littering offense to the waiver list on October 8, 2003 pursuant to NCGS 7A-148.

The waiver policy for these two littering offenses applies only to first-time offenders; a defendant charged with a second offense under NCGS 14-399(c) or (c1) would be required to appear in court to answer the charge.

This information can be found at the North Carolina Court System web site at http://www.nccourts.org/Forms/Documents/788.pdf.

ATTACHMENT A: Session Law 2001-512, Sections 9 and 10

SECTION 9. The text of G.S. 147-12 is designated as subsection (a) of that section, and G.S. 147-12 is further amended by adding a new subsection to read: "(b) The Department of Transportation, the Department of Correction, the Department of Crime Control and Public Safety, the State Highway Patrol, the Wildlife Resources Commission, the Division of Parks and Recreation in the Department of Environment and Natural Resources, and the Division of Marine Fisheries in the Department of Environment and Natural Resources shall deliver to the Governor by February 1 and August 1 of each year detailed information on the agency's litter enforcement, litter prevention, and litter removal efforts. The Administrative Office of the Courts shall deliver to the Governor by February 1 and August 1 of each year detailed information on the enforcement of the littering laws of the State, including the number of charges and convictions under the littering laws of the State. The Governor shall gather the information submitted by the respective agencies and deliver a consolidated semiannual report on or before March 1 and September 1 of each year to the Environmental Review Commission, the Joint Legislative Transportation Oversight Committee, and the House of Representatives and the Senate Appropriations Subcommittees on Natural and Economic Resources."

SECTION 10. The first reports required to be delivered by the Department of Transportation, the Department of Correction, the Department of Crime Control and Public Safety, the State Highway Patrol, the Wildlife Resources Commission, the Division of Parks and Recreation in the Department of Environment and Natural Resources, the Division of Marine Fisheries in the Department of Environment and Natural Resources, and the Administrative Office of the Courts to the Governor under G.S. 147-12(b), as enacted by Section 10 of this act, shall be due February 1, 2002. The first report required to be delivered by the Governor to the Environmental Review Commission, the Joint Legislative Transportation Oversight Committee, and the House of Representatives and the Senate Appropriations Subcommittees on Natural and Economic Resources under G.S. 147-12(b), as enacted by Section 10 of this act, shall be due March 1, 2002.

NORTH CAROLINA CONTACTS

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2003 North Carolina Interagency Report
on
Litter Cleanup, Education/Prevention and Enforcement

I. 2003 Roadside Litter Pick Up Summary - NCDOT, AAH, DOC and CSWP

A. Roadside Litter Cleanup Recap and Comparison (Pages 3-7):

Litter Amounts Picked Up In Pounds by Year				Three-year Cumulative Amount by Group
	2003	2002	2001	
NCDOT *	455,490	847,545	1,620,900	2,923,935
DOC *	2,123,601	2,680,635	1,547,550	6,351,786
Other volunteers *	382,590	391,410	390,405	781,815
AAH**	3,649,360	4,241,325	4,379,760	12,270,445
CSWP**	3,222,675	4,498,590	4,121,325	11,842,590
Sum	9,833,716	12,659,505	12,059,940	34,553,161

* Litter Sweep (only) litter pick up amount

**Annual litter pick up amount

The three-year cumulative amount of 34,553,161 pounds of litter equates to 2,303,544 bags of litter based on the average bag weighing 15 pounds.

B. NCDOT 2003 Roadside Litter Pick Up Expenditure (Page 7)

NCDOT Litter Cleanup Expenditure Recap By Year			
	2003	2002	2001
NCDOT Employees	$3,328,699	$4,324,947	$4,098,679
Adopt-A-Highway	293,357	590,092	543,213
DOC (Medium and Minimum Custody Inmates)	10,289,129	10,457,854	6,342,509
Expenditures by year:	$13,911,185	$15,372,893	$10,984,401

C. Other Litter Cleanups (DENR, Big Sweep, KAB)

1. The Division of Parks and Recreation Recycling Recap (Pages 8-13):

Number of Pounds Recycled		
Item	2003	2002
Aluminum	5,343	
Plastic	3,448	3,200
Glass	4,322	13,200
Metal		6,900
Paper	5,350	8,000
Other	16,427	
Total	34,760	41,000

2. NC Big Sweep - watershed, beach, rivers and creek sides (Page 14-16)

	Sites	Volunteers	Miles	Tires	Bags	Pounds
2003 TOTALS	430	13,757	1,305	2,346	16,318	451,073

NC Big Sweep is normally held the third Saturday in September. For 2004 the date of the annual litter pick up has been changed to October 2, 2004. The reason is to avoid the inclement weather, which is usually present during September.

3. Keep America Beautiful Affiliates (Page 17)

KAB Affiliate	Number of Volunteers	Number of Volunteer Hours All Projects	2003 NC Great American Cleanup Litter Amount Picked Up In Pounds
Totals	32,677	130,708	1,176,478

II. Anti-Litter Education/Prevention – 2003

A. Department of Environmental and Natural Resources (DENR)

Division of Pollution Prevention and Environmental Assistance (DPPEA Page 18)

- Distributed more than 10,000 recycling activity books as well as 100,000 Recycle Guys packets to schools local governmental and civic organizations in 2003.
- The campaign promoted waste reduction and recycling.

Division of Parks and Recreation (Page 18)

- Trashcans are provided in convenient locations to encourage visitors to keep the parks clean and provide at least one recycling center for visitors and campers.
- The Division uses Internet servers instead of printed materials where possible. Park maps and other information can be viewed online, or via computer interactive exhibits in park offices.

Division of Marine Fisheries - Marine Patrol (Page 18)

- Officers patrol the waters of North Carolina working to control the discharge of litter into the state's coastal waterways along with their other patrol duties.
- Officers are stationed along the coastal counties from the Virginia State line to South Carolina State line and as part of their daily patrol to ensure proper disposal of trash, discarded equipment and abandoned fishing gear is done properly.

B. NC Wildlife Resources Commission (Page 18)

- The Division of Engineering Services maintains 191 boating access areas and 36 public fishing access areas across the state.
- Approximately 3,500 hours were spent policing and removing litter from these sites. "Littering is Illegal" signs are maintained on all sites.
- The Division of Wildlife Management reports 120 hours of general litter pick-up on game lands across the state. Enforcement Officers participate in numerous public service announcements regarding disposal of lawfully taken wildlife.

C. NC Department of Transportation

Office of Beautification Programs (Pages 19-20)

- During 2003 the Office of Beautification Programs placed emphasis on enhancing their web site to promote anti-litter education. The intent of this site is to be a resource for educators in need of classroom curriculum material. The curriculums can be downloaded for classroom usage.

- Provided a variety of educational materials for schools, civic groups and others. This included thousands of anti-litter stickers, decals, pencils, car litterbags, temporary tattoos, leaflets and Swat-A-Litterbug cards.

- Other items available through their Internet web site included links i.e. to the Litter Law, Swat-A-Litterbug, Adopt-A-Highway, Litter Sweep, Current Events/News, printable activity pages, and litter activity book with lessons and activities for 2nd and 3rd grades and information about NCDOT's fight against litter.

- Distributed car litterbags in the tens of thousands through rest areas, welcome centers and the NC State Fair and on request to numerous groups.

- Annual Litter Prevention Awards Competition: The NCDOT, the Office of the Governor and the NC Soft Drink Association, sponsors a litter prevention awards contest annually. Eligible categories are as follows:
  - Government Agencies, Schools/Youth Groups and Nonprofits.
  - Each category offers first place prizes of $1,000 and second place prizes of $500. Winning groups are required to use their winnings to expand existing litter prevention programs.
  - Winners are posted to the Office of Beautification Programs web site's Litter Prevention Contest link.

- Swat-A-Litterbug program: The Office of Beautification Programs continues to administer the Swat-A-Litterbug program. Through this program those who are observed littering can be reported on-line through the Office of Beautification Programs web site at www.ncdot.org/~beautification, or through the mail (Swat-A-Litterbug cards), or by calling *HP or calling the NCDOT Customer Service Office at 1-877-DOT-4YOU.
  - The information required in a Swat-A-Litterbug report is the vehicle license plate number, time, date, street, city, county, and a description of the littering offense.
  - In 2003, more than 6,000 Swat-A-Litterbug letters were mailed to those observed littering. In 2002 there were 5,000 letters mailed.
  - Swat-A-Litterbug is viewed as an educational tool, which informs those observed violating the litter law. The letters, which are signed by the Colonel of the State Highway Patrol, inform recipients of their littering, that littering is illegal and the penalties they could receive if convicted. Those submitting the license plate numbers are anonymous. There are no citations or warnings issued from these reports and no record is kept regarding who receives the letter. Again, this is mainly a tool to help educate those observed littering.

- Litter License Plate: As of this report date, there have been 425 plates issued.

III. Litter Enforcement – 2003 Summary

A. Department of Crime Control and Public Safety (Page 21)

- The State Highway Patrol issued 683 tickets for littering. The State Highway Patrol also cooperates with NC Department of Transportation (NCDOT) to offer the *HP as an option for reporting littering activity on the highways.

- State Highway Patrol Recap of Litter Charges G.S. 14-399 and local ordinances (Page 21):

Year	Number of Charges
2003	683
2002	699
2001	748

- DMV's Enforcement Section Recap of Improper Loading/covering of Vehicle G.S. 20-116(g):

Year	Number of Charges
2003 *	1,161
2002	1,066
2001	1,683

* Combined DMV and SHP

B. Department of Environmental and Natural Resources (Pages 21-22)

- Division of Parks and Recreation - In 2003, 15 citations were written for littering within North Carolina State parks and recreation areas.

- Division of Marine Fisheries - Marine Patrol Citation Recap

Year	Citations	Warnings	Time Spent
2003	5	4	54 hours
2002	11	6	53 hours
2001	19	1	10.5 hours

C. Wildlife Resources Commission (Page 22)

- There were six charges and three convictions in violations of G.S. 75A-10c (littering the state's waterways).
- Wildlife Resources Commission (WRC) Recap of Litter Charges G.S. 14-399 and local ordinances:

Year	Charges
2003	646
2002	748
2001	866

D. Administrative Office of the Courts (Page 23-36)

NUMBER OF LITTERING CHARGES AND CONVICTIONS													
					Number Of Charges By Charging Agency							
	Offense Code	Number of Charges	Number of Convic-tions		ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
STATEWIDE				STATEWIDE								
20-116(g)	4425	1453	968	4425			267	16	19	1145	1	5
14-399(e)	5370	12	4	5370			1		7			4
14-399(e)	5371	1	0	5371			1					
14-399(c)	5372	2757	1499	5372	10	47	1273	2	230	661	377	157
14-399(d)	5373	107	49	5373		1	28		34	5	7	32
14-399(e)	5374	35	3	5374			7		21		2	5
14-399(c1)	5375	21	12	5375			5		4	10	2	
14-399(d1)	5376	3	2	5376					1	1		1
14-399(e1)	5377	1	1	5377			1					
113-264(a)	6248	257	194	6248							250	7
local ordinance	8514	72	40	8514		2	44		6	6	8	6
Total		4719	2772	Total	10	50	1627	18	322	1828	647	217

Three-year Comparison

			Number Of Charges By Charging Agency							
	Number of Charges	Number of Convictions	ABC	ALE	Police	DMV	Sheriff	SHP	WRC	Other
2003 Totals	3266*	1804	10	50	1360	2	303	683	646	212
2002 Totals	3601	1951	8	64	1480	23	323	699	748	256
2001 Totals	4059	2219	5	44	1633	53	404	748	866	484

* Totals are less the 20-116 (g) charges and convictions

DMV's Enforcement Section Recap of Improper Loading/covering of Vehicle G.S. 20-116(g):

Year	Number of Charges
2003 *	1,161
2002	1,066
2001	1,683

* Combined DMV and SHP

For punishment levels and littering offense code descriptions please see pages 35-36.

E. Anti-Litter Signs Posted By County:

County	# Signs	County	# Signs
Alamance	13	Lee	9
Alexander	5	Lenior	14
Alleghany	12	Lincoln	13
Anson	10	Macon	6
Ashe	13	Madison	10
Avery	12	Martin	15
Beaufort	14	McDowell	13
Bertie	9	Mecklenburg	20
Bladen	17	Mitchell	10
Brunswick	12	Montgomery	12
Buncombe	16	Moore	11
Burke	12	Nash	20
Cabarrus	15	New Hanover	8
Caldwell	10	Northampton	14
Camden	5	Onslow	10
Carteret	6	Orange	14
Caswell	16	Pamlico	4
Catawba	15	Pasquotank	4
Chatham	15	Pender	12
Cherokee	6	Perquimans	4
Chowan	6	Person	9
Clay	3	Pitt	20
Cleveland	17	Polk	8
Columbus	15	Randolph	18
Craven	10	Richmond	8
Cumberland	18	Robeson	15
Currituck	7	Rockingham	16
Dare	5	Rowan	13
Davidson	14	Rutherford	12
Davie	9	Sampson	20
Duplin	17	Scotland	12
Durham	14	Stanly	12
Edgecombe	16	Stokes	12
Forsyth	19	Surry	14
Franklin	18	Swain	6
Gaston	18	Transylvania	8
Gates	5	Tyrrell	3
Graham,	3	Union	15
Granville	10	Vance	8
Greene	12	Wake	31
Guilford	24	Warren	9
Halifax	18	Washington	7
Harnett	18	Watauga	12
Haywood	10	Wayne	15
Henderson	11	Wilkes	17
Hertford	10	Wilson	18
Hoke	7	Yadkin	9
Hyde	7	Yancey	9
Iredell	15		
Jackson	10		
Johnston	21	Discretionary 1994	280 - 20 per division
Jones	10	Discretionary 1995	280 - 20 per division
		Rest Areas & Welcome Centers	58
		Total	1827

In addition to the "Keep NC Clean & Green" signs there are approximately 1400 "Littering Is Illegal" signs posted across the state. These were issued at a rate of 100 per highway division.

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Environmental Review Commission
State Legislative Building
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20 April 2004

TO: Persons Interested in the Phase II Stormwater Rules

FROM: George F. Givens, Commission Counsel

CC: Members – Environmental Review Commission

RE: Phase II Stormwater Management Working Group – 27 April 2004

This memorandum is a follow up to my memoranda of 4 March and 13 April 2004 regarding the possibility of initiating a Phase II Stormwater Management Working Group. None of the dates/times that were proposed in the 13 April memorandum proved to be satisfactory to a sufficient number of interested parties. However, while no time works for everyone, it appears that a critical mass of those who represent the principal interest groups are available to meet on the afternoon of 27 April. **Accordingly, a Phase II Stormwater Management Working Group will meet at 2:00 p.m. on Tuesday 27 April 2004 in Room 605 of the Legislative Office Building in Raleigh.** If, as appears likely, one or more additional meetings will be required, these will be scheduled at the meeting on 27 April.

The 13 April memorandum contains language regarding the status of discussions on this matter that may have been misleading. There is no agreement at this time on how to resolve the issues involved in Phase II stormwater management. Rather, in general, there is agreement among representatives of the principal interest groups that a 605 discussion of these issues may be useful. Whether consensus legislation will result and the extent to which any consensus legislation will address the full range of outstanding issues remains to be seen. I regret any misunderstanding that may have resulted from the 13 April memorandum.

If you have questions or concerns, please feel free to call me at (919) 733-2578.

DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
April 22, 2004
Asheville, NC

The Environmental Review Commission (ERC) met on Thursday 22 April 2004 at 1:30 p.m. in the Arabian Room, Holiday Inn, Asheville Airport.

Senator Charles Albertson presided over the 22 April 2004 meeting. The following members were present: Senators Albertson, Clodfelter, and Dorsett, and Representatives Gibson and Williams. Representative Ray Rapp, representing Haywood, Yancey and Madison counties, also attended the meeting. Mr. George Givens, Commission Counsel, Jennifer McGinnis, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Tim Dodge, Research Assistant, Stephanie Smith, Fiscal Research, Jennifer Haygood, Fiscal Research, and Mary Watson, Commission Clerk were also present.

On 6 April 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Senator Albertson called the meeting to order and welcomed members and visitors attending the meeting. He asked members to introduce themselves.

George Givens, Commission Counsel, was asked to explain the agenda. He thanked everyone present and also thanked those who made it possible for us to meet here today.

Mr. Givens introduced General Assembly staff members present. He thanked Representative Gibson, Richard Rogers and Nan Guthrie for coordinating today's meeting. He also thanked Steve Pagano, State Parks and Recreation for arranging the tour of Gorges State Park and Dianne Beasley, Division of Forest Resources who arranged transportation for the tours.

Mr. Givens thanked Kate Dixson, Land for Tomorrow Coalition, for today's lunch and Betty Huskins, Advantage West, for the reception tonight at Biltmore Estate.

Ms. Betty R. Huskins, Vice President, Public Affairs and Corporate Development, AdvantageWest, gave a PowerPoint presentation on the designation of the Blue Ridge National Heritage Area by the Western North Carolina Regional Economic Development Commission. A copy of AdvantageWest's 2003 Annual Report is listed as **Exhibit D**.

Ms. Huskins said that AdvantageWest has a 19-member board, co-located with the North Carolina Department of Commerce. There are nine full-time staff members and three profession consultants as well as advisory boards who are employed by AdvantageWest.

Ms. Huskins said that AdvantageWest works in retention and recruitment. In retention, they have formed the North Carolina Training Alliance. In recruitment, AdvantageWest started the Certified Industrial Site Program, now adopted by the State.

Ms. Huskins said that in tourism and development in Western North Carolina, they are fortunate to have three private organizations representing over 700 tourism businesses.

Ms. Huskins said that the Blue Ridge National Heritage Area is a Congressional designation. There are 24 different heritage areas in the United States and each one is diversely different.

Ms. Huskins said that the Blue Ridge National Heritage Areas in western North Carolina have many advantages. Both the Eastern Band of the Cherokee and Natural Attraction are privately owned national heritage areas.

Ms. Huskins said that AdvantageWest has already put in over $180,000 a year in co-op advertising for the tourism industry and will focus them toward the Blue Ridge Heritage area as a marketing umbrella.

Ms. Huskins said that with the development of a 10-year management plan, they would be calling on many folks to work with them and encouraged members and visitors to see her if they were interested.

Senator Clodfelter asked how outcome is measured.

Ms. Huskins said that $25,000 has been allocated for the first year to work with the three universities to develop a baseline research project.

Representative Gibson asked what is needed to help interface these projects.

Ms. Huskins said that folks would need to come to the table with them when they have specific issues, once the management plan is prepared.

Representative Gibson asked if the projects would be constructive projects.

Ms. Huskins answered in the affirmative.

Representative asked if they would be worried about sedimentation or buffers or regulatory process.

Ms. Huskins said that whatever the development guidelines are that they are wrestling with right now would need to be in place for these projects.

Senator Albertson asked Ms. Huskins if the film industry was on the decline in North Carolina.

Ms. Huskins said that was absolutely true. They have had the worst two years with the film industry in North Carolina because of lack of funding.

Richard E. Rogers, Jr., Director, Office of Conservation & Community Affairs, DENR, gave a report on progress toward attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands. A copy of his report is listed as **Exhibit E**.

On the first page of Mr. Rogers' report, he noted that the number of acres permanently protected has changed from 225,892 to 228,239.

Mr. Rogers said that the Million Acre Initiative has been engaged for about a year and one half. The idea is that conservation and the need for stewardship of our natural resources is not just about the acquisition of land but also about the restoring of our farmland and forestland across the State.

Mr. Rogers said that regional plans are being developed for eight different regions. A grant from Z. Smith Reynolds is being used to develop these plans. The plans are to interact with local governments and constituency to get their ideas on what they believe is important for conservation in their region.

Mr. Rogers said that all of the information collected from the regions would be compiled into a central map to be updated on a regular basis. A webpage will be developed for the public to view.

Mr. Rogers said that funding is important for acquisition of those areas around military closings.

Mr. Rogers said that short term needs range from $70-90 million for land acquisitions and restoration.

Mr. Rogers said that water conservation in the estuarine systems is critically important and funding is very important for this.

Mr. Rogers said that the long term needs for the Million Acres Program run around $176 million annually.

Senator Clodfelter asked if was a version of the report that lists, by agency or type of plan.

Mr. Rogers said that they do not have such version but could format it that way.

Senator Clodfelter asked how we know that we have the right acreage that we need for conservation.

Mr. Rogers said that the concept behind the map is including the priorities of conservation interests and the interests of the people so that future focus areas can be developed.

Senator Clodfelter said that funding couldn't be granted until a strategic plan is in place.

Representative Gibson asked Mr. Rogers if he assure that the necessary land purchases were being made through the million-acre initiative.

Mr. Rogers said they were trying to stay in close communication in identifying purchase or new land and projects on those purchases.

Senator Albertson asked Mr. Rogers about the Lake James project and Crescent Resources.

Mr. Rogers said that Crescent Resources has a 3,000-acre alongside Lake James, going up into the Linville Gorge area that will be made for purchase. He asked Lewis Ledford, new Division Director of Park and Recreations, DENR, to answer Senator Albertson's question.

Senator Albertson asked Mr. Ledford if there was a time certainty when the land would be available for purchase.

Mr. Ledford said that they did not have a time certainty at this time, but are getting appraisals on the property. They think that the land could available for purchase in one to two years.

Mr. Rogers said that there is a wealth of interest and excitement about this project that would benefit tourism and the economy.

Representative Gibson told Mr. Ledford that when they are doing projects such as this; don't be afraid to bring in folks from the private sector to provide as much assistance as possible.

Senator Clodfelter asked Mr. Rogers what percentage of money should be split for opportunistic purchases such as the Lake James project and how much should be reserved for more strategic acquisitions. What is the relative breakdown of what we ought to think about those spending choices?

Mr. Rogers said that the split is about 75/25.

Senator Albertson asked anyone in the audience if they had any questions to ask Mr. Rogers about the Million Acre Initiative.

Mr. William M. Eaker, Land of Sky Regional Council, said that the Million Acre Initiative should be addressing land protection within water supply watersheds.

Mr. Rogers asked members to look at the Wildlife North Carolina magazine, Exhibit E, placed in front of them and note the article on

Conservation Visions. He also pointed out the articles on Wilson Bay and the Wildest Day of the Year.

Mr. Lewis R. Ledford, Director, Division of Parks and Recreation, DENR, gave a report on allocations from the Parks and Recreation Trust Fund from the prior fiscal year. A copy of the Parks and Recreation Trust Fund progress report and the 2002-2003 Annual Report is listed as **Exhibit F**.

Mr. Ledford summarized the report by saying that 5% of real estate deed transfer tax goes to the Coastal Beach Access program, 30% goes to local governments and 65% comes to the State system for Capital Development and Land Acquisition.

Mr. Ledford recognized Wendell Begley, who serves on the Parks and Recreation Trust Fund Authority, who was present at the meeting.

Senator Dorsett asked Mr. Ledford asked about the counties who did not receive grants and those who did not apply for grants.

Mr. Ledford said this could be based on these counties not have a local Parks and Recreation Department to submit an application.

Mr. Ledford said there are seven recreational consultants who travel throughout the counties and municipal systems to make them aware of grant opportunities.

Senator Dorsett asked Mr. Ledford if there were any instances where counties have gone together to apply for grants.

Mr. Ledford said he was not aware of any.

Senator Clodfelter asked Mr. Ledford if it the half of the excise tax that local governments receive earmarked for a specific purpose or are they free to use it as they please.

Mr. Bill Holman said that it goes into a general fund.

Senator Albertson asked if $250,000 was the maximum grant amount.

Mr. Ledford said that in 2005, it would be raised to $500,000.

Senator Albertson asked if a State appropriation paid his salaries.

Mr. Ledford said that it was.

Senator Albertson asked Mr. Ledford what the starting salary was for an Officer or Ranger.

Mr. Ledford said that a Ranger I start at $21,000 with a four-year degree. They are hired and sent to law enforcement training and about

$16,000 to $17,000 to train these new Rangers. It is not uncommon for local law enforcement to hire these employees from the State.

Senator Albertson asked what the turnover rate was in employment of Rangers.

Mr. Ledford said that the first two years of a new hire for Ranger position is of the greatest concern.

Representative Gibson asked Mr. Ledford if they have to have law enforcement training.

Mr. Ledford said that they become a full law enforcement officer with full powers of arrest, with statewide jurisdiction and full subject matter jurisdiction.

Senator Albertson asked if the Forest Rangers had the same full subject matter jurisdiction as Wildlife officers.

Mr. Ledford said they have full subject matter jurisdiction also. Their officers are restricted by policy; however, if they are traveling and see a felony, they can take action.

Representative Gibson asked Mr. Ledford what the current attitude is of the visitors to our parks as far as fees and maintenance.

Mr. Ledford said that with 12 to 13 million visitors per year to our state parks, North Carolina has geared their rules to cater to our visitors. He said that one of the things they have tried to address through the Parks and Recreation Trust Fund is to allocate $1.2 million to the district superintendents in the four districts to address some of the major maintenance needs.

Representative Gibson asked if the legislature should look at NCSU graduate students, or park personnel to do a survey of park users, to see if we could generate enough money and a reasonable fee structure to sustain our parks.

Mr. Ledford said that he personally had reservations about this approach; given our state heritage and the clientele they serve.

Senator Clodfelter asked if we had exhausted all opportunity to charge special users, other than general admission.

Mr. Ledford said that a number of special uses have been addressed. Fees were raised last year. One of the examples of a special use permit is a bike race, where the extra fees are deposited back into a general fund.

Senator Clodfelter asked if there were any suggestions as to how we can tweak the Trust Fund in how the money should be used.

Mr. Ledford said that applications well exceed percentages of monies granted and feels that they are adequately balanced.

Ms. Linda Pearsall, Director, North Carolina Natural Heritage Program, Office of Conservation & Community Affairs, DENR, gave a report on allocations from the Natural Heritage Trust Fund from the prior fiscal year. A copy of her report for 2003 and a handout on Grant Awards, Spring 2004 Project Locations is listed as **Exhibit G**.

Ms. Pearsall said that in 2003, the Natural Heritage Trust had $37.5 million requested for grants and were able to provide $13.4 million for 25 projects, representing almost 27,000 acres.

Ms. Pearsall said that in 2004, $13.3 million was requested, $6.6 million available, and 15 grants representing over 15,000 acres.

Representative Gibson asked if the Black River project is contiguous with the 1999-2000 South River project.

Mr. Holman said that that it was more of a mixture of projects.

Ms. Pearsall added that when projects come to the Heritage Trust, they look for public access.

Representative Gibson then asked if the Boiling Springs tract was going toward the power plant and if it was a single tract.

Ms. Pearsall said that it was not a single tract but a piece that the Nature Conservancy has been consolidating into blocks for acquisition by the State Department of Agriculture. It is still a bit of a patchwork but soon they will be able to fill in all of the gaps.

Representative Gibson asked Ms. Pearsall about the Eno River site and the arguments going on with the Durham Loop.

Ms. Pearsall said that the piece acquired with the Heritage Trust funds was not anywhere near the proposed road.

Senator Albertson asked Ms. Pearsall if the site in Boiling Springs had venus flytraps located on it.

Ms. Pearsall answered in the affirmative.

Mr. Richard Rogers gave an annual report on the implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR. A copy of this report is listed as **Exhibit H**.

Mr. Rogers said that the overall conservation tax credit program allows folks to donate property and easements on their property with a tax credit on 25 percent of the appraised market value of the property. Individuals can get up to $250,000 on the property and corporations up to $500,000.

Mr. Rogers said that through this program has received over 109,000 acres put under conservation in excess of $305 billion in donated land.

Mr. Rogers said that in 1998-99 the acquisition of conservation lands by the state was at $23 million below the appraised market value and over the duration of the programs the grantees saved more than $48.1 million in bargain sales facilitated by the tax credit incentive.

Mr. Rogers said that HB887 has been written to make the tax credit program more appealing to prospective land acquisitions. The issue of refund ability would provide a cash refund on the tax credit to 50 percent of the tax credit after three years of being in the program.

Representative Gibson asked about where we are in mapping as it relates to the initiative by some of the best management practices. He asked if there was a map piece that has the federal, state and local government acquisition territories.

Mr. Rogers said that the gaps they are trying to fill are the local governments and local entities. They have approximately 98 percent of what is out there with regards to future acquisitions. An updated map will be available in the fall.

Mr. Gerry Cohn, Director, Southeast Regional Office, American Farmland Trust, asked if numbers were cross-referenced in million acres report, Attachment B, show up in the annual report.

Mr. Rogers said that the million-acre report does not reflect this data but it would be rolling into the next report due in 2004.

Mr. Edgar Miller, Director of Government Relations, Conservation Trust for North Carolina asked Mr. Rogers to speak to the Department's efforts to develop more guidelines for the tax credit.

Mr. Rogers said they are currently working to develop guidelines for the different types of conservation easements. Also on the table is the issue of golf courses. They are trying to develop guidelines to bring people into the program and will be easy for them to follow.

Mr. Rogers said that the program does not address the assessment or value put on the property, which is not in their jurisdiction.

Senator Clodfelter added that the Revenue Laws Study Commission is addressing the value of the property.

Mr. Edgar Miller, Director of Government Relations, Conservation Trust for North Carolina, gave a report on the Farmland Preservation Trust Fund. A copy of a fact sheet for Conservation Trust and a copy of the Grant Awards report for 2002-2003 are listed as **Exhibit I**.

Mr. Miller reviewed the both the fact sheet and listed highlights from the Farmland Preservation Trust Fund report. A copy of his slide presentation is also listed as Exhibit I.

Mr. Gerry Cohn, Director, Southeast Regional Office, American Farmland Trust, gave a slide presentation on the American Farmland Trust. A copy of a fact sheet and a copy of his presentation are listed as **Exhibit J**.

Mr. Cohn said he see a lot positive signs on creating incentives for landowners to hold on to their farms to pass them on to future generations. He believes the significant piece missing is funding for these projects.

Senator Dorsett asked Mr. Cohn about the chart and the program created in the State of Maryland in 1977. She asked if there are some lessons that we can learn from a small state such as Maryland that would help North Carolina.

Mr. Cohn said that the big strength for Maryland is that they have created dedicated sources of funding so organizations have been able to plan a steady stream of income there. Maryland has also had a real estate transfer tax.

Mr. Miller added that New Jersey was able to come into the federal program requesting a lower match because of their size and large contributions they brought to the state.

Senator Clodfelter asked if there were any states used Transfer Development Rights (TDR) programs instead of publicly funded purchase programs.

Mr. Cohn said that a TDR program uses the private market to provided sources and funds for development rights. This requires a strong local planning component rather than that of a a state level. The State of Georgia has a TDR program.

Senator Clodfelter said these programs are a lot cheaper.

Mr. Cohn said they are a lot cheaper but require a very strong local planning component.

Senator Clodfelter asked Mr. Cohn if he would suggest TDR's for our state.

Mr. Cohn said TDR programs are a great option but we need to see examples of how it actually works before we bring them to North Carolina.

Senator Albertson said that it looks like we will have to find another way of funding of Farmland Preservation Trust unless the budget situation improves.

Representative Gibson asked what surrounding states have state funded programs.

Mr. Cohn said that none of the surrounding states have state funded programs at present. South Carolina is close to funding their conservation bank, which will be a dedicated source of funding, and farmland will be one of the components.

Representative Gibson asked Mr. Cohn where South Carolina's funding would come from.

Mr. Cohn said it would come from deed stamps.

Representative Gibson asked if it would be a percentage or a set fee.

Mr. Cohn said that it would be a set fee.

Representative Gibson asked if it would legislative or executive.

Mr. Cohn said that it would be legislative.

Representative Gibson asked how much revenue is anticipated from this fee.

Mr. Cohn said it was about $10 million annually.

Representative Ray Rapp asked if he could make a copy of his PowerPoint presentation available.

Mr. Cohn said that he would be happy to provide Representative Rapp with this report.

Senator Albertson recognized three members of the Land of Sky Regional Council: Joe McKinney, Jim Stokoe and Bill Eaker.

Mr. William E. Holman, Executive Director, Clean Water Management Trust Fund, gave a report on implementation of the Clean Water Management Trust Fund. A copy of the Annual Report on the Clean Water Management Trust Fund and a copy of a memorandum accompanying the report, which listed highlights from the report, are listed as **Exhibit K**.

Mr. Holman introduced Karen Cragnolin from Asheville, one of the original 21 trustees of the CWMTF appointed by the General Assembly and the Governor.

Mr. Holman highlighted projects from the annual report and listed several of the issues related to the CWMTF.

Representative Gibson asked what kind of match are we getting for the our dollars.

Mr. Holman said that the CWMTF has put up about $10 million to leverage about $210 million in federal funds and a total state match of $40 million. The processing of transactions needs to be improved in order to receive funding.

Representative Gibson asked if changes in the farm bill this year would change the KREP operations or would they stay like they are.

Mr. Holman said he believed that Congress is wrestling with how much money they can allocate for funding.

Mr. Holman said that the Eco Systems Enhancement Program (ESEP), formerly known as the Wetlands Restoration Program, is the combined efforts of DOT and DENR. All restoration and acquisition programs from the CWMTF are sent to the ESEP.

Senator Albertson asked if the water quality is improving in our state.

Mr. Holman said that water quality differed all over the state.

Mr. Givens asked if issues raised were listed in the handout.

Mr. Holman said that they were.

Mr. Givens asked if there was litigation with the project in Dupont Forest.

Mr. Holman said there was litigation with the value of the property. The State Attorney General's office and the State Property Office settled with Mr. Anthony.

Senator Clodfelter stated that if we continue to use fee simple acquisition, there should not be a need for large appropriations of monies.

Representative Gibson asked Mr. Holman is there would be legislation for counties to use fee simple.

Mr. Holman said there would be legislation.

Representative Gibson asked if County Commissioners Association has been involved in this.

Mr. Holman said that almost all of the acquisition projects use the conservation income tax credit as a valuable tool to lower the price of land.

Mr. Givens said that he and Mr. Holman would get together on draft legislation for the upcoming session.

Representative Rapp commended Mr. Holman on the good job he is doing.

Ms. Katherine (Kate) M. Dixon, Government Relations Project Director, The Nature Conservancy, gave a report by the Land for Tomorrow Coalition on the results of its conservation needs assessment. A copy of her presentation and a handout entitled Land for Tomorrow, and an Executive Summary of the Statewide North Carolina Public Poll for 2003 and 2004 are listed as **Exhibit L**.

Representative Gibson said he would be interested in seeing the results of the changes from 2002-2003 as it relates to overall perception of the environment.

Representative Gibson asked Ms. Dixon where the environment stands in the overall poll.

Ms. Dixon said that what happens with the poll is that you end up with a lot of specific topics so it is hard to tell where it stands.

Senator Clodfelter asked Mr. Givens how the mechanism of certifications of participation (COPs) is structured.

Ms. Dixon said that the dedicated funding stream is not what is central but it uses the land as the asset.

Senator Clodfelter asked if someone makes sure that the Treasurer's office says that acquisition of lands for conservation is a proper, legal use of COPs.

Mr. Givens said that this answer would be researched.

Mr. Terry Albrecht, Program Director, Waste Reduction Partners (administered by Land-of Sky Regional Council in special partnership with the Division of Pollution Prevention and Environmental Assistance, DENR), gave a report on the Waste Reduction Partners Program. A copy of Mr. Albrecht's slide presentation, a copy of an article from the Mountaineer, and a handout on Waste Reduction Partners 2003 Highlights are listed as **Exhibit M**.

Mr. Albrecht highlighted some of the programs and gave examples of waste reduction projects done over the past year.

Mr. Albrecht introduced Mr. Tom McCullough, volunteer with the Waste Reduction Partners Program, a native of Hendersonville, who spoke on his involvement with the program.

Mr. McCullough said that he leads the solid waste efforts by organizing the recycling of pallets, paper and other product that makes waste.

Senator Albertson commended Mr. McCullough on his efforts and thanked him for being at the meeting.

Mr. Givens invited everyone present to a reception sponsored by the Biltmore Winery and Advantage West, following the meeting.

Representative Gibson recognized members of Advantage West and asked them to introduce themselves.

Senator Albertson thanked those who were responsible for organizing the meeting in Asheville and thanked everyone for attending.

The meeting was adjourned at 5:15 p.m.

Senator Charles Albertson Presiding Co-Chair	Mary R. Watson Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Handout: Advantage West's 2003 Annual Report: Strength in Numbers
EXHIBIT E:	Report on progress toward attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands presented by Richard Rogers
EXHIBIT F:	Parks and Recreation Trust Fund progress report and the 2002-2003 Annual Report presented by Lewis Ledford
EXHIBIT G:	Report on allocations from the Natural Heritage Trust Fund for 2003 and a handout on Grant Awards, Spring 2004 Project Locations presented by Linda Pearsall
EXHIBIT H:	Annual report on the implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR presented by Richard Rogers
EXHIBIT I:	Copies of slide presentation, fact sheet for Conservation Trust and a copy of the Grant Awards report for 2002-2003 presented by Edgar Miller
EXHIBIT J:	Slide presentation on the American Farmland Trust. Fact sheet and a copy of presentation by Gerry Cohn
EXHIBIT K:	Annual Report on the Clean Water Management Trust Fund and a copy of a memorandum accompanying the report, presented by Bill Holman
EXHIBIT L:	Report by the Land for Tomorrow Coalition on the results of its conservation needs assessment. Presentation and handout entitled Land for Tomorrow, and an Executive Summary of the Statewide North Carolina Public Poll for 2003 and 2004 presented by Kate Dixon
EXHIBIT M:	Report on the Waste Reduction Partners Program, copy of article from the Mountaineer, and handout on Waste Reduction Partners 2003 Highlights presented by Terry Albrecht

April 22, 2004 ERC Meeting
EXHIBIT A

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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6 April 2004

TO: Interested Parties – Environmental Review Commission

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meetings - 20 April and 22 April 2004; Additional Information**

COMMISSION MEETING – 20 APRIL 2004:

The Environmental Review Commission will meet at 9:00 a.m. on Tuesday 20 April 2004 in Room 1228 of the Legislative Building in Raleigh. Please note the change in time and location from the normal meeting schedule.

At this meeting, the Commission will hear reports from State agencies, consider studies for which the Commission is responsible, discuss topics to be considered at future meetings, and attend to other matters. The meeting is expected to conclude around 12:00 noon. Listed below are potential agenda topics for this meeting. More specific information regarding the agenda for the 20 April meeting of the Commission will be developed at the public staff planning meeting.

1) Report on options to protect water quality and endangered species in the portion of Swift Creek that is located east of Nash County Road 1003 (S.L. 2003-433, Sec. 3)

2) Update on issues related to the Phase II stormwater rules

3) Discussion on the proposed modification of the rule setting out the acceptable ambient level (AAL) for hydrogen sulfide under rules adopted by the Environmental Management Commission that govern the emission of toxic air pollutants

4) Status report on the One-Stop Permit Assistance and Coordination Program. (S.L. 2001-424, Sec. 19.6)

5) Report on the Express Review Pilot Program and whether the Pilot Program be continued or expanded (S.L. 2003-284, Sec. 11.4A(e))

6) Annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund (G.S. 143-215.94M)

7) Report on issues related to the Leaking Petroleum Underground Storage Tank Cleanup Program (S.L. 2003-352, Sec. 12.(a))

8) Information item on the Transportation Demand Management Program

9) Semiannual report on agency litter enforcement, litter prevention, and litter removal efforts (G.S. 147-12(b))

10) Annual report on recycling efforts of public schools in the State (S.L. 2001-512, Sec. 11)

11) Information item on the NC GreenPower Program

12) Other matters related to the Commission's powers and duties under G.S. 120-10.43

SPECIAL BUSINESS MEETING – 22 APRIL 2004:

The Commission will hold a special business meeting at the Holiday Inn, Asheville Airport in Fletcher, North Carolina at 1:30 p.m. on Thursday 22 April 2004. This special meeting will focus primarily on various matters related to land conservation and preservation of open spaces and will be held in connection with a tour of Gorges State Park and Dupont State Forest on Thursday 22 April 2004 and Friday 23 April 2004. Listed below are potential agenda topics for this meeting.

1) Annual Report on allocations from the Parks and Recreation Trust Fund from the prior fiscal year (G.S. 113-44.15(c))

2) Annual Report on acquisitions made with funds from the Natural Heritage Trust Fund (G.S. 113-77.9(e))

3) Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands (G.S. 113A-241(c))

4) Annual report on implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR (G.S. 113A-235(c))

5) Annual Report on implementation of the Clean Water Management Trust Fund (G.S. 113-145.6A(a))

6) Report by the Land for Tomorrow Coalition on the results of its conservation needs assessment

7) Report on the designation of the Blue Ridge National Heritage Area (S.L. 2001-491, Sec. 18.10)

8) Report on the Waste Reduction Partners Program

9) Other matters related to the Commission's powers and duties under G.S. 120-10.43

Directions to the Holiday Inn, Asheville Airport: From Asheville, take Interstate 26 south to exit 40 (formerly exit 9). At the top of the off ramp, turn left over the bridge. The Holiday Inn will be visible on the left. The hotel telephone number is (828) 684-1213.

PLANNING MEETING:

To facilitate development of the agenda for the 20 April and 22 April meetings of the Commission and to receive input from interested persons regarding the future work of the Commission, the Commission Counsel will hold an informal public planning meeting at **10:00 a.m. on Tuesday 13 April 2004 in Room 605 of the Legislative Office Building**. Persons who wish to participate in the development of the agenda for meetings of the Commission, or who are interested in any matter before the Commission, are invited to attend. Commission members are not expected to attend these meetings.

FUTURE MEETINGS:

The Commission will hold a regular business meeting at **9:30 a.m. on Wednesday 5 May 2004 in Room 643 of the Legislative Office Building.**

The 2004 Regular Session is scheduled to begin at 12:00 noon on Monday 10 May. The Commission normally meets shortly after the beginning of the session to complete work on legislative proposals prior to the commission/ committee bill request deadline, which in 2004 is 4:00 p.m. Wednesday 12 May. A Commission meeting at 2:30 p.m. on Tuesday 11 May is tentatively scheduled for this purpose.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Leaking Petroleum Underground Storage Tank Working Group
2:00 p.m. Monday 19 April 2004– 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel at (919) 733-2578.

April 22, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION 4-22-04
Name of Committee **Date**
ASHEVILLE, NC

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Linda Pearsall	Natural Heritage Program, DENR
LEWIS LEDFORD	STATE PARKS AND RECREATION
STEVE PAGANO	STATE PARKS AND RECREATION
Kieran Roe	Carolina Mtn. Land Conservancy PO Box 2822 Hendersonville, NC 28793
Este Stifel	TNC P.O. Box 397 Saluda NC 28773
MIKE WATERS	N.C. RECREATION & PARK Society 339 WASHINGTON ST. RALEIGH N.C. 27605
IRBY BRINSON	Asheville Parks And Recreation PO Box 7148 Asheville, NC 28802
LuAnn Bryan	State Parks + Recreation 2090 US Hwy 70 Swannanoa, NC 28778
Dianne Beasley	Div. of Forest Resources
Bill Ealen	Land of Sky Regional Council 25 Heritage Dr. Asheville NC 28806 bill@landofsky.org
Dr. Holman	CWMTF

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 4-22-04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Karen Cragnolin	RiverLink, Inc PO Box 1549, Asheville, NC 28813
Tom McCullough	Waste Reduction Partners Asheville
Terry Albrecht	Waste Reduction Partnership - NCDPPEA 25 Heritage Dr, Asheville, NC 28806
Diana Rees	N.C. Division of Pollution Prevention & Environmental Assistance -DENR Raleigh NC
JIM STOKOE	Land-of-Sky Regional Council 25 HERITAGE DRIVE, ASHEVILLE 28806
JOE McKINNEY	
Johanna Reese	DENR - Public Affairs
Nann Guthrie	DENR - Asheville Regional Office

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION
Name of Committee

April 22, 2004
Date Asheville, NC

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Michael Nelson	CCNC
Kate Dixon	Land for Tomorrow Coalition c/o Nature Conservancy Durham NC
Angie McMillan	TNC
Edgar Miller	CTNC 319 Beck's Ch. Road, Lexington, NC
[illegible]	HENDERSON COUNTY ASSESSOR 200 N GROVE ST STE 102 HVL 28792
Susan Johnson	Henderson County Assessor Office 200 N. Grove ST. Suite 102 Hvle 28792
David Knight	TPL, NC Sierra, NC Wildlife Fed
GERRY COHN	American Farmland Trust
Walt Gravley	NC DPR
Wendell Begley	State Pks. Authority
DWAYNE STEFFEY	NCDPR

April 22, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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AGENDA
1:30 p.m. Thursday 22 April 2004
Arabian Room, Holiday Inn, Asheville Airport

1. Call to order
   Senator Charles W. Albertson, Presiding

2. Introductory remarks by Cochairs
   Senator Charles W. Albertson
   Senator Daniel G. Clodfelter
   Representative Pryor A. Gibson
   Representative Daniel F. McComas

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Report on the designation of the Blue Ridge National Heritage Area by the Western North Carolina Regional Economic Development Commission (AdvantageWest) (S.L. 2001-491, Sec. 18.10)
   Betty R. Huskins, Vice President, Public Affairs and Corporate Development
   AdvantageWest

5. Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands (G.S. 113A-241(c))
   Richard E. Rogers, Jr., Director
   Office of Conservation & Community Affairs, DENR

6. Annual report on allocations from the Parks and Recreation Trust Fund from the prior fiscal year (G.S. 113-44.15(c))
   Lewis R. Ledford, Director
   Division of Parks and Recreation, DENR

7. Annual report on allocations from the Natural Heritage Trust Fund from the prior fiscal year (G.S. 113-77.9(e))
   Linda P. Pearsall, Director
   North Carolina Natural Heritage Program,
   Office of Conservation & Community Affairs, DENR

8. Annual report on implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR (G.S. 113A-235(c))
   Richard E. Rogers, Jr., Director
   Office of Conservation & Community Affairs, DENR

9. Report on the Farmland Preservation Trust Fund
   Edgar Miller, Director of Government Relations
   Conservation Trust for North Carolina

   Gerry Cohn, Director
   Southeast Regional Office, American Farmland Trust

10. Annual Report on implementation of the Clean Water Management Trust Fund (G.S. 113-145.6A(a))
    William E. Holman, Executive Director
    Clean Water Management Trust Fund

11. Report by the Land for Tomorrow Coalition on the results of its conservation needs assessment
    Katherine "Kate" M. Dixon, Government Relations Project Director
    The Nature Conservancy

12. Report on the Waste Reduction Partners Program
    Terry Albrecht, P.E., Program Director
    Waste Reduction Partners (administered by Land-of-Sky Regional Council in special partnership with the Division of Pollution Prevention and Environmental Assistance, DENR)

13. Commission discussion and announcements

14. Adjourn

SCHEDULE OF FUTURE MEETINGS:

Friday 23 April 2004 – Tour of Dupont State Forest

Wednesday 5 May 2004 -- Regular Business Meeting
Time: 9:30 a.m.
Location: 643 Legislative Office Building

Tuesday 11 May 2004 -- Regular Business Meeting
Time: 2:30 p.m. (tentative)
Location: 643 Legislative Office Building

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. 4 May 2004 – 605 Legislative Office Building

Phase II Stormwater Management Working Group
2:00 p.m. 27 April 2004 – 605 Legislative Office Building

April 22, 2004 ERC Meeting
EXHIBIT D

ADVANTAGEWEST
NORTH CAROLINA

Western North Carolina Regional Economic Development Commission
3 General Aviation Drive • Fletcher, NC 28732
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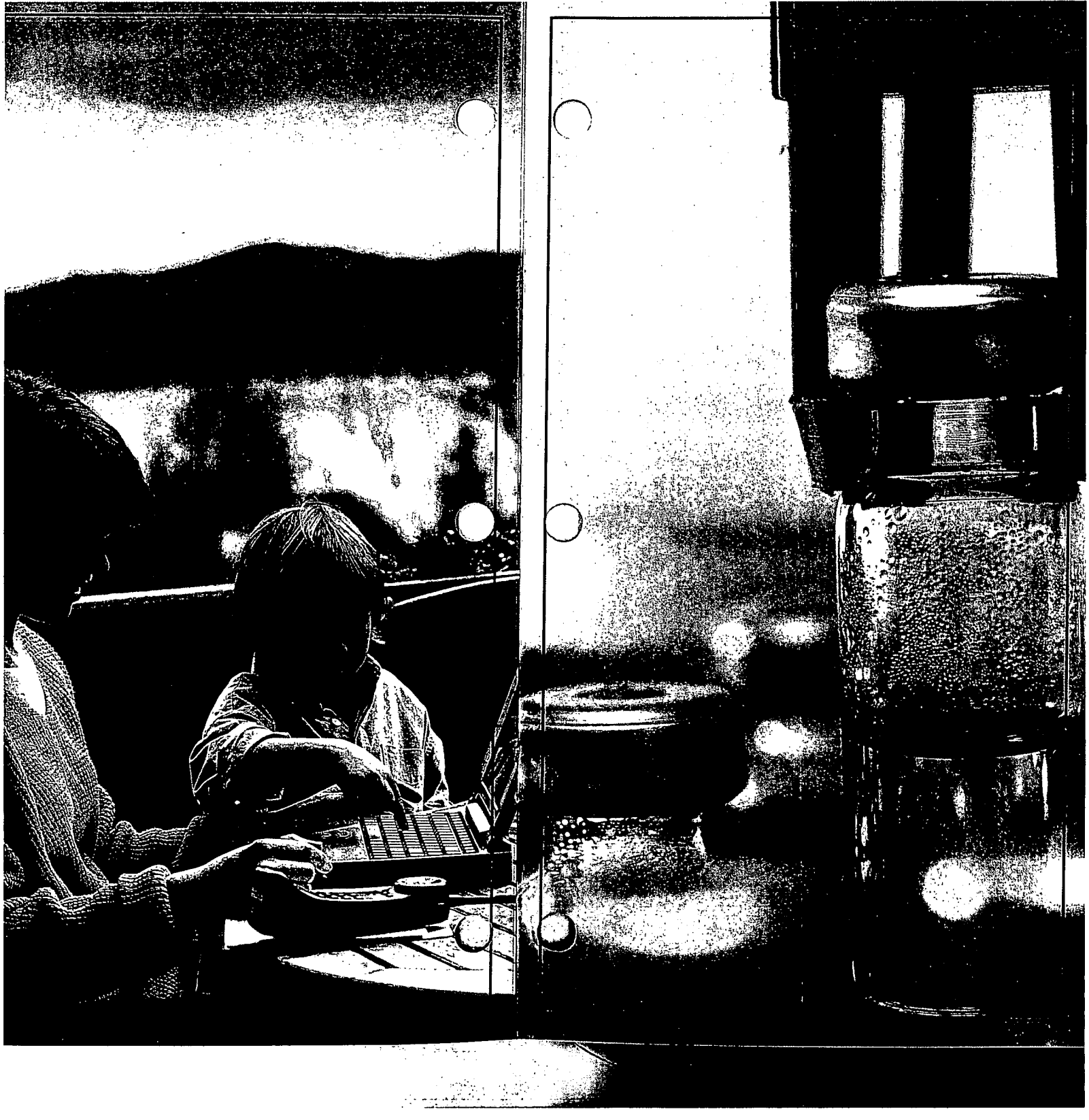
www.advantagewest.com

ADVANTAGEWEST
NORTH CAROLINA



Strength in Numbe

When I became chairman of AdvantageWest nearly ten years ago, th challenges facing western North Carolina were long-standing and well documented. At that time, many of our economic challenges put us in contrast with more urban areas of the state such as Charlotte and the Research Triangle, where growth and prosperity seemed limitless. Few if any of us saw the day coming when urban and rural areas alike would compete for jobs not with Atlanta or Greenville, but with India or China. We now wake up each morning in a state where nearly a quarter-million people are without jobs. Our unemployment rate of 6.4 percent remains one of the nation's highest. If you've picked up a newspaper or ıtched television recently, you don't need me to tell you about some of the challenges we face our economy.

ıd yet there is good news in western North Carolina. We stood at a crossroads in 2003, with ınufacturing jobs leaving our state, never to return. We've faced war and an ever-expanding global onomy. At the crossroads, we could have turned back. We could have stood around and ımed each other and gone our separate ways. Instead, as a region, western North Carolina ıck together. And together, we are learning that there is strength in numbers.

ıe General Assembly has been steadfast in its investments to create new jobs and rebuild our ıte's economy. Through investing in AdvantageWest, this has helped leverage private 'estments from a growing number of private sector partners, who even in a down economy ve invested vigorously in the communities in which they do business.

embers of our U.S. Congressional delegation have helped bring needed federal dollars to t gion for critical economic development initiatives. Private foundations and federal agencie have partnered with AdvantageWest during the past year to fund many of the priorities and iatives listed in this report. Local governments have seen the value of partnerships, and have lized matching grants from AdvantageWest to create jobs in their communities, and used lvantageWest as a conduit to find and secure additional funding.

ır board and professional staff, the 23 counties in our service area and local governments hin those counties, our private sector partners, our representatives in Congress and the neral Assembly, our institutions of higher learning — together we are finding that there is ength in numbers. We're putting the old adage to work in the new economy, because we're onger working together than we are apart.

e 2003 AdvantageWest annual report documents our strength in numbers, representing od news for our economy now and the initiatives and programs we have put in place to pare for the future. If you're already involved with our work at AdvantageWest, I want to nk you for your leadership on behalf of western North Carolina. If you want to learn more out how you can be involved, please contact us at: 828-687-7234.

cerely,

rdon Myers

rdon Myers
airman of the Board

Federal Agencies, private foundations and educational institutions also provide funding and support for many AdvantageWest initiatives. These include:

Golden LEAF Foundation
Appalachian Regional Commission
The Asheville Merchant's Fund of
The Community Foundation of
Western North Carolina
Z. Smith Reynolds Foundation
The U.S. Congress, with special thanks to
Rep. Charles Taylor, Rep. Cass Ballenger,
Rep. Richard Burr, Sen. John Edwards
and Sen. Elizabeth Dole
Western Carolina University
The Center for Regional Development
Appalachian State Univeristy
The Walker College of Business
The Appalachian-
Regional Development Institute
The Cherokee Preservation Foundation

ADVANTAGEWEST
NORTH CAROLINA

Staff

Dale Carroll
President & CEO

Betty Huskins
VP, Public Affairs & Corporate Development

Sam Powers
VP, Industrial Marketing

Karen Hays
Director, Grants Administration

Mark Owen
Director, Communications & Research

Jim Roberts
Executive Director, Blue Ridge Entrepreneurial Council
& Blue Ridge Angel Investors Network

Rob Bell
Project Coordinator

Kate Russell-Cobb
Executive Director,
MountainSouth USA

Mary Lou Surgi
Executive Director, Blue Ridge Food Ventures

Carolyn Griffin
Assistant Corporate Secretary

AdvantageWest 2003 Annual Report *Strength in Numbers*
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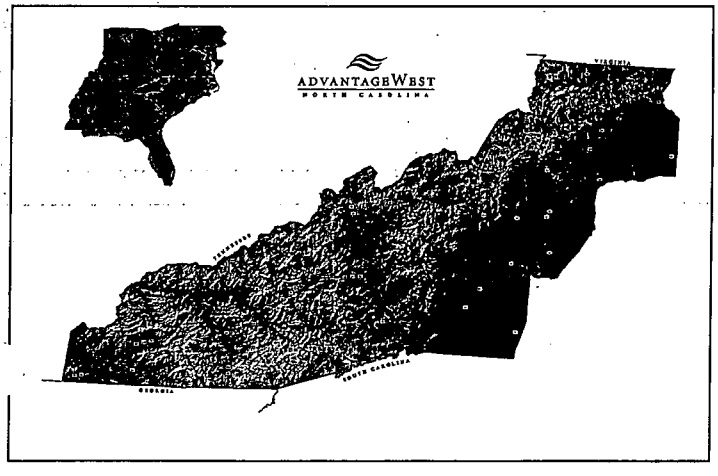
Mission Statement

The Western North Carolina Regional Economic Development Commission shall promote and advocate the creation of improved economic opportunity in our region, while encouraging stewardship of the culture, heritage and natural resources of western North Carolina.



Regional strengths. Regional advantages.

AdvantageWest is a marketing-focused public/private partnership providing a broad range of economic development services to the twenty-three westernmost counties of North Carolina.

Business Leaders

19

who serve on our board!

Strength in Numbers

Created by an act of the N.C. General Assembly in 1993, the Western North Carolina Regional Economic Development Commission incorporated as a 501(C)(3) non-profit in 1994. Realizing that "Western North Carolina Regional Economic Development Commission" is a mouthful, the commission adopted a marketing brand — AdvantageWest North Carolina — to reflect its mission of promoting the advantages of the region to business leaders, decision makers, film producers, leisure travelers, the general public and other audiences.

Today, AdvantageWest's program of work is guided by a board of 19 business leaders appointed by the Governor, Lieutenant Governor and General Assembly of North Carolina. With funding from the General Assembly and other partners, AdvantageWest provides diverse regional services and grants programs to help western North Carolina's economy grow and prosper. In addition to the General Assembly, which provides funding for AdvantageWest and six other economic development regions covering the entire state, our funding comes from the following diversified sources:

- Private industry such as Progress Energy, Duke Power and Wachovia
- Federal agencies such as the Appalachian Regional Commission
- Grants from private foundations such as the Z. Smith Reynolds Foundation, the Golden LEAF Foundation and The Community Foundation of Western North Carolina.

Ongoing Work: Getting Stronger Every Day

Blue Ridge Heritage Designation

AdvantageWest is part of a coalition of federal, state, local and private sector entities working to protect and promote the national treasures of North Carolina's mountains, while maximizing the economic value of our assets for the communities and citizens of the region. AdvantageWest helped create a state commission to study the potential of creating a National Heritage Area in western North Carolina, and in 2001 the N.C. General Assembly passed legislation supporting the cause. In March, 2002, western North Carolina's own U.S. Rep. Charles Taylor introduced federal legislation in conjunction with WNC colleagues U.S. Rep. Cass Ballenger and U.S. Rep. Richard Burr, and in September, 2002, similar legislation was introduced in the Senate by Sen. John Edwards.

Higher Education VISION Planning Summit

As directed by the General Assembly based on legislation originally introduced by WNC Senator Walter Dalton, AdvantageWest helped facilitate a long-term VISION planning process, bridging the critical gaps between higher education and economic development planning. Presidents of western North Carolina's community colleges joined Chancellors from Western Carolina University, Appalachian State University, The University of North Carolina-Asheville and leadership from the area private colleges and universities for an August planning summit. The initiative, co-chaired by Chancellor Bardo of Western Carolina University, President Bill Lewis of Isothermal Community College and AdvantageWest Chairman Gordon Myers, will produce a regional VISION plan that will make policy recommendations on curriculum improvements and updates. Ultimately, the plan will help position WNC's workforce as a strategic asset for creating new economy jobs for western North Carolina.

MountainSouth USA Symposium

In August, 2003, MountainSouth USA held a symposium on international tourism for all the organization's partners and area tourism leaders at The Grove Park Inn Resort & Spa. For the first time in western North Carolina, leading international tourism marketing strategists shared the stage, covering a wide range of topics including international tourism research, the role of airlines and other strategic partners, co-op advertising and marketing, the role of wholesalers and receptive service providers, and more.

Speakers included George Thomas, from the U.S. Department of Commerce export division, Susan Phillips, of the Asheville Regional Airport, Steve McClanahan of Unique Tours & Travel, Chris Mackey of the N.C. Division of Tourism, and other state and national experts on international tourism promotion. More than 70 people attended the meeting, and despite a shrinking market for the global traveler in many U.S. destinations, the MountainSouth USA partnership is helping to keep the Southern Highlands on the radar screen of international tourists with measurable success.

Economic Developers Advisory Council (EDAC) Industrial Marketing Retreat

In February, 2003, AdvantageWest's EDAC group, comprised of local and corporate economic developers from across the AdvantageWest region, convened for a marketing retreat facilitated by AdvantageWest board member Craig Madison, President & CEO of The Grove Park Inn Resort & Spa and founder of the Asheville-based marketing firm, The Alpha Group. The group, working with local representatives of the North Carolina Department of Commerce and Western Carolina University's Center for Regional Development, pieced together a comprehensive regional marketing strategy that AdvantageWest is implementing on their behalf. The plan covers targeted industry clusters and geographic markets, as well as specific action items designed to ensure measurable success. The EDAC members meet regularly at AdvantageWest and play a vital role in carrying out the plan.

Bolstering the Bottom Line: Investment and Inspiration

The State of North Carolina is the largest financial supporter of AdvantageWest. None of the accomplishments, initiatives or services outlined in this report would be possible without the leadership and financial support of the General Assembly. The state's investment in AdvantageWest continues to be leveraged by a growing number of additional sources.

Ongoing support from our private investors is a key component of fulfilling our mission. Our investors provide critical ongoing financial support, and stand ready to further assist individuals, groups or corporations interested in doing business in western North Carolina.

Our largest private-sector supporters, Sustaining Partners, typically provide annual support ranging from $10,000 - $25,000 annually. These partners include:

Progress Energy
Wachovia
Duke Energy
BellSouth
Verizon
RBC Centura
First Citizens
PSNC Energy
Macon Savings Bank
The Eastern Band of the Cherokee Indian
Carolina First
(formerly known as MountainBank)

Additional corporate partners participate in a variety of ways, from financial support to in-kind donations of goods or services. These include:

Biltmore Farms
Blue Ridge Motion Pictures
Blue Ridge Mountain EMC
Blue Ridge Mountain Host
Blue Spiral Gallery
BUILDERadius
Buncombe County TDA
Cherokee Travel & Promotion
Chetola Resort
Chimney Rock Park
Crisp Hughes Evans
DeepWeave
Dot Org Group
Doubletree Biltmore Hotel
Eastern Band of the Cherokee Indian
Elant Systems
Enterprise Solutions
Fairway Outdoor Advertising
Golden LEAF, Inc
Grant Thornton
Great Smoky Mountain Golf Association
Great Smoky Mountain Railroad
Handmade in America
Haywood County TDA
Helms Mullis Wicker
Ironwood Media Group
KemperStrategy
Macon Savings Bank
McGill Associates
McGuire, Wood & Bissette
Murphy Power Board
Nanotech Capital
Nantahala Outdoor Center
North Carolina High Country Host
Office Environments Asheville
RBC Centura
Ridgetop Associates
Seventy-two DPI
Smoky Mountain Host
Sonopress
The Alpha Group
The Grove Park Inn Resort & Spa
The Sanford Holshouser Law Firm
Tweetsie Railroad
UBS Financial
Wilcox Travel
Womble, Carlyle, Sandridge & Rice

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Jefferson, NC

Western North Carolina Film Commission

Dollars spent

$37 million

on regional film production

Strength in Numbers

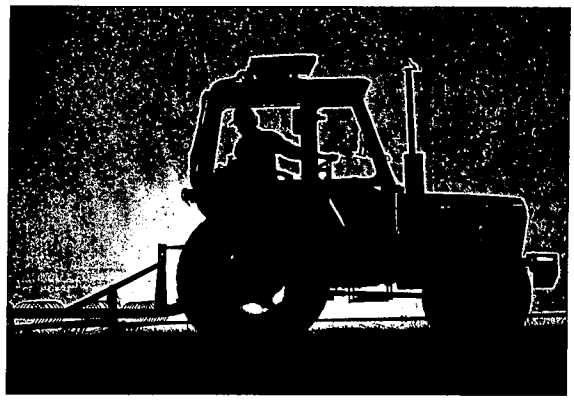
Western North Carolina's beauty provides an ideal backdrop for blockbuster films, still photography and television commercial projects alike. Since 1995, western North Carolina film projects have generated more than 37 million in direct spending in the region, ranging from local crew wages to spending on hotels, catering and even services like dry cleaning. The Western North Carolina Film Commission, an initiative of AdvantageWest recruits these projects, provides location scouting and logistics support and works to ensure they have a pleasant and productive stay in western North Carolina. Our Film Commission website, www.wncfilm.net, as well as a published film directory for the region, market our locations and talent around the world. And, AdvantageWest is partnering this year with the City of Asheville to help bring a world-class film festival to the region, providing even greater exposure for film making possibilities in our Blue Ridge Mountains.

MountainSouth USA

Today, most of the visitors to the mountains of North Carolina are from the Southeast, and in many cases adjacent states or even other parts of North Carolina.

Today, most of the visitors to the mountains of North Carolina are from the Southeast, and in many cases adjacent states or even other parts of North Carolina. These visitors make a tremendous economic impact on our region, but AdvantageWest is committed to finding new and innovative ways to grow western North Carolina's economy. One example is MountainSouth USA, a cooperative initiative of AdvantageWest and other partners from both the public and private sectors. MountainSouth USA markets the region to travelers in select overseas markets — currently focusing primarily on the United Kingdom and Germany. These markets are promising because the average vacation visit of a foreign traveler is significantly longer than most U.S.-based travelers, meaning a greater economic impact to the region per visitor. Since MountainSouth USA's inception, UK and German visitors to our region have risen steadily, even as international travel to the U.S. overall has slowed. The initiative's website, www.mountainsouthusa.com, provides detailed itineraries, regional information geared towards international travel agents and travelers, and more.

Blue Ridge Food Ventures



Family farms were once a mainstay of the mountain economy, but today are considered by many to be an endangered species. And while there are no easy answers to this growing trend across America, it's a known fact that growers can reap higher margins and enhanced profits by selling value-added foods, such as apple butter, rather than raw commodities, such as apples, on the wholesale market.

BLUE RIDGE
FOOD VENTURES

With funding support from Progress Energy, The Z. Smith Reynolds Foundation, the Golden LEAF Foundation, The Asheville Merchants Fund of The Community Foundation of Western North Carolina and other sponsors, AdvantageWest is partnering with the North Carolina Department of Agriculture to build a value-added food processing facility in western North Carolina. Current plans call for an 11,000 sq. ft. commercial kitchen, to be located at the A-B Tech Enka Campus, that area growers can use to create value-added food products.

Major Events in 2003

Getting up-to-date, accurate and insightful information on the local economy into the hands of business leaders and decision makers is a critical step in growing our economy.

AdvantageWest is committed to providing valuable, localized data for a variety of purposes, from convincing a global business to expand into our region, to helping an entrepreneur gauge market potential for a new venture.

In early 2003, a team of Appalachian State University economists and geographers set out to devise a new "index" to measure economic conditions across western North Carolina. With leadership from Dr. Paul Combs of ASU's Appalachian Regional Development Institute and Dr. Ken Peacock, Dean of the Walker College of Business, AdvantageWest agreed to help sponsor and launch the index, which is today published online monthly and featured in new publications across the region. The Index was launched during an April luncheon attended by financial supporters of AdvantageWest and The Walker College of Business, as well as area media.

The Index is compiled by Dr. Todd Cherry, Associate Professor of Economics, Dr. John Dawson, Associate Professor of Economics and Dr. Richard Crepeau, Associate Professor of Geography. The region corresponds closely to the AdvantageWest regional economic development region, but also includes the Hickory-Morganton-Lenoir Metropolitan areas. Wondering which western North Carolina counties are outpacing the state average in job creation? Curious how our region's employment is tracking compared to the rest of the state? Check out the Index each month in the WNC Business section of the *Asheville Citizen-Times* or online at: www.business.appstate.edu/wncindex.asp.

Building Entrepreneurial Communities/Carolina Connect

Co-hosted by AdvantageWest and the Appalachian Regional Commission, this event featured more than 360 participants from across the nation. Economic developers, business incubator operators, entrepreneurs and venture capitalists all came together for a two-day summit in September at The Grove Park Inn Resort & Spa. On the final day of the conference, N.C. State Treasurer Richard Moore kicked the meeting off, and more than $1 billion of venture capital was represented in the audience as local entrepreneurs presented their business plans. At least one business has since landed new investors, which could translate into new jobs for western North Carolina down the road.

This legislation is making its way through Congress, and could soon bring a National Heritage Area federal designation to the mountains of North Carolina. AdvantageWest is working with a long list of strategic partners in the effort, including Handmade in America, privately operated tourist attractions and two national parks, all of whom are working hard to ensure the designation is a success.

Tourism Marketing and Development

Look around the world and it's hard to find a place with a better reputation for great outdoors, authentic culture and heritage, and an all-around good time than the North Carolina mountains.

But that's not by accident; our region is home to skilled and dedicated tourism industry practitioners who work hard to put us on the map as a heralded destination.

AdvantageWest brings these professionals together for regular meetings as our Tourism Advisory Council. The council is comprised of our Corporate Partners from the tourism industry, representatives from the region's three sub-regional tourism host organizations, and major public attractions, including the Great Smoky Mountains National Park and the Blue Ridge Parkway. The council plays an important policy role, but also focuses on regional marketing efforts such as cooperative advertising.

Industrial Marketing, Recruitment and Retention

Central to the AdvantageWest mission is promoting, or marketing, North Carolina's Blue Ridge Region to the rest of the world.

With the help of strategic partners and under the direction of the region's local economic developers, AdvantageWest develops an industrial marketing plan that encompasses print advertising, direct mail, targeted call missions, select trade show participation and online marketing.

The focus of the plan is to generate qualified "leads," or prospects that have an interest in starting, expanding or relocating a business to or within our region. Based on our comprehensive inventory of available buildings and sites, compiled in conjunction with the NC Department of Commerce, we market a broad range of individual business locations based on the clients' stated needs and expectations. Once a lead is qualified and has expressed interest in a specific set of potential business locations, local economic developers and the NC Department of Commerce can provide targeted incentives to help close the deal. AdvantageWest stays involved through the recruiting process by offering our own grant funding, as well as providing professional grant writing services in cases where additional funding is needed. At the end of the process, AdvantageWest stands with local and state leaders to welcome new industry and new jobs to communities across western North Carolina.

Western North Carolina is home to North Carolina's Blue Ridge Region, one of the most captivatingly beautiful, culturally rich and ecologically diverse places on earth.

Our 23-county region comprises 9,629 sq. miles, larger than eight states and roughly the size of Maryland. With a population of approximately 1 million, we have room to grow and yet still enjoy natural landmarks, such as the Great Smoky Mountains National Park, the U.S. Park Service's most visited attraction. And, we're anything but isolated; our region is served by Interstates 40 and 26, as well as the scenic Blue Ridge Parkway. Our central eastern U.S. location puts us three hours or less from Atlanta, Charlotte, Raleigh, Greenville-Spartanburg, Knoxville and Johnson City, and less than a day's drive from half of the U.S. population.

Our economy and workforce

Manufacturing firms:

1,200

in western North Carolina.

Strength in Numbers

There are many things that make North Carolina's Blue Ridge Region special: scenery, climate, heritage, music, crafts and more. But nothing defines a region more than its people. It's the collective strength of our region's people, their vision and their commitment, that make western North Carolina's economy and workforce truly special.

Our region is home to 1,200 manufacturing firms, and manufacturing-related jobs comprise more than 30 percent of the workforce. AdvantageWest values all of these incumbent companies and has been directly involved in helping to retain 3,000 manufaturing jobs. As traditional manufacturing declines across our state and nation, western North Carolina's economy continues to diversify. Today, our region is home to more than 300 IT-related businesses, and serves as a health care, retirement and tourism hub. More than 25% of our region's workforce is engaged in the services sector, and 25,000 workers have tourism-related jobs, generating $1.6 billion in annual revenues.

Our region is home to a significant film industry; more than 45 major motion pictures have been made in our Blue Ridge Mountains, generating a more than $37 million economic impact since 1995.

As homegrown, entrepreneurial businesses play an increasingly important role in our national economy, western North Carolina is ahead of the curve. 17.5% of the workforce is engaged in entrepreneurial businesses, higher than state and national averages. From 1997-2002, our region has seen more than 20,000 new jobs created and more than 1.8 billion in new manufacturing investments.

ADVANTAGEWEST
NORTH CAROLINA

Grant Allocations 1993-2003

County	2003 Tier #	Total Grant $	Population	Per Capita $
Alleghany	1	$178,718.68	10,677	$16.74
Ashe	3	$205,400.27	24,384	$8.42
Avery	3	$123,218.68	17,176	$7.17
Buncombe	5	$327,525.31	206,330	$1.59
Burke	3	$157,765.86	89,148	$1.77
Caldwell	4	$82,920.71	77,415	$1.07
Cherokee	2	$193,621.13	24,298	$7.97
Clay	3	$167,221.13	8,775	$19.06
Graham	1	$169,212.04	7,993	$21.17
Haywood	4	$220,920.85	54,033	$4.09
Henderson	5	$229,103.32	89,173	$2.57
Jackson	3	$199,767.41	33,121	$6.03
Macon	3	$180,676.50	29,811	$6.06
Madison	3	$174,108.22	19,635	$8.87
McDowell	2	$157,531.77	42,151	$3.74
Mitchell	2	$153,105.17	15,687	$9.76
Polk	3	$80,031.77	18,324	$4.37
Rutherford	2	$157,390.86	62,899	$2.50
Swain	1	$179,992.21	12,968	$13.88
Transylvania	3	$204,491.22	29,334	$6.97
Watauga	4	$99,956.68	42,695	$2.34
Wilkes	3	$160,118.57	65,632	$2.44
Yancey	2	$135,661.06	17,774	$7.63
Totals		**$3,938,459.49**	**999,433**	

New Programs and Initiatives: Creating Opportunities through Innovation

Nurturing and growing our local entrepreneurial economy becomes an increasing priority for local leaders aiming to develop a sustainable economy.

Blue Ridge Entrepreneurial Council & Blue Ridge Angel Investors Network

More than

72%

of North Carolina's workforce is employed by small businesses

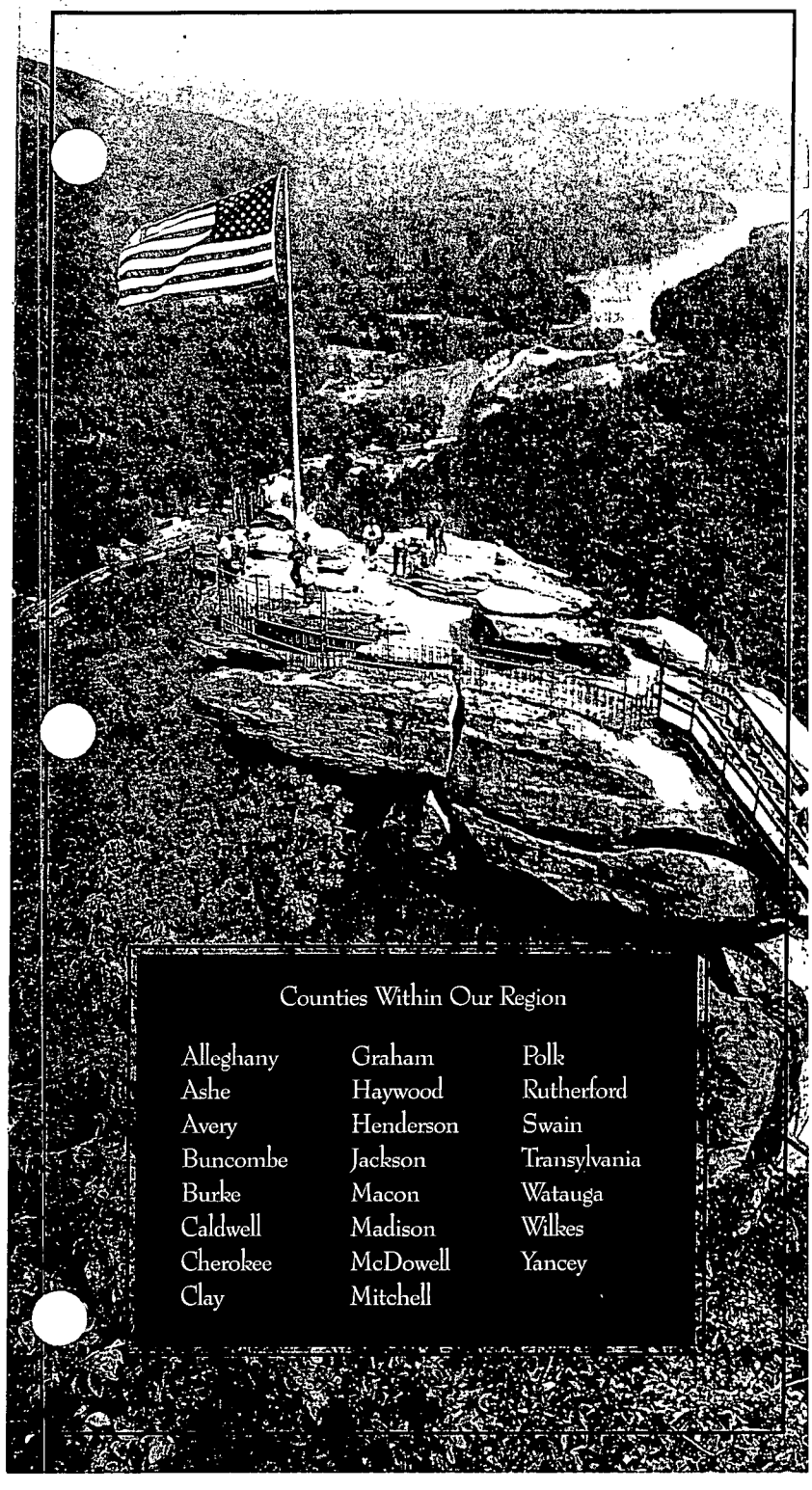
Strength in Numbers

A recent study conducted by the North Carolina Rural Center concluded that more than 72% of North Carolina's workforce is employed by small businesses. And, as we've seen local operations of global companies leave our region for lower operating costs in Asia and elsewhere, nurturing and growing our local entrepreneurial economy becomes an increasing priority for local leaders aiming to develop a sustainable economy.

BRAIN
Blue Ridge Angel Investors Network

BREC
Blue Ridge Entrepreneurial Council

AdvantageWest, with funding support from the Appalachian Regional Commission and private sector partners such as Womble, Carlyle, Sandridge & Rice, Office Environments and McGuire, Wood & Bissette, operate the Blue Ridge Entrepreneurial Council to help local entrepreneurs succeed. Last year, the Council held monthly meetings with speakers such as Red Hat Software CEO Matthew Szulik and covered topics ranging from funding to landing local clients. Quarterly investment meetings, in conjunction with the Blue Ridge Angel Investors Network, provide qualified entrepreneurs with an opportunity to present business plans and seek capital from qualified investors. So far, one entrepreneurial business has received significant investments following a presentation to the group, and a second business received significant outside investment after getting involved with the entrepreneurial network. These businesses, and the leadership behind them, may one day provide a solid backbone for the economy of the Blue Ridge Mountains. Visit the BREC website for more details at: www.ncmtns.biz.



Counties Within Our Region

Alleghany	Graham	Polk
Ashe	Haywood	Rutherford
Avery	Henderson	Swain
Buncombe	Jackson	Transylvania
Burke	Macon	Watauga
Caldwell	Madison	Wilkes
Cherokee	McDowell	Yancey
Clay	Mitchell	

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: Senator Daniel Clodfelter, Co-chair
Environmental Review Commission

Representative Pryor Gibson, Co-chair
Environmental Review Commission

Representative Daniel McComas, Co-chair
Environmental Review Commission

Senator Charlie Albertson, Co-chair
Environmental Review Commission

FROM: William G. Ross, Jr. WGRj

DATE: November 24, 2003

RE: 2003 North Carolina Million Acre Initiative Annual Report

Pursuant to G.S. 113A-241, I am transmitting a report on the million acre initiative. This report covers the preceding year's progress in land conservation through acquisition or perpetual conservation easements in our effort to add one million acres of farmland, open space and conservation lands in the State through permanent protection by December 31, 2009.

The report was prepared by DENR's Office of Conservation and Community Affairs. If you have any questions or would like additional information, please contact Richard Rogers at (919) 715-4152.

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2003 Annual Report
NC Million Acre Initiative

Presented to the Governor and the Environmental Review Commission
of the North Carolina General Assembly

October 1, 2003

By the North Carolina Department of Environment and Natural Resources
Office of Conservation and Community Affairs

The Latest Numbers

At the end of the fourth full year of the North Carolina Million Acre Initiative (January 1, 1999 - December 31, 2002), private and public land protection partners across the state have permanently protected an additional **225,892** "Million Acre" acres. These partners reported adding **47,610** of those acres during the 2002 calendar year. This past year's activities represent a decrease in the rate of land protection in North Carolina from the previous year.

The table at the end of this report describes in detail the number of acres protected by sector (state government, local government, etc), by program, and by time period. Footnotes at the bottom of the page note special circumstances in some of the calculations. The end result is a conservative presentation of the totals. It is likely that the numbers presented here could be adjusted upward between 10,000 to 30,000 acres. To avoid confusion in the future, only official reports of new acquisitions (from surveys, interviews, and questionnaires) make it into the final total. Estimations for non-respondents are not included.

It should be noted that, while our rate of land protection is encouraging, we have not yet reached an annual rate that will allow us to meet the goal of permanently protecting an additional million acres by December 31, 2009 (G.S. 113A-240 and 241). The primary barrier is the availability of public and private funding for new protection projects. If we intend to meet the Million Acre Goal by the end of 2009, more money for land protection must be found.

The Program

In addition to increasing the rate at which we are protecting land in North Carolina, the Million Acre Initiative continues to work towards making information about land protection tools and techniques more broadly available, and to encourage conservation planning. Because there are so many shared goals, the Million Acre Initiative has joined the One North Carolina Naturally effort, and much of the latter part of 2002 was spent facilitating the One North Carolina

Naturally regional meetings. The Million Acre Initiative, in conjunction with One North Carolina Naturally and other partners, continues to slowly, but steadily increase awareness among North Carolinians about the desperate condition of our land resources. In addition, hundreds of surveys, filled out across the State during the series of regional meetings in the Fall of 2002, make it clear that more technical assistance to local governments, non-profits, and community groups is still needed. This includes education and awareness building for local elected officials and the general population. As tens of thousands of acres a year are permanently altered from their existing natural condition for new development, increased awareness about the importance of setting aside our critical and unique lands is essential, and providing information and conservation tools is part of our job.

Looking Ahead

Calendar year 2003 looks to be a good year for new land protection projects. Final reports regarding how many acres were protected from January 2003 – December 2003 will not be available until the Spring of 2004, but estimates suggest that approximately 80,000 acres will have been protected – due in large part to the land transfer from The Nature Conservancy moving forward with state funding. Also, conversations with a number of partners indicate that land purchases that have been under negotiation for years are closing in 2003.

The upcoming year offers us an opportunity to initiate new regional-scale projects for identifying networks of important resources, and an opportunity to finalize similar projects that are already underway. By teaming with the One North Carolina Naturally effort to foster the completion of regional open space plans for every part of the State, it will be possible to see how individual greenspaces and working landscapes across North Carolina fit together into a network of essential green infrastructure. Understanding the interrelationships among those areas will help us target our protection efforts so that we maximize the cost effectiveness and the natural protection value of our investment.

Acres Under Permanent Protection

(note: a blank cell means no data were collected. 0 means no land was protected)

State Agency	category	Acres Protected 1/99 - 12/00	Acres Protected 1/01 - 12/01	Sub-Total through 2001	Acres Protected 1/02 - 12/02	"Million Acre" Total
DENR - FOREST RESOURCES	state forest	1,746	2,535	4,281	793	5,074
DENR - SOIL AND WATER	conservation reserve enhancement program	349	526	875	535.8	1,411
	hog farm buyout	0	886	886	57	943
WILDLIFE RESOURCES	game lands	28,010	15,485	43,495	6384	49,879
DENR - Wetlands Restoration Program	wetlands restoration program	139	75	214	379	593
DENR - PARKS AND REC.	state park	13,897	3,729	17,626	2270	19,896
	state natural area	315	42	357	9	366
	state rec area	0	0	0	0	-
	state lakes	0	0	0	0	-
DENR - COASTAL MNGMT.	coastal reserves	18,790	378	19,168	9734.8	28,903
	public beach/access	0	0	0	0	-
	submerged lands	0	0	0	0	-
DoA&CS - PLANT INDUSTRY	state nature preserve	3,898		3,898	3074	6,972
	other lands					-
DCR - HISTORIC SITES	state historic sites	0	0	0	476.94	477
STATE UNIVERSITY SYSTEM	university property					-
SUBTOTALS		67,144	23,656	90,800	23713.54	114,514
Local Governments						
CITY AND COUNTY GOVERNMENTS (*)	parks, greenways, watersheds, etc.	9,994	5,413	15,407	816.9	16,224
SUBTOTALS		9,994	5,413	15,407	816.9	16,224
Federal Agency						
FISH AND WILDLIFE SERVICE	national wildlife refuge	1,142	4,256	5,398	1363.34	6,761
USDA FOREST SERVICE	national forests	2,512	1,557	4,069	976	5,045
USDA-NRCS WETLAND RESERVE PROGRAM	wetlands reserve	3,149	1,894	5,043	0	5,043
NATIONAL PARK SERVICE	national park	209	6,265	6,474	201.14	6,675
SUBTOTALS		7,012	13,972	20,984	2540.48	23,524
Local Land Trusts						
NC LAND TRUSTS (**)	protected lands	22,738	10,500	33,238	14,419	47,657
SUBTOTALS		22,738	10,500	33,238	14,419	47,657
Other Conservation Groups						
THE NATURE CONSERVANCY(***)	nature preserves	4,606	9,883	14,489	3912.9	18,402
AUDUBON SOCIETY	nature preserves	0	0	0	0	-
AMERICAN FARMLAND TRUST	farmland	0	0	0	0	-
PRESERVATION NC	historic preservation	577	20	597	39	636
NC COASTAL FEDERATION(****)	nature preserves	2,767	0	2,767	2168	4,935
DUCKS UNLIMITED(****)	waterfowl habitat	-	403	403	1944	2,347
SUBTOTALS		7,950	10,306	18,256	8063.9	26,320
TOTALS		114,838	63,847	178,685	49,554	228,239

*Local governments include LWCF projects closed, PARTF projects funded, and counties that responded to information requests.

**25 local land trusts that regularly partner with the Conservation Trust for North Carolina

***The Nature Conservancy closed on 45,591.42 total acres in 2002. However, counting these acres for 2002 would be double-counting, as TNC is holding this acreage (e.g. Angola Bay, Hickorynut Gorge) until it can be transferred to state ownership. Transfer began in 2003 with easement at Bear Garden.

****NC Coastal Federation and Ducks Unlimited had not been counted prior to 2002. Previous numbers have been added to correct the table.

April 22, 2004 ERC Meeting
EXHIBIT F

RESEARCH DIVISION

North Carolina Parks & Recreation Trust Fund

Jonathan B. Howes, Chair
M. Wendell Begley
Harriet L. Farrior
Eddie Holbrook
Walt Israel
Jimmy Jacumin
Ron Kincaid
Russell M. Robinson III
Kenneth Sadler
Cynthia Tart
Todd Tilley

March 1, 2004

The Honorable Marc Basnight
North Carolina Senate
Room 2007
Legislative Building
Raleigh, North Carolina 27601-2808

Dear Senator Basnight:

As chair of the Parks and Recreation Authority, I am pleased to submit the Parks and Recreation Trust Fund (PARTF) Progress Report for fiscal year 2003-2004.

Through PARTF, the state continues to address the tremendous needs in North Carolina's state parks system. This report shows allocations for land acquisitions, capital improvements, renovation projects, emergency repairs, trails and maintenance in state parks.

Thanks to PARTF, the Division of Coastal Management is able to give greater assistance to the 20 coastal communities in their endeavors to provide the public's access to the state's beaches and waterways.

The PARTF grants program for local governments for 2003-04 is underway. Eighty communities have submitted applications seeking over $14 million in PARTF assistance. The Authority is scheduled to select grant recipients in May and July.

If you have questions or comments about the report, please call me at (919)962-1558.

Sincerely,

Jonathan B. Howes

Jonathan B. Howes, Chairman
North Carolina Parks and Recreation Authority

RBC/rbc

Enclosure

cc: (See next page)

cc: Senator David Weinstein, Chair, Senate Appropriations NER Committee
Rep. Stanley Fox, Co-Chair, House Appropriations NER Subcommittee
Rep. Roger West, Co-Chair, House Appropriations NER Subcommittee
Bill Ross, Secretary, DENR
Lewis Ledford, Acting Director, Division of Parks and Recreation
Sheryl Stephens, DENR Office of Legislative Affairs
✓George Givens, Staff Attorney, Environmental Review Commission
Jennifer Hoffman, Fiscal Research Division

North Carolina
Parks & Recreation Trust Fund

Jonathan B. Howes, Chair

M. Wendell Begley

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Eddie Holbrook

Jimmy Jacumin

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Ron Kincaid

Russell M. Robinson III

Kenneth Sadler

Cynthia Tart

Todd Tilley

March 1, 2004

The Honorable James Black
North Carolina House of Representatives
Room 2304
Legislative Building
Raleigh, North Carolina 27601-2808

Dear Representative Black:

As chair of the Parks and Recreation Authority, I am pleased to submit the Parks and Recreation Trust Fund (PARTF) Progress Report for fiscal year 2003-2004.

Through PARTF, the state continues to address the tremendous needs in North Carolina's state parks system. This report shows allocations for land acquisitions, capital improvements, renovation projects, emergency repairs, trails and maintenance in state parks.

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If you have questions or comments about the report, please call me at (919)962-1558.

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North Carolina Parks and Recreation Authority

RBC/rbc

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North Carolina
Parks & Recreation Trust Fund

Jonathan B. Howes, Chair
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Cynthia Tart
Todd Tilley

March 1, 2004

The Honorable Richard T. Morgan
North Carolina House of Representatives
Room 418B
Legislative Building
Raleigh, North Carolina 27601-2808

Dear Representative Morgan:

As chair of the Parks and Recreation Authority, I am pleased to submit the Parks and Recreation Trust Fund (PARTF) Progress Report for fiscal year 2003-2004.

Through PARTF, the state continues to address the tremendous needs in North Carolina's state parks system. This report shows allocations for land acquisitions, capital improvements, renovation projects, emergency repairs, trails and maintenance in state parks.

Thanks to PARTF, the Division of Coastal Management is able to give greater assistance to the 20 coastal communities in their endeavors to provide the public's access to the state's beaches and waterways.

The PARTF grants program for local governments for 2003-04 is underway. Eighty communities have submitted applications seeking over $14 million in PARTF assistance. The Authority is scheduled to select grant recipients in May and July.

If you have questions or comments about the report, please call me at (919)962-1558.

Sincerely,

Jonathan B. Howes

Jonathan B. Howes, Chairman
North Carolina Parks and Recreation Authority

RBC/rbc

Enclosure
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Sheryl Stephens, DENR Office of Legislative Affairs
George Givens, Staff Attorney, Environmental Review Commission
Jennifer Hoffman, Fiscal Research Division

Department of Environment and Natural Resources
Division of Parks and Recreation
Parks and Recreation Trust Fund (PARTF)
Progress Report
March 1, 2004

This progress report for the Parks and Recreation Trust Fund (PARTF) shows activities of and allocations from the Trust Fund for July 1 to December 31, 2003. The report is being submitted as required by North Carolina General Statute §113-44.15(c).

Parks and Recreation Trust Fund
General Program Description

The North Carolina Parks and Recreation Trust Fund (PARTF) was established by the North Carolina General Assembly on July 16, 1994. The General Assembly gave an initial appropriation of $1 million to PARTF for projects in state parks and for a matching grants program for local governments. In 1996, 75% percent of the funds from the excise stamp tax on deed transfers were dedicated to the trust fund. The Parks and Recreation Authority, an eleven-member board, was also created to allocate funds from PARTF to the state parks system and to the grants programs for local governments.

Pursuant to G.S. 113-44.15, the Parks and Recreation Trust Fund is to be allocated as follows:

(1) Sixty-five percent (65%) for the State Parks System for capital projects, repairs and renovations of parks facilities, and land acquisition.

(2) Thirty percent (30%) to provide matching funds to local governmental units on a dollar-for-dollar basis for local park and recreation purposes.

(3) Five percent (5%) to the Division of Coastal Management for the Coastal and Estuarine Water Beach Access Program.

(4) No more than three percent (3%) for operating expenses associated with managing capital improvements projects, acquiring land, and administering the local grants program.

Progress Report - July 1, 2003 to December 31, 2003

Mr. Jonathan B. Howes serves as the chairperson of the North Carolina Parks and Recreation Authority, the governing board of the North Carolina Parks and Recreation Trust Fund (PARTF). North Carolina General Statue §143B-313.1 requires the Authority to meet at least quarterly. The Authority held meetings on July 17, 2003 and October 24, 2003. In 2004, the group is scheduled to meet on March 19-20, May 21-22, July 23-24 and October 22-23.

Table 1, on page 3, shows the distribution of PARTF revenues as of December 31, 2003 and a projection of anticipated funds for fiscal year 2003-2004.

Department of Environment and Natural Resources
Division of Parks and Recreation
Parks and Recreation Trust Fund (PARTF)
Progress Report
March 1, 2004

State Parks Capital Improvements

Through December 31, 2003, the Parks and Recreation Authority approved $12,475,000 for capital improvements in the state's park system. Contracts will be awarded only as funds become available. Table 2 is a list of the capital improvement projects approved by the Authority.

State Parks Land Acquisition

Through December 31, 2003, the Parks and Recreation Authority approved $5,270,000 for land acquisition projects at Haw River, Jockey's Ridge, Mayo River, Stone Mountain and William B. Umstead state parks and at Weymouth Woods State Natural Area. In 2003, the N.C. General Assembly established the Haw River and Mayo River state parks. Table 3 gives a description and the cost for each of these projects.

Coastal and Estuarine Water Beach Access Program

The Parks and Recreation Authority transferred $1,038,246, five percent of PARTF revenues, to the Division of Coastal Management. The Division of Coastal Management distributes these funds to grant recipients according to criteria approved by the Coastal Resources Commission. Grants are awarded for the Coastal and Estuarine Water Beach Access Program.

Local Government Grants Program

Thirty percent of PARTF revenues are to provide matching funds to local governments on a dollar-for-dollar basis for park and recreational purposes. Letters describing the funding schedule and application process were mailed to all eligible applicants in September 2003. A PARTF application workshop was conducted on October 1, 2003 at seven UNC video conference sites across the state. Completed applications were due by 5:00 p.m. on February 2, 2004. Eighty local governments have submitted applications requesting more than $14 million in assistance from PARTF. The Division's staffs are currently evaluating each completed application. The Parks and Recreation Authority is scheduled to meet on May 21, 2004 to select grant recipients from PARTF revenues deposited for the first three quarters of the fiscal year. The board will meet again on July 23, 2004 to select grant recipients using revenues from the fourth quarter of the fiscal year. The Authority will review project evaluations and other relevant data prepared by the applicant and by Division staff before selecting grant recipients.

Department of Environment and Natural Resources
Division of Parks and Recreation
Parks and Recreation Trust Fund (PARTF)
Progress Report
March 1, 2004

Program Administrative Expenditures

As established in N.C.G.S. §113-44.5, up to 3% of PARTF money may be used by the Department of Environment and Natural Resources for operating expenses associated with managing capital improvements projects, acquiring land, and administering the grants program for local governments. The actual administrative costs will be shown in the PARTF Annual Report for fiscal year 2003-2004. During the past seven fiscal years, administrative costs have been held to approximately 2% of the available funds.

N.C. Parks and Recreation Trust Fund Revenues Received July 2003-December 2003 Projections January 2004-June 2004			
	July 2003 – December 2003	**January 2004 – June 2004**	**Annual Total**
	Revenue	**Projected**	**Projected**
Public Beach and Coastal Waterfront Access Program (5%)	$1,038,246	$750,000	$1,788,246
Matching Grants Program for Local Governments (30%)	$6,042,591	$4,365,000	$1,040,7591
State Parks Capital Improvements and Land Acquisition (65%)	$13,092,281	$9,457,500	$22,549,781
Administrative Expenses (Up to 3%)	$591,800	$427,500	$1,019,300
Total	$20,764,918	$15,000,000	$35,764,918

* The Department of Revenue changed the schedule for collecting and reporting PARTF revenues from a quarterly basis to monthly basis as of July 2003. PARTF will receive some additional revenue in FY2003-04 because of this change in the reporting schedule.

** The revenue for January 2004 through June 2004 (6 months) is projected at $2,500,000 per month.

Department of Environment and Natural Resources
Division of Parks and Recreation
Parks and Recreation Trust Fund (PARTF)
Progress Report
March 1, 2004

Table 2
Parks and Recreation Trust Fund
Capital Projects Approved for FY 2003-2004
as of December 31, 2003

Park	Project	Amount
Crowder's Mountain	Boulders Access and Connection Trail	$1,000,000
Falls Lake State Park	Dock Replacement at Sandling Beach	$66,859
Hanging Rock	Lower Cascade Trail Improvement	$300,000
	Moores Wall Climbing Access Area	$768,093
Kerr Lake Recreation Area	Phase III Additional Funds	$1,000,000
Lake Norman	Water Systems Repairs	$147,353
Morrow Mountain	Masonry Curbing and Parking Lot	$264,200
	Electrical Renovation of Distribution System	$727,469
	Building Renovation	$ 232,088
Mount Mitchell	Deep Gap Trail Improvements	$195,954
Mountains to Sea Trail	Trail Establishment	$ 1,000,000
New River	Phase II Construction	$ 3,500,000
Pilot Mountain	Electric Repairs to Pinnacle	$463,312
	Sewer Repairs	$106,400
	Pinnacle Toilet Building Replacement	$150,123
Park System	Major Maintenance Funds	$1,000,000
Park System	Small Trails Funds	$400,000
Park System	Statewide Exhibits Repair Funds	$50,000
	Construction Reserve	$525,000
	Total	$12,475,000

Department of Environment and Natural Resources
Division of Parks and Recreation
Parks and Recreation Trust Fund (PARTF)
Progress Report
March 1, 2004

Table 3
Parks and Recreation Trust Fund
Land Acquisition Projects Approved for FY 2003-2004
as of December 31, 2003

Unit	Acres	Description	Cost
Haw River State Park	1,100	The General Assembly established the park in 2003. These funds are to acquire tracts along the Haw River. The Division will seek additional funds from the Ecosystem Enhancement Program. One tract is currently under option and several others are being appraised.	$2,100,000
Jockey's Ridge State Park	2	Funds for multiple vacant tracts within the master plan for the park. Once tract is along Soundside Road and two tracts are along US 158.	$200,000
Mayo River State Park	1,500	The General Assembly established the park in 2003. These funds are to acquire tracts along the Mayo River. The Division will seek additional funds from the Ecosystem Enhancement Program. Five tracts are being appraised.	$2,100,000
Stone Mountain State Park	2	Tract on Sandy Creek which flows into the park and over Stone Mountain Falls.	$175,000
Weymouth Woods State Natural Area	4	A parcel adjacent to the Boyd tract which will provide access to this section of the state natural area.	$170,000
William B. Umstead State Park	11	A tract on the south side of the park to protect existing forest natural communities. The tract has park land on two sides.	$525,000
Total	2,619		$5,270,000

North Carolina
Parks and Recreation Trust Fund

2002– 2003
ANNUAL REPORT

Division of Parks and Recreation
Department of Environment and Natural Resources
1615 MSC
Raleigh, NC 27699-1615

Michael F. Easley
Governor

William G. Ross Jr.
Secretary
Department of
Environment and Natural
Resources

Parks and Recreation Trust Fund
Annual Report 2002–2003

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1.0 Introduction

The North Carolina General Assembly established the North Carolina Parks and Recreation Trust Fund (PARTF) on July 16, 1994. The General Assembly gave an initial appropriation of $1 million to PARTF to fund improvements in state parks, to fund grants for local governments and to increase public access to the state's beaches. In 1995, the General Assembly dedicated funds from the excise stamp tax to the trust fund starting in FY 1996-97. The Parks and Recreation Authority, an eleven-member board, was also created to allocate funds from PARTF to projects in state parks and to grants for local governments.

The excise tax is the primary funding source for PARTF. The tax is levied on each "deed, instrument, or writing by which interest in real property is conveyed to another person." The tax is levied at the rate of one dollar on each $500 of the interest or property conveyed. Each county remits one-half of the proceeds, less the county's allowance for administrative expenses, to the state. Effective July 1996, the General Assembly (G.S. 105-228.30) stipulated that part of the state's share would be allocated to PARTF. Of the funds remitted, the Department of Revenue credits 75% to the Parks and Recreation Trust Fund and 25% to the Natural Heritage Trust Fund.

Pursuant to G.S. 113-44.15, the money from the Parks and Recreation Trust Fund are to be allocated as follows:

(1) Sixty-five percent (65%) for the State Parks System for capital projects, repairs and renovations of facilities and to land acquire land.

(2) Thirty percent (30%) to provide grants to local governments on a dollar-for-dollar basis to create or improve parks and recreational projects.

(3) Five percent (5%) for the Coastal and Estuarine Water Beach Access Program.

(4) No more than three percent (3%) may be used by the Department of Environment and Natural Resources (DENR) for the operating expenses associated with managing capital improvements projects, acquiring land, and administering the grants program for local governments.

2.0 North Carolina Parks and Recreation Authority

The North Carolina Parks and Recreation Authority, an 11-member board that oversees the Parks and Recreation Trust Fund, was created by the General Assembly with the Authority's powers and duties becoming effective July 1, 1996. The Governor appoints three members, including the chairperson. The General Assembly appoints four members upon the recommendation of the President Pro Tempore of the Senate. The General Assembly appoints four members upon the recommendation of the Speaker of the House.

The Authority is charged with six powers and duties: to receive public and private donations and funds for deposit into the trust fund; to allocate funds for land acquisition; to allocate funds for capital projects; to solicit financial and material support; to develop effective support for parks and recreation; and to advise the Secretary of DENR on any matter he may refer to the body.

Members are appointed for three-year terms and may serve no more than two consecutive three-year terms. After serving two consecutive three-year terms, a member is not eligible for appointment to the Authority for at least one year after the expiration of the member's last term. The Parks and Recreation Authority held four meetings during fiscal year 2002-2003.

The 2002-2003 Parks and Recreation Authority members were:

Jonathan Howes
Chapel Hill

Roy Alexander
Charlotte

Wendell Begley
Black Mountain

Harriet L. Farrior
Wallace

Eddie Holbrook
Shelby

Walt Israel
Belmont

Ron Kincaid
Mount Gilead

Russell Robinson III
Greensboro

Dr. Kenneth M. Sadler
Lewisville

Todd Tilley
Hertford

One seat is vacant. Ms. Leslie Anderson of Asheville resigned in December 2002.

3.0 Parks and Recreation Trust Fund Summary

Table 3-1 shows the revenues received into the Parks and Recreation Trust Fund and the allocation of revenues by program for fiscal year 2002-2003.

Table 3-1
Parks and Recreation Trust Fund (PARTF)
Distribution of Revenues
Fiscal Year 2002-2003

Item	Amount
Public Beach and Coastal Waterfront Access Program	$1,424,218
Local Governments Matching Grants Program	$8,392,498
State Parks System	
Capital Improvements	$12,571,570
Land Acquisition	$5,387,816
Administrative Expenses	
Contract with NCSU Recreation Resources Service	$151,163
Division of Parks & Recreation staff and Authority members	$332,731
2002-2003 PARTF Revenues	**$28,484,354**

4.0 Grants Program for Local Governments

4.1 Program Description

The Parks and Recreation Trust Fund (PARTF) program provides dollar-for-dollar grants to local governments. All counties, incorporated municipalities and public authorities (as defined in N.C.G.S. 159-7) are eligible for funding. Two or more local governments may apply jointly. Recipients can acquire land to use for public recreation or to protect the natural or scenic resources of the property. Recipients can also use a grant to build or renovate recreational and support facilities. All facilities must serve the general public.

In September, the Division of Parks and Recreation (DPR) mails a description of the PARTF program and a schedule to local governmental officials and parks and recreation directors. A local government can request a maximum grant amount of $250,000 in PARTF assistance with its grant application. The approved value of land that is donated to a local governmental unit or public authority may be applied to the 50% matching requirement.

The DPR provides assistance to local governments in several ways. In October, the PARTF staff conducts a workshop where local governments can learn about the program and how to complete an application. The workshop is presented simultaneously at University of North Carolina video conference sites. The DPR has a contract with Recreation Resources Service (RRS) at North Carolina State University. The staff of RRS can provide technical assistance to local governments who request help in planning projects and preparing grant applications. RRS has six consultants in regional offices across the state.

The members of the Parks and Recreation Authority select which applicants will receive a grant. The factors considered by the Authority as it selects recipients include, but are not limited to, the criteria contained in the PARTF scoring system, the population of the applicant, the geographic distribution of projects across the state, the presence or absence of other funding sources and compliance with prior grant agreements.

Applications are due January 31. The Parks and Recreation Authority meets in May to select recipients from PARTF revenues received for the first three-quarters of the fiscal year. The Authority meets in early July to select grant recipients from PARTF revenues received during the fourth quarter of the fiscal year.

4.2 Description of Applications and Grants

Fifty-seven local governments submitted applications for consideration in fiscal year 2002-2003. The Parks and Recreation Authority reviewed all of the applications and awarded 49 grants for a total of $8,328,953. There is a balance of $63,545 from the PARTF administrative expenses that will be awarded to local governments in the near future. Table 4-1 on the following page is a list of the projects approved for fiscal year 2002-2003. The table is organized alphabetically by recipient.

4.3 Geographic Distribution of Grants

The members of the Parks and Recreation Authority consider the geographic distribution of funds across the state as one of the factors used in selecting grant recipients. After eight funding cycles, the Authority has awarded $48.4 million in PARTF grants to 317 projects in 96 counties across North Carolina.

Figure 4-1 (page 7) is a map showing the distribution of PARTF grants by county across North Carolina from 1995-2003.

Table 4-1
N.C. Parks and Recreation Trust Fund
Grants Awarded Fiscal Year 2002-2003

Applicant	County	Project	Grant Amount
Apex	Wake	Holleman Tract Acquisition	$250,000
Asheville	Buncombe	French Broad River Park Phase IV	$250,000
Beech Mountain	Watauga	Buckeye Lake Indoor Recreational Facility	$250,000
Belwood	Cleveland	Belwood Community Park	$10,579
Cabarrus	Cabarrus	Camp Spencer Park	$250,000
Canton	Haywood	Canton Park	$250,000
Catawba	Catawba	Catawba Town Park	$47,730
Cherryville	Gaston	Piedmont Equestrian	$250,000
Columbus	Polk	Veteran's Park	$139,527
Cornelius	Mecklenburg	Bailey Road Park Phase II	$250,000
Dunn	Harnett	Tart Park Improvements	$250,000
Emerald Isle	Carteret	Coast Guard Road Park	$250,000
Gastonia	Gaston	Smyre Millennium Park	$100,688
Granite Falls	Caldwell	Lakeside Park	$250,000
Greensboro	Guilford	Northeast Community Trail	$200,000
Huntersville	Mecklenburg	Waymer Park Renovation	$126,919
Jackson	Jackson	Canada Community Park	$181,335
Jonesville	Yadkin	Lila Swain Memorial Park	$10,600
Kannapolis	Cabarrus	Village Park	$250,000
Kernersville	Forsyth	Fourth of July Park	$250,000
King	Stokes	King Recreation Acres	$250,000
Lake Waccamaw	Columbus	Elizabeth Brinkley Memorial Park	$100,000
Liberty	Randolph	P.H. Smith Park	$15,950
Lucama	Wilson	Lucama Town Park	$14,792
Macon	Macon	Little Tennessee River Greenway- Phase II	$217,467
Maggie Valley	Haywood	Maggie Valley Festival Grounds	$250,000
Mars Hill	Madison	Mars Hill Recreation Park	$36,750
Mayodan	Rockingham	Farris Memorial Park	$145,000
Monroe	Union	Parks Williams Athletic Complex	$249,202
Mooresville	Iredell	Neel Tract Park	$250,000
Morganton	Burke	Youth Baseball Complex	$250,000
New Bern	Craven	Pleasant Hill Park	$87,691
Newton	Catawba	Jacob's Fork Park	$250,000
North Topsail Beach	Onslow	N. Topsail Beach Park II	$179,342
Oakboro	Stanly	Oakboro District Park Phase II	$117,500
Pembroke	Robeson	Pembroke Recreation Center	$250,000
Person County	Person	Merritt Kane Commons	$79,627
Pinehurst	Moore	Wicker Park I	$224,737
Polk	Polk	Searcy Field	$250,000
Raleigh	Wake	Buffalo Road Athletic Park	$241,000
Rutherfordton	Rutherford	Crestview Park	$60,000
Scotland	Scotland	Scotland Recreation Complex	$250,000
Snow Hill	Greene	Genesis Hill Park	$68,000
Stallings	Union	Stallings Municipal Park	$30,000
Stedman	Cumberland	Ernest Freeman Park	$45,482
Swain	Swain	Island Park / Greenway Project	$53,762
Union	Union	Cane Creek Park	$250,000
Weldon	Halifax	River Falls Park	$45,273
Yancey	Yancey	Yancey Recreational Grounds	$250,000
		Total	$8,328,953

Parks and Recreation Trust Fund Grants
County Summary
1995 - 2003

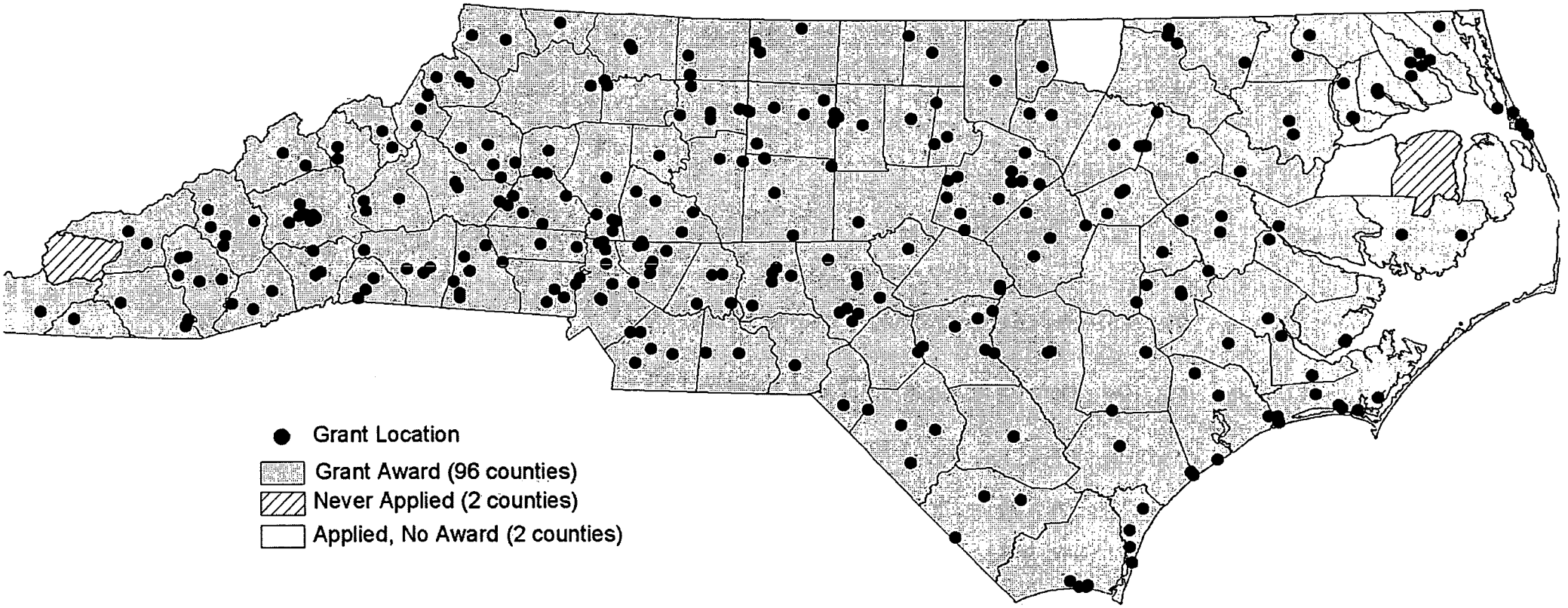


Figure 4-1

5.0 State Parks Program

5.1 Land Acquisition

For fiscal year 2002-2003, the Parks and Recreation Authority approved land acquisition projects for the state parks system for a total of $5,387,816 (Table 5-1).

Table 5-1

N.C. Parks and Recreation Trust Fund

Land Acquisition Projects Approved in Fiscal Year 2002-2003

Park	Acres	Description	Cost
Bushy Lake State Natural Area	1,000	Tracts along the sand rim of Bushy Lake Bay and tracts in Big White Bay from willing sellers.	$650,000
Crowders Mountain State Park	4	Inholding home site on the north end of the park currently for sale. Structure of no value; to be removed.	$50,000
Elk Knob State Park	1,104 100	*Funding for the initial acquisitions at the state natural area. The project includes property at Pottertown Gap for better access and control; includes a residence. Other funds from Natural Heritage Trust Fund. *Tracts from a willing seller on the south side of Elk Knob that has access from the secondary road.	$2,200,000 $350,000
Eno River State Park	47	Poplar Ridge natural area project. Additional funds from Ecosystem Enhancement Program and the Natural Heritage Trust Fund.	$600,000
Goose Creek State Park	2	Property for sale on northeast side of the park with a house that may be used as a residence.	$70,000
Gorges State Park	80	Property along the Toxaway River for water quality and scenic resource protection.	$375,000
Jones Lake State Park	35	Property to protect the park's resources and to bring the park boundary to a secondary road.	$75,000
Lake James State Park	1	Inholding with access through the park which is for sale. Structure is a small cabin.	$50,000
Raven Rock State Park	90	One tract on the north side and two tracts on the south side of park from willing sellers.	$275,000
South Mountains State Park	127	Tracts on the east side of the park. Will provide water quality protection. One tract contains a house that may be used as a residence.	$537,816
Stone Mountain State Park	2	Inholding lot that overlooks tent and trailer campground which is currently for sale.	$155,000
Total	2,592		$5,387,816

5.0 State Parks Program

5.1 Land Acquisition (continued)

In early October 2002, Weyerhaeuser Corporation approached the Division of Parks and Recreation with an offer to sell property adjacent to Raven Rock State Park. The cost of the project was approximately $2 million. On December 10th, the Executive Committee reallocated $1,173,954 from existing land acquisition projects to the Raven Rock State Park project. The Weyerhaeuser transaction was closed December 20th and added 714 acres to the park.

Lists of land acquisitions from previous fiscal years have been revised to reflect changes to projects made by the Executive Committee in December 2002 in order to accommodate the purchase from Weyerhaeuser. The lists are in Attachment A.

5.2 Construction and Renovation

During fiscal year 2002-2003, the Parks and Recreation Authority approved state park construction and renovation projects totaling $12,571,570 (Table 5-2).

Table 5-2
N.C. Parks and Recreation Trust Fund
Capital Improvement Projects Approved in Fiscal Year 2002-2003

Park	Project	Amount
Dismal Swamp State Park	Construct a visitor's center.	$2,700,000
Merchants Millpond State Park	To study the impact of the increasing sedimentation in the millpond and ways to delay the process.	$50,000
New River State Park	Initial construction of a visitor's center, maintenance facilities, residence for ranger, picnic shelter for groups of visitors.	$3,500,000
Pilot Mountain State Park	The funds will complete the renovation of most of the major trails in the park.	$420,200
South Mountains State Park	Construct a visitor's center.	$2,400,000
Stone Mountain State Park	Additional funds to construct a campground including adding sites, a contact station, access roads, extend utilities and bury a power line.	$1,000,000
William B. Umstead State Park	For the Reedy Creek side of the park, renovate the existing picnic shelter and build a new shelter to include exhibits, tables, benches, and public telephone.	$334,800
Systemwide General Maintenance Funds	Funds for items such as such as replacing and repairing roofs, water lines, pumps, wells.	$1,181,570
Systemwide Trail Maintenance Funds	Funds for the routine maintenance of existing trails such as resurfacing and replacing erosion control devices.	$400,000
Systemwide Exhibits Repair Funds	Funds for the general maintenance of exhibits in each park. Funds are used to repair or replace exhibits that are broken or worn from use by visitors to the parks.	$50,000
	Construction Reserve	$535,000
	Total	$12,571,570

6.0 Public Beach and Coastal Waterfront Access Program

The Public Beach and Coastal Waterfront Access Program was established by the General Assembly in 1981. Beginning in fiscal year 1996-97, the program began receiving 5% of the revenues from the Parks and Recreation Trust Fund. The public beach and coastal waterfront access program's enabling legislation (GS 113A-134.1) states that public purposes would be served by providing increased access to ocean beaches, public parking facilities, or other related public uses.

The program provides matching grants to local governments for low-cost capital projects designed to improve pedestrian access to the state's beaches and waterways. The program, administered by the Division of Coastal Management (DCM), offers matching grant funds to local governments throughout the 20 coastal counties. Since 1981, over 288 public access sites have been constructed at a cost of $19.6 million ($11.6 million state/federal and $8 million local funds). Local governments are responsible for construction, operation and long-term maintenance of the facilities. While most of the early projects were located along the oceanfront, more and more projects are now designed to improve access to estuarine shorelines, coastal rivers, and urban waterfronts.

The Division of Coastal Management sends requests for proposals to local governments in the 20 coastal counties in March of each year. The division uses criteria developed by the Coastal Resources Commission to select grant recipients. Local governments are required to match at least 25% of the project costs. Recipients are selected in July and contracts are awarded in August or October. Grant recipients have one year to complete their projects.

Communities can apply for five different types of water access sites: local, neighborhood, regional, multi-regional and urban waterfront redevelopment projects.

- Local access sites include public access points which offer minimal or no facilities. They are primarily used by pedestrians who reside within a few hundred yards of the site. Generally, these accessways are a minimum of ten feet in width and provide only a dune crossover or pier, if needed, litter receptacles and public access signs. Vehicle parking is generally not available at these access sites. However, bicycle racks may be provided.

6.0 Public Beach and Coastal Waterfront Program

- Neighborhood access sites are public access areas offering parking, usually for five to twenty-five vehicles, a dune crossover or pier, litter receptacles and public access signs. Such accessways are typically 40 to 60 feet in width and are primarily used by individuals within the immediate subdivision or vicinity of the site. Restroom facilities may be installed.

- Regional access sites serve the public from throughout an island or community including day visitors. These sites normally provide parking for 25 to 80 vehicles, restrooms, a dune crossover, pier, foot showers, litter receptacles and public access signs. Where possible one-half acre of open space in addition to all required setback areas should be provided for buffering, day use, nature study or similar purposes.

- Multi-regional access sites are generally larger than regional accessways but smaller than state parks. Multi-regional accessways provide parking for a minimum of 80 and a maximum of 200 cars, restrooms with indoor showers and changing rooms, and concession.

- Urban waterfront redevelopment projects improve public access to utilized urban waterfronts. Such projects include the establishment or rehabilitation of boardwalk areas, shoreline stabilization measures such as the installation or rehabilitation of bulkheads, and the placement or removal of pilings for the purpose of public safety and/or increased access and use of the urban waterfront.

The Division of Coastal Management received $1,569,915 in PARTF revenues from the last quarter of 2001-02, the first three quarters of 2002-03 and reserve ($175,054) from canceled projects. The Division distributed $1,496,000 to local governments (Table 6-1). The remaining $73,915 will be reserved for grant awards in 2003-2004.

The Division of Coastal Management (DCM) received 52 pre-applications from 30 local governments requesting $4,256,034. DCM received 23 final applications from 19 local governments requesting $1,496,000. These 19 local governments received public beach and coastal water front access grants funded by PARTF in 2002-2003 (Table 6-2).

6.0 Public Beach and Coastal Waterfront Access Program

Table 6-1 Division of Coastal Management Distribution of PARTF Revenues For Fiscal Year 2002-2003	
Item	Amount
PARTF revenues received in first three quarters of fiscal year 2002-2003	$1,119,726
Reserve from fiscal year 2001-2002 (4th quarter revenues) and Reserve from canceled projects	$275,135 $175,054 $450,189
Total available for fiscal year 2002-2003 grants	$1,569,915
Grants awarded for fiscal year 2002-2003	$1,496,000
Reserve for grants to be awarded in fiscal year 2003-04*	$73,915

*DCM's annual funding cycle is based on PARTF revenues for the first three quarters of fiscal year 2002-2003 and any reserve from the previous fiscal year including the fourth quarter revenues. The balance of $73,915 will be added to upcoming PARTF revenues and used to fund projects in the fiscal year 2003-04 grants cycle.

Table 6-2 Public Beach and Coastal Waterfront Access Program PARTF Grants Awarded in Fiscal Year 2002-2003					
Local Government	**Project Description**	**Grant**	**Cash Match**	**In-kind Match**	**Total Cost**
Ahoskie	Ahoskie Creek Access. Construct parking, restrooms and benches along Ahoskie Creek.	$45,000	$7,500	$7,500	$60,000
Bridgeton	Neuse River Park. Construct 120' boardwalk, fishing pier, benches and 12 parking spaces along Neuse River.	30,945	10,315	0	41,260
Caswell Beach	Oak Island Lighthouse Access. Acquisition of 5.36 acre oceanfront site, construct 5-10 parking spaces and handicapped boardwalk.	15,500	4,500	500	20,500
Emerald Isle	Louise Ave Phase IV. Addition of 95 parking spaces to existing ocean access and construction of stormwater retention area.	26,250	11,250	0	37,500
Hertford, Town of	Raccoon St Access. Construction of a 450' boardwalk, covered shelter, gravel drive, canoe launch and picnic tables along Raccoon Creek.	41,250	13,750	0	55,000
Holden Beach	Halstead St Fishing Pier. Construct handicap walkway, pier, gazebo and 5 parking spaces.	18,949	6,316	0	25,265
Holden Beach	Dune crossover Replacements Jordan St, 357 & 1017 Ocean Blvd.	15,412	5,138	0	20,550
Indian Beach	Ocean Club Neighborhood Access. Construct 700' dune crossover and parking for 10 vehicles.	67,500	22,500	0	90,000
Indian Beach	Indian Beach West Neighborhood Access. Acquisition of oceanfront lot and construction of 15-space parking lot.	168,750	56,250	0	225,000
Kure Beach	Improvements to access sites at Avenues E, K, L, N, and 1342 Ft. Fisher Blvd. ADA compliant crossovers and upgraded parking.	37,796	6,067	6,267	50,130

Table 6-2
Public Beach and Coastal Waterfront Access Program
PARTF Grants Awarded in Fiscal Year 2002-2003

Local Government	Project Description	Grant	Cash Match	In-kind Match	Total Cos
Manteo	Manteo Waterfront Rehabilitation. Replacement of existing boardwalk, bulkhead with addition of floating docks.	194,257	32,377	32,376	259,010
Nags Head	Curlew St Access Parking. Construct 20-22 parking spaces.	65,992	33,958	0	99,950
New Hanover County	Airlie Gardens Pier and Canoe Launch. Expand overlook by adding a second access, canoe launch and educational dock.	81,000	41,822	0	122,822
North Topsail Beach	Town Park Expansion Phase II. Construct nature trail, restroom, pier and canoe launce.	128,325	42,775	0	171,100
Oak Island	Waterway Park improvements Phase II. Construct a gazebo, parking, pier, canoe launch and floating ramps.	97,125	16,188	16,187	129,500
Ocean Isle	East First St crossover replacement. Construct handicap crossover and gazebo.	36,450	12,150	0	48,600
Ocean Isle	East First St Restroom construction.	24,191	8,064	0	32,255
Pasquotank County	Pasquotank College of the Albemarle Access Phase III. Construct 560' boardwalk.	38,925	12,975	0	51,900
Surf City	Soundside Park Phase III. Construction of 6,000 sq ft pier.	198,000	102,000	0	300,000
Swansboro	White Oak River Walk Phase II. Construct 350' boardwalk, landscaping , benches and lamp posts.	63,123	21,241	5,000	89,364
Topsail Beach	South Anderson/Ocean Blvd Regional Facility. Construction of 24-space parking lot.	900	150	150	1,200
Topsail Beach	Hines Ave Estuarine Access Improvements. Installation of trash cans, bench and bike rack.	360	60	60	480
Washington, City of	Tar River Access. Acquisition of property on southwest side of Hwy 17 bridge.	100,000	26,000	10,000	136,000
	TOTAL	**$1,496,000**	**$493,346**	**$78,040**	**$2,067,386**

Attachment A

N.C. Parks and Recreation Trust Fund State Parks Land Acquisition Projects Approved in Fiscal Year 1997-98 Revised December 2002		
Park	**Acres/Cost**	**Description**
Cliffs of the Neuse State Park	73 $100,000	Property from a willing seller that will provide water quality protection and buffer park facilities.
Eno River State Park	30 $220,000	Land along Buckquarter Creek to protect the creek and the associated high quality natural communities. Land was identified in the natural area inventory of Orange County.
Eno River State Park	20 $141,966	Multiple tracts Durham and Orange counties to protect the river corridor, provide land for planned park facilities and to protect water quality.
Hanging Rock State Park	9 $220,000	Continuation of acquisition project at Moore's Wall for resource protection.
Jockey's Ridge State Park	1 $52,500	Tracts on Soundside Road from willing sellers and acquisition of outstanding partial interest in property along Roanoke Sound.
Lumber River State Park	1,500 $1,200,000	Tracts within the Princess Ann Swamp/Big Sandy Ridge natural area complex and across from the Pea Ridge Access Area. Partial funding from the NHT Fund and the CWMT Fund.
Pilot Mountain State Park	200 $400,000	Property at the Yadkin River Section of the park. Property contains frontage along the Yadkin River and remnants of an old mill.
Mount Mitchell State Park	150 $750,000	Protection of views from Mount Mitchell south and west of the park.
Raven Rock State Park	21 $52,500	Funds for Weyerhaeuser tracts on the north and side of the river.
Stone Mountain State Park	125 $420,000	Parcel on the Blue Ridge escarpment for visual and water quality protection. Part of this property will be exchanged for Blue Ridge Parkway property to straighten the boundary.
William B. Umstead State Park	16 $425,000	Property near Richland Creek that has parkland on three sides. Inclusion in the park will improve management of the park and buffer horse trail.
Total	**2,145** **3,981,966**	

N.C. Parks and Recreation Trust Fund State Parks Land Acquisition Projects Approved in Fiscal Year 1998-99 Revised December 2002		
Park	**Acres/Cost**	**Description**
Crowders Mountain State Park	430 $1,286,000	Partial funding for the Kings Mountain range connector to provide recreational and wildlife corridor to Kings Mountain State Park in SC.
Gorges State Park	20 $200,000	Land to improve boundaries and/or provide staff housing.
Gorges State Park	up to $40,000	The initial acquisition is funded by an appropriation, a NHTrust Fund grant and a private donation. These are funds to pay property taxes.
Jockey's Ridge State Park	3 $122,000	An undeveloped tract on the north end of the park that contains good quality natural communities.
New River State Park	200 $500,000	Multiple tracts in the designated section of the New River to protect water quality and scenic resources.
Raven Rock State Park	181 $338,000	Tracts on north and south side of the park for water quality protection and additional land for trails.
South Mountains State Park	600 $850,000	Land in the Jacobs Fork watershed needed for trail connections and improved park management. These trail connections are needed to allow for loop trails from the new horse camp facility.
Stone Mountain State Park	300 $849,000	Parcel on the Blue Ridge escarpment for visual and water quality protection. Part of this property has state park on three sides.
Donation Expenses	$15,000	Donations have associated costs such as title opinions, attorney fees, surveys and filing fees.
Total	**2,134** **$4,688,718**	

N.C. Parks and Recreation Trust Fund State Parks Land Acquisition Projects Approved in Fiscal Year 1999-2000 Revised December 2002		
Park	**Acres/Cost**	**Description**
Cliffs of the Neuse State Park	200 $400,000	Property to protect water quality and/or provide additional buffer to existing park facilities.
Crowders Mountain State Park	150 $600,000	Partial funding for the Kings Mountain range connector to provide recreational and wildlife corridor to Kings Mountain State Park in SC.
Eno River State Park	75 $400,000	Land along the Eno River for water quality protection and additional land base for trails.
Gorges State Park	20 $200,000	Land to protect resources of the park and/or water quality.
Jockey's Ridge State Park	1 $140,000	A tract along Soundside Road from a willing seller which has a structure.
Kerr Lake State Recreation Area	8 $250,000	Land for improved control and access to multiple sites at Kerr Lake.
Lake Waccamaw State Park	3 $300,000	Tract at dam to provide public access and to improve management of the site.
Mount Jefferson State Natural Area	160 $654,563	Tracts on the lower slopes of Mount Jefferson for the protection of the natural resources.
New River State Park	15 $300,000	Multiple tracts in the designated section of the New River to protect water quality and scenic resources.
Pettigrew State Park	120 $200,000	Brumsey Woods area and lots of the eastern shore of Lake Phelps.
Raven Rock State Park	524 $1,110,000	Tracts on the north and south sides of the river for water quality protection and additional land for trails. Includes the Weyerhaeuser tracts.
Weymouth Woods State Natural Area	1 $175,000	Residence near maintenance area to provide additional security to the site.
Survey Expenses	$250,000	Surveys of existing park boundaries for management purposes.
Total	**1,277** **$4,879,563**	

N.C. Parks and Recreation Trust Fund State Parks Land Acquisition Projects Approved in Fiscal Year 2000-01 Revised December 2002		
Park	**Acres/Cost**	**Description**
Crowders Mountain State Park	600 $1,648,000	Partial funding for the Kings Mountain range connector to provide recreational and wildlife corridor to Kings Mountain State Park in SC.
Goose Creek State Park	91 $255,000	Water quality protection on tributaries to Mallard Creek and boundary management on the east side of the park.
Hammocks Beach State Park	20 $10,000	Lease of dredge State Parkoil island for maintenance dredging of Cow Channel. Cow Channel is the main access to Bear Island from the Intra-coastal waterway, and the route used by the park's ferries.
Hanging Rock State Park	180 $815,000	Resource protection at Cooks Wall, Wolf Rock, and Flat Shoals Mountain along the south side of the park. Boundary management on the north side of the park.
Lake Norman State Park	8 $110,000	Land to improve boundary management on the west side of the park.
Morrow Mountain State Park	50 $260,000	Protection of a portion of the ridgeline on the northwest side of the park. Property is currently on the market.
Raven Rock State Park	53 $133,454	Funds to acquire Weyerhaeuser tracts on the north and south side of the park to protect water quality and provide additional land for trails.
Stone Mountain State Park	98 $211,000	Protection of Big Sandy Creek which flows over Stone Mountain falls within the park. Tract is on the escarpment and the northeast side of the park.
William B. Umstead State Park	55 $1,000,000	Protection of the Reedy Creek entrance to the park. This is a $6 million project with other funds from the NC Department of TranState Parkortation, the Town of Cary and the sale of property surplus to the park along US 70.
Total	**78** **$465,435**	

N.C. Parks and Recreation Trust Fund
State Parks Land Acquisition Projects Approved in Fiscal Year 2001-02
Revised in December 2002

Park	Acres/Cost	Description
Dismal Swamp State Natural Area	15 $25,000	Funds to cover cost of acquiring access to the State Natural Area from the south for construction and management access to the site.
Eno River State Park	161 $500,000	River corridor protection upstream of the Cabelands section of the park. Additional funds will be requested from the Natural Heritage Trust and Clean Water Management Trust funds for this project.
Eno River State Park *	825 $1,207,808	The Eno Wilderness project. PARTF allocation will be used as the match for the LWCF request. Additional funds will be requested from the Natural Heritage Trust and Clean Water Management Trust funds for this project.
Lake Norman State Park	75 $450,000	Land to improve boundary management on the north side of the park and to protect water quality of Norwood Creek, the main stream, into the park lake. Additional funds may be requested from Clean Water Management Trust Fund for this project.
Lumber River State Park	80 $100,000	River corridor tracts across from the Pea Ridge Access of the park. Landowners want to sell to the state for the park.
Merchants Millpond State Park	200 $200,000	Entrance protection across from the picnic area and property on the north side of the park.
Raven Rock State Park	280 $700,000	Funds to acquire Weyerhaeuser tracts on the north and south side of the park to protect water quality and provide additional land for trails.
South Mountains State Park	460 $920,000	Additional funds for tracts in the Henry Fork and Jacob Fork watersheds. Additional funds will be requested from Clean Water Management Trust and Natural Heritage Trust Funds for these projects.
Total	**2,096** **$4,102,808**	

April 22, 2004 ERC Meeting
EXHIBIT G

NORTH CAROLINA

NATURAL HERITAGE TRUST FUND

AWARD REPORT

Calendar Year 2003

A Report to the Governor and General Assembly

William G. Ross, Jr, Secretary
Department of Environment
and Natural Resources

Dewey W.Wells, Chairman
Robert Gordon, Chairman
Board of Trustees
NC Natural Heritage Trust Fund

NORTH CAROLINA
NATURAL HERITAGE TRUST FUND
AWARD REPORT
Calendar Year 2003

Origins and Mission

The North Carolina Natural Heritage Trust Fund was established by the 1987 General Assembly (G.S. 113-77, effective July 1, 1987) as a supplemental funding source for state agencies to acquire lands and to pay for the inventory of natural areas by the North Carolina Natural Heritage Program. A twelve-member board of trustees administers the Trust Fund.

Funding Sources

Since 1987, and as of December 31, 2003, the Natural Heritage Trust Fund has received $115 million including an initial appropriation of $275,000. The Trust Fund acquired a continuing source of funding in 1989 when a part of the receipts from the sale of personalized license plates was designated as income. The General Assembly in 1991 increased the state's deed stamp tax to $2 per $1000 value and set aside 15% of the state's share of this additional money as income for the Trust Fund. The 1995 General Assembly increased the Trust Fund's portion of the deed stamp tax from 15% to 25% effective July, 1996. Moneys not expended remain in the interest-accumulating Natural Heritage Trust Fund account and do not revert to the General Fund.

Board of Trustees

The North Carolina Natural Heritage Trust Fund is delegated the authority to grant funds to eligible state agencies pursuant to applications which meet statutory criteria and board guidelines. The governing authority for the Trust Fund is a 12 member Board of Trustees. This number was increased from nine members during the 2001 legislative session. Four members are appointed by the Governor who also designates the chairman. Eight members are appointed by the General Assembly with four recommended by the President Pro-Tempore of the Senate and four recommended by the Speaker of the House. Appointments are made effective January 1 and are for staggered six year terms. Persons appointed are to be knowledgeable in the acquisition and management of natural areas. The 2003 trustees are as follows:

Governor Appointees	Senate Appointees	House Appointees
Charles E. Clement Watauga County	J. Robert Gordon, Chairman* Scotland County	Alan D. Briggs Wake County
Thomas D. "Bud" Hunter Henderson County	George Richards Wake County	William Joslin Wake County
R. Michael Leonard Forsyth County	Jim Sponenberg Caldwell County	Henry L. Kitchen Richmond County
Elizabeth D. Taft, PhD Pitt County	Dewey W. Wells, Chairman* Avery County	Thomas W. Reese Catawba County

*In the calendar year 2003, Dewey Wells was Chairman of the board from December 2003 till August 2003. Robert Gordon became Chairman in August 2003.

Calendar Year 2003 Projects and Agencies

Grants are awarded for the purposes of acquiring lands that represent the state's ecological diversity to ensure their preservation and conservation for recreational, scientific, educational, cultural, and aesthetic purposes; for additions to the system of parks, state trails, aesthetic forests, wild and scenic rivers, fish and wildlife management areas; to develop a balanced State program of historic properties; and for other beneficial use and enjoyment of the public. Funds are also allocated to the Natural Heritage Program for natural area inventories and conservation and protection planning of natural areas. State agencies authorized to apply for grant awards are the Department of Environment and Natural Resources, the Wildlife Resources Commission, the Department of Cultural Resources, and the Department of Agriculture and Consumer Services. Priority consideration is given to protection of land having outstanding natural or cultural heritage values. Land with outstanding natural heritage values is land that is identified by the N.C. Natural Heritage Program as having state or national significance. Land with outstanding cultural heritage values is land that is identified, inventoried or evaluated by the Department of Cultural Resources.

During calendar year 2003, the Natural Heritage Trust Fund awarded 25 grants totaling $13,422,487 which contributed to the protection of 26,837 acres.

Calendar Year 2003
NHTF Awarded Grant Totals by Agency

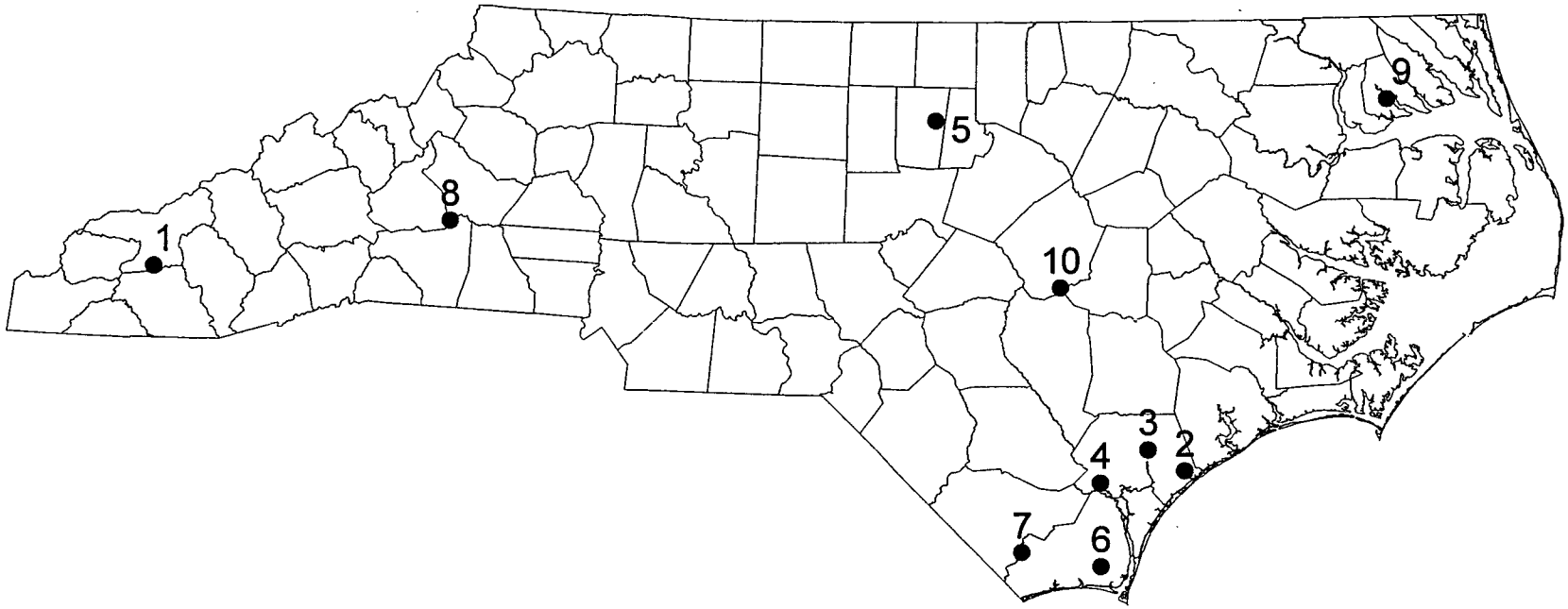
Agency	Acres	Grant Total
Department of Environment and Natural Resources - *Division of Forest Resources*	4,850	$450,000
Department of Environment and Natural Resources - Conservation and Community Affairs - *Natural Heritage Program*	N/A	$184,765
Department of Environment and Natural Resources - *Division of Parks and Recreation*	341	$2,659,000
Wildlife Resources Commission	18,833	$6,753,957
Department of Agriculture and Consumer Services	1,982	$2,095,478
Department of Cultural Resources	831	$1,279,287
Total	**26,837**	**$13,422,487**

Natural Heritage Trust Fund
Spring 2003 Grant Awards

DOA- Department of Agriculture and Consumer Services
DCR- Department of Cultural Resources
DPR- Division of Parks and Recreation
NHP- Natural Heritage Program
WRC- Wildlife Resources Commission

AGENCY	PROJECT NAME	COUNTY	ACRES	AWARD	DESCRIPTION
DOA	Boiling Spring Lakes Preserve Additions	Brunswick	1,779	$1,000,000	Land part of the nationally significant Boiling Spring Lakes Wetland Complex Natural Area.
DCR	Newbold-White House Historical & Natural Heritage Site	Perquimans	89	$236,000	Protect land surrounding Newbold-White House; oldest brick house in NC.
DCR	Bentonville Preservation Project	Johnston	313	$414,317	Protect historically significant land associated with the 1865 Battle of Bentonville.
DENR-DPR	Eno River State Park -Eno Wilderness	Orange	143	$1,208,000	Adjacent to Eno River State Park. Contribute to the protection of water quality and identified Significant Natural Heritage Area.
DENR-NHP	Inventory of Federally Listed and Candidate Aquatic Species	N/A	N/A	$34,765	Inventory of high priority populations of federally listed and candidate aquatic species.
WRC	Needmore Tract	Macon and Swain	4,458	$1,500,000	Protect critical wildlife and aquatic habitats along portions of the Little Tennessee River.
WRC	Atkinson Tract	Pender	232	$242,000	Bordered by the Holly Shelter Game Land. Contains Pine Scrub Oak Sandhill Community and pocosin habitat.
WRC	Bollinger Gap Tract	Burke	78	$180,000	Land adjacent to South Mountains Game Land. Protection will provide recreational opportunities and will benefit wildlife habitat.
WRC	Waccamaw River/Juniper Creek Tracts	Brunswick and Columbus	2,530	$280,365	Land within the Waccamaw River Megasite and the Middle Waccamaw River Macrosite. Protect critical plant and animal habitat.
WRC	Pender 4 Tract	Pender	796	$168,342	Addition to the Holly Shelter Game Land. Within the Nationally Significant Northeast Cape Fear River Floodplain State Natural Area.
WRC	Pridgen Tract	Pender	813	$251,000	Land is within the Nationally Significant Black River Floodplain Macrosite. Contains upland pine and wetland natural communities.
		TOTAL	**11,231**	**$5,514,789**	

NC Natural Heritage Trust Fund
Grant Awards, Spring 2003
Project Locations



1 WRC Needmore Tract (Macon & Swain)
2 WRC Atkinson Tract (Pender)
3 WRC Pender 4 Tract (Pender)
4 WRC Pridgen Tract (Pender)
5 DPR Eno Wilderness -Eno River (Orange)
6 DOA Boiling Springs Addition (Brunswick)
7 WRC Waccamaw River/Juniper Creek Tract (Brunswick & Columbus)
8 WRC Bollinger Gap Tract (Burke)
9 DCR Newbold-White House (Perquimans)
10 DC Bentonville Preservation Project (Johnston)

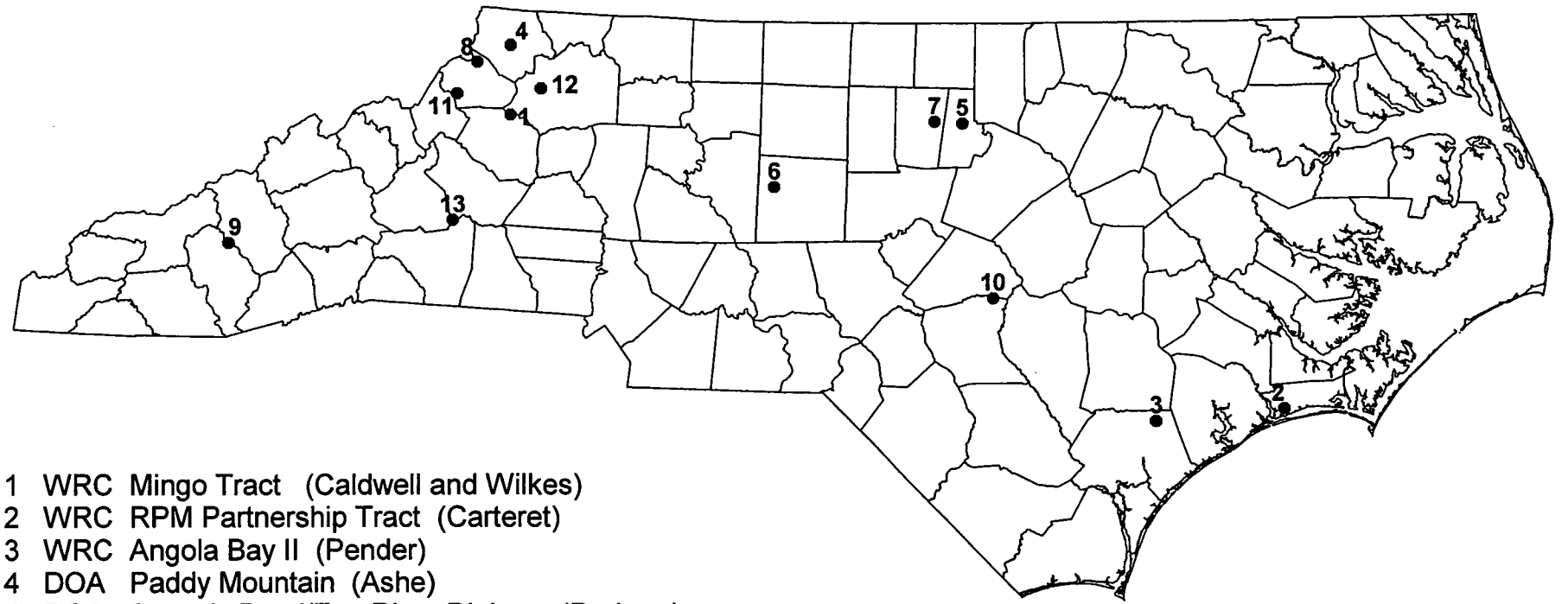
Natural Heritage Trust Fund
Fall 2003 Grant Awards

DENR- Department of Environment and Natural Resources
DFR- Division of Forest Resources
DPR- Division of Parks and Recreation
NHP- Natural Heritage Program
DOA- Department of Agriculture and Consumer Services
DCR- Department of Cultural Resources
WRC- Wildlife Resources Commission

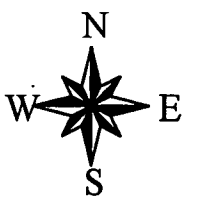
AGENCY	PROJECT NAME	COUNTY	ACRES	AWARD	DESCRIPTION
DFR	Balsam Gap Blue Ridge Parkway Buffer	Jackson and Haywood	4,670	$300,000	Protection of scenic water sources, watershed, and fish and wildlife habitat. Adjacent to 10 miles of the Blue Ridge Parkway.
DFR	Whittington Acquisition at Rendezvous Educational State Forest	Wilkes	180	$150,000	Addition to Rendezvous Educational State Forest.
DPR	Eno River State Park-Eno Wilderness and Poplar Ridge	Orange	111	$1,073,000	Adjacent to Eno River State Park. Contribute to the protection of water quality and identified Significant Natural Heritage Area.
DPR	Elk Knob State Natural Area Land Acquisition-III	Watauga	87	$378,000	Part of the amphibolite mountain complex. Protection of several natural communities and rare species.
NHP	Continuation of County and Protection focused Natural Areas Inventories	N/A	N/A	$150,000	Completion of the county-wide or protections focused inventory of natural areas.
DOA	Paddy Mountain	Ashe	35	$400,000	Excellent quality high elevation rocky summit communities, rare plants.
DOA	Penny's Bend/Eno River Diabase Sill	Durham	111	$500,000	Protection of federally endangered plant species, Smooth Coneflower and other rare plant species.
DOA	Caraway Mountain	Randolph	57	$195,478	Adjacent to the Caraway Creek Corridor macrosite. Protection of federally endangered Schweinitz's Sunflower and other rare species.
DCR	Averasboro Preservation Project	Cumberland and Harnett	356	$507,420	Protect historically significant land associated with the 1865 Battle of Averasboro.
DCR	Valle Crucis Conference Center Agricultural Conservation Easement	Watauga	73	$121,550	Protect part of the historically and culturally significant Valle Crucis Conference Center. Protect watershed.
WRC	RPM Partnership Tract	Carteret	114	$719,250	Protection of longleaf pine, streamhead pocosins and freshwater marsh habitats as part of Game Land Program.

AGENCY	PROJECT NAME	COUNTY	ACRES	AWARD	DESCRIPTION
WRC	Lone Mountain	Rutherford and McDowell	1,265	$913,000	Adjacent to South Mountains Game Land. Will be managed as part of the Game Land Program and will help insure ecosystem integrity of this area.
WRC	Angola Bay Phase II Tract	Pender	2,926	$1,500,000	Contribute towards linking Angola Bay Game Land to Holly Shelter Game Land, contains extensive pocosin and pond pine woodland and longleaf communities.
WRC	Mingo Tract	Caldwell and Wilkes	5,621	$1,000,000	Managed as part of the Game Land Program to enhance wildlife habitat and provide recreational opportunities.
		TOTAL	**15,606**	**$7,907,698**	

NC Natural Heritage Trust Fund
Grant Awards, Fall 2003 Awards
Project Locations



1 WRC Mingo Tract (Caldwell and Wilkes)
2 WRC RPM Partnership Tract (Carteret)
3 WRC Angola Bay II (Pender)
4 DOA Paddy Mountain (Ashe)
5 DOA Penny's Bend/Eno River Diabase (Durham)
6 DOA Caraway Mountain (Randolph)
7 DPR Eno Wilderness and Poplar Ridge (Orange)
8 DPR Elk Knob Acquisition III (Watauga)
9 DFR Balsam Gap (Jackson & Haywood)
10 DCR Averasboro Project (Cumberland & Harnett)
11 DCR Valle Crucis Easement (Watauga)
12 DFR Whittington at Rendezvouis Mountain ESF (Wilkes)
13 WRC Lone Mountain Tract (Rutherford & McDowell)



Total Projects and Agencies

In the seventeen years of operating, the Natural Heritage Trust Fund has awarded 289 grants totaling $110,631,146 which contributed to the protection of 205,092 acres. The amount requested was $233,695,657 showing that the need far exceeds the received amount.

NHTF Total Awarded Grants by Agency

Agency	Acres	Grant Total
Department of Agriculture and Consumer Services	19,477	$12,564,534
Department of Cultural Resources	1,540	$5,189,037
Department of Environment and Natural Resources	61,194	$48,742,828
Wildlife Resources Commission	122,881	$44,134,747
Total	**205,092**	**110,631,146**

FINANCIAL STATUS
INCOME-AWARDS
(CHRONOLOGICAL YEAR)

Year	Amt Income	Amt Returned*	Amt Requested	Amt Awarded
1987	$275,000.00	$0	$0	$0
1988	$31,091.49	$0	$494,000	$270,000
1989	$201,439.80	$0	$1,383,000	$136,500
1990	$1,888,704.03	$21,892	$2,121,892	$946,792
1991	$2,343,142.38	$221,068	$6,542,385	$2,769,180
1992	$3,720,582.06	$1,157,400	$7,355,700	$4,013,425
1993	$4,505,854.15	$210,084	$7,688,259	$4,569,259
1994	$4,252,960.72	$30,302	$13,940,282	$5,389,291
1995	$5,136,146.30	$48,000	$14,404,433	$6,122,199
1996	$6,117,723.01	$9,670	$17,872,718	$4,639,473
1997	$9,073,773.08	$684,111	$17,058,459	$8,387,003
1998	$10,459,690.77	$2,153,819	$12,702,410	$11,554,810
1999	$12,164,731.49	$1,470,910	$23,973,006	$13,752,006
2000	$12,995,540.27	$1,085,982	$22,842,003	$13,499,293
2001	$12,124,483.72	$516,099	$23,253,591	$11,471,188
2002	$12,689,018.84	$263,337	$24,520,903	$9,688,240
2003	$16,906,511.00	$0	$37,542,616	$13,422,487
Totals	**$114,886,393.11**	**$7,965,124**	**$233,695,657**	**$110,631,146**

Total Actually Awarded = $102,666,022
(Amt Awarded - Amt Returned)

*Funds are returned to the NHTF when a project could not be completed or was completed for less than the amount awarded. *Returned funds are reflected in this table in the year awarded, rather than in the year returned.*

Report prepared by: Jennifer Dennis
NC Natural Heritage Trust Fund
MSC 1601
Raleigh, NC 27699-1601

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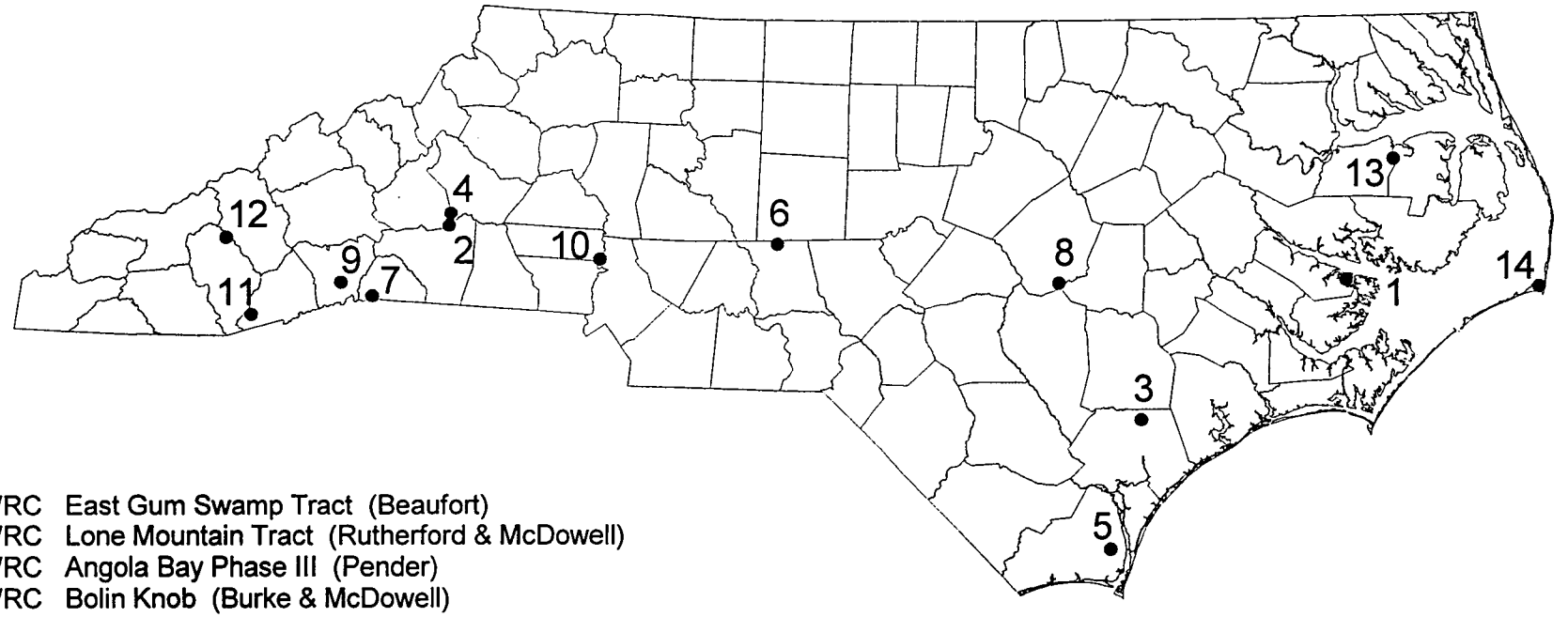
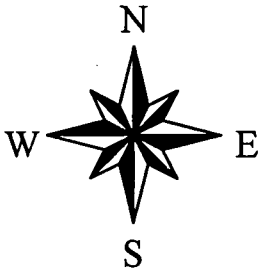
(Fax) 919-715-3085

Fewer than fifty copies of this annual report were printed at $0.04 per page.

NC Natural Heritage Trust Fund
Grant Awards, Spring 2004
Project Locations



1 WRC East Gum Swamp Tract (Beaufort)
2 WRC Lone Mountain Tract (Rutherford & McDowell)
3 WRC Angola Bay Phase III (Pender)
4 WRC Bolin Knob (Burke & McDowell)
5 DOA Hog Branch Ponds, Boiling Spring Lakes Addition (Brunswick)
6 DOA Long Mountain, Barnes Creek/Poison Fork Preserve (Montgomery)
7 DOA Melrose Mountain (Polk)
8 DCR Bentonville Preservation Project (Johnston)
9 DCR Carl Sandburg Home, Glassy Mountain Tract (Henderson)
10 DFR Mountain Island ESF (Lincoln)
11 DPR Gorges State Park Phase II (Transylvania)
12 DFR Balsam Gap Blue Ridge Parkway Buffer (Jackson & Haywood)
13 DPR Pettigrew State Park-Scuppernong River (Washington & Tyrell)
14 DCM Buxton Woods Coastal Reserve-Ann Jennette Tract II (Dare)



Spring 2004
Natural Heritage Trust Fund Grant Award Summary

AGENCY	GRANT NAME	COUNTY	REQUEST	ACRES	DESCRIPTION
WRC	East Gum Swamp Tract	Beaufort	$204,600	261	Tract will be incorporated into the Goose Creek Game Land. Protects wetlands and watersheds that contribute to water quality in the lower Pamlico River Estuary.
WRC	Lone Mountain Tract	Rutherford and McDowell	$565,750	1,265	Adjacent to South Mountains Game Land. Will be managed as part of the Game Land Program and will help insure ecosystem integrity of this area.
WRC	Bolin Knob	Burke and McDowell	$356,000	468	Tract borders South Mountains Game Land and is part of the total management project being carried out in this area.
WRC	Angola Bay Phase III Tract	Pender	$500,000	1,307	Contributes toward linking Angola Bay Game Land to Holly Shelter Game Land, contains extensive pocosin and pond pine woodland and longleaf communities.
Agriculture	Hog Branch Ponds, An Addition to Boiling Spring Lakes Preserve	Brunswick	$1,100,000	516	Addition to the Boiling Spring Lakes Wetland Complex. Tract contains ten large and small lime sinks, which are a rare landform. Acquisition will allow for safe and effective fire management.
Agriculture	Melrose Mountain	Polk	$316,000	318	Protection of five large populations of the federally endangered White Irisette and other rare species.
Agriculture	Long Mountain, Barnes Creek/Poison Fork Preserve	Montgomery	$125,000	78	Addition to the Barnes Creek/Poison Fork Preserve which borders the Uwharrie National Forest. Acquisition will restore upland habitat for rare plant species and will preserve riparian buffer for rare acquatic species.
Cultural Resources	Bentonville Preservation Project	Johnston	$473,000	100	Protects historically significant land associated with the 1865 Battle of Bentonville.
Cultural Resour	Carl Sandburg Home National Historic Site Buffer (Glassy Mountain Tract)	Henderson	$400,000	22	Tract adjoins and forms much of the scenic backdrop to the Carl Sandburg National Historic Home Site. Tract also contains a globally rare granite dome plant community.
DENR-Natural Heritage	Inventory of Aquatic Significant Natural Areas	N/A	$138,000	N/A	Identification, inventory and documentation of Aquatic Significant Natural Heritage Areas.
DENR-Forest Resources	Land Acquisition at Mountain Island Educational State Forest	Lincoln	$531,000	103	Land adjacent to Mountain Island Educational State Forest. Expansion of environmental educational outreach
DENR Forest Resources	Balsam Gap Blue Ridge Parkway Buffer	Jackson and Haywood	$1,000,000	285	Protection of scenic water sources, watershed, and fish and wildlife habitat. Adjacent to 10 miles of the Blue Ridge Parkway.
DENR-Parks & Recreation	Gorges State Park Land Acquisition-Phase II (Collins Tract)	Transylvania	$295,000	80	Addition to Gorges State Park. Acquisition would aid in preserving two identified Significant Natural Heritage Areas and a rare temperate rainforest ecosystem.
DENR-Parks & Recreation	Pettigrew State Park - Scuppernong River Land Acquisition	Washington and Tyrell	$550,000	570	Addition to Pettigrew State Park. The tracts will help connect existing tracts already in conservation ownership. Tract contains Peatland Atlantic White Cedar and Riverine Swamp Forest natural communitites.
DENR-Coastal Management	Buxton Woods Coastal Reserve-Ann Jennette Tract II	Dare County	$51,050	3	Tract will be incorporated into Buxton Woods, the largest maritime forest in the state.
	Total Awards		**$6,605,400.00**	**5,376**	
	Amount requested		**$13,333,460.00**	**15,048**	

CONSERVATION EASEMENT PROGRAM
ANNUAL REPORT
2003

Pursuant to NC G.S. 113A-235(c), the Department of Environment and Natural Resources reports to the Environmental Review Commission each year on the implementation of Article 16, the Conservation Easement Program. This Article, 113A-230 through 113A-235, also includes enabling legislation for a program for conservation tax credit promotion/education, and enabling legislation for a conservation grant fund. The following reports on these programs.

Conservation Easement Program 113A-230. Having been established in 1997, this program is administered as part of the NC Conservation Tax Credit Program (NCCTC). The Conservation Easement (CE) program is intended to use promotion and education to increase the use of conservation easements as a tool to accomplish conservation goals, such as the Million Acre Initiative. A graph (Attachment A) of NCCTC Program Statistics shows the increasing use of conservation easements through this program, due primarily to the growing acceptance of CEs within the farming and forestry communities. Also an inventory (Attachment B) of the conservation easements held by the Department shows use of this conservation tool by programs such as State Parks, Wetlands Restoration, Conservation Reserve Enhancement, Coastal Reserves, Forest Legacy, and Clean Water.

To accomplish optimum use of conservation easements and their related economic advantages, the program needs to provide more than superficial information and guidance. While a more substantial and in-depth outreach program could greatly increase the use of conservation easements, it will also require more attention to the complexities of conservation easement drafting and stewardship. By combining the CE Program with the NCCTC Program, the Department has maintained a limited CE Program in the absence of staff or line item operating budget.

Conservation Tax Credit Program 113A-231. The State's Conservation Tax Credit was established in 1983 and this Department's role was passive, to respond to donor's applications for certification of their gifts of interests in real property for conservation purposes. In 1997 the Department received the authorization to begin a non-regulatory program of education/promotion to increase the use of conservation tax credits. Last year NCCTC/CE presentations were made at three workshops organized by other groups for landowners and land related professionals, and the NCCTC display and brochures were sent to three other workshops or conferences.

Graphs (Attachments C,D,E,F) of the NCCTC Program Statistics show the acreage and value of donations over the duration of the program. Cumulatively, more than 109,000 acres valued in excess of $305 million has been donated.

Over the duration of Conservation Tax Credit use, it has leveraged the donation of $87.7 million of excess value that was above the amount that could be used to create the maximum credit allowed (Attachments G, H, I, J).

Further, when used in conjunction with bargain sales, the conservation Tax Credit (Attachments K, L) can yield substantial savings for conservation trust funds, local governments, and nonprofit organizations purchasing land. For example, in 1998 & 1999 alone, the gift portion of bargain sales to the State that qualified for the Conservation Tax Credit allowed the acquisition of conservation lands by the state at a price $23 million below appraised market value. Over the duration of the program, all grantees have saved more than 48.1 million through bargain sales facilitated by the tax credit incentive.

The increasing benefits from the Conservation Tax Credit Program have been derived mostly from increases in the maximum tax credit allowed. A more substantial and in depth outreach program could greatly increase donations of real property for conservation purposes from the use of conservation tax credits. To date the Department has provided minimum support for this function while the Conservation Tax Credit Program has operated in a limited fashion in the absence of permanent, full time staff or line item operating budget.

Conservation Grant Fund 113A-232. Established in 1997, it was intended to stimulate the use of conservation easements, to improve the capacity of private nonprofit land trusts and agencies to successfully accomplish conservation projects, to better equip real estate related professionals to pursue opportunities for conservation, to increase private landowner participation in land and water conservation, and to provide an opportunity to leverage private or other public monies for the stewardship of conservation easements. To date the Department has not received an appropriation to actualize the Conservation Grant Fund.

Results from 2003 Legislative Session. HB 887, An Act To Expand The Income Tax Credit For Real Property Donations For Conservation Purposes And To Provide For More Detailed Reporting By The Department of Revenue Regarding The Credit, was introduced and carried over to the Short Session. It incorporates the following two recommendations from last year's report to the ERC, and its ratification will further enhance the incentives for the conservation of interest in real property in North Carolina.

(1) **Index Credit Cap.** Since its establishment in 1983, the maximum credit allowed (credit cap) for the NCCTC has been raised three times (1989, 1997, and 1999). Further requests for increases are inevitable as increasing property values decrease the incentive provided by the NCCTC. These dynamics can be addressed by indexing the credit cap. The incentive to donate would then be stabilized relative to land value, and repetitive legislated increases would be

avoided. As proposed, an increase equal to 75% of the Consumer Price Index (CPI) would be calculated from the last year of credit cap increase, with the cap increasing incrementally in the year following a cumulative increase of $25,000 for individuals and $50,000 for corporations. If enacted, it should be several years before an indexed increase would occur.

(2) **NCCTC Refundability.** The NCCTC was created as an incentive for landowners to donate interests in real property for conservation purposes. While the concept has been very successful and has been emulated in other states, there is still a category of landowner that finds little incentive in the program. "Land-rich and cash-poor" landowners receive disproportionately low response from their conservation donation for a tax credit. Several states with more recent conservation tax credit programs have addressed this issue by authorizing "transferability" for their tax credits, but this involves a considerable administrative workload. The issue could be addressed more simply through "refundability". As proposed, a 50% refund would be authorized of any credit amount remaining unclaimed after the second year of carry forward (third year including the year of donation). In this way, land-rich and cash-poor landowners would have more incentive to donate interests in real property for conservation purposes. If enacted, it would be three years before any refunds were paid.

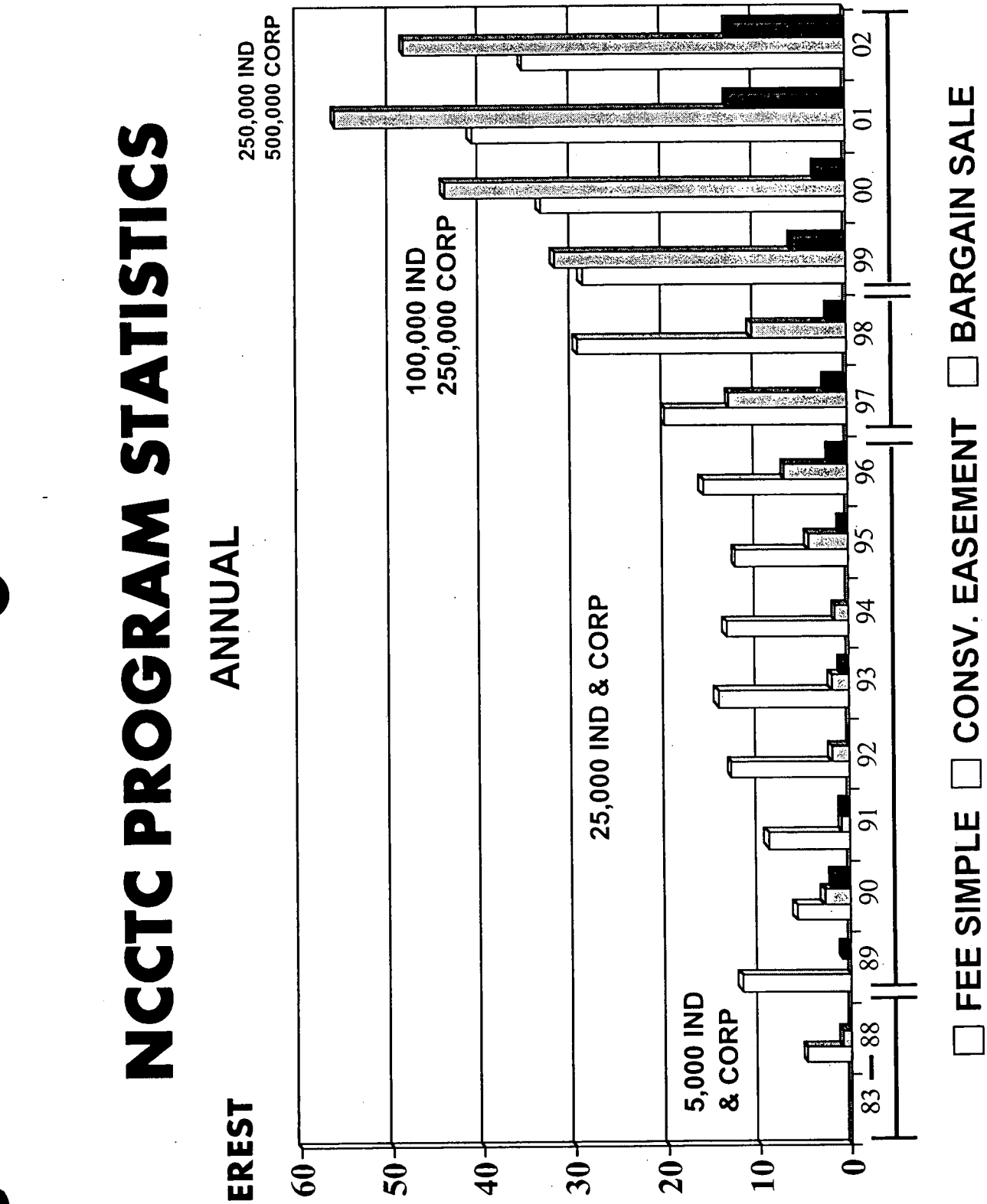
Recommendations for Substantive Legislation. Generally speaking, activities under Article 16 are being carried out as well as can be expected, given the limited resource commitment to these programs. The principal constraint on the promotional and educational opportunities envisioned by Article 16 is the absence of staff and operating budgets. Nevertheless, there are items that may be considered for substantive legislation to improve existing programs.

(1) **NCCTC For Partnerships (Pass Through Entities).** A recent 2001 amendment to Department of Revenue (DOR) statutes, governing the way all pass through entities may claim tax credits, deferred its effect on the NCCTC until 1/1/2005. At that time, partnerships and other pass through entities will be limited to a maximum allowed credit of $250,000 for donations under the NCCTC, regardless of the value of the donated interests in real property. This has the potential to be a significant disincentive on the scale of donations and gift portion of bargain sales. In response to this pending change, DENR has coordinated with the DOR to seek an approach to meeting mutual public needs. An amendment to NCCTC statutes to allow pass through entities to claim the same NCCTC ($500,000) as other corporations, with each pass through recipient limited too the maximum individual NCCTC ($250,000) or portion thereof, would address the pending loss of incentive to the NCCTC. The effective date of such amendment should be 1/1/2005.

(2) **Charitable Purpose Flexibility.** To be eligible for a NCCTC, the donated land must yield one or more of the required public conservation purposes. Nevertheless, minor parts of donated tracts may not contribute to the conservation purpose and may not be allowed to be converted to another purpose without conflict with the tax credit statues. While it would be inappropriate to allow wholesale or unsupervised conversion of conservation properties to other

uses, there may be justification to consider allowing small parts that do not contribution to conservation purposes to be converted to another charitable purpose under a specific process of checks and balances administered by the NCCTC Program.

NCCTC PROGRAM STATISTICS



Effective Date 8/15/03

ATTACHMENT B

CONSERVATION EASEMENTS HELD BY DENR

Clean Water Management Trust Fund

- Prior to 2003: One Hundred Eighteen easements on 15,420 acres.
- New in 2003: Thirty-seven easements on 2598 acres.

Division of Coastal Management

- Prior to 2003: Two easements on 8732 acres.
- New in 2003: None

Division of Forest Resources, Forest Legacy Program

- Prior to 2003: Two easements on 2357 acres.
- New in 2003: One easement on 326 acres.

Division of Parks and Recreation

- Prior to 2003: Sixteen easements on 44.3 acres.
- New in 2003: None

Division of Soil & Water Conservation. Conservation Reserve Enhancement Prog.

- Prior to 2003: Twenty-five easements on 2122 acres.
- New in 2003: Thirteen easements on 598 acres.

Division of Soil & Water Conservation. Hog Buyout Program.

- Prior to 2003: Three easements on 57 acres.
- New in 2003: One easement on 84 acres.

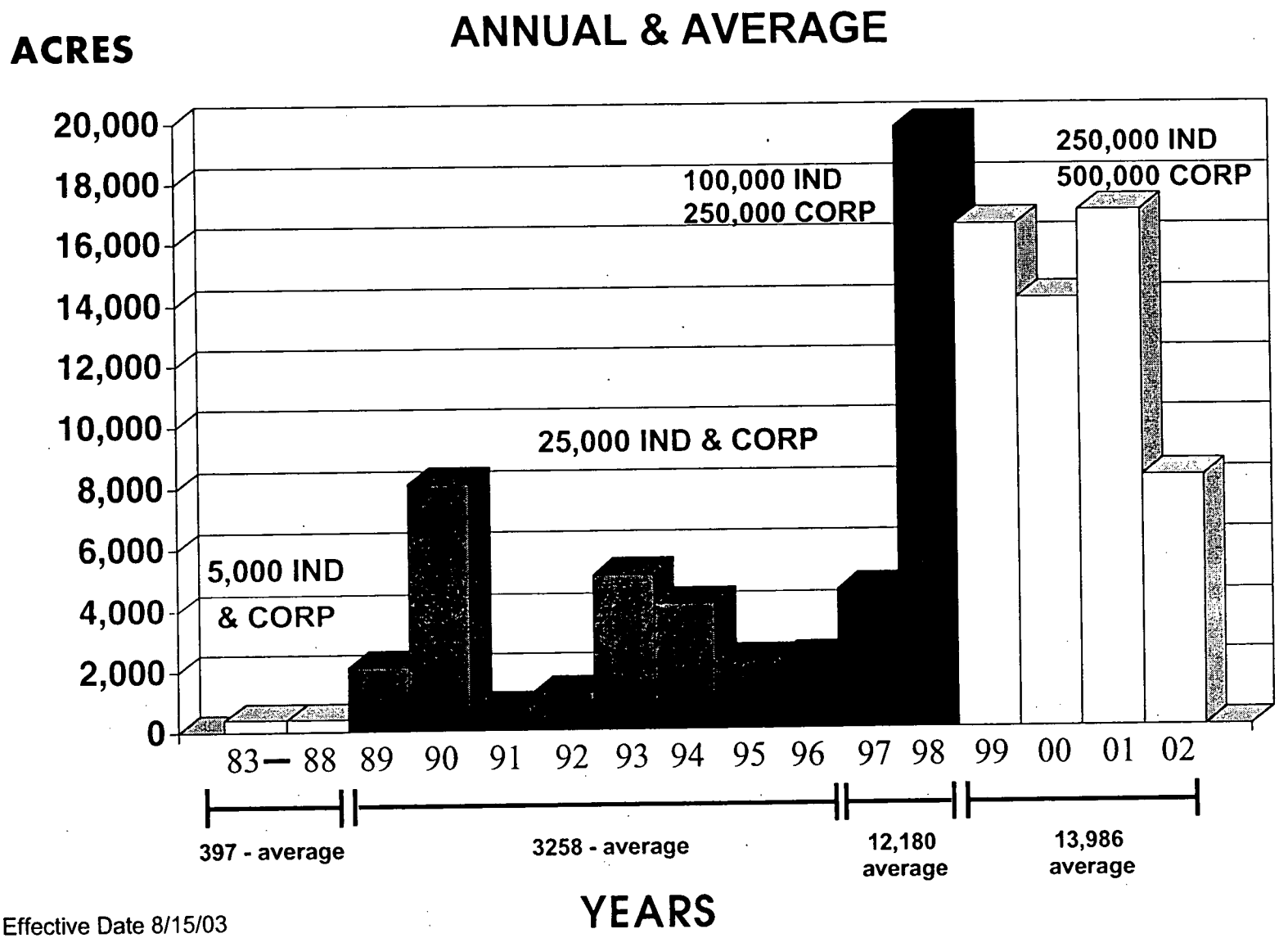
Division of Water Quality. Wetland Restoration Program

- Prior to 2003: Twenty-Six easements on 1228 acres.
- New in 2003: Thirty easements on 399 acres.

Ecosystem Enhancement Program

- Prior to 2003: EEP did not exist.
- New in 2003: Three easements on 6816 acres.

NCCTC PROGRAM STATISTICS

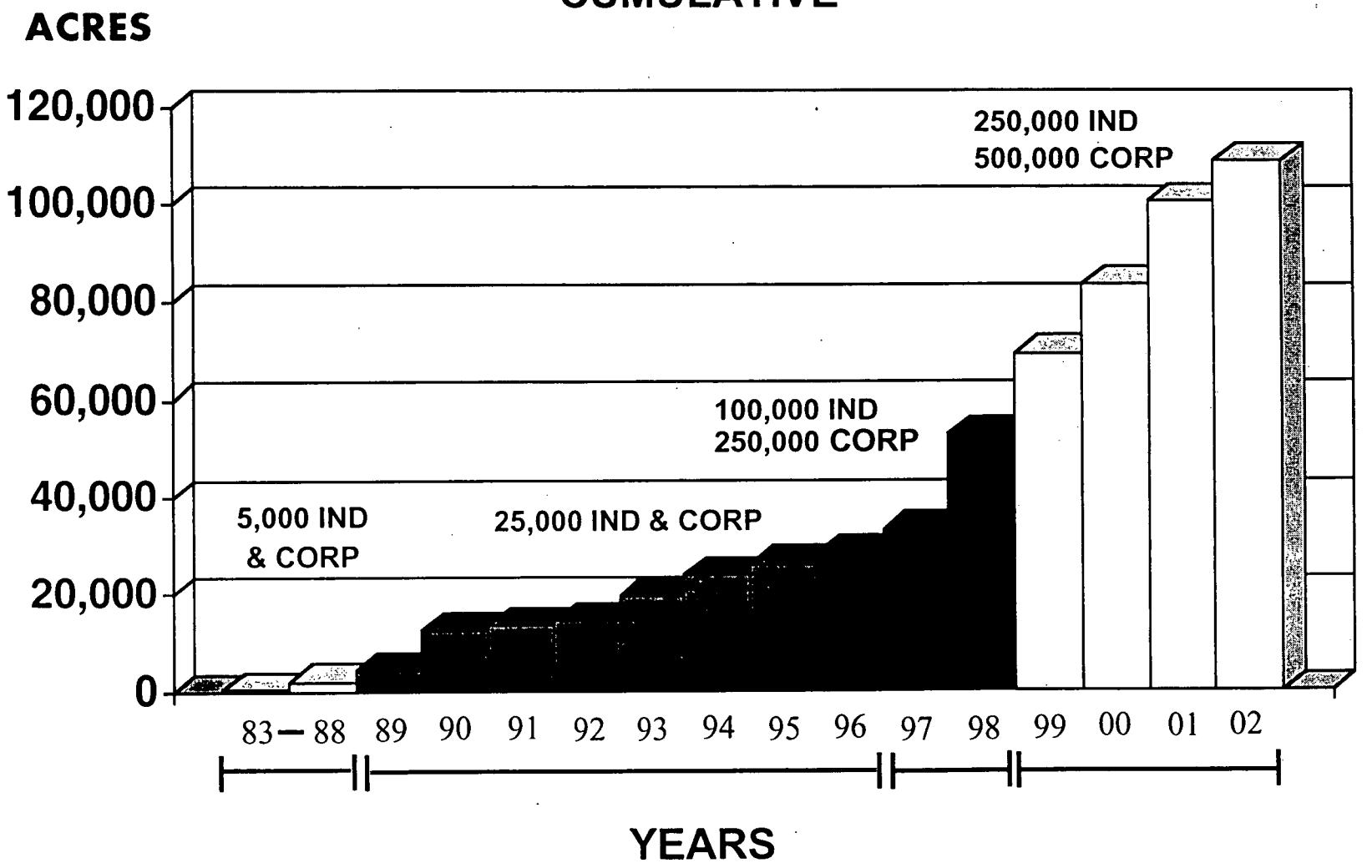


Effective Date 8/15/03

ATTACHMENT C

NCCTC PROGRAM STATISTICS

CUMULATIVE

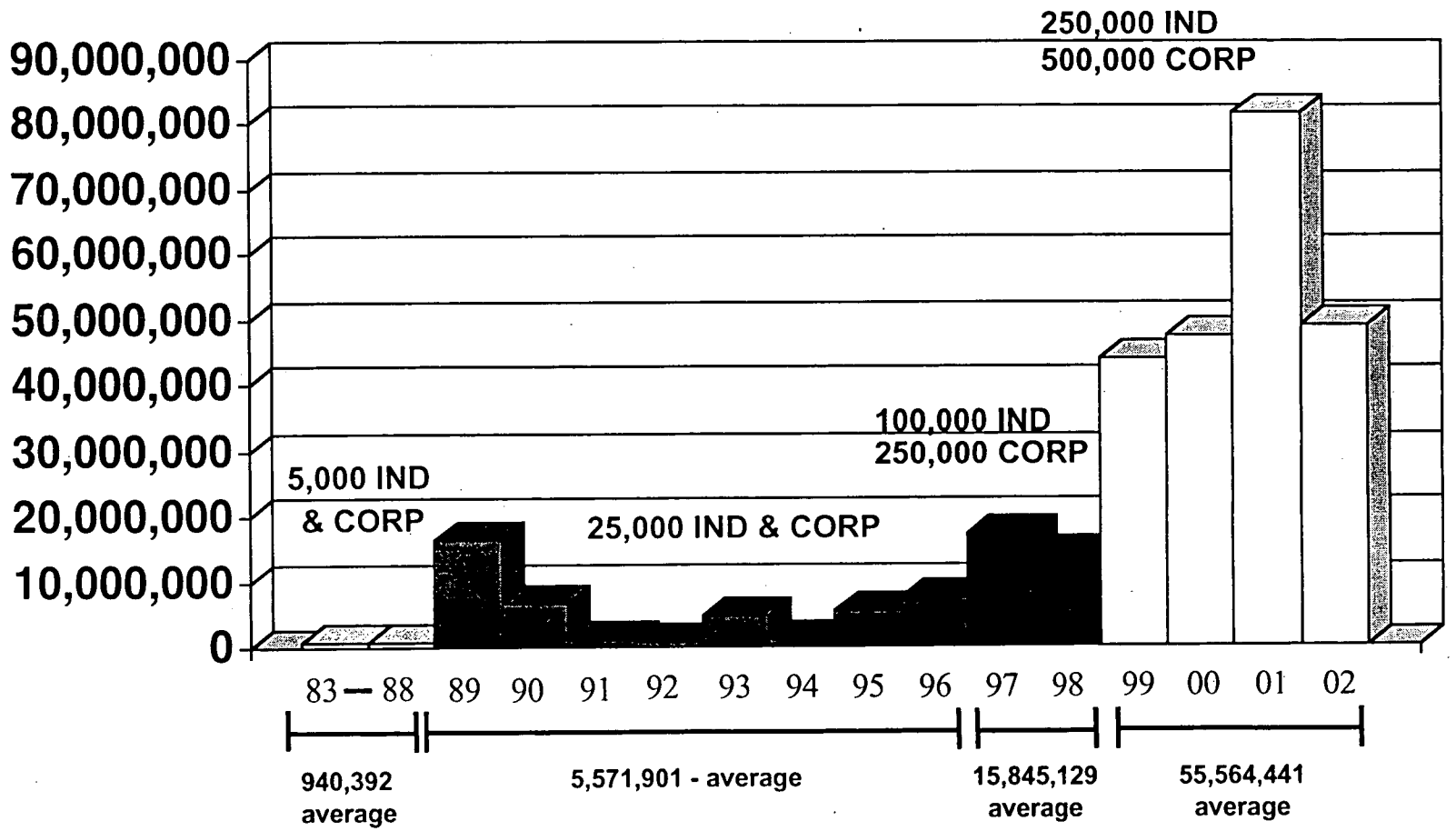


Effective Date 8/15/03

ATTACHMENT D

NCCTC PROGRAM STATISTICS

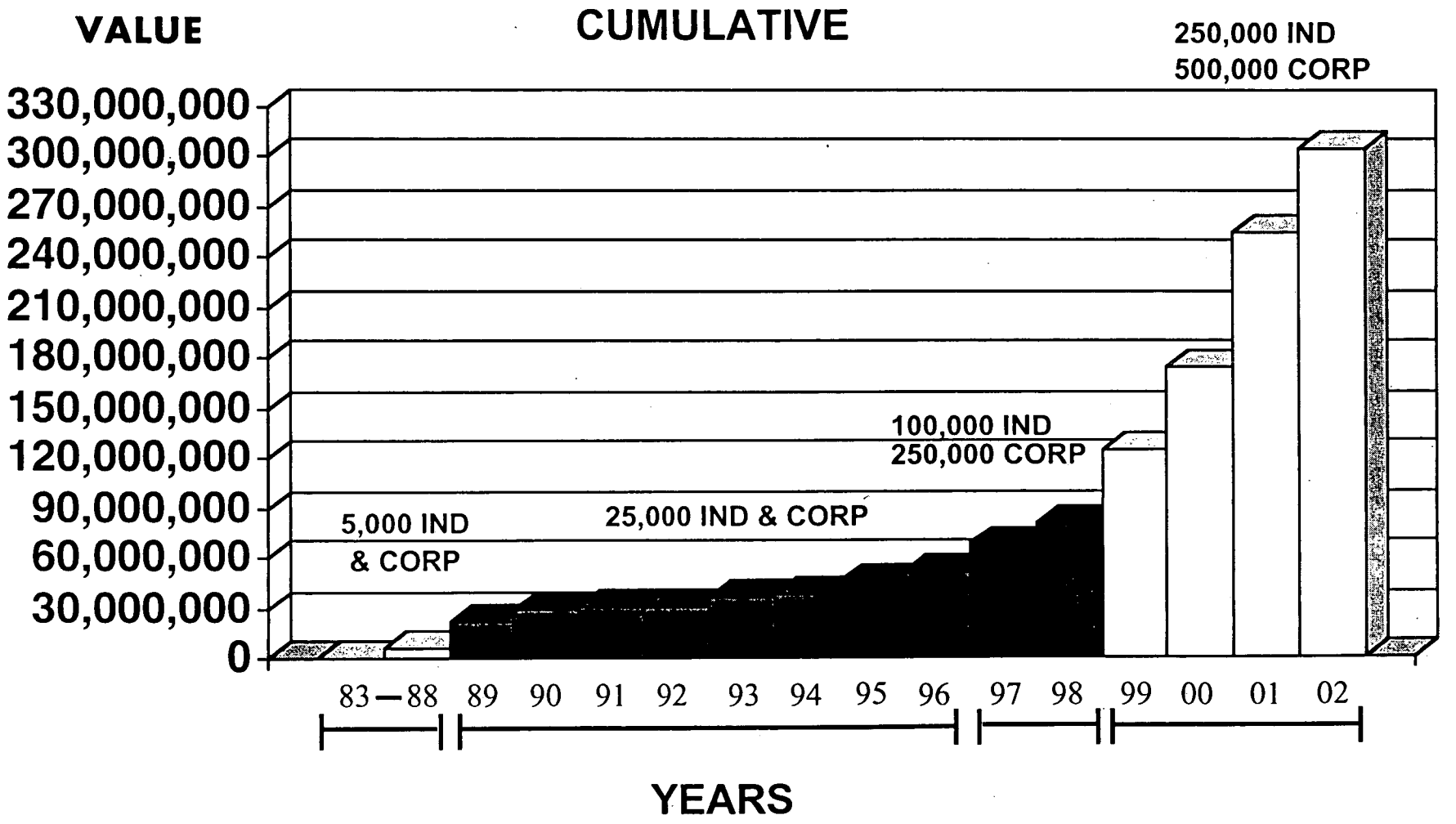
ANNUAL & AVERAGE



Effective Date 8/15/03

ATTACHMENT E

NCCTC PROGRAM STATISTICS



Effective Date 8/15/02

ATTACHMENT F

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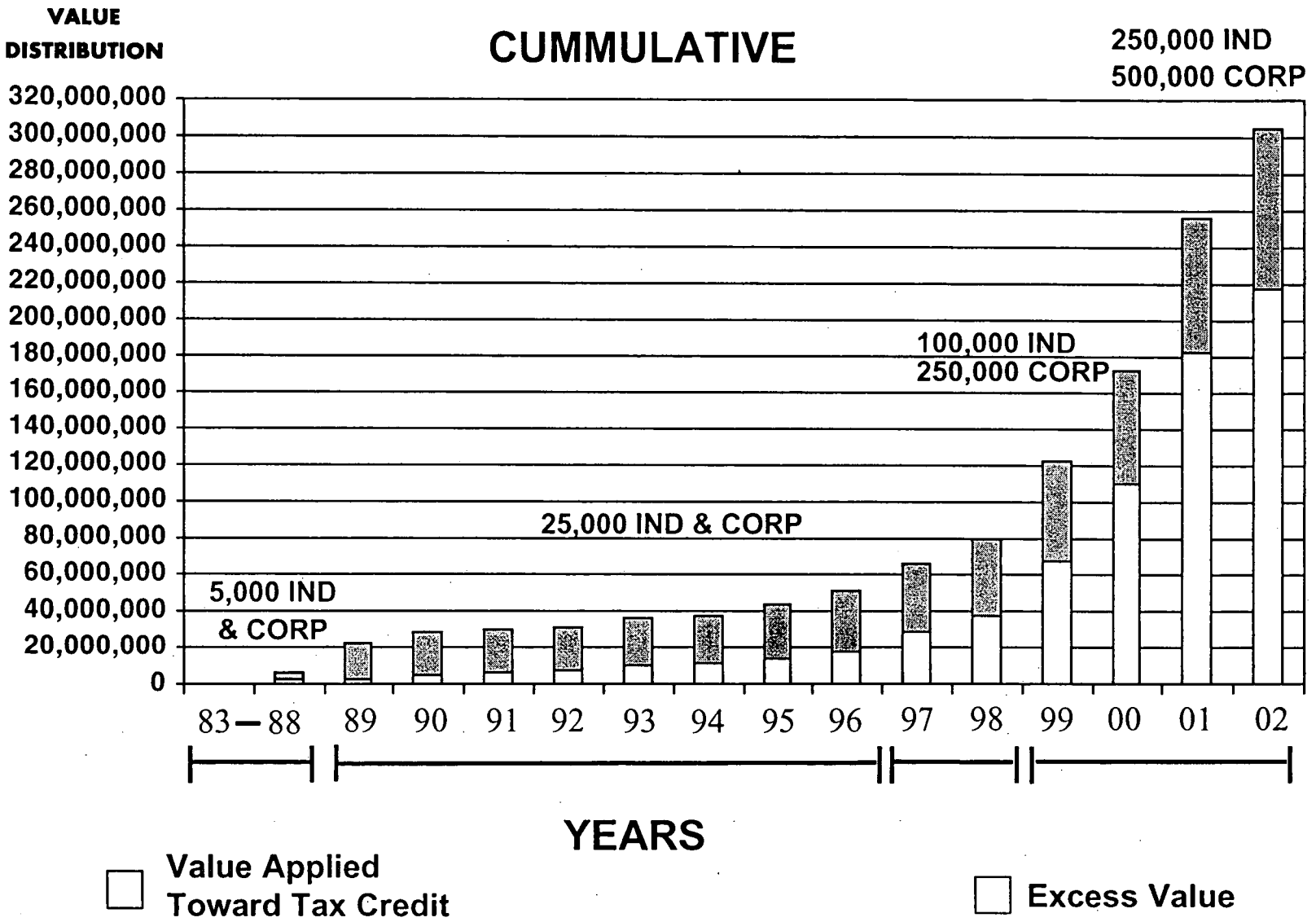
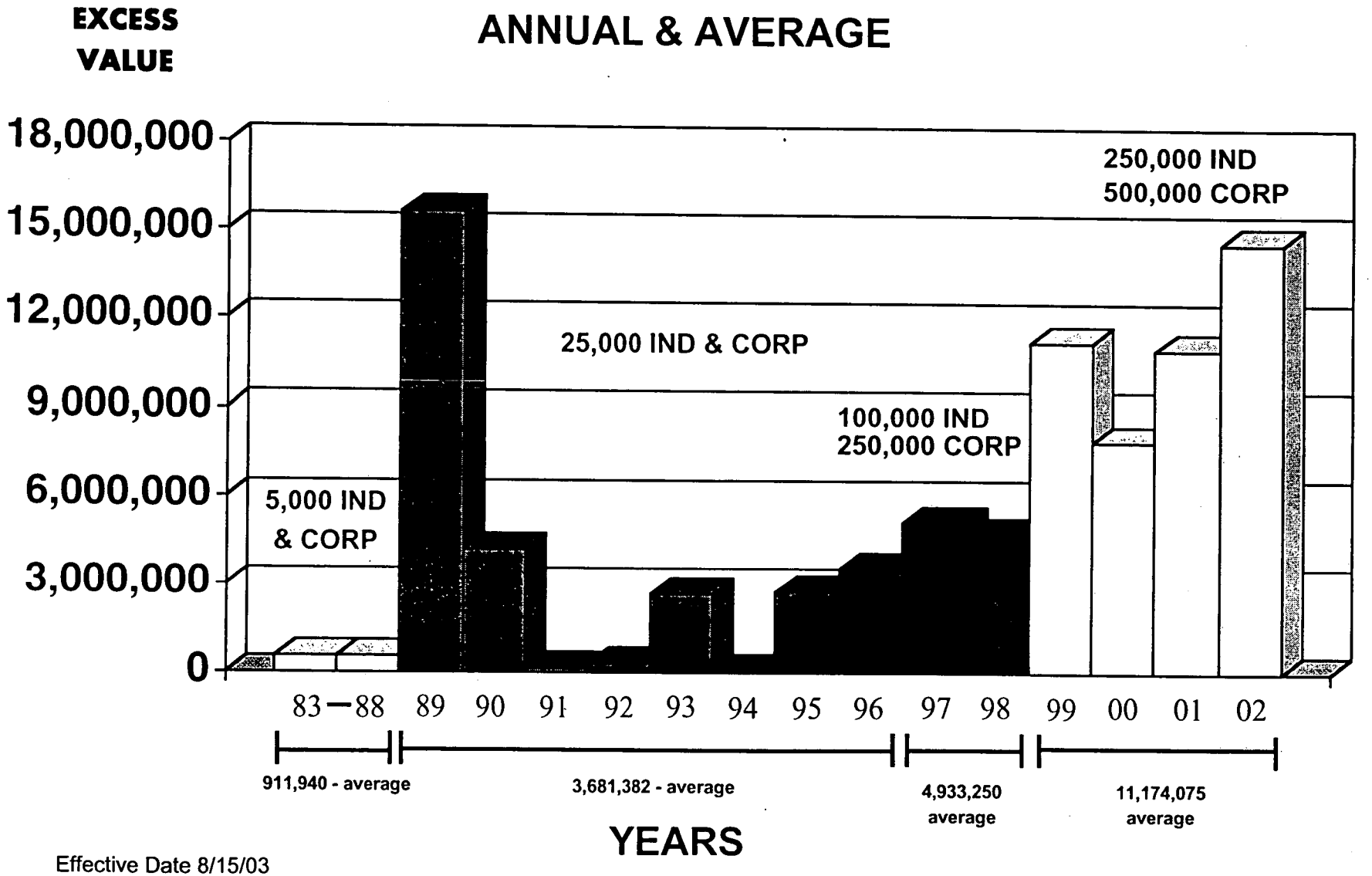


Effective Date 8/15/03

ATTACHMENT G

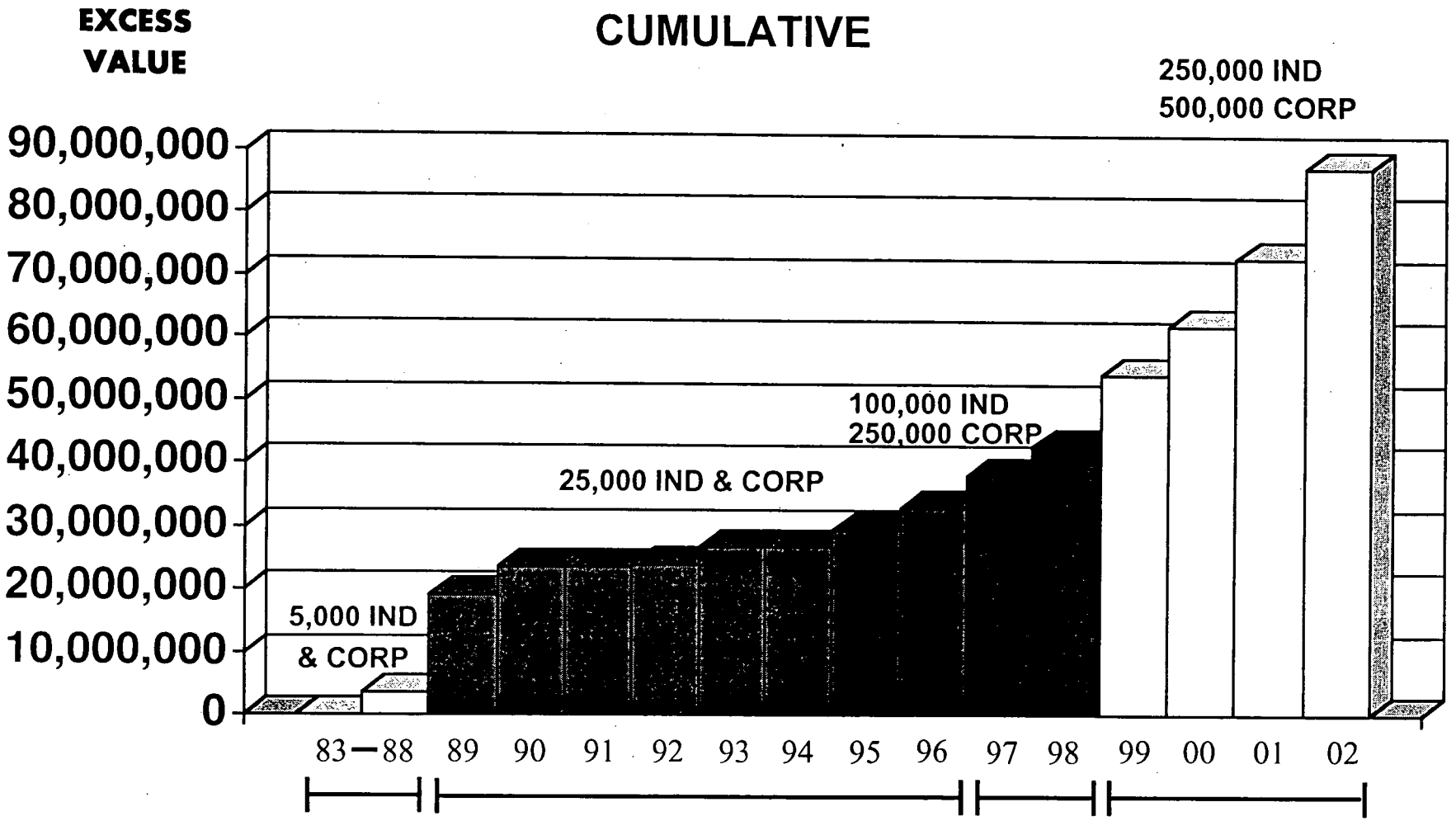
NCCTC PROGRAM STATISTICS



Effective Date 8/15/03

ATTACHMENT H

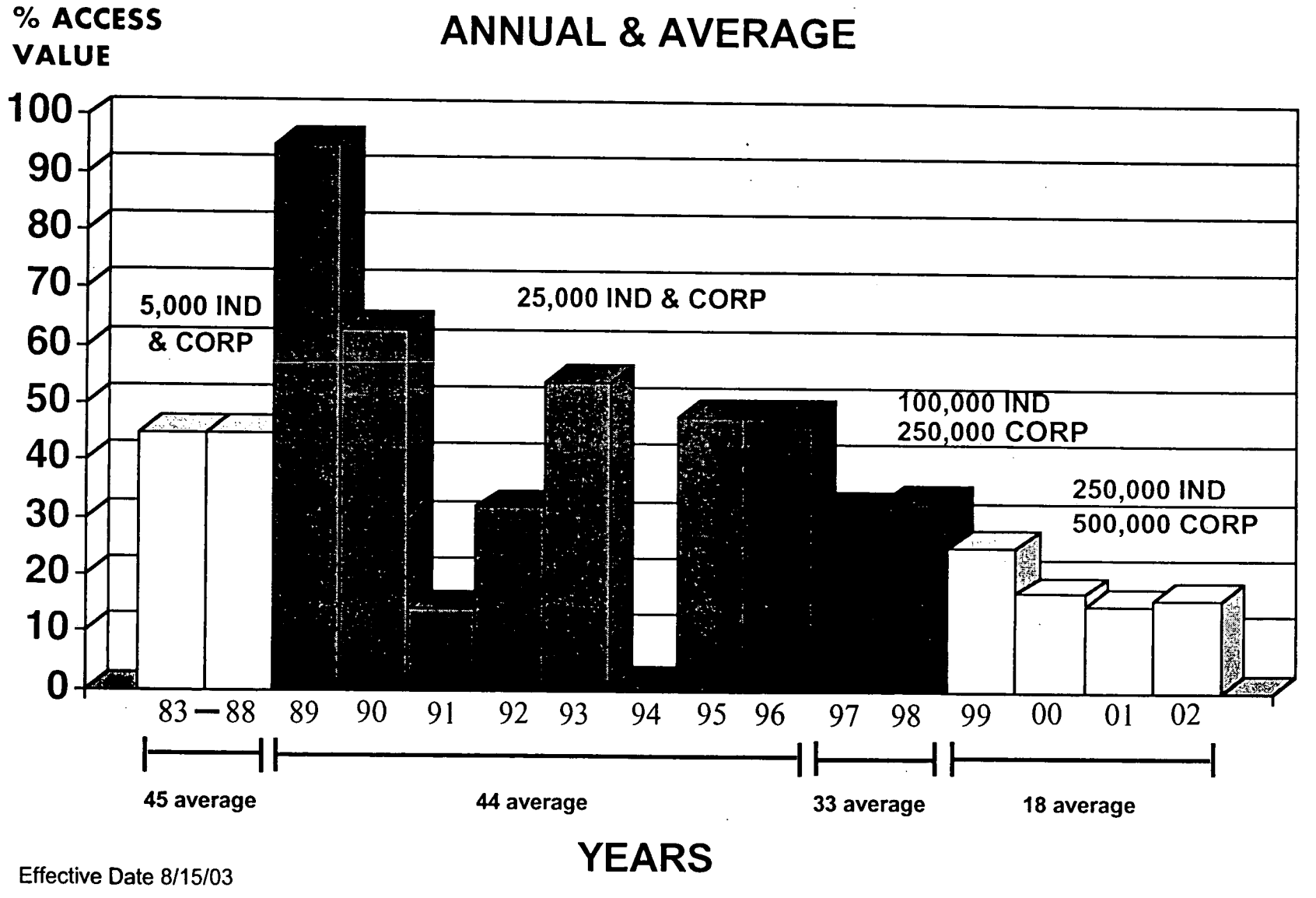
NCCTC PROGRAM STATISTICS



Effective Date 8/15/03

ATTACHMENT 1

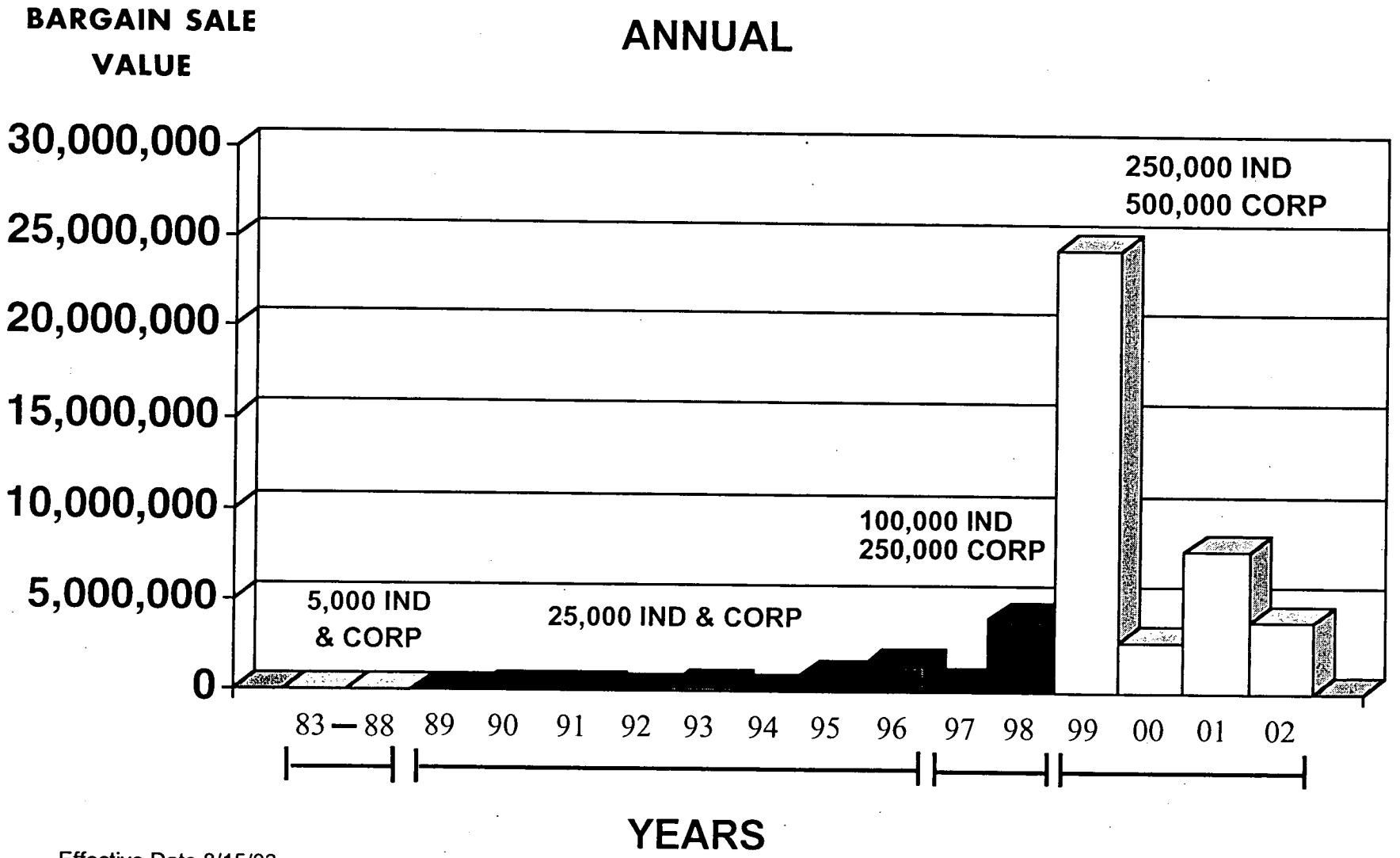
NCCTC PROGRAM STATISTICS



Effective Date 8/15/03

ATTACHMENT J

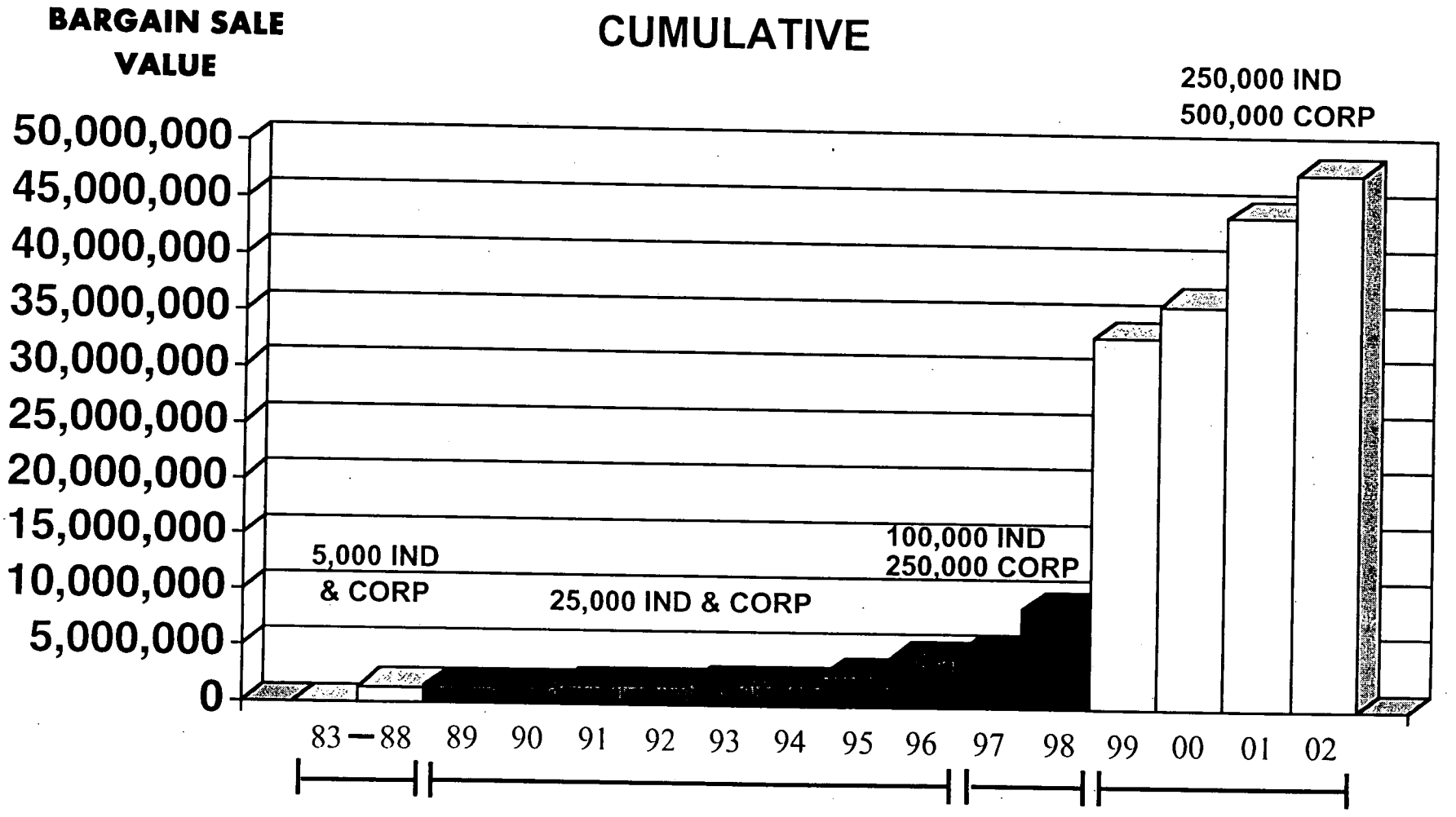
NCCTC PROGRAM STATISTICS



Effective Date 8/15/03

ATTACHMENT K

NCCTC PROGRAM STATISTICS



Effective Date 8/15/03

ATTACHMENT L

North Carolina Farmland Preservation Trust Fund

NC Department of Agriculture and Consumer Services

Environmental Review Commission

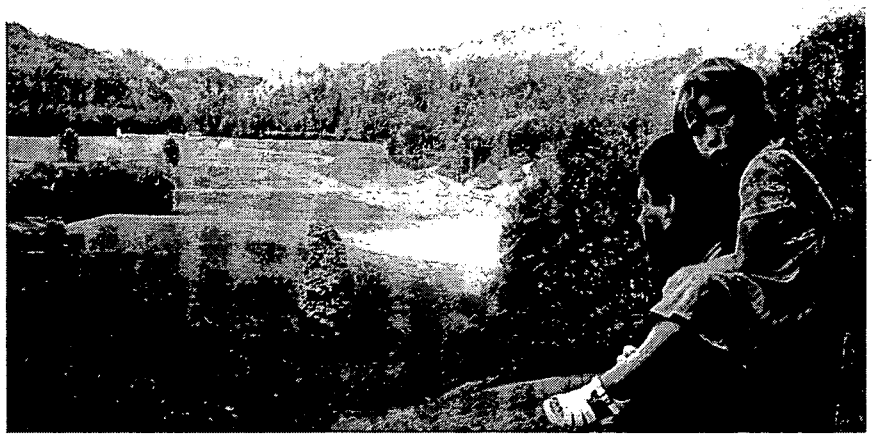
April 22, 2004

Presented by Edgar Miller

Conservation Trust for NC

April 22, 2004 ERC Meeting
EXHIBIT I

Need for Farmland Preservation

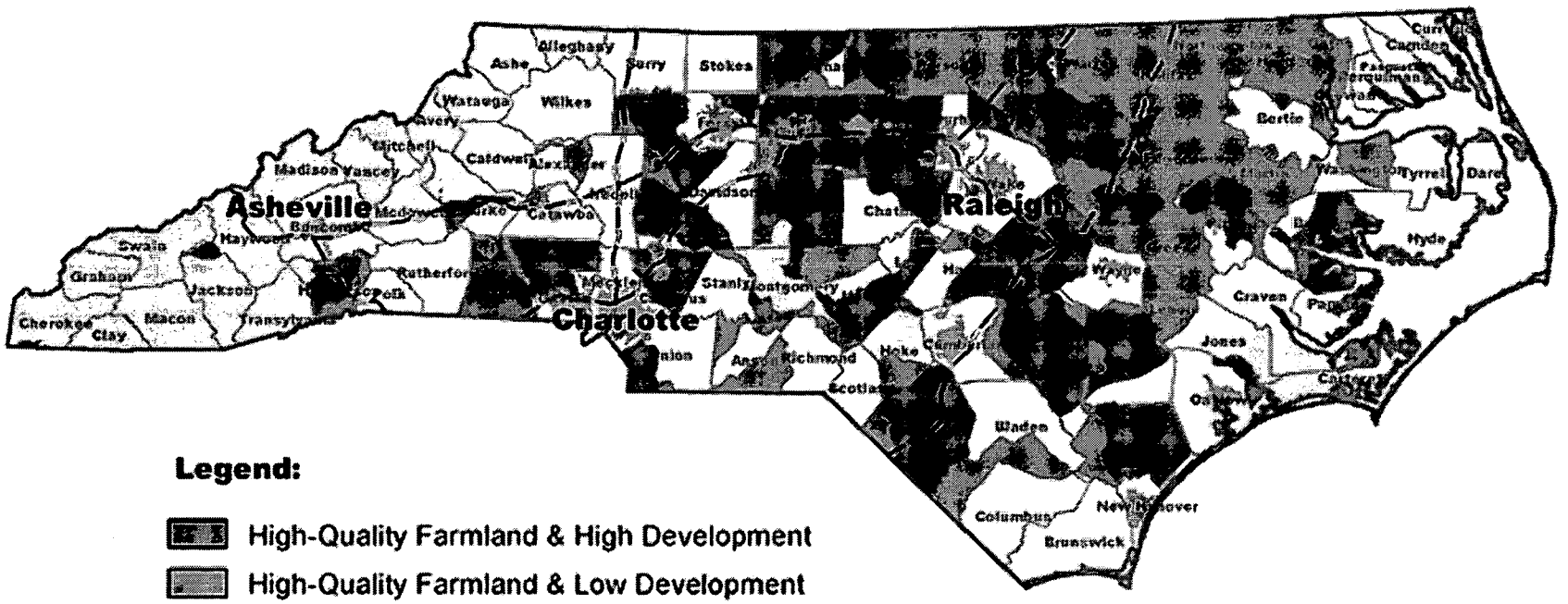


- 2.8 M acres of cropland and forest between 1982-2002
- = 383 acres/day
- 4th Highest Rate of Farmland Loss
- Agriculture Still #1 Industry – $62B/yr

FARMING ON THE EDGE

Sprawling Development Threatens America's Best Farmland

North Carolina



American Farmland Trust
www.farmland.org

Benefits of Farmland Preservation Trust Fund

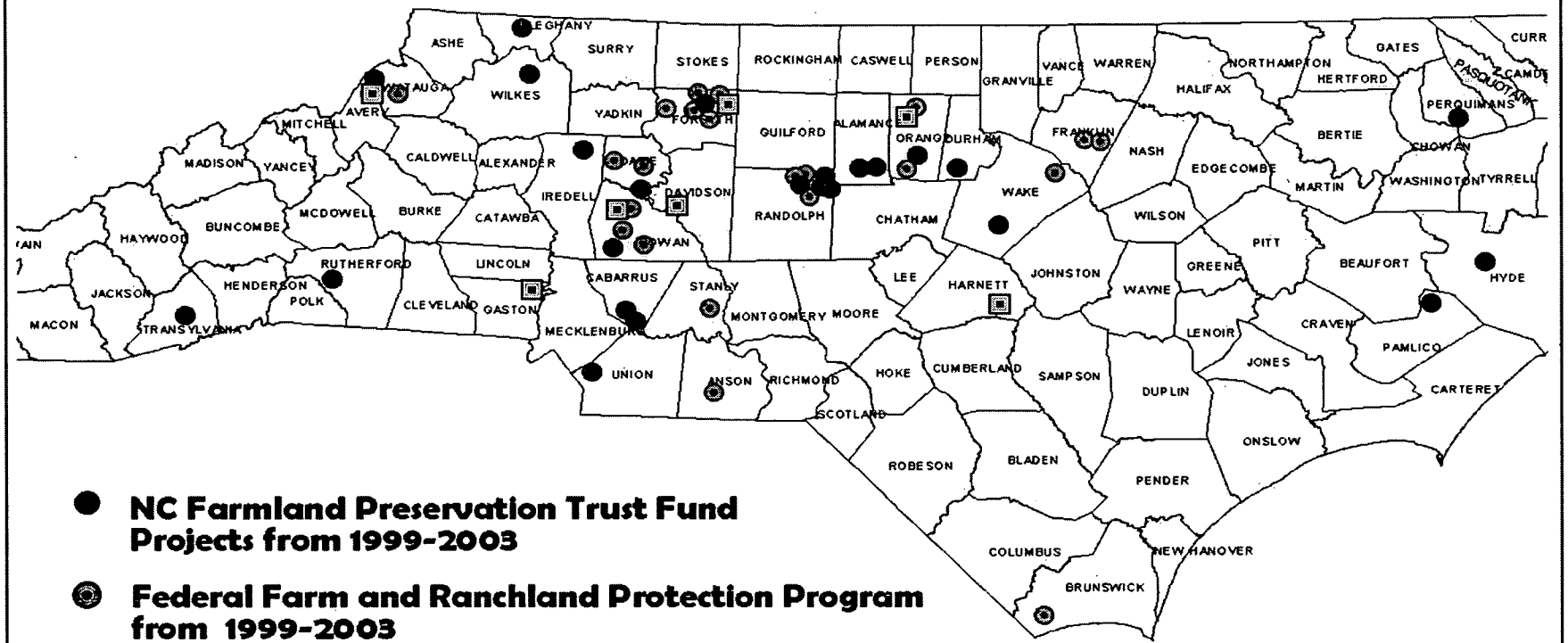
- Offers a viable alternative to selling land for development
- Provides financial resources to farmers through purchase of development rights
- Preserves prime agricultural lands & farming opportunities
- Protects water quality and wildlife habitat
- Saves local government resources
- Provides source of funding for matching dollars - $26 M leveraged

Farmland Preservation Program Statistics

- NC Farmland Preservation Trust Fund (FPTF)
  - $2.6 M appropriated since 1998
  - 4,412 acres protected on 33 farms ($589/acre)
  - $0 appropriated in FY 04-05 budget

- USDA Farm and Ranchland Protection Program (FRPP)
  - $ 5,235,300 received since 1998
  - 8,618 acres protected on 30 farms($607/acre)
  - $ 2,293,600 allocated to NC for FY '04
  - Lack of state matching funds hurting NC's allocation

State and Federally Funded Farmland Projects 1999-2003



- **NC Farmland Preservation Trust Fund Projects from 1999-2003**
- **Federal Farm and Ranchland Protection Program from 1999-2003**
- **Both State and Federal Farmland Funded Projects**

Interstates

Cities and Towns

40 0 40 80 Miles

N

2002-2003 FPTF Projects

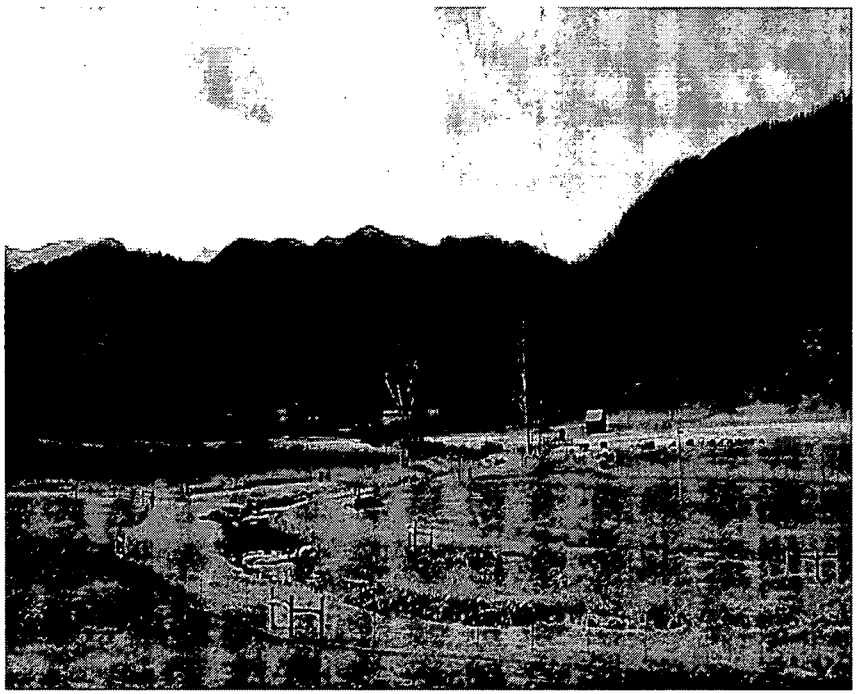
- $200,000 appropriated in '02 Short-Session

- Three Projects Funded
  - Graham Farm-Davidson County
  - Taylor Farm-Watauga County
  - Shelton Farm-Randolph County

Graham Farm – LandTrust for Central North Carolina

- Working Dairy Farm in Davidson Co.
- 124 acres under easement
- $125 K from FPTF
- $250 K from FRPP
- 25% donated value

Taylor Farm – High Country Conservancy



- Legacy Farm in Watauga Co.
- $22 K FY '02 FPTF
- $10 K FY '03 FPTF
- $125 K in FRPP
- 43 acres under easement
- Greater than 50% of value donated

Local Farmland Preservation Initiatives

- NC Land Trusts
  - Hold easements on more than 14,000 acres of farmland
  - Value of Easement on 50% of acres donated by landowner
- NC County Farmland Protection Initiatives
  - Orange County - $1.5 M
  - Currituck County - $250,000
  - Rowan County - $140,000
  - 39 Voluntary Agricultural Districts (VAD)

Related Farmland Initiatives

- Summit on Working Lands Conservation
  - NC Association of Soil and Water Conservation Districts
  - Focus on Conservation Options for Private Working Lands/Nontraditional Partnerships
- NC Farm Transition Network
  - Housed at NC Farm Bureau
  - Multiple Organizations Involved
  - Focus on Working Farms and Farm Transition Issues
- Land for Tomorrow Coalition

CTNC Recommendations

- Appropriate adequate resources to match federal allocation ($2.3)
- Reauthorize use of Clean Water Management Trust Fund money to match federal, state and local resources
- Develop a Statewide Farmland Protection Plan
- Expand Incentives for VADs
- Encourage Communication/Coordination Between Interested Parties
- Make NC Conservation Tax Credit Refundable (H887)

Conservation Trust For NC Fact Sheet – April 2004
Farmland Preservation Programs Help Save Working Farms

Agriculture is North Carolina's number one industry, contributing $62 billion annually to the state's economy and 20 percent of its jobs. In addition to the challenges posed by the globalization of agricultural markets, North Carolina's agricultural heritage is threatened by the loss of farmland. North Carolina is losing prime agricultural land to development at the fourth highest rate in the nation.

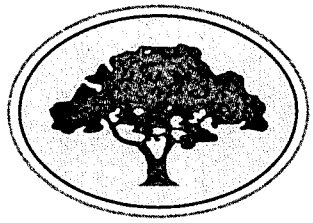
- During the past 20 years, North Carolina lost more than 2.8 million acres of cropland and forest, at the rate of 383 acres a day.
- In 1950, there were more than 300,000 farms in the state. Today, there are less than 50,000.

Farmland preservation programs that purchase development rights (conservation easements) on working agricultural lands prevent development of farmland and allow farmers to retain ownership and continue farming. Such programs must be an integral part of a comprehensive strategy to save family farms in North Carolina. Protecting working family farms through the purchase of agricultural conservation easements (PACE):

- provides farmers financial resources to reinvest in new technologies or equipment, expand into new markets, pay off debt or capitalize retirement programs.
- preserves prime agricultural lands for future generations and farm-related economic opportunities.
- protects water quality and wildlife from sedimentation and loss of habitat.
- saves local government resources by limiting residential developments that cost communities more to provide services than farmland and forests.
- continues to generate property and payroll taxes for local and state governments.

The Farmland Preservation Trust Fund, using $2.6 million appropriated by the General Assembly since 1998, has protected more than 4,400 acres on 33 working farms. These projects have leveraged more than $26 million in federal, local and private funds and the value of donated easements. To expand the state's farmland preservation efforts, the General Assembly should:

- Appropriate at least $2 million per year to the Farmland Preservation Trust Fund to provide resources for PACE programs and to leverage funds from the federal Farmland and Ranchland Protection Program.
- Reauthorize the use of up to $4 million in Clean Water Management Trust Fund money to match federal, state, local and private farmland preservation resources.
- Recommend the development of a statewide farm protection plan to identify priority farmland protection areas, resources to protect working farms, and agriculture-based economic development programs.
- Expand incentives for state/county-authorized Voluntary Agricultural Districts.
- Encourage further coordination and communication among the Department of Agriculture and Consumer Services, Department of Environment and Natural Resources, Clean Water Management Trust Fund, Soil and Water Conservation Districts and private conservation and agricultural organizations on the use of conservation easements to protect working farms and forests.



CONSERVATION TRUST
FOR NORTH CAROLINA
Saving the Places You Love

REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION

AND THE

NORTH CAROLINA GENERAL ASSEMBLY

ON THE

NORTH CAROLINA FARMLAND PRESERVATION TRUST FUND GRANT AWARDS FOR 2002-2003

April, 2004

Prepared for the N.C. Department of Agriculture & Consumer Services
by the Conservation Trust for North Carolina
Summary of NC Farmland Preservation Trust Fund

The views and recommendations contained in this report are those of the Conservation Trust for North Carolina and do not necessarily reflect the positions of the North Carolina Department of Agriculture and Consumer Services.

Summary of NC Farmland Preservation Program

The North Carolina General Assembly established the Farmland Preservation Trust Fund in 1986. Funding to create the NC Farmland Preservation Program was not provided until 1998, when the North Carolina General Assembly appropriated $250,000 to the Farmland Preservation Trust Fund for acquisition of agricultural conservation easements. The Conservation Trust for North Carolina (CTNC), a private, non-profit statewide land trust has been contracted by the Department of Agriculture and Consumer Services to oversee the program since funding was first provided. Public funds cover the purchase of easements, transaction, monitoring costs, program administration and may be used as matching funds for federal programs enabling the purchase of development rights such as the Farm and Ranchland Protection Program.

Following the success of the first year pilot project, the legislature doubled funding for the second year. The program grew and built momentum throughout the state, and the General Assembly increased funding for the grant program for fiscal year 2000-2001 to $1.5 million. However, due to State budget constraints in fiscal year 2001-2002, the NC Farmland Preservation Trust Fund received only $200,000 from the General Assembly, and 4% of that was retained by the Governor to help balance the State's budget, leaving only $192,000 for projects in 2002. The lingering State budget crisis once again limited funding for the NC Farmland Preservation Program to $200,000 in fiscal year 2002-2003. Still, 4,412 acres of working farms have been protected through this valuable program.

The pilot Farmland Preservation Program successfully protected six farms in 1999. Substantial parts of seven farms were protected the following year. The steady increase in funding each year produced significant results, and nine farm sites totaling 957 acres were protected in 2001. Although funding was dramatically reduced in 2002, CTNC and the statewide network of land conservation organizations were still able to protect land on nine farms and another 1,352 acres. Adequate funding for the NC Farmland Preservation Trust Fund was again limited in 2003, yet three grants were awarded for the purchase of agricultural easements totaling 275 acres of farmland, now permanently protected from development.

The goal of this program is the permanent protection of critical farmlands that provide important economic and ecological functions, while protecting the cultural heritage and scenic quality of North Carolina's rural landscape, particularly in areas of rapid urban development, and in ecologically sensitive areas and watersheds. The protection of farmland ensures our state's ability to produce food, fiber and other agricultural products. According to the NC Department of Agriculture & Consumer Services, there are currently about 57,000 farms in the North Carolina, covering nearly 9,200,000 acres of our state's 31,000,000 acres. Agriculture is North Carolina's number one industry, generating more than $62 billion each year. In addition to the economic impacts, benefits of farmland conservation also include the protection of water quality and other natural resources, diversification of the economy, alternatives to urban sprawl, and improvement of the overall quality of life.

While the progress of farmland protection in NC is impressive, it is disappointing that the program received no funding in the State's 2003-2004 budget. CTNC hopes this important program can be revived and even expanded in the 2004-2005 budget cycle. A firm commitment to the program through the restoration and expansion of significant funding for the Farmland Preservation Trust Fund is essential to the success of this valuable program and our ability to continue drawing federal farmland protection funding into NC to preserve our state's agricultural economy and heritage.

Background

The Conservation Trust for North Carolina is a private, not-for-profit 501(c)(3) organization dedicated to expanding the protection of North Carolina's land and water resources. CTNC provides works with the statewide network of locally-based land trusts, as well as provides direct assistance to local communities, private landowners, and public agencies. CTNC has effectively managed the NC Farmland Preservation Program for the NC Department of Agriculture & Consumer Services by working with county agencies, utilizing this state's network of 22 locally-based land trusts, and establishing close relations with national conservation organizations and agencies to identify and work with willing farmers interested in voluntarily protecting their land.

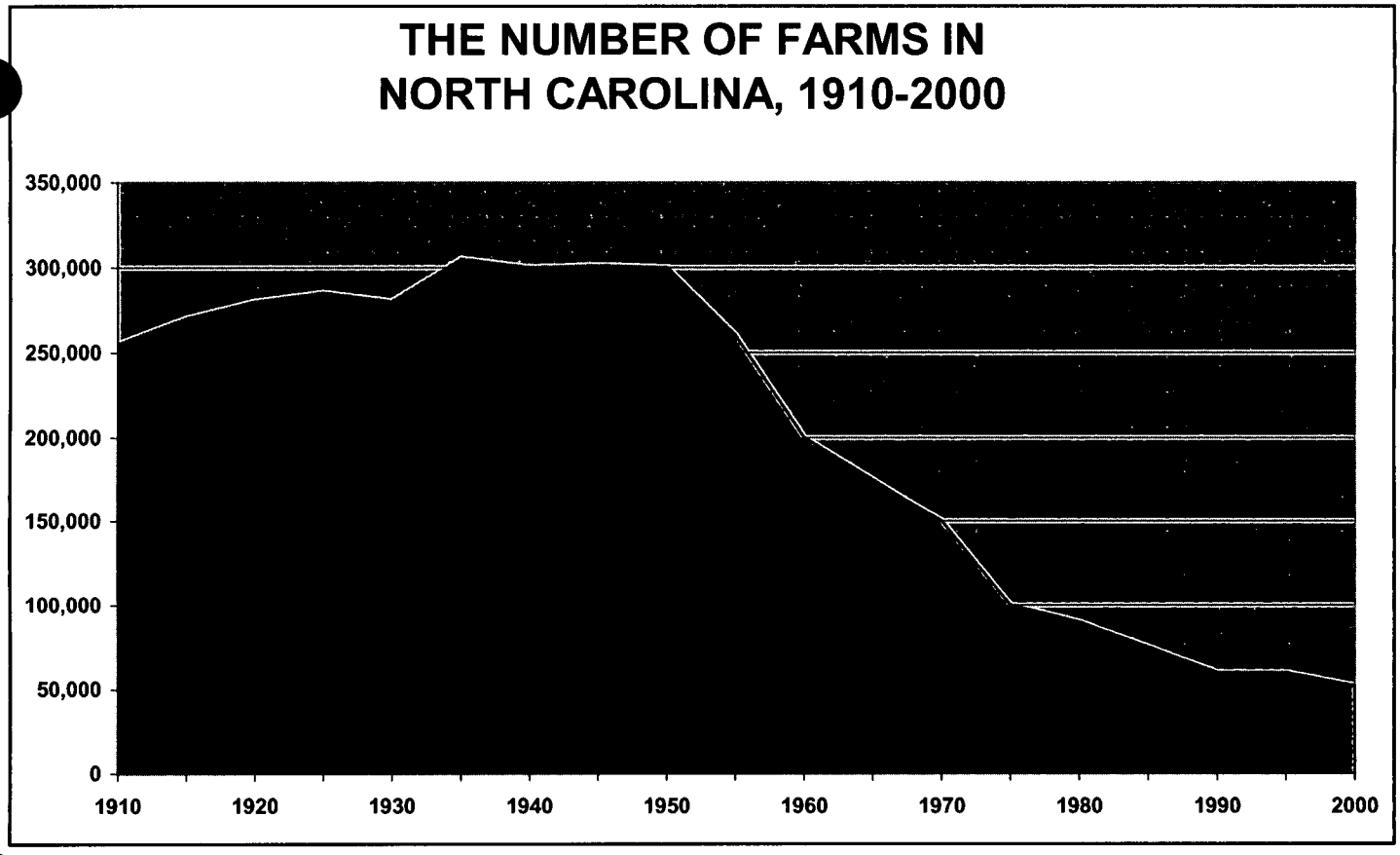
The NC Farmland Preservation Program (funded through the Farmland Preservation Trust Fund) utilizes agricultural conservation easements to achieve voluntary, permanent farmland protection. Conservation easements are legal agreements between a landowner and a government agency or non-profit conservation organization. Conservation easements limit the use of the subject property based on the wishes of the landowner and requirements of the easement holder. They are intended to protect the conservation values of a property that provide public benefit, while allowing continued agricultural use of the property. Some of these conservation values may include, drinking water supply sources, aquatic habitat, historic or scenic areas, open space, and wildlife habitat.

By selling or donating an agricultural conservation easement agreement, the landowner gives up certain development rights while retaining agricultural use and ownership of the land. The donation or bargain sale of development rights can result in substantial estate tax reductions for the landowner, as well as eligibility for the NC conservation tax credit and a federal tax deduction while keeping the property on the county's tax ledgers. The flexibility of conservation easements allows some portions of the property to be set aside for landowners to maintain limited development rights in those areas. Conservation easements remain on the land in perpetuity, even if ownership changes, and compliance is monitored at least annually by the holder of the easement.

Open space protection and farmland preservation is becoming more and more important as urban areas grow and spread into the countryside. Every year in America, nearly 1 million acres of farmland are lost to suburban sprawl and land development. Loss of farmland has lasting economic and environmental impacts on the community. Cost of Community Services studies are often used to determine the costs of a community's public services versus revenues generated by current land use in that community. In a summary of 83 such studies in 19 states, the American Farmland Trust found that the median cost of community services per dollar of revenue raised for farm and forest land is $0.36, while the cost of residential land is $1.15 per dollar of revenue raised (American Farmland Trust's Cost of Community Services Studies: Making a Case for Conservation, by Julia Freedgood, 2002). This shows that protecting farmland in our state will not only save our state's rural, historic, ecological and economic resources, but will also save counties and municipalities money, as they struggle to deal with the increasing demands and burdens of urbanization.

The following page contains facts and figures illustrating the need for farmland preservation in North Carolina. The NC Department of Agriculture & Consumer Services is working with the Conservation Trust for North Carolina, a network of land trusts, and Soil & Water Conservation Districts across the state to protect what is left of North Carolina's agricultural resources.

The Need for Farmland Preservation in North Carolina



North Carolina lost more than 100,000 acres per year to development from 1992 to 1997, the fifth highest rate in the United States. USDA Natural Resource Conservation Service, Natural Resources Inventory. (Source: http:www.nhq.nrcs.usda.gov/CCS?NRIrlse.html).

North Carolina has lost more than 37% of its land in farm use since 1964 - from 14.4 million acres to 9.1 million acres in 1997. (Source: Census of Agriculture, 1997).

Much of North Carolina's farmland lost to development (31%) contained *prime* and *unique* farmland soils as defined by the USDA. (Source: NC Rural Economic Development Center, February 2000).

Agriculture is North Carolina's biggest industry, contributing an estimated $62.6 billion to the state's economy each year from farm sales, jobs, and farm-related industries. This accounts for 22% of the State's economy. (NC Department of Agriculture website: http://www.ncagr.com/stats/cashrcpt/commrank.htm).

NC is the leading producer of tobacco products, exporting over $1.6 billion in 2000, yet the state is still third in the United States in agricultural diversity. (Source: Larry Wooten, President of NC Farm Bureau Federation, Editorial in the Raleigh *News & Observer*, Aug. 22, 2001, "A good quota buyout could help").

NC farm commodity receipts totaled nearly $7 billion in 2001.
(Source: NC Dept. of Agriculture website: http://www.agr.state.nc.us/).

North Carolina contains some of the most endangered farming areas of the U.S. This area includes 54 of North Carolina's 100 counties as determined by the American Farmland Trust. (http://www.farmland.org).

See **Appendix A** for additional information on prime agricultural soils in danger of conversion to development in North Carolina.

Complimentary Programs and Sources of Matching Funds

Given the funding constraints that have limited the NC Farmland Preservation Program since its inception, the Conservation Trust for North Carolina and participating land trusts and counties have been forced to be very creative and proactive in seeking additional sources of funding for farmland protection in North Carolina. The generous donation of easement values by participating landowners is one reason the State's limited investment in this program has been so effective. Counties and local land trusts have also donated funding and staff time towards individual projects and worked to secure matching and supplemental funds to ensure their completion.

One of the most frequently used programs providing matching funds for State farmland preservation efforts is the federal Farm and Ranchland Protection Program, authorized under the 2002 Farm Bill. This program supplies up to 50% of the funding for purchase of agricultural conservation easements on working farms, but requires at least 50% matching funds from state or private sources. This is where the NC Farmland Preservation Program has been so successful and so important in helping bring federal conservation funding to North Carolina.

The federal Farm and Ranchland Protection Program is administered through the USDA's Natural Resources Conservation Service (NRCS) offices in each participating state. North Carolina's NRCS staff have been impressed and influenced by the enthusiasm and effectiveness of farmland protection efforts across our state. In the past few years they have been heavily involved in helping land trusts and counties draw additional federal funds to North Carolina for farmland protection. The federal program has been used to protect 8,618 acres on 30 farms in North Carolina with a total of $5,235,300 in federal funds to date. The 2004 allocation to North Carolina will bring in an additional $2,293,600 for farmland protection. North Carolina needs a strong and viable state program to leverage as much of the federal farmland protection dollars as possible for farmers in North Carolina.

In 2003, members of the North Carolina land trust community and Conservation Trust for North Carolina worked with the NRCS Assistant State Conservationist and others at NRCS to organize a field tour of protected and prospective farmland in North Carolina for the director and legal council who oversee the Farm and Ranchland Protection Program. Staff from the NRCS, CTNC and participating land trusts helped bring two key federal administrators to North Carolina for three days in April. This tour raised awareness and interest in the farmland protection efforts in North Carolina among those in charge of the federal program, and we expect increasing amounts of federal funding to be available to North Carolina farmers, if state matching funds are available through the NC Farmland Preservation Trust Fund.

North Carolina Farmland Preservation Program
Grants Awarded From 1998 Through 2003

The NC Farmland Preservation Trust Fund has received five successive annual appropriations from the NC General Assembly to the NC Department of Agriculture and Consumer Services, beginning in late 1998 under the Farmland Preservation enabling statute of 1986 (NCGS 106-735 to 744).
Appropriations to the program by the General Assembly have been:
$250,000 for FY 1998-99;
$500,000 for FY 1999-2000;
$1,500,000 for FY 2000-01;
$200,000 (later cut to $192,000) for FY 2001-2002; and
$200,000 for FY 2002-2003
The appropriations were used to make grants for qualified local governments and non-profit land trusts to cover transactional costs of acquiring agricultural conservation easements, acquisition of the easements, and annual easement monitoring costs. **These grants have leveraged over $26 million in local funds and equivalent values of donated development rights (i.e., a grant ratio of $1 state: $10 local or federal funds and donated value).** All expenditures have satisfied legislative intent to demonstrate protection of critical farmlands located in urban fringe growth areas and in sensitive watersheds or other important environmental resource areas. The Department of Agriculture's contractual relationship with the Conservation Trust for North Carolina has proven a cost-effective and successful model for implementation of the NC Farmland Preservation Program.

Program Results to Date
Total Grants Awarded: $2,384,500.00 in five annual grant cycles.
Farms Protected: 33* **Acres Protected: 4,412*** **Average: $540.46 per acre**

Other Program Activities: promotion of farmland protection opportunities through publications, news media articles, public presentations, forums and workshops; provision of guidelines for forming county farmland protection programs and establishing voluntary agricultural preservation districts; representation of farmland preservation interests to legislative study commissions and other task forces; exploration of other potential sources of funding for farmland preservation in N.C.; and collaboration with federal Farm & Ranchland Protection Program to leverage more federal conservation funding for farmland protection in North Carolina.

Farmland Preservation Trust Fund Awards in Fiscal Year 2002-2003 [$200,000 State appropriation]

Grantee	Grant	Farm	County	Easement Size
High Country Conservancy	$10,000 b/m	Taylor Farm	Watauga	43 acres
The LandTrust for Central NC	$125,000 m	Graham Farm	Davidson	124 ac.
Piedmont Land Conservancy	$50,000	Shelton Farm	Randolph	67 ac.
3 Land Trusts	**$185,000**	**3 Farms**	**3 Counties**	**234 acres**

*The Taylor Farm received grants in 2002 and 2003, but it is only counted once in the Program Results to Date.

b = Bargain sale of non-farm development rights. The purchase price for the permanent conservation easement was substantially less than half of the appraised development rights values.
m= Matching funds were raised for the purchase of non-farm development rights on land designated by a county as high priority for farmland protection.

Farmland Preservation Trust Fund Awards in Fiscal Year 2001-2002 [$200,000 State appropriation*]

Grantee	Grant	Farm	County	Easement Size
Blue Ridge Rural Land Trust	$23,500 d	Ward Farm	Watauga	230 acres
High Country Conservancy	$22,000 b/m	Taylor Farm	Watauga	43 ac.
Catawba Lands Conservancy	$24,000 m	Rhyne Farm	Gaston	179 ac.
Ducks Unlimited	$11,250 d	Duncan Farm	Hyde	49 ac.
Ducks Unlimited	$11,250 d	Mallard Creek	Pamlico	238 ac.
Carolina Mtn. Land Conserv.	$23,500 d	Morrithel Meadows	Transylvania	127 ac.
Catawba Land Conservancy	$24,000 d	Hunter Farm	Union	57 ac.
Piedmont Land Conservancy	$12,000 m	Wall Farm	Randolph	24 ac. of 262 ac.
The LandTrust for Central NC	$10,500 d	Davis Farm	Davie	405 ac.
	$162,000	**9 farms**	**8 counties**	**1,352 acres total**

*4% revoked by the Governor to balance the State budget, leaving only $192,000 for Fiscal Year 2001-02.

Farmland Protection Grants Awarded in Fiscal Year 2000-2001 [$1,500,000 State appropriation]

Grantee	Grant	Farm	County(s)	Easement Size
LandTrust for Central NC	$217,350 b	Barber/Floyd Farm	Rowan	120 of 241 acres
Piedmont Land Conservancy	$210,300 b	Hadley Bros. Farm	Alamance & Chatham	143 of 262 ac.
Triangle Land Conservancy	$ 15,000 d	Nutter/Siebert Farm (2^{nd} of series of phased easements: total of 187 ac.)	Orange	80 of 350 ac.
Durham County	$250,000 b	Herndon Farm	Durham	50 of 110 ac.
Orange County	$107,000 m	Walters Farm	Orange	70 of 113 ac.
NC Coastal Land Trust	$210,000 b	Rayburn Farm	Perquimans	130 of 378 ac.
Sandhills Area Land Trust & Averasboro Battlefield Comm.	$217,350 b	Weeks Farm	Harnett	75 of 600 ac.
LandTrust for Central NC	$138,000 b	Wilburn/Williams	Cabarrus	92 ac.
Blue Ridge Rural Land Trust	$ 60,000 b	Mauldin Farm	Wilkes	177 ac.
	$1,425,000	**9 farms**	**9 counties**	**957 acres total**

Farmland Protection Grants Awarded in Fiscal Year 1999-2000 [$500,000 State appropriation]

Grantee	Grant	Farm	County	Easement Size
The LandTrust for Central NC	$150,000 b	Green Farm	Cabarrus	317 acres
Forsyth County SWCD+	$123,000 m	Preston Farms	Forsyth	66 of 200 ac.
Foothills Conservancy	$102,000 b	Bovender Farm	Rutherford	304 of 935 ac.
Wake County SWCD+	$ 6,000 d	Theys Farm	Wake	92 of 100 ac.
Piedmont Land Conservancy	$ 7,448 d	Ferguson Farm	Randolph	70 of 85 ac.
Piedmont Land Conservancy	$ 30,771 d	Troy Farm	Randolph	305 of 314 ac.
	$425,000	**6 farms**	**5 counties**	**154 acres total**

+ Soil and Water Conservation District

Farmland Protection Grants Awarded in Fiscal Year 1998-1999 [$250,000 State appropriation]

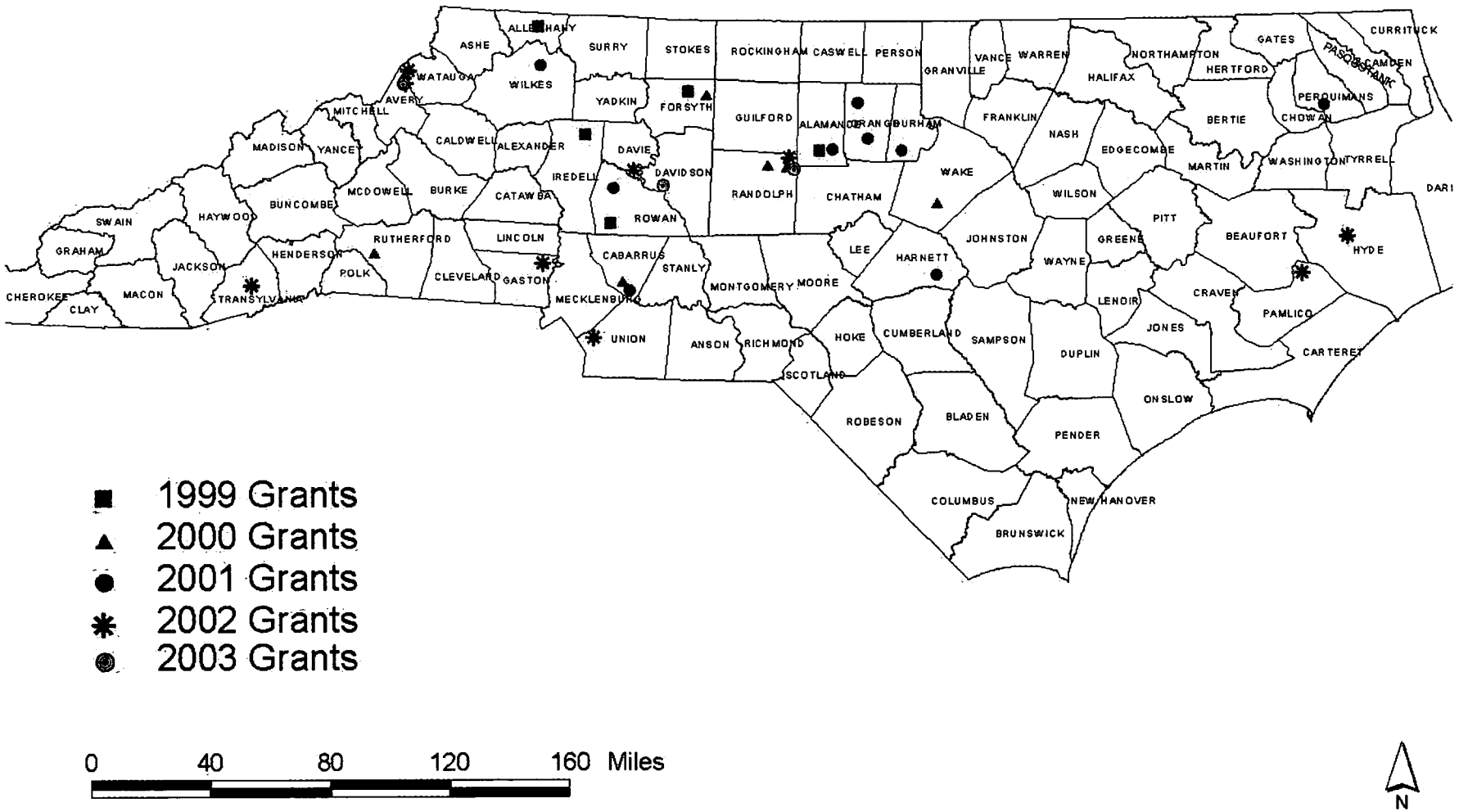
Grantee	Grant	Farm	County	Easement Size
LandTrust for Central NC	$ 15,518 d	Daltonia and bequested easement donated over remainder	Iredell	198 of 615 ac.
LandTrust for Central NC	$ 50,390 b	Karriker Farm	Rowan	81 of 400 ac.
Blue Ridge Rural LT/SAHC	$ 10,500 d	Richardson	Alleghany	298 ac.
Piedmont Land Conservancy	$ 67,000 b	Newlin-Hickory & Grove Dairy	Alamance Chatham	122 of 160 ac.
Forsyth Co. Soil & Water CD.	$ 44,092 m	Blackburn	Forsyth	59 ac.
	$187,500	**6 farms**	**6 counties**	**758 acres total**

+ Soil and Water Conservation District

d = Donated development rights, this grant reimbursed transactional costs for establishing permanent conservation easement.
b = Bargain sale of non-farm development rights. The purchase price for the permanent conservation easement was substantially less than half of the appraised development rights values.
m= Matching funds were raised for the purchase of non-farm development rights on land designated by a county as high priority for farmland protection.

NC Farmland Preservation Trust Fund

1999-2003 Farms Protected

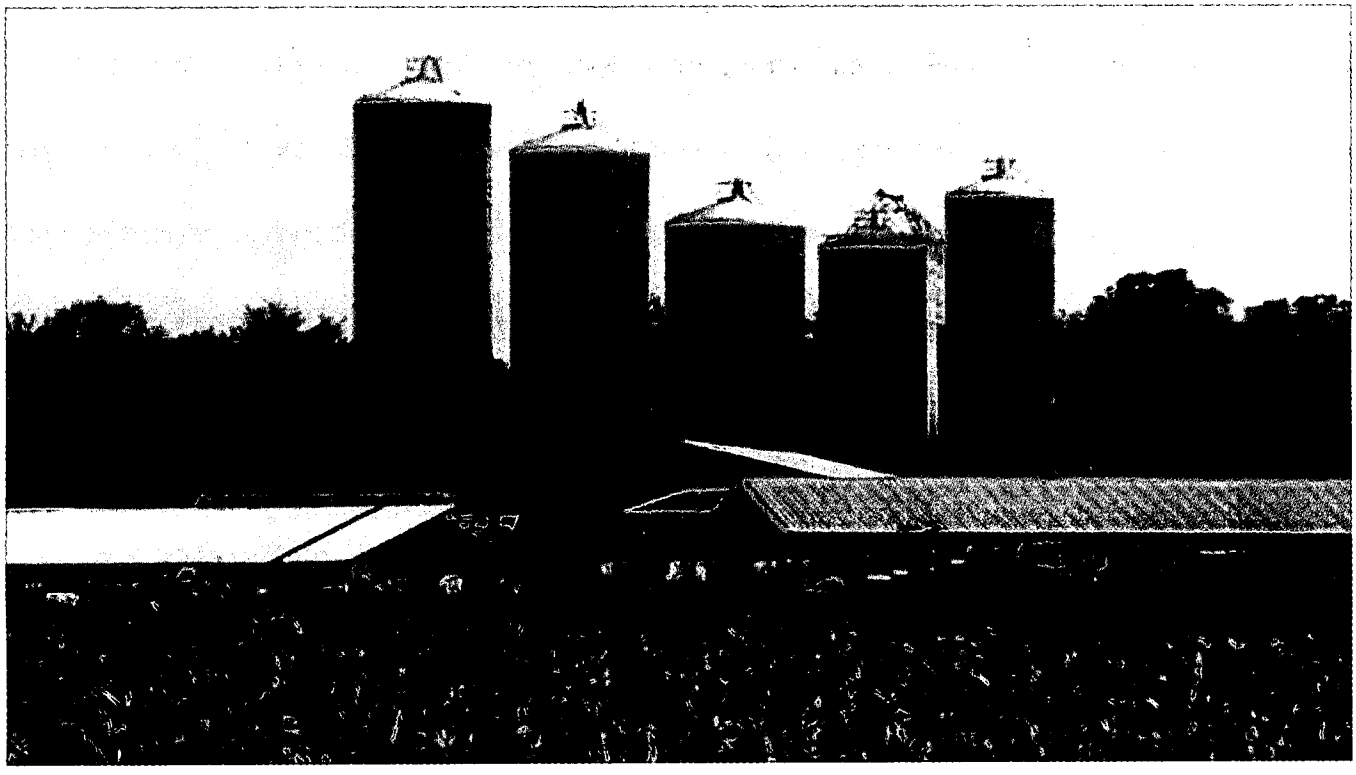


2003 Farmland Preservation Trust Fund Award Recipients

Graham Farm protected by The LandTrust for Central North Carolina. The 124-acre Graham Farm is located in southern Davidson County along the Interstate-85 corridor. Despite tremendous development pressures created by the transportation infrastructure, it remains a hub of agricultural activities, consisting of thousands of acres of working farmland. The Graham Farm has remained in the same family since the original land grant in 1762, and is subject to best management practices including "never-till" crop production. We are proud to announce that the conservation easement on the Graham Farm was signed and recorded on December 15, 2003 so this farm is now protected for agricultural use in perpetuity.

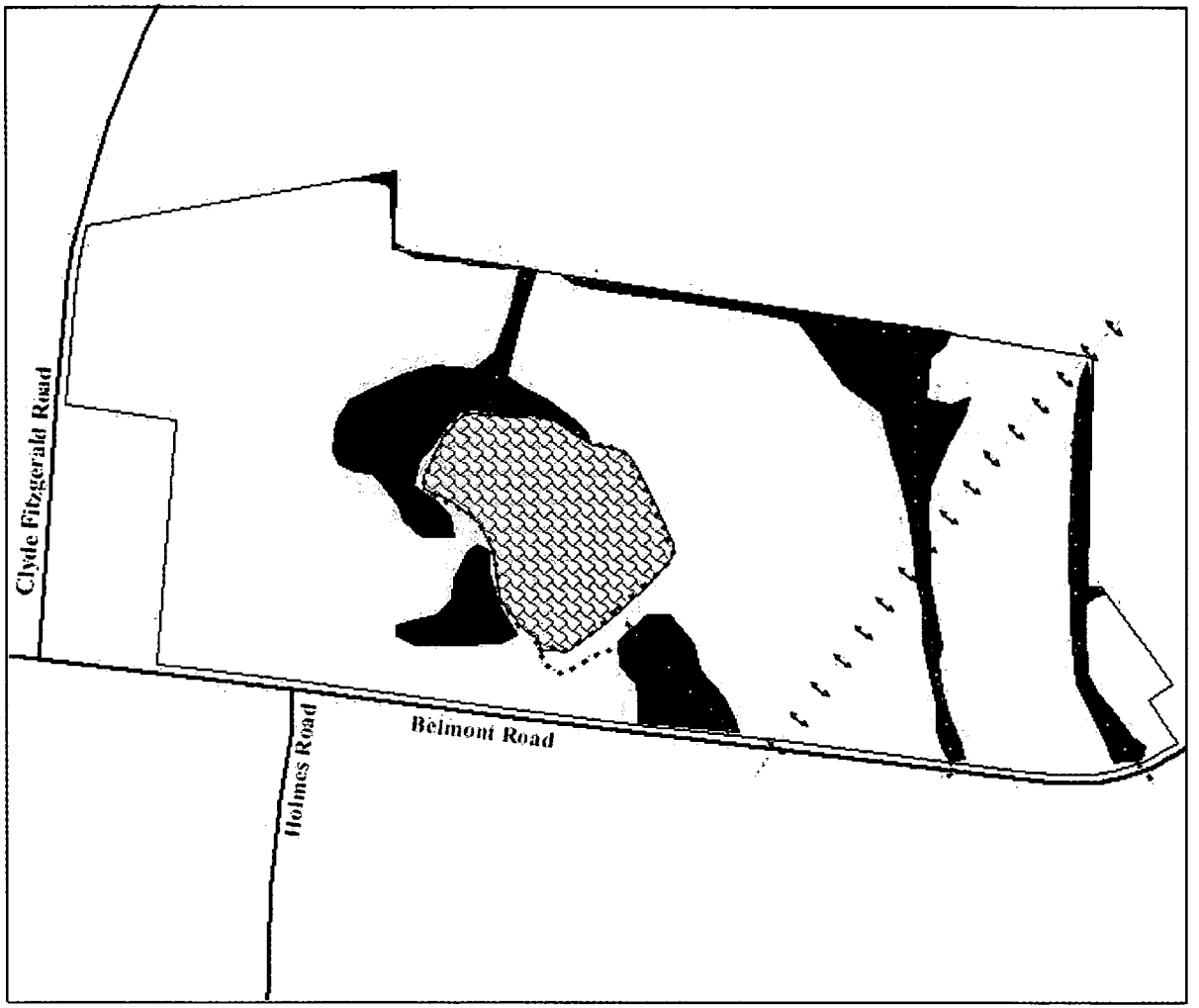
Preservation of the Graham Farm was made possible by a combination of funding from the U.S. Department of Agriculture's Farm and Ranchland Protection Program (under the federal Farm Bill) and the NC Farmland Preservation Program, as well as a donation of funds and staff time by The LandTrust for Central North Carolina. The North Carolina Farmland Preservation Program contribution to the preservation of this farm constitutes roughly 33% of the value of the easement, once again illustrating the power of this State program to leverage federal and private dollars for conservation projects in North Carolina.

Efforts to protect the Graham Farm have spurred other farmland preservation interest on adjacent farms and The LandTrust for Central North Carolina expects to have as many as an additional 500 acres protected in 2004 on nearby farms. A 'Day on the Land Celebration' will be held April 3, 2004 on this property to promote farmland preservation and introduce people to life on a working farm in North Carolina. Members of the NC General Assembly and NC Department of Agriculture staff are encouraged to attend that event.



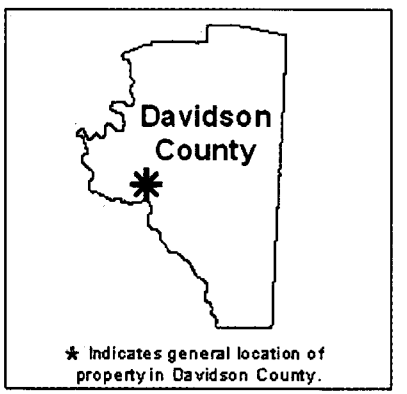
Above: Grain silos and cattle barns on the Graham Farm, now protected by a conservation easement thanks to a partnership between the NC Farmland Preservation Program, the USDA Farm and Ranchland Protection Program and The LandTrust for Central North Carolina, based in Salisbury, NC.

Graham Farm Map



Power Line
Streams
Roads
Pond
Graham forested area.shp
Crop Cultivation Area

N



Map Prepared by The LandTrust for Central North Carolina

Shelton Farm, protected by the Piedmont Land Conservancy. This farm consists of 67 acres in Randolph County, and is now owned by the eight heirs of Wade T. Shelton. Thanks to the work of the Piedmont Land Conservancy, this farm will not be subdivided and sold for development, as is the fate of so many farms transitioning from one generation to the next.

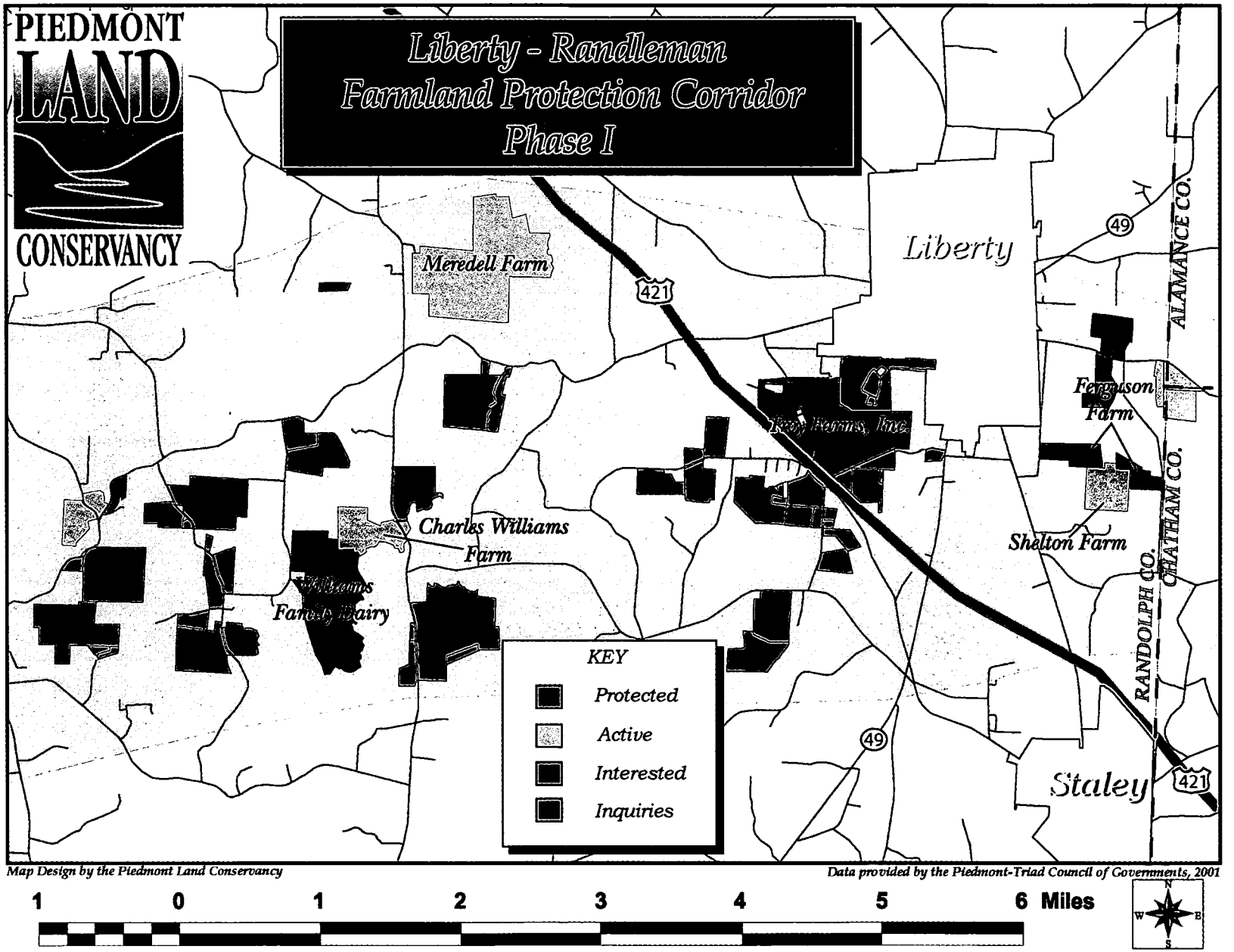
The Wade T. Shelton Farm is located on the eastern edge of the Piedmont Land Conservancy's Liberty-Randleman Farmland Protection Corridor. This corridor is a community-based land protection concept that grew out of a grassroots effort of farmers and landowners who were concerned about the rapid development of farmland along Old Liberty Road. To date, five farms comprising about 649 acres within this corridor have been permanently protected by agricultural easements. Currently, there are four additional farmers in the Corridor who have expressed their intent to the Piedmont Land Conservancy to permanently protect their land, which encompasses an additional 675 acres.

The Shelton Farm's 67 acres are comprised of 99% prime agricultural soils. Since the land is located on the eastern edge of Liberty, and the soils are well-drained, and the topography is relatively flat, this property was a prime location for development. In addition to this high degree of threat, the farm is adjacent to the 70-acre Ferguson Farm, a beef cattle farm, protected in 2000 through a donated conservation easement with funding support for transactional costs from the North Carolina Farmland Preservation Program. These projects demonstrate the foresight and proactive conservation efforts of one of North Carolina's leaders in farmland protection. The Piedmont Land Conservancy's Liberty - Randleman Farmland Protection Corridor is piecing together hundreds of acres in a concentrated area of prime agricultural soils and ensuring their protection as viable working farms.

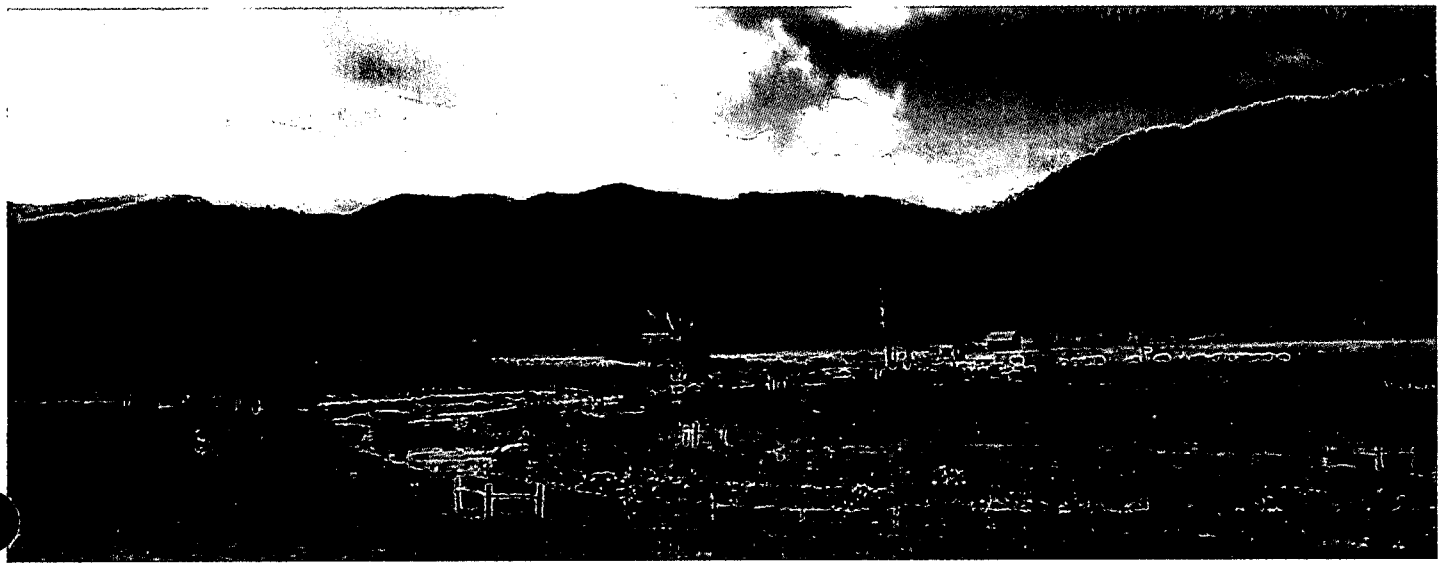
Through an innovative conservation buyers network, Piedmont Land Conservancy is seeking a farmer willing to buy this farm subject to an agricultural easement. The buyers will be able to purchase this land with the agricultural easement in place, enabling a farmer or someone hoping to get into farming, to purchase the farm below the price of a farm valued at full development potential.

Above: Cattle grazing on the pastures of the Shelton Family Farm, now protected by an agricultural conservation easement purchased by the Piedmont Land Conservancy through the NC Farmland Preservation Program.

Shelton Farm & Surrounding Area Map



Taylor Family Farm protected by High Country Conservancy: The Taylor Farm is a "legacy farm", designated as such because it is in its 6th generation of continuous farm use by the Taylor family, pre-dating the Civil War. This farm is the first to receive funding from the NC Farmland Preservation Program two years in a row. The initial award in 2002 allowed High Country Conservancy to initiate protection of this farm as the first agricultural parcel in the Valle Crucis Historic District. This year's award allowed The Conservancy to repay a low-interest loan it secured to ensure protection of the farm. The popularity of this area for second-home development threatens the scenic, agrarian landscapes which make it so attractive. High Country Conservancy hopes the Taylor Family Farm will serve as the cornerstone of their conservation efforts in the Valle Crucis area and along Scenic Byway 194. This NC Scenic Byway, NC Route 194, has been identified as one of America's 10 most endangered scenic byways by Scenic America (see http://www.scenic.org).



The Taylor Farm easement was signed on December 20, 2002 and provides considerable water quality benefits, as it contains the confluence of three creeks, which actually form the cross shape for which the valley is named (Valle Crucis is Spanish for "Valley of the Cross"). The farm is adjacent to the Valle Crucis Episcopal Conference Center, which is in the process of negotiating a conservation easement on its 450 acres. Permanent protection of these two properties will provide a sizeable area of protected views and wildlife habitat in this scenic and historic area of Watauga County.

Right: Family member and landowner Scott Jensen and daughter Tory (4) overlooking the Taylor Family Farm in Valle Crucis protected with an agricultural conservation easement by High Country Conservancy in 2002.

Taylor Farm Map

Taylor Farm Boundary - Valle Crucis, NC

0 1,000 2,000 4,000 Feet

N
W E
S

* Watauga Digital Tax Data shows a clear Discrepency between it and the Plat held in the HCC office. This extension is in addition to the rest of the Plat boundary.

Conservation Easement Boundary - 65.719 acres

Taylor Parcel - Acreage not included in easement -18.281

Conclusion

Despite limited funding, fiscal year 2002-2003 was another successful year for the North Carolina Farmland Preservation Program, permanently protecting another 234 acres on three farms. The North Carolina Department of Agriculture & Consumer Services and the Conservation Trust for North Carolina again, successfully partnered to maintain a viable farmland conservation program with minimal funding allocated to the state Farmland Preservation Trust Fund. By utilizing the experience of the Conservation Trust and the network of local land trusts across the state, limited funding was used to leverage other sources of funding and private donations to maximize the investment made by the North Carolina General Assembly. Productive farmland is one of this state's most valuable economic resources, and is deserving of the state's long-term investment in the protection of working farms. In addition to protecting the greatest economic engine of the State of North Carolina, farmland preservation provides additional public benefits including water quality protection, protection to farmers from encroachment issues and nuisance lawsuits, protection of scenic views, cultural and historic resources, and recreation and tourism opportunities.

As previously noted, the NC General Assembly did not provide funding for the State's Farmland Preservation Trust Fund in fiscal year 2003-2004. The lack of funding for the NC Farmland Preservation Trust Fund creates several challenges to protecting farmland in North Carolina, including:

- The loss of federal Farm and Ranchland Protection Program funds to North Carolina due to the lack of state matching funds.
- The loss of opportunities to acquire easements on endangered farmlands though voluntary measures.
- The inability to compensate farmers for the value of conservation easements, relying on them to donate the value of the agricultural conservation easement.
- The continued loss of prime farmlands and working family farms across North Carolina.

The Conservation Trust for North Carolina recommends:

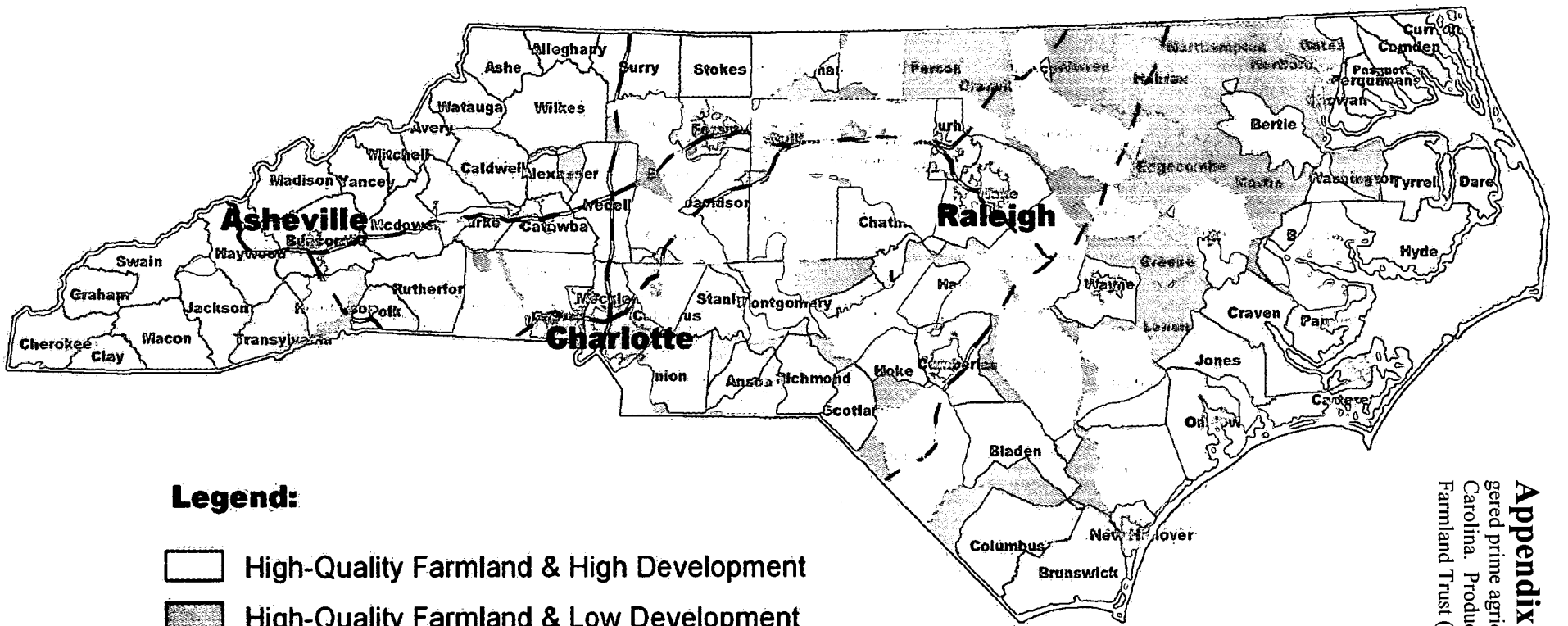
- Adequate resources be dedicated to the NC Farmland Preservation Trust Fund to match the 2004-2005 fiscal year allocation of $2.3 million and future allocations from the federal Farm and Ranchland Protection Program. This will enable us to maximize the amount of federal farmland protection funding available to North Carolina in future years.
- This funding be available to compensate farmers for the value of permanent conservation easements placed on farmland.
- Expanded discussions among government agencies and the agricultural and conservation interests about the use of conservation easements on working farms and forests.
- Development of a statewide farmland protection plan, which identifies priority farmland protection areas and the resources necessary to protect these areas.
- Expanded incentives for farmers in state/county-authorized Voluntary Agricultural Districts.

As the rate of loss of farmland and family farms accelerates across North Carolina, it is imperative that our state address these issues as part of a comprehensive effort to protect our state's economy and agricultural heritage.

FARMING ON THE EDGE

Sprawling Development Threatens America's Best Farmland

North Carolina



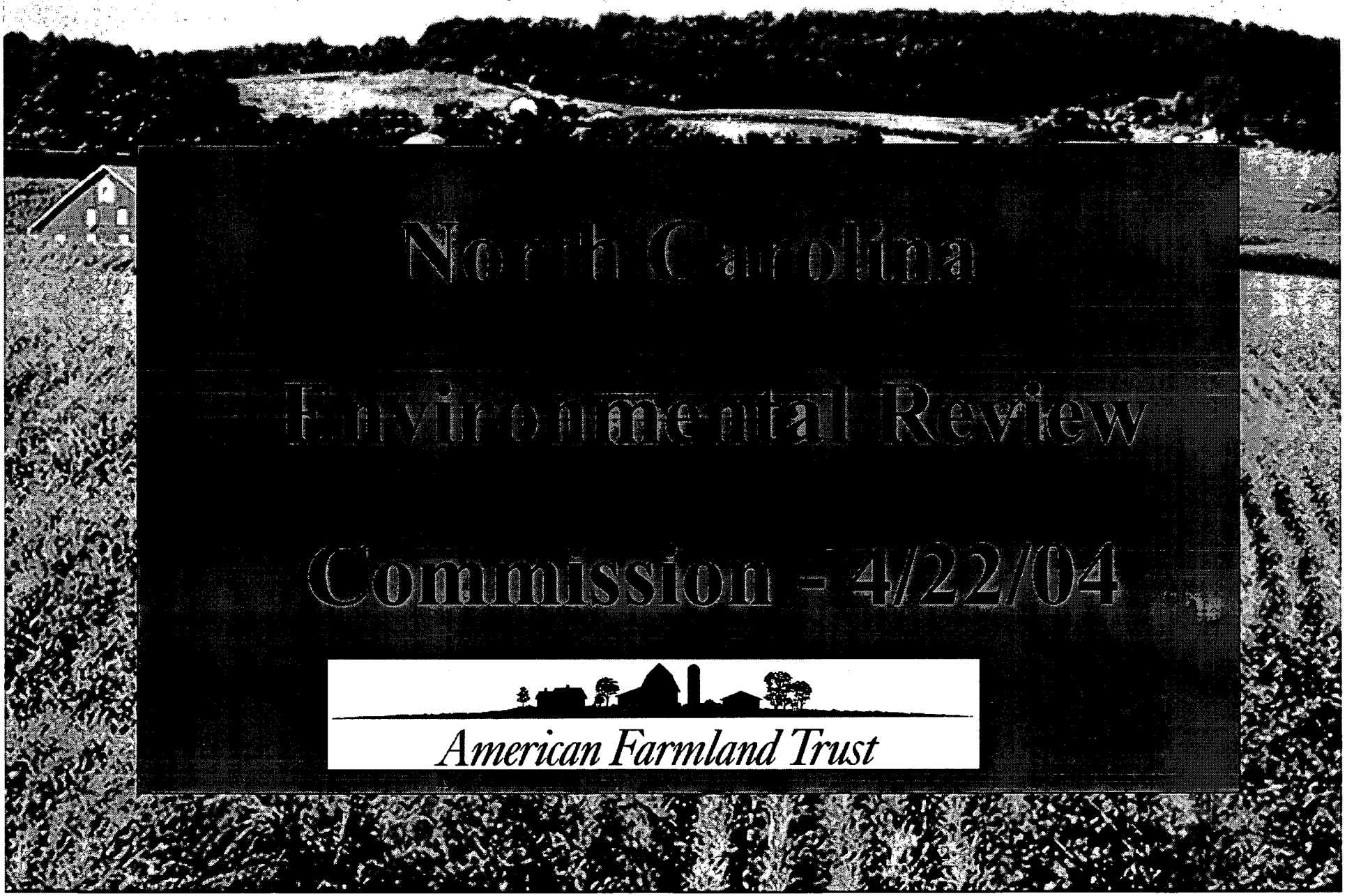
Legend:

- High-Quality Farmland & High Development
- High-Quality Farmland & Low Development
- Federal & Indian Lands
- Urban Areas
- Other Lands

American Farmland Trust
www.farmland.org

Appendix A: Map of endangered prime agricultural lands in North Carolina. Produced by the American Farmland Trust (www.farmland.org).

April 22, 2004 ERC Meeting
EXHIBIT J



American Farmland Trust

- Founded in 1980, stop the loss of productive farmland.
- Only national organization dedicated to maintaining our productive agricultural resources by protecting the best land, planning for an agricultural future, and promoting economically and environmentally sustainable farming practices.
- 11 offices across the country, partnering with local orgs, sharing success stories, and providing technical assistance to landowners and policy makers.
- Visit our website at farmland.org, and come to our next national conference in Lexington, KY in November.

American Farmland Trust

What Is Farmland Protection?

- New frontier of conservation: private working lands. Most cost effective means of achieving conservation objectives.
- Using tools and knowledge to help landowners and the local community achieve a range of financial, natural resource, economic, and open space goals to improve the quality of life for farm families and other citizens, for now and for future generations
- Times are tough in NC farm country: tobacco, peanuts, commodity prices, animal biosecurity concerns. Need to provide a sense of hope and stability for the future.

American Farmland Trust

Toolbox: What Can We Do?

- Community Planning
  - Incentives for agricultural profitability
- Landowner Options
  - Incentives to protect from future development

American Farmland Trust

Planning for Agriculture

- Land use policies: Ag Districts

- Agricultural Economic Development

American Farmland Trust

Agricultural Districts – North Carolina

- 39 of 100 counties have passed ordinances (tripled in past 4 years), stating that agriculture is an important part of their future
- Farmers voluntarily limit development for 10 years
- Benefits authorized by state, but chosen by individual county – notification, assessments, planning, public hearing
- Administered by local board appointed by county commissioners
- Giving farmers a sense of pride and a stable investment climate for ag profitability
- Can the state authorize additional incentives for the counties to offer to landowners willing to restrict development for a longer period?

American Farmland Trust

Agricultural Economic Development

- Diversification financial assistance: Golden Leaf and Tobacco Trust Fund
- Orange: Hired agricultural economic development coordinator
- Planning for agricultural viability: Henderson first countywide plan
- Recruitment of input and output businesses: Alamance working with new seed company to fill empty textile plant

Agricultural Economic Development (continued)

- Creating alternative markets: farmers markets, connecting directly with consumers in changing demographic climate
- Agri-tourism/local promotion: Extension and NCDA
- Farm Transition Network: assistance in passing management of the farm business and assets to the next generation
- Purchase of Agricultural Conservation Easements: a business management tool for farmers with great public benefits to the citizens of the state. Partnership between the public and private landowners. Our Missing Link!

American Farmland Trust

PACE: Our Great Missing Link!

- Kentucky: 25 million dollars of T settlement money, through their Ag Development Board.
- Federal Farm Bill: 1 billion authorized over 10 years…and we see an increasing trend towards awarding farmers for their stewardship and conservation for future farm bills.
- 4 counties in NC have stepped forward and provided their own funding. CWMTF and DOT funding have been used in some cases.
- Most successful programs are those which link federal, state, and local programs and incentives.
- We need a steady and significant state fund to do our part in these partnerships.

American Farmland Trust

From the Field: Vermont PDR Study

- More than 70% of farmers used the proceeds to improve or expand their farms.
- 79% felt the changes made were important to the profitability of the operation.
- 84% cited the program as an important reason they could make these management and operational changes.
- 73% of farmers surveyed feel that the program has positively affected their ability to stay in farming.
- 67% of participants feel the program will enable them to pass the farm to the next generation in the family.

American Farmland Trust

Slowing Farmland Loss: How Do You Do It?

Creating the right conditions and incentives that landowners don't want to sell their farms

Gerry Cohn
American Farmland Trust
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American Farmland Trust

FACT SHEET

STATUS OF STATE PACE PROGRAMS

DESCRIPTION

As of July 2002, at least 24 states had authorized state-level Purchase of Agricultural Conservation Easement (PACE) programs. This table displays the status and summarizes important information about farm and ranch land protection programs in 19 states that had acquired funding and easements as of January 2002.

EXPLANATION OF COLUMN HEADINGS

Year of Inception/Year of First Acquisition

"Year of Inception" is the year the law creating the PACE program was approved. "Year of First Acquisition" is the year the program acquired its first easement.

Easements/Restrictions Acquired

Number of agricultural conservation easements or conservation restrictions acquired through the state program. This number does not necessarily reflect the total number of farms/ranches protected, as some programs acquire a property in stages and may hold multiple easements on the same farm/ranch. Some state programs do not hold easements but instead provide funds for easement purchase to local governments or land trusts.

Acres Protected

Number of acres protected by the program to date.

Program Funds Spent to Date

Dollars spent by each program to acquire easements on farms/ranches. Amounts may include unspent funds that are encumbered for installment payments on completed projects. Unless otherwise noted, this figure does not include either incidental land acquisition costs, such as appraisals, insurance and recording fees, or the administrative cost of running the program. These figures may not reflect the total cost of acquiring easements, as some state PACE programs receive matching funds from local governments, as well as contributions from local land trusts and donations from landowners.

Local Contributions to Date

Funds contributed by local governments (e.g., counties) toward state program acquisitions.

Funds Spent Per Capita

The amount spent on farmland protection per person based on state population figures for 2001 from the U.S. Bureau of the Census.

Funds Available

Program funds available for the current fiscal year to acquire easements on agricultural land.

Funds Available Per Capita

Program funds available per person based on state population figures for 2001 from the U.S. Bureau of the Census.

Outstanding Applications

Backlog of applications reported by program administrators.

Funding Sources

Sources of funding for each program. This list does not include contributions from local governments and land trusts or donations from landowners. "Transportation funding" refers to federal money disbursed under the Intermodal Surface Transportation Efficiency Act of 1991 and the Transportation Equity Act for the 21st Century (ISTEA and TEA-21). ISTEA provided funding for a broad range of highway and transit programs, including "transportation enhancements."Easement acquisitions that protect scenic views and historic sites along transportation routes are eligible for this program. TEA-21 was adopted in May of 1998, re-authorizing federal transportation spending through fiscal 2003. "FPP" is the federal Farmland Protection Program established in 1996 and re-authorized in the 2002 Farm Bill to provide matching funds to state, local, tribal and land trust agricultural easement acquisition programs. In addition to these sources of funding, several state programs reported financial contributions from private individuals or foundations.

American Farmland Trust

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July 2002

The Farmland Information Center is a public/private partnership between American Farmland Trust and the USDA Natural Resources Conservation Service that provides technical information about farmland protection.

PURCHASE OF AGRICULTURAL CONSERVATION EASEMENTS

State	Year of Inception/ Year of First Acquisition	Easements/ Restrictions Acquired	Acres Protected	Program Funds Spent to Date	Local Contribut to Date
California	1995/1997	49	13,480	$16,169,595 ^	N/A
Colorado	1992/1995	79	88,585	$26,948,065~^	$5,000,000 ~
Connecticut	1978/1979	207	28,173	$82,206,885 ^	$300,000
Delaware	1991/1996	309	65,117	$69,378,401 ^	$0
Kentucky	1994/1998	22	4,708	$2,295,176	$0
Maine	1987/1988	7	2,555	$1,620,000	$0
Maryland	1977/1980	1,395	198,276	$258,048,105 ^	$76,953,425
Massachusetts	1977/1980	561	50,664	$126,064,519	$11,274,576
Michigan	1974/1994	57	13,875	$26,198,014	$15,000
Montana ❖	1999/2000	8	9,923	$888,000	$0
New Hampshire					
Agricultural Lands Preservation Program	1979/1980	31	2,864	$5,000,000 ^	$15,[illegible]
Land Conservation Investment Program ❖	1987/1988	36	6,232	$5,349,008	$0
New Jersey	1983/1985	635	86,986	$248,958,246 ^	$126,222,445
New York	1996/1998	43	6,843	$13,921,720 ^	$7,712,198
North Carolina	1986/1999	30	4,275	$2,442,000 ^	$342,000
Ohio	1999/1999	3	374	$0	$0
Pennsylvania	1988/1989	1,657	209,338	$419,296,400	$141,325,220
Rhode Island	1981/1985	45 ~	3,719 ~	$15,017,580 ~	$5,676,276~**
Utah	1999/2000	10	30,300	$9,450,000 ^	$320,000
Vermont	1987/1987	297	96,000	$50,000,000 ^	$175,000
STATE TOTALS		5,481	922,287	$1,379,251,714	$375,331,140
LOCAL TOTALS #		1,515	213,654	$604,598,567	
NATIONAL TOTALS		6,996	1,135,941	$1,983,850,281	

STATUS OF STATE PROGRAMS AS OF JANUARY 2002

Funds Spent Per Capita	Funds Available	Funds Available Per Capita	Outstanding Applications	Funding Sources
$0.47 ~	$5,000,000	$0.14	24	Appropriations, bonds, FPP
$6.10	$6,000,000	$1.36	6	Portion of lottery proceeds, FPP
$24.00	$2,000,000	$0.58	N/A	Bonds, FPP
$87.14	$7,000,000	$8.79	170	Appropriations, bonds, portion of lawsuit settlement, transportation funding, FPP
$0.56	$11,000,000	$2.71	141	Appropriations, bonds, FPP
$1.26	$1,000,000	$0.78	10	Appropriations, bonds, royalties from credit card, FPP
$48.01	$27,303,876	$5.08	N/A	Agricultural transfer tax, real estate transfer tax, FPP
$19.76	$6,000,000	$0.94	108	Bonds, transportation funding, FPP
$2.62	$5,000,000	$0.50	1,225	Repayment of tax credits by landowners withdrawing from the state's circuit breaker program, FPP
$0.98	$0	$0.00	14	Appropriations, FPP
$3.97	$0	$0.00	0	Appropriations, FPP
$4.25	$0	$0.00	0	Bonds
$29.34	$80,000,000	$9.43	630	Appropriations, bonds, portion of state sales and use tax, FPP
$0.73	N/A	N/A	37	Bonds, FPP
$0.30	$192,000	$0.02	8	Appropriations
$0.00	$6,250,000	$0.55	0	Appropriations, bonds
$34.12	$40,000,000	$3.26	1,600	Appropriations, bonds, cigarette tax, roll-back property tax payments, FPP
$14.18 ~	N/A	N/A	N/A	Bonds, FPP
$11.28	$2,000,000	$0.88	3	Appropriations
$81.55	$4,500,000	$7.34	60	Appropriations, bonds, property transfer tax, Farms for the Future pilot program, transportation funding, FPP
	$203,245,876		4,036	
	$185,481,972		908	
	$388,727,848		4,944	

STATUS OF STATE PACE PROGRAMS

NOTES

❖ The Montana Agricultural Heritage program is scheduled to sunset in 2003. The New Hampshire Land Conservation Investment Program was terminated in 1993.

~ Figures are from 2001 or earlier data.

^ "Program Funds Spent to Date" includes incidental land acquisition costs and/or personnel costs. North Carolina program spending only covers transaction costs and future monitoring costs, net landowner compensation.

** "Local Contributions to Date" includes contributions from land trusts and private citizens.

For a summary of local activity refer to the "Status of Local PACE Programs" fact sheet.

December 29, 2003

MEMORANDUM

To: The Honorable Marc Basnight, Co-Chairman

The Honorable Jim Black, Co-Chairman

The Honorable Richard Morgan, Co-Chairman

Joint Legislative Commission on Government Operations

The Honorable Charlie Albertson, Co-Chairman

The Honorable Dan Clodfelter, Co-Chairman

The Honorable Pryor Gibson, Co-Chairman

The Honorable Danny McComas, Co-Chairman

Environmental Review Commission

The Honorable David Weinstein, Co-Chairman

The Honorable Stan Fox, Co-Chairman

The Honorable Roger West, Co-Chairman

Joint Appropriations Subcommittee on Appropriations for Natural and Economic Resources

Mr. Jim Johnson, Director, Fiscal Research Division

Ms. Jennifer Haygood, Fiscal Research Division

From: Robert Howard, Chairman, Board of Trustees

Bill Holman, Executive Director

Re: Clean Water Management Trust Fund's 2003 Annual Report

Introduction

We are writing on behalf of the Board of Trustees and staff of the Clean Water Management Trust Fund (CWMTF) to thank the members of the General Assembly of North Carolina for your continuing strong support for investments in clean water and to make our annual report to the General Assembly and the public pursuant to GS 113-145.6A.

GS 143-15(a) requires that the General Assembly appropriate a minimum of $100,000,000 to CWMTF each year. The 2003 General Assembly made many difficult budget decisions and cut many programs, including CWMTF.

HB 397, Current Operations and Capital Improvements Act of 2003, appropriated $62,000,000 to CWMTF in each year of the biennium. This is a cut of $38,000,000 or 38% from CWMTF. Thanks to the appropriation of $62,000,000 from the General Assembly to CWMTF in fiscal year 2003-2004 North Carolina continued to make progress in protecting and restoring water quality in calendar year 2003. As we face another challenging budget in 2004, the future of our state's environmental and economic health depends on your continued support and interest.

Background

The General Assembly for many years has advocated non-regulatory, incentive-based programs to complement North Carolina's environmental regulatory and educational programs and to ensure both a strong economy and healthy environment.

The 1996 General Assembly created the Clean Water Management Trust Fund (CWMTF) (GS 113-145) "to clean up pollution in the state's surface waters and to protect and conserve those waters that are not yet polluted." The CWMTF "shall be used to help finance projects that specifically address water pollution problems and focus on upgrading surface waters, eliminating pollution, and protecting and conserving unpolluted surface waters, including urban drinking water supplies" and "to build a network of riparian buffers and greenways for environmental, educational, and recreational benefit.

The CWMTF is an independent agency housed for administrative purposes in the Department of Environment and Natural Resources (DENR.) A twenty-one-member board of trustees establishes criteria, allocates funds, reviews applications, approves grants, and hires the executive director. Seven members are appointed by the Governor; seven, by the General Assembly upon the recommendation of the President Pro Tempore of the Senate; and seven, by the General Assembly upon the recommendation of the Speaker of the House. An advisory council composed of the Commissioner of Agriculture, Chair of the Wildlife Resources Commission, Secretary of DENR, and Secretary of Commerce or their designees advises the board of trustees.

Local governments or other political subdivision of the state, state agencies, and nonprofit conservation organizations, such as land trusts, may apply for grants. Deadlines for applications are June 1 and December 1 of each year.

The board of trustees typically meets 10 times per year - six times across the state and four times in Raleigh. In 2003, the board met in Greenville, Gastonia, Fayetteville, Cullowhee, Eden, Jacksonville, and Raleigh. In 2004, the board plans to meet in Moore County, Currituck County, Caldwell County, Morganton, Kinston, Greensboro, and Raleigh.

Moneys from CWMTF may be used to acquire conservation easements or land in fee simple to preserve riparian buffers, wetlands, floodplains, and greenways; to restore riparian buffers, streams, and wetlands; to repair failing wastewater collection and treatment systems; to eliminate failing septic tanks and straight pipes; to collect and treat stormwater pollution; to plan water quality projects; and for administration and staff. The board works through three principal committees: acquisitions, infrastructure/wastewater, and restoration/stormwater.

CWMTF applications forms for grants, grant evaluation guidelines, enabling legislation, lists of the board of trustees, staff directory, news releases, and other reports and documents are available at www.cwmtf.net.

The executive director, deputy director, senior scientist, administrative officer, public information officer, and executive assistant are based in the central office in Raleigh. Five field representatives cover the coast, piedmont and mountain regions of the state. A part-time water quality advisor is home based.

Progress & Challenges

The extreme drought and **water quantity** were the water issues of 2002. Heavy rain and Hurricane Isabel in 2003 made flooding, stormwater pollution, and **water quality** the water issues of 2003.

In its North Carolina 20/20 report, the state's Progress Board laid out a series of performance targets to improve environmental quality by the year 2020. Those

targets included increasing the percentage of water bodies fully supporting their uses, ensuring that 100 percent of all North Carolinians have access to clean and safe drinking water, protecting and permanently preserving one million acres by 2010, and improving water quality to ensure the continued viability of the state's fisheries.

In its biennial 303(d) report to the US Environmental Protection Agency the DENR/Division of Water Quality estimates that 3485 miles of streams in North Carolina are impaired, not meeting their designated uses, or are polluted.

In almost all the areas cited by the North Carolina 20/20 report, CWMTF grants are playing a role in reaching those performance targets. Here are some examples:

- The CWMTF and its partners have helped protect 2,908 miles of riparian buffers and preserve 237,366 acres of land, thereby ensuring streams, rivers and lakes can continue or will be able to support their uses.
- CWMTF is helping the State achieve its goal of preserving a million acres of open space, as set out in GS 113A-240, and is helping Governor Easley implement his One North Carolina Naturally initiative.
- CWMTF grants have been used to develop watershed protection plans and to purchase buffers surrounding drinking water supplies.
- The CWMTF has funded 79 riparian buffer, stream and wetland restoration projects totaling over $48.2 million to help maintain and preserve these important water quality filtering systems.
- CWMTF acquisition and restoration grants have been used to protect shellfishing waters, to help restore waters in areas closed to shellfishing, to restore oyster reefs and other fisheries habitat, and to provide public access to public waters.
- The CWMTF has assisted local governments with 99 wastewater improvement projects, investing over $77.2 million to reduce discharges and more effectively treat wastewater so that fewer nutrients and other pollutants enter our rivers.
- CWMTF grants have funded 36 stormwater management projects totaling $29.8 million to reduce pollution from urban runoff and decrease flooding.

Since 1996 the board of trustees has approved 512 grants for a total of $405.1 million. CWMTF grants have leveraged at least $643.3 million or 61% in private and other public funds.

The CWMTF continues to be an important tool in helping local governments protect their water resources. Since 1996, $168.9 million – over forty percent of the $405.1 million in CWMTF grants has gone to cities, counties and other local government agencies to finance local solutions to water quality problems.

All of these efforts are just as important to North Carolina's economic well-being as they are to the health and safety of its citizens and the environment. They enhance both the recreational and commercial fishing industries, strengthen North Carolina's travel and tourism industry, and help maintain North Carolina's high quality of life.

As the Progress Board asserts in its report, "...states can and do have strong economies and simultaneously protect the environment. In fact, the states with the strongest environmental records also claim the distinction of having the best job opportunities and climate for long term economic development."

2003 Highlights

The CWMTF Board of Trustees and staff reviewed 70 applications requesting over $103 million in the spring of 2003 (2002B Cycle) and 101 applications requesting over $174 million in the fall of 2003 (2003A Cycle) for a total of 171 applications requesting over $277 million in 2003.

Thanks to appropriations from the General Assembly and to the closing out of old grants the Board of Trustees of CWMTF approved 88 water quality grants totaling $72,133,700 and 17 mini-grants totaling $385,400 or a grand total of 105 grants for $72,519,100 in calendar year 2003. The total invested in CWMTF-funded water quality projects, including CWMTF and other public and private funds was $220,766,370 in calendar year 2003. A list of the projects is attached to this report.

Protection of the 4468-acre **Needmore tract on the Little Tennessee River in Swain and Macon Counties** has been a high priority of the NC Wildlife Resources Commission and The Nature Conservancy for many years. CWMTF provided $6.6 million to assist in the purchase. The Ecosystem Enhancement Program, Natural Heritage Trust Fund, US Fish and Wildlife Service, and private funds provided the balance of the funds needed. Protecting Needmore will conserve 26 miles of the Little Tennessee River and 37 miles of tributary streams. It also helps conserve 57 species of fish, dozens of Cherokee and historic sites, and the largest cluster of mountain floodplain forests remaining the Southern Appalachians.

CWMTF, Natural Heritage Trust Fund, The Nature Conservancy, Wildlife Resources Commission and US Navy partnered to acquire **the 2500-acre Beck tract in Onslow County** for the state's gamelands program. CWMTF provided $2,146,000. Acquisition of the Beck tract protects Stones Creek and the New River. It will also prevent encroachment on Camp Lejeune.

CWMTF continues to work with municipalities and counties on a variety of projects to protect and restore water quality. The **Town of Troy** replaced chlorination of its wastewater with ultraviolet radiation treatment in 2003 with help from CWMTF. Troy and CWMTF are working to prevent and reduce pollution of Densons Creek by improving wastewater treatment and by acquiring riparian buffers and greenways along the creek. CWMTF has funded four phases of greenway acquisition. The Ecosystem Enhancement Program (EEP) may fund Phase 5 in 2004.

The **City of Greensboro** with assistance from CWMTF acquired a key property for its stormwater treatment project on South Buffalo Creek. CWMTF has provided $1,370,000 to Greensboro to acquire property and to construct its stormwater project.

Mecklenburg County and CWMTF continue our efforts to clean up Sugar Creek and other streams in Charlotte. Mecklenburg County dedicated a constructed wetland at the Bruns Avenue School on April 25, 2003. CWMTF has provided $3.9 million to help Mecklenburg County and Charlotte restore urban streams.

Bessemer City has decommissioned its wastewater treatment plant, connected to Gastonia's wastewater system, and reduced infiltration and inflow in its sewer system with $2,000,000 million grant from CWMTF. Regional wastewater systems generally collect and treat pollution to higher standards at lower costs.

Working with the Southern Appalachian Highlands Conservancy CWMTF acquired a conservation easement on the **Town of Canton's pristine 870-acre Rough Creek Watershed** with a $689,000 grant. SAHC raised $429,000 in private funds. Canton reinvested the funds to improve its drinking water system and its parks system.

The NC Coastal Land Trust (NCCCLT) acquired 911 acres from International Paper (IP) in November to continue its efforts to protect **Town Creek in Brunswick County**. CWMTF provided $2 million. NCCLT will transfer the property to Brunswick County for a local park. NCCLT, IP, and CWMTF have protected more than 10,000 acres along Town Creek since 1997.

Working with The Conservation Fund CWMTF, EEP, NHTF provided funding to acquire part of the **headwaters of the Yadkin River**, the 5621-acre Mingo tract in Caldwell and Wilkes Counties. The Wildlife Resources Commission will manage the property as gamelands.

Conservation Reserve Enhancement Program (CREP)

CWMTF has provided state funds to match over $200 million in US Department of Agriculture funds for the Conservation Reserve Enhancement Program (CREP). CWMTF provided a grant of $5.4 million to the DENR/Division of Soil and Water Conservation (DSWC) in 1998 for the first phase of CREP. CWMTF provided a second grant of $4.2 million to DSWC in 2003 for Phase 2 of CREP.

CWMTF and DSWC have worked together to increase the incentives offered to farmers who sign up for permanent conservation easements. CWMTF has approved expansion of CREP into the Pasquotank, Roanoke, White Oak, and lower Cape Fear Rivers. The Chowan, Tar-Pamlico, Neuse, and upper Cape Fear Rivers were already covered.

The Soil and Water Conservation Commission will have to amend its rules in 2004 to incorporate the new incentives for farmers.

CWMTF has urged DSWC to increase processing of conservation easements and to reduce the backlog of enrollments in 2004. DSWC will report to the Board of CWMTF in April 2004 on its progress. DSWC will probably request additional funding from CWMTF in June 2004. CWMTF supports providing the state matching funds to continue CREP in NC – if DSWC improves administration of the program. If DSWC does not improve administration, CWMTF may not provide Phase 3 funding for CREP.

CWMTF is working with DSWC, local soil and water conservation districts, the US Natural Resources Conservation Service, and others to leverage other federal Farm Bill conservation programs, such as the wetlands reserve program (WRP) and the environmental quality incentives program (EQIP).

Ecosystem Enhancement Program (EEP)

The NC Departments of Environment and Natural Resources and Transportation and the US Army Corps of Engineers established the Ecosystem Enhancement Program (EEP) in 2002 to improve coordination and the quality of stream and wetland mitigation projects.

CWMTF and EEP coordinate their efforts. CWMTF refers all acquisition and restoration applications to EEP for review and potential funding. As of December 1, 2003 the Board of Transportation had approved full or partial funding of at least 12 CWMTF projects valued at over $37 million.

CWMTF will share its expertise and experience in working with local governments and land trusts on contracts and conservation easements with EEP. CWMTF believes that CWMTF, EEP, and the public will benefit from consistent policies on contracts and conservation easements.

DuPont State Forest Settlement

In 2000 CWMTF provided $12.5 million to DENR/Division of Forest Resources (CWMTF Project #1999A-005) to acquire a critical 2,200-acre inholding in DuPont State Forest in Transylvania and Henderson Counties. Unfortunately the State could not reach an agreement with the property owner, and the Council of State authorized condemnation of the property in October 2000.

The property owner and the State settled on the value of the property in August 2003. The Office of State Budget and Management (OSBM) transferred $12.0 million from CWMTF to pay for the settlement. The Board of Trustees of CWMTF did not approve the transfer. OSBM committed to try to reimburse CWMTF $8.0 million with $4.0 million coming from DENR and $4.0 million coming from Department of Transportation wetland and stream mitigation funds. As of December 29, 2003 CWMTF had not received any reimbursement for the DuPont State Forest settlement.

Base Realignment and Closure (BRAC)

The US Department of Defense will consider realignment and closure of military bases in 2005. The Department of Defense, the State of North Carolina, and many local governments are working together to prevent and reduce encroachment on military bases by acquiring conservation easements and land in fee simple and by regulating land uses.

In 2003 CWMTF, Natural Heritage Trust Fund, The Nature Conservancy, and the US Navy worked with the Wildlife Resources Commission to acquire the Beck tract (CWMTF Project # 2001B-036) in Onslow County to help protect Camp Lejeune.

The Wildlife Resources Commission applied to CWMTF for additional funds to protect water quality and Camp Lejeune in December. Goldsboro and Wayne County also applied to CWMTF for funds to acquire floodplain and converted wetlands near Seymour Johnson Air Force Base. With assistance from CWMTF the Sandhills Area Land Trust is conducting a riparian corridor conservation study on the Little River – the northern boundary of Fort Bragg.

CWMTF and the other conservation trust funds can assist the State and the military in protecting both the environment and the training mission of our bases.

Stormwater Problems and Phase II Rules

CWMTF is one of the few sources of funds local governments can seek to reduce stormwater pollution and flooding and to comply with EPA and state Phase II stormwater rules. Thirty-three counties and 123 municipalites are covered by EPA and State Phase I and Phase II Stormwater rules. CWMTF has funded 36 local stormwater projects totaling $28.9 million.

2003 Legislative Action

The 2003 General Assembly demonstrated that protecting and restoring water quality remains a high priority of the State. HB 397, Current Operations and Capital Improvements Act of 2003, appropriated $62,000,000 to CWMTF in fiscal year 2002-2003 and $62,000,000 to CWMTF in fiscal year 2004-2005. The Office of State Budget and Management is withholding 2.0% of CWMTF's 2003-2004 appropriation or $1,240,000.

Section 11.7 of HB 387 directed the Property Tax Subcommittee of the Revenue Laws Study Committee to study the positive and negative impacts of conservation land acquisition on local government ad valorem tax revenues. The subcommittee had not considered this issue as of December 1, 2003.

Section 11.8(b) of HB 397 authorized CWMTF for fiscal year 2003-2004 to spend up to $4,100,000 to match federal, State, local, and private farmland preservation and forestland preservation funds and to acquire permanent conservation easements on working farms and forests. CWMTF has participated in some federal farmland preservation and forest legacy projects in calendar year 2003.

Section 6.8 of HB 397 directed the NC Department of Administration, in consultation with other agencies, to develop and implement a State-owned surplus real property disposal system. CWMTF recommends that surplus properties with high conservation values be allocated to conservation agencies such as the Division of Parks & Recreation and Wildlife Resources Commission. CWMTF also recommends that the State place permanent conservation easements on 100-year floodplains, riparian buffers, and wetlands before selling surplus properties.

Section 6.21 of HB 397 strengthened reporting requirements for non-state entities that receive state funds. CWMTF has amended its contracts to require non-state entities to comply with GS 143-6.1.

Section 6.23(a) of HB 397 authorized the Office of State Budget and Management to transfer up to twenty percent of the balance of any special fund other than CWMTF, NHTF, and PARTF to the Reserve for Special Funds Transfer. If OSBM determines that transfers from other special funds are insufficient, then it may transfer funds from CWMTF, NHTF, and PARTF. As of December 19, 2003 OSBM had not transferred any funds from CWMTF for this purpose.

The 2003 General Assembly also continued its strong support for CWMTF partners, the Parks and Recreation Trust Fund (PARTF) and Natural Heritage Trust Fund (NHTF). HB 855, Special (Vehicle) Registration Plates, by Representative Martha Alexander and others, increased the fee for personalized license plates by $10 and dedicated half of the increase to the Parks and Recreation Trust Fund and half of the Natural Heritage Trust Fund. The General Assembly established the new Mayo River State Park (HB 1078) in Rockingham County and Haw River State Park (HB 1025) in Guilford and Rockingham Counties. The Division of Parks & Recreation will probably apply to CWMTF in the future to help acquire land for these two new state parks.

The CWMTF Board of Trustees supported SB 831, Stagger CWMTF Appointments, by Senator Charlie Albertson, to restructure the terms of board members to increase continuity in the decision-making process. Under the existing law the terms of two-thirds of the board expired on December 31, 2002. SB 831 also added three appointments to the board. Governor Easley signed SB 831 on August 14, 2003.

HB 738, Expand CWMTF Purpose, by Representative Paul Miller and others, and SB 551, Expand CWMTF Purpose, by Senator Jeanne Lucas and others, were referred to the House Committee on Environment and the Senate Committee on Appropriations/Base Budget, respectively, and were not acted upon.

The Year Ahead

The CWMTF board and staff will review 83 applications requesting $151.8 million this spring (2004A Cycle). CWMTF will also receive applications on June 1, 2004 and review them in the fall (2004B Cycle). Specific grant requests submitted on December 1, 2003 for the spring 2004 cycle include:

- A request for $1.7 million from the City of Goldsboro and Wayne County to help protect Stoney Creek, a tributary of the Neuse River, and to prevent encroachment on Seymour Johnson Air Force Base;
- A request for $891,150 from DENR/Division of Forest Resources to help protect Mountain Island Lake and to expand the Mountain Island Lake Educational State Forest in Gaston and Lincoln Counties;
- A request for $3.2 million from the Southern Appalachian Highlands Conservancy to help protect water quality in Reems Creek, a tributary of the French Broad River in Buncombe County;
- A request for $7.6 million from the Town of Spring Lake in Cumberland County to eliminate failing septic tanks and reduce pollution of the Little River, a major tributary of the Cape Fear River; and
- A request for $7.7 million from DENR/Division of Soil & Water Conservation to implement phase three of the swine lagoon buyout program in the 100-year floodplain.

CWMTF may centralize water quality monitoring of its restoration and stormwater projects to improve quality and reduce costs in 2004. CWMTF is reviewing its policies regarding stewardship and long-term management of properties that are acquired with CWMTF funds. CWMTF is also reviewing the criteria by which it evaluates projects.

CWMTF hopes to develop consistent contracts, conservation easements, monitoring requirements, and stewardship policies with EEP.

Planning, design, permitting, bidding, and construction of wastewater, stormwater, and restoration projects take many years. CWMTF in 2003 began to start funding the design and permitting phase of projects to ensure that water quality objectives are being met, to develop more accurate estimates of cost, and to manage its cash balance. CMWTF has also reduced the average time to implement acquisition projects from 36 months to 12-18 months. CWMTF will continue to work to manage its cash balance in 2004.

2004 Legislative Issues

State law requires an appropriation of $100 million to CWMTF in 2005-2006 and future years. CWMTF will work with the General Assembly this year to secure appropriations to continue North Carolina's progress in protecting and restoring water quality.

CWMTF supports the work of its partners: the Conservation Income Tax Program, Natural Heritage Trust Fund, Parks and Recreation Trust Fund, Farmland Preservation Trust Fund, and the new Ecosystem Enhancement Program.

The 2003 General Assembly considered SB 683, State Capital Facilities Financing, by Senators John Kerr and David Hoyle, and HB 1227, Finance Parks and Natural Heritage, by Representative Gordon Allen and others. Many provisions of SB 683 and HB 1227 were incorporated into the budget bill, HB 397. CWMTF is interested in certificates of participation financing for natural heritage, parks, clean water, and other purposes.

Tier I and Tier II counties are concerned that acquisition of land in fee simple by the Wildlife Resources Commission, Division of Parks & Recreation, and other agencies for conservation purposes is reducing their property tax base. CWMTF has encouraged the sellers and buyers of conservation properties in Tier I and Tier II counties where thirty percent or more of the land is in fee simple conservation ownership to provide a one-time payment worth ten times the ad valorem taxes of the property to the county. CWMTF respectfully recommends that the 2004 General Assembly consider legislation to enable CWMTF to provide some Tier I and Tier II counties with a one-time payment to compensate them for the loss of property tax revenues.

The 2002 General Assembly enacted SB 1161, Present Use Taxation Amendments, by Senator Fletcher Hartsell. SB 1161 clarified that farm or forestland taxed at present use would remain taxed at present use after a conservation easement was donated or acquired. CWMTF funds acquisition of many conservation easements. SB 1161 also directed that the Property Tax Subcommittee of the Revenue Laws Study Committee address other issues associated with property taxes and conservation easements. As of December 29, 2003 the Property Tax Subcommittee had not considered these issues.

CWMTF is available to assist the Governor and General Assembly in their efforts to prevent inappropriate development in floodplains and to mitigate flood hazards.

CWMTF is available to provide technical assistance to members of the General Assembly in the development of an incentive-based air quality program such as the Clean Air Trust Fund, proposed in SB 981 by Senators Steve Metcalf and Joe Sam Queen and HB 866 by Representative Phil Haire and others.

Please contact me if you need more information.

Listing of CWMTF Projects Funded During Calendar Year 2003
(Listed by Cycle and In Alphabetical Order)

2002B Projects Funded by Board Action, July, 2003 (received Dec 1, 2002)

Project Number	Application Name	Amount Requested	Board Funded	Total Project Cost
2002B-001	Blue Ridge Rural Land Trust - Acq./Brushy Mts., Moravian Cr	$276,000	$276,000	$2,976,000
2002B-003	Blue Ridge Rural Land Trust - Acq./French Broad Tracts	$127,200	$100,000	$1,507,200
2002A-001	Bryson City, Town of - Acq/ Lands Creek	$1,232,166	$1,531,000	$1,964,066
2002B-401	Buncombe SWC District - Restoration/Newfound Cr.	$450,000	$415,000	$616,200
2002B-004	Catawba Lands Conservancy - Acq./Anderholt Tract, S. Fork Catawba R.	$346,000	$343,000	$350,000
2002B-005	Catawba Lands Conservancy - Acq./Wilson Farm, S. Fork Catawba R.	$247,700	$245,000	$972,300
2002B-006	Charlotte, City of - Acq./Mt. Island Lake, Gar Cr.	$500,000	$250,000	$1,000,000
2002B-603	Dover, Town of - Wastewater Regionalization/Mosely Cr	$333,000	$333,000	$3,338,000
2002B-007	Foothills Conservancy - Acq./Adams Tract, Left Prong Catawba R.	$719,500	$821,000	$1,581,500
2002B-008	Granite Falls, Town of - Acq./Lake Rhodhiss	$889,555	$890,000	$1,805,000
2002B-501	Greater Badin Water & Sewer District - Sewer System Rehabilitation/Little Mt. Cr.	$1,958,000	$1,677,000	$1,786,438
2002B-604	LaGrange, Town of - Septic Systems/Mosely Cr.	$400,000	$400,000	$452,000
2002B-703	Mecklenburg Co. - Stormwater/Little Sugar Cr., Belmont Branch	$1,450,000	$1,200,000	$3,262,000
2002B-402	Mecklenburg County - Restoration/Little Sugar Cr. Greenway Trail	$400,000	$400,000	$2,000,000
2002B-403	Middle Fork Greenway Assoc. - Restoration/S. Fork New R. Greenway	$60,560	$61,000	$3,911,060
2002A-707	Mount Airy - Stormwater/ Lovills Creek	$440,000	$81,000	$857,500
2002B-009	National Committee for the New River - Acq./Blackburn Tract, Todd S. Fork Greenway	$152,350	$147,700	$173,250
2002B-011	NC Coastal Federation - Acq./Stump Sound	$971,540	$972,000	$1,011,540
2002B-012	NC Coastal Land trust - Acq./IP Realty, Town Cr.	$2,094,700	$2,095,000	$2,869,050
2002B-013	NC Coastal Land Trust - Acq./Pettiford Cr II	$2,779,000	$603,000	$4,685,000
2001B-028	NC Coastal Land Trust-Weyerhaeuser Tracts	$1,375,358	$1,376,000	$3,324,150
2002B-015	NC Parks and Recreation - Acq./Eno R. State Park	$2,318,400	$47,000	$7,025,607
2002B-405	NC Parks and Recreation - Restoration/Stone Mt. State Park, Big Sandy Cr.	$425,000	$290,000	$1,239,800
2002B-016	NC Wildlife Resources Commission - Acq./Needmore Tract	$13,338,456	$6,660,000	$17,550,600
2002B-017	NC Wildlife Resources Commission - Acq./Risky Business, Roanoke Sound	$375,000	$375,000	$375,000

2001B-033	NC Wildlife Resources Commission - Chowan River Tracts	$3,308,000	$3,000,000	$3,933,000
2002A-026	Piedmont Land Conservancy - Acq/ Upper Mitchell R. Winebarger Tract	$3,397,221	$1,408,000	$3,438,098
2002B-803	Piedmont Land Conservancy - Planning/Upper Dan R.	$173,235	$160,000	$211,735
2002B-804	Pilot View RC&D - Planning/Upper Yadkin Sediment	$294,800	$295,000	$422,500
2002B-406	Pilot View RC&D - Restoration/Tom's Cr.	$191,250	$192,000	$689,250
2002B-407	Pilot View RC&D - Restoration/Yadkin Farmland Project	$961,000	$314,000	$1,796,600
2002A-404	Pilot View RC&D. - Stream Restoration & Stormwater/ Koerner Place Cr.	$238,000	$175,000	$313,000
2002B-018	Pitt SWC District - Acq./Little Contentnea	$25,000	$25,000	$67,750
2002B-606	Powellsville, Town of - Waste Treatment Facility Construction/Ahoskie Cr.	$474,800	$475,000	$3,479,800
2002A-708	Raeford, City of - Stormwater Wetland/ Peddler's Branch Construction	$390,885	$296,000	$390,885
2002B-021	Troy, Town of - Acq./Denson's Cr. Phase IV	$271,500	$272,000	$271,500
2002B-608	Tyrell Co. Water & Sewer District 1 - Septic Systems/Scuppernong II	$1,096,626	$979,000	$3,204,472
2002B-609	Tyrell Co. Water & Sewer District 2 - Septic Systems/Scuppernong II	$274,717	$225,000	$2,747,169
2002B-704	UNC Ashville - Stormwater/French Broad R.	$69,200	$70,000	$112,370
2002A-406	Wake Forest - Stream Restoration/ Richlands Cr. Restoration & Greenway	$2,734,739	$240,000	$1,865,798
2002B-408	Watauga SWC District - Restoration/Agricultural BMPs	$37,500	$38,000	$50,000
2002B-805	Westerm Carolina University - Planning/Stream Restoration BMP Evaluation	$166,430	$167,000	$220,960
	2002B Totals	**$47,764,388**	**$29,919,700**	**$89,848,148**

2003A Projects Funded by Board Action, November 18, 2003 (received June 1, 2003)

Project Number	Application Name	Amount Requested	Board Funded	Total Project Cost
2003A-601	Bay River Metropolitan Sewer District- Septic Tanks/ Reelsboro, Goose & Broad creeks	$3,000,000	$136,000	$3,010,725
2002B-601	Beaufort Co. Water District V - Septic Systems/Pantego Cr.	$350,000	$350,000	$3,350,000
2003A-801	Biscoe, Town of- Plan./ Regional Wastewater Feasability, Cedar Cr.	$36,000	$36,000	$40,000
2003A-502	Bridgeton, Town of- Wastewater/ Neuse Non-discharge	$773,475	$116,000	$874,905
2003A-701	Carteret Community College- Storm./ Bogue Sound Constructed Wetland	$420,000	$420,000	$785,364
2003A-008	Catwaba Lands Conservancy- Acq./ Rollins & Banker Tracts, South Fork River	$359,975	$286,000	$374,000
2003A-503	Clarkton, Town of- Wastewater/ Brown Marsh Swamp	$3,000,000	$185,000	$3,000,000
2002A-005	Conservation Fund - Acq/ Scott Creek	$4,057,000	$4,057,000	$7,699,000

2003A-010	Conservation Fund- Acq./ Goshen Swamp & Grove Creek	$98,400	$55,000	$188,900
2003A-804	Conservation Trust for NC- Plan./ Riparian Corridors, Multi-Basin	$595,000	$625,000	$620,000
2003A-506	Farmville, Town of- Wastewater/ Little Contentnea Creek	$1,963,500	$119,000	$2,310,000
2002B-702	Fayetteville, City of - Stormwater/Little Cross Cr.	$2,102,578	$766,000	$3,051,275
2003A-012	Foothills Conservancy of NC- Acq./ Blue Ridge Parkway, Linville River	$327,800	$328,000	$428,800
2003A-015	High Country Conservancy- Acq./ Valle Crucis, Craborchard Creek	$705,740	$706,000	$1,213,990
2003A-703	Kinston, City of- Storm./Country Club, Catfish Branch	$249,645	$25,000	$249,645
2003A-510	Maxton, Town of- Wastewater/ Shoe Heel Creek	$2,349,700	$154,000	$2,349,700
2003A-705	Mecklenburg County- Storm/ Mt. Island Lake, McDowell Creek	$1,500,000	$200,000	$3,000,000
2003A-706	Mecklenburg Soil & Water Conservation District- Storm./ Briar Creek	$30,000	$30,000	$60,000
2003A-017	National Committee for the New River- Acq./ Wagner Tract,Todd South Fork Greenway	$81,050	$82,000	$87,050
2003A-019	Nature Conservancy, The- Acq./ Corbett Tract, NE Cape Fear	$670,177	$671,000	$670,177
2003A-023	NC Coastal Land Trust- Acq./ Humphrey Tract, Shaken Creek	$365,445	$366,000	$650,045
2003A-024	NC Coastal Land Trust- Acq./ McKeithan Tract, NE Cape Fear	$991,820	$992,000	$2,105,820
2003A-026	NC Coastal Land Trust- Acq./ Weyerhaeuser Tract, Nevill's Creek	$1,066,700	$489,000	$489,000
2003A-807	NC Coastal Management- Plan./ Pivers Island Stormwater Management	$45,500	$40,000	$80,769
2002B-404	NC Cooperative Extension Service - Restoration/Buffalo Cr.	$396,900	$71,000	$793,800
2003A-027	NC Forest Resources- Acq./ Clemmons Forest, Strickland Creek	$1,771,285	$1,772,000	$3,542,570
2003A-403	NC Marine Fisheries- Rest./ Oyster Sanctuaries, Pamlico Sound	$699,375	$140,000	$773,260
2003A-029	NC Parks & Recreation- Acq./ Pettigrew State Park, Scuppernong River	$889,500	$890,000	$1,224,500
2002A-305	NC Soil & Water Conservation - CREP	$5,338,027	$4,200,000	$29,221,100
2003A-604	NC State University- Septic Tanks/ Sertoma 4-H Center, Vade Mecum Creek	$231,465	$232,000	$316,555
2003A-031	NC Wildlife Commission- Acq./ Davis Tract, Alligator River	$373,500	$374,000	$373,500
2003A-030	NC Wildlife Resources Commission- Acq./ Bolin Knob Tract, Silver Creek	$235,422	$236,000	$948,022
2003A-035	NC Wildlife Resources Commission- Acq./ Mingo Tribal Tract, Joes Creek	$13,401,300	$13,500,000	$22,000,000
2003A-511	Pembroke, Town of- Wastewater/ Lumber River	$2,130,000	$114,000	$2,150,000

2003A-404	Pilot View RC&D, Inc.- Rest./ Upper Linville River	$1,882,500	$257,000	$2,132,500
2003A-512	Ramseur, Town of- Wastewater/ Deep River Collection Rehabilitation	$399,750	$278,000	$479,750
2003A-808	Resource Institute, Inc.- Plan./ Hitchcock Creek	$214,102	$215,000	$647,756
2003A-038	Sandyfield, Town of- Acq./ Beaverdam Creek Wetlands	$308,500	$161,000	$308,500
2003A-708	Smithfield, Town of- Storm./ Spring Branch Constructed Wetland	$660,000	$660,000	$906,360
2003A-039	Southern Appalachians Highlands Conservancy- Acq./ Flat Creek Watershed	$3,927,800	$3,928,000	$7,737,800
2003A-405	Southwestern NC RC&D, Inc.- Rest./ Pigeon River	$666,865	$207,000	$806,205
2003A-040	Trangle Land Conservancy- Acq./ Regional Park, Marks Creek	$1,775,335	$1,776,000	$3,550,670
2003A-606	Trent Woods, Town of- Septic Tanks/ Trent River	$3,200,000	$524,000	$7,690,000
2003A-513	Troy, Town of- Wastewater/ Densons Creek Reuse	$1,242,000	$55,000	$1,340,000
2003A-514	Tuckaseigee Water & Sewer Authority- Wastewater/ Dix Gap Creek Collection	$348,795	$353,000	$497,747
2003A-515	Wallace, Town of- Wastewater/ Rock Fish Creek Regionalization	$1,036,870	$1,037,000	$6,154,720
	2003A Totals	**$66,268,796**	**$42,214,000**	**$130,284,480**

Standard Minigrants Funded During Calendar Year 2003

Project Number	Application Name	Amount Requested	Board Funded	Total Project Cost
2002M-005	Blue Ridge Rural Land Trust Mini-Grant/ Waterfall Creek	$25,000	$25,000	$25,000
2003M-007	Foothills Conservancy of NC Minigrant - Catawba R	$25,000	$25,000	$25,000
2002M-007	Foothills Conservancy of North Carolina Mini-Grant/Catawba River (Withdrawn)	$25,000	$25,000	$25,000
2003M-004	Haw River Assembly - Minigrant: Alston Qtr., Saxapahaw	$25,000	$25,000	$25,000
2002M-006	New Hanover Soil & Water Conservation District Mini-Grant/Eagle Island	$25,000	$25,000	$25,000
2003M-003	Piedmont Land Conservancy Mini-Grant - Len's Knob	$25,000	$25,000	$25,000
2002M-004	Pitt County Comm. Schools and Rec Mini-Grant/ Swift Creek	$25,000	$25,000	$25,000
2003M-002	Sandhills Area Land Trust - Methodist College River Tract	$25,000	$25,000	$25,000
2003M-006	Town of Atlantic Beach Minigrant - Money Island	$25,000	$25,000	$25,000
	Standard Minigrant Total	**$225,000**	**$225,000**	**$225,000**

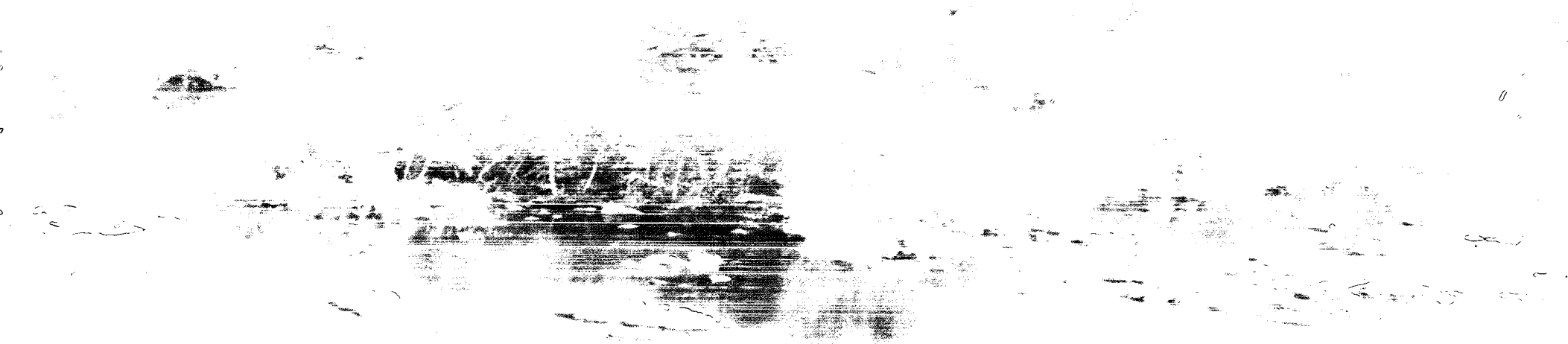
Donated Conservation Easement Minigrants Funded During Calendar Year 2003

Project Number	Application Name	Amount Requested	Board Funded	Total Project Cost
2003D-004	Blue Ridge Rural Land Trust - Donated Minigrant, Johnston Tract/ Cales and Bussels Creeks	$25,000	$25,000	$25,000
2003D-003	Blue Ridge Rural Land Trust - Donated Minigrant, Tate Farm/ Ripchin Creek	$25,000	$25,000	$25,000
2003D-002	Blue Ridge Rural Land Trust-Donated Minigrant, Ketchum Tract/ Piney Fork Creek	$25,000	$25,000	$25,000
2003D-001	Carolina Mountain Land Conservancy- Donated Minigrant, Linneman Tract/ Green River	$21,500	$22,000	$271,500
2003D-006	Catawba Lands Conservancy - Donated Minigrant, Colt Thornburg tract/ South Fork Catawba River and Coley Creek	$9,866	$10,000	$9,866
2003D-007	Catawba Lands Conservancy - Donated Minigrant, Friday Farm tract/ Hoyle Creek	$15,333	$16,000	$15,333
2003D-008	Catawba Lands Conservancy - Donated Minigrant, Oakwood Farm tract/ South Fork Catawba River	$24,643	$25,000	$24,643
2003D-005	Tar River Land Conservancy - Donation Minigrant, Brittain Tract/ Lynch Creek	$12,400	$12,400	$12,400
	Donated Conservation Easement Minigrant Total	**$158,742**	**$160,400**	**$408,742**

2003 Year Totals	Amount Requested	Board Funded	Total Project Cost
2002B	$47,764,388	$29,919,700	$89,848,148
2003A	$66,268,796	$42,214,000	$130,284,480
Subtotal Water Quality Projects	$114,033,184	$72,133,700	$220,132,628
Minigrants	$383,742	$385,400	$633,742
Grand Total for 2003	**$114,416,926**	**$72,519,100**	**$220,766,370**

e North Carolina Clean Water Management Trust Fund

ANNUAL REPORT



2003

The North Carolina Clean Water Management Trust Fund

2003 Annual Report

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Introdu

2003 provided a sharp contrast to the water resources issues that gripped North Carolina the year before. Heavy rains and Hurricane Isabel brought an end to the extreme drought that was the water issue of 2002. In its wake, the end of the drought left the state grappling once again with flooding, stormwater pollution and water quality as opposed to quantity in 2003.

North Carolina continued to feel the effects of a sluggish post 9/11 economy. The 2003 General Assembly was faced with once again making many difficult budget decisions and as in recent years, many state programs saw their funding cut, including the Clean Water Managment Trust Fund.

At the same time, local governments, along with state agencies and non-profit conservation groups turned to CWMTF as a much needed resource and partner in their efforts to deal with the water quality issues before them. CWMTF recorded a record grant cycle in 2003; on June 1, the agency received the largest number of applications in its seven year history requesting a record number of grant funds. Including deferred projects, CWMTF trustees reviewed a total of 101 grants requesting $174 million in the 2003A cycle.

Recognizing the importance of water quality to the health of the state's residents and its economy, the General Assembly through HB 397, Current Operations and Capital Improvements Act of 2003, appropriated $62,000,000 to CWMTF in each year of the biennium. As a result North Carolina continued to make progress in protecting and restoring water quality in calendar year 2003. As we face another challenging budget in 2004, the future of our state's environmental and economic health depends on continued support and interest.

Background

For many years, the North Carolina General Assembly has advocated non-regulatory, incentive-based programs to complement North Carolina's environmental regulatory and educational programs and to ensure both a strong economy and healthy environment.

In 1996, the General Assembly created the Clean Water Management Trust Fund (CWMTF) (GS 113-145) "to clean up pollution in the state's surface waters and to protect and conserve those waters that are not yet polluted."

The CWMTF "shall be used to help finance projects that specifically address water pollution problems and focus on upgrading surface waters, eliminating pollution, and protecting and conserving unpolluted surface waters, including urban drinking water supplies" and "to build a network of riparian buffers and greenways for environmental, educational, and recreational benefit."

The CWMTF is an independent agency housed for administrative purposes in the Department of Environment and Natural Resources (DENR.) A 21-member board of trustees establishes criteria, allocates funds, reviews applications, approves grants, and hires the executive director. Seven members are appointed by the Governor; seven by the General Assembly upon the recommendation of the President Pro Tempore of the Senate; and seven by the General Assembly upon the recommendation of the Speaker of the House. An advisory council composed of the Commissioner of Agriculture, Chair of the Wildlife Resources Commission, Secretary of DENR, and Secretary of Commerce or their designees advises the board of trustees.

Local governments or other political subdivisions of the state, state agencies, and nonprofit conservation organizations, such as land trusts, may apply for grants. Deadlines for applications are June 1 and December 1 of each year.

The board of trustees typically meets 10 times per year - six times across the state and four times in Raleigh. In 2003, the board met in Greenville, Gastonia, Fayetteville, Cullowhee, Eden, Jacksonville, and Raleigh. In 2004, the board plans to meet in Moore County, Currituck County, Caldwell County, Morganton, Kinston, Greensboro, and Raleigh.

Monies from CWMTF may be used to acquire conservation easements or land in fee simple to preserve riparian buffers, wetlands, floodplains, and greenways; to restore riparian buffers, streams, and wetlands; to repair failing wastewater collection and treatment systems; to eliminate failing septic tanks and straight pipes; to collect and treat stormwater pollution; to plan water quality projects; and for administration and staff. The board works through three principal committees: acquisitions, infrastructure/wastewater, and restoration/stormwater.

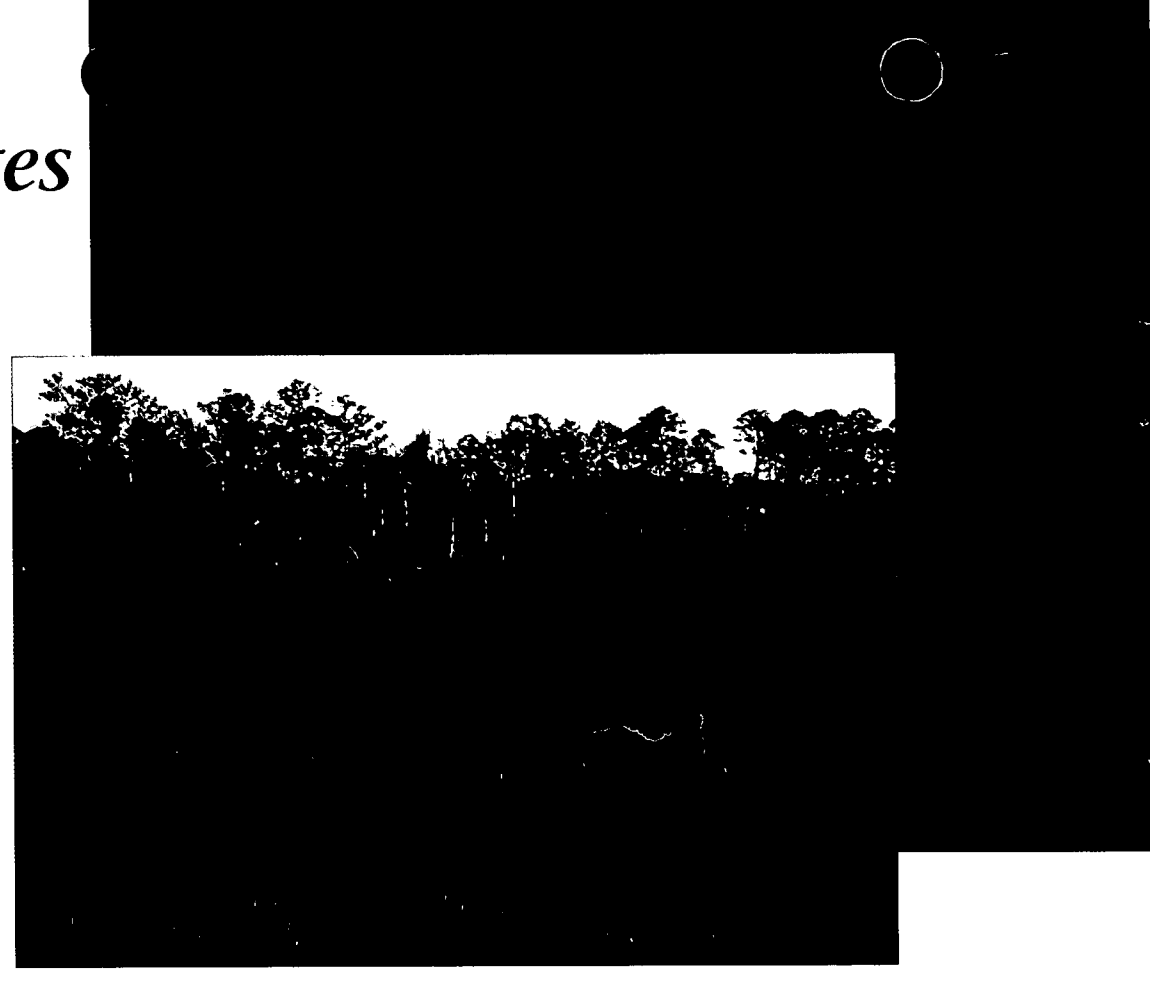
CWMTF application forms for grants, grant evaluation guidelines, enabling legislation, lists of the board of trustees, staff directory, news releases, and other reports and documents are available at www.cwmtf.net.

The executive director, deputy director, senior scientist, administrative officer, public information officer, and executive assistant are based in the central office in Raleigh. Five field representatives cover the coast, piedmont and mountain regions of the state. A part-time water quality advisor is home based.

Progress and Challenges

In 2003 the CWMTF continued to make strides in reaching performance targets outlined in the state's Progress Board report entitled **North Carolina 20/20.** Designed to significantly improve water quality throughout the state by the year 2020, the targets included increasing the percentage of water bodies fully supporting their uses, ensuring that 100 percent of all North Carolinians have access to clean and safe drinking water, protecting and permanently preserving one million acres by 2010, and improving water quality to ensure the continued viability of the state's fisheries.[1]

In addition, CWMTF is helping the state achieve its goal of preserving a million acres of open space, as set out in GS 113A-240, and is helping Governor Easley implement his One North Carolina Naturally initiative.



The Numbers

In almost all the areas cited by the North Carolina 20/20 report, CWMTF grants are playing a role in reaching those performance targets. Here are some examples:

- The CWMTF and its partners have helped protect 2,908 miles of riparian buffers and preserve 237,366 acres of land, thereby ensuring streams, rivers and lakes can continue or will be able to support their uses, CWMTF grants have been used for watershed planning projects and to purchase buffers surrounding drinking water supplies.
- The CWMTF has funded 79 riparian buffer, stream and wetland restoration projects totaling over $48.2 million to help maintain and preserve these important ecosystems.

[1] North Carolina 20/20: A Report About the Future of North Carolina; N.C. Progress Board, December 2001

- ◇ CWMTF acquisition and restoration grants have been used to protect shellfishing waters, to help restore waters in areas closed to shellfishing, to restore oyster reefs and other fisheries habitats, and to provide access to public waters.

- ◇ The CWMTF has assisted local governments with 99 wastewater improvement projects, investing over $77.2 million to reduce discharges and more effectively treat wastewater so that fewer nutrients and other pollutants enter our rivers.

- ◇ CWMTF grants have funded 36 stormwater management projects totaling $29.8 million to reduce pollution from urban runoff and decrease flooding.

All of these efforts are just as important to North Carolina's economic well-being as they are to the health and safety of its citizens and the environment. They enhance both the recreational and commercial fishing industries, strengthen North Carolina's travel and tourism industry, and help maintain North Carolina's high quality of life.

As the Progress Board asserts in its report, "...states can and do have strong economies and simultaneously protect the environment. In fact, the states with the strongest environmental records also claim the distinction of having the best job opportunities and climate for long term economic development."

2003 Totals

Since 1996 the board of trustees has approved 512 grants for a total of $405.1 million. CWMTF grants have leveraged at least $643.3 million or 61% in private and other public funds.[2]

The CWMTF Board of Trustees and staff reviewed 70 applications requesting over $103 million in the spring of 2003 (2002B Cycle) and 101 applications requesting over $174 million in the fall of 2003 (2003A Cycle) for a total of 171 applications requesting over $277 million in 2003.

Thanks to appropriations from the General Assembly and to the closing out of old grants CWMTF approved 90 water quality grants totaling $80,471,700 in calendar year 2003.[3]

[2] See Appendix A: Summary of Funded Projects 1997-2003

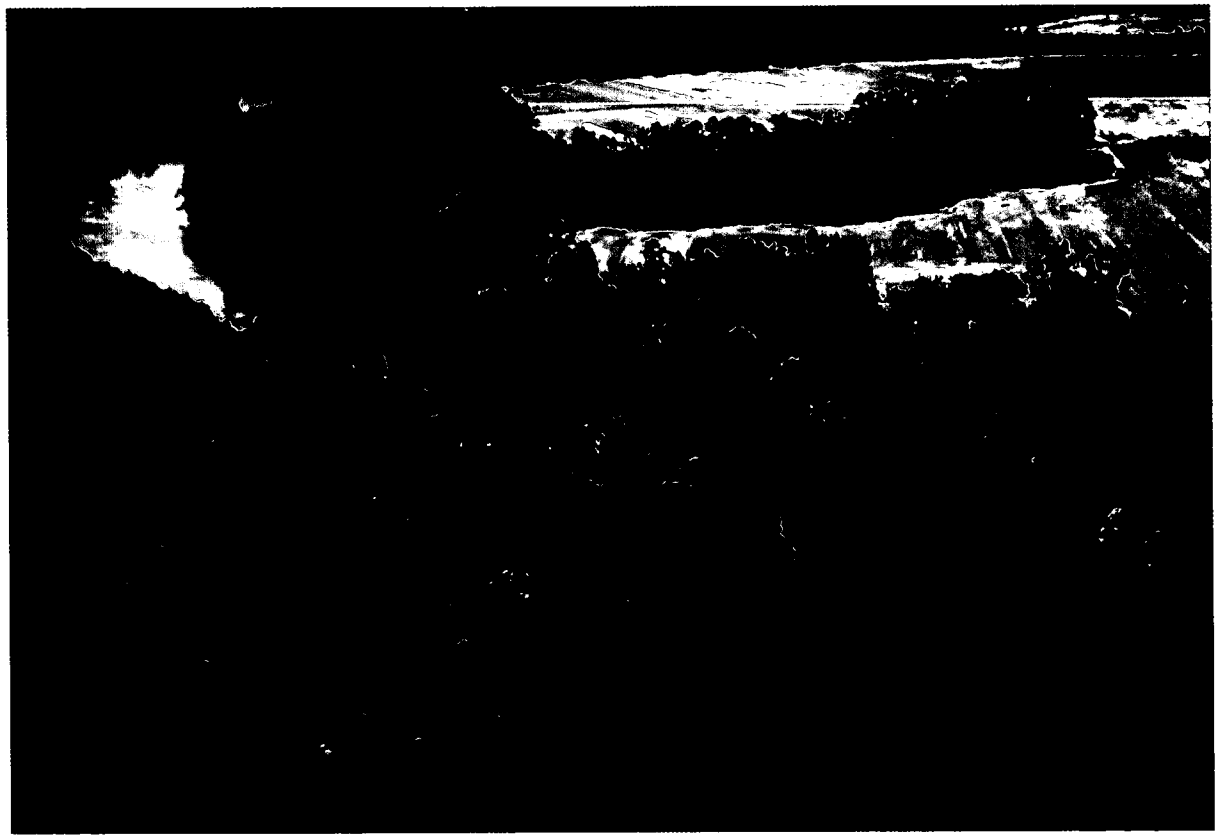
[3] See Appendix B: CWMTF Projects Approved in Calendar Year 2003 (Project List)

2003 Legislative Action

The 2003 General Assembly demonstrated that protecting and restoring water quality remains a high priority for North Carolina through several key legislative actions. The legislature showed its support for water quality by appropriating $62 million to CWMTF in fiscal year 2002-2003 and $62,000,000 to CWMTF in fiscal year 2004-2005.

In addition, the 2003 General Assembly also continued its strong support for CWMTF partners, the Parks and Recreation Trust Fund (PARTF) and Natural Heritage Trust Fund (NHTF). HB 855, Special (Vehicle) Registration Plates, increased the fee for personalized license plates by $10 and dedicated half of the increase to the Parks and Recreation Trust Fund and half of the Natural Heritage Trust Fund. The General Assembly established the new Mayo River State Park (HB 1078) in Rockingham County and Haw River State Park (HB 1025) in Guilford and Rockingham Counties.

The CWMTF Board of Trustees supported SB 831, Stagger CWMTF Appointments, by Senator Charlie Albertson, to restructure the terms of board members to increase continuity in the decision-making process. Under the existing law the terms of two-thirds of the board expired on December 31, 2002. SB 831 also added three appointments to the board. Governor Easley signed SB 831 on August 14, 2003.



HB 738, Expand CWMTF Purpose, by Representative Paul Miller and others, and SB 551, Expand CWMTF Purpose, by Senator Jeanne Lucas and others, were referred to the House Committee on Environment and the Senate Committee on Appropriations/Base Budget, respectively, and were not acted upon.

The Year Ahead

The CWMTF board and staff will review 83 applications requesting $151.2 million this spring (2004A Cycle). CWMTF will also receive applications on June 1, 2004 and review them in the fall (2004B Cycle). Specific grant requests submitted on December 1, 2003 for the spring 2004 cycle include:

- A request for $1.7 million from the City of Goldsboro and Wayne County to help protect Stoney Creek, a tributary of the Neuse River, and to prevent encroachment on Seymour Johnson Air Force Base;
- A request for $891,150 from DENR/Division of Forest Resources to help protect Mountain Island Lake and to expand the Mountain Island Lake Educational State Forest in Gaston and Lincoln Counties;
- A request for $3.2 million from the Southern Appalachian Highlands Conservancy to help protect Woodfin's Watershed and the Blue Ridge Parkway, in Buncombe County.
- A request for $7.6 million from the Town of Spring Lake in Cumberland County to eliminate failing septic tanks and reduce pollution of the Little River, a major tributary of the Cape Fear River; and
- A request for $7.7 million from DENR/Division of Soil & Water Conservation to implement phase three of the swine lagoon buyout program in the 100-year floodplain.

CWMTF may centralize water quality monitoring of its restoration and stormwater projects to improve quality and reduce costs. CWMTF is reviewing its policies regarding stewardship and long-term management of properties that are acquired with CWMTF funds. CWMTF is also reviewing the criteria by which it evaluates projects.

CWMTF hopes to develop consistent contracts, conservation easements, monitoring requirements, and stewardship policies with the N.C. Department of Environment and Natural Resources and Department of Transportation's new Ecosystem Enhancement Program.

Planning, design, permitting, bidding, and construction of wastewater, stormwater, and restoration projects take many years. CWMTF in 2003 began to start funding the design and permitting phase of projects to ensure that water quality objectives are being met, to develop more accurate estimates of cost, and to more efficiently manage its cash balance. CMWTF has also reduced the average time to implement acquisition projects from 36 months to 12-18 months. CWMTF will continue to work on these issues in 2004.

The Clean Water Management Trust Fund and Local Governments:

A Continuing Partnership

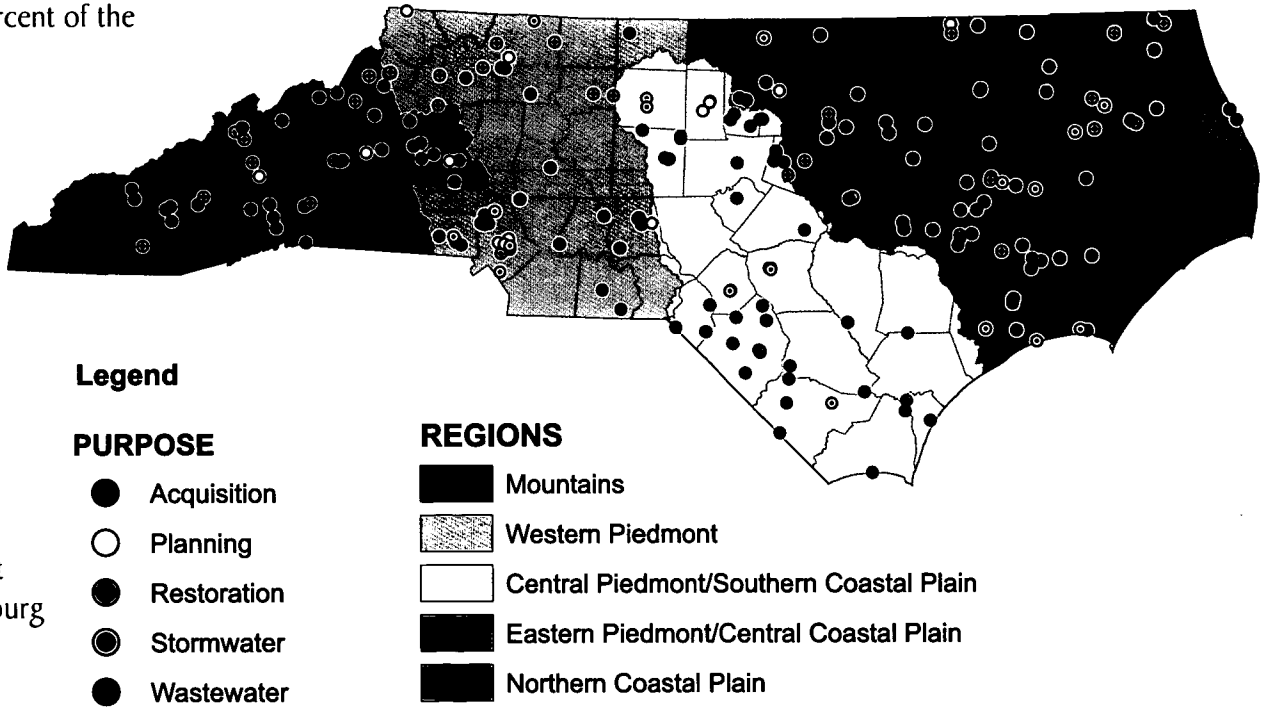
The CWMTF continues to be an important tool in helping local governments protect their water resources. Since 1996, $168.9 million – over 40 percent of the $405.1 million in CWMTF grants has gone to cities, counties and other local government agencies to finance local solutions to water quality problems.

Numbers of Grants Made to Local Government:

(Municipalities, Counties, Other Local Government Agencies)

- 238 grants totaling $168.9 million – over 40 percent of the $405.1 million of the CWMTF grants awarded.
- The CWMTF has assisted 99 local governments with wastewater improvements and invested over $77.2 million to reduce spills from leaky sewers and to more effectively treat wastewater.
- As local governments comply with national Phase I and Phase II stormwater regulations, CWMTF has funded 36 stormwater treatment projects for a total of $29.8 million.
- CWMTF has invested over $8.9 million to assist Charlotte, Gastonia, Mount Holly and Mecklenburg County in protecting Mountain Island Lake, the state's largest public drinking water supply.

CWMTF Grants to Local Government



Highlight:

The Town of Troy/Protection of Denson's Creek

One of the most successful CWMTF/local government partnerships has been with the Town of Troy in Montgomery County for the protection of Denson's Creek.

Denson's Creek starts in Uwhharrie National Forest and Game Lands where it is rated as High Quality Water (HQW). Below the town's wastewater treatment plant, the N.C. Division of Water Quality has rated the creek 's waters as good or fair. The creek is the focal point of Troy's comprehensive efforts for long-range water quality protection, resource conservation, recreation and environmental education.

The Denson's Creek initiative began as an effort to prevent encroaching development along the creek that would have significantly affected water quality in the area. Working with CWMTF, the town crafted a way to purchase the property and place a permanent conservation easement onto it. The town decided to continue with the preservation effort, developing what has become a five-phase project to purchase buffers along more than five miles of the creek.

With the help of CWMTF funds, more than 500 acres along the creek –including 4,500 feet of Hughes Creek Reservoir shoreline -- have been placed into permanent conservation, thus protecting water quality from development, preserving wildlife habitat and creating recreational and education opportunities for residents. The effort also includes creation of an environmental education center and extensive greenway system.

In addition, two of the six CWMTF grants to Troy will be used for improvements to the town's wastewater treatment facilities in order to reclassify the creek as High Quality Waters. $200,000 in CWMTF grant funds were used to install an ultraviolet disinfecting process to remove chlorine residue from the plant's discharge. The treatment went on line in June 2003.

In 2003, CWMTF trustees approved $55,000 to help the town create a wastewater reuse system. The reuse project will significantly reduce the amount of discharge flowing into Denson's Creek from its wastewater treatment plant by using treated wastewater to irrigate the local golf course.

CWMTF commends the Town of Troy and its proactive strategy for ensuring that Denson's Creek remains a viable water resource for Montgomery County.

- ◇ Six projects funded by CWMTF totaling $2.89 million
- ◇ Four acquisitions along Denson's Creek, Little River
- ◇ Two wastewater projects: reuse and rehabilitation

To date, CWMTF has invested $43.1 million in the Yadkin River Basin.

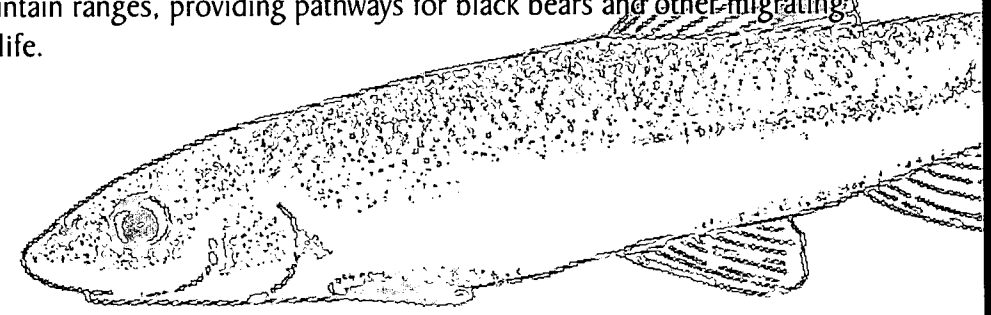
CWMTF 2003 Successes:

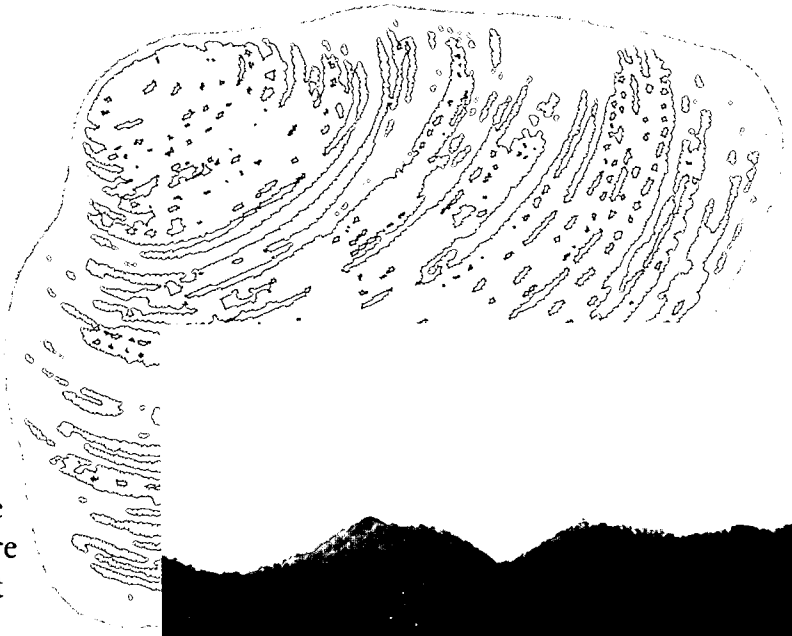
Acquisitions:

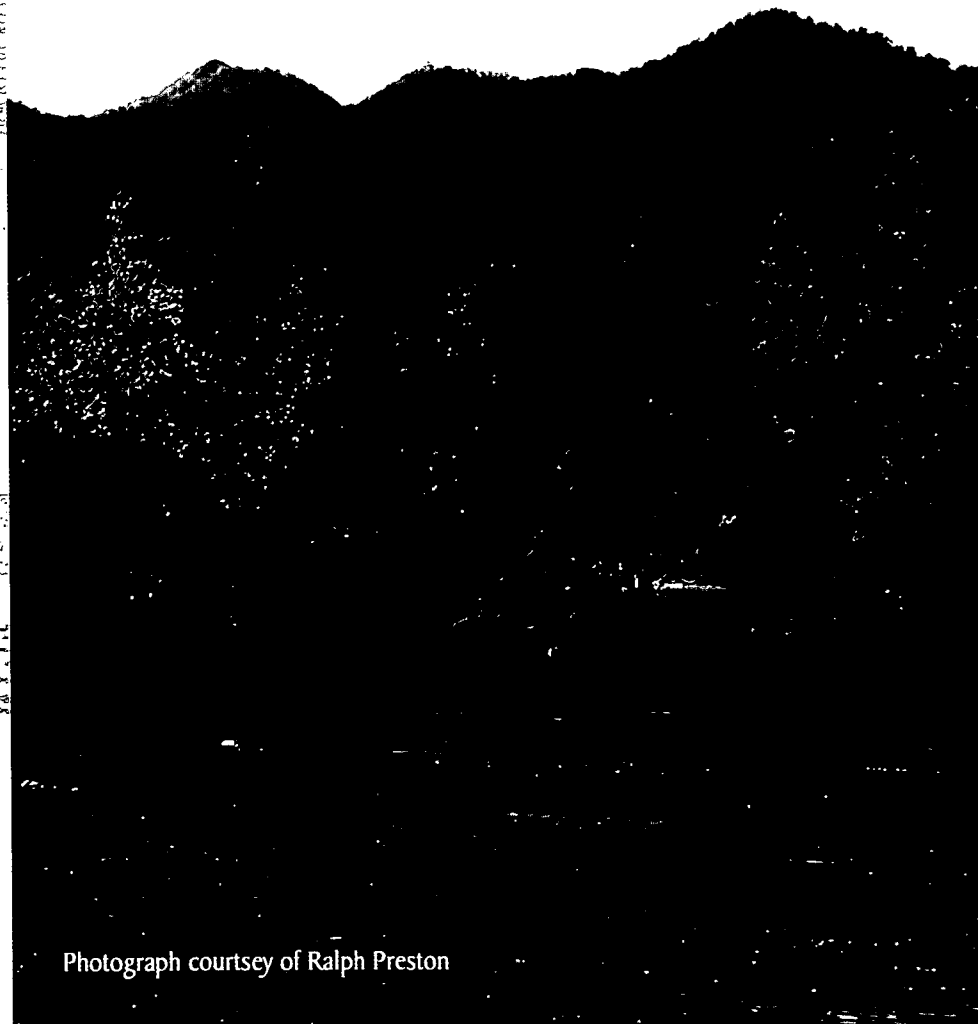
The Needmore Tract, Little Tennessee River Basin

In July 2003, the CWMTF Board of Trustees approved $6.6 million to assist with the purchase of the 4,400-acre Needmore tract on the Little Tennessee River in Swain and Macon counties. As one of the N.C. Wildlife Resources' top acquisition priorities, several agencies joined with CWMTF in its efforts to protect the property and one of the state's most pristine waterways. Other contributors included The Nature Conservancy, the Natural Heritage Trust Fund, Ecosystem Enhancement Program, and the U.S. Fish and Wildlife Service.

The Needmore tract, which also includes 21 tributaries to the Little Tennessee River, contains Natural Heritage Program Areas of significance and is home to many endangered and protected species. Wildlife biologists believe it will be a very important source for replenishing species lost or threatened in other waterways all across the southeast. Also, the site is the keystone to the forested corridor connecting the Nantahala and Cowee Mountain ranges, providing pathways for black bears and other migrating wildlife.







Photograph courtsey of Ralph Preston

Highlight:

Needmore Project

The Needmore project will conserve:

- ◇ 26 miles of Little Tennessee River frontage - over half of the river between Franklin and Lake Fontana;
- ◇ 37 miles of tributary streams, some of which are outstanding trout streams;
- ◇ Four federally-listed and twelve state-listed threatened and endangered species, including the spotfin chub;
- ◇ 57 fish species, half of all the freshwater species native to NC;
- ◇ The greatest abundance of freshwater mussels in the state, including several threatened or endangered species;
- ◇ Critical wildlife habitat in the wetlands and forests surrounding the river;
- ◇ A keystone of an unfragmented forested corridor connecting the Nantahala and Cowee Mountains, providing pathways for black bears and other wildlife;
- ◇ The most intact archeological landscape of the Cherokee people remaining in the nation;
- ◇ Dozens of historic sites, including portions of the largest National Register historic district in western North Carolina, the Cowee/West's Mill community;
- ◇ The largest cluster of mountain floodplain forests and the most species-rich forest type in the Southern mountains;
- ◇ The greatest concentration of river islands in the Southern Blue Ridge. These islands have unique botanical value.

To date, the CWMTF has invested $20.5 million in the Little Tennessee River Basin

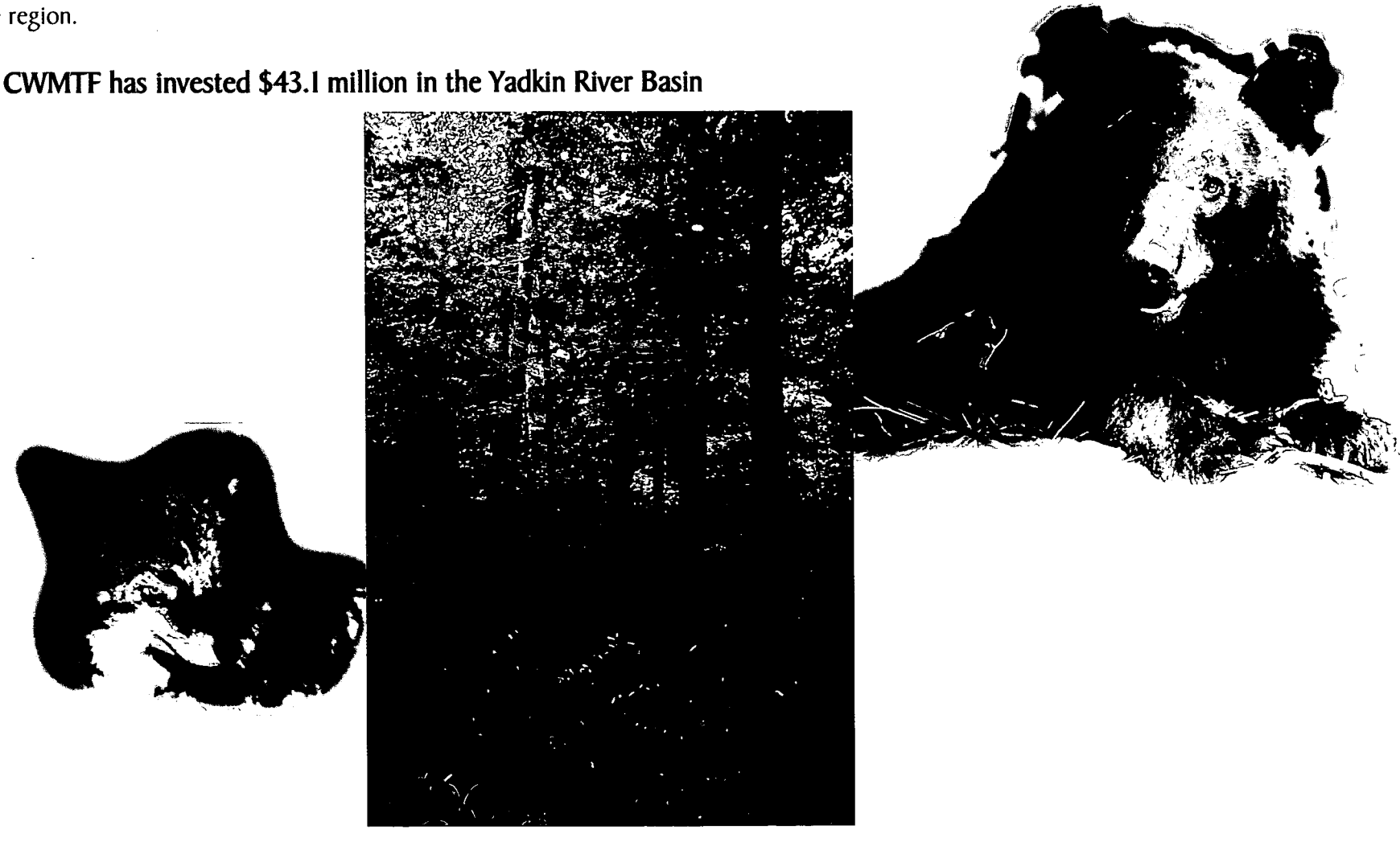
The Mingo Tract, Yadin River Basin

Working with The Conservation Fund, CWMTF, the Ecosystem Enhancement Program, and the Natural Heritage Trust Fund provided funding to acquire the 5,621-acre Mingo tract in Caldwell and Wilkes counties. One of the last undeveloped large tracts of land in the area, the Mingo tract also contains a portion of the headwaters of the Yadkin River.

The $13.5 million CWMTF grant to the N.C. Wildlife Resources Commission will help preserve several streams on the property, which flow into the Yadkin River. The project will also protect water quality at Kerr Reservoir, which would have been affected if the site had been developed.

The rugged property on the eastern edge of the Blue Ridge escarpment is habitat for numerous plant and animal species, including bear and coyote. The property, one of the highest acquisition priorities for the N.C. Wildlife Resources Commission, will help create continuity for the agency's gamelands program in the region.

To date, the CWMTF has invested $43.1 million in the Yadkin River Basin



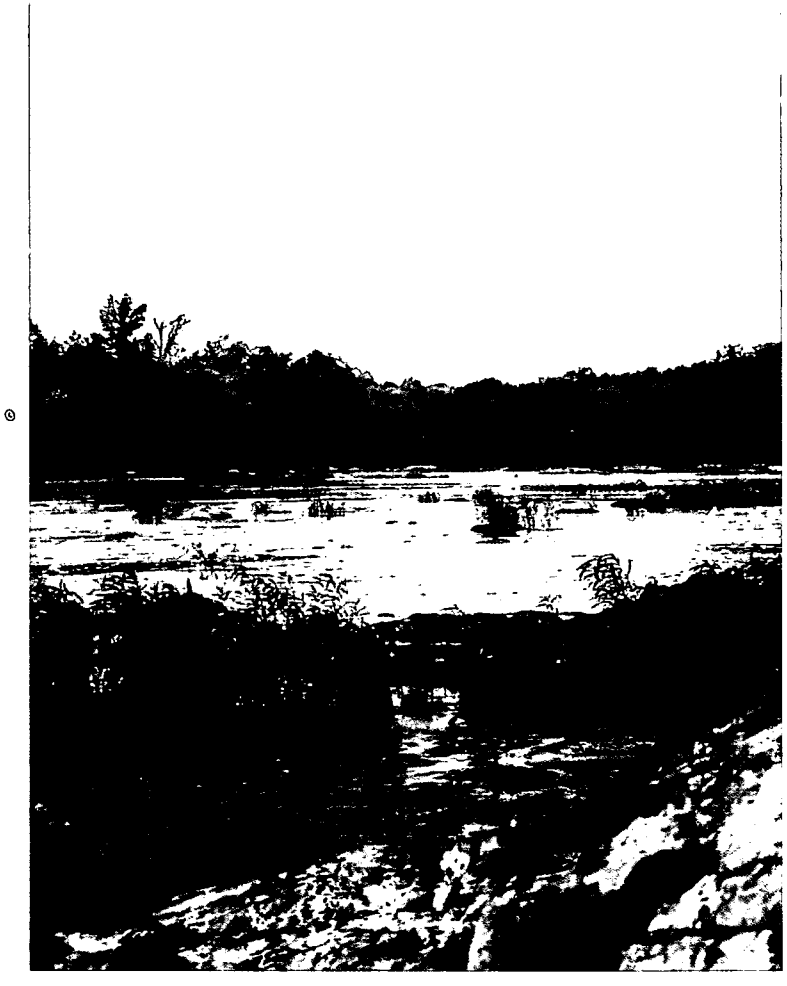
Other Acquisition Updates:

The Justice Tract, Cape Fear River Basin

In August 2003, the Triangle Land Conservancy completed the largest land transaction in its history, the purchase of the Justice tract in Chatham County.

With the help of a $1.8 million CWMTF grant, the 760-acre parcel on the Deep River near Moncure was placed in permanent protection, with the possibility of one day becoming part of the N.C. Division of Parks and Recreation system.

The Justice tract lies at the point where the Deep River comes closest to Jordan Lake, an important regional water supply. Conservation of the land is key to protecting water quality in both these water bodies, especially as development moves into the area from the Triangle. In addition to protecting the important water resources in the area, the CWMTF grant for the Justice tract will help maintain a critical wildlife corridor. Among the important species found on the Justice tract is the endangered Cape Fear shiner.
The Justice tract also will provide outstanding recreational opportunities in the form of hiking, kayaking and nature study – only 20 minutes from downtown Cary!



To date, the CWMTF has invested $55.3 million in the Cape Fear River Basin

The Beck Tract and Our Military Bases

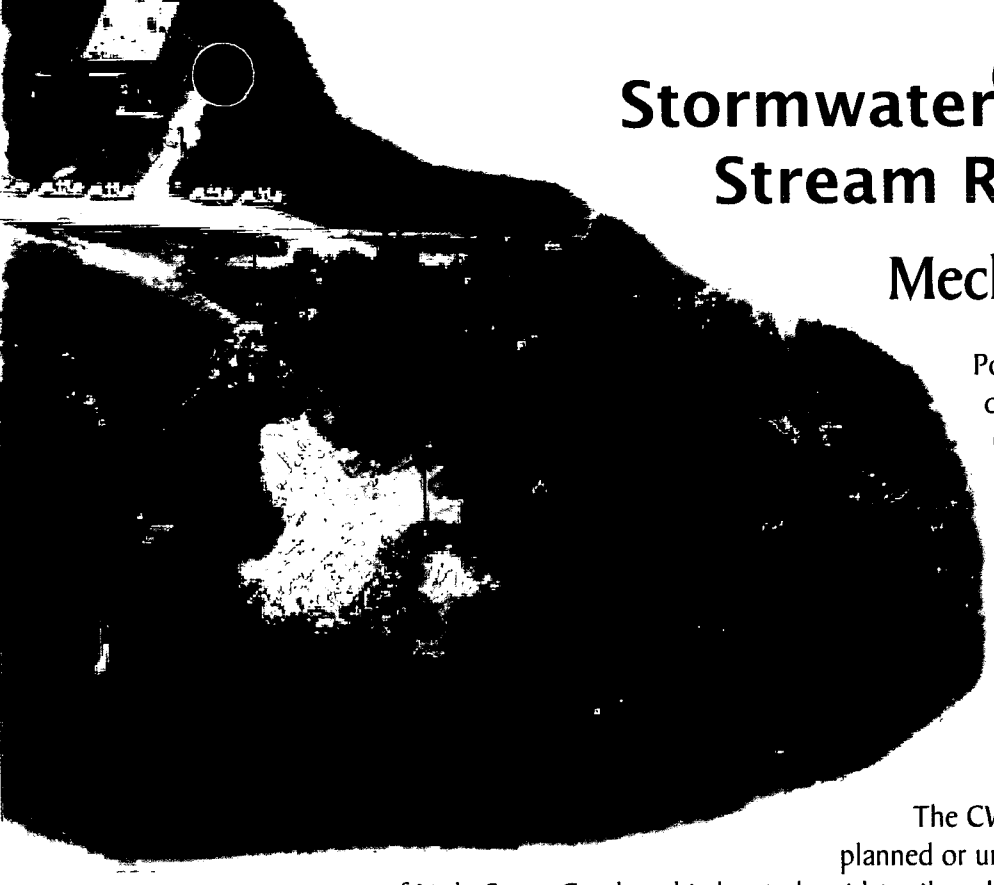
The U.S. Department of Defense, (DOD) will consider realignment and closure of military bases in 2005. The DOD, the State of North Carolina, and many local governments are working together to prevent and reduce encroachment on military bases by acquiring conservation easements and land in fee simple and by regulating land uses.

In 2003, CWMTF, Natural Heritage Trust Fund, The Nature Conservancy, and the U.S. Navy worked with the Wildlife Resources Commission to acquire the 2,500-acre Beck tract in Onslow County to help protect Camp Lejeune.

The project will protect the headwaters of Stone's Creek, a tributary of the New River. The tract had been slated for development, with preliminary plans calling for two golf courses and 3,000 homes with individual septic systems. Such a large-scale development would have dramatically degraded water quality in the creek and the river and would have severely affected shellfishing in Stone's Bay and other sections of the New. Preservation of the property will also protect the area's long leaf pine and hardwood bottom habitats, which provide homes to red cockaded woodpeckers, migrant waterfowl, neo-tropical birds and a wide variety of mammals, including deer and fox.

Goldsboro and Wayne County also applied to CWMTF for funds to acquire floodplain and converted wetlands near Seymour Johnson Air Force Base. With assistance from CWMTF the Sandhills Area Land Trust is conducting a riparian corridor conservation study on the Little River – the northern boundary of Fort Bragg.

CWMTF and the other conservation trust funds can assist the state and the military in protecting both the environment and the training mission of our bases.



Stormwater Management and Stream Restoration:

Mecklenburg County, Catawba River Basin

Pollution from stormwater run-off remains North Carolina's most pressing water quality concern as the state's urban areas grow. In North Carolina's largest urban area, CWMTF has been able to make significant strides in managing stormwater.

Charlotte/Mecklenburg County's biggest challenge is to restore water quality in its urbanized creeks that are most negatively affected by this non-point source pollution. Mecklenburg County and CWMTF continue to work together to clean up and restore Sugar Creek and its tributaries. In June 2003 the CWMTF Board of Trustees approved $1.2 million for Phase 4 of the Little Sugar Creek Environmental Restoration Initiative – part of a renewed regional effort to manage stormwater and restore water quality in the Catawba River Basin.

The CWMTF grant will fund the proposed Belmont Branch improvements–one of seven projects planned or underway to address water quality in Little Sugar Creek. Belmont Branch is the headwater of Little Sugar Creek and is located amidst rail yards, several auto salvage yards, a major interstate highway and other industrial operations. Pollutants from stormwater run-off draining into the creek include phosphorus, metals and petroleum, and fecal coliform. Phase 4 of the initiative will significantly reduce the amount of these pollutants flowing into the creek through the construction of wetlands, a retention basin, buffer plantings along the streambank, and the re-routing of drainage and sanitary sewer lines.

CWMTF has provided more than $4.7 million to help Mecklenburg County and Charlotte manage stormwater and restore urban streams. The unprecedented three-county regional effort underway seeks to improve water quality overall by purchasing and protecting undeveloped property along the stream corridor, installing Best Management Practices for stormwater management on both vacant and undeveloped lands and the construction of a 20-mile greenway - from downtown Charlotte to the Catawba River in South Carolina - to provide both recreational opportunities along the waterways and increase public awareness of water quality issues. The Belmont Branch project will be the cornerstone of the greenway corridor.

In June 2003, CWMTF trustees approved a $400,000 grant to go toward $2 million for the Phase 3 stream restoration component of the Little Sugar Creek initiative – the Westfield Road Trail and Boardwalk. Here, Mecklenburg County will return this segment of the creek back to a more natural stream pattern and improve water quality of the waterway through disconnection and filtering of storm drain inlets. The stream restoration will be done in conjunction with the greenway plan and because of its closeness to Charlotte's urban center, will be an important node along the 20-mile trail system. The project will actually extend nearby Freedom Park, Charlotte's "Central Park" and will provide excellent opportunities to educate the public about the importance of protecting water quality. Long-term participation in an environmental stewardship program by two nearby schools also is expected. Completion of the phase is scheduled for Spring 2004.

Local support is building for Mecklenburg County's water quality efforts and substantial local contributions have been made to match CWMTF funding. Grants from CWMTF have allowed the county to leverage its limited resources to maximize benefits. In addition to improved water quality, residents will notice other benefits from the initiative as well, including reductions in flood damage, increased property values and improved quality of life.

Other CWMTF funded projects in the overall effort are coming on line. On April 25, 2003, such a site was dedicated at the Bruns Avenue School. Adjacent to an urban elementary school, CWMTF funds assisted in the construction of a wetlands area to help manage stormwater run-off and provide environmental education opportunities for both students and neighborhood residents alike.

To date, the CWMTF has invested $31.4 million in the Catawba River Basin

Wastewater:

Bridgeton, Neuse River Basin

Nowhere in the state are North Carolina's water quality problems more evident than in the Neuse River Basin. All the waters within the basin are classified as impaired, the result of so-called "nutrient loading" from agricultural run-off, sedimentation and stormwater run-off from increased development, and wastewater discharge.

Many communities along the river are now taking active and aggressive actions to reverse the effects of nutrient loading on the river, including Kinston, Goldsboro and LaGrange. With a $116,000 grant from the CWMTF, the small community of Bridgeton in Craven County has joined the effort.

The CWMTF funds will be used for design, permitting and land acquisition costs associated with the town's plans to eliminate its wastewater discharge to the river. The project includes purchase of 500 acres for land application of treated wastewater, construction of a storage lagoon, holding pond and an innovative irrigation system. A permanent conservation easement will be placed on the 500 acres.

This conversion of Bridgeton's wastewater treatment plant to a non-discharge facility will eliminate 6.26 pounds of BOD (biochemical oxygen demand or the amount of oxygen required to neutralize organic wastes) from entering the river per day. In addition, it will eliminate 18.8 pounds of suspended solids, 2.5 pounds of ammonia and 1.25 pounds of phosphorus per day from being discharged into the river.

The town of Bridgeton has made a commitment to protecting its water resources, including the Neuse River, and intends to use this CWMTF-funded project as the basis for a future regional wastewater system.

To date, the CWMTF has invested $47.9 million in the Neuse River Basin

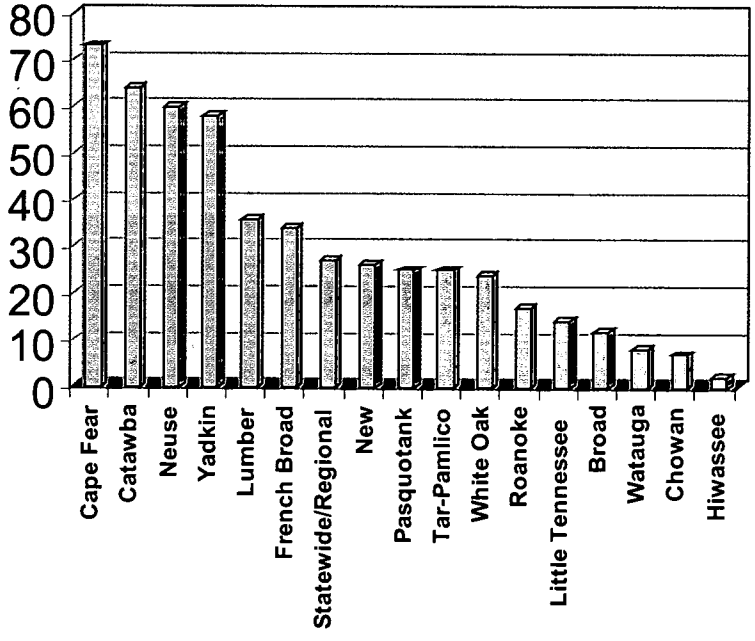
Appendix A: Summary of Funded Projects 19[illegible]-2003 (1997A-2003A Cycles)

Note: As of December 1, 2003, there were 21 projects funded for a total of $10,957,202 that were subsequently withdrawn. These projects are included in these tables in the funded amounts, but noted as "Withdrawn" in their project name.

Summary of Requested v. Funded Totals

	Number	Amount
Requested	1010	$1,167,027,478
Funded	512	$405,128,029
% Funded	51%	35%

Number Projects By River Basin



Funded Projects Summarized by River Basin

River Basin	Projects	Amount Funded
Cape Fear	73	$55,385,400
Catawba	64	$31,401,123
Neuse	60	$47,927,570
Yadkin	58	$43,101,100
Lumber	36	$21,330,852
French Broad	34	$44,679,794
Statewide/Regional	27	$33,765,506
New	26	$5,476,080
Pasquotank	25	$23,031,858
Tar-Pamlico	25	$19,832,635
White Oak	24	$25,793,141
Roanoke	17	$7,892,100
Little Tennessee	14	$20,573,967
Broad	12	$7,313,090
Watauga	8	$5,856,003
Chowan	7	$9,267,810
Hiwassee	2	$2,500,000
Total	512	$405,128,029

Summary of Requested v. Funded by Region

Region	Requests- No. Projects	Funded- No. Projects	% Number Projects Funded	Amount Requested	Amount Funded	% Amount Funded
Central Piedmont/Southern Coastal Plain	229	108	47%	$254,250,398	$76,438,252	30%
Eastern Piedmont/Central Coastal Plain	212	88	42%	$271,618,495	$65,814,480	24%
Mountains	196	100	51%	$210,702,492	$93,659,854	44%
Northern Coastal Plain	117	68	58%	$174,185,114	$68,795,984	39%
Statewide/Regional	43	20	47%	$63,289,911	$29,748,056	47%
Western Piedmont	213	128	60%	$192,981,068	$70,671,403	37%
Total	1010	512	51%	$1,167,027,478	$405,128,029	35%

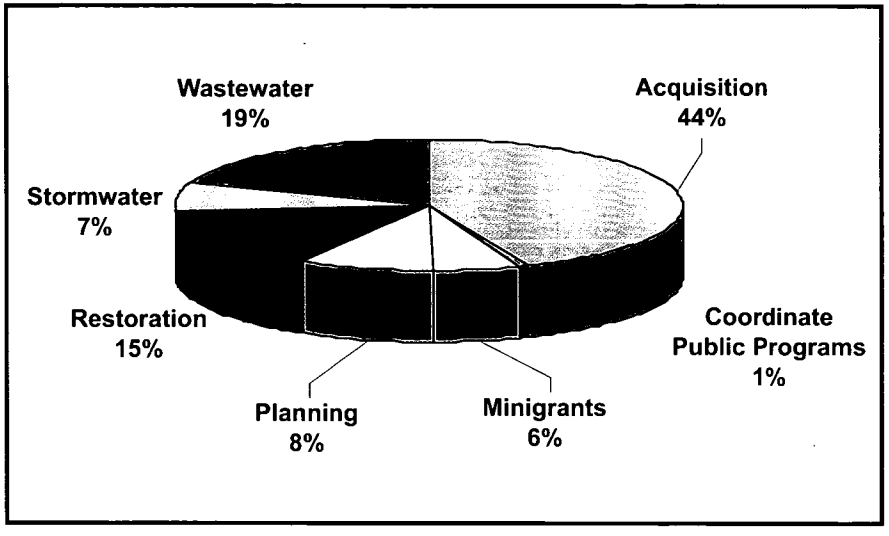
Acquisition Summary:

(1997A-2003A Cycles)
CWMTF contributed to preservation of:
2,908 Miles of Riparian Buffer
237,366 Acres of Land

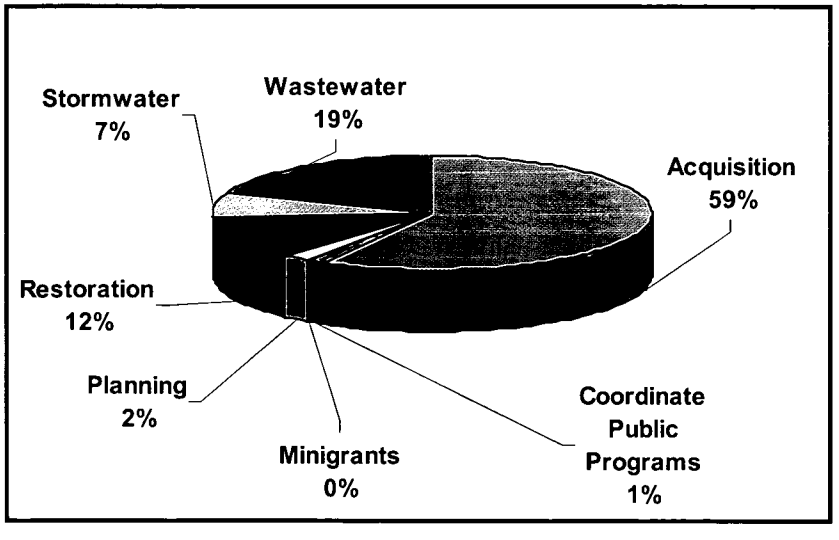
Funded Projects Summarized by Primary Purpose

Primary Purpose	Projects	Amount Funded	Notes
Acquisition	223	$235,326,444	Includes fee simple, easements, and greenways.
Coordinate Public Programs	3	$5,750,000	
Minigrants	29	$662,100	
Planning	43	$8,006,297	
Restoration	79	$48,209,976	Includes stream restoration, ag BMPs, and other types of ecological restoration
Stormwater	36	$29,899,482	
Wastewater	99	$77,273,730	
Total	512	$405,128,029	

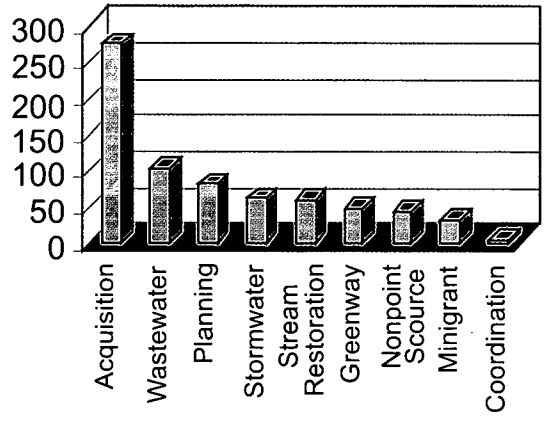
Number of Projects by Primary Purpose



Amount Funded by Primary Purpose



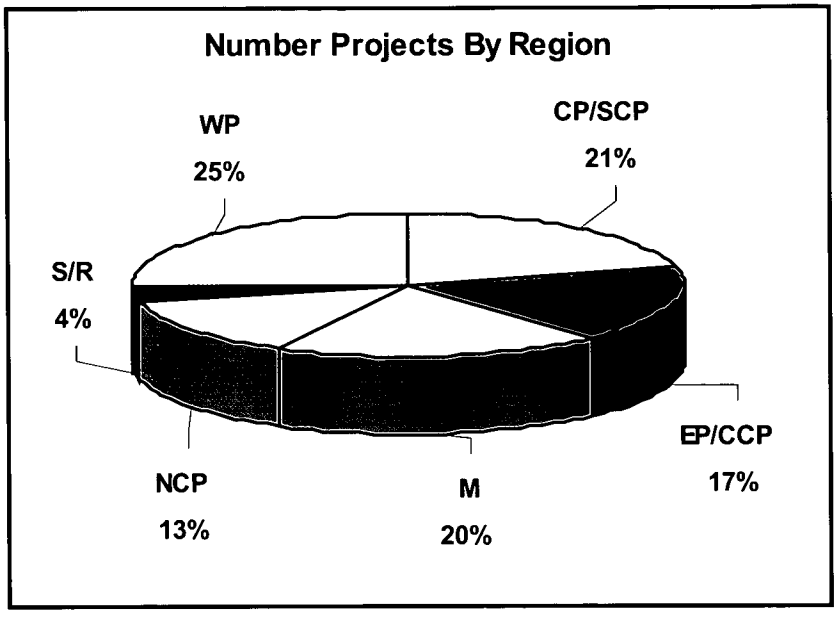
Number Projects by Purpose



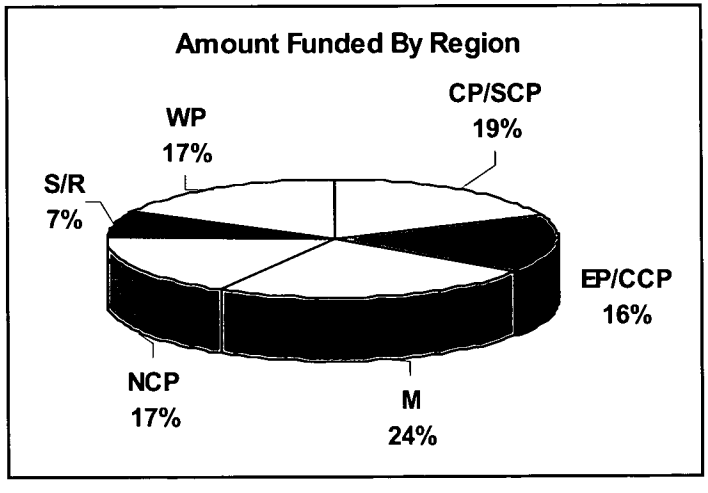
Funded Projects Summarized by Region

Region Name	Region Abbreviation	Number Projects	Amount Funded
Central Piedmont/Southern Coastal Plain	CP/SCP	108	$76,438,252
Eastern Piedmont/Central Coastal Plain	EP/CCP	88	$65,814,480
Mountains	M	100	$93,659,854
Northern Coastal Plain	NCP	68	$68,795,984
Statewide/Regional	S/R	20	$29,748,056
Western Piedmont	WP	128	$70,671,403
	Total	512	$405,128,029

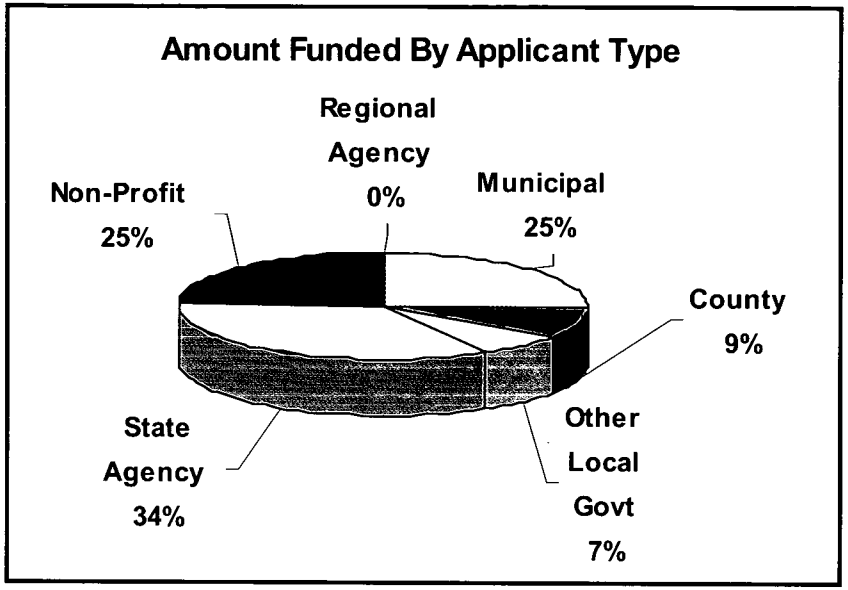
Funded Projects Summarized by Applicant Type



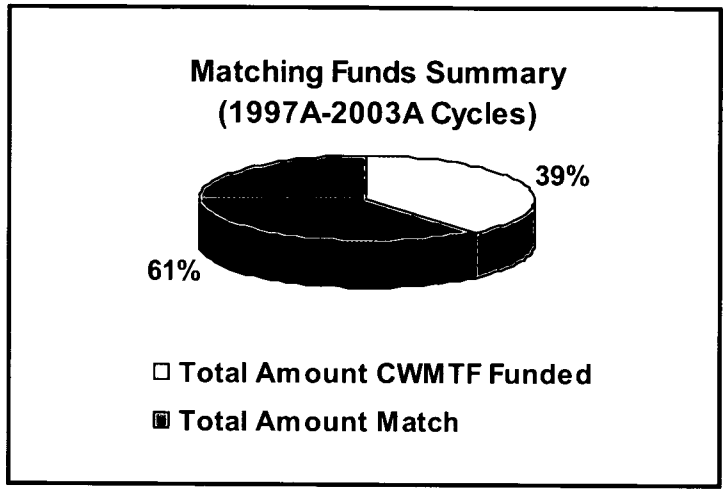
Amount Funded by Region



Funded Projects Summarized by Applicant Type



Matching Funds Summary

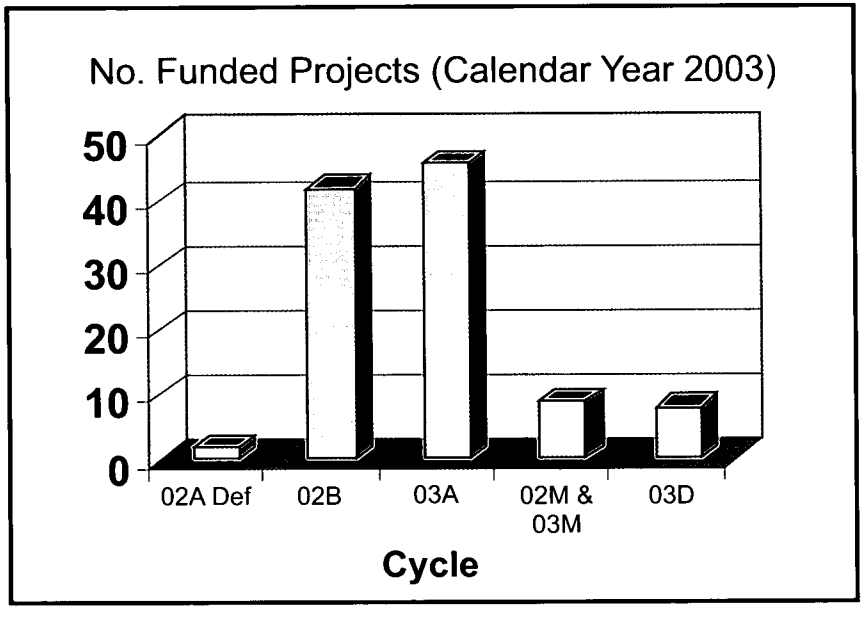


Appendix B: Projects Funded by CWMTF in Calendar Year 2003

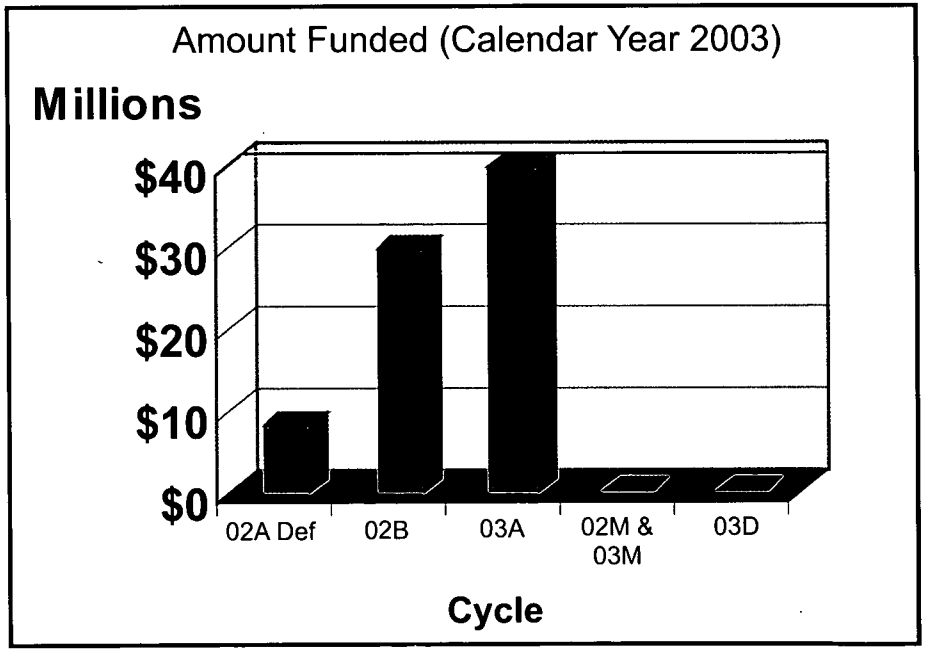
"M" denotes mini-grant funding

Cycle	Number Projects	Amount Funded	Comments
02A Def	2	$8,338,000	2002A Cycle Decisions Made in January 2003
02B	42	$29,919,700	Regular Cycle
03A	46	$42,214,000	Regular Cycle
02M & 03M	9	$225,000	Standard Minigrants
03D	8	$160,400	Donated Conservation Easement Minigrants
Total	107	$80,857,100	

Number of Projects Funded Calendar Year 2003



Amount Funded Calendar Year 2003



Listing of CWMTF Projects Funded During Calendar Year 2003

(Listed by Cycle and In Alphabetical Order)

Application Name	Approval Date	Amount Funded	Applicant Type	County	Watershed	Amount Requested
2002A cycle projects listed in 2002 Annual Report:						
Camden County/Currituck County-Sawyer's Creek	1/13/2003	$438,000	Local Government - County	Camden	Pasquotank	$2,564,011
Nature Conservancy - Acquisition/ Bear Garden & Angola Bay Tracts/NE Cape Fear River and tributaries	1/13/2003	$7,900,000	Non-profit	Pender	Cape Fear	
	2002A Cycle Deferred Decisions Subtotal	$8,338,000				
2002B Cycle						
Blue Ridge Rural Land Trust - Acq./ Brushy Mts., Moravian Cr	7/22/2003	$276,000	Non-profit	Wilkes	Yadkin	$276,000
Blue Ridge Rural Land Trust - Acq./ French Broad Tracts	7/22/2003	$100,000	Non-profit	Avery	French Broad	$127,200
Bryson City, Town of - Acq/ Lands Creek	7/22/2003	$1,531,000	Local Government - Municipal	Swain	Little Tennessee	$1,232,166
Buncombe SWC District - Restoration/ Newfound Cr.	7/22/2003	$415,000	Local Government	Buncombe	French Broad	$450,000
Catawba Lands Conservancy - Acq./ Anderholt Tract, S. Fork Catawba R.	7/22/2003	$343,000	Non-profit	Gaston	Catawba	$346,000
Catawba Lands Conservancy - Acq./ Wilson Farm, S. Fork Catawba R.	7/22/2003	$245,000	Non-profit	Iredell	Yadkin	$247,700
Charlotte, City of - Acq./Mt. Island Lake, Gar Cr.	7/22/2003	$250,000	Local Government - Municipal	Mecklenburg	Catawba	$500,000
Dover, Town of - Wastewater Regionalization/Mosely Cr	7/22/2003	$333,000	Local Government - Municipal	Craven	Neuse	$333,000

Foothills Conservancy - Acq./Adams Tract, Left Prong Catawba R.	7/22/2003	$8[illegible]00	Non-profit	McDowell	Catawba	$719,500
Granite Falls, Town of - Acq./Lake Rhodhiss	7/22/2003	$890,000	Local Government - Municipal	Caldwell	Catawba	$889,555
Greater Badin Water & Sewer District - Sewer System Rehabilitation/Little Mt. Cr.	7/22/2003	$1,677,000	Local Government	Stanly	Yadkin	$1,958,000
LaGrange, Town of - Septic Systems/ Mosely Cr.	7/22/2003	$400,000	Local Government - Municipal	Lenoir	Neuse	$400,000
Mecklenburg Co. - Stormwater/Little Sugar Cr., Belmont Branch	7/22/2003	$1,200,000	Local Government - County	Mecklenburg	Catawba	$1,450,000
Mecklenburg County - Restoration/ Little Sugar Cr. Greenway Trail	7/22/2003	$400,000	Local Government - County	Mecklenburg	Catawba	$400,000
Middle Fork Greenway Assoc. - Restoration/S. Fork New R. Greenway	7/22/2003	$61,000	Non-profit	Watauga	New	$60,560
Mount Airy - Stormwater/ Lovills Creek	7/22/2003	$81,000	Local Government - Municipal	Surry	Yadkin	$440,000
National Committee for the New River - Acq./Blackburn Tract, Todd S. Fork Greenway	7/22/2003	$147,700	Non-profit	Watauga	New	$152,350
NC Coastal Federation - Acq./Stump Sound	7/22/2003	$972,000	Non-profit	Onslow	White Oak	$971,540
NC Coastal Land trust - Acq./IP Realty, Town Cr.	7/22/2003	$2,095,000	Non-profit	Brunswick	Cape Fear	$2,094,700
NC Coastal Land Trust - Acq./Pettiford Cr II	7/22/2003	$603,000	Non-profit	Carteret	White Oak	$2,779,000
NC Coastal Land Trust-Weyerhaeuser Tracts	7/22/2003	$1,376,000	Non-profit	Craven	Neuse	$1,375,358
NC Parks and Recreation - Acq./Eno R. State Park	7/22/2003	$47,000	State Agency	Orange	Neuse	$2,318,400

NC Parks and Recreation - Restoration/Stone Mt. State Park, Big Sandy Cr.	7/22/2003	$290,000	State Agency	Wilkes	Yadkin	$425,000
NC Wildlife Resources Commission - Acq./Needmore Tract	7/22/2003	$6,660,000	State Agency	Swain	Little Tennessee	
NC Wildlife Resources Commission - Acq./Risky Business, Roanoke Sound	7/22/2003	$375,000	State Agency	Dare	Pasquotank	$375,000
NC Wildlife Resources Commission - Chowan River Tracts	7/22/2003	$3,000,000	State Agency		Chowan	$3,308,000
Piedmont Land Conservancy - Acq/ Upper Mitchell R. Winebarger Tract	7/22/2003	$1,408,000	Non-profit	Surry	Yadkin	$3,397,221
Piedmont Land Conservancy - Planning/Upper Dan R.	7/22/2003	$160,000	Non-profit	Stokes	Roanoke	$173,235
Pilot View RC&D - Planning/Upper Yadkin Sediment	7/22/2003	$295,000	Local Government	Surry	Yadkin	$294,800
Pilot View RC&D - Restoration/Tom's Cr.	7/22/2003	$192,000	Local Government	Surry	Yadkin	$191,250
Pilot View RC&D - Restoration/Yadkin Farmland Project	7/22/2003	$314,000	Local Government	Surry	Yadkin	$961,000
Pilot View RC&D. - Stream Restoration & Stormwater/ Koerner Place Cr.	7/22/2003	$175,000	Local Government	Forsyth	Cape Fear	$238,000
Pitt SWC District - Acq./Little Contentnea	7/22/2003	$25,000	Local Government	Pitt	Neuse	$25,000
Powellsville, Town of - Waste Treatment Facility Construction/ Ahoskie Cr.	7/22/2003	$475,000	Local Government - Municipal	Bertie	Chowan	$474,800

Raeford, City of - Stormwater Wetland/ Peddler's Branch Construction	7/22/2003	$296,000	Local Government - Municipal	Hoke	Cape Fear	$390,885
Troy, Town of - Acq./Denson's Cr. Phase IV	7/22/2003	$272,000	Local Government - Municipal	Montgomery	Yadkin	$271,500
Tyrell Co. Water & Sewer District 1 - Septic Systems/Scuppernong II	7/22/2003	$979,000	Local Government - County	Tyrrell	Pasquotank	$1,096,626
Tyrell Co. Water & Sewer District 2 - Septic Systems/Scuppernong II	7/22/2003	$225,000	Local Government - County	Tyrrell	Pasquotank	$274,717
UNC Ashville - Stormwater/French Broad R.	7/22/2003	$70,000	State Agency	Buncombe	French Broad	$69,200
Wake Forest - Stream Restoration/ Richlands Cr. Restoration & Greenway	7/22/2003	$240,000	Local Government - Municipal	Wake	Neuse	$2,734,739
Watauga SWC District - Restoration/ Agricultural BMPs	7/22/2003	$38,000	Local Government - County	Watauga	Watauga	$37,500
Westerm Carolina University - Planning/Stream Restoration BMP Evaluation	7/22/2003	$167,000	State Agency	Statewide/Regional	Statewide/Regional	$166,430
	2002B Cycle Subtotal	**$29,919,700**				
2003A Cycle						
Bay River Metropolitan Sewer District- Septic Tanks/ Reelsboro, Goose & Broad creeks	11/18/2003	$136,000	Local Government - County	Pamlico	Neuse	$3,000,000
Beaufort Co. Water District V - Septic Systems/Pantego Cr.	11/18/2003	$350,000	Local Government - County	Beaufort	Tar-Pamlico	$350,000
Biscoe, Town of- Plan./ Regional Wastewater Feasability, Cedar Cr.	11/18/2003	$36,000	Local Government - Municipal	Montgomery	Yadkin	$36,000
Bridgeton, Town of- Wastewater/ Neuse Non-discharge	11/18/2003	$116,000	Local Government - Municipal	Craven	Neuse	$773,475

Carteret [illegible]munity College- Storm./ Bogue Sound Constructed Wetland	11/18/2003	[illegible]0,000	Local Government	Carteret	White Oak [illegible]	$420,000
Catwaba Lands Conservancy- Acq./ Rollins & Banker Tracts, South Fork River	11/18/2003	$286,000	Non-profit	Lincoln	Catawba	$359,975
Clarkton, Town of- Wastewater/ Brown Marsh Swamp	11/18/2003	$185,000	Local Government - Municipal	Bladen	Lumber	$3,000,000
Conservation Fund - Acq/ Scott Creek	11/18/2003	$4,057,000	Non-profit	Jackson	Little Tennessee	$4,057,000
Conservation Fund- Acq./ Goshen Swamp & Grove Creek	11/18/2003	$55,000	Non-profit	Duplin	Cape Fear	$98,400
Conservation Trust for NC- Plan./ Riparian Corridors, Multi-Basin	11/18/2003	$625,000	Non-profit	Statewide/Regional	Statewide/Regional	$595,000
Farmville, Town of- Wastewater/ Little Contentnea Creek	11/18/2003	$119,000	Local Government - Municipal	Pitt	Neuse	$1,963,500
Fayetteville, City of - Stormwater/Little Cross Cr.	11/18/2003	$766,000	Local Government - Municipal	Cumberland	Cape Fear	$2,102,578
Foothills Conservancy of NC- Acq./ Blue Ridge Parkway, Linville River	11/18/2003	$328,000	Non-profit	Burke	Catawba	$327,800
High Country Conservancy- Acq./ Valle Crucis, Craborchard Creek	11/18/2003	$706,000	Non-profit	Watauga	Watauga	$705,740
Kinston, City of- Storm./Country Club, Catfish Branch	11/18/2003	$25,000	Local Government - Municipal	Lenoir	Neuse	$249,645
Maxton, Town of- Wastewater/ Shoe Heel Creek	11/18/2003	$154,000	Local Government - Municipal	Robeson	Lumber	$2,349,700
Mecklenburg County- Storm/ Mt. Island Lake, McDowell Creek	11/18/2003	$200,000	Local Government - County	Mecklenburg	Catawba	$1,500,000
Mecklenburg Soil & Water Conservation District- Storm./ Briar Creek	11/18/2003	$30,000	Local Government - County	Mecklenburg	Catawba	$30,000

National Committee for the New River- Acq./ Wagner Tract,Todd South Fork Greenway	11/18/2003	$82,000	Non-profit	Watauga	New	$81,050
Nature Conservancy, The- Acq./ Corbett Tract, NE Cape Fear	11/18/2003	$671,000	Non-profit	Pender	Cape Fear	$670,177
NC Coastal Land Trust- Acq./ Humphrey Tract, Shaken Creek	11/18/2003	$366,000	Non-profit	Pender	Cape Fear	$365,445
NC Coastal Land Trust- Acq./ McKeithan Tract, NE Cape Fear	11/18/2003	$992,000	Non-profit	Pender	Cape Fear	$991,820
NC Coastal Land Trust- Acq./ Weyerhaeuser Tract, Nevill's Creek	11/18/2003	$489,000	Non-profit	Beaufort	Tar-Pamlico	$1,066,700
NC Coastal Management- Plan./ Pivers Island Stormwater Management	11/18/2003	$40,000	State Agency	Carteret	White Oak	$45,500
NC Cooperative Extension Service - Restoration/Buffalo Cr.	11/18/2003	$71,000	State Agency	Johnston	Neuse	$396,900
NC Forest Resources- Acq./ Clemmons Forest, Strickland Creek	11/18/2003	$1,772,000	State Agency	Wake	Neuse	$1,771,285
NC Marine Fisheries- Rest./ Oyster Sanctuaries, Pamlico Sound	11/18/2003	$140,000	State Agency	Statewide/Regional	Statewide/Regional	$699,375
NC Parks & Recreation- Acq./ Pettigrew State Park, Scuppernong River	11/18/2003	$890,000	State Agency	Tyrrell	Pasquotank	$889,500
NC Soil & Water Conservation - CREP	11/18/2003	$4,200,000	State Agency	Statewide/Regional	Statewide/Regional	$5,338,027
NC State University- Septic Tanks/ Sertoma 4-H Center, Vade Mecum Creek	11/18/2003	$232,000	State Agency	Stokes	Roanoke	$231,465

NC Wildlife Commission- Acq./ Davis Tract, Alligator River	11/18/2003	$374,000	State Agency	Tyrrell	Pasquotank	$373,500
NC Wildlife Resources Commission- Acq./ Bolin Knob Tract, Silver Creek	11/18/2003	$236,000	State Agency	Burke	Broad	$235,422
NC Wildlife Resources Commission- Acq./ Mingo Tribal Tract, Joes Creek	9/22/2003	$13,500,000	State Agency	Caldwell	Yadkin	
Pembroke, Town of- Wastewater/ Lumber River	11/18/2003	$114,000	Local Government - Municipal	Robeson	Lumber	$2,130,000
Pilot View RC&D, Inc.- Rest./ Upper Linville River	11/18/2003	$257,000	Local Government	Avery	Catawba	$1,882,500
Ramseur, Town of- Wastewater/ Deep River Collection Rehabilitation	11/18/2003	$278,000	Local Government - Municipal	Randolph	Cape Fear	$399,750
Resource Institute, Inc.- Plan./ Hitchcock Creek	11/18/2003	$215,000	Non-profit	Richmond	Yadkin	$214,102
Sandyfield, Town of- Acq./ Beaverdam Creek Wetlands	11/18/2003	$161,000	Local Government - Municipal	Columbus	Cape Fear	$308,500
Smithfield, Town of- Storm./ Spring Branch Constructed Wetland	11/18/2003	$660,000	Local Government - Municipal	Johnston	Neuse	$660,000
Southern Appalachians Highlands Conservancy- Acq./ Flat Creek Watershed	11/18/2003	$3,928,000	Non-profit	Buncombe	French Broad	$3,927,800
Southwestern NC RC&D, Inc.- Rest./ Pigeon River	11/18/2003	$207,000	Local Government	Haywood	French Broad	$666,865
Trangle Land Conservancy- Acq./ Regional Park, Marks Creek	11/18/2003	$1,776,000	Non-profit	Wake	Neuse	$1,775,335
Trent Woods, Town of- Septic Tanks/ Trent River	11/18/2003	$524,000	Local Government - Municipal	Craven	Neuse	$3,200,000
Troy, Town of- Wastewater/ Densons Creek Reuse	11/18/2003	$55,000	Local Government - Municipal	Montgomery	Yadkin	$1,242,000

Tuckaseig[illegible]Water & Sewer Authority- Wastewater/ Dix Gap Creek Collection	11/18/2003	$353,000	Local Government	Jackson	Little Tennessee	$348,795
Wallace, Town of- Wastewater/ Rock Fish Creek Regionalization	11/18/2003	$1,037,000	Local Government - Municipal	Duplin	Cape Fear	$1,036,870
	2003A Subtotal	$42,214,000				
Standard Minigrants Funded During Calendar Year 2003						
Blue Ridge Rural Land Trust Mini-Grant/ Waterfall Creek	2/17/2003	$25,000	Non-profit	Alleghany	New	$25,000
Foothills Conservancy of NC Minigrant - Catawba R	10/20/2003	$25,000	Non-profit	Burke	Catawba	$25,000
Foothills Conservancy of North Carolina Mini-Grant/Catawba River (Withdrawn)	3/17/2003	$25,000	Non-profit	Burke	Catawba	$25,000
Haw River Assembly - Minigrant: Alston Qtr., Saxapahaw	9/22/2003	$25,000	Non-profit	Alamance	Cape Fear	$25,000
New Hanover Soil & Water Conservation District Mini-Grant/Eagle Island	3/17/2003	$25,000	Local Government - County	New Hanover	Cape Fear	$25,000
Piedmont Land Conservancy Mini-Grant - Len's Knob	8/18/2003	$25,000	Non-profit	Surry	Roanoke	$25,000
Pitt County Comm. Schools and Rec Mini-Grant/ Swift Creek	2/17/2003	$25,000	Local Government - County	Pitt	Neuse	$25,000
Sandhills Area Land Trust - Methodist College River Tract	9/22/2003	$25,000	Non-profit	Cumberland	Cape Fear	$25,000
Town of Atlantic Beach Minigrant - Money Island	10/20/2003	$25,000	Local Government - Municipal	Carteret	White Oak	$25,000
	Standard Minigrant Subtotal	**$225,000**				

Donated Conservation Easement Minigrants						
Blue Ridge Rural Land Trust - Donated Minigrant, Johnston Tract/ Cales and Bussels Creeks	11/18/2003	$25,000	Non-profit	Wilkes	Yadkin	$25,000
Blue Ridge Rural Land Trust - Donated Minigrant, Tate Farm/ Ripchin Creek	11/18/2003	$25,000	Non-profit	Ashe	New	$25,000
Blue Ridge Rural Land Trust-Donated Minigrant, Ketchum Tract/ Piney Fork Creek	11/18/2003	$25,000	Non-profit	Ashe	New	$25,000
Carolina Mountain Land Conservancy- Donated Minigrant, Linneman Tract/ Green River	9/22/2003	$22,000	Non-profit	Henderson	Broad	$21,500
Catawba Lands Conservancy - Donated Minigrant, Colt Thornburg tract/ South Fork Catawba River and Coley Creek	11/18/2003	$10,000	Non-profit	Catawba	Catawba	$9,866
Catawba Lands Conservancy - Donated Minigrant, Friday Farm tract/ Hoyle Creek	11/18/2003	$16,000	Non-profit	Gaston	Catawba	$15,333
Catawba Lands Conservancy - Donated Minigrant, Oakwood Farm tract/ South Fork Catawba River	11/18/2003	$25,000	Non-profit	Catawba	Catawba	$24,643
Tar River Land Conservancy - Donation Minigrant, Brittain Tract/ Lynch Creek	11/18/2003	$12,400	Non-profit	Franklin	Tar-Pamlico	$12,400
	Donated Conservation Easement Minigrant Subtotal	**$160,400**				
	TOTAL FUNDED FOR 2003	**$80,857,100**				

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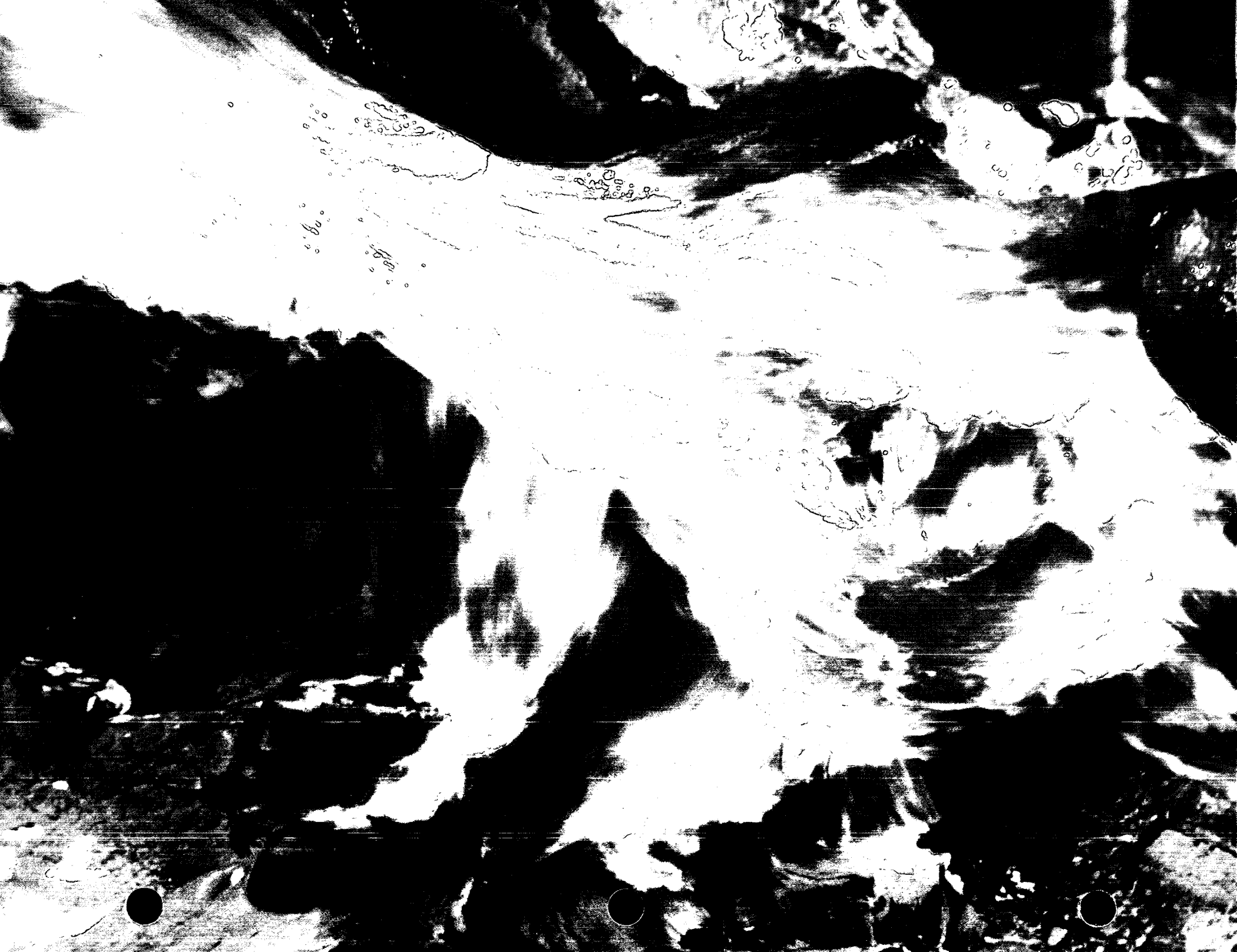
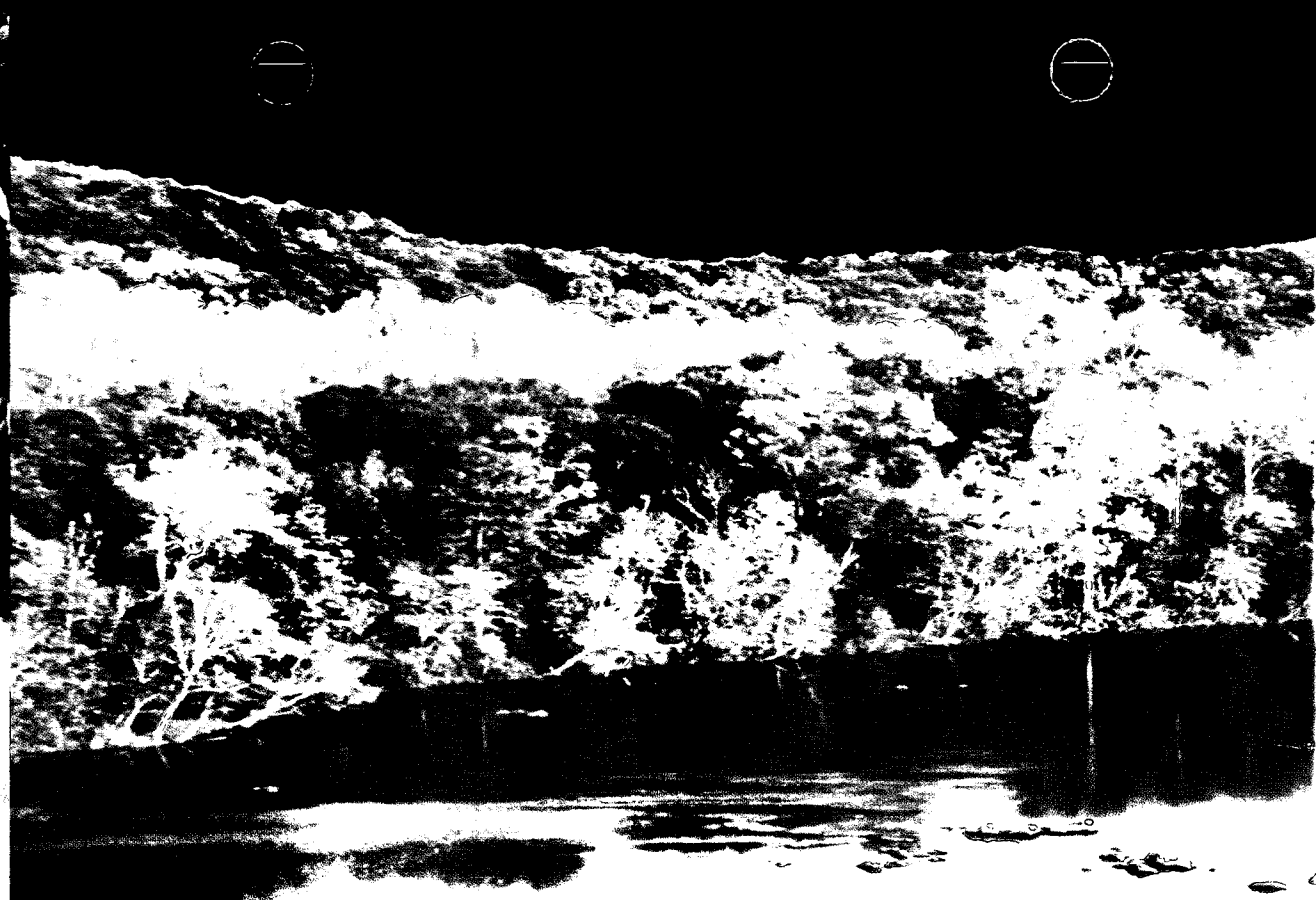
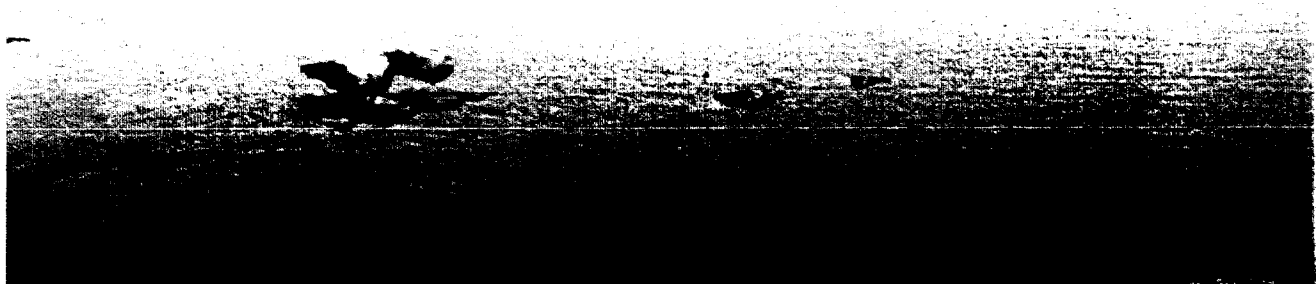




cleanwater

MANAGEMENT TRUST FUND



Land Conservation

Preserving our environment
Strengthening our economy
Protecting NC's heritage for those who come after us

Land for Tomorrow Coalition
American Farmland Trust
Conservation Trust for North Carolina
NC Public Interest Research Group
NC Recreation and Park Society
The Nature Conservancy
The Trust for Public Land

Presentation Objectives

- What is the *Land for Tomorrow Coalition?*
- Why is land conservation so important to North Carolina?
- What have we learned from our research to date?
- What are our recommendations for this year?
- Next steps

What is the *Land for Tomorrow Coalition*?

- Goals
  - Help North Carolina find creative ways to increase funding for land conservation
  - Build public awareness of the need
- Founding coalition members
  - American Farmland Trust
  - Conservation Trust for NC
  - The Nature Conservancy
  - NC Public Interest Research Group (NCPIRG)
  - NC Recreation and Park Society
  - Trust for Public Land

First Phase of Project

Fall 2003 to Winter 2004

- $120,000 start-up funding from Z Smith Reynolds and Cemala Foundations
- Coordinating with *One NC Naturally*
- Phase 1 of Project: Research and Planning

Current Phase of Project

Spring 2004 to Summer 2005

- Recommend **short-term funding** to strengthen programs in FY 2004-05
- Assess the statewide **need** for open space and parks and the funding required to preserve that land
- Educate the **public** about the importance of open space protection
- Assess the full range of funding mechanisms and recommend **long-term, sustained funding** programs to the NC Legislature

Why is land conservation so important to North Carolina?

Natural land helps protect water quality and trees and shrubs purify the air.

Natural areas provide habitat for native species.

Open space is critical to our economic well-being -- it is the basis for North Carolina's tourism industry.

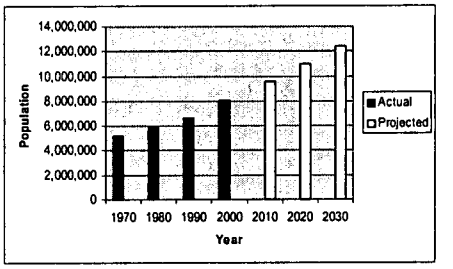
And to the agricultural and timber industries.

Open space makes North Carolina a great place to live and helps attract new workers and industry.

Land is central to the quality of life we experience as North Carolinians and to the legacy we hope to leave our children.

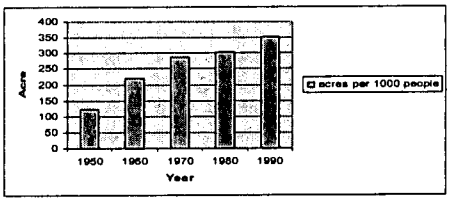
But open space is disappearing in North Carolina.

North Carolina's population is burgeoning.



We are developing more land per person than ever before.

For example, in the Triangle, the number of acres developed for every 1000 people increased from 122 to 353 between 1950 and 1990.



The state is losing 277 acres of open space/day to development or more than 100,000 acres/year.*

*One NC Naturally website: www.enr.state.nc.us/ofl/lean/conservation/pages/impactfacts.html

In addition, North Carolina's land ownership patterns are changing rapidly.

- Power and timber companies are selling vast tracts of land.
- Farmers are selling out because of the weak agricultural economy and the demise of tobacco.

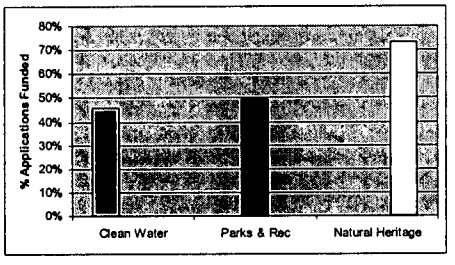
Incompatible development around military bases makes training and operations difficult. DOD is asking states to preserve land around its bases.

All across North Carolina communities and nonprofit land trusts are responding by creating visions for parks, greenways, wildlife areas, stream buffers, and farmland protection.

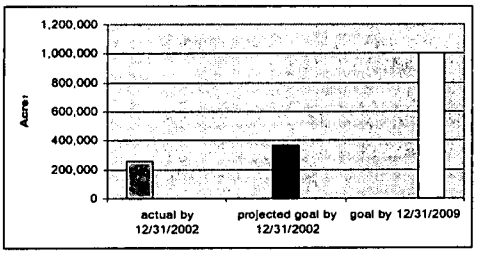
One NC *Naturally* is also creating a state-wide vision.

But sufficient funding is not available to bring these visions to life.

The state's trust funds receive many more applications than they can fund.



We're falling behind the Legislature's goal of saving one million acres by December 2009.



$256 million per year are needed to meet one million acre goal by 2009*

*Sutherland, Ron and Richard Whisnant (2003) NC State Agency Conservation Funding Needs Assessment Environmental Finance Center, UNC-Chapel Hill, p. 5.

Funding for land protection comes from a variety of sources

State Funding

- Presently have approximately $50 million per year for land protection in the state's four trust funds
  - Clean Water Management Trust Fund
  - Natural Heritage Trust Fund
  - Parks and Recreation Trust Fund
  - Farmland Preservation Trust Fund
- Ecosystem Enhancement Project (EEP) has increased preservation dollars at least temporarily
- Conservation Tax Credit Program

Federal Funding

- Federal funds totaled $27 million in 2002
  - Farm and Ranch Land Protection Program
  - Forest Legacy
  - Land and Water Conservation Fund
  - Conservation Reserve Enhancement (CREP)
  - Clean Water State Revolving Fund
  - Transportation Efficiency Act (TEA)

Local Funding

- Provided $180 million for open space protection since 1998
- Since 1998, 15 bond referendums in 14 towns/counties
- Thirteen referenda (86%) passed by wide margins (average 69%)

Private Funding

Nonprofit land trusts and conservancies

- work with landowners and partner with governments to save land
- accept donations of land and easements
- accept donations of cash and other assets to support land conservation

A funding gap of more than $100 million still exists despite current funding programs at federal, state, and local levels.

What has the *Land for Tomorrow Coalition* learned from its research to date?

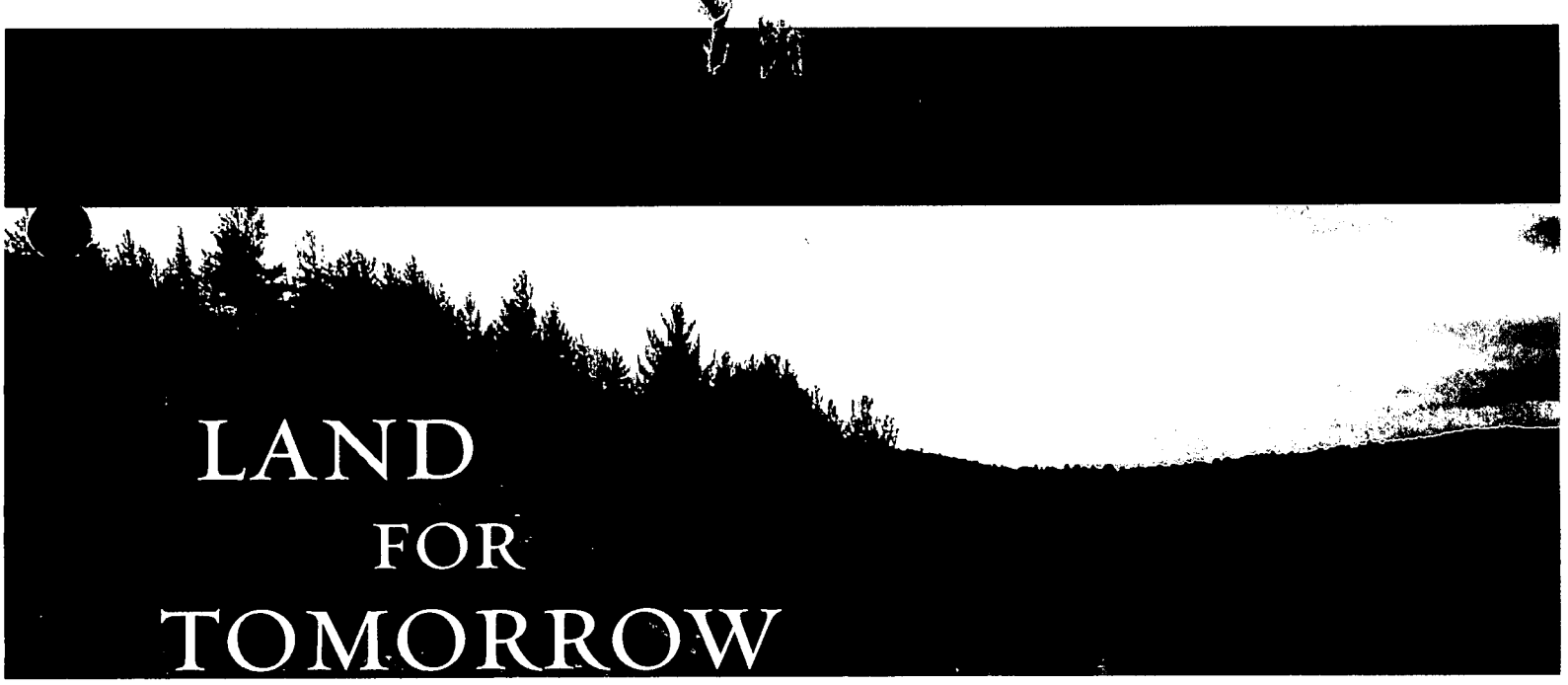
Research and Planning

- 50 Leadership interviews
- Focus groups (in Asheville, Raleigh and Wilmington)
- Financing study (by TPL)
- Economic study (by NC PIRG)
- Poll of 400 farmers
- Poll of 787 frequent voters
- Four forums in different areas of the state for leaders in the conservation, parks, and environmental communities

Results of the Public Poll

A significant shift in attitudes toward growth has occurred in the last two and a half years.

In June 2002, 31% said they thought growth and development of land was occurring too rapidly and steps needed to be taken to discourage more growth. That number increased to 43% in March 2004 survey.



LAND FOR TOMORROW

From the Great Smoky Mountains to the Outer Banks, North Carolina's peaceful farms, crashing waves, shady streams, formidable mountains and deep forests enrich our lives and attract thousands of visitors to the state. Our natural heritage is in danger of being lost, however, without proper planning and action to save the best land now.

Almost two million more people live in North Carolina than in 1990, and the population is expected to grow by another four million by 2030. Our population isn't the only thing that's growing - so is our consumption of land. For example, in the 1950s 122 acres were developed for every 1,000 residents in the Triangle area. Now that figure is 353 acres per 1,000 residents.

As a result, the state lost an average of 156,000 acres of open space per year between 1992 and 1997. That development boom has brought many great things to the state, but it also threatens our quality of life. Our air and water have become increasingly polluted. Traffic jams are commonplace. Once-productive farms are now suburban developments. Native wildlife is disappearing. We risk losing the many things that make North Carolina such a great place to live and work unless we act now.

Fortunately, all across North Carolina citizens have big visions for new parks, greenways, wildlife areas, stream buffers and protected farmland. Local and state governments and nonprofit land conservancies are working hard to save land now.

In 1999, the State Legislature also responded by establishing a goal to save one million acres in ten years. Those million acres will be a critical investment in the state's future - a green infrastructure that is as important to our future quality of life as other infrastructure, like roads and sewer.

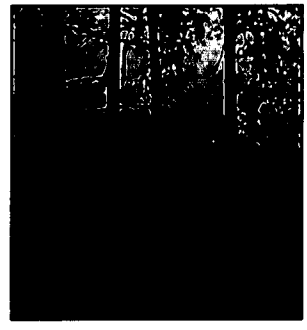
Four years after the legislature's visionary vote, however, we are only saving land at two-thirds the needed rate because of limited funding. University researchers estimate that we need $256 million per year to reach the million-acre goal by 2009. Even with all funding from state, federal and local governments and from private sources, we are still more than $100 million the amount needed to reach our goal.

Because of the urgent need to act now, six conservation organizations came together in 2003 to raise public awareness and help find solutions to the funding shortfall. American Farmland Trust, Conservation Trust for North Carolina, NC Public Interest Research Group, NC Recreation and Park Society, The Nature Conservancy, and Trust for Public Land founded the Land for Tomorrow Coalition, a partnership that we hope will grow to include hundreds of leaders and organizations throughout the state.

A PROJECT TO INCREASE PUBLIC FUNDING FOR LAND CONSERVATION

With start-up funding from the Z. Smith Reynolds and Cemala foundations, the Land for Tomorrow Coalition spent the fall and winter of 2003-2004 learning more about public and leadership opinion and about funding options that have worked in other states.

We have now completed personal interviews with more than 50 state leaders and focus groups and polls of more than 1,000 randomly-selected citizens. We have also published the *North Carolina Land Conservation Financing Study* that describes successful land conservation programs in other states and recommends steps that can be taken here to increase funding and effectiveness.



We found that state leaders and citizens alike feel very positively about land conservation, but few understand the urgent need to act now before more opportunities are lost to protect the most sensitive natural land and productive agricultural and timber land.

After learning more about the issue, 59% of those polled agreed that we are losing land so fast in North Carolina that we must find a way to preserve open space, farmland and areas that are important to protect our water supply. Eighty-six percent said they would support a program to protect rivers like the Catawba, French Broad and Neuse, and 83% would support a program to protect small family farms and farmland.

Our *Financing Study* reveals that strong land protection programs depend on reliable, dedicated funding sources at the state level and additional authority for dedicated funding at the local level. It also reveals that North Carolina could consider a statewide bond referendum to allow it to borrow up-front money now when land costs and interest rates are low. North Carolina's debt ratios compare favorably to those of other states with strong credit ratings.

The Land for Tomorrow Coalition is now embarking upon a statewide education and awareness effort in 2004 and 2005 to broaden public understanding of the extent and urgency of the need and also to develop strategies for increasing funding. The campaign will focus on opinion leaders and decision makers as well as on concerned citizens in general, and will seek to increase understanding and build consensus about sources of funding and about how land conservation programs would be managed to assure accountability.

We will reach out to opinion leaders and decision makers with the help of a campaign committee of statewide leaders in a broad variety of fields including business (with particular emphasis on the tourism, home building and agricultural industries), local and state government, the conservation and environmental communities, education, health and sportsmen. We will reach concerned citizens through a variety of vehicles including earned media and a targeted speakers bureau but also through direct mail and paid advertising.

Our goal is a secure and substantial increase in state and local funding for land conservation by July 2006. But while a secure source of funding is the goal of the Land for Tomorrow Coalition, this project is ultimately about so much more than money; it is about creating parks in which to play baseball, to fish, and to picnic; about buffering rivers that supply our drinking water and feed vast wetland ecosystems; about shielding mountains that rise from the Blue Ridge Parkway and from the American consciousness; about preserving farmlands that put food on our tables and sustain a way of life.

For more information about the work of the Land for Tomorrow Coalition, contact Kate Dixon, Project Director, by mail at 4705 University Drive, Suite 290, Durham, NC. 27707; by telephone at 919.403.8558 ext 1009; or by email at kdixon@tnc.org.

EXECUTIVE SUMMARY
Statewide Poll of North Carolina Farmland Owners

Prepared
By
The Kitchens Group
for
Land for Tomorrow Coalition

November 2003

Methodology

The Nature Conservancy, on behalf of the North Carolina *Land for Tomorrow Coalition*, commissioned a public opinion survey of four hundred farmland owners in statewide North Carolina. These farm owners were interviewed in a random sample on November 19-22, 2003. Respondents were screened for owning farm land in North Carolina. The sample was balanced according to all known demographic factors. All interviews were conducted by telephone. The margin of error for this survey is +/-4.9%, with a 95% confidence level. The poll was conducted by The Kitchens Group of Maitland, Florida.

Conclusions

- **Farm owner profile.** A majority of those we polled farm between 40 and 250 acres. Eighty-one percent live on the land that they farm. Sixty-one percent receive half or less of their income from farming. Eighty-four percent were 50 or older, and the sample was evenly split between men and women.
- **Thirty-seven percent of farm owners rent their land to someone else to farm.** Fifty-three percent lease out at least some of their land to someone else.
- **Farm owners express serious doubts about the future of farming in the state.** Nearly half (48%) say their children will not farm the land they own in the future. Seventy-one percent expressed the opinion that no one is buying land for farming, and 56% say the only people who will buy the land are developers.
- **Conservation techniques are generally acceptable.** Seventy-five percent support buffer zones along rivers and streams, and 61% support programs to restore wetlands.
- **Purchase of Development Rights (PDR) programs are little known but viewed positively when explained to farmland owners.** Only 39% were familiar with the state's Farmland Preservation Trust Fund and only 24% with the federal Farm and Ranchland Protection Program. However, when given a brief explanation of PDR, 64% thought that it sounded like a good idea.
- **Farmers are open to a range of land protection options.** Of those whose counties had Voluntary Agricultural District programs, 49% were enrolled in this 10-year protection agreement. Fifty-four percent would be willing to restrict development longer for additional benefits. Sixty-five percent think that business planning assistance and grants in exchange for short-term land protection would be helpful for North Carolina agriculture.

North Carolina Land Conservation Financing Study

Executive Summary

Over the past decade (1990 – 2000), North Carolina was among the fastest growing states in the country, with the sixth highest numeric population change. The state added 1.4 million new residents (21 percent) during that time period. The state's population is expected to increase by 35 percent from 2000 to 2020 to nearly 11 million. The current rate of growth and housing development is consuming approximately 427 acres of open space a day, mostly in the state's seven largest metropolitan areas.

In January 2000, the North Carolina General Assembly voted overwhelmingly in support of a mandate to preserve one million acres by December 31, 2009. The Million Acre Plan would increase the percentage of preserved land from 8.8 percent to 12 percent, however no additional money was attached to the plan beyond existing funding. Governor Mike Easley directed the state Department of Environment and Natural Resources to undertake a planning process for protecting the state's land and water resources, called One North Carolina Naturally. A draft strategic plan was released in the spring of 2003.

To meet the land conservation objectives outlined in these plans, the Environmental Finance Center (EFC) at the University of North Carolina, Chapel Hill, estimates that approximately $1.85 billion is needed, or $256 million a year in new acquisition and management funds over the next seven years.[1] Currently, the state funds land conservation through four separate conservation trust funds. According to EFC data, the trust funds spent approximately $50 million on conservation land acquisition in Fiscal Year 2002. While the current funding is significant, it is not sufficient to meet the state's land conservation goals. Furthermore, the sources of these funds are not permanently dedicated and therefore could be diverted to other programs in tight economic times.

North Carolina also has a good policy framework in place to support land conservation. The state's conservation tax credit program – one of the first established in the country – has become a model for many other states. North Carolina also participates in a wide array of federal land conservation programs, accessing significant funds and matching grants for land protection throughout the state. There are, however, a number of policy changes that could go a long way toward strengthening the state's framework and bringing additional funds to the table. Specifically, TPL recommends:

- In 2004
  - **Enabling certificates of participation.** State legislators should consider authorizing the issuance of certificates of participation (COPs) for land conservation. COPs authority would enable the conservation trust funds to issue debt in order to acquire and protect additional lands in the near-term while it is available and less expensive than in the future.
  - **Leverage State Revolving Loan Funds.** By using a portion of its Clean Water and Drinking Water state revolving loan funds (SRFs) as collateral for revenue bonds, the state could produce additional monies for low-interest loans for open space land acquisition.

[1] North Carolina State Agency Conservation Funding Needs Assessment, Environmental Finance Center at University of North Carolina, 4/16/2003.

- In 2004 - 2005
  - **Strengthening local participation.** North Carolina counties and municipalities should be strong partners for the state, but they are currently not committing local funds for land conservation to any great extent. The state should enact enabling legislation authorizing additional local funding sources and provide greater incentives.

  - Model programs from several other states including New Jersey, Florida and Massachusetts provide guidance for developing a framework that will create state incentives for local participation in land conservation funding. For example, in New Jersey a 1989 constitutional amendment allocates (for 30 years) $98 million in annual sales tax revenues to open space. The state also authorized counties and municipalities to raise local funds by establishing voter-approved open space trust funds supported by dedicated property taxes. State incentives, in the form of 50 percent matching grants, are provided to local governments that adopt an open space tax. As of November 2003, all 21 counties and more than 200 municipalities in New Jersey have a dedicated open space tax in place, generating more than $200 million in annual local funding.

  - TPL presents a scenario whereby the 10 fastest-growing counties could generate between $200 and $300 million in local funds over ten years with a dedicated tax or issuance of general obligation bonds.

  - **Increasing the state's funding commitment.** Recent budget shortfalls and rising indebtedness present significant challenges to pursuing additional state funds for land conservation. However, the state does have some additional debt capacity, and there exist a few other potential revenue sources that should be explored further.

  - **Securing the state's funding investment.** Stable state funding fosters program development and long-term vision, and establishes the program as a reliable partner for federal and local conservation efforts. A portion of the state's current investment in land conservation is secured by a dedicated revenue stream, but other funds are subject to annual appropriation. In order to defend land conservation programs against potential budget cuts, the state should consider dedicating revenue to this purpose through a constitutional amendment. Since 1992, seven states have adopted constitutional amendments to secure funding for parks and land conservation.

  - **Leveraging federal funds.** North Carolina should intensify its efforts to obtain a range of federal conservation dollars, including funding from the Farm and Ranch Land Protection Program, Forest Legacy, Land and Water Conservation Fund, and the North American Wetlands Conservation Act..

EXECUTIVE SUMMARY
Statewide North Carolina Public Poll

Prepared
by
The Kitchens Group
for
Land for Tomorrow Coalition

March 2004

Methodology

The Nature Conservancy, on behalf of the North Carolina *Land for Tomorrow Coalition,* commissioned a public opinion survey of seven hundred and eighty-seven likely voters in North Carolina. These voters were interviewed in a random sample conducted March 1-5, 2004. Respondents were screened for voter registration, and the sample was balanced according to all known demographic factors. All interviews were conducted by telephone. The margin of error for this survey is +/-3.5%, with a 95% confidence level. A 95% confidence level is acceptable in social science research. This refers to the fact that 95 times out of 100 these results will fall within this margin of error. The poll was conducted by The Kitchens Group of Maitland, Florida.

The Kitchens Group has conducted three statewide surveys in North Carolina between April 2000 and March 2004. A comparison of the demographics in each survey reveals the samples are comparable enough to track certain questions.

Most Important Issue Facing North Carolina

In each of the three polls since April 2000, respondents were first asked to name the issue they think is the most important for the Governor and Legislature to address. In 2000, the economy barely made the radar screens of these voters. Education dominated as the leading concern in April 2000 (29%). While education continues to be a concern (19%), it does not merit the same level of preoccupation as the economy (40%). No other single issue was mentioned by more than 7% of those polled.

Growth and Development Issues

Some of the most interesting findings, in the survey, focused upon growth and development. A significant shift in attitudes about growth has occurred within the last two and a half years. In June 2002, only 31% said they thought growth and development of land in their area of the state was occurring too rapidly and steps needed to be taken to discourage more growth. That number has increased to 43% in the current survey.

Environmental Concerns

More than 70% of respondents saw the following environmental issues as very or somewhat serious in North Carolina:

84% pollution of rivers and streams
75% loss of wildlife habitat
74% air pollution
73% loss of farmland

Competing Needs

Another significant finding in this survey is that 59% of North Carolina voters say, even though the state has a budget crisis and other competing needs like education and health care, open space and farmland must be preserved before it is lost to development. Although voters see the economy and education as primary issues facing North Carolina, a strong majority say part of the budget should be allocated for the preservation of open space.

Popular Features of a Land Protection Program

More than 60% said the following features of a state level land protection program would make them more likely to support the program:

86% protection of rivers like the Catawba, French Broad and Neuse
82% protection of small family farms and farmland
80% protection of drinking water
78% provision of matching funds to help local governments preserve land
78% preservation of historic sites like battlefields, historic homes and churches
77% preservation of forests
76% preservation of scenic views
68% provision of more public access to beaches and coastal areas
65% protection of habitat for animals like the black bear and red cockaded woodpecker
63% creation of more local parks close to home
61% preservation of areas that would be open to the public for hunting and fishing
57% provision of more hiking and biking trails and areas for canoeing and kayaking

Sources of Funding

Respondents were asked about a variety of ways of paying for an open space protection program. One proposal is to issue bonds. Almost 65% said they would be more likely to support bonds if the bonds cost the average family only $27 per year or less than $3 per month.

Public Education Campaign

The data from this survey points to the necessity of conducting a campaign to inform voters about key conservation issues. The poll indicates how strongly they respond to specifics about issues, such as the disappearance of 2.5 million acres of wetlands, the loss of coastal wetlands, farmland, and forest areas, and the expected increase in population. The statistics, coupled with information about what types of land a conservation program would protect, are very compelling information to voters.

Waste Reduction Partners, Land-of-Sky Regional C

An Overview of the Waste Reduction Partners Model

WASTE REDUCTION PARTNERS
dedicated professionals sharing expertise

By Terry Albrecht, P.E
Program of the Land-of-Sky Regional Council
In Partnership with NCDENR, Division of Pollution Prevention and Environmental Assistance

Waste Reduction Partners

Dedicated Professionals Sharing Expertise

Services: **Energy Auditing, Solid Waste Reduction, Water Efficiency, and Pollution Prevention**
Approach: **Innovative, Preventative, Cost Saving Strategies**
Staff: **Team of Volunteer and Retired Engineer, Scientists, and Architects**
Clients: **Business, Industry, Institutions & Public Entities**
Service Area: **WNC**

Confidential - Non-regulatory - No-cost services

Land-of-Sky Regional Council

Specialty Services

- Solid Waste Reduction
- Water Efficiency / Demand Side Mgmt
- Energy Efficiency
- ISO 14001
- Pollution Prevention
- Clean and Alternative Fuel Vehicles
- Environmental Sustainability
- Special Environmental Projects

Land-of-Sky Regional Council

In Partnership with NCDENR, Div. of Pollution Prevention and Environmental Assistance

WRP Engages Retired and Volunteer Engineers and Scientists

Providing Technical Assistance

- Effective use of community resources
- Staff is highly respected by clients *"Speak the Business Language"*
- Over 1000 years of cumulative experience
- Staffing able to "stay with" clients through the project
- economic competitiveness & improved envir. performance

Land-of-Sky Regional Council

Millennium Stats

- No of active assessors: 45
- No. of new assessments: 237
- No. of WNC counties: 14
- Documented client saving: $4.2 M/yr
- Technical Assistance: 34,900 Hours

Land-of-Sky Regional Council

WRP RESULTS:

"That meet the needs of WNC"

- Reducing Burden on Local Solid Waste Landfills…
  - Over 40,000 tons solid waste diverted from landfills since 2000 ($3.87M in client savings)
- Extending Public Water Supply Capacity via Demand-side Management…
  - 153 mgy saved through water efficiency assessments ($980,000/yr saving to clients)
- Addressing the Reduction of Air Pollutants from Power Generation…
  - Strategies to reduce electricity usage by 14.4 million kWh/yr
  - $890,000/yr savings to clients
  - 15,948 tons of CO2 reduced annually
  - 38.2 tons of NOx reduced annually
  - 65.3 tons of SOx reduced annually
  - Equivalent to eliminating NOx from 1885 passenger cars

Land-of-Sky Regional Council

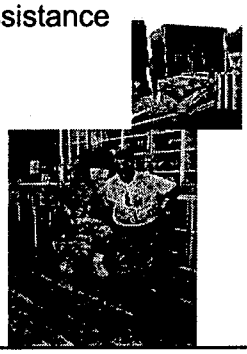
Solid Waste Reduction –FY2003

- 13,447 tons diverted from landfilling
- $1.3 million savings in disposal avoidance and revenues
- Lightweight aggregate
- Assisting processors
- Pallet Flooring
- WNC Green Building Council
- High Performance Buildings
- Regional Recycling Infrastructure
- Spirit of volunteerism

Land-of-Sky Regional Council

New Product Development – Entrepreneurial Assistance

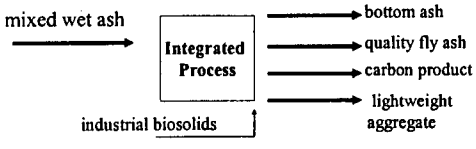
- Pallet-to–Flooring Project
- EPA Funded
- University/USFS research to commercialization
- Demonstration Floor in Asheville's Grove Arcade Public Market
- Business Partners secured, Oaks Unlimited in Waynesville, NC
- Recycling Business grant secured



Land-of-Sky Regional Council

Coal Combustion Products Integrated Process

- Demonstration Pilot Plant
- NCSU Mineral Research Lab – leading
- Public/private consortium partners



Land-of-Sky Regional Council

Energy Efficiency Assistance

- On-site Energy Audits
- Public Agencies, Commercial, Industrial
- NC's Utility Savings Initiative
  - 3 million sq. ft of state agencies reviewed O & M practices
- Self-Assessment Tools / Fact Sheets
- Supporting Performance Contracting – financing (schools)
- Winner of NCDOA – Energy Leadership Award

State Energy Office
ENERGY

Water Efficiency

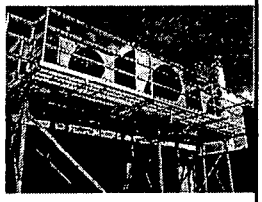
Extending life of quality public water supplies

- 196 assessments conducted - WNC
- 288 MGY Recommended
- 192.8 MGY Implemented
- $911,500 annual savings to customers
- Drought Response

Land-of-Sky Regional Council

Water Efficiency Case Study: Industrial Sector

- Machinery Manufacturer – Compressors
- Improved operations of wash tanks
  - Formed Operator Quality Teams
  - Better operation of rinse tanks, in-tank filters, & conductivity controllers
  - Future design strategies recommended
- Saving over 11.2 million gallons per year – minimal investment



Land-of-Sky Regional Council

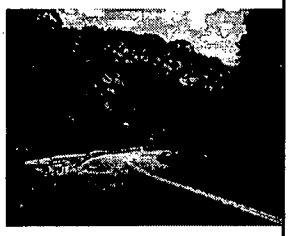
Water Efficiency Case Study: Commercial - Asheville Housing Authority

- 1296 units, housing over 2335 people
- Annual water use: 64.5 mgy ($460,000/yr expense)
- WRP Assessors performed water efficiency benchmarking study
- Recommendations / Projections
  - Upgrading fixtures: Save 23.5 mgy
  - Save $113,700 to $159,000 per year
  - Payback in 1.0 to 2.5 years

Land-of-Sky Regional Council

ISO 14001

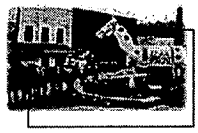
- Assisted Blue Ridge Parkway to implement Environmental Management System
- Assisting Warren Wilson College to implement ISO 14001
- Assisting Regional Water Authority of Asheville, Buncombe and Henderson Counties.



Land-of-Sky Regional Council

Pollution Prevention- Town of Tryon

- Tryon: small town in WNC pop. 2000
- Issue: mercury in wastewater
- WRP worked with Town's textile mill and dentists
- Provide recommendations on "ultra-clean" wastewater sampling techniques
- Lunched public education effort
- Held NC first "Mercury Waste Collection Day"
- Mercury non-detection since the program



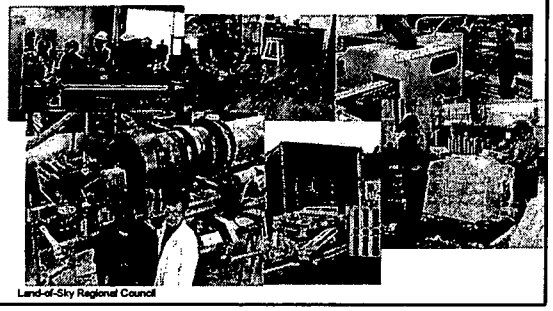
Land-of-Sky Regional Council

Program Funding Partners

- FY2004 Budget – $142,777
- Funding Partners
  - NCDENR, DPPEA
  - NCDOA, State Energy Office
  - USDA – Rural Utility Service
  - USEPA – Innovations grant
  - Municipalities (RWA)
  - Private Contributions

Land-of-Sky Regional Council

DPPEA's Goal: Duplicate Program in Eastern NC Working with Robeson County...



Land-of-Sky Regional Council

Contact WRP

Waste Reduction Partners
Land-of-Sky Regional Council
25 Heritage Drive
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Land-of-Sky Regional Council

MOUNTAINEER

WEDNESDAY, APRIL 7, 2004

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perform a high-
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tunes, rock and
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Life, Page 1B

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her drawings
Mountaineer,
Waynesville,

Pipe store robbed for third time

By DARREN MILLER
Staff writer

An investigation by the Haywood County Sheriff's Office of a major theft on March 21 from Peter Pipers Pipes on Jonathan Creek Road in Waynesville led to the arrest of three suspects about a week later.

The investigation is continuing, as law enforcement officials attempt to recover more of the stolen property, including glass pipes, bongs and other store merchandise estimated at $28,500.

The three suspects — Hector Luis Rivera, 27, of Waynesville, Christopher Martin, 19, of Clyde, and Ryan Martin, 21, of Clyde — were arrested in separate incidents March 27. Christopher Martin is a former store employee.

Each suspect was charged with felony breaking and entering, felony conspiracy, felony larceny and felony possession of stolen property.

They are all in custody in the Haywood County Detention Center under $25,000 secured bonds.

The larceny warrants allege that Rivera and the Martin brothers stole more than $10,000 in store merchandise, most of which were glass pipes and bongs.

A bong is a pipe commonly used for smoking marijuana, but can be legally sold because it also could be used to smoke tobacco.

■ See PIPES, Page 10A

Joe Pryor of Oaks Unlimited is shown with the scrap lumber from used pallets before and after it has been recycled into the rustic flooring he plans to turn out.

Benjamin Hicks / staff photographer

Turning wood waste into rustic flooring

By VICKI HYATT
Editor

A Jonathan Creek business owner has found a new way to recycle discarded pallet pieces by creating rustic flooring — a business venture that is already gaining national attention.

Joe Pryor, owner of Oaks Unlimited on Jonathan Creek, has received a state business recycling development grant to purchase equipment for the new process.

When he first read about a research project to find uses for discarded pallets — the portable platforms used for storing and handling of warehoused goods, his interest was piqued.

Pryor operates a third-generation family business producing and selling high-end hardwood lumber for furniture, cabinets, moldings and millwork.

The product is sold wholesale and shipped internationally.

The family has had a long-standing history with recycling. Sawdust and wood shavings have been recycled for use as boiler fuel, animal bedding and composting at the family's South Carolina facility since 1979. Pryor said he frequently keeps up with trends in wood product recycling and saw an item in a recycling newsletter about using pallet pieces for rustic flooring that caught his eye. The product seemed like something that would fit into his existing business.

Pryor contacted Waste Reduction Partners, the nonprofit organization comprised of retired business engineers and scientists spearheading the project through the Land-of-Sky

■ See FLOORING, Page 8A

Jail bonds get the nod

By JEFF SCHMERKER
Staff writer

The Haywood County Board of Commissioners approved a resolution issuing $12 million in general obligation bonds for the jail/law enforcement center project on Monday.

Adoption of the resolution was necessary before the scheduled bond sale, said Julie Davis, the county's finance director. The document provides details on the issuance of the bonds.

The new jail, to be built using precast modular nodes, is slated to rise on land now occupied by the old jail and popular recycling convenience center in west Waynesville.

The bonds are payable in annual installments of $600,000 beginning on June 1 of 2006, and running until 2025.

In other business, board members learned:

• The county is spending $38,895 at the

■ See BONDS, Page 10A

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Egg hunts

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Testing school

By PEGGY GOSSELI
Canton bureau chief

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"You don't have to be
to participate in the
survey. Any graduate
County high school can

■ See TESTING, Page

Flooring

■ Continued from Page 1A

Regional Council in Asheville.

At that point, he met David Lowles, a retired engineer assigned to the project.

"We try to help in three areas — energy reduction, water and sewer reduction and recycling of solid waste," Lowles said.

Although his background was in semiconductor equipment, Lowles said a lot of the project was business strategy, research and investigation.

The first step was to understand the concept of grinding pallets into mulch or fuel, which was the standard use for used pallets, he said. Lowles concluded there was no economic incentive to grind up the pallets because the end product would sell for no more than the actual cost of the grinding and handling.

He studied the pallet-to-flooring research being done, looking at the pros and cons.

"The people at the National Forest Service in Virginia had the technology and experience. The wood lab in Raleigh had smarts and studied the labor costs for the first set of experiments," he said. "We applied for and received an Environmental Protection Agency grant and began to work together to make the project economically viable."

Joining forces with Oaks Unlimited brought the project one step further along.

"Having Joe on board is the exciting part," said Lowles. "We were at the point where we had validated the market, cost-reduced the process and worked many of the bugs out, but we needed somebody to invest in the machinery and to run the business operationally. Joe said, 'I can do that.' It turned out Joe knew the professor we were working with so they had pre-established confidence in one another."

Lowles said he spent about 18 months trying to find a use for the broken wood pallet pieces that used to end up as garbage.

There are pallet recycling companies that repair the broken slats so the pallets can be reused, but at some point, the pallet is beyond repair. This creates wood waste that can't be landfilled under the solid waste disposal rules, he said. The accepted disposal method was grinding the pallets up to be sold or landfilled.

Creating flooring, more jobs

Upon reading about the project, Pryor said his initial interest was to work through subcontractors who already had the necessary equipment to produce the flooring.

But with the help of Lowles and Waste Reduction Partners, he applied for and received a state Department of Environment and Natural Resources grant for equipment. That changed his outlook.

While the grant won't cover all the cost of the equipment, it will allow Oaks Unlimited to increase staff locally to make the product. The company currently has 25 employees, 15 of whom are located at the Jonathan Creek operation. Pryor said he will add one to two people initially and more as the market grows.

Benjamin Hicks | staff photographer

Joe Pryor demonstrates the use of a nail press that removed the rusty nails from pallet pieces. Oaks Unlimited will receive a state recycling grant to purchase equipment needed to turn pallet pieces into a rustic-looking wood flooring.

He estimates it will take about three months to reach full production.

"We're still working on patterns, finishes and the equipment," he said.

The company has completed a trial run, which included securing the broken pallet pieces, removing the nails, kiln-drying and finishing the material, and applying the finish.

"The flooring definitely has a unique look," he said. "There's natural variations in the wood and you have nail holes in the board. It's a very rustic look, which is very popular right now. The story behind the flooring — that it is 100-percent recycled — is its strongest appeal."

Recycling is the underlying goal for each step of the process, even to the point to saving the nails that are normally taken to a junk yard.

"Part of grant application was that we would totally recycle and reuse everything," Pryor said.

The equipment will initially be at the Oaks Unlimited Jonathan Creek site, but if the product takes off, Pryor said he is prepared to move the flooring aspect of the business elsewhere in the county.

"We would certainly like to see it expand to the point of needing to do that," he said. "But for now, we have a lot to learn, so we better keep it right here and find out if it's a viable business."

If phone calls he has fielded so far are any indication, it appears the idea is a winner.

Pryor said he has spoken with architects as far away as Washington, D.C., and Boston who read about the project and are interested in the flooring.

He has already met with a distributor in Asheville who will initially concentrate on marketing the project locally.

Lowles said another immediate need is for used pallets, especially those within a 100-mile radius of Haywood County.

Pryor has operated the Haywood County business for the past 18 years. He and his wife, Karen, have two children, an 11-year-old son, Tripp, and a 14-year-old daughter, Taylor.

Vicki Hyatt can be reached at 452-0661, ext. 128 or at TEM@themountaineer.com

Park

■ Continued from Pa

"If they feed it and they can maintain it as ment," she said. "T investment that the have made, and this incenses me more than in the world."

Van Noppen says sh the fight for sever though admits she di the "dirty work." That, was left to Mib Medfo

Medford bemoans t trees in Waynesville. she said, back whe roads were dirt, l sugar maples were equidistant along th streets. Almost all of gone now, victim to ing or overzealous la hoping to tame the co

But even as trees trimmed into submi tudes are changing, said. For example, th plan for Waynesville new parking space in cial development ca more than 30 feet fro

The department of tion, she adds, will highways and inters but you have to tel Medford cruises the and byways of West Carolina, and when

Testing

■ Continued from F

he surveys," Woody

"We have received responses through and another 70 fo filled out on the W he said.

Woody suggested vey as an evaluation

"Hopefully, we ar get a lot more comp veys and I look fo seeing the results,"

Graduates are be to indicate whether working, continui education or have for military service

Then, getting do purpose of the surv uates are being ask their educational e using an A to F gr tem.

Areas graduates asked to rate schools prepared acquiring a broa education, acquirir work-related know skills, writing cl effectively, speaki and effectively, thi

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NOTICE OF MEETINGS

Land-of-Sky Regional Council

7/1/02 – 6/30/03
Achievements

WASTE REDUCTION PARTNERS
2003 HIGHLIGHTS

PROGRAM HIGHLIGHTS

Solid Waste Reduction	1
Waste Markets	2
Water Eff / Drought	2
Energy Efficiency	3
Utility Savings Initiative	3
Alternative Fuels	4
Environmental Management Systems	5
Notable WRP Projects	5
Services / Funding	6

Special Accomplishments
7/1/02 – 6/30/03

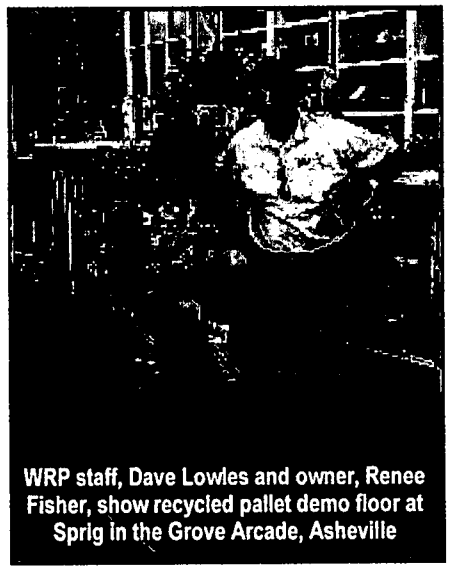
- Saved clients $1.4 million
- 13,447 tons of solid waste diverted from landfills
- 2.4 million kWh/year of electricity savings recommendation
- 15.2 million gallons/yr of water saving recommendations
- Coordinated Southeastern Alternative Fuels Workshop
- Supported Green Building efforts
- Performed 77 waste/energy reduction assessments with business and public clients
- Working in 14 WNC counties
- Provided 11,100 hours of technical assistance

VOLUNTEER PROFESSIONALS HELP WNC BUSINESSES CUT UTILITY COSTS BY $1.3M

In the WNC region, Waste Reduction Partners' (WRP) team of volunteer and retired engineers and scientists have identified nearly 300,000 tons of industrial by-products needing recycling markets, value-added processing, source reduction technologies, and creative entrepreneurial energy and financing. In fiscal year 2003, WRP staff has helped Western North Carolina (WNC) companies move 13,500 tons of waste materials into markets–saving clients over $1.3 million in disposal avoidance cost and revenues. (13 WNC Counties)

New Flooring from Old Pallets

With a grant from EPA, WRP Project Manager, Dave Lowles, is leading a public/private partnership to demonstrate and commercialize a process to make wood flooring from waste pallets that cannot be recycled. A 750 square foot demonstration floor has been installed at Sprig, a flower accessory shop in the Grove Arcade public market in Asheville. The flooring product is attractive and shows great market and economic potential. In December 2002, a Focus Group of area flooring stakeholders was convened to collect marketing information and feedback on 13 different samples of pallet flooring products. Mr. Lowles has multiple business partners collaborating on the project, including American Floor Finishing Co., Kings Kountry Pallets, WNC Pallet, Pallet Express, Oaks Unlimited, Vintage Hardwood Flooring and others. Technical assistance partners include NCSU's Wood Products Extension and the US Forest Service. The project has a goal of producing 50,000 sq. ft in the first two years. In NC, over 300,000 tons of pallet waste is landfilled annually. (Buncombe, Jackson, Henderson, and Haywood Counties.)



WRP staff, Dave Lowles and owner, Renee Fisher, show recycled pallet demo floor at Sprig in the Grove Arcade, Asheville

Beneficial Reuse of Coal Combustion Byproducts

In joint collaboration with the NCSU Mineral Research Lab (MRL), WRP scientists, Tom McCullough and Elaine Martin, are working to develop multiple uses for coal ash by-products from industrial and utility boilers. The reuse strategies include short-term use of ash as a structural fill and reclamation of bottom ash for use in cement blocks. Near-term solutions include wet separation of carbon to produce two marketable by-products, a low LOI ash for cement kiln markets and a high carbon product for the steel industry. The MRL has led a third initiative to develop a light-weight aggregate using industrial biosolids and fly ash. For three years a consortium of public and private partners have been investigating products and production feasibility. A high-performance lightweight aggregate has been produced. The consortium team is currently developing a business plan to attract interested production companies. If the process can be commercially developed, up to 130,000 tons of by-product ash and sludge could be diverted annually from industrial landfills. (Buncombe, Henderson and Transylvania Counties.)

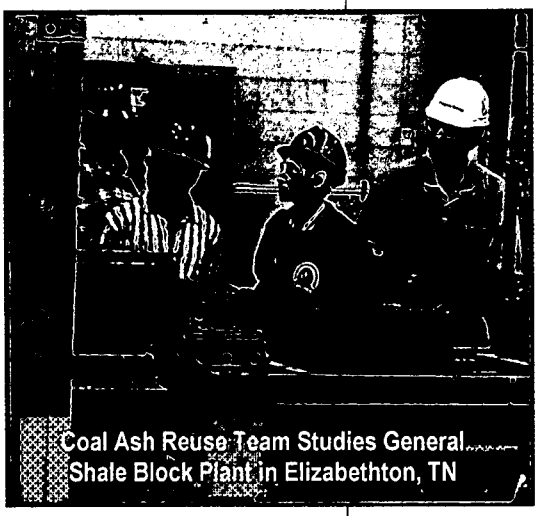
WRP Assists Cleveland Vocational Industries

Waste Reduction Partners' assessor, Richard Burke, worked with Cleveland Vocational Industries to address significant solid waste problem. Cleveland Vocational employs mentally challenged individuals to recycle textile dye tubes provided by area manufacturers. While Cleveland Vocational reclaims the plastic tubes for recycling, they also were disposing of 650,000 pounds/year of contaminated yarn that was still left on the tubes. Mr. Burke was able to determine a cleaner way of removing the yarn using a specialized saw blade. The once contaminated waste yarn is now being sold for $0.03/pound. The net savings for this non-profit is $40,000 per year.

Moving Waste to Markets

Mecklenburg County Waste Reduction Assistance

In a service contract with Mecklenburg County, WRP staff, Ray Guerrein, conducted waste reduction assessments at 23 Charlotte businesses and industries in 2002 and 2003. Through client follow-up, Mr. Guerrein documented that these businesses have expanded recycling markets by 1,525 tons/year and are saving an estimated $172,000 annually. (Mecklenburg County)



Coal Ash Reuse Team Studies General Shale Block Plant in Elizabethton, TN

Green Building Hotline

In joint collaboration with the WNC Green Building Council, WRP and the NC Division of Pollution Prevention launched a WNC Green Building Hotline in August 2002. WRP volunteer, Matt Seigel, staffs this hotline on a half-time basis. For the year, Mr. Seigel addressed 123 questions and provided referrals on alternative energy, water efficiency, low toxic and recycled materials, and solar power. Mr. Seigel also led a number of outreach efforts to area schools and developers in the residential, commercial and affordable housing sectors. Contact the Hotline at (828) 232-5080 or e-mail info@wncgbc.org with any green building question. (11 WNC Counties)

Carbon Waste Recycling

Over two years ago WRP Assessor, Tom McCullough, began working with a carbon processor in Burke County that wanted to dispose of a large stock pile of carbon waste materials through the county's waste transfer facility. Mr. McCullough worked to find a crushing operation that was able to grind the waste into an acceptable form for use in the steel processing industry. The company has been crushing 600 tons per month and will ultimately process over 25,000 tons of waste carbon into a resalable product. The waste stockpile area will be redeveloped into soccer fields. The net economic benefit of these efforts for the client business is over $80 per ton. (Burke County)

Supporting Commercial Recycling Infrastructure

WRP staff is working with two progressive recycling companies to site operations in Buncombe County. WRP assisted McGill Environmental Systems in reviewing potential sites and markets for an industrial composting operation. McGill has partnered with Buncombe County to locate a new facility at the Buncombe County Landfill. WRP also worked with Materials Reclamation, a reputable construction and demolition recycling company to also negotiate with the County to site at their landfills. While County commissioners have vetoed a commercial waste franchising agreement as the first step in these negotiations, the issues will be readdressed later in the year. Both companies would accept waste from the greater WNC area.

"A WRP water audit provided to the Billy Graham Center resulted in annual savings of $11,800 and over 2 million gallons of water savings. The Center implemented 4 of the 7 efficiency measures recommended."

WRP Provides Drought Assistance With Demand-Side Management

Waste Reduction Partners assisted western municipalities with demand-site water reduction support during the severe drought in 2002. WRP worked with Statesville, Shelby, Bessemer City, Forrest City, Gastonia, Huntersville, and Cherryville to provide mailings and resource information to largest water using customers at these municipalities. On-site water efficiency audits were offered and seven assessments were conducted in Statesville and various other locations. A special water training program was presented to Hotel/motel managers in Statesville to discuss water-use restriction and share immediate conservation opportunities at their facilities. In September 2002, WRP provided training on "Establishing a Commercial Water Conservation Program" for the City of Monroe. Program management and auditing expertise was shared with the City's engineering and utility staff.

Regional Water Authority—Industrial Audits Program

In fiscal year 2003, WRP conducted 17 commercial and industrial water efficiency assessments for the Regional Water Authority of Asheville, Buncombe and Henderson. WRP Assessors recommended measures to reduce water consumption by 15.2 million gallons per year. These strategies represent a potential cost saving of $209,200/year for clients.

Hendersonville H.S. Students Audit Water Use

WRP water assessors, Don Hollister and Roger Ambrose, shared experiences with two 10th grade science classes on water efficiency. After lessons on water conservation, the student conducted their own assessment of the High School's water consumption. Students measured water flow from domestic water fixtures, performed calculations, and made suggestions for water efficiency improvements.

Energy Efficiency Assistance
Enhances Profits & Air Quality

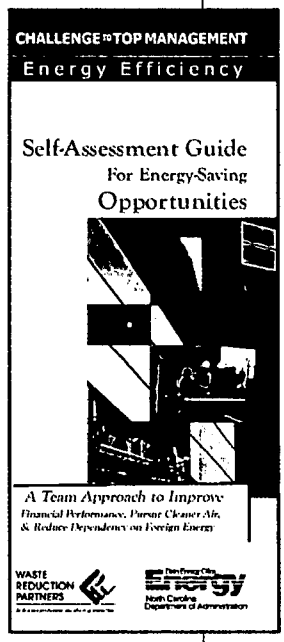
Supported by a grant for the State Energy Office, WRP Energy Assessors completed 25 energy efficiency assessments in fiscal year 2003. WRP auditor, Russ Jordan, coordinated this assistance for a number of public and private business and governmental entities, including schools, vocational centers, and local government buildings.

Assessments in nine WNC counties have addressed a broad range of improvements to energy management issues, including billing rate schedules, HVAC, chillers, hot water, waste heat reclamation, fuel selection, and boiler efficiency.

For work completed in fiscal year 2003, WRP staff recommended efficiency and management improvements to reduce electricity consumption by 2.4 million kWh/year. These recommendations equate to a potential client savings of $185,000 per year. Projected air pollution reductions from WRP energy efficiency recommendations are equivalent to removing 308 vehicles from the highways.

Self-Assessment Guide for Top Managers

WRP team, Wayne Rumble, Sara Boyd and other internal and external reviewers, developed an energy efficiency self-assessment guide designed to inspire top managers to strive for more efficient use of energy resources and improved financial performance. The guide includes check-lists, best management practices, and saving potentials and paybacks for typical energy upgrade projects.



Public Facilities Follow-up

WRP auditors conducted a review of technical assistance provided to public facilities between October 2001 and May 2003. Of 39 energy audits provided, these public clients have implemented measures that are saving nearly 1 million kWh/yr and over $75,000 in annual operation costs. On average, these public facilities have implemented 37 percent of the opportunities presented in written audit reports. WRP management continued to explore ways to help clients increase implementation rates.

"Projected air pollution reductions from WRP energy efficiency work are equivalent to removing 308 vehicles from the highways."

Reducing Costs for State Agencies
Utility Savings Initiative (USI)

Utility costs for over 12,000 state-owned or leased structures exceeds $225 million per year. WRP Special Projects Manager, Wayne Rumble, worked with the State Energy Office on an initiative to reduce state agencies' utility bills by $7.5 million per year.

In a Memorandum of Understanding, WRP conducted operation and maintenance (O&M) surveys at 23 state owned or leased facilities. The survey at each site consisted of observing the conditions, behavioral use and maintenance of building envelopes, lighting systems, HVAC system, domestic hot water, compressed air, electric motors, and miscellaneous items in appropriate building. Opportunities to improve efficiency and upgrade systems were also reviewed.

As part of the surveys, WRP developed and distributed energy saving awareness posters and light switch stickers.

Ten Waste Reduction Partner volunteers participated in the surveys. Overall, WRP members surveyed 3,028,000 square feet of state facilities.

Based on these O&M surveys, WRP assessors have also provided additional in-depth energy audits on specific areas such as lighting and water use. More follow-up assistance is planned at these facilities in the fall of 2003.

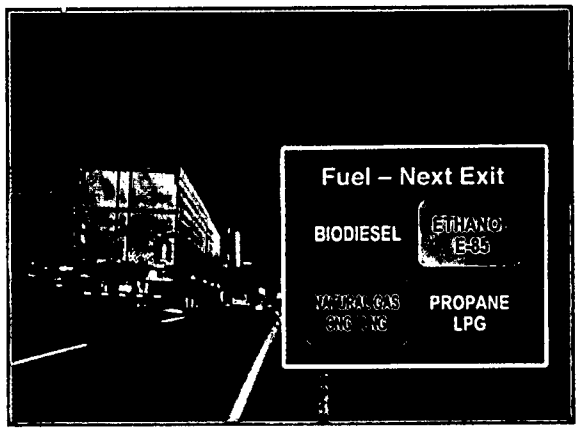
In August, 2003, the State Energy Office recently received an award for the USI effort from the National Association of State Chief Administrators.

ALTERNATIVE FUEL VEHICLES

"Over 135 public and private sector participants from 4 southeastern states attended *Building Alternative Fuel Networks in the Southeast.*"

SEO's Alternative Fuels Workshop - A Regional Success

The Land-of-Sky Regional Council was the lead workshop contractor for two-day workshop/working session entitled, "*Building Alternative Fuel Networks in the Southeast,*" on November 6 & 7, 2002 in Asheville, NC. USDOE's Clean Cities Program, and the State Energy Office sponsored the event. Over 135 public and private sector participants from the states of Georgia, North Carolina, South Carolina, Tennessee and others attended. The workshop had a dual purpose: alternative fuels education and outcome-focused breakout sessions, which addressed the challenges of advancing alternative fuel use and corridor development in the Southeast. Twenty-six national speakers provided educational sessions on air quality, alternative fuels (AF), and alternative fuel vehicles (AFV), and AF success stories. Facilitators led breakout discussions about cooperative actions and prioritized solutions to advancing alternative fuel use through regional strategies. Breakout sessions focused on advancing use of biodiesel, ethanol, natural gas, and propane fuels. Participants were also able to view five AFV's and eight educational exhibits, as well as attending a networking reception.



As a next step, the states of Georgia, North Carolina, South Carolina, and Tennessee have assembled a group of stakeholders to serve on an Alternative Fuels Work Group to address regional issues pertinent to the advancement of alternative fuels. One of the work group's first action items will be the development of a white paper, which will overview the current status of alternative fuels in the four states and provide future goals and action items. If you are interested in participating or contributing to this Alternative Fuels Work Group, please contact Linda Tidwell, Special Projects Coordinator, with the TDEC Policy Office, phone 615-532-0742 or Email: Linda.Tidwell@state.tn.us

SUPPORTING– SMALL BUSINESSES ENVIRONMENTAL OPPOURTUNITIES

Closing-the-Loop

WRP scientist, Eric Wellisch, worked with a small plastic molding manufacturer to reduce and recycle its industrial wastewater. The company does not have access to an industrial sewer system and must have all wastewater hauled off-site at a costly fee. WRP staff recommended several pollution prevention ideas to reduce the volume of wastewater generated and provided an option for the installation of an evaporation system that would save the facility $13,000 in wastewater hauling costs.

Eric Wellisch consults with client on-site.

WRP Assists EZ Block Business Development

WRP staff worked with Jerome Chambliss in developing his new business to manufacture a lightweight cellular block. The block has numerous superior qualities, including improved moisture resistance, fire resistance, thermal efficiency, acoustic properties and ease of construction. The block also uses recycled fly ash, perlite, and fiberglass in its manufacture.

Environmental Management Systems

Blue Ridge Parkway

In April 2003 the Blue Ridge Parkway completed the first environmental management system (EMS) of a National Park in the Southeast. WRP consultant Margie Meares provided numerous hours of on-site assistance and guidance on the initiative. The parkway used EMS models from both the pubic and provide sectors to customize a system to best meet their needs.

Warren Wilson College

Margie Meares also began working with Warren Wilson College to implement an EMS that will follow the ISO 14001 model. Warren Wilson hopes to be the first college in North Carolina to have a registered EMS in place.

Implementation Training

In November 2002 Waste Reduction Partners coordinated and sponsor a two-day ISO14001 implementation course in Asheville. Fifteen participants from areas business and colleges attended the training course led by Jack Rockstad and Margie Meares.

Supporting NC Environmental Stewardship Initiative

WRP management helped NCDENR promote and review candidates for new environmental recognition program called the Environmental Stewardship Initiative. Any NC company with an outstanding environmental program is encouraged to apply at: www.p2pays.org/esi/

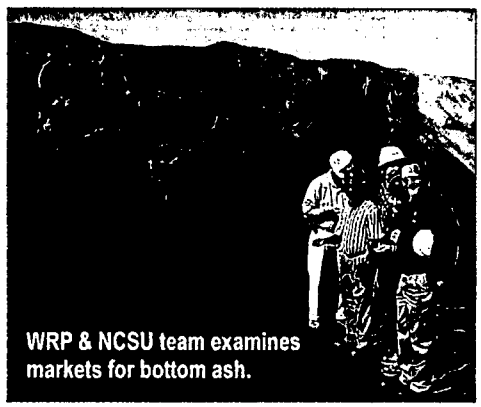
Notable WRP Projects

Ash to Asphalt

WRP scientist Elaine Marten has been experimenting with various formulations of asphalt that includes up to 50 percent fly ash in their makeup. Elaine had partnered with Reuse Technologies to develop a product that could be used in private asphalt paving applications.

New WRP Web Site

WRP Intern, Sara Boyd, recreated the Waste Reduction Partners website, making it easier to read and navigate. Sara also greatly expanded self-assessment guide resources and other web links.



WRP & NCSU team examines markets for bottom ash.

UNC-A Lab Chemical Management Assistance

WRP Scientists, Elaine Martin, Gordon Moore, and Al Glatz, provided UNC-A assistance in sorting through and inventorying surplus and out-date chemicals at student laboratories. A hazardous waste management firm packaged all these chemical for proper treatment, disposal and recycling.

WRP Assists Small Business with Safety Plan

WRP Assessor Gordon Moore worked with a small minerals reclamation company interested in locating a facility in Buncombe County. Gordon assisted the company in developing a site-specific safety plan that would meet the employer's expectations. The minerals reclamation could move 30,000 tons/year of by-products to new markets.

Marketing Efforts

WRP Marketing Manager, Orville McKinney continued marketing WRP services in area counties and keeping close contact with area chambers of commerce. Orville gained media coverage for several WRP achievements, including front page recognition on the Asheville Citizen Times.

Mechanically Inclined

Mechanical engineers, Keith Wood and Paul Sikes, helped a vocational workshop evaluate the potential to refurbish used video cassette tapes. Keith and Paul examined a disassemble/reassembly process.

Volunteers Assist with Chamber's Ind. Awards

Three WRP volunteers helped the Asheville Chamber review finalists for its annual Manufacturing Leadership Awards. Volunteers conducted on-site visits and analyzed evaluation criteria.

WRP Quarterly Meetings—Open to Stakeholders

Interested stakeholders in the community are invited to WRP's quarterly meetings. This year WRP had presentations from Southface Institute on green building construction techniques, the State Energy Office on the Utility Savings Initiative, SafetyKleen on chemical recycling, and WCI on hazardous waste management and minimization.

"WRP Scientist, Gordon Moore, helped a small recycling business develop a site specific safety manual to procure work in Buncombe County. The recycler hopes to move 30,000 tons per year into construction markets."

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Web:www.landofsky.org/wrp

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John Ashe
Bill Bottjer
Jim Brunn
Richard Burke
Craig Coker
Bill Dickason
Bob DiDiego
Al Glatz, Ph.D.
Raymond Guerrein
Don Hollister
Russ Jordan
Hans Kahn
Andrew Kallianos, Ph.D.
Harry Kopp
Al Keiser
Bob Legg
Art Lins
Dave Lowles
Elaine Marten, Ph.D.
Art Martin
Bob Martin
Tony Martin
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Orville McKinney
Margie Meares
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Wayne Rumble
Bob Schornstheimer
Matt Seigel
Gary Semlak
Paul Sikes
Jerry Touzinsky, Ph.D.
Ron Townley*
Len Urback
Eric Wellisch
Keith Wood

WRP Program Director
Terry Albrecht, PE**

WRP Administrator
Don Hollister

Joe McKinney*
Executive Director, LOSRC
James L. Stokoe*
Assistant Director, LOSRC
Gary Hunt**
Director, NCDPPEA

*LOSRC Employee
**NCDPPEA Employee

What is WRP?

Waste Reduction Partners, a team of highly experienced volunteer and retired engineers, architects and scientists, provides WNC businesses and industries with waste and energy reduction assessments and technical assistance.

WASTE REDUCTION PARTNERS

dedicated professionals sharing expertise

Specialty Services:

Water Efficiency / Demand Side Management , Solid Waste Reduction; Multimedia On-site Assessments, Energy Efficiency , Lighting Efficiency , ISO14001 Assistance, Indoor Air Quality Assessments, and Special Environmental Projects.

Service Area:

Waste Reduction Partners serves any business or public entity located in the westernmost 26 counties west of Interstate 77 in North Carolina.

The WRP Mission:

To work for a sustainable economy, healthy environment, and a better quality of life by helping WNC businesses, industries, institutions, and government entities reduce waste and utilize natural resources efficiently.

Partners:

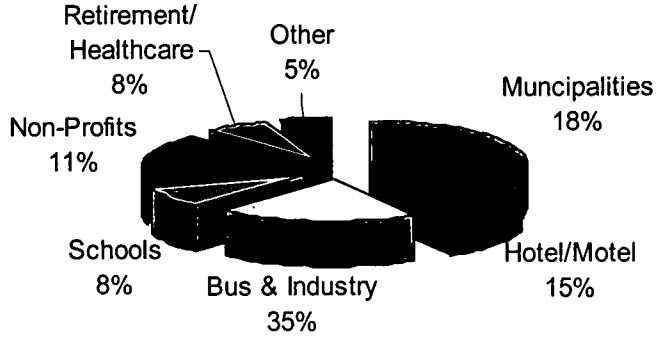
Waste Reduction Partners is a program of the **Land-of-Sky Regional Council** and works in special partnership with the North Carolina Division of Pollution Prevention and Environmental Assistance. Other partners include the State Energy Office of North Carolina; the Regional Water Authority of Asheville, Buncombe and Henderson; the Environmental Protection Agency; the USDA Rural Utility Services; and private contributors.

Confidential, No-Cost Services In Waste Reduction and Energy Management

WRP Funding/Service Recipients

WNC Community Sectors Receiving Assistance

FY2003 Budget $175,172



"This year WRP has provided 11,100 technical assistance hours to improve operations of WNC businesses and public facilities."

POLLUTION PREVENTION PAY$

Waste Reduction Partners works in special partnership with the NC Division of Pollution Prevention and Environmental Assistance (NCDPPEA)

Special thanks to the State Energy Office for funding support.

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DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
May 5, 2004

The Environmental Review Commission (ERC) met on Wednesday 5 May 2004 at 9:30 a.m. in Room 643 of the Legislative Office Building.

Representative Daniel McComas presided over the 5 May 2004 meeting. The following members were present: Senators Albertson, Dorsett, Forrester, Kinnaird, Swindell and Weinstein, and Representatives Fox, Gibson, LaRoque, McComas, Weiss and Williams. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Jennifer McGinnis, Assistant Commission Counsel, Tim Dodge, Research Assistant, and Mary Watson, Commission Clerk were also present.

On 27 April 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Representative McComas called the meeting to order and called on co-chairs for their remarks.

George Givens, Commission Counsel, was asked to explain the agenda.

Mr. Givens said that he had distributed to each member, copies of read only reports that are required by law to be made to the Commission. These reports, Water Quality Accountability for the Agriculture Cost Share Program Fiscal Year 2003, a list of Federally Threatened and Endangered Species in North Carolina and a copy of the Secretary's Scientific Advisory Board on Toxic Air Pollutants provided by DHHS are listed as **Exhibit D**.

Mr. Givens said a status report that lists all of the reports due to the ERC, will be provided to members at the next meeting.

Mr. Givens said that the last meeting of the ERC is scheduled for 11 May 2004 at 2:30 p.m. to approve legislation for the 2004 Short Session. A packet of bills will be distributed to members on 10 May 2004 for review.

Mr. Givens asked members to sign the visitor registration forms and asked members to sign and send forward their reimbursement forms.

Senator Katie G. Dorsett was asked to give a report on the Thursday 22 April 2004 site visit to Gorges State Park and the Friday 23 April 2004 site visit to DuPont State Forest.

Senator Dorsett said that Senators Clodfelter, Albertson and Representatives Gibson and Williams were in attendance for the site visits as well as Representatives Rapp and Walend.

Senator Dorsett said that the State made a very good investment in protecting the environment and the future and conserving our soil, water and air and in protecting the unique species in both the Gorges States Park and the Dupont State Forest. She passed around maps of both parks for members to see.

Senator Dorsett encouraged members to visit both parks whenever they were in the area.

Representative Gibson said that one of the smartest investments our state has ever made was to get involved in Dupont Forest and applauded DENR for their part in making it what it is today.

Mr. Carl L. Wilkins, Program Manager, NC GreenPower, Advanced Energy, gave a report on the NC GreenPower program. A copy of Mr. Wilkins slide presentation is listed as **Exhibit E**.

Mr. Wilkins said that GreenPower is energy that is generated from renewable sources that is constantly replenished. Traditionally it is cleaner to produce than fossil fuels and thereby gets its name GreenPower.

Mr. Wilkins said that we have abundant resources in North Carolina. The State Energy Office has conducted studies on wind power and report there is much wind power yet to be harnessed.

Mr. Wilkins said that renewable energy would improve the air and water quality in our region and creates jobs for our state and improves our economy.

Mr. Wilkins said that North Carolina is the 32nd state to have a GreenPower program. North Carolina is the first program in the country that involves all of the utilities.

Mr. Wilkins said that the GreenPower program is voluntary for all of the utilities and customers and is tax deductible.

Senator Kinnaird asked Mr. Wilkins if the block of energy she bought is tax deductible.

Mr. Wilkins answered in the affirmative. He said that any contribution made to the program is tax deductible.

Mr. Wilkins said that the four objectives of the GreenPower program are 1) improve quality of the environment and public health, 2) increase the amount of generation from renewables, 3) maximize the investment in renewable generation inside the state, and 4) maximize the number of participants in the program.

Mr. Wilkins said that NC GreenPower offers two options: one for residential/small business and the other large business/industry. The major differences are cost and make-up of the resources.

Mr. Wilkins said that the cost for residential and small business is $4 per block of 100kWh. This is about 10 percent of the average consumers usage in the state.

Senator Kinnaird asked Mr. Wilkins if 1,000KWh hour's usage was per day or per month.

Mr. Wilkins said that it was per month.

Mr. Wilkins said that 15 out of 27 electric co-ops have joined the GreenPower program.

Senator Kinnaird asked if any of the electricities turned down an opportunity to join the GreenPower program or are they just deliberating at this point.

Mr. Wilkins said that he would categorize their actions as deliberating the idea.

Representative Weiss asked if information on the program was inserted in the power bills each month or just periodically.

Mr. Wilkins said that power bill inserts are sent out twice a year.

Senator Albertson asked what would be the reason for coops or electricities not to be eager to participate in the program.

Mr. Wilkins said that he could not speak for them at this time but he did say that the cost, with no financial benefits, might be the reason. Some of them may not have the infrastructure to participate.

Senator Kinnaird asked if Home Depot had been approached with the idea of using green lumber.

Mr. Wilkins said that Home Depot had been approached.

Representative McComas asked if Wal Mart had been approached.

Mr. Wilkins said that Wal Mart does not do much outside of selling their products at a competitive price.

Senator Clodfelter asked Mr. Wilkins how long it would take to reach a sales total of a half million blocks.

Mr. Wilkins said that was a good observation; however, he did not have an answer for the question. Based on the marketing plan, they have

dedicated more resources for larger businesses to buy larger blocks of energy.

Mr. Wilkins said that the national average for GreenPower participants is one percent of consumers.

Senator Clodfelter asked Mr. Wilkins if we had one percent of participants in North Carolina, how many blocks would it translate to.

Mr. Wilkins said that it would equate to 40,000 customers and the number of blocks would depend on how many blocks each participant bought.

Senator Albertson asked Mr. Wilkins if there is anything the legislature can do to speed this process along and if so, what.

Mr. Wilkins said that each member could participate as well as encourage business and industry in your district to participate. However, legislatively, he did not have a good answer.

Representative Weiss asked Mr. Wilkins if GreenPower had displays at public festivals across the state.

Mr. Wilkins said that on Earth Day, they were represented in six companies.

Senator Dorsett asked Mr. Wilkins what the goal was with respect to the total number of residential and small business blocks and what determines the number of blocks a residence would use in deciding how many blocks to purchase.

Mr. Wilkins said that their goal is to exceed or meet the national average of one percent of the households, which would be 40,000 homes with one and one half blocks sold to each home.

Mr. Wilkins encouraged members to visit the GreenPower website where a lot of good information is located.

Senator Kinnaird suggested that all members participate in the program and to get the word out to their family and friends.

Ms. Edythe McKinney, Director, Customer Service Center, DENR, gave a report on the One Stop Permitting Program and Express Review Pilot Program and whether the Pilot Program should be continued or expanded. A copy of her report is listed as **Exhibit F**.

Ms. McKinney said that as part of her responsibility with DENR, she works with the coordination program, which is a pilot program from the 2001 legislation, and the new one-stop permitting process program, which is a pilot program from legislation during the 2003 session.

Ms. McKinney said the one-stop permitting program is totally optional. There has been a big demand for it and coastal stormwater is their biggest client. More applications are being received each month and processing time has been reduced significantly from ten days to two days.

Ms. McKinney said that the program included $500,000 for the pilot program. To date, they have received over $200,000 over a three month period.

Ms. McKinney said that the feedback on the program has been positive.

Representative McComas said that from personal experience, the program has worked far beyond his expectations.

Senator Albertson asked Ms. McKinney how many repeat customers would they have from the permitting program.

Ms. McKinney said that people in the wetlands area were repeat customers as well as others.

Senator Albertson said it appeared that more people were beginning to learn about the process and the program was a success.

Representative LaRoque asked Ms. McKinney if the regular process has sped up as a result of the pilot program.

Ms. McKinney said she wishes she could say yes, but she does not have hard data to support that.

Representative LaRoque asked Ms. McKinney if the program was supposed to pay for itself by 2008 if it continues.

Ms. McKinney said that the intent was for that it would pay for itself; however, she did not know of a timeline.

Senator Kinnaird asked if applicants need the most help with the permitting process.

Ms. McKinney said that the more front end involvement with the customers, the better the results.

Senator Kinnaird asked Ms. McKinney if any developers disadvantaged by the higher fees.

Ms. McKinney said that many times, even with small business, time is money and when they borrow money to develop a property, their time frame is even shorter. In theory, when you have the same number of permits and some people are willing and able to pay, other customers should be able to be served quicker.

Senator Kinnaird asked Ms. McKinney how many extra staff members did they have to hire for the program.

Ms. McKinney said that at this time, they have seven additional staff hired. Five are in Wilmington and two in Raleigh.

Senator Kinnaird said she would be interested in seeing the correlation between how many jobs were lost that we have now paid for in a different way.

Senator Clodfelter said that he believes if you could reallocate existing staff or you could hire additional staff with the additional fee resources.

Mr. Givens asked Ms. McKinney if you could just extrapolate what you would have to charge in fees or make up for in appropriations, so that good service could be provided for everyone and everyone's permit would go through quickly.

Ms. McKinney said that this was an ultimate goal.

Representative McComas asked Ms. McKinney to share some of her experiences with the application process.

Ms. McKinney said that some folks are not as experienced in filling out the applications and this does delay the permitting process.

Representative Fox asked Ms. McKinney if the customer has to come through her office before they put in the application, for either information or forms.

Ms. McKinney said that this is one of the requirements of the pilot program.

Mr. Brock M. Nicholson, Deputy Director, Division of Air Quality, DENR, gave an update on the status of designation of nonattainment areas to comply with the revised national ambient air standard (NAAQS) for ozone (the 8-hour standard). A copy of three handouts: North Carolina's Ground Level Ozone Designations, EPA's Boundary Designations for 8-Hour Ozone Standards for North Carolina, and North Carolina's Recommendation on 8-hour Ozone Nonattainment Boundaries is listed as **Exhibit G**.

Mr. Nicholson reviewed the handouts and then answered questions.

Representative McComas asked if the Buncombe Amendment has been made to the map that was handed out. The map was amended in February 2004 to remove Buncombe County.

Representative McComas asked why Cumberland County, which is recommended by DENR, is not reflected on the EPA map.

Mr. Nicholson said that Cumberland County is included both in DENR and EPA's recommendations.

Senator Forrester asked Mr. Nicholson if any of the counties had complained about the placement of monitors.

Mr. Nicholson said that there have been concerns about the placement of monitors. Meetings have been held with a number of officials about monitor placement, particular the PM, the particulate matter monitors. Special studies are being done to try to find out what is influencing the monitors at the water tower sites in Hickory and Lexington. Those are only two sites in which the fine particle standard is still being violated. Those designations are expected by December of 2004 from EPA.

Representative Gibson asked Mr. Nicholson if any group is favor of the EPA groupings versus DENR's groupings.

Mr. Nicholson said that DENR has had some correspondence from the Southern Environmental Law Center on behalf of several organizations that favored the EPA designations.

Mr. Tom Bean, lobbyist for the North Chapter of the Environmental Defense.

Mr. Bean said that both Environmental Defense and the Southern Environmental Law Center support the full county designation methodology that EPA has followed in setting these boundaries.

Mr. Bean also said that as a general rule, in counties where the state proposed a partial designation, one would expect that development would lead to non-attainment beyond those areas where non-attainment now exists.

Representative Gibson said that he would like for someone to bring to him the information that differentiates the EPA eight hour versus DENR's eight-hour rules.

Representative Gibson said that it was his opinion that EPA has taken advantage to do something that looks good on paper but in fact, DENR has a better plan. He urged DENR to appeal this and to look to the legislature for any remedy it could provide.

Senator Swindell asked Mr. Nicholson if there will be ongoing monitoring located other than in Leggett and how will we know in six months from now if we are improving and in three years is there a magic time when all of that data will be looked at and we will be released from this mandate.

Mr. Nicholson said that the data is a three-year running average and whenever we factor in the 2004 air quality monitoring data, we then have a three-year average. Then we can request a re-designation. The State will then have to reapply.

Mr. Nicholson said that for good sound science reasons, we have a much broader monitoring network than other states our size and population.

Mr. Nicholson said that if we had not had these monitors in the downwind rural counties, perhaps they would not have been designated. DENR will take a strong look at what the monitoring network is.

Senator Swindell said that an inquiring mind would look at what the State and EPA have recommended and question the positioning of the monitoring sites.

Mr. Givens asked Mr. Nicholson who would decide to appeal or not.

Mr. Nicholson said that this decision would be a joint decision from DENR and either the Governor's office or the Attorney General's office.

Mr. Givens asked Mr. Nicholson when this would be decided.

Mr. Nicholson said they have 60 days to appeal from the date of publication.

Senator Kinnaird asked Mr. Nicholson what the difference is between a one-hour measure and an eight-hour measure.

Mr. Nicholson said the one-hour ozone standard was set, as was the eight-hour, based on the federal EPA's understanding of the effects of ozone on human health. Studies that came after the time that the one-hour standards were set suggested that exposure over a longer period of time may be more important in terms of health protection than the one-hour standard.

Mr. Nicholson said that the state is still measuring ozone the way we have always measured it but we take eight, one-hour averages, and take a running tally of those averages to get an eight-hour value. The one-hour standard is much less stringent than the eight-hour standard. It is essentially 120 parts per billion (ppb) one hour versus 80 ppb for the eight-hour average.

Senator Kinnaird asked if the readings are different when taken at different times of the day or night.

Mr. Nicholson said that it is measured continuously, 24 hours a day from April 1 to October 31.

Senator Kinnaird asked how the eight hours is picked.

Mr. Nicholson said that the average is picked during each day.

Senator Kinnaird asked if we are making any progress with the federal government on requiring trucks to be inspected. There are more stringent requirements for automobiles while trucks are not regulated.

Mr. Nicholson said that EPA has standards in effect for heavy-duty diesel trucks. There are more stringent requirements in the 2005-06 model years and even more in the 2007 and beyond model years.

Mr. Nicholson said they should begin to see 90 percent reduction in emissions in 2007 with these trucks.

Mr. Nicholson said that we might soon see an onboard diagnostics program used for diesels because they are going from the old mechanical injection systems to the electronically controlled systems.

Representative McComas said that as a fleet owner, the engines you buy today are already electronically controlled. If the diesel is not working according to the specs, it will not operate at all.

Senator Forrester asked what effect does this new ozone rule have on new businesses coming into our area.

Mr. Nicholson said that if a new source of business coming in is a major source for volatile organic compounds, they could exceed this number. Or, if they have boilers or combustion sources that have NOx emissions, they will have to put on lowest achievable emission rate controls.

Ms. Miriam Perry, Director, Public Transportation Division, Department of Transportation, gave a report on a Statewide Transportation Demand Management Program (TDM). A copy of Ms. Perry's report is listed as **Exhibit H**.

Ms. Perry said that Senate Bill 953 required the Departments of Transportation, DENR, and Office of State Personnel to develop a plan that would address reducing the number of vehicle miles traveled for both private and public sector employees and NOx emissions by the year 2009.

Ms. Perry said that Governor Easley appointed a panel of 16 representatives in January 2003, representing local transportation demand management programs, local elected officials, major employers and developers in the state, marketing professionals, and federal and state environmental agencies to guide the development of a statewide transportation demand management (TDM) plan.

Ms. Perry said that Secretary of Transportation, Lyndo Tippett, announced the recommendations of the plan last month.

Ms. Perry said that plan panel developed a three-year action plan, including the establishment of an Office of Commuter Assistance within DOT that would focus on demand management techniques and TDM initiatives for North Carolina.

Ms. Perry said that North Carolina is the first state to develop a statewide program, US EPA and US DOT program, that recognizes employer that provide commuter benefits to their employees. These benefits could

include subsidized transit passes, preferential parking for employees that ride share or van pool, a telecommute program, providing bike rack on buses and at the employment site and providing showers for those who choose to bike to work. This would keep that single occupant vehicle off of the road.

Ms. Perry said that an additional recommendation of the plan was the development of trip reduction ordinances or programs and a reduced parking ordinance in major urban areas. Durham County has a trip reduction ordinance and similar ordinances are planned for Wilmington, Asheville and RTP.

Ms. Perry said that other activities recommended in the plan include the creation of a transportation management association in downtown Raleigh and Charlotte for state and private sector employees to reduce the single occupancy vehicle use.

Ms. Perry said that short-term improvements are already being taken in performance and accountability of the existing ride-share and vanpool programs in the RTP, the Piedmont Triad and Charlotte.

Ms. Perry said that the State has also implemented a show your ID and ride for free transit plan program in Raleigh for any state employee showing their ID. The program initiated in September 2003 and riders ship has gone from 6,200 passengers to over 10,000 in 2004.

Ms. Perry said that better use of limited parking options are being discussed in downtown Raleigh and Charlotte.

Senator Kinnaird asked Ms. Perry if DOT was working with the Clean Cities Coalition.

Ms. Perry said that DOT was working with the Clean Cities Coalition through the Division of Energy.

Senator Kinnaird asked Ms. Perry why DOT doesn't have TTA service from Chapel Hill to Raleigh.

Ms. Perry said that a study was initiated in the Triangle in 2003 that supported the feasibility of consolidating the transit systems that operate in Durham, Raleigh, Chapel Hill, Cary, and Triangle Transit Authority as well as the University systems transportation provided by NC State and Duke Universities.

Ms. Perry said that at this point, the City of Raleigh, City of Durham, TTA's Board of Trustees and the Town of Cary Town Council, authorize the transportation directors from each of those organizations to move forward with developing a memorandum of understanding and a cost allocation plan that would allocate revenues and expenses for a consolidate system.

Ms. Perry said that a meeting is planned this week for a consultant team to present the recommendations for the allocation of cost for a consolidated system.

Ms. Heather Hildebrandt, Environmental Engineer, Technical Services Section, division of Air Quality, DENR, gave a presentation on retrofitting diesel engines (transit and public school buses). A copy of Emission Control Strategies for Diesel Engines is listed as **Exhibit I**.

Senator Forrester asked Ms. Hildebrandt what percentage of our current fleet of school buses is diesel powered.

Ms. Hildebrandt said that with the exception of some buses in Mecklenburg County that run on natural gas, the majority of the fleet is diesel powered.

Senator Kinnaird asked Ms. Hildebrandt about the additional NOx emissions from bio-diesel.

Ms. Hildebrandt said that there is some thought into looking into other technologies that work in reducing the emissions in bio-diesel.

Senator Kinnaird asked Representative McComas how we are going to justify the costs for these new emission control options for the individual truck owners.

Representative McComas said that the increased rates for industry would cover this expense.

Senator Swindell asked Ms. Hildebrandt if anyone at DENR was working in conjunction with DPI or DOA with regard to bids on purchasing of our buses.

Ms. Hildebrandt said there was a member on the Committee of the Mobile Source Emissions Reduction Grant program, from DPI, who helped work with DAQ on emission control strategy.

Ms. Hildebrandt said she was scheduled to meet in June with the bus people to let them know about the program and about the technologies available.

Senator Swindell asked Ms. Hildebrandt if that person was Ben Matthews.

Ms. Hildebrandt said it was Derrick Graham.

Representative Weiss asked Ms. Hildebrandt if the catalysts installed on buses were in the areas with the greatest pollution air quality problems.

Ms. Hildebrandt said that in many areas this was true. The five area schools funded this year were Greensboro County, Wake County, Mecklenburg County, Iredell/Statesville, and Braggline Schools.

Ms. Hildebrandt said there because it is a grant program, they are limited to who can submit applications for this program.

Representative Weiss asked Ms. Hildebrandt if they were also looking as asthma rates when they are making these grants.

Ms. Hildebrandt said that during the selection process, which includes someone from the American Lung Association, they are made aware of this.

Representative Weiss said that she recognizes we have an old bus fleet, so is there a way that when we retire buses that have been converted over, could we reuse the catalyst on the newer buses.

Ms. Hildebrandt said that it would probably be possible reuse these catalysts, but this hasn't been an issue at this point and she couldn't speak to this point.

Representative McComas told Representative Weiss that when the bus is retired, there should be new technology that would do away with the need for a catalyst.

Mr. Givens added that with regard to alternative fuel vehicles, in the 1999 Clean Air Act, there was a directive for DPI, DOT and DENR to prepare a plan for the use of alternative fuel vehicles for public school buses and transit buses. The plan was presented to the ERC in 2000; however, he does not believe anything has ever been implemented.

Mr. Grover Nicholson, Chief, Underground Storage Tank Section, Division of Waste Management, DENR, gave an annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund. A copy of the annual report and a fact sheet on the Pay-For-Performance Initiative is listed as **Exhibit J**.

Mr. Nicholson reviewed the Pay-For-Performance Initiatives handout and cited backup information in the Annual Report.

Representative LaRoque asked Mr. Nicholson if the UST Program was funded by the gasoline tax.

Mr. Nicholson said it was funded by the gasoline tax, the tax on kerosene and motor fuels and also by tank fees.

Representative LaRoque asked Mr. Nicholson if he had any suggestions as to how we could get these small business owners a decent cash flow so that they would not have to wait a year to get payment on the services they are providing.

Representative McComas told Representative LaRoque that his question would be addressed with the next presentation on the agenda.

Representative Weiss asked Mr. Nicholson about the changes in inspections, would they be able to do more frequent inspections with the current staff or do they need additional people to handle this.

Mr. Nicholson said they do need additional people, and eight inspectors would be needed to handle the twice a year inspection goal.

Senator Kinnaird asked Mr. Nicholson if they were going to personnel and try to reclassify these positions.

Mr. Nicholson said that was correct.

Representative Gibson asked Mr. Nicholson what the status is of the Attorney General's suit on the people that might have been taking advantage of the UST program.

Mr. Nicholson said that the Attorney General brought charges against eight consultants for price fixing. When they developed a reasonable rate document, it was based on a competitive bidding process. They found it very difficult to canvas consultants and get rates they were comfortable with, so they used the competitive bidding process. Six companies have settled their suit and court cases are continuing against the other two companies.

Representative Gibson asked Mr. Nicholson where are we headed with the UST Program.

Mr. Givens said that more money could be put into the program or less could be spent. To put more money in the program, you either have to raise the tank fees or raise the gas tax or reallocate some general fund money. The industry folks will accept a tank fee increase if it is coupled with additional tax money somewhere else.

Mr. Givens said that what we are really funding here is an under funded insurance program. It is important to recognize that with exception to this program and the dry cleaning program, everybody else who has a spill or leak pays for it out of their pocket or it becomes an orphaned site and the state pays for it.

Mr. Givens said that this is a program that gets a site cleaned up and takes some of the burden off the responsible party.

Mr. Givens said that if we spend less money on the program, we do less work and leave the contamination in place, use the money more efficiently, or end the program.

Representative Gibson asked Mr. Nicholson if there was any insurance company that would underwrite these folks currently.

Mr. Nicholson said that this has been investigated quite a bit and there are companies out there writing $1.5 million coverage, now. The deductible is $20,000 for remediation and $100,000 for lawsuits.

Mr. Nicholson said that he does not have the staff to look after every penny of the fund and needs help from the responsible parties. That kind of help would come if people were required to get insurance.

Mr. Givens said that whether or not there are companies writing policies now does not determine if they will continue to do so on a regular basis.

Representative Gibson said that if we don't develop legislation for a ½ cent gas tax before session starts, it would be next year before anyone pays attention to this. And, with the numbers he has seen, we have a disaster here. The tank people and the gas folks are at the table and are being more than cooperative. They want this resolved.

Representative Gibson asked Mr. Nicholson if anyone has looked at the standards issue and where are we in limits.

Mr. Nicholson said that the standards issue is being reviewed and the rule is being looked at right now. Last year they realized that some of their analytical procedures didn't need to apply to every sample. It is taking them longer than they thought but they are running the rule.

Representative Gibson asked if there is a way that gradation can be given to tank owners that might easier delineate the level to which the cleanup is, so that we don't put the burden on the tank owners.

Mr. Nicholson said that the working group is doing well and all of the options are being explored. No matter what they do, they will save some money but the program is still under funded. It is a matter of rate, how fast do we want to clean this up.

Representative McComas told Representative Gibson that he would be glad to have a meeting, after session convenes, between the ERC co-chairs, Mr. Nicholson and the Department of Insurance to find a solution to this problem.

Senator Albertson asked Mr. Nicholson if any tests had been done to tell us when the greatest damage might occur from one of these UST's.

Mr. Nicholson said that he did not have the answer to this question but would check with his staff and obtain this information for Sen. Albertson.

Senator Albertson asked if it was possible that some of the tanks that have been in the ground for over 30 years don't do any damage and don't need cleanup.

Mr. Nicholson said that if a tank system is not leaking, it is not doing any damage. Certainly, an unprotected tank corrodes and it is difficult to know when the leak would occur. He told Sen. Albertson said that he would look into this and gather data to report to him.

Senator Albertson said that the most frustrating thing to him and those involved in the testing and consulting is lack of closure on the sites.

Representative LaRoque said that he sees the residential UST's as being the next windfall for the plaintiff attorneys. So, we need to make sure that the State is trying to get these UST's cleaned up.

Mr. Nicholson said they continue to do things to try to hold costs down through the fact that reimbursement is done only to reasonable and necessary remediation.

Representative McComas said that the 250,000 residential tanks listed in his handout seems to be a little on the low side. Are these the ones identified as leaking and how many does he estimate are out there that we do not know about.

Mr. Nicholson said that since those tanks are unregulated, they do not have a good idea of how many of those tanks are out there. The 250,000 numbers was based on the amount of heating fuel sold in the state with some correction for those that were above ground versus below ground.

Mr. Lindsay Trittipoe, Principal, Commonwealth Acceptance, LLC, Richmond, VA, gave a report on the Virginia Resources Authority's (VRA) accelerated claim payment program for underground storage tank fund claims and the development of a national accelerated claim payment program (NATLUST). A copy of Mr. Trittipoe's presentation is listed as **Exhibit K**.

Mr. Trittipoe said that the VRA was established in 2002 with a lot of similarities between North Carolina's UST fund program and Virginia's. Both state's funds are functionally insolvent in that they cannot process claims as they are approved in a timely manner.

Mr. Trittipoe said that NATLUST program is one that can be participated in by all states to provide a permanent solution to the periodic bounce of LUST fund insolvency. Operationally, NATLUST will function much like the VRA program where it will provide liquidity by purchasing approved claims from residual payments. Participation will be voluntary and on a claim-by-claim basis.

Mr. Trittipoe said that NATLUST will receive its funding through a Virginia governmental entity that would sell municipal bonds as required by down streaming the money into NATLUST to purchase the claims. The financing should be available in any state where political leaders, regulatory agencies and stakeholders can agree that this type of financing should be an option.

Mr. Trittipoe said that an independent Board of Directors would govern NATLUST. Participating states would be invited to appoint a representative to the Board.

Mr. Trittipoe said that this program has been a success in Virginia and encouraged members to consider this program for North Carolina.

Senator Kinnaird asked how the interest rates are set for the borrowed money.

Mr. Trittipoe said that short term floating rate debt is used for determine the interest rates. The rates would fluctuate.

Representative Gibson asked what our State Treasurer's offices say about the NATLUST program.

Mr. Trittipoe said that investment bankers spoke with our Attorney General's office about this determined this is not a debt to DENR, the State or the taxpayers of North Carolina.

Representative Gibson asked if this same feeling is shared by our bond counsel in our State Treasurer's office as to the liability of the residual payee.

Mr. Trittipoe said that he is quite confident that the folks at the AG's office understand that this has zero effect on North Carolina's bonded indebtedness.

Representative asked Mr. Trittipoe if there was no assumption of any liability on any office or branch of North Carolina.

Mr. Trittipoe said there absolutely no liability.

Mr. Givens said that he is not recommending anything, yet. He just wanted to make sure that it was determined that participation in this program would not be an increased debt to our State.

Representative Gibson asked if DENR thinks this is a good program.

Mr. Givens said that DENR thinks this is a viable way to go.

Senator Clodfelter said that his questions about the program would not be legal at all but rather questions to find out if there was a less expensive way to go about it.

Representative Gibson asked Mr. Givens if it would be appropriate to have legislation available for short session in the event that this comes up or do we need to make any placeholder available between now and the start of session.

Mr. Givens said that he expects there will be some type of placeholder available or he would need to identify a vehicle that could be used.

Representative Gibson said that at the appropriate time, he would like to make a motion as to when legislation is voted on, we provide an appropriately titled bill that could be used for this.

Senator Clodfelter told Representative Gibson that we will have some kind of place holder available by the convening of session.

Mr. Dempsey E. Benton, Chief Deputy Secretary, DENR, gave a report on implementation of the Wetlands Restoration Program and use of the Wetlands Restoration Fund. A copy of Mr. Benton's comments, a copy of the 2003 Annual Report, and a copy of a condensed report are all listed as **Exhibit L.**

Mr. Benton referred to Table 3 in the condensed report (see Exhibit L) which show the Annual expenditures and encumbered monies in the Wetlands Trust Fund account and to Table 4 that showed the amount of dollars encumbered in design/construction management contracts.

Senator Kinnaird asked Mr. Benton what the accountability is for the private firms to make sure they are competitively bidding and not overcharging the state.

Mr. Benton said that his staff is putting proposals out which identify the type of work that is required. When those proposals are received, it is a two-step process to make a decision. First step is a thorough review of the sites proposed by the prospective vendors to make sure they meet the expectations of wetlands mitigation at which time bids are opened and selection made based on competitive nature of the bids.

Mr. Benton said that second step is extensive monitoring of the project itself so that the work is done according to the specifications. There is a required five-year monitoring by the vendors so that they make sure it meets objectives.

Mr. Benton said that the WRP accounting mechanism is a high level of accountability. They are working with the Corp of Engineers on providing some degree of flexibility on transitioning some of the areas that are a major problem.

Mr. Benton said that one of the challenges for 2004 is balancing out the workload on a multi-year schedule so that the private contractors can understand their timing. They want to achieve 100 percent of mitigation delivery targets identified.

Representative Gibson asked Mr. Benton who is in charge of the WRP at this time.

Mr. Benton said that Bill Gilmore is the director of the newly constituted program.

Representative Gibson asked Mr. Benton was DOT happy with the WRP at this time.

Mr. Benton said that this was a work in progress. What they presented to DOT today was a first effort to take DOT's improvement plan and translate that into mitigation needs. This would be a work plan for them to use for the next two years to assure them that when they need those permits for their projects, they would be at work getting the mitigation in place.

Representative Gibson asked Mr. Benton to explain in layman's term what are we obligating ourselves for in a cost per acre and cost per foot for 2004.

Mr. Benton said this information was included the 2003 Annual Report (see Exhibit L). He said the trend line for future years would be going down. He believes that one of the results of merging the state's mitigation into a specialized business team is to get bigger projects, which would allow the cost to go down.

Representative Gibson asked if $68 million is the amount obligated for full delivery.

Mr. Benton said that is WRP's estimate for the projected value.

Representative Gibson asked what the $68 million translates into with regard to acres and feet.

Mr. Benton said it was not broken down by acre but he would get this information to Representative Gibson.

Representative LaRoque asked what are we going to do for the poor counties that land is being taken away from for wetland mitigation.

Mr. Benton said that he did not have a specific answer to the question, but in this program, he believed that some of the projects would take them out of the poorer counties.

Ms. Beverly O. Hall, Chief, Radiation Protection Section, Division of Environmental Health, DENR, gave a report on the management of low-level radioactive waste in North Carolina. A copy of Ms. Hall's report is listed as **Exhibit M**.

Ms. Hall's comments are included in full in the report (see Exhibit M).

Mr. John F. Maddrey, Special Deputy Attorney General, North Carolina Department of Justice, gave a report on the pending litigation: State of Alabama, State of Florida, State of Tennessee, Commonwealth of Virginia, and The Southeast Interstate Low-Level Radioactive Waste Management Commission v. State of North Carolina.

Mr. Maddrey said that the case listed above is U. S. Supreme Court, No 132, Original.

Mr. Maddrey said that North Carolina withdrew from the Southeastern Compact in July 1999. In December 1999, the Southeastern Compact Commission entered a sanctioned order against North Carolina based on its failure to cite, license, and operate a regional disposal facility for low-level radioactive waste. Sanctions were assessed at $80 million of restitution, monies that the Compact Commission had provided in furtherance of North Carolina's citing procedure as well as the ordered repayment of $80 million plus interest, plus $10 million based on lost income projected over the 20 year of life of the facility, plus attorneys' fees.

Mr. Maddrey said the State of North Carolina has resisted liability for this amount and as a result, there was action filed in June 2001 by the Compact Commission asking that the U.S. Supreme Court accept the case.

Mr. Maddrey said the U. S. Supreme Court denied the case and in June 2002, the current action was filed. It as the same as the prior, rejected action with one significant difference, the plaintiffs included the states of Alabama, Florida, Tennessee and Virginia, together with the Compact Commission, against the State of North Carolina. The relief being sought was the enforcement of the sanctions orders entered by the Compact Commission.

Mr. Maddrey said that in June 2003, the U. S. Supreme Court, granted the motion for leave to file that bill of complaint and accepted the case. Following North Carolina's answer to the bill of complaint, in November 2003, the Court referred the case to a special master, or an officer of the Court to receive evidence, make a recommendation as to rulings, and pass them on to the Court.

Mr. Maddrey said that the special master assigned to this case was a law professor at George Washington University School of Law in Washington, D.C., Bradford Clark. The special master has convened a variety of case management conferences and has issued a procedural order as to how the case will progress.

Mr. Maddrey said that in March 2004, the State of North Carolina filed a motion to dismiss the bill of complaint on the legal grounds that the Compact Commission had no jurisdiction over the State, as the State had withdrawn from the Compact Commission prior to the beginning of the sanctioned procedure; therefore, any sanctions issued were of no consequence.

Mr. Maddrey said that the plaintiff states and the Compact Commission have filed a motion for summary judgment, seeking a ruling from the special master and the Supreme Court that the sanctions imposed by the Compact Commission should be enforced on their face.

Mr. Maddrey said that the Attorney General's office in the process of replying to those cross motions. There will be a brief due in ten days and the final round of briefs is due to the special master in mid June. They anticipate a hearing in July or August before the special master on those motions at which time the special master will enter a report or recommended decision to the U. S. Supreme Court.

Mr. Maddrey said they could have a resolution by the U.S. Supreme Court at the preliminary stage or it could be determined that the matter has to go to a full blown trial before the Special Master at which time discovery and depositions would have to be made. This trial would not occur until summer of 2005 or beyond.

Mr. Maddrey said that the total dollar amount that the plaintiff states and the Compact Commission are seeking from North Carolina is in the ballpark of $100 million.

Senator Kinnaird asked Mr. Maddrey if we are 132 in the pipeline or if 131 cases have already been heard.

Mr. Maddrey said that this case is number 132 in the history of the Supreme Court.

Senator Kinnaird asked how many cases are in front of us.

Mr. Maddrey said that in terms of original jurisdiction cases, he is aware of maybe two or three others that are ongoing. Most of these cases concern boundary disputes. This is the first case he is aware of that regard radioactive waste sites.

Senator Kinnaird asked Mr. Maddrey how many compacts still exist.

Mr. Maddrey said that there are numerous other compacts still in existence. Most of them are dormant and he knows of only one other active compact involving Nebraska and the Central States that formed that compact.

Mr. Givens said there are seven other compacts approved by Congress, which are still in existence. Congress has consented to two or three additional compacts.

Senator Kinnaird asked Mr. Maddrey who wrote our answer to the complaint.

Mr. Maddrey said the attorneys from the Attorney General's office wrote the complaint with the permission and cooperation of the Governor's Office and Washington, D.C. counsel to assist them.

Senator Kinnaird asked if they also helped on the motion to dismiss.

Mr. Maddrey said this was correct.

Senator Clodfelter announced that the ERC would meet sometime next week and to watch for an e-mail announcing the meeting.

The meeting was adjourned at 2:00 p.m.

Representative Daniel McComas
Presiding Co-Chair

Mary R. Watson
Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Reports that are required by law to be made to the Commission – read only. Water Quality Accountability for the Agriculture Cost Share Program Fiscal Year 2003, a list of Federally Threatened and Endangered Species in North Carolina and a copy of the Secretary's Scientific Advisory Board on Toxic Air Pollutants provided by DHHS
EXHIBIT E:	Slide presentation by Carl Wilkins on the NC GreenPower program
EXHIBIT F:	Presentation by Edythe McKinney on the One Stop Permitting Program and Express Review Pilot Program and whether the Pilot Program should be continued or expanded
EXHIBIT G:	Presentation by Brock M. Nicholson and copy of three handouts: North Carolina's Ground Level Ozone Designations, EPA's Boundary Designations for 8-Hour Ozone Standards for North Carolina, and North Carolina's Recommendation on 8-hour Ozone Nonattainment Boundaries
EXHIBIT H:	Presentation by Miriam Perry, on a Statewide Transportation Demand Management Program (TDM).
EXHIBIT I:	Presentation by Heather Hildebrandt on retrofitting diesel engines (transit and public school buses). A copy of Emission Control Strategies for Diesel Engines
EXHIBIT J:	Presentation by Grover Nicholson includes annual report and a fact sheet on the Pay-For-Performance Initiative
EXHIBIT K:	Presentation by Lindsay Trittipoe, on the Virginia Resources Authority's (VRA) accelerated claim payment program for underground storage tank fund claims and the development of a national accelerated claim payment program (NATLUST)
EXHIBIT L:	Presentation by Dempsey Benton: includes copy Mr. Benton's comments, a copy of the 2003 Annual Report, and a copy of a condensed report
EXHIBIT M:	Report given by Beverly Hall on the management of low-level radioactive waste in North Carolina.

May 5, 2004 ERC Meeting
EXHIBIT A

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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27 April 2004

TO: Environmental Review Commission – Members and Interested Parties

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meetings - 5 May and 11 May 2004**

COMMISSION MEETING – 5 May 2004:

The Environmental Review Commission will meet at 9:30 a.m. on Wednesday 5 May 2004 in Room 643 of the Legislative Office Building in Raleigh.

At this meeting, the Commission will hear reports from State agencies, consider studies for which the Commission is responsible, discuss topics to be considered at future meetings, and attend to other matters. Listed below are potential agenda topics for this meeting.

1) Information item on the NC GreenPower Program

2) Status report on the One-Stop Permit Assistance and Coordination Program. (S.L. 2001-424, Sec. 19.6)

3) Report on the Express Review Pilot Program and whether the Pilot Program be continued or expanded (S.L. 2003-284, Sec. 11.4A(e))

4) Information item on the Transportation Demand Management Program

5) Update on the status of designation of nonattainment areas to comply with the revised national ambient air quality standard (NAAQS) for ozone (the 8-hour standard)

6) Annual report on implementation of S.L. 2002-4 (Clean Smokestacks Act) (S.L. 2002-4, Sec. 14)

7) Report on issues related to the Leaking Petroleum Underground Storage Tank Cleanup Program (S.L. 2003-352, Sec. 12.(a))

8) Annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund (G.S. 143-215.94M)

9) Information item on the Virginia Resources Authority's accelerated claim payment program for underground storage tank fund claims and the development of a national accelerated claim payment program (NATLUST)

10) Annual report on implementation of the Wetlands Restoration Program and use of the Wetlands Restoration Fund (G.S. 143-214.13)

11) Annual report on the effectiveness of projects funded under the Agricultural Cost Share Program for Nonpoint Source Pollution Control (G.S. 143-215.74(e))

12) Update on issues related to the Phase II stormwater rules

13) Report on the management of low-level radioactive waste in North Carolina (G.S. 120-70.33(7))

14) Consideration of legislative proposals for recommendation to the 2004 Regular Session of the General Assembly

15) Other matters related to the Commission's powers and duties under G.S. 120-10.43

COMMISSION MEETING – 11 May 2004:

The 2004 Regular Session is scheduled to begin at 12:00 noon on Monday 10 May. The Commission normally meets shortly after the beginning of the session to complete work on legislative proposals prior to the commission/ committee bill request deadline, which in 2004 is 4:00 p.m. Wednesday 12 May. **A Commission meeting at 2:30 p.m. on Tuesday 11 May in Room 643 of the Legislative Office Building is tentatively scheduled for this purpose.** The agenda for the meeting may also include any unfinished agenda items from the 5 May meeting of the Commission and any other matters related to the Commission's powers and duties under G.S. 120-10.43.

FUTURE MEETINGS:

The Commission may meet at other times while the General Assembly is in session (G.S. 120-70.44). If the Commission meets while the General Assembly is in session, written notice will not be mailed to persons on the mailing list. Rather, notice will be given at a session of the Senate and House of Representatives as provided by G.S. 143-318 (b). The Commission will resume a schedule of regular monthly meetings following adjournment of the 2003 Session of the General Assembly. Mailed notices of Commission meetings will resume at that time.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Phase II Stormwater Management Working Group
2:00 p.m. Tuesday 27 April 2004– 605 Legislative Office Building

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. Tuesday 4 May 2004– 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel at (919) 733-2578.

May 5, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 5-5-04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Beth Warren	AG's Office
Kathy Hawkins	Progress Energy
Nancy Thompson	MCIC
Sandra Long	Martin Marietta
Tommy Stevens	NCPC
Elizabeth Ouzts	NCPIRG
Andy Ellen	NC Retail Merchants
R. Randall Wilson	NCMPA
Beverly Hall	NC Radiation Protection
Suzanne Klimek	NC EEP

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 5-5-04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Brock Nicholson	NC DENR-DAQ
Keith Overcash	"
Eugene Mesley	"
Brian Phillips	"
Heather Hildebrandt	"
DONNIE REDMOND	"
Lindsay Truthpue	Commonwealth Acceptance/WATCH
Charlotte Robinson	Restoration Systems
Kim Hibbard	NCLM
Anita Watkins	NCLM
Winston Sutton	NCDA-CS

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 5-5-04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
George Everett	Duke Energy
David Mickey	BREAL
Nancy Rees	SELF
Jon Carr	Jordan Price
Dexter Matthews	DENR - Waste Management
Nathaniel Thornburg	Division of Water Quality
Eddie Caldwell	Hafer + Caldwell, P.A.
Edythe McKinney	DENR - Customer Services
David Barnes	Poyner + Spruill LLP
Teri Wade	Bailey + Dixon Raleigh
Sharon Strouse	State Energy Office
Tom Beam	NC Env. Ins. Defense

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 5-5-04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
CARL L. WILKINS	ADVANCED ENERGY NC GREENPOWER
DOUG HOWEY	NC Petroleum Marketers Assn.
Bill Holman	CUMTF
Michael Nelson	CCNC
Gudy Wyler	NC. Conservation Network.
JOHN GOODMAN	ALLEY ASSOCIATES
Lisa Martin	NC Home Builders Assoc
Gary Harris	NC Petroleum Marketers Assn.
Robin Smith	DENR

May 5, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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AGENDA
9:30 a.m. Wednesday 5 May 2004
Room 643 Legislative Office Building

1. Call to order
   Representative Daniel F. McComas, Presiding

2. Introductory remarks by Cochairs
   Representative Daniel F. McComas
   Representative Pryor A. Gibson
   Senator Charles W. Albertson
   Senator Daniel G. Clodfelter

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Report on the Thursday 22 April 2004 site visit to Gorges State Park and the Friday 23 April 2004 site visit to DuPont State Forest
   Senator Katie G. Dorsett

5. Information item on the NC GreenPower program
   Carl L. Wilkins, Program Manager
   NC GreenPower, Advanced Energy

6. Report on the Express Review Pilot Program and whether the Pilot Program should be continued or expanded (S.L. 2003-284, Sec. 11.4A(e)); Report on the One-Stop Permit Assistance and Coordination Program (S.L. 2001-424, Sec. 19.6)
   Edythe McKinney, Director
   Customer Service Center, DENR

7. Information item on the Transportation Demand Management Program
   Miriam Perry, Director
   Public Transportation Division, Department of Transportation

8. Update on the status of designation of nonattainment areas to comply with the revised national ambient air standard (NAAQS) for ozone (the 8-hour standard)
   Brock M. Nicholson, Deputy Director
   Division of Air Quality, DENR

9. Information item on retrofitting diesel engines (transit and public school buses)
   Heather Hildebrandt, Environmental Engineer
   Technical Services Section, Division of Air Quality, DENR

10. Annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund (G.S. 143-215.94M)
    Grover Nicholson, Chief
    Underground Storage Tank Section, Division of Waste Management, DENR

11. Information item on the Virginia Resources Authority's accelerated claim payment program for underground storage tank fund claims and the development of a national accelerated claim payment program (NATLUST)
    Lindsay Trittipoe, Principal
    Commonwealth Acceptance, LLC, Richmond, VA

LUNCH BREAK – Estimated for 12:30 p.m. to 1:15 p.m.

12. Annual report on implementation of the Wetlands Restoration Program and use of the Wetlands Restoration Fund (G.S. 143-214.13)
    Dempsey E. Benton, Chief Deputy Secretary
    DENR

13. Report on the management of low-level radioactive waste in North Carolina (G.S. 120-70.33(7))
    Beverly O. Hall, Chief
    Radiation Protection Section, Division of Environmental Health, DENR

14. Information item on pending litigation: *State of Alabama, State of Florida, State of Tennessee, Commonwealth of Virginia, and The Southeast Interstate Low-Level Radioactive Waste Management Commission v. State of North Carolina.* [U.S. Supreme Court, No. 132, Original]
    John F. Maddrey, Special Deputy Attorney General
    North Carolina Department of Justice

15. Commission discussion and announcements

16. Adjourn

SCHEDULE OF FUTURE MEETINGS:

Tuesday 11 May 2004 -- Regular Business Meeting
Time: 2:30 p.m. (tentative)
Location: 544 Legislative Office Building

The Commission may meet at other times while the General Assembly is in session (G.S. 120-70.44). If the Commission meets while the General Assembly is in session, written notice will not be mailed to persons on the mailing list. Rather, notice will be given at a session of the Senate and House of Representatives as provided by G.S. 143-318.12(b). The Commission will resume a schedule of regular monthly meetings following adjournment of the 2004 Session of the General Assembly. Mailed notices of Commission meetings will resume at that time.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Phase II Stormwater Working Group
10:00 a.m. Friday 7 May 2004 – 605 Legislative Office Building

May 5, 2004 ERC Meeting
EXHIBIT D

REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION AND FISCAL RESEARCH DIVISION OF THE NORTH CAROLINA GENERAL ASSEMBLY ON WATER QUALITY ACCOUNTABILITY FOR THE AGRICULTURE COST SHARE PROGRAM FISCAL YEAR 2003

INTRODUCTION

In 1983 the North Carolina Agriculture Cost Share Program (ACSP) was authorized by the General Assembly to improve water quality associated with agriculture in three nutrient sensitive areas of the state covering 16 counties. It was expanded in 1990 to include all 96 Soil and Water Conservation Districts covering all 100 counties.

While the Soil and Water Conservation Commission (Commission) has the statutory responsibility to create, implement and supervise the Cost Share program, it is delivered at the local level by 492 elected and appointed soil and water conservation district supervisors who are assisted by their staff and partners in natural resource conservation. These partners include technical and professional employees of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), the District or county, the Division of Soil and Water Conservation (Division), the Cooperative Extension Service, and the North Carolina Department of Agriculture and Consumer Services.

In this very popular program, participating farmers receive up to 75 percent of the average cost of an installed best management practice (BMP) with the remaining 25 percent paid by the farmer directly or through in-kind contributions (e.g., labor). When complete cost information is not available, the farmer is required to submit invoices and is paid at 75 percent of actual cost rather than average cost. Cost Share payments cannot exceed $75,000 per year per applicant.

The Commission continues to adapt the program to respond to changing needs and technology. For Program Year 2003, there were 46 approved BMPs grouped under 32 definitions in the ACSP. BMPs include both short-term and

long-term practices. The definitions of approved BMPs for the Cost Share program are provided in the Detailed Implementation Plan (Attachment A).

For a BMP to be approved by the Commission for the ACSP, there must be 1) an NRCS technical standard addressing that BMP, and 2) sufficient cost information to determine the appropriate cost share amount. Occasionally, BMPs are approved on a limited scale for evaluation purposes (District BMPs).

For most practices, the amount provided in cost share is based on 75% of a predetermined average cost for the practice. However, some practices are cost shared on 75% of actual cost due to the variable nature of the practice. (In the 2003-04 Budget Bill, the General Assembly approved a special budget provision that modified N.C.G.S 143-215.74(b) to allow beginning farmers and limited resource farmers to receive up to 90% cost share beginning in the 2004 program year.) The Commission conducts a wholesale review of its cost rates every three years, but it can make necessary mid-course corrections when presented with information that one of its predetermined costs is inaccurate.

Districts spot check a minimum of 5% of randomly selected active contracts each year to ensure that practices are being maintained properly. Further Division and NRCS also spot check contracts as part of regular reviews of district office implementation of the ACSP. Spot checks have shown excellent compliance with maintenance requirements by participating farmers. When practices are discovered to need additional maintenance, the district is usually able to assist the cooperator to restore the practice.

PROGRAM ACCOMPLISHMENTS

Since the first Cost Share contracts were issued in 1984, there have been 34,208 contracts for installing BMPs (through the end of program year 2003, which ended on June 30, 2003). Most BMPs have a life expectancy of ten years, which is how long participating farmers must agree to maintain the practices.

Early in the program, the major factor used for determining success was tons of soil saved because the program funded predominantly sediment and erosion control practices. It is estimated that an average of 6.07 million tons of soil have been saved annually during the life of the program. Since the mid-1990s, while continuing its attention on minimizing soil loss and erosion, the program has increased its attention on reducing and managing nutrients from cropland and livestock production. Part of the impetus for this new attention was the promulgation of the 15A NCAC 2H.0200 animal waste management rules and the nutrient sensitive waters strategies for the Neuse and Tar-Pamlico River Basins.

Highlights of additional accomplishments include the following:

- Nearly 110,000 acres of marginal or environmentally sensitive cropland have been converted to trees, grass, or wildlife habitat
- 2,103 waste management structures have been constructed to properly store and manage dry and wet animal waste
- 3,670 water control structures have been installed improving water management on and reducing nutrient loss from approximately 292,500 acres
- Over 870 miles of fencing have been erected, in combination with other practices (e.g., watering sources) to exclude livestock from streams
- Over 579,000 acres of cropland acres have been converted to no-till or conservation tillage to reduce sediment loss associated with traditional practices
- Over 170 miles of forested riparian buffer have been established to reduce nutrient loss from approximately 13,000 acres of cropland
- 81 structures have been built for the proper handling and storage of agricultural chemicals (pesticides and fertilizers)

REPORTING REQUIREMENTS

Projects Receiving State Funds

Participating farmers have up to three years to complete the work included in ACSP contracts. Therefore, cost share payments made each year may be for contracts written in the current fiscal year or in the two previous fiscal years. For this reason the fund balance for the program will always exceed the amount appropriated in a given year.

Each contract is considered a "project." Each project may include only one BMP or a system of practices that include several BMPs. Cost share payments are made only when installation of the BMP is completed and certified to be in accordance with current NRCS or Commission standards.

Cost Share payments were applied to **2,128** projects statewide between July 1, 2002 and June 30, 2003. These contracts received total payments of **$9,701,033**. A list of individual contracts to which Cost Share funds were applied in Program Year 2003 is available upon request.

New Contracts for Fiscal Year 2003

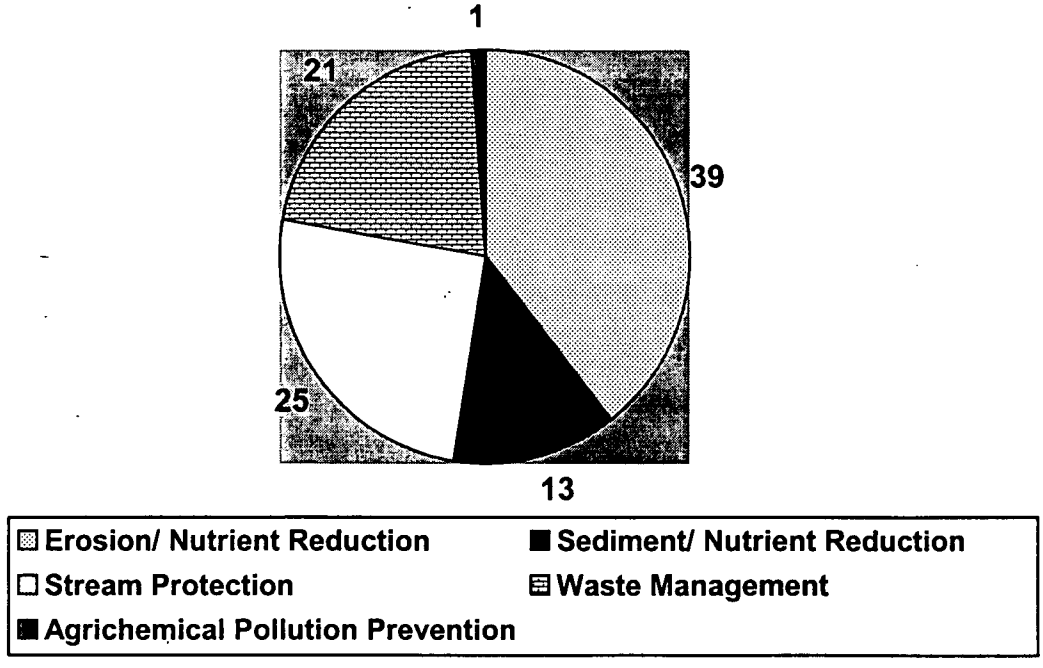
The General Assembly appropriated **$5,269,897** in recurring general funds for BMP installation. For Fiscal Year 2003 soil and water conservation districts requested **$23,760,798** to address identified water quality needs. Current appropriations do not enable districts to meet demand for financial assistance for installing BMPs to protect water quality in North Carolina.

For Fiscal Year 2003, the Commission allocated $9,825,833 to districts. In addition to the 2003 appropriation, the Commission also had available for allocation: 1) funds allocated to districts in 2002 which districts were unable to execute contracts with farmers prior to the end of the fiscal year, and 2) funds recovered from completed and expired contracts from Program Years 2000 through 2002. Despite the Commission's actions to improve efficiency of the cost share program (discussed on pp. 7-8), districts still must turn away three out of every five farmers requesting cost share assistance.

In Fiscal Year 2003 districts obligated **$9,190,555** to **1,819** new contracts with farmers.

As shown in Figure 1, 39% of the 2003 funds were directed toward erosion and nutrient-reducing BMPs (e.g., conservation tillage, cropland conversion to grass or trees), 25% were directed toward stream protection systems (e.g., livestock exclusion from streams), 13% were directed toward sediment and nutrient-reducing BMPs (e.g., riparian buffers, field borders, grassed waterways), 21% were directed toward animal operations for waste management BMPs (e.g., poultry litter storage structures, closure of inactive lagoons, livestock feeding/waste storage structures), and 1% were directed toward agrichemical pollution prevention practices (e.g., agrichemical handling facilities).

Figure 1: Breakdown of 2003 ACSP Contracts by BMP Type



Attachment B is a chart displaying a summary of contracts initiated during the 2003 program year (July 1, 2002 - June 30, 2003). This chart shows the planned as well as installed BMPs. The most-used single BMP from a financial and acres affected standpoint (over $1.7 million affecting over 19,000 acres) was the 3-year conservation tillage incentive. Attachment C presents the number and value of 2003 contracts by soil and water conservation district and each district's allocation of cost share funds for 2004.

Estimated Water Quality Benefits of ACSP Contracts Initiated in 2003

N.C.G.S 143-215.74(b)(7) requires that each project's benefits to water quality be estimated before funding is awarded. To meet this requirement, the Commission chose three indicators of water quality benefits: tons of soil saved, pounds of nitrogen saved or managed, and pounds of phosphorus saved or managed. Soil savings estimates have been required on all Cost Share contracts since the beginning of the program. Beginning with the 1997 program year, estimates of nitrogen and phosphorus savings were required to be reported. The Division continues to work with the Division of Water Quality, NRCS, and North Carolina State University to improve and refine our method to estimate and account for nutrient reductions.

These estimates have been very useful to help track progress by agriculture relative to the nutrient reduction requirements in the Neuse and Tar-Pamlico Nutrient Reduction Rules for agriculture. The ACSP is playing a key role in helping farmers achieve the 30% nutrient reduction required in these rules.

Local soil and water conservation districts determine which projects are eligible for funding in their districts according to a required priority ranking process, tailored to each district's water quality concerns. The water quality evaluations on each project are carried out at the district level, and the water quality benefit estimates are provided to the Division on each contract form. The data are entered from the contract form into the Division's cost share database and tracked by Division staff. The estimated sediment and nutrient reduction benefits for program years 2001-2003 are summarized in Table 1.

Some BMPs standing alone will not directly result in sediment or erosion reductions or nitrogen or phosphorus savings, but are used in conjunction with other practices. These BMPs are called "facilitating practices" and are necessary to facilitate and ensure that other practices in the BMP system are effective at reducing nutrient or sediment loading to a water resource. Therefore, their reduction credit is linked to the facilitated practice. An example of a facilitating practice is a water tank, which must be installed for livestock drinking water purposes before fencing can be put up to keep livestock out of a stream.

Table 1: Sediment and Nutrient Reduction Benefits for Program Years 2001 through 2003.

	2001	2002	2003
Number of Contracts	2,060	1,937	1819
Acres Affected	97,171 acres	79,602 acres	89,436 acres
Soil Saved	344,627 tons	258,853 tons	290,065 tons
Nitrogen Saved	1,911,610 pounds	1,716,024 pounds	1,359,918 pounds
Phosphorus Saved	216,021 pounds	397,875 pounds	741,691 pounds
Waste Nitrogen Managed	4,714,328 pounds	4,481,779 pounds	4,406,982 pounds
Waste Phosphorus Managed	4,945,421 pounds	3,743,366 pounds	4,572,177 pounds

Effectiveness of Each Project to Accomplish Its Primary Purpose

The statutory purpose of the program and each project is to reduce the input of agricultural non-point source pollution into the water courses of the state, which is for water quality improvement. Each BMP approved for the Cost Share program is designed for one of five major purposes to protect the water resources of the state:

1) sediment/nutrient delivery reduction through reduction of applied nutrients, reduction of soil loss, or interception of nutrients from fields;
2) erosion reduction/nutrient loss reduction in fields through reduction of applied nutrients or prevention of soil detachment;
3) prevention of agricultural chemical pollution of ground or surface water from improper handling or accidents;
4) reduction of nutrient loading through proper management of animal waste; and
5) stream protection measures to reduce the delivery of sediment and nutrients by animals and stabilize streambanks to minimize further erosion and sediment contribution.

Attachment D is a chart showing the approved BMPs in these categories and their relationship to water quality improvement.

Staff of the Division, soil and water conservation districts, and NRCS has verified every project for which program year 2003 funds have been expended to have been installed in accordance with program standards and to be accomplishing its primary purpose.

TARGETING ACSP FUNDS TO WATERSHEDS OF IMPAIRED WATERS

The Commission continues to exercise leadership in allocating ACSP resources to local districts containing impaired waters and in encouraging district supervisors to use ACSP funds to address impaired waters. This is best illustrated by the fact that the Commission targeted $582,451 of funds available in 2003 for the specific purpose of installing erosion- and sediment-reducing best management practices into watersheds of waters listed on the State's 303(d) list of waters as impaired due to sediment from sources including agriculture in twenty counties.

Historically, about 30% of ACSP funds have been used to implement BMPs in watersheds of impaired waters. Considering that only 3% of North Carolina's stream miles are attributed to being impaired by agricultural sources, this demonstrates that the ACSP funds are being significantly targeted toward improving streams that do not fully meet their uses.

Over 30% of funds contracted in Program Year 2003 were contracted with farmers in the Neuse and Tar-Pamlico River Basins to help them achieve the required 30 percent reduction in agricultural nitrogen losses. Districts in the Neuse and Tar-Pamlico Basins will continue to use ACSP to sustain the reductions already achieved and to attain further voluntary reductions in these nutrient sensitive watersheds. ACSP funds are also being used to reduce phosphorus losses from agriculture to help achieve the goal of no net increase in phosphorus loading to the Tar-Pamlico Basin.

In 2003 the Commission approved the revised NRCS nutrient management standard, which requires participating farmers to assess phosphorus losses using the Phosphorus Loss Assessment Tool (PLAT). In response, districts are using ACSP funds to assist farmers to implement phosphorus-reducing BMPs, where needed.

The Commission also targeted $318,220 of Program Year 2003 funds to 24 districts to assist with implementation of riparian buffers in nutrient sensitive watersheds under the Conservation Reserve Enhancement Program.

NEW PROGRAM ENHANCEMENTS TO IMPROVE EFFICIENCY AND PROGRAM DELIVERY

Because of the need to continually improve the program's cost effectiveness, and because of recurring budget reductions in the program's appropriation, the Commission made several enhancements that took effect for the 2003 program year. These enhancements were designed to improve the efficiency by which program funds are used by agricultural cooperators to install best management

practices and to improve the responsiveness of the program to state and local water quality priorities.

One efficiency improvement was to initiate a pilot project in selected districts to delegate final approval authority for most cost share contracts to the local Soil and Water Conservation District Board of Supervisors. This enhancement eliminates advance case-by-case approval by the Division of Soil and Water Conservation for most cost share contracts. In exchange, for delegated pilot districts, the Division will increase the frequency of its program review oversight of ACSP delivery at the district level. Sixteen districts across the state were selected to participate in the delegation pilot project based on their track record of high-level performance in implementing the ACSP. The Division of Soil and Water Conservation conducted a program review of each selected district prior to delegation. This enhancement will reduce the likelihood that a participating farmer will miss an opportunity to implement a BMP that is highly dependent on season and weather while he or she is awaiting final approval for an ACSP contract.

The Commission also began to see the benefits of another efficiency improvement it initiated in 2002 that was designed to accelerate installation of BMPs. This improvement targets program funds toward cooperators who are prepared to implement best management practices within 12 months of contract approval. If a cooperator fails to complete at least 1/3 of the work included in the cost share contract within 12 months of the contract approval date, then the contract will terminate. Because cooperators sometimes encounter circumstances beyond their control, local soil and water conservation districts can grant an extension of up to 6-months to complete at least 1/3 of the work. This improvement was added to establish a better incentive for cooperators to begin work early during the contract period. This will result in fewer contracts terminating after lengthy contract periods, and more efficient use of program funds as cooperators and districts become accustomed to this higher standard. Of course, every attempt is being made to be fair and to work with cooperators who voluntarily participate in the cost share program to get practices installed.

COST-EFFECTIVENESS CONSIDERATIONS

The ACSP is an extremely cost-effective program from both a state expenditure perspective and the farmer's perspective. This program has been credited with helping the state to achieve considerable success in protecting and improving water quality. Many farmers could not afford to implement BMPs (many of which are required by regulations) without cost share assistance. Because a farmer must invest at least 25% of the cost for BMPs, the farmer has ownership in the practice and is more likely to maintain it. The education value of local farmers participating the program is substantial in helping to change local practices.

Use of ACSP to Leverage Additional BMP Implementation Funds From Other Sources

The Commission's 2003 allocation to districts included $582,451 for the intended purpose of installing BMPs in watersheds of streams on the state list of impaired waters due to sediment from agricultural sources. Because of this targeted allocation the Division of Soil and Water Conservation and districts were able to obtain $1,400,000 in grant funds from the Clean Water Management Trust Fund and 667,580 from the US Environmental Protection Agency 319 (EPA-319) program to implement sediment-reducing BMPs in these watersheds. The Division has also entered into a cooperative agreement with the United States Geological Survey who will provide an additional $150,000 of water quality monitoring services to document reduction in sediment loading.

ACSP funds are an essential part of the state match for the Conservation Reserve Enhancement Program (CREP), a federal/state partnership. ACSP and other state programs (CWMTF, NC Wetlands Restoration Program) are providing a total of $54 million over eight years to match $221 million in federal payments to North Carolina landowners participating in CREP.

ACSP funds for BMP implementation and technical assistance also provide the required state match for three EPA-319 grants for accelerating BMP implementation in the Neuse and Tar-Pamlico river basins. The total of the three grants is $1,191,700.

Whenever possible, the districts use the ACSP in conjunction with other programs, such as the federal Environmental Quality Initiative Program and the Conservation Reserve Enhancement Program, to stretch scarce resources as far as possible, and partner to meet the needs of cooperating producers and landowners.

Leveraging of Local and Federal Resources for Technical Assistance and Local Delivery

This program is delivered locally by 492 elected and appointed volunteer Soil and Water Conservation District Supervisors and by over 400 local staff of districts and NRCS. District supervisors receive no state salary, yet are responsible for seeing that state funds are spent where they are most needed to improve water quality. District supervisors are required to develop a prioritization ranking system for administering the ACSP in their respective district to maximize the water quality benefits of the program. Applications to each district are evaluated and prioritized according to this system. District supervisors also must inspect at least five percent of all cost share contracts in their district every year to ensure the BMPs are properly maintained.

The ACSP is heavily dependent on the technical resources of the local soil and water conservation districts and the NRCS. District and federal employees develop conservation plans, design BMPs, and provide engineering assistance for water quality improvements at no cost to the farmers whose applications are accepted for cost share assistance. These staff also assist farmers and other landowners in implementing water quality projects using other funding sources such as the USDA's Environmental Quality Incentives Program and Conservation Reserve Enhancement Program, the U.S. Environmental Protection Agency's Section 319 Non-Point Source Program, and North Carolina's Clean Water Management Trust Fund.

A critical portion of the General Assembly's appropriation for ACSP provides a state match for salaries for many of these district technical employees and for their operating expenses to carry out the cost share program. For 2003, the General Assembly appropriated $1,875,000 in recurring funds for cost sharing technical assistance positions in local districts and directed DENR to continue to transfer $240,000 from BMP assistance to support technical assistance. County commissions provide 50% match for salaries and operating expenses, including office space and administrative support for these technical assistance positions. In program year 2003 the cost share technical assistance program cost shared on 123 technical positions (115.77 FTEs) in 90 counties to assist farmers in designing and installing BMPs. These state technical assistance cost share funds maintain a local conservation infrastructure and are critical to sustain local county support and funding for local delivery of the program.

NRCS engineers and conservation specialists are also available to each district. These federal employees carry out a portion of the cost share work support without cost to the state, and they provide additional technical resources and expertise to ensure that cost-shared practices are properly installed and maintained for the expected life of the practice.

In addition, NRCS allows district staff to use federal vehicles for use on state cost share work. NRCS also provides computers and sophisticated natural resources materials and computer software in all 100 county field offices, and develops the technical standards for most of the BMPs used in the cost share program. This state program leverages a much greater amount of federal funding for water quality improvements in North Carolina.

PROGRAM MANAGEMENT

Attachment E is an overview of the funding and compliance process used for implementing the Agriculture Cost Share Program.

A Division program staff of four FTEs reviews approximately 2,000 contracts annually and processes about 2,500 requests for payment each year. The

Division also maintains the ACSP Manual, trains local personnel, provides daily technical assistance to the districts, and conducts oversight through district program reviews to ensure proper record keeping and BMP maintenance for continued water quality protection.

Because the state specifies that the purpose of the program is to assist agricultural operations in addressing an existing water quality problem, the program does not assist new operations to go into business. It is the policy of the Commission that new producers or companies constructing new agricultural operations should be aware of the existing environmental requirements and technical standards and should be prepared to meet them without state funding assistance. This is especially important when existing operations are struggling to comply with new requirements that were not in place when they began operating. Therefore, the Commission has restricted eligibility for Cost Share funds to those operations in existence as of May 1992 that need help to meet new regulations (i.e., 15A NCAC 2H.0200) designed to protect ground and surface water. Operations that were not in existence as of May 1992 may still be eligible for cost-share if changes in environmental statutes or regulations (e.g., SB 1217 in June 1996) create new requirements that could, without assistance, make the facility out of compliance. These exceptions require Commission approval.

IMPACT OF BUDGET REDUCTIONS IN 2001, 2002, AND 2003

For Fiscal Year 2001 the Department was directed to transfer $240,000 appropriated for BMP assistance to overcome a projected shortfall of funds for cost sharing for essential technical assistance staff in local soil and water conservation districts. This transfer represented a 3.4 percent reduction in the funding available for assisting farmers with costs to install best management practices for Fiscal Year 2002.

The 2002 budget bill made the transfer for technical assistance permanent. Further, for 2002 the recurring appropriation for the Agriculture Cost Share Program was reduced by another $1,000,000. In 2003, the recurring appropriation for ACSP funding was further reduced by $400,000. The net effect of the reduction and diversion is that for Fiscal Year 2003 the funding available for assisting farmers to install best management practices was reduced by $1,640,000 (23.7%) relative to the Fiscal Year 2000 funding level.

This recurring loss of funds for the ACSP has had several negative consequences. These include:

- Reducing the number of agricultural producers assisted, turning away an estimated 250-300 additional producers per year.

- Diminishing the local impact of the ACSP to the point that it may weaken local governments' support (match) for soil and water conservation district technicians who provide technical assistance (BMP design and installation oversight) to agricultural producers. The Soil and Water Conservation Commission has worked diligently over a number of years to build local support for district technical assistance. A reduction of local support would jeopardize the state's ability to maintain technical support for conservation programs.
- Further threatening the state's ability to provide the required 20% match for the $221 million in federal funds for the Conservation Reserve Enhancement Program (CREP). The non-federal match for CREP relies on $8.84 million of ACSP funds over 5 years used to establish riparian buffers on agricultural land enrolled in CREP. DENR may be forced to seek additional legislative appropriations or other non-federal revenue sources (e.g., Tobacco Trust Fund Commission) or risk termination of the State's CREP agreement by USDA. In FY-2003, the Commission allocated over $318,220 to be used toward the match for CREP.
- Further restricting funding available to allow soil and water conservation districts to provide additional cost share to new farmers and limited resource farmers in response to the statutory revision enacted in the 2003 Legislative Session.
- Reducing the financial assistance available to assist livestock and poultry producers to respond to new phosphorus management requirements resulting from modification to the NRCS Nutrient Management Standard and NPDES and state permitting requirements. These changes have created enormous new demands on ACSP.
- Further reducing funding available for installing conservation practices on private working lands, a major provision of the <u>One North Carolina Naturally Initiative</u>.
- Significantly diminishing the financial assistance available to assist agricultural producers in the Neuse and Tar-Pamlico river basins to implement BMPs and achieve and maintain 30% nutrient reduction requirements.
- Reducing funds available for installing BMPs in watersheds of streams impaired by sediment from agricultural sources. The Agricultural Sediment Initiative is a priority for the Soil and Water Conservation Commission and the Sediment Control Commission. The Commission allocated $582,451 for this purpose in FY-2003.
- Reducing available funding for installing riparian buffers and protecting streams from impacts from livestock and cropland. DENR wants to rely on voluntary approaches to protect buffers, and ACSP is a valuable tool for this purpose.

CONCLUSION

Based on the above considerations, the Commission believes the ACSP is being administered very cost-effectively and that considerable water quality benefits are being realized for the investment made with state funds. The program aids agricultural operations in making essential water quality improvements, the cost of which cannot be passed on to the consumer in the price of the food or fiber product, and thereby contributes both to water quality and to sustaining a strong state agricultural economy. The Commission continues to emphasize prioritizing, targeting, accountability, leveraging, and adaptability in managing these public funds to further improve the water quality benefits intended by the General Assembly.

The Commission believes that budget reductions have impacted the program's effectiveness and local support to a serious degree. The Commission has taken actions to improve program efficiencies that have helped to partly offset these impacts in the short-term. The ACSP continues to play a vital role in assisting farmers and ranchers with voluntary water quality protection and with compliance with state and federal regulatory requirements. The program is our state's cornerstone in efforts to support private working lands stewardship for the benefit of water quality and all the citizens of North Carolina.

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Attachment A
DETAILED IMPLEMENTATION PLAN
July 2002 (Revised)

Definition of Practices

(1) An agrichemical handling facility means a permanent structure that provides an environmentally safe means of storing and mixing agrichemicals and filling tanks with agrichemicals. Benefits may include prevention of accidental degradation of surface and ground water.

(2) A chemigation backflow prevention system means a system for preventing backflow of pesticides or chemicals from contaminating water sources in chemigation applications. It can include retrofitting or installing injection equipment, check valves, gauges, drains, and vacuum breakers. It does not include items unrelated to backflow prevention (e.g., tanks, mixers, or filters).

(3) A Christmas Tree Conservation Cover practice means to establish and maintain a conservation cover of grass, legumes, or other approved plantings on fields previously with no groundcover established, to reduce soil erosion and improve water quality. Other benefits may include reduced offsite sedimentation and pollution from dissolved and sediment-attached substances.

(4) A conservation tillage system means any tillage and planting system in which at least (60) sixty percent of the soil surface is covered by plant residue to improve water quality. Benefits may include reduction of soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

A. An annual conservation tillage for small grain system means a one year tillage and planting system using a small grain crop.

B. A three-year conservation tillage system means a tillage and planting system using the same fields for three consecutive years. The three-year conservation tillage incentive is broken down into two categories depending on the crop(s) to be grown:
   a. Grain crops and cotton
   b. Vegetables, Tobacco, Peanuts, and Sweet Corn

(5) A critical area planting means an area of highly erodible land that cannot be stabilized by ordinary conservation treatment on which permanent perennial vegetative cover is established and protected to improve water quality. Benefits may include reduced soil erosion and sedimentation.

(6) A cropland conversion practice means to establish and maintain a conservation cover of grasses, trees, or wildlife plantings on fields previously used for crop production to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(7) A diversion means a channel constructed across a slope with a supporting ridge on the lower side to control drainage by diverting excess water from an area to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(8) A fertigation backflow prevention system means a system for preventing backflow of nutrients from contaminating water sources in fertigation applications. It can include retrofitting or installing injection equipment, check valves, gauges, drains, and vacuum breakers. It does not include items unrelated to backflow prevention (e.g., tanks, mixers, or filters).

(9) A field border means a strip of perennial vegetation established at the edge of the field that provides a stabilized outlet for row water to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(10) A filter strip means an area of permanent perennial vegetation for removing sediment, organic matter, and other pollutants from runoff and waste water to improve water quality. Benefits may include reduced soil erosion, sedimentation, pathogen contamination and pollution from dissolved, particulate, and sediment-attached substances.

(11) A grade stabilization structure means a structure (earth embankment, mechanical spillway, detention-type, etc.) used to control the grade and head cutting in natural or artificial channels to improve water quality. Benefits may include reduced soil erosion and sedimentation.

(12) A grassed waterway means a natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(13) A heavy use area protection means an area used frequently and intensively by animals, which must be stabilized by surfacing with suitable materials to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved, particulate, and sediment-attached substances.

(14) A livestock exclusion system means a system of permanent fencing (board or barbed, high tensile or electric wire) installed to exclude livestock from streams and critical areas not intended for grazing to improve water quality. Benefits may include reduced soil erosion, sedimentation, pathogen contamination and pollution from dissolved, particulate, and sediment-attached substances.

(15) A long term no-till practice means planting all crops for five consecutive years with at least 80 percent plant residue from preceding crops to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(16) A pastureland conversion practice means establishing trees or perennial wildlife plantings on excessively eroding land with a visible sediment delivery problem to the waters of the state used for pasture that is too steep to mow or maintain with conventional equipment to improve water quality. Benefits may include reduced soil erosion and sedimentation.

(17) A nutrient management practice means a definitive plan to manage the amount, form, placement, and timing of applications of nutrients to minimize entry of nutrients to surface and groundwater and improve water quality.

(18) A rock-lined outlet means a waterway having an erosion-resistant lining of concrete, stone or other permanent material where an unlined or grassed waterway would be inadequate to improve water quality. Benefits may include safe disposal of runoff, reduced erosion and sedimentation.

(19) A sediment basin means a basin constructed to trap and store waterborne sediment where physical conditions or land ownership preclude treatment of a sediment source by the installation of other erosion control measures to improve water quality.

(20) A sod-based rotation practice means an adapted sequence of crops, grasses and legumes or a mixture thereof established and maintained for a definite number of years as part of a conservation cropping system which is designed to provide adequate organic residue for maintenance or improvement of soil tilth to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(21) A stock trail or walkway means to provide a stable area used frequently and intensively for livestock movement by surfacing with suitable material to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved, particulate, and sediment-attached substances.

(22) A stream protection system means a planned system for protecting streams and stream banks that eliminates the need for livestock to be in streams by providing an alternative-watering source for livestock to improve water quality. Benefits may include reduced soil erosion, sedimentation, pathogen contamination, and pollution from dissolved, particulate and sediment-attached substances. System components may include:

(A) A spring development means improving springs and seeps by excavating, cleaning, capping or providing collection and storage facilities.

(B) A trough or tank means devices installed to provide drinking water for livestock at a stabilized location.

(C) A well means constructing a drilled, driven or dug well to supply water from an underground source.

(D) A windmill means erecting or constructing a mill operated by the wind's rotation of large vanes and is used as a source of power for pumping water.

(E) A stream crossing means a trail constructed across a stream to allow livestock to cross without disturbing the bottom or causing soil erosion on the banks.

(23) A stripcropping practice means to grow crops and sod in a systematic arrangement of alternating strips or bands on the contour to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop, fallow, or no-till crop, or a strip of grass is alternated with a close-growing crop.

(24) A terrace means an earth embankment, a channel, or a combination ridge and channel constructed across the slope to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

(25) A waste management system means a planned system in which all necessary components are installed for managing liquid and solid waste to prevent or minimize degradation of soil and ground and surface water resources. System components may include:

(A) A waste storage pond means an impoundment made by excavation or earthfill for temporary storage of animal waste, waste water and polluted runoff.

(B) A drystack means a fabricated structure for temporary storage of animal waste.

(C) A livestock mortality management system means a facility for managing livestock mortalities such as to minimize water quality impacts or to produce a material that can be recycled as a soil amendment and fertilizer substitute. Cost sharable mortality management system components include: composter, mortality freezer, and mortality incinerator.

(D) A waste treatment lagoon means an impoundment made by excavation or earthfill for biological treatment and storage of animal waste.

(E) A waste application system means an environmentally safe system (such as solid set, dry hydrant, mobile irrigation equipment, etc.) for the conveyance and distribution of animal wastes from waste treatment and storage structures to agricultural fields as part of an irrigation and waste utilization plan.

(F) A constructed wetlands for land application practice means an artificial wetland area into which liquid animal waste from a waste storage pond or lagoon is dispersed over time to lower the nutrient content of the liquid animal waste.

(G) A controlled livestock lounging area means a planned, stabilized and vegetated area in which livestock are kept for a short duration.

(H) A closure of abandoned waste treatment lagoons and waste storage ponds means the safe removal of existing waste and waste water and the application of this waste on land in an environmentally safe manner.

(I) A storm water management system means a system of collection and diversion practices (guttering, collection boxes, diversions, etc.) to prevent unpolluted storm water from flowing across concentrated waste areas on animal operations.

(J) An offsite or an alternative poultry dry litter waste utilization means applying, processing and/or transporting poultry dry litter such that it is properly utilized to reduce nutrient impacts.

(K) A feed/waste storage structure means a fabricated structure for the temporary storage of animal waste.

(26) A water control structure means a permanent structure placed in farm canals and ditches which provides control of surface and subsurface drainage to improve water quality. The primary benefit is to reduce nutrient pollution. Other benefits may include reduced pollution from other dissolved and sediment-attached substances, reduced sedimentation and reduced stormwater surges of fresh water into estuarine areas.

(27) An insect control system means a practice or combination of practices (planting windbreaks, pre-charging structures, incorporation of waste into soil, etc.) which manages or controls insects from confined animal operations, waste treatment and storage structures, and waste applied to agricultural land.

(28) A riparian buffer means an area adjacent to solid blue line streams as shown on 7.5 minute USGS maps where a permanent, long-lived vegetative cover (sod, shrubs, trees, or a combination of vegetation types) is established to improve water quality. Benefits may include reduced soil erosion, sedimentation, pathogen contamination and pollution from dissolved, particulate and sediment-attached substances.

(29) An odor control management system means a practice or combination of practices (planting windbreaks, pre-charging structures, incorporation of waste into soil, etc.) which manages or controls odors from confined animal operations, waste treatment and storage structures and waste applied to agricultural land.

(30) A streambank stabilization system means the use of bio-engineering practices, native material revetments, channel stability structures, and/or the restoration or management of riparian corridors in order to protect upland BMPs, restore the natural function of the stream corridor and improve water quality by reducing sedimentation to streams from streambank erosion and decreasing the delivery of nitrogen, phosphorous and other pollutants to the stream from adjacent pasture or cropland.

(31) A wetland restoration system means a system of practices designed to restore the natural hydrology of an area that had been drained and cropped.

(32) A land smoothing practice means reshaping the surface of agricultural land to planned grades for the purpose of improving water quality.

*To be used in conjunction with the most recent version of the APA Rules for the North Carolina Agriculture Cost Share Program for Nonpoint Source Pollution Control and the NC-ACSP Manual.

BEST MANAGEMENT PRACTICES ELIGIBLE FOR COST SHARE PAYMENTS

(1) Best Management Practices eligible for cost sharing include the practices listed in Table 1 and any approved District BMPs. District BMPs shall be reviewed by the Division for technical merit in achieving the goals of this program. Upon approval by the Division, the District BMPs will be eligible to receive cost share funding.

Table 1

Practice	Minimum Life Expectancy (years)
Agrichemical Handling Facility	10
Chemigation Backflow Prevention System	10
Christmas Tree Conservation Cover	6
Conservation Tillage System :	
Annual for small grain	1
Three year	3
Critical Area Planting	10
Cropland Conversion	10
Diversion	10
Fertigation Backflow Prevention System	10
Filter Strip	10
Grade Stabilization Structure	10
Grassed Waterway	10
Heavy Use Area Protection	10
Land Smoothing	5
Livestock Exclusion	10
Long Term No-Till	5
Pastureland Conversion	10
Nutrient Reduction Management System	3
Rock-lined Waterway or Outlet	10
Sediment Control Structure	10
Sod-based Rotation	4 or 5
Stock Trail and Walkway	10
Storm Water Management	10
Stream Protection System	
Spring Development	10
Trough or Tank	10
Well	10
Windmills	10
Stream Crossing	10
Streambank Stabilization	10
Stripcropping	5
Riparian Buffer	10
Terrace	10
Waste Management System:	
Waste Storage Pond	10

Waste Storage Structure	10
Waste Treatment Lagoon	10
Farm Mortality Management System	10
System for Land Application of Animal Waste	10
Wetlands Development for Land Application	10
Controlled Livestock Lounging Area	10
To-Be-Abandoned or Abandoned Confined Animal Operation (CAO)	5
Insect Control	5
Odor Control	1 to 10
Offsite or Alternative Poultry Dry Litter Waste Utilization Incentive	1
Water Control Structure	10
Wetlands Restoration System	10

(2) The minimum life expectancy of the BMPs shall be that listed in Table 1. Practices designated by a District shall meet the life expectancy requirement established by the Division for that District BMP.

(3) The list of BMPs eligible for cost sharing may be revised by the Commission as deemed appropriate in order to meet program purpose and goals.

NC Agriculture Cost Share Program
Practice Log Summary

Year : 2003
Program : CS

Best Management Practice	Planned Units	Planned Msr.	Planned Cost	Implemented Units	Implemented Msr.	Implemented Cost
Erosion/Nutrient Reduction						
Conservation Tillage	4,139.11	Acre	$124,726	2,956.59	Acre	$92,326
Conservation Tillage (3 Yr.)	19,261.86	Acre	$1,767,493	24,548.81	Acre	$1,424,257
Terraces	22,241.00	Feet	$18,755	9,086.00	Feet	$8,149
Critical Area Planting	94.44	Acre	$83,132	24.49	Acre	$29,245
Diversion	18,105.00	Feet	$21,259	4,598.00	Feet	$6,759
Sod-Based Rotation	1,568.20	Acre	$134,878	1,301.82	Acre	$109,131
Stripcropping	0.00	Acre	$1,227	9.40	Acre	$1,227
Cropland Conversion - Grass	3,008.55	Acre	$388,552	2,093.76	Acre	$269,546
Cropland Conversion - Trees	2,520.90	Acre	$257,357	2,064.48	Acre	$164,236
Cropland Conversion - Wildlife	62.28	Acre	$8,285	41.58	Acre	$5,583
Cropland Conversion - Christmas Trees	60.40	Acre	$5,730	61.09	Acre	$5,336
Pastureland Conversion To Trees	35.80	Acre	$4,008	35.80	Acre	$4,008
Long Term No-Till	6,726.80	Acre	$711,787	5,250.50	Acre	$563,228
Land Smoothing	55.20	Acre	$4,554	0.00	Acre	$0
Nutrient Scavenger	4,956.90	Acre	$50,105	4,579.95	Acre	$47,225
Sediment/Nutrient Reduction						
Filter Strip	99.71	Acre	$67,175	30.00	Acre	$15,701
Field Border	297.10	Acre	$354,598	92.11	Acre	$106,947
Grassed Waterway	175.49	Acre	$270,392	46.23	Acre	$78,273
Water Control Structure	47.00	Units	$95,181	18.00	Units	$30,960
Nutrient Management	6,100.60	Acre	$102,791	2,315.60	Acre	$34,661
Sediment Control Basin	18.70	Units	$14,908	18.70	Units	$14,908
Riparian Buffer	2,139.80	Acre	$249,457	1,669.40	Acre	$163,133
Streambank Stabilization	1,410.00	Feet	$34,792	850.00	Feet	$31,267
Grade Stabilization Structure	9.00	Units	$23,148	6.00	Units	$21,255
Rock-Lined Outlet	3.00	Units	$13,090	1.00	Units	$8,905
Stream Protection						
Spring Development	72.00	Units	$101,782	31.00	Units	$45,365
Stock Trail	1,955.00	Units	$94,921	577.00	Units	$51,133
Stream Crossing	50.00	Units	$81,504	18.00	Units	$25,748
Trough Or Tank	497.00	Units	$669,307	170.00	Units	$233,444
Livestock Exclusion	444,554.00	Feet	$569,601	135,161.00	Feet	$179,269
Well	128.00	Units	$498,481	57.00	Units	$191,618
Heavy Use Area Protection	246.50	Units	$311,111	60.52	Units	$125,918
Waste Management						
Solid Set	66.00	Units	$46,825	1.00	Units	$21,825
Hydrants	3.00	Units	$18,412	2.00	Units	$8,412
Mobile Irrigation	15.00	Units	$136,556	13.00	Units	$126,128
Land Application (Wet)	1.00	Gallo	$5,250	1.00	Gallons	$5,250
Land Application (Dry)	18.00	Tons	$97,476	14.00	Tons	$71,317
Waste Storage Pond	0.00	Units	$827	0.00	Units	$827
Dry Stack	50.00	Units	$683,910	24.00	Units	$297,451
Composter	14.00	Units	$118,250	3.00	Units	$27,764
Litter Storage	2.00	Units	$15,887	2.00	Units	$15,887
Controlled Livestock Lounging Area	1.00	Units	$6,730	0.00	Units	$0
Abandon Cao	7.00	Units	$101,664	6.00	Units	$95,372
Storm Water Management	7.00	Units	$23,747	5.00	Units	$17,991
Poultry House Clay Liner	1.00	Units	$6,492	0.00	Units	$0
Incinerator	125.00	Units	$554,695	53.00	Units	$227,655

NC Agriculture Cost Share Program
Practice Log Summary

Year : 2003
Program : CS

Best Management Practice	Units	Planned Msr.	Cost	Implemented Units	Msr.	Cost
Feed/Waste Storage	11.00	Units	$149,242	6.00	Units	$76,933
Agri-Chemical Pollution Prevention						
Agri-Chemical Handling Facility	5.00	Units	$71,755	3.00	Units	$28,261
Chemigation	6.00	Units	$18,750	0.00	Units	$0
Contracts: 1,819 0200	0	Total:	$9,190,555		Total:	$5,109,834

	Value	Expended
Contract $:	$8,846,650	$4,923,677
Non-ACSP $	$337,814	$190,142
Total $:	$9,184,464	$5,113,819

Dairy	7,140
Beef	15,560
Hogs	546,842
Horses	576
Broilers	8,143,790
Layers	19,200
Turkeys	364,250
Poultry	2,466,871
Sheep	2
Goats	514

Acres Affected	Acre	89,436.40
Soil Saved	Tons	290,065.31
Nitrogen Saved	Pounds	1,359,918.06
Phosphorus Saved	Pounds	741,691.41
Waste-N Managed	Pounds	4,406,981.80
Waste-P Managed	Pounds	4,572,177.20

Attachment C: Agriculture Cost Share Program 2003 contracts and 2004 Allocation by County

County	Number of 2003 Contracts	Amount	2004 Allocation
Alamance	19	$ 100,054	$ 101,282
Alexander	10	$ 89,792	$ 72,728
Alleghany	10	$ 93,382	$ 82,438
Anson	6	$ 44,282	$ 77,036
Ashe	11	$ 122,197	$ 135,549
Avery	7	$ 47,187	$ 48,810
Beaufort	28	$ 170,180	$ 159,463
Bertie	25	$ 102,322	$ 89,548
Bladen	26	$ 95,832	$ 89,516
Brunswick	14	$ 73,059	$ 52,862
Buncombe	12	$ 85,214	$ 117,478
Burke	5	$ 66,423	$ 70,000
Cabarrus	7	$ 27,882	$ 64,593
Caldwell	5	$ 47,614	$ 39,430
Camden	3	$ 3,467	$ 44,800
Carteret	3	$ 36,161	$ 49,100
Caswell	37	$ 90,557	$ 87,313
Catawba	13	$ 66,879	$ 58,448
Chatham	11	$ 119,283	$ 137,845
Cherokee	18	$ 61,573	$ 83,054
Chowan	19	$ 102,337	$ 96,164
Clay	13	$ 67,816	$ 108,037
Cleveland	16	$ 47,876	$ 64,675
Columbus	35	$ 101,455	$ 97,405
Craven	24	$ 124,833	$ 82,300
Cumberland	28	$ 106,241	$ 80,535
Currituck	1	$ 15,000	$ 25,000
Davidson	19	$ 57,758	$ 54,060
Davie	9	$ 57,897	$ 67,328
Duplin	17	$ 171,984	$ 187,090
Durham	3	$ 7,419	$ 45,000
Edgecombe	52	$ 217,084	$ 163,182
Forsyth	9	$ 68,415	$ 45,518
Franklin	25	$ 94,722	$ 139,252
Gaston	5	$ 66,057	$ 51,000
Gates	41	$ 131,979	$ 100,024
Graham	10	$ 39,295	$ 45,904
Granville	14	$ 58,075	$ 94,362
Greene	44	$ 149,745	$ 151,438
Guilford	30	$ 162,679	$ 130,264
Halifax	48	$ 230,377	$ 237,940
Harnett	41	$ 89,080	$ 106,490
Haywood	22	$ 101,749	$ 131,536
Henderson	12	$ 95,222	$ 101,301
Hertford	52	$ 194,275	$ 90,420
Hoke	13	$ 44,712	$ 71,145
Hyde	19	$ 122,880	$ 104,714
Iredell	16	$ 149,102	$ 127,113
Jackson	3	$ 39,016	$ 35,367
Johnston	40	$ 163,862	$ 174,777
Jones	16	$ 114,549	$ 87,970
Lee	16	$ 56,007	$ 49,905
Lenoir	46	$ 137,945	$ 161,013
Lincoln	15	$ 83,732	$ 94,765
Macon	5	$ 9,149	$ 33,407
Madison	15	$ 58,064	$ 70,407
Martin	27	$ 106,618	$ 79,742
McDowell	6	$ 34,568	$ 38,884
Mecklenburg	0	$ -	$ 41,575
Mitchell	13	$ 105,039	$ 102,566
Montgomery	10	$ 92,400	$ 90,009
Moore	22	$ 148,523	$ 167,835
Nash	19	$ 114,925	$ 144,335
New Hanover	0	$ -	$ 34,572
Northampton	63	$ 129,814	$ 149,856
Onslow	17	$ 89,035	$ 81,014
Orange	20	$ 87,252	$ 102,228
Pamlico	10	$ 101,064	$ 85,950
Pasquotank	9	$ 53,560	$ 58,800
Pender	12	$ 83,756	$ 67,205
Perquimans	9	$ 96,057	$ 99,164
Person	14	$ 64,036	$ 73,750
Pitt	50	$ 267,572	$ 183,946
Polk	6	$ 46,969	$ 45,945
Randolph	14	$ 95,306	$ 124,810
Richmond	14	$ 89,436	$ 75,930
Robeson	30	$ 117,927	$ 105,015
Rockingham	25	$ 90,045	$ 85,664
Rowan	16	$ 73,264	$ 89,554
Rutherford	21	$ 93,477	$ 70,788
Sampson	16	$ 84,447	$ 135,581
Scotland	12	$ 112,849	$ 96,814
Stanly	16	$ 74,797	$ 83,905
Stokes	5	$ 83,535	$ 67,784
Surry	31	$ 209,978	$ 146,252
Swain	4	$ 16,458	$ 29,059
Transylvania	5	$ 64,737	$ 47,953
Tyrrell	7	$ 80,038	$ 61,761
Union	19	$ 128,537	$ 116,174
Vance	17	$ 18,175	$ 41,854
Wake	29	$ 125,729	$ 100,864
Warren	29	$ 112,199	$ 100,866
Washington	6	$ 46,460	$ 71,504
Watauga	11	$ 79,587	$ 86,536
Wayne	39	$ 225,172	$ 237,793
Wilkes	12	$ 134,334	$ 131,971
Wilson	38	$ 148,363	$ 120,633
Yadkin	10	$ 101,372	$ 110,151
Yancey	19	$ 83,145	$ 100,514

ATTACHMENT D: NC AGRICULTURE COST SHARE PROGRAM
WATER QUALITY IMPROVEMENT PURPOSES OF APPROVED BMPs

Purpose: Sediment/Nutrient Delivery Reduction From Fields

BMP	Reduction of applied nutrient	Reduction of soil loss	Nutrient interception	Facilitating BMP	Life of BMP (yrs)
Field Border	-	√	√	-	10
Filter Strip	-	√	√	-	10
Grade Stabiliz. Structure	-	-	-	√	10
Grassed Waterway	-	√	√	-	10
Nutrient Mgmt.	√	-	-	-	3
Riparian Buffer	-	√	√	-	10
Rock-lined Outlet	-	-	-	√	10
Sediment Control Basin	-	-	√	-	10
Water Control Structure	-	√	√	-	10
Streambank Stabilization	-	√	√	-	10

Purpose: Erosion Reduction/Nutrient Loss Reduction in Fields

BMP	Reduction of applied nutrient	Reduction of soil loss	Facilitating BMP	Life of BMP (yrs)
Annual Conservation Tillage				1
Christmas Tree Conservation Cover		√		6
Conservation Tillage 3-yr	-	√		3
Critical Area Planting	-	√		10
Cropland Conversion	√	√		10
Water Diversion	-	√		10
Land Smoothing			√	10
Long Term No-till	-	√		5
Pastureland Conversion	√	√		10
Sod-based Rotation	√	√		4 or 5
Stripcropping	√	√		5
Terraces	-	√		10
Wetlands Restoration				10

Purpose: Agricultural Chemical Pollution Prevention

BMP	Interception of chemicals	Life of BMP (yrs)
Agri-chemical Handling Facility	√	10
Chemigation Back Flow Prevention	√	10
Fertigation Back Flow Prevention	√	10

Purpose: Proper Animal Waste Management

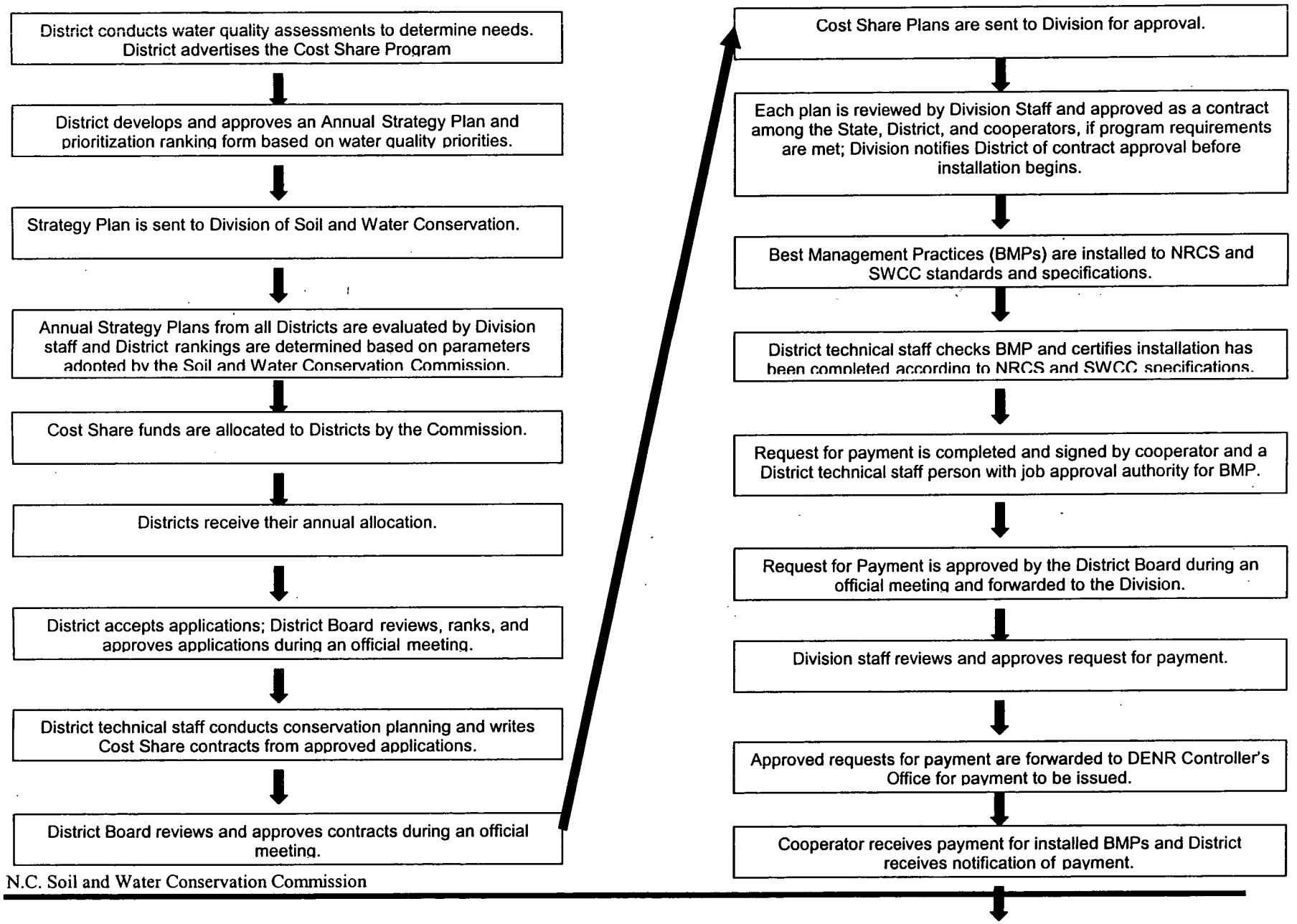
BMP	Proper mgmt. of nutrients	Reduction of soil loss	Nutrient interception	Facilitating BMP	Life of BMP (Yrs)
Animal Waste Lagoon Closure	√	-	-	-	5
Constructed wetlands	√	-	√	-	10
Controlled Livestock Lounging Area	-	√	-	√	10
Dry Manure Stack	√	-	-	-	10
Feeding/Waste Storage					10
Heavy Use Area Protection	-	√	-	-	10
Insect Control	-	-	-	-	5
Odor Control	-	-	-	-	1-10
Storm Water Management	√	-	-	-	10
Waste Treatment Lagoon/Storage Pond	√	-	-	-	10
Mortality Management System	√	-	-	-	10
Waste Application System	√	-	-	√	10
Offsite/Alternative Dry Litter Incentive	√	-	-	-	1

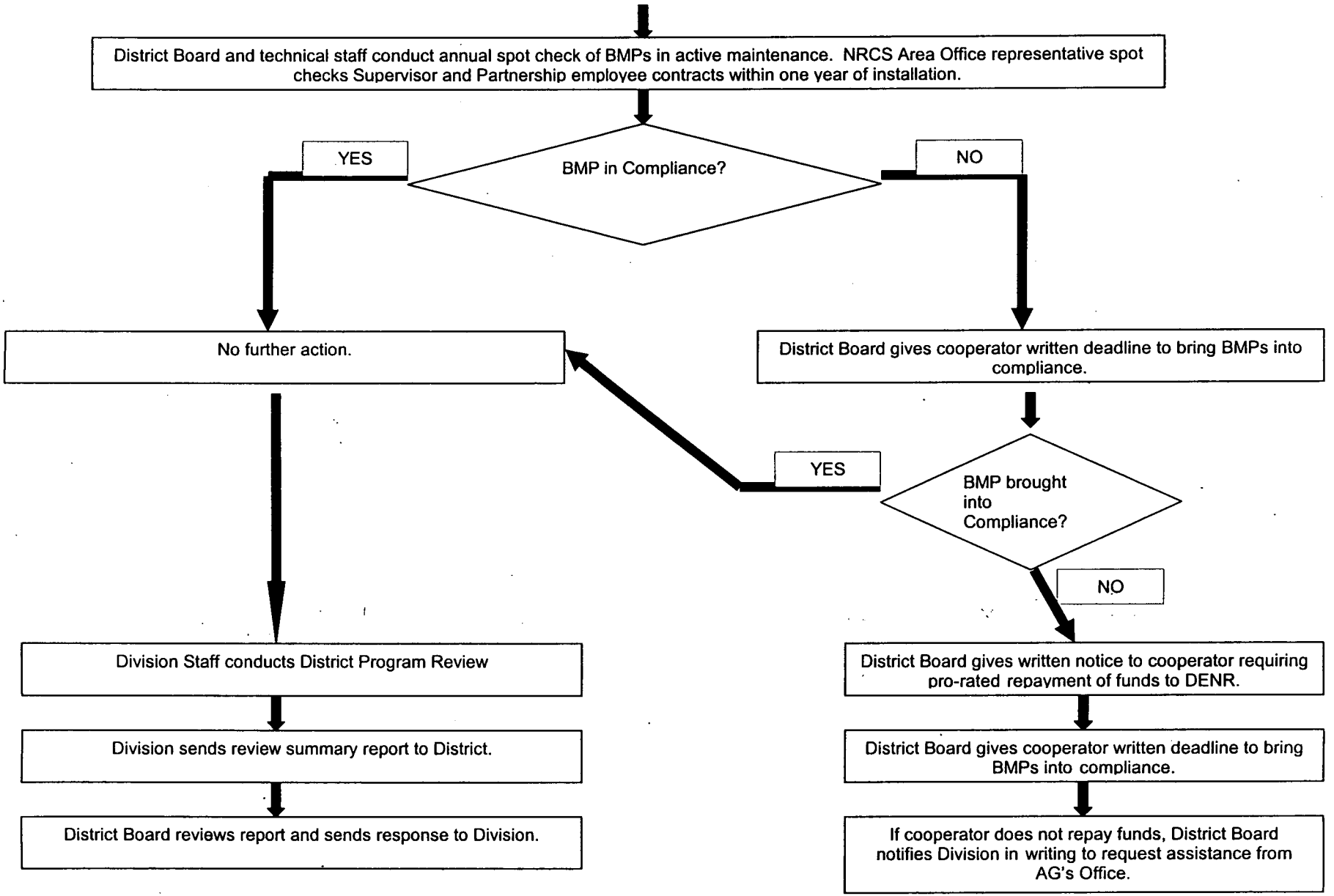
Purpose: Stream Protection from Animals

BMP	Reduction of applied nutrient	Reduction of soil loss	Facilitating BMP	Life of BMP (Yrs)
Heavy Use Area Protection	-	√	-	10
Livestock Exclusion System	√	√	-	10
Spring Development	-	-		10
Stock Trail	-	√	-	10
Stream Crossing		√	-	10
Trough or Tank	-	-	√	10
Well	-	-	√	10
Windmill	-	-	√	10

Attachment E: NC Agriculture Cost Share Program

Funding and Compliance Process




District Board and technical staff conduct annual spot check of BMPs in active maintenance. NRCS Area Office representative spot checks Supervisor and Partnership employee contracts within one year of installation.
BMP in Compliance?
YES
NO
No further action.
District Board gives cooperator written deadline to bring BMPs into compliance.
YES
BMP brought into Compliance?
NO
Division Staff conducts District Program Review
Division sends review summary report to District.
District Board reviews report and sends response to Division.
District Board gives written notice to cooperator requiring pro-rated repayment of funds to DENR.
District Board gives cooperator written deadline to bring BMPs into compliance.
If cooperator does not repay funds, District Board notifies Division in writing to request assistance from AG's Office.

FEDERALLY THREATENED AND ENDANGERED SPECIES IN NORTH CAROLINA

Mammals

Carolina Northern Flying Squirrel *Glaucomys sabrinus coloratus* - Endangered
Finback Whale - *Balaenoptera physalus* - Endangered
Eastern Cougar - *Puma concolor couguar* - Endangered
Gray Bat - *Myotis grisescens* - Endangered
Gray Wolf - *Canis lupus* (Extirpated in North Carolina) - Threatened, Endangered
Humpback whale - *Megaptera novaeangliae* - Endangered
Indiana Bat - *Myotis sodalis* - Endangered
Red Wolf- *Canis rufus* - Endangered
Right Whale - *Balaena glacialis* - Endangered
Sei Whale - *Balaenoptera borealis* - Endangered
Sperm Whale - *Physeter catodon* - Endangered
Virginia Big-eared Bat- *Corynorhinus townsendii virginianus* - Endangered
West Indian Manatee - *Trichechus manatus* - Endangered

Birds

Bachman's Warbler - *Vermivora bachmanii* - Endangered
Bald Eagle - *Haliaeetus leucocephalus* - Threatened
Ivory-billed Woodpecker - *Campephilus principalis* - Endangered (Extirpated in North Carolina)
Kirtlands Warbler - *Dedroica kirtlandii* - Endangered (Extirpated in North Carolina)
Piping Plover - *Charadrius melodus* - Threatened, Endangered
Red - Cockaded Woodpecker - *Picoides borealis* - Endangered
Roseate Tern - *Sterna dougallii* - Threatened, Endangered
Wood Stork - *Mycteria americana* - Endangered

Reptiles

American Alligator - *Alligator mississippiensis* - Threatened due to similarity of appearance
Bog Turtle - *Clemmys muhlenbergii* - Threatened due to similarity of appearance
Green Sea Turtle - *Chelonia mydas* - Threatened, Endangered
Hawksbill Turtle - *Eretmochelys imbricata imbricata* - Endangered
Kemp's Ridley Sea Turtle - *Lepidochelys kempii* - Endangered
Leatherback Sea Turtle - *Dermochelys coriacea* - Endangered
Loggerhead Sea Turtle - *Caretta caretta* - Threatened

Fish

Cape Fear Shiner - *Notropis mekistocholas* - Endangered
Shortnose Sturgeon - *Acipenser brevirostrum* - Endangered
Spotfin Chub - *Cyprinella monacha* - Threatened
Waccamaw Silverside - *Menidia extensa* - Threatened

Insects

Saint Francis' Satyr Butterfly - *Neonympha mitchellii francisci* - Endangered
American Burying Beetle - *Nicrophorus americanus* - Endangered (Extirpated in North Carolina)

Spiders
Spruce-fir Moss Spider - *Microhexura montivaga* - Endangered

Mussels
Applachian Elktoe - *Alasmidonta raveneliana* - Endangered
Carolina Heelsplitter - *Lasmigona decorata* - Endangered
Cumberland Bean Pearlymussel - *Villosa trabalis* - Endangered
Dwarf Wedgemussel - *Alasmidonta heterodon* - Endangered
James Spinymussel - *Pleurobema collina* - Endangered
Little-wing Pearlymussel - *Pegius fabula* - Endangered
Oyster Mussel - *Epioblasma capsaeformis* - Endangered
Tan Riffleshell - *Epioblasma florentina walkei* - Endangered
Tar Spinymussel - *Elliptio steinstansana* - Endangered

Snails
Noonday Globe - *Mesodon clarki nantahala* - Threatened

Plants
American Chaffseed - *Schwalbea americana* - Endangered
Blue Ridge Goldenrod - *Solidago spithamaea* - Threatened
Bunched Arrowhead - *Sagittaria fasciculata* - Endangered
Canby's Dropwort - *Oxypolis canbyi* - Endangered
Cooley's Meadowrue - *Thalictrum cooleyi* - Endangered
Dwarf-flowered Heartleaf - *Hexastylis naniflora* - Threatened
Golden Sedge - *Carex lutea* - Endangered
Green Pitcher Plant - *Sarracenia oreophila* - Endangered
Harperella - *Ptilimnium nodosum* - Endangered
Heller's Blazing Star - *Liatris helleri* - Threatened
Michaux's Sumac - *Rhus michauxii* - Endangered
Mountain Golden Heather - *Hudsonia montana* - Threatened
Mountain Sweet Pitcher Plant - *Sarracenia rubra* ssp. *jonesii* - Endangered
Pondberry - *Lindera melissifolia* - Endangered
Roan Mountain Bluet - *Hedyotis [=Houstonia] purpurea* var. *montana* - Endangered
Rock Gnome Lichen - *Gymnoderma lineare* - Endangered
Rough-leaved Loosestrife - *Lysimachia asperulifolia* - Endangered
Schweinitz's Sunflower - *Helianthus schweinitzii* - Endangered
Seabeach Amaranth - *Amaranthus pumilus* - Threatened
Sensitive Joint-vetch - *Aeschynomene virginica* - Threatened
Small-anthered Bittercress - *Cardamine micranthera* - Endangered
Small Whorled Pogonia - *Isotria medeoloides* - Threatened
Smooth Coneflower - *Echinacea laevigata* - Endangered
Spreading Avens - *Geum radiatum* - Endangered
Swamp Pink - *Helonias bullata* - Threatened
Virginia Spiraea - *Spiraea virginiana* - Threatened
White Irisette - *Sisyrinchium dichotomum* - Endangered

MEMBERSHIP OF THE SECRETARY'S SCIENTIFIC ADVISORY BOARD ON TOXIC AIR POLLUTANTS (SAB)

Dr. George Lucier, Ph.D., retired
Director, National Toxicology Program

Dr. Jerry W. Spoo, DVM
RTI International

Thomas B. Starr, PhD.
Principal
TBS Associates

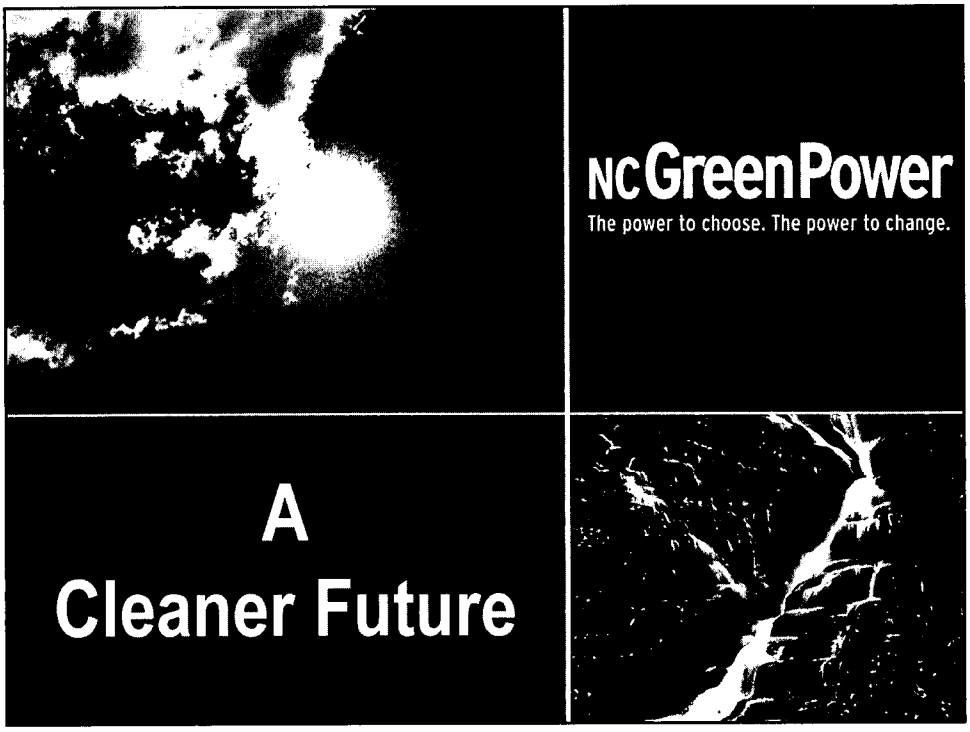
Woodhall Stopford, MD, MSPH
Occupational Physician
Duke Medical Center

Man-Sung Yim, Sc.D
Director of Graduate Programs
NCSU Department of Nuclear Engineering
(Degree is in Radiologic Health)

Elaina M. Kenyon, Ph.D.
U.S. Environmental Protection Agency
Pharmacokinetics Branch

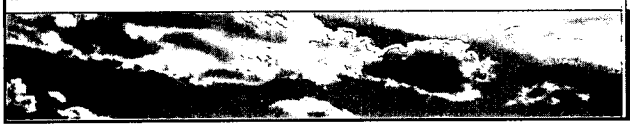
Ronald L. Melnick, Ph.D.
National Institute of Environmental Health Sciences

May 5, 2004



What Is Green Power or Renewable Energy?

- Energy generated from natural sources that are constantly replenished
- Cleaner to produce and use than traditional fuels
- Sources for power exist everywhere and are easily accessible
- Abundant sources mean abundant energy supplies for years to come!

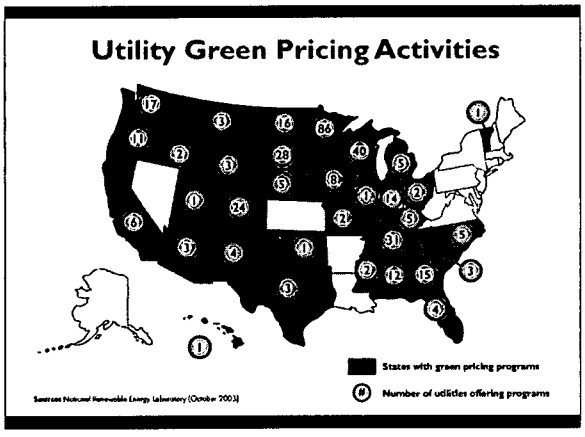


Why Use Renewable Energy?

- Improve regional air and water quality
- Renewable energy is naturally reoccurring.
- Provides local jobs and economic benefits.
- Reduces dependence on fuel sources from other states and countries.
- It's the right thing to do!!!

NC GreenPower
The power to choose. The power to change.

Green Power Across the Nation



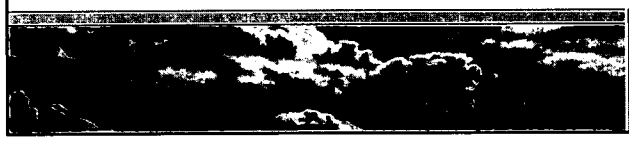
Renewable Energy in NC

Activities include multiple renewable energy producers, partnered with investor owned utilities, electric membership cooperatives and municipalities across North Carolina.

NC GreenPower
The power to choose. The power to change.

NC GreenPower Program

- Involves investor-owned, municipal and rural electric cooperative utilities in North Carolina
- Voluntary and tax-deductible
- Electricity generated from renewable sources by independent power producers
- Produced in North Carolina for North Carolinians



NC GreenPower
The power to choose. The power to change.

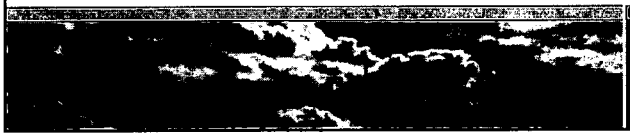
One Common Goal

Protecting the environment by encouraging the development of renewable energy resources through consumers' voluntary participation in the purchase of green power.

NC GreenPower
The power to choose. The power to change.

Objectives

- Improve quality of environment and public health.
- Increase amount of generation from renewables
- Maximize investment in renewable generation
- Maximize number of participants



NC GreenPower
The power to choose. The power to change.

NC GreenPower Options

- Residential / Small Business
  - Designed for residential customers and small businesses
  - $4 per block of 100 kWh
  - Minimum = One block or $4 per month
  - Average = 1.6 blocks
- Large Business/Industry
  - Designed for large industrial and commercial customers
  - $2.50 per block of 100 kWh
  - Minimum: 100 blocks or $250 per month
  - Approx. 60,000 blocks sold

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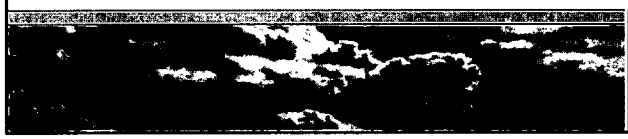
Product Offering

- Mass Market
  - Solar
  - Wind
  - Methane
- Large Volume Market
  - Solar
  - Wind
  - Methane
  - Small hydro
  - Biomass
    - Agriculture waste
    - Animal waste
    - Clean wood waste



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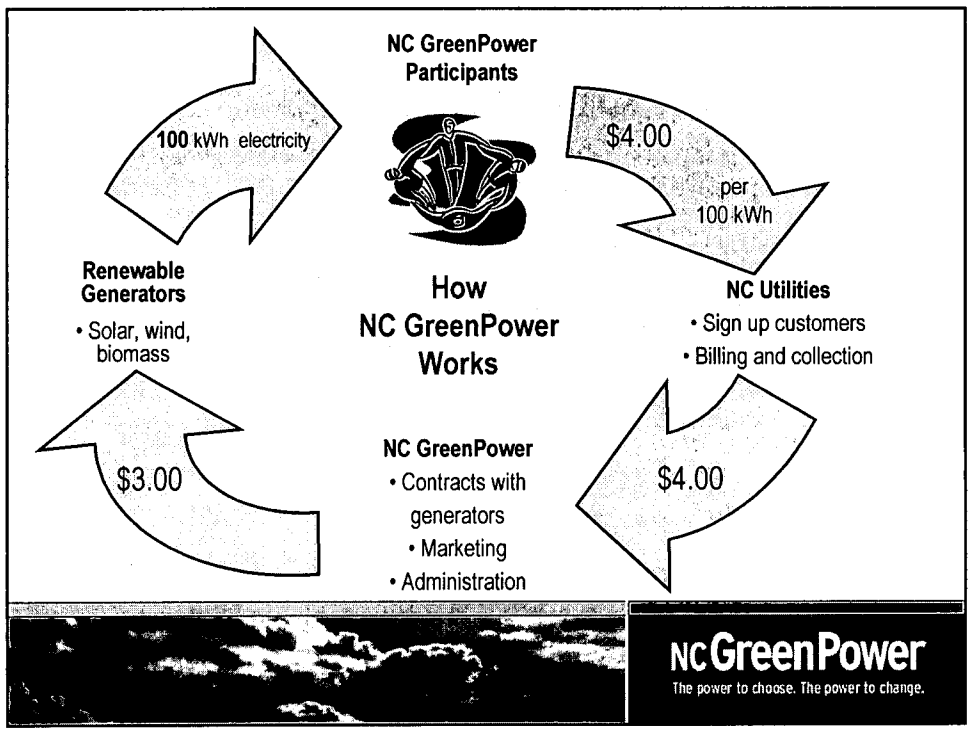

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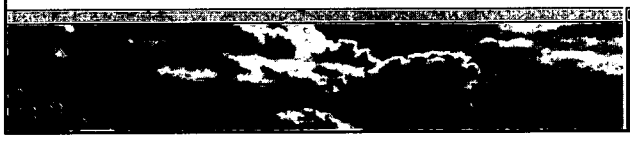
Program Status

- Public launch on October 1, 2003
- Utilities have placed billing inserts
- Board of Directors appointed by NCUC
- Public awareness campaign is underway
  - Selected advertising on public radio
  - Advertising in Our State magazine
  - Speakers Bureau



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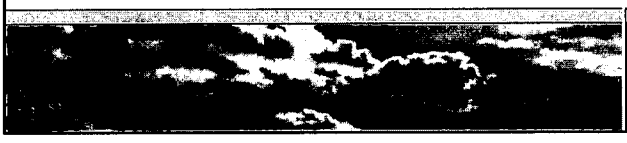
Participation Status

- All investor-owned utilities participating
- 15 out of 27 EMC's participating
- 10 out of 70 ElectriCities participating
- As of Feb. 2004

• Mass Market	Large Volume
– 4,300 participants	- 5 participants
– 6,800 blocks	- 58,000 blocks



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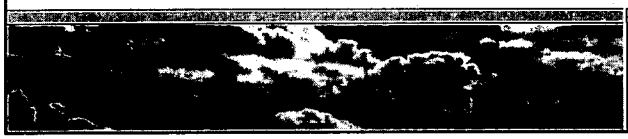
Green Resources Status

- Request for Proposal for new green resources
- RFP submitted in October 2003
  - 49 sites representing over 608 million kWh
  - 135 million kWh was new generation
  - 15 of 49 sites requested contract guarantees
- Resources will be selected and recommended to Board in April 2004



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Challenges

- Statewide marketing and awareness campaign
- Having adequate solar and wind resources
- External issues with possible impact on NCGP:
  - Utility Interconnection
  - Energy Bill (production tax credits)
- Contract guarantees for resources

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Recognition of Our Business Leaders

- We value business contributions!

Founding sponsors:

Advanced Energy · Dominion · Duke Power, A Duke Energy Company · EPA United States Environmental Protection Agency · Lowe's

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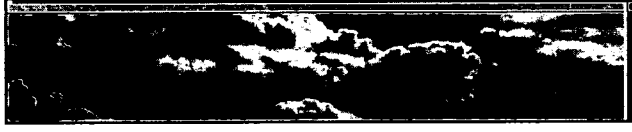

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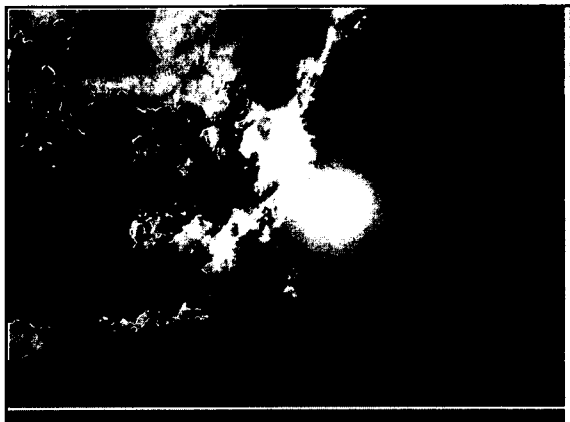

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www.ncgreenpower.org
919-857-9000

Presentation to Environmental Review Commission-May 5, 2004
One-Stop Express Permitting Program
Edythe McKinney, Director of Customer Service
Department of Environment and Natural Resources

I am pleased to provide you with a progress report on the one-stop permit coordination and express permitting programs now operating within the Department of Environment and Natural Resources. These legislatively directed pilot programs provide more front-end assistance to customers seeking environmental permits and reduce environmental permit processing time.

Last year, the North Carolina General Assembly authorized $500,000 to fund a pilot program to provide express permit and certification reviews for some environmental programs within the Department of Environment and Natural Resources. Participation in the program is voluntary, and higher fees are charged for express permitting review.

The first phase of implementation was in the Wilmington Regional Office, since it allowed us to test a wide range of development related permits/certifications. Programs which are part of the one-stop express program are: coastal stormwater permits; water quality wetland certifications; stream origin determinations; erosion and sedimentation control plans; and permits required by the Coastal Area Management Act. The Wilmington Regional Office, which serves seven southeastern counties, has been fully staffed and operational since January.

The 401 Wetland Certification staff in Raleigh is now providing express permitting review on wetland and stream determination projects for Wake County and the surrounding areas. The department expanded this pilot to test the concept on wastewater non-discharge permits. In the Non-Discharge Program, applicants from different regions of the state have participated in the express permit process.

Combining the express permitting and the one-stop permit coordination programs allows customers to get:

- Quicker permit decisions and certifications;
- Pre-application consultation to identify necessary environmental requirements;
- A more predictable project timeline;
- Concurrent review of applications, if multiple permits are required; and
- Coordination throughout the permitting process.

A project applicant can choose to participate in the express permitting program or may apply through the normal permitting channels. If one opts to participate in the express permitting program, property owners, developers and engineers are required to be actively involved in meetings and discussions related to permit review. The involvement by all parties is critical to ensure good communication and high-quality applications.

There have been some positive signs during the first few months of operation for the express permit program, and I want to highlight some of them.

- Customers seem to be willing to pay for quicker turnaround time. The costs of the project depend on the size and number of permits required. The fees for erosion and sedimentation plans range from $250 to $2000, in addition to the normal $50 an acre charge. Coastal stormwater fees are $2000 to $4000. A maximum of $5,500 is charged if a project needs multiple permits. While these fees are substantially higher than those under the regular DENR permitting programs, there have been little or no complaintsabout the higher fees for the services rendered.

- About 100 permits and certifications have applied for the express permitting process. The greatest demand is for coastal stormwater permits. Requests for 401 wetlands and stream certifications are growing. Thirteen of the projects applied for more than one permit. Applicants have included residential housing communities, corporate clients and other commercial properties such as restaurants and retailers.

- The types of projects vary. For example, one project involved a new restaurant in an existing commercial development in a coastal county. An initial meeting was held with the engineering firm and the express staff from all participating programs. At the meeting it was determined that no coastal management or water quality 401 certifications would be required for this project because of its location and site specification. Materials and supporting information needed for a stormwater permit and erosion and sedimentation control plan were provided to the applicant. When the complete applications were submitted in late March, reviews were immediate and the stormwater permit and sedimentation and erosion control plan approvals were issued the next day.

- Permit processing time has been reduced without relaxing the environmental requirements for the project. Increased staff communication with project designers is helping to ensure that the necessary documentation is provided in the initial application, so that review can take place immediately. Additional staff for this program allows pre-application meetings, site visits, and permit review meetings to occur in a timely manner. Let me share a few figures:

  The average turnaround time for Erosion and Sedimentation Control Plans is two days, compared to 20 days under the normal review process. Stormwater permits have typically been issued within two days after all information is received, compared to 40 days under the regular program. The time saved is actually greater than these figures show since the backlog and delays associated with obtaining all of the permit documentation can take several months.

Coastal permits that meet all the requirements for the Army Corps of Engineers and outside agencies are issued within 30 days, which is the shortest possible time due to public comment periods required by regulation. Processing time for stream determination requests by the wetland staff has declined from an average of 32 days to nine days.

- The number of applicants accepted into the express permitting program is increasing as word about the program spreads. In March, the number of permits issued by the Wilmington Regional Office was triple the number issued in January. This upward trend is expected to continue. Printed information on the program is being distributed, visits to economic development groups are increasing, and articles are being published in trade associations and government newsletters. Equally important, satisfied customers are sharing their experience.

- Despite some improvements, there are delays and additional costs to customers because many applicants are still not submitting quality applications. Meeting with customers on the front end has helped, but there still needs to be more education and communication about permit requirements and documentation. This is best illustrated by looking at the non-discharge applications. Only two have not required substantial additional information. Of the average 41 days needed for express permit review, only 16 days involved permit review. This additional delay occurred because the necessary design and engineering information were not provided the first time.

- One of the legislative expectations was that the program would become self sufficient through the higher fee receipts. How are we doing in this area? About $200,000 in receipts has been collected from the express permitting programs through mid-April. This is encouraging since the fees represent a little more than three months of operation. Because of start-up delays, this program may not pay for itself the first year, but we expect receipts to meet the appropriation the following year.

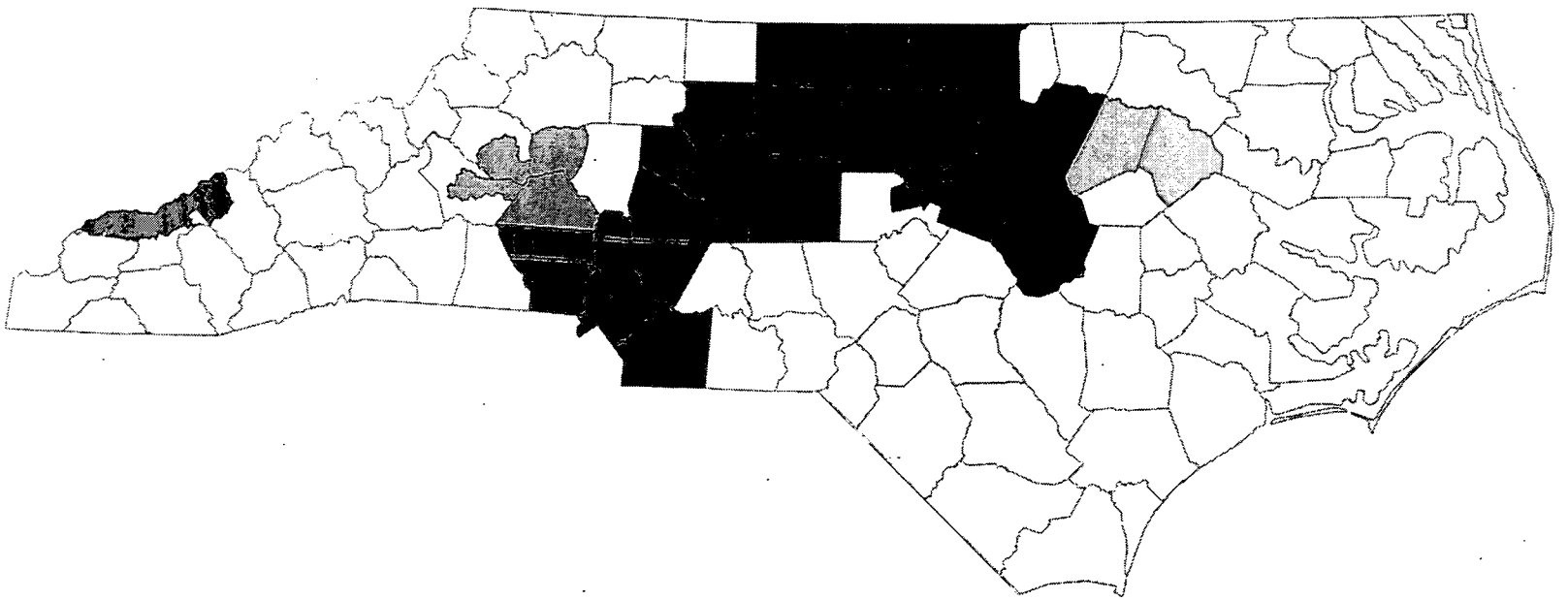
Overall, we think the One-Stop Express Permitting Program is working. The limited time of operation has shown some positive results. The number of permits being sought under one-stop express permitting is increasing, and customer feedback has been encouraging. We still need more time to fully assess its demand and to evaluate permit programs that are the most appropriate for one-stop express permitting. As we gain information, we look forward to working with the Legislature, permit applicants and others to improve environmental permitting in North Carolina.

May 5, 2004 ERC Meeting
EXHIBIT G

North Carolina's Ground Level Ozone Designations

- Federal Designations Signed by EPA Administrator - April 15, 2004
  - Published in Federal Register – April 30, 2004
  - Effective Date – June 15, 2004
- All North Carolina EAC's Approved
  - Non-attainment Designations Deferred
- Consequences of Designations
  - Non-attainment New Source Review Effective June 15, 2004
  - General Conformity Required June 15, 2004
  - Transportation Conformity Required June 15, 2005
  - State Implementation Plans Due June 15, 2007
  - Attainment Dates Depend on Classification – 2007-2010
- Boundaries
  - North Carolina Recommended 10 Full Counties and 21 Partial Counties
  - EPA Designated 26 Full Counties and 6 Partial Counties

EPA's Boundary Designations for 8-Hour Ozone Standards for North Carolina (4/15/04)



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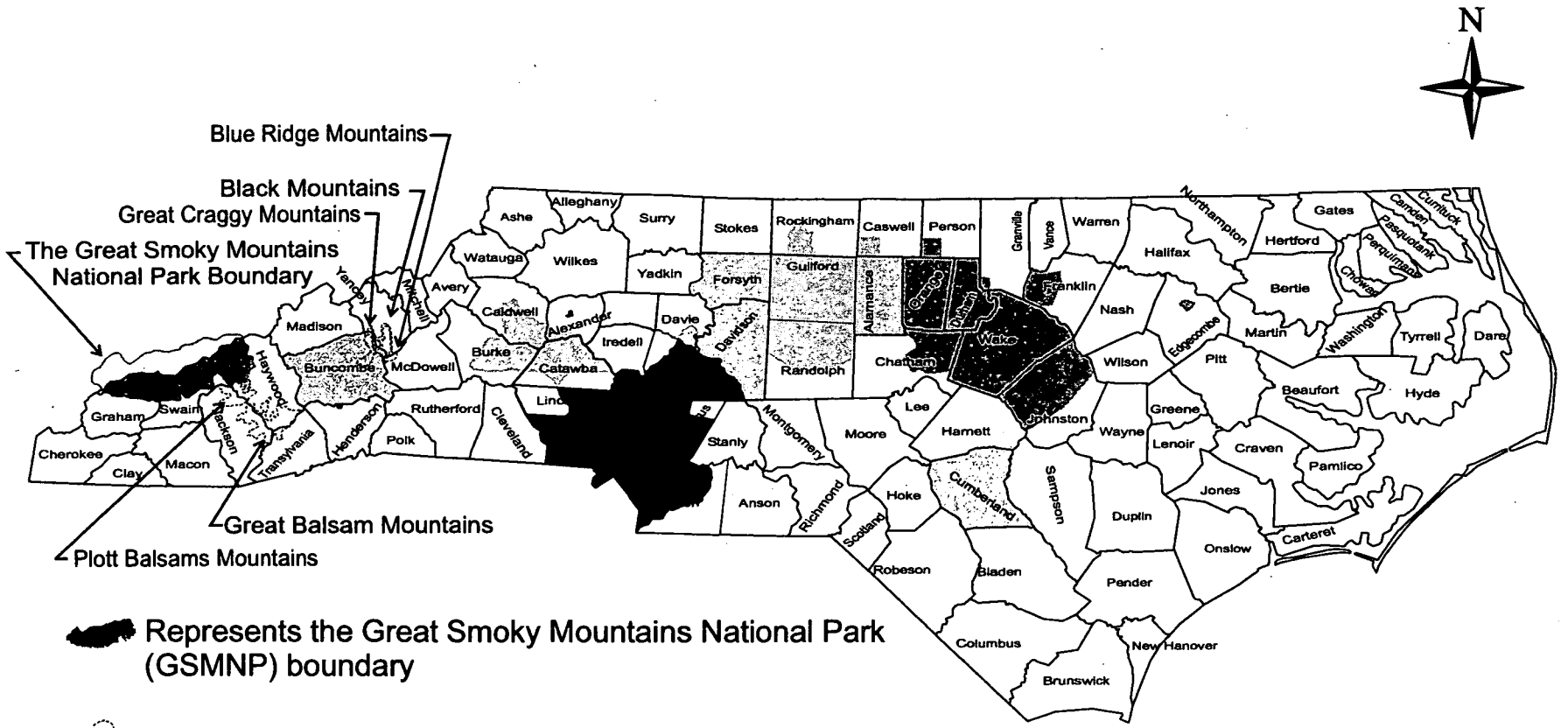
Notes:
Charlotte area: Moderate, Max. attainment date: June 2010
Triad area (EAC): Moderate, Max. attainment date: Dec. 2007
Triangle area: Basic, Max. attainment date: June 2009
Unifour area(EAC): Basic, Max. attainment date: Dec 2007
Haywood & Swain cos: Basic, Max. attainment date: June 2009
Fayetteville area(EAC): Basic, Max. attainment date: Dec 2007
Rocky Mount area: Basic, Max. attainment date: June 2009

North Carolina's Recommendation on 8-hr Ozone Nonattainment Boundaries



Represents the Great Smoky Mountains National Park (GSMNP) boundary

Represents 4,000 feet† elevation boundary

Reductions in emissions will be required in areas as needed, even in areas not designated nonattainment.

Not To Scale
8-hrOZnonATT
07-15-03

Statewide Transportation Demand Management Program

Frequently Asked Questions

What is Transportation Demand Management (TDM)?
TDM is a phrase applied to a number of strategies intended to encourage the use of alternatives to driving alone -- increasing the efficiency of the transportation system by focusing on travel demand instead of supply. Most TDM strategies deal with the modification of travel behaviors, maximizing the people-moving capability of the transportation system and usually focusing on trip-making, time of travel or the accommodation of people through fewer trips.

Why is North Carolina interested in TDM?
The Ambient Air Quality Improvement Act of 1999, Senate Bill 953 (S.B. 953), addresses growing concerns over ground level ozone pollution from motor vehicles and the need to address the increasing vehicle miles traveled (VMT) and nitrogen oxide (Ox) emissions. TDM is one way to address these issues and reduce congestion on the state's highways.

What are the state goals of S.B. 953?
It is the goal of the state to reduce emissions of NOx from all sources and reduce the growth of VMTs in the state by at least 25 percent by July 1, 2009.

What does S.B. 953 specifically require of the Departments of Transportation, Administration, Environment and Natural Resources and Commerce?
Sections 4.6 and 4.7 require the above departments to jointly develop and periodically update a plan to reduce VMTs by both state and private sector employees and vehicle emissions resulting from job-related travel, including commuting to and from work. The sections call for the plan to consider the use of carpooling, vanpooling, public transportation, incentives and other appropriate strategies.

Who prepared the Statewide TDM Plan?
The plan was prepared by the Parsons Brinkerhoff consulting firm, with the assistance of the Institute for Transportation Research and Education (ITRE) at North Carolina State University. To initiate an analysis of the key problems and which TDM strategies might be taken to address them, NCDOT asked a cross-section of leaders from across the state to join a working group, called the TDM Panel, to guide the statewide TDM study. Panel members were appointed by Gov. Easley. They include: former NCDOT Chief Deputy Secretary Gene Conti; John Phelps, Corning, Inc. (Wilmington); Jim Palermo, Bank of America; Kennon Bordern, Borden Real Estate; Crystal Bunch, former Coordinator for Smart Commute @RTP; Lawless Bean, Wilmington Regional TDM Program Coordinator; Nancy Dunn, N.C. Board of Transportation member; Marion A. Cowell, Jr., N.C. Board of Transportation member; Ellen Reckow, Vice-Chairman Durham County Board of Commissioners; Charles Worley, Mayor of Asheville; Bill Laxton, U.S. EPA; Dempsey Benton, Chief Deputy Secretary, DENR; Judith Bell, Office of State Personnel; Nina Slozburg, N.C. Board of Transportation member; and Elaine Lyerly of Lyerly Marketing in Charlotte.

What were the reasons for choosing TDM as the mobility management tool for North Carolina at this time?

There were a number of reasons, including:

- Congestion has continued to mount, especially in the urban areas/regions and travel-related delays are increasing. Comparable national figures indicate that we are driving twice as many miles each year compared to 10 years ago.
- Rising NOx, through its relationship to ozone, is directly responsible for the rising levels of asthma and other respiratory diseases nationally. Closer to home, nearly 30 percent of North Carolina 6th graders suffer from asthma or other respiratory ailments, which are exacerbated by ozone. Auto emissions remain the largest source of NOx in the atmosphere.
- Other mobility trends of concern relate to hours of delay, again associated with increased congestion. According to the 2022 Urban Mobility Report from Texas Transportation Institute, the average annual delay per peak road traveler climbed from 16 hours in 1982 to 62 hours in 2000 and delay in the same period quadrupled in areas with less than one million people.
- The three largest urban areas in North Carolina (Charlotte, Raleigh/Durham/Chapel Hill, and Greensboro/Winston-Salem), continue to face commuter-related delays adding to congested-related delays and aggravating air quality. Significant increases in commuting time during the last decade occurred primarily as a result of the growth in vehicle miles traveled.
- Road improvements cannot keep pace with growing traffic volumes and travel time statistics continue to indicate increases in commute times. Nationally, travel time grew at about one-fourth to one-third as fast in areas where traffic volumes grew when roads were added. In other words, we cannot continue to rely on building our way out of congestion and expecting those solutions to "solve" mobility or air quality problems.

What are some of the recommendations of the Statewide TDM Plan?

The plan includes a wide-range of strategies to improve mobility for commuters and improve air quality. Because commuters often make their travel decisions -- choosing times, routes and modes based on what works for them -- NCDOT and local TDM programs will focus on improving commuter choices, benefits and incentives.

Highlights of the plan include:

- Establishment of an Office of Commuter Assistance within the NCDOT— A Commuter Assistance Program, located within the Public Transportation Division, will be established to focus on demand management techniques and TDM initiatives for North Carolina. Working with the transit and environmental committees of the N.C. Board of Transportation, specific congestion, air quality and commuter issues will be addressed. New air quality and VMT goals will be established for each existing and new urban area ridesharing program.
- Implementation of a statewide TDM project that would benefit the state and overall TDM effort—Development of a North Carolina Best Workplace for Commuters (BWC) Program, a USEPA and DOT public-private partnership program aimed at improving the way people commute to and from work. The BWC program publicly recognizes employers whose commuter benefits reach a national standard of excellence. The program builds on the efforts of many top employers to help get employees to work safely, on time and free of commute-related stress. It will provide the tools, guidance and promotion necessary to help employers of any size incorporate commuter benefits, such as a monthly transit/vanpool subsidy;

preferred parking for carpools and vanpools, compressed work schedules, ridesharing services or lockers and showers for bikers; an Emergency Ride Home for participating employees; and a central point of contact for employees on employer benefits provided. North Carolina will be the first to launch this initiative on a statewide basis.

- Development of additional trip reduction ordinances or programs, and a reduced parking ordinance in major urban areas—Using the Durham County Trip Reduction Model, NCDOT will assist select areas, such as Asheville, Wilmington and Research Triangle Park, in the development of additional trip reduction ordinances/programs. It has been shown that TDM and transit can work together to address growth and development issues, producing significant improvements. Parking requirements based on TDM measures should be introduced in other major urban areas, working with local planners, NCDOT, DENR and local business communities/chambers to develop local ordinances.

The plan also includes activities that will broaden efforts of existing TDM programs across the state.

When will the TDM plan be implemented?
The plan includes a three-year action plan for implementation of the recommended strategies. NCDOT began efforts to incorporate recommendations to strengthen existing programs last summer through emphasizing measurable program outcomes and coordination of US EPA sponsored training opportunities. The Triangle Best Workplace for Commuters campaign was launched on April 20 to sign up more employers to be designated as Best Workplaces for Commuters. This will be used as a model for statewide implementation. In addition, the Commuter Assistance Program should be staffed within three months. The program manager will partner with the DENR and others to implement the plan's recommendations.

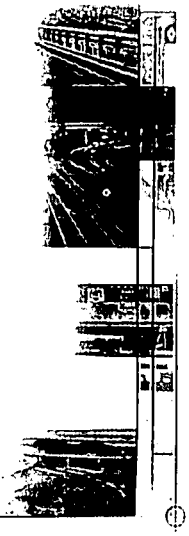
Which state agency(s) will take the lead in implementing the recommendations in the TDM plan?
S.B. 953 placed the NCDOT squarely in a leadership role for improving TDM efforts in North Carolina. In partnership with the Departments of Administration and Environment and Natural Resources, NCDOT is seeking ways to address TDM and effectively reduce NOx and VMT.

Where can I get more information?
Visit www.ncdot.org/transit/transitnet. Click on Statewide TDM Plan to view a copy of the report or contact Miriam Perry, Director of the NCDOT Public Transportation Division, at mperry@dot.state.nc.us or 919.733.4713, ext. 243.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION AND
INSTITUTE FOR TRANSPORTATION RESEARCH & EDUCATION

April 2004

Statewide Transportation Demand Management (TDM) Plan



PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

FOREWORD BY SECRETARY LYNDO TIPPETT

We in North Carolina are not surprised that our state consistently ranks high nationwide for its livability. In fact, thousands of families are drawn to North Carolina each year as a result of the excellent business climate—not to mention our rich history, diverse culture and natural beauty. Our urban areas in particular continue to experience unprecedented growth as more and more people discover North Carolina's unique appeal.

While this growth brings many benefits, the increasing number of vehicles on our highways is threatening the quality of life in many regions. For many North Carolinians, driving to work is becoming increasingly difficult. Traffic congestion is also impacting our environment and the quality of the air we breathe. These concerns were the impetus behind the Ambient Air Quality Improvement Act, passed by the General Assembly in 1999. The legislation requires the state to develop a plan to reduce vehicle emissions resulting from job-related travel.

To jumpstart this plan and to ensure that we sustain our high quality of life, Gov. Easley set an ambitious goal in January 2003 to reduce job-related travel statewide by 25 percent by 2009. To lead this endeavor, he appointed a panel to focus on developing a statewide travel demand management (TDM) plan to increase commuting options for workers in both the private sector and public sectors. The panel, under the leadership of the N.C. Department of Transportation, took this charge to heart and developed a comprehensive TDM program for North Carolina and a three-year proposed action plan to incorporate TDM strategies throughout the state.

This report details the panel's findings and recommended strategies -- which range from working with the EPA to establish a 'Best Workplaces for Commuters' program to the creation of a statewide Office of Commuter Assistance. Such strategies represent a new approach to improving mobility for commuters. Gov. Easley and I thank the panel members for their efforts—and for leading the way for improved mobility, less congestion and cleaner air in North Carolina.

The recommendations of this panel offer citizens a range of choices and provide a way for us all to become actively involved in shaping our communities. I ask for your support of this plan, and to help us spread the momentum by developing TDM programs at the local level. In doing so, we will ensure that our rural and urban areas remain vibrant and attractive places where industry grows and families thrive. With your cooperation, TDM will be an important part of the future of our state and Gov. Easley's vision of *One North Carolina.*

TDM Mission Statement

To provide citizens of North Carolina specific opportunities and strategies for improving sustainable economic growth and quality of life through reduced transportation congestion, expanded mobility options, improved air quality and more efficient use of scarce resources.

- Adopted by the TDM panel on January 2003

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1.0 STUDY OVERVIEW

The North Carolina Department of Transportation and Parsons Brinckerhoff completed a statewide Transportation Demand Management Plan and program of work in the spring of 2003 and suggested improvements to the existing state program efforts during the following summer. Parsons Brinckerhoff, NCDOT and the TDM Panel that assisted in the study, saw this less as another "shelf document" and more as an opportunity for the development of a series of guiding principles. The NCDOT and its partners, DENR and others would have the opportunity to move the state toward programmatic change with an effective process and results to address many of the requirements of Senate Bill 953, the Ambient Air Quality Improvement Act of 1999.

The study team wanted a plan and program that would include leadership and improved program management, reinvigorated ridesharing/TDM programs, a more results-oriented program of work and a marketing framework that incorporated what was learned throughout the study process.

Parsons Brinckerhoff recommended a study process focused on the goals and expectations defined in Senate Bill 953 and encouraged the formation of an internal leadership team spearheaded by NCDOT and supported by a Panel composed of political, technical, development, marketing and government representatives across the state. The Panel would support NCDOT and the consultant team, providing guidance, leadership, dialogue and direction. Specific input would be provided on items such as program mission, work planning, implementation, guiding principles and marketing strategies.

The initial phase of work involved a fact-finding effort, completed in partnership with ITRE, to create a baseline of data and similar information about each of the ridesharing/TDM programs. This was an opportunity to inventory statewide efforts and in some cases "compare and contrast" program efforts currently underway. The product was a summary of results and complete notebook featuring the highlights of each program's efforts.

In addition, the program managers defined in their own words, critical components, accomplishments, major successes and other key information concerning their programs. This information was very important as the consultant team also examined other TDM programs across the country, compared the North Carolina programs various efforts and evaluated individual program efforts such as financials, staff size, organizational structure and program accomplishments.

Upon completion of these initial interviews, preliminary ideas for the SWOT interviews and analysis were developed. A framework for the approach was developed to include a cross-section of representation beyond existing markets. Because the SWOT represented such an important piece of "field" data and information for the study, it was critical to select a cross-section of stakeholders representing clients, board members, political representation and others.

As the acronym "SWOT" suggests, the SWOT analysis would offer feedback concerning existing TDM/ridesharing programs and the characteristics as described by their various

audiences. These sessions were also opportunities to discuss NCDOT's program expectations and through the study, discuss TDM's progress statewide, its performance and the results of various program efforts. Key stakeholders, policy representatives, decision-makers and of course, the program representatives themselves, had an opportunity to learn more about their programs, their effectiveness and any steps for improvement.

In combination, the ITRE baseline information and SWOT interviews and analysis results formed a solid foundation for assessing the progress of ridesharing/TDM programs. After addressing issues related to their strengths, weaknesses and improved program opportunities, including a look at potential projects in Asheville and Hickory, the consultants provided an overall assessment of steps necessary to improve existing TDM programs, including those focused specifically on the reduction of VMT and NOx as specified in Senate Bill 953.

Based on an overall assessment of each local program and an evaluation of comparable program efforts in locations such as California, Washington, Maryland, Florida, Connecticut and Iowa, a series of "Guidelines" were developed for NCDOT.

The "Guidelines" addressed NCDOT's leadership, the need for basic program improvement, "tools" such as mission statement, program goals and objectives, the need for demonstrating the value of TDM in order to encourage participation and political support, measuring performance and other key issues. With specific "how to" information and examples referenced in the Appendices of the report, a menu of choices was provided for how to improve the existing TDM efforts. Armed with this information, it would be possible to prioritize next steps for implementation.

The consultant, NCDOT and Panel were able to further refine the "Guidelines" so that realistic choices for implementation could be coupled with changes to timetables for funding and marketing. The earliest look at marketing included an overall marketing framework, the development of a broader marketing program and a summary marketing orientation from the SWOT analysis.

The final piece of work included a three-year proposed TDM Action Plan, which summarized the most critical pieces of work from the "Guidelines" document and prioritized the efforts. This would formulate the work plan for NCDOT and its Office of Commuter Assistance in the upcoming three years.

2.0 WHY TRANSPORTATION DEMAND MANAGEMENT? A PERSPECTIVE

Transportation demand management (TDM) is a phrase applied to a number of strategies intended to encourage the use of alternatives to driving alone, increasing the efficiency of the transportation system by focusing on travel demand instead of supply. Most TDM strategies deal with the modification of travel behaviors, maximizing the people-moving capability of the transportation system and usually focusing on trip-making, time of travel or the accommodation of people through fewer trips.

Transportation Demand Management strategies, when packaged effectively, can address a variety of transportation problems and provide a variety of economic, social and environmental benefits. The earliest TDM successes were accomplished through carpooling beginning during World War II.

Todd Litman, of the Victoria Transportation Institute, has written dozens and dozens of articles and essays about TDM and its effectiveness. What makes Litman's work and his position about TDM so compelling is his passion for successful implementation. Litman truly believes that TDM is the "next big thing" in transportation.

To Litman, the next major breakthrough in transportation will be one that effectively manages existing resources, resulting in the more efficient use of services and infrastructure already in place. TDM offers that capability.

In more and more communities across the country, TDM is becoming the mechanism by which businesses and community leadership, government and citizens, partner to develop effective transportation solutions. Sometimes, these solutions are in response to overwhelming congestion. Sometimes, environmental issues, such as air quality, have been the motivating factor. But in nearly all cases, the desire for increased mobility has produced new interest in TDM.

2.1 North Carolina Interests in TDM

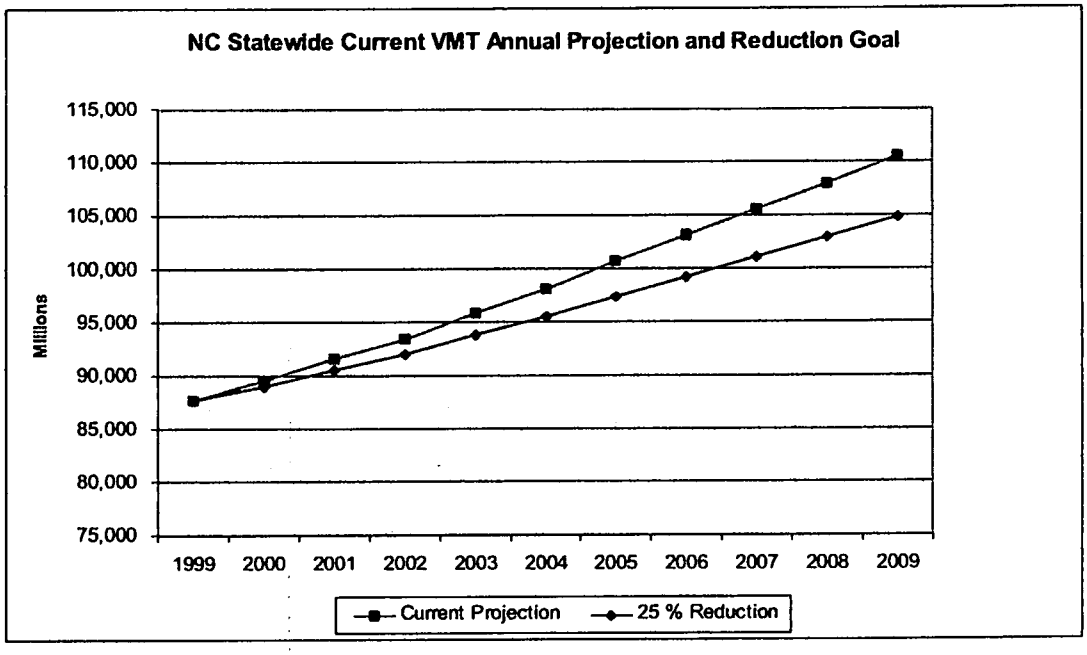
In North Carolina, the NCDOT and its Public Transportation Division, were motivated by the provisions of the Ambient Air Quality Improvement Act of 1999, Senate Bill 953, to address growing concerns over ground level ozone pollution from motor vehicles and the need to deal with increasing vehicle miles traveled (VMT) and NOx. The copy of the Senate Bill 953 is included in **Appendix A**. The NCDOT believed that TDM was one way to deal with the requirements of the Senate Bill. **Figure 1** shows that North Carolina has a statewide goal of reducing VMT by 25 percent (5.7 Billion VMT) by 2009.

While communities across the state had been practicing TDM and ridesharing for some number of years, little progress had been made at significantly reducing vehicle miles traveled, and air pollution-related problems were continuing to mount, especially in the urban areas and surrounding regions.

To initiate an analysis of the key problems and an effective means of what TDM-steps might be taken to address them, NCDOT asked a cross-section of leaders from across

the state to join a working group, called a TDM Panel, to guide a statewide TDM study. The Panel membership was created by NCDOT under the direction of the Governor.

Figure 1: Statewide VMT Reduction Goal of 25% By 2009

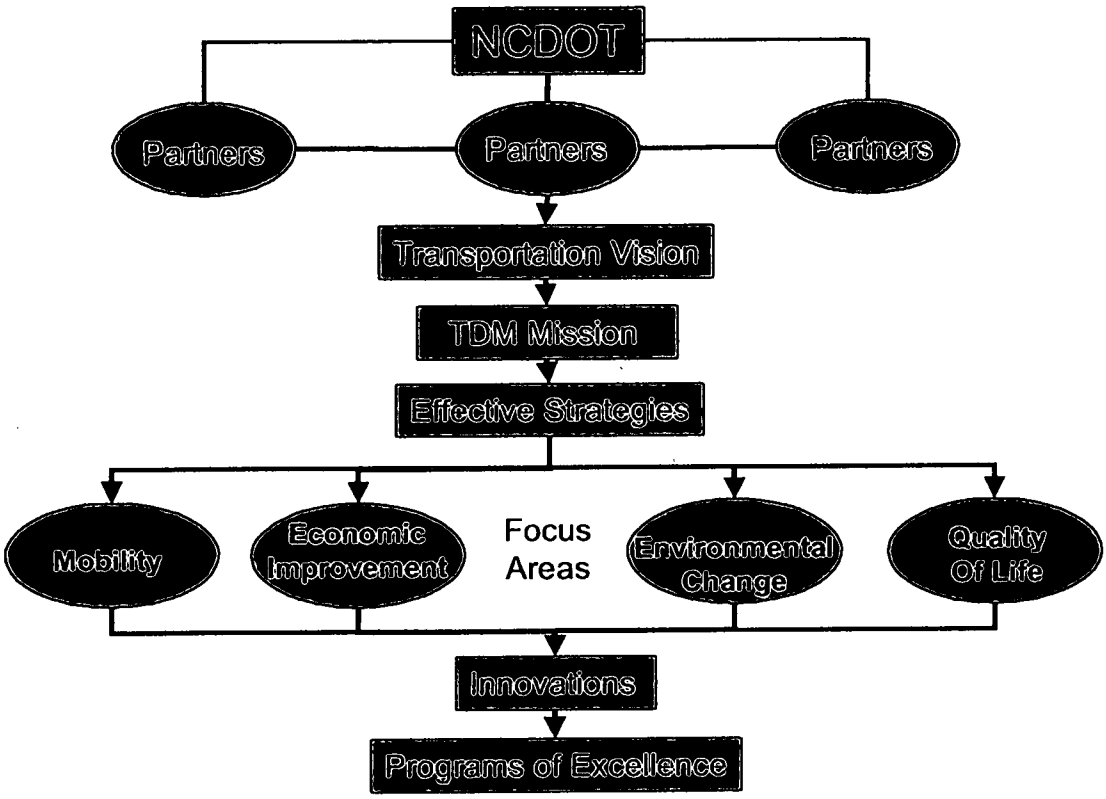


2.2 Leadership with a Purpose

The most successful TDM programs across the country are those with strong, defined leadership and enthusiastic, energetic champions at the helm. A visionary and innovative leader can arrange, facilitate, develop and informally coerce the necessary players into development of effective plans and programs. In addition, policies and programs can be created to support a well-defined TDM vision.

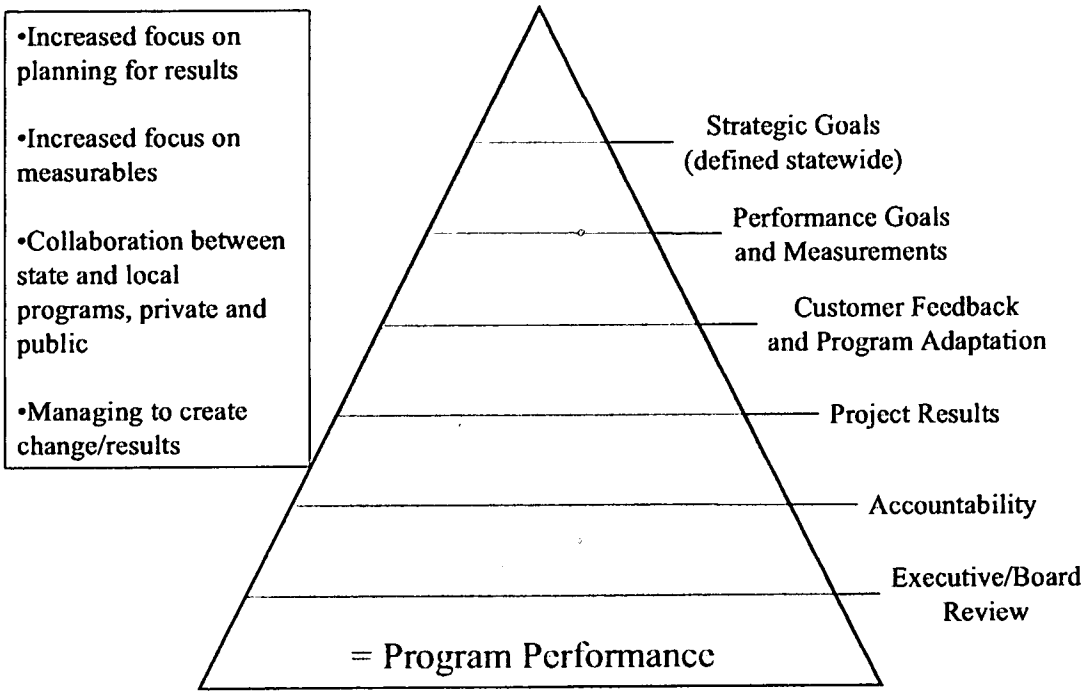
In the case of the NCDOT Statewide TDM Plan, it was important to create the leadership team (both champion and Panel) and then develop ideas for a mission and vision. New, overall program guidance, established first through a mission statement would (1) help establish an overall program direction (for a future Office of Commuter Assistance), (2) lend formality and direction to a statewide effort, (3) give a sense of purpose and defined need to the program, and (4) aid NCDOT in its assessment of future program outcomes. In addition, NCDOT could begin to link individual TDM/ridesharing program missions to its own, adjusting various program purposes and monitoring goals and objectives. This would be especially important as program performance goals were developed and funding decisions were formally linked to performance. The multi-dimensional plan was described as follows:

Figure 2: NCDOT/ TDM Program Structure



To begin to define and document the new program direction, a draft mission statement was prepared for NCDOT. The vision for the program, was introduced to the Panel and NCDOT staff, describing new roles, relationships and focus areas for the program (see **Figure 2**). These tools began to give definition to the program and added a strategic purpose for TDM. In addition, a Paradigm for Commuter Trip Management (see **Figure 3**) was developed which clearly illustrated steps required for development of a successful statewide program. Strategic goals, performance-based programming, customer feedback, project results, accountability, and an environment for continuous review were combined to produce a model for improved program results.

Figure 3: The Paradigm for Commuter Trip Management - Steps for a Successful Statewide TDM Program



2.3 Acting Now

Senate Bill 953 placed NCDOT squarely in a leadership role for improving Transportation Demand Management efforts in North Carolina. In partnership with the Departments of Administration and Environmental and Natural Resources, the Department was seeking ways to address TDM and effectively reduce NOx and VMT (vehicle miles traveled). The 25% reduction goal specified in Senate Bill 953 was aggressive, and to address this goal, a number of ideas needed to be considered to accelerate the planning and advocacy already underway.

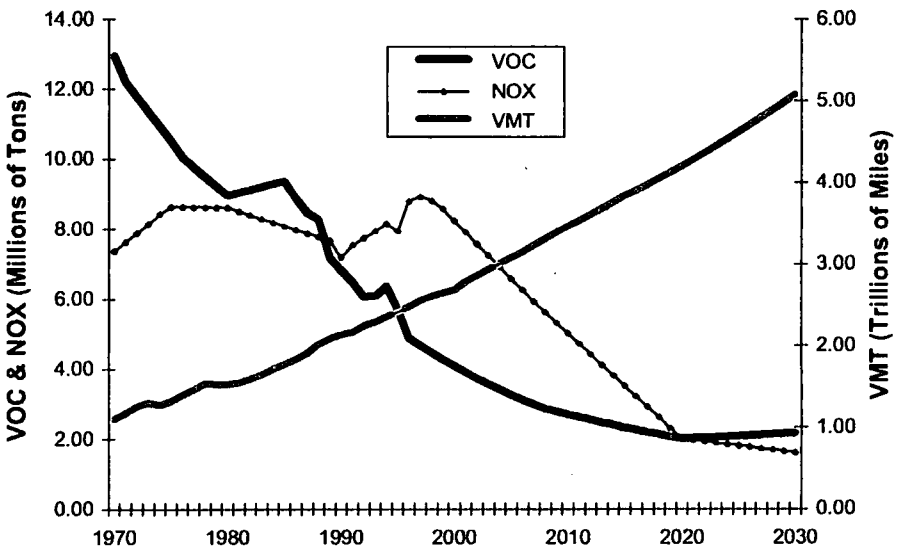
To begin, NCDOT wanted to focus on a series of congestion-reducing initiatives. Re-examination of the existing programs across the state, determination of levels of effectiveness, looking at the need to meet broader state goals and re-invigorating an older state government program for state employee TDM/ridesharing could produce a number of immediate results. Looking at innovation, incentives and more employer-focused programs was another way of strengthening program efforts and increasing impacts.

There were a number of reasons for choosing TDM as the mobility management tool for North Carolina at the current time.

1. Congestion has continued to mount, especially in the urban areas/regions and travel-related delays are increasing. **Figure 4** shows comparable national figures that indicate that we are driving twice as many miles each year compared to10 years ago.

   Since 1970, aggregate emissions traditionally associated with vehicles have significantly decreased (with the exception of NOx) even as vehicle miles traveled have increased by approximately 149%. NOx emissions increased between 1970 and 1999 by 16%, due mainly to emissions from light-duty trucks and heavy-duty vehicles. However, as future trends show, vehicle travel is having a smaller and smaller impact on emissions as a result of stricter engine and fuel standards, even with additional growth in VMT.

Figure 4: National Vehicle Miles Traveled (VMT) vs. Vehicle Emissions



Source: Statement of Senator Bob Smith, Environment & Public Works Committee Hearing on Transportation & Air Quality, July 30, 2002

2. Rising NOx, through its relationship to ozone, is directly responsible for the rising levels of asthma and other respiratory diseases nationally. Closer to home, nearly 30% of our North Carolina 6th graders suffer from asthma or other respiratory ailments, which are exacerbated by ozone.

Asheville youth has asthma

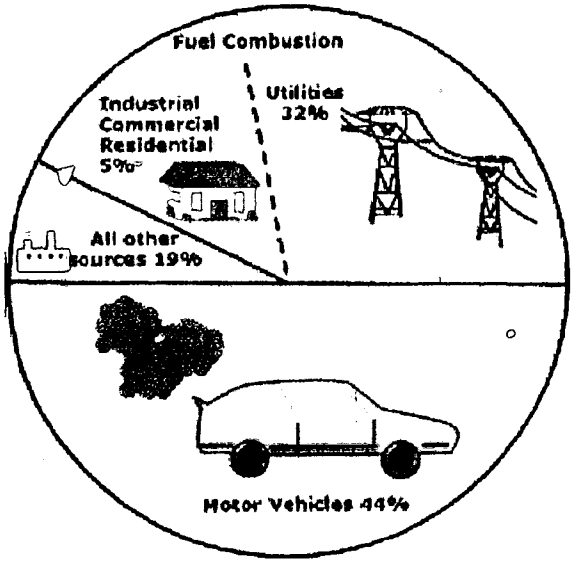
On days when air pollution clouds the view from his home in Murphy, Jeffrey can't play outside. Hear his mother Ronda Robberson explain how dirty air makes it harder for Jeffrey to breathe...

Degraded air quality makes it impossible for Jeffrey Robberson to play basketball.

Source: http://www.ibiblio.org/ncair/

High ozone levels in our air are now a documentable health hazard; **Figure 5** illustrates that auto emissions remain the largest source of NOx in the atmosphere.

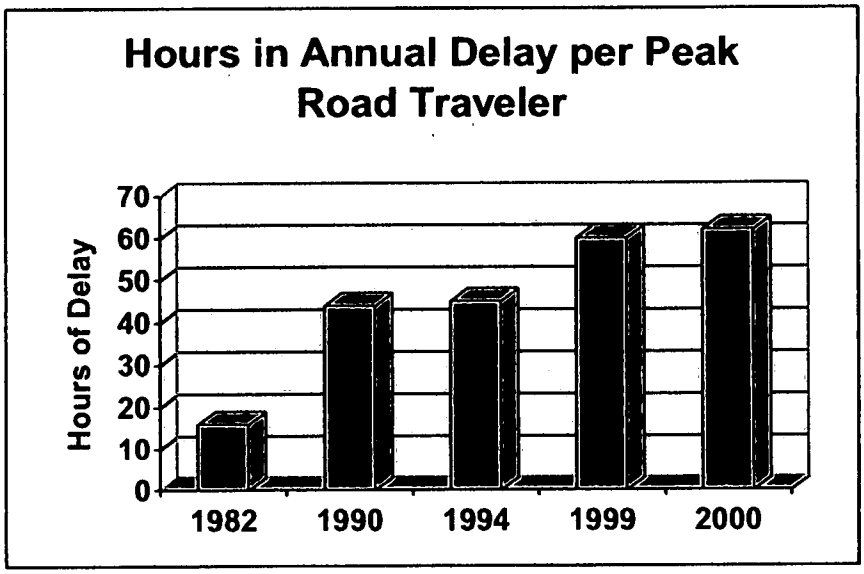
Figure 5: Sources of NOx



Source: http://www.ibiblio.org/ncair/index.php?page=ozone

3. Other mobility trends of concern relate to hours of delay, again associated with increased congestion. **Figure 6** shows that according to the 2002 Urban Mobility report from TTI, the average annual delay per peak road traveler climbed from 16 hours in 1982 to 62 hours in 2000 and delay in the same period quadrupled in areas with less than one million people.

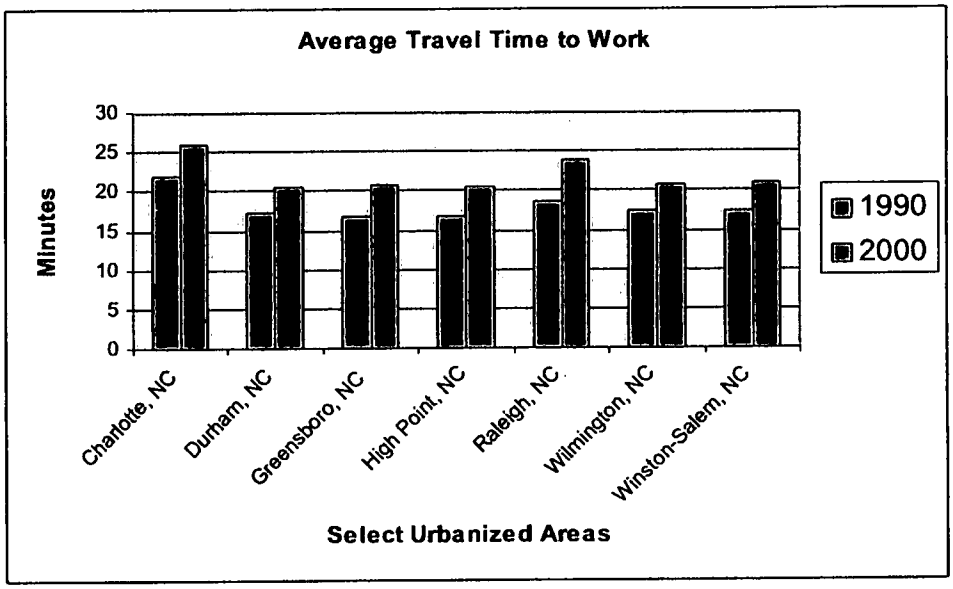
Figure 6: Hours of Delay



Source: ITT 2002 Urban Mobility Study

4. **Figure 7** shows that the three largest urban areas in North Carolina continue to face increases in commute-related delays adding to congested related delays and aggravating air quality. Significant increases in commuting times during the last decade occurred primarily as a result of the growth in vehicle miles traveled (VMT).

Figure 7: Average Travel Time to Work



Source: US Census

5. While road improvements have impacted congestion and curbed some air quality issues by allowing traffic to move along, travel time statistics continue to indicate increases. Nationally, travel time grew at about one-fourth to one-third as fast in areas where traffic volumes grew when roads were added. In other words, we cannot continue to rely only on building our way out of congestion and expecting those solutions to "solve" mobility or air quality problems.

3.0 SWOT ANALYSIS FOR STATEWIDE TDM PROGRAMS

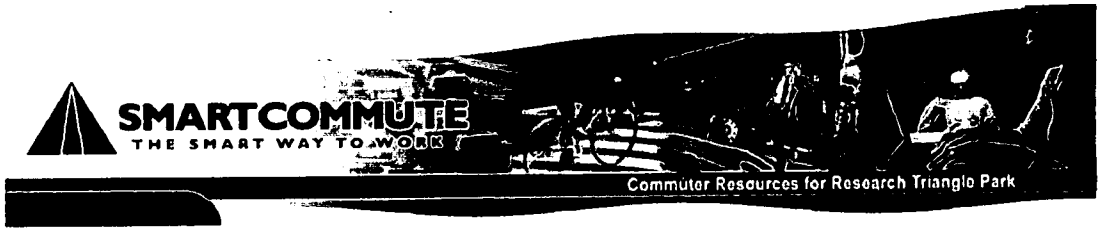
During January 2003, a series of interviews were held with key stakeholders, representing clients, board members and others from the various ridesharing and TDM programs across the state. The interviews provided information in addition to that already provided by the TDM coordinators themselves who were interviewed in the Fall of 2002 by ITRE as part of the initial evaluation of each existing program.

The results of this evaluation are summarized in this section of the report. A list of programs reviewed is provided below. The actual questionnaires from the interviews are in **Appendix B** and the list of participants is shown in **Appendix C** of this report.

Existing Programs
Smart Commute
Triangle Transit Authority
State Government Public Transportation Division Ridesharing Program
City of Wilmington
State Government Public Transportation Division Rural Jobs Access Program
Piedmont Authority for Regional Transportation (PART)
Programs under consideration
City of Asheville
City of Hickory

3.1 Existing Programs

3.1.1 SMARTCOMMUTE @ RTP



System Name	SmartCommute@RTP
Contact Information	Ms. Crystal S. Bunch Travel Demand Management Coordinator SmartCommute@RTP Research Triangle Foundation 2 Hanes Drive PO Box 12255 Research Triangle Park, NC 27709 Phone: 919.549.8181; Fax: 919.549.2846 Email: bunch@rtp.org
Year Formed and Brief History	Started in February 1999; hired ½ time person in fiscal year 2001 and full time person in fiscal year 2002
Geographic Service Area	Major employers within and adjacent to the Research Triangle Park
Services Delivered	Employer based programs; service provider enhancements; preferred parking; emergency ride home; transit subsidy; on site transit sales; telecommuting; vanpooling through Triangle Transit Authority
Annual Budget	Fiscal Year 2003 $80,500 funded by Durham and Wake County Research and Production Service District
Successes	2002 SmartCommute Awards Luncheon on October 4, 2002; development of website; completion of phases 1 and 2 initiatives and beginning work on phase 3; annual survey of employees;
Website	www.smartcommute.org
Mission	Provide information, coordinate support and resources to enhance and promote alternative commuting practices to proactively confront travel demand and environmental issues facing companies within Research Triangle Park.

The SMARTCOMMUTE program received "high marks" from the stakeholders who participated in the interviews. In general, the program was perceived as extremely proactive, and it is described as the appropriate forum for meeting the needs of the companies it represents.

The full-time TDM Coordinator is viewed as the biggest resource of the current effort. Staff is energetic and dedicated and credited with the success of current marketing efforts. All stakeholders viewed the brand name of "SMARTCOMMUTE" as an asset to the successful marketing of the TDM initiative.

When asked to describe three major accomplishments, those were summarized as (1) the first annual SMART COMMUTE awards program for companies, (2) generalized marketing activities, and (3) the increased participation of RTP companies in the program.

Strengths

- In general, those interviewed believe that the SMARTCOMMUTE program capitalizes on the Triangle's interest in commuting, and perhaps the previous problems with I-40 and other congestion-related locations. While they could not cite exact evidence of how this was accomplished, they believed that it was done through marketing.

- The telecommuting program is viewed as a major success, with 7% of the RTP employees participating. This is one of the strongest elements of the SMARTCOMMUTE program.

- The SMARTCOMMUTE program facilitates information-sharing between companies. Through regular meetings and direct working sessions and problem-solving efforts, the TMA meets the needs of its participating companies.

- The Durham County Trip Reduction Ordinance is viewed as a valuable, but under-utilized tool. The Ordinance needs to be more effectively marketed, more effectively used. Emissions results need to be marketed as well. The "natural" results between RTP companies and teleworking and environmental linkages need to be marketed.

Weaknesses

- There is limited transit service to the RTP, and existing services are not convenient enough to attract the choice rider that the Park employees represent. Travel time savings are not competitive to driving; services are not oriented to the needs or schedules of Park employees.

- Companies need to share their "lessons learned" and devise a TDM agenda and/or priorities plan for immediate implementation (with NCDOT and or others involved).

- There are conflicting goals between organizations representing the Park's transportation agenda. Who speaks for the Park when it comes to "congestion management"?

- There is an interest in having this program be more results-oriented, beginning with emissions information. Other sorts of statistics should also be monitored.

- The interest in the Commute Trip Reduction Ordinance also raises issues related to transportation and land use. Should the Park look for mechanisms that have more "teeth"?

Opportunities

- The Program is beginning to track new statistics and is interested in working with its employers to do so.
- From a marketing perspective, the Park never envisioned itself in any sort of "savior" role relative to air quality or congestion, but it is certainly willing to play a management role.
- Employers feel sense of responsibility and success with program efforts to date.

Threats

- Reductions in force have reduced what was once a major emphasis in TDM strategies and programs.
- Elected officials may also be somewhat indifferent to the air quality requirements, not yet realizing the "implications" or realizing the "realities" associated with Senate Bill 953. There needs to be some other way to orient key decision-makers.
- The RTP development pattern is one of lower density and plentiful parking. This may need to be revisited to make TDM-based decisions work (EPA example).
- Streets have not been conducive to the use of alternatives such as bicycles.
- There is worsening air quality and increasing congestion—particularly in locations such as I-40.
- Other issues that the stakeholders wanted to be sure were communicated included the (1) need for an expanded version of "best practices" that could be used beyond the RTP. There was the suggestion for adoption of the (2) Wake County version of the Commute Trip Reduction Ordinance and the (3) consolidation of the CAMPO and DCHC organizations for a "single voice" in regional transportation.

3.1.2 Triangle Transit Authority

Triangle Transit Authority
PO Box 13787
Research Triangle Park, NC 27709
(919) 549-9999
Fax: (919) 485-7441

System Name	Triangle Transit Authority
Contact Information	Mr. John Tallmadge Commuter Resources Interim Manager Triangle Transit Authority PO Box 13787 *Research Triangle Park, NC 27709* Phone: 919.485.7430, Fax: 919.485.7441 Email: jtallmadge@ridetta.org
Year Formed and Brief History	*1980 was formed as part of the National Ridesharing Demonstration Project as the Triangle area program located in the Triangle J Council of Government; Vanpool Program started in 1985; TTA was chartered on December 1, 1989 and ridesharing / vanpooling was the first service offered in 1991;*
Geographic Service Area	Cities: Raleigh, Cary, Durham, Chapel Hill *Counties: Wake, Durham, Orange and surrounding counties*
Services Delivered	Vanpool Matching and Vehicles (employers subsidizing) Guaranteed Ride Home Preferential Parking Employer based Commuter Benefits Bike racks on buses in region Telecommuting Compressed work week / staggered work hours UPass program with NC State University *Transit Information*
Annual Budget	Administrative Budget: $484,751 FY 03 ($242,375 from NCDOT PTD)
Successes	*Staff and manage Commute Trip Reduction program for Durham County; 47 vanpools operating in June 2002; integrated with transit services and provides marketing for all modes of transportation; lead in the procurement / implementation of a regional web-based trip planning application and web-based rideshare matching application*
Website	www.ridetta.org
Mission	To plan, facilitate, and promote, for the Greater Triangle Community, an affordable, customer-oriented public transportation network which provides mobility, promotes economic opportunities, and protects the environment.

The Triangle Transit Authority Program was characterized by those interviewed as providing vanpool information and related services and working with major employers throughout the region. The staff also markets transit services to companies and provides "lunch and learn" sessions to employers and employees. Significant staff time is devoted to the administration/review of the Durham County Trip Reduction plans submitted by those employers in Durham County.

In providing descriptions of major accomplishments of the TTA program, those interviewed described the administration of the Durham Ordinance and the employer assistance provided by the TTA staff in meeting the Ordinance requirements. The completion of the regional rail study (EIS) and the I-40 HOV Feasibility Study were also cited as major accomplishments.

In discussing ways that the program receives political attention or recognition, those interviewed stated that the TTA Board is composed of a number of elected officials and that they convey TTA's various activities and priorities to other elected officials. The ridesharing/TDM work was not specifically mentioned.

There seems to be a good relationship with local traffic reporter Mark Roberts who was described as frequently mentioning TTA and the commute alternatives sponsored by their various programs.

Strengths

- The provision of vanpool and ridematching services have been important service priorities for TTA. There is a planned implementation of an on-line matching service in the near future.

- There is good staff leadership and strong staff/Board relationships at this organization, although the relationships do not reflect specifically on the ridesharing and TDM programs.

- Broader regional cooperation has been illustrated through the work of TTA on its regional rail project and through such projects as the Mayors Transportation Alliance.

Weaknesses

- The dominant work activity for the program has been the planning for the regional rail project.

- The existing transit services are not convenient enough to attract the choice rider, especially those from the Research Triangle Park. Travel time savings for alternatives as they currently exist are not competitive to the single occupant driving public.

- There are confusing connections between the TTA local transit operations that further discourage transit usage in the region.

- TTA does not operate services in the Research Triangle Park.

Opportunities

- There is interest in some sort of merger or integration of transit services in the Triangle Region.
- Wake County has an interest in a Trip Reduction Ordinance.
- There is a growing interest in the relationship between land use and transportation. The region is facing continued growth and problems with a number of related issues and "transportation solutions" could be the meaningful answers.

Threats

- There are increasing costs associated with the provision of public transportation services in the (region) (state).
- Potential funding crises at all levels of government have a negative impact on TDM and transit initiatives.
- Indifference on the part of elected officials and citizens in meeting the air quality and related goals may negatively impact the Triangle's quality of life and economic "position".
- There is a lack of unified leadership for the region concerning this subject (TDM amd related matters). Who speaks for TDM?
- Continuing on a path of predominantly highway construction only reduces the need for and opportunity for TDM's success.
- There is plentiful parking within the Research Triangle Park.
- Streets within the Triangle have not been designed in such a way as to be conducive to bicycle commuting.
- In addition to these issues, there are the parallel issues of worsening air quality and increasing congestion in the region. I-40's traffic has been particularly problematic.
- The stakeholders involved in this discussion and these interviews suggested more aggressive employer/employee education concerning the benefits of TDM measures and better information describing what is really important to commuters in selecting their travel choices.

3.1.3 State Government Public Transportation Division Ridesharing Program

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

System Name	Public Transportation Division Ridesharing Program
Contact Information	Ms. Tamra Shaw Transportation Planner Public Transportation Division NC Department of Transportation 1550 Mail Service Center Raleigh, NC 27699-1550 Phone: 919.733.4713 x 238, Fax: 919.733.1391 Email: tshaw@dot.state.nc.us
Year Formed and Brief History	Late 1970s received an FHWA National Ridesharing Demonstration Project Grant and began programs in the three major metropolitan areas of the state (one program in the Triangle (TJCOG), one program in Charlotte (CDOT) and three in the Triad (Greensboro, High Point, Winston-Salem); Currently, NCDOT–PTD supports two types of TDM programs: administrative (pays 50% of administrative support for the programs in Charlotte, Triad and Triangle regions) and start up (Wilmington);
Geographic Service Area	State of North Carolina, primarily focused on major metropolitan regions
Services Delivered	Funding Technical Support Planning
Annual Budget	FY03 $995,826 (state funds $497,913)
Successes	One of the first programs in the country; Technology funding for web based applications;
Website	http://www.ncdot.org/transit/transitnet/
Mission	It is the mission of the Public Transportation Division, in partnership with other public and private entities to support and promote the availability of high-quality public transportation services and partnerships throughout the state by delivering funding, technical assistance and leadership.

NCDOT's role in ridesharing and TDM activities is currently focused primarily on administration and management of the programs that exist locally. Technical assistance has been provided through direct support and consultant contracts.

The Triangle Transit Authority provides vans for vanpooling to the NCDOT offices, and NCDOT has an extensive flextime program, but flexible scheduling is not broadly promoted nor is it encouraged by all offices of state government.

NCDOT's TeleDOT (teleworking) program is being used by employees, but primarily on a part-time basis. Preferential parking is provided for those employees who carpool, but the program is promoted on a limited basis.

The Office of State Personnel/Department of Adminstration's pilot program for teleworking included more than 250 employees from several state agencies. There were several components of this program that could prove to be workable and expandable for a larger effort.

Overall, the public transportation services and TDM initiatives within state government continue to be a difficult product to sell and market to the senior management and higher ranking officials within Raleigh. Marketing TDM and commute benefits totally on the basis of convenience will continue to be a "difficult sale".

The major accomplishments of the state government program include (1) assisting with the development of the SMARTCOMMUTE Program, (2) assisting in the development of the Durham County Trip Reduction Ordinance, and (3) establishing the UNC-Chapel Hill TDM Program.

NCDOT has begun to think more strategically about the need for political and public support of its TDM efforts. Through its (1) support of the Department of Administration and State Personnel Teleworking program, and by examining the (2) need for Trip Reduction programs throughout the state, NCDOT is broadening its potential role in TDM. NCDOT is also encouraging the inclusion of TDM strategies in the Urban Area Long Range Plans.

Strengths

- The TDM initiative assists in the maximization of highway capacity during peak periods with a focus on moving people rather than moving vehicles.
- The NCDOT employees enjoy the teleworking program because of the convenience and time-saving aspects.
- NCDOT employees enjoy flextime because of the scheduling flexibility that results. The opportunity for a 4-day workweek reduces time spent commuting by 20%.
- There are estimated savings for state government in reduced office space requirements, equipment and associated costs, if the telework program can be successful, and then expanded. In 1996-97, the cost estimate was $21M if 1% of state employees began to telework.

- TDM programs have documentable health benefits and improvements to recruitment and retention goals. These are qualities that state government should "advertise".

Weaknesses

- Many state managers do not support teleworking, flextime and other TDM initiatives, so only a limited number of state employees are participating.
- There is a poor understanding among state leadership of the benefits of TDM and public transportation.
- TDM strategies are not being incorporated into state policies, long range plans and similar initiatives.
- System upgrades may be needed to accomplish a telecommuting program.
- The provision of employee parking in downtown Raleigh that is so inexpensive and so readily available is a deterrent to employee participation in commuting alternatives.

Opportunities

- Expanding/resurrecting TDM programs to encourage interested employees and embrace others will begin to establish NCDOT and other departments of state government in a leadership role.
- There will be benefits to recruitment and retention and positive morale for state government as an employer, through this unique transportation program.
- There is an opportunity to partner for successful program efforts with TTA, SMART COMMUTE and the companies in the Research Triangle Park.

Threats

- Increasing parking costs for state employees could be negatively received unless the TDM "package" includes a number of convenient TDM alternatives.
- To make any initiative involving state employees successful, there will likely be a need to focus on multiple actions: the amount of time devoted to commuting, the resources "used" by traffic congestion (and therefore saved by the improvements), and the resulting savings that various departments will produce by participating in various programs such as teleworking, etc.

3.1.4 City of Wilmington

City of Wilmington

System Name	City of Wilmington
Contact Information	Ms. Lawless Bean Transportation Demand Management Coordinator Development Services / Transportation City of Wilmington PO Box 1810 305 Chestnut Street Wilmington, NC 28402-1810 Phone: 910.341.3258; Fax: 910.341.7801 Email: lawless.bean@ci.wilmington.nc.us
Year Formed	Program started in 2001 and a coordinator hired in early 2002
Geographic Service Area	City: Wilmington Counties: New Hanover and surrounding counties
Services Delivered	Input from an employer group and advisory board; working to define roles and the services to be delivered; interfacing with the rural jobs access initiative in New Hanover County; vanpools will be provided by the third party contractor already working in Wilmington;
Annual Budget	First Year $60,000
Successes	Planned and started operation of transit services for the UNC-Wilmington community and a shuttle service for Corning employees that was open to the public; produced a TDM video; developed an employer services brochure; created work priorities with the employer group; currently surveying 14,000 employees to ascertain services needed;
Website	
Mission	Establishing an on-going employer-based coalition that will define and implement TDM initiatives which will enhance and / or maintain the high quality of life for their employees and the community at large.

The Wilmington TDM program is employer-based. Its major success story with TDM began with the Corning shuttle, demonstrating a public/private partnership for transportation service involving the City, NCDOT, Corning and Wilmington Transit.

Currently, the employer transportation group is focusing on a park and ride project involving express bus service from Monkey Junction.

There is growing awareness within the community of the issues surrounding the land use and transportation "connection". New ordinances will require the provision of sidewalks with new construction, and there is possible interest in a Trip Reduction Ordinance similar to Durham County's.

In terms of accomplishments, the hiring of a full-time coordinator was viewed as important to all stakeholders interviewed. The coordinator has been as integral part of the Program's continued progress. The other items cited as accomplishments included the (1) activation of the Corning shuttle, (2) the operation of the Downtown Trolley, the (3) geocoding of the employee surveys, the planning for the Monkey Junction park and ride service, and (4) the expansion of the TDM employer group to iinclude additional employers.

To achieve political or public recognition, the program obtains media coverage of its special activities through activities like the launching of the Corning shuttle. The TDM coordinator periodically attends the WTA Board meetings, and there has been a video prepared produced for marketing the TDM program, but it has not yet been distributed/released.

Strengths

- The establishment of the full-time TDM coordinator position based on NCDOT funding, has helped focus program efforts and bring employer-based activities together with a defined purpose. As a result, there is a better understanding among the TDM employer committee members about their direction and what needs to be accomplished with their program.
- There is good cooperation between the WTA staff and the TDM Coordinator.
- There is an excellent GIS system that can be used for geo-coding and establishing employee trip origins/destinations.
- There is the possibility of purchasing ridematching software to assist in car and vanpool matching and the provision of transit services.

Weaknesses

- There is inadequate funding for both the transit and TDM programs, making it difficult to serve the needs identified by the employer groups and the community.
- Existing transit services are not convenient enough for the choice riders, resulting in the perception that the system is for the lower income citizens in the community.
- There is limited communication and marketing of the TDM effort.

- There has been poor cooperation between Wilmington and New Hanover County, complicating matters like the regional transportation initiative that could result in more services and more efficient services for the community.

Opportunities

- Consolidation of city and county transportation/transit services is under consideration and service improvements could be an outcome.
- There is increasing public concern over worsening traffic congestion and the possible impacts on Wilmington's quality of life.
- There are opportunities to coordinate with Brunswick and Pembroke Counties and to provide regional connections through improved services.
- There are opportunities to expand TDM and transit marketing in conjunction with WTA's adoption of a new logo and purchase of new buses.
- More employers are being added to the working group representing a broader group within which to "sell" TDM.

Threats

- The local government in Wilmington faces financial constraints that could impact TDM *and* transit funding.
- The loss of state funding could impact the TDM program.
- Turf-related issues could break-down the cooperation in several areas.
- There could be declining interest in TDM among the major employers for any number of reasons (economic changes, as an example).
- The shuttle service demonstration or the express bus service demonstration could fail.
- In addition to these items, Wilmington has several congestion "hot spots" that need to be monitored but no specific plans for addressing these locations or monitoring their problems has been planned. Castle Hayne Road is one of those problem areas.
- The ability to monitor the performance of the TDM program is also of concern. There should be "quantifiable" information for the program that can be reported to elected officials, employers and other key community stakeholders.

3.1.5 Rural Job Access

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

System Name	Public Transportation Division Rural Jobs Access Program
Contact Information	Mr. Charles Glover Assistant Director for CommunityTransportation Public Transportation Division NC Department of Transportation 1550 Mail Service Center Raleigh, NC 27699-1550 Phone: 919.733.4713 x 277, Fax: 919.733.1391 Email: cglover@dot.state.nc.us
Year Formed and Brief History	In April 1999, awarded a Job Access & Reverse Commute Grant from the Federal Transit Administration; focus is to support a statewide rural vanpool program and a subscription commuter service program;
Geographic Service Area	State of North Carolina, primarily focused on getting people in rural areas to work
Services Delivered	Vanpool Matching and Vehicles (employer subsidies) Guaranteed Ride Home Preferential Parking Employer based Commuter Benefits
Biannual Budget	$495,000 Job Access & Reverse Commute Grant from the Federal Transit Administration – matched with $495,000 from NCDOT Work First Employment Transportation Demonstration funds
Successes	9 vanpools in operation in Oct 2002; contract with 3rd party vanpool provider for vehicles and administration;
Website	http://www.ncdot.org/transit/transitnet/
Mission	It is the mission of the Public Transportation Division, in partnership with other public and private entities to support and promote the availability of high-quality public transportation services and partnerships throughout the state by delivering funding, technical assistance and leadership.

The focus of the Rural Job Access program is the provision of vans for vanpool services within areas of the state where traditional public transportation services do not currently exist, or in areas where the vanpool services can augment those services being provided by a traditional public transportation services provider. The program works alongside health and human service agencies and others to meet the needs of employers and their employees in counties with significant unemployment.

The Rural Job Access Program has been beneficial to the Soffe plants in Maxton and Lumberton. The program has also provided vans for the Tyco plant near Rocky Mount and Harnett County.

This program presents a good option for persons commuting long distances to rural employment sites. The vanpools generally serve work shifts more efficiently than rural transit (employees often arrive to work earlier and stay at work later than the bus schedule allows).

The major accomplishment of the program includes the (1) contracting with 2Plus for the provision of vans so that vehicles for pooling can be provided quickly to those employers/employees desiring to participate in vanpooling. 2Plus also provides the management, oversight, maintenance and operation of these vehicles.

By working locally with the Departments of Social Services, Employment Security Commissions and others, the program works to develop improved partnerships for the provision of transportation services in rural areas.

Strengths

- This program reduces the number of single occupant vehicles traveling to and from job sites, helping to control emissions and manage parking-related problems.
- The program provides an affordable transportation option for lower-income persons and those without cars or valid driver's licenses so that they can get to and from work.
- The program improves communications between agencies seeking jobs and those employers needing workers. The transportation "broker" provides a much-needed service.
- The 2Plus contract provides "peace of mind" for companies and agencies interested in the alternatives to driving and for those with employees who have no automobiles.
- The vanpooling alternative represents a dependable option for long-distance commuters, improving on-time performance and overall productivity.
- Vanpooling has been proven to be a stress-reducing, employee-favored benefit. With experience, the program can grow.

Weaknesses

- It is sometimes difficult to find the vanpool drivers with the required/acceptable driving record.

- Using drivers with poorer driving records raises insurance costs, which increases the vanpool program operation costs (to users and to NCDOT).

- Inadequate marketing materials (brochures, explanatory information) and inappropriately decaled vehicles may hamper the programs effectiveness and the total understanding of the program by those currently involved and those that could become involved.

- Poor communication of the program problems/successes within NCDOT, the Department of Health and Human Services and others involved limit the understanding of how the program works. Similarly, there may be a need to make adjustments to the program and all players need to assess the effort routinely.

Opportunities

- Improved awareness of the program by employers and agencies could increase the vanpool program use. There does not appear to be a strong marketing program.

- Use of existing vanpool participants in a peer-to-peer marketing approach would be another way to spread the word about success and market within the rural jobs community.

- The Rural Jobs Access Program should be linked to marketing initiatives in every city and town and every department where an active program "lives"...through the DSS's, through the transit systems. Perhaps a demonstration could begin in Wilmington, linking vanpooling to rural jobs access and WTA.

Threats

- The economic downturn has created fewer and fewer employment opportunities so the "natural" linkages for the jobs access may be limited. How can the "broker" (2Plus) be guaranteed a link to jobs and to the provider of jobs in each community?

- The loss of federal and state funding for Rural Jobs Access and related activities (TANF, TEA 21) may threaten the overall welfare-to-work emphasis/interest at the local levels.

- There is a continuing lack of DSS cooperation within many counties, and NCDOT cannot force agency participation. Without this support, the program loses its original intent and purpose.

3.1.6 Piedmont Authority for Regional Transportation (PART)

System Name	Piedmont Authority for Regional Transportation
Contact Information	David Morris Operations Manager Piedmont Authority for Regional Transportation 100 West 5th Street Winston-Salem, NC 27101 Phone: 336.727.2003, Fax: 336.748.3072 Email: davidm@partnc.org
Year Formed And Brief History	1980 was formed as part of the National Ridesharing Demonstration Project as one of three programs in the Triad. In 1982, the High Point and Greensboro programs were merged. Vanpool Program started in 1984. In January 1995, the Greensboro and Winston-Salem programs merged. With the formation of PART in 1998, the ridesharing vanpool program was the first service to be offered by PART in June 2000.
Geographic Service Area	Cities: Greensboro, High Point, Winston-Salem Counties: Guilford, Forsyth, Alamance, Rockingham, Davidson, Randolph and their surrounding counties
Services Delivered	Vanpool Matching and Vehicles Guaranteed Ride Home Preferential Parking / Free Vanpool Parking Employer based Commuter Benefits Bike racks on buses in region Shuttle service for construction sites Transit Information
Annual Budget	Administrative Budget: $305,704 FY 03 ($152,852 from NCDOT PTD)
Successes	Oldest vanpool program in NC; won 1985 Federal Highway Administrator's Award for Ridesharing; 58 vanpools operating in October 2002; integrated with transit services and provides marketing for all modes of transportation; first 511 implementation in NC (fall 2003);
Website	www.partnc.org
Mission	To enhance the quality of all forms of transportation for each of our citizens through efficient use and protection of our natural, economic and human resources.

PART is involved in the comprehensive provision of ridesharing and vanpooling and markets services throughout the region. Their vanpools are visible throughout the region and, the PART Express service to the Airport represents the first regional service of its kind in the area.

Vanpooling continues to be an integral part of the ridesharing program, although the number of vans in active operation as gone up and down over the last few years.

The major accomplishments of the PART program have focused on the (1) start up of the PART Express, (2) the new PART Connections (out-of-county medical trips) and, (3) the construction of a new regional passenger station at NC 68 and I-40. Completion of the high speed, intercity rail and Major Investment Studies for the region were also significant activities. Pursuit of the rental car surcharge to support PART was a critical activity, and there was continued progress in the coordination of planning performed by the local MPO's.

PART receives political and public recognition through the work of its Board. It is well represented by elected officials and member jurisdictions. Board members convey PART activities to other elected officials through peer-to-peer communications.

Media coverage of special events is good, such as the PART Express kick-off.

Strengths

- The political composition of the PART Board facilitates the buy-in and support of member jurisdictions.
- There is good leadership and a good working relationship with the staff and Board.
- Regional cooperation continues to increase.
- The rental car tax, as a funding source for transportation initiatives, is working with minimal political implications.

Weaknesses

- No transit services exist in the suburban areas.
- Existing transit services are not convenient enough to attract the choice riders.
- Vanpool services have received mixed reviews from the marketplace, resulting in up and down formation rates. The economy has not helped this situation.

Opportunities

- There is a growing awareness of the relationship between transportation and land use.

- PART has an increasing role in regional transportation planning and travel demand modeling.

- There is increased public awareness of worsening air quality and highway congestion in the region.

Threats

- There is a lack of public support for TDM/transit based on overall use/understanding of the program and key issues.

- Funding needs to be more permanent, and it will have to be greater to support major transit initiatives.

- There has been limited media coverage of PART's efforts and a stronger marketing and media program is needed to build the overall program.

- There has been a breakdown of regional cooperation resulting from "turf protection", and for the PART program to succeed, this turf-related battling needs to be resolved.

- In addition to the information described above, those interviewed described the need to have more qualitative information about TDM and the PART program. Only the vanpool program statistics seemed to be in the memory of most, and that information was not easily remembered by many of those interviewed.

- Savings from the various transportation initiatives would be an important fact to be known by local elected officials and PART Board members.

- Steps being taken by PART to remedy congestion should be specifically identified.

- It is important to continue the TDM program advocacy, but the program may need to be re-identified and it may need more support from elected officials.

3.2 Programs under consideration

3.2.1 City of Asheville

Prior to participation in this statewide TDM Plan effort, Asheville had not paid too much attention to TDM or the need to look at the VMT and air quality "numbers" as they relate to growth strategies and NOx. They had related most of their air quality and vehicle trip reduction strategies to their Smart Growth Planning, incorporating some important changes to recent zoning ordinance modifications and plans for mixed use developments.

At the current time, Asheville is using their "urban village" zoning classification and their neighborhood corridor district as mechanisms for dealing with the need to infill and "refill" select locations, encouraging certain kinds of development. Higher density, mixed use developments offer opportunities to reduce dependence on the automobile.

While there is no formally adopted air quality assessment, or policy to deal with air quality, several steps have been taken to assure a positive impact on traffic. Fewer

vehicle miles traveled is a goal. Improving the transit system is a goal. Transit and land use integration as described in the 2025 Plan should become a major goal for further public action.

The I-26 Connector project is going to present an opportunity for the community to "test" its ability to move traffic under a variety of conditions. TDM and public support for alternatives could be a part of this effort.

In the downtown area, there is business interest in the "traffic-related" issues. The scarcity of parking and parking management are important. How to deal with the issues that are important to the University and the Hospital, as major employers (and as businesses), would be important to next steps in transportation. If TDM could present strategies that would address these issues, this would be appealing to the community.

Asheville Transit System could do a number of things to address the priorities identified in Senate Bill 953. Steps might include (1) broadening coverage of the system, (2) maximizing service into select areas, and (3) improving/expanding services regionally. There is an interest in focusing on a variety of tools and services, but new funding would be required.

There is the belief that the public recognition of the transportation "predicament", including the air quality situation, is well understood in Asheville. An understanding of the solutions may not be so clearly understood. Possible solutions, including TDM programs, will need to be well defined in order to be well received by the community.

Innovative approaches are likely to be successful in Asheville. There was discussion of a fare-free transit system like in Chapel Hill, along with other measures to improve transportation system performance. Incentives were discussed along with their importance to TDM's success.

3.2.2 City of Hickory

The opportunities for program development in the Hickory area clearly lie with air quality and ozone reduction-related goals. TDM strategies could be part of the long-range planning currently being done by the Western Piedmont Council of Governments and by Catawba County, and the Early Action Compact would be an excellent "place" to begin to define TDM as a solution for air quality problems in the 4-county region.

Problems hampering Hickory's TDM program development in the past have included limited traffic congestion and limited peak hour problems that would serve as motivators for employer interest or motivators for community participation, a lack of large employers with parking, access or circulation problems, and a failed "first attempt" to launch vanpooling in the area.

Since air quality remains an issue, Hickory is willing to take another look at TDM programs, perhaps looking at incentives and ways to link TDM to development and "smart growth". There is an interest in linking the program to ridesharing services through their existing transportation program at the City. The City is interested in looking at a number of models for lowering VMT, especially where transit services can be improved through better planning. Alternative fuels, the use of school buses and improved signal timing are just a few possible improvements that the City is interested in exploring as part of TDM planning.

3.3 SWOT SUMMARY CONCLUSIONS

SMARTCOMMUTE @ RTP

- Employers Want TDM to Succeed
- CEO Participation has Disappeared
- Energetic Staff
- Accomplishments are Marketing-Related
- Increased Telecommuting is Greatest Behavior Change
- Limited Transit Services Hamper Choice Ridership
- Program Needs to Focus More on Results
- Durham Ordinance is Valuable but Underutilized
- RTP Development Pattern is "Anti-TDM"
- No Clear Transportation "Spokesperson" in RTP

Triangle Transit Authority (TTA)

- Transit Marketing to Employers is Significant Activity
- Vanpool & Ridematching are Traditional Strengths
- Little Growth in Vanpool Numbers
- Administration of Durham Ordinance is Major Effort
- TTA Board/Political Relationships are Strong
- Growing Awareness of Land Use/Transportation Linkages
- Lack of Public Understanding of TDM
- Continuing Preference for More Highways
- Little Focus in Meeting Air Quality Goals

Piedmont Authority for Regional Transportation (PART)

- Markets Vanpooling & Ridesharing in Triad Region
- Number of Vanpools has Fluctuated
- TDM Should be Elevated to Board Level
- Limited Transit Services Hamper Choice Ridership
- Growing Awareness of Land Use/Transportation Linkages
- Lack of Public Understanding of TDM
- Need to Quantify TDM Program Results

City of Wilmington

- Employer-Based Program with Some Successes
- Full-time TDM Coordinator has Focused Efforts
- Current Initiative is Express Bus/Park & Ride
- Limited Transit Services Hamper Choice Ridership
- Growing Awareness of Land Use/Transportation Linkages
- Limited TDM Communications/Marketing
- City/County Relations Threaten TDM Initiatives
- WTA's "New" Look Could Help TDM Program

City of Asheville

- Trip Reduction Strategies Tied to "Smart Growth"
- Growing Awareness of Land Use/Transportation Linkages
- Potential for Linking TDM to Zoning
- TDM Potential in Downtown and I-26 Connector
- Funding Needed to Expand Bus/TDM Services

City of Hickory

- TDM Strategies are in Long-Range Plan
- Potential for TDM as Part of Air Quality Actions
- TDM Strategies Could Appeal to Hospitals
- Lack of Employer Interest in TDM
- Growing Awareness of Land Use/Transportation Linkages

State Government

- Teleworking is Limited but has Appeal to Employees
- Flextime is Not Widely Promoted
- TDM Is a "Tough Sale" to State Employees
- Partnership Opportunities with TTA and RTP
- NCDOT Should Promote TDM Benefits to Leadership

Rural Job Access Program

- Serves Long-distance Commutes in Rural Areas
- Benefits Counties with High Unemployment
- Third-Party Operator Facilitates Vanpool Creation
- Integrates Employment & Transportation Objectives
- Need to Create Program Identity
- Need to Improve Marketing Efforts
- Need to Quantify Program Results

Overall SWOT Themes

- Limited Transit Services Hamper Choice Ridership
- Growing Awareness of Land Use/Transportation Linkages
- Lack of Understanding of TDM Benefits
- Need to Quantify TDM Program Results
- NC Program Focus is Support of Alternative Modes

4.0 GUIDELINES FOR DEVELOPING A TRANSPORTATION DEMAND MANAGEMENT (TDM) PROGRAM FOR NORTH CAROLINA

The SWOT analysis and stakeholder interviews provided information and feedback concerning the existing ridesharing programs in North Carolina. It was clear that more could be done to strengthen these programs and improve stakeholder understanding of TDM and various program efforts.

The North Carolina Department of Transportation (NCDOT) has an opportunity to build upon current ridesharing programs, broadening their efforts to include more than just planning and advocacy. Improving current programs will require more leadership and training and improvements that yield meaningful impacts to congestion and mobility across the state. The State will need to partner with DENR and others on programs that will positively impact air quality and vehicle trip reduction goals. To achieve significant results, there will need to be a new focus on program performance and accountability. Changes to marketing and specific program elements, such as vanpooling, can be expected.

Because commuters often make their travel decisions, choosing times, routes and modes based on what works for them, NCDOT and its ridesharing/TDM programs need to focus on improving commuter choices, benefits and incentives. The following "Guidelines" have been developed to illustrate a mix of actions that could be undertaken by NCDOT and the local programs in several areas to improve TDM statewide.

4.1 Establishing a Case for TDM: Goals, Objectives, and a Clear Mission

1. *NCDOT needs to develop a clear compelling body of evidence for the value of applying and carrying out TDM strategies.*

- The evidence is clear that commuters use carpooling, vanpooling, transit, alternate work hours, and other TDM strategies when these options meet their needs, usually measurable in terms of travel time and cost but also in terms of availability of travel modes.

- There are clear reasons for North Carolina commuters to use TDM strategies today. With rising gas prices and compelling air quality conditions in a number of communities, motivations are stronger than they were 30 years ago.

- Some commuters will use transit because it is their best choice; some use carpools because they gain convenience; and some use vanpools to save money.

- More such reasons to use TDM strategies can be created through development of high occupancy vehicle (HOV) lanes, increased transit service, land use planning that integrates transportation considerations, increased TDM services, and a wide range of strategies. When commuters believe they will be better off by using modes other than single occupant vehicles, they act accordingly.

- When employers conclude that it is in their self-interest to provide commute alternatives, they act accordingly. A number of best practices references are available nationally, but North Carolina needs to create its own reference guide for this sort of information.

- It will be essential for NCDOT and its partners to demonstrate the value of TDM and to create benefits for commuters.

2. *TDM needs a distinct identity tied to specific and prominent statewide goals and objectives.*

- To begin this effort, NCDOT worked with its TDM Panel to develop the mission statement for a TDM initiative, but this needs further refinement and the entire program needs an easily recognizable name. During the marketing portion of this study, the mission statement and name will be examined further, but NCDOT should consider an extensive plan for marketing all congestion-mitigating forms of transportation, promoting the programs and the achievements across the state.

- NCDOT should work to elevate the TDM initiative internally and externally, specifically integrating the program into all of its long-range planning and key program efforts.

3. NCDOT should develop a clear statement of the goals for commuter transportation (and for other trip purposes) that provide the framework within which TDM must operate.

- These goals need to consider mobility, air quality, energy, and related topics. The State's program should define outcomes that accomplish results that best meet the various needs.

- The three urban area programs, the rural program, and, perhaps other programs, should be covered by this broader framework. Targets should be established that each program can work toward, developing results that are in the State's interest. This should lead to new operating plans and budgets (work programs) for each involved organization.

- By having a clearer statewide set of objectives, the funding for each regional or local program can be sized appropriately to the investment needed.

4.2 Improved Management, New Initiatives and Targeted Activities

4. *NCDOT needs to develop an Office of Commuter Assistance, focusing on demand management techniques and TDM initiatives for North Carolina.*

- A Committee of the North Carolina Board of Transportation, similar to the Transit, Rail and Ferry Committee, needs to be established to look specifically at congestion, air quality and commuter issues.

- New air quality and VMT goals should be established for each urban area/ridesharing program in North Carolina. These goals should be developed through the local offices but coordinated with NCDOT, its new Office of Commuter Assistance and DENR. The new goals should be promoted and monitored by local policy-makers and decision-makers.

- Cooperatively, NCDOT and DENR should work with this Board Committee and the local ridesharing/TDM programs to make sure that new goals are met in conjunction with Senate Bill 953.

5. *A new position should be created to oversee the development of TDM initiatives statewide and to manage existing ridesharing/TDM programs funded by NCDOT, but more importantly to foster innovation and creativity in the areas of TDM and ridesharing across North Carolina. This position/person must be highly visible and able to work across senior leadership lines.*

- NCDOT should partner with DENR and other appropriate state departments to develop a leadership-based position that can meet the needs of DOT and provide leadership for existing local programs. (A comparable Washington State Transportation Demand Management program is described in **Appendix D** of this report.)

- This position should be entrepreneurial, focusing on training and creative solutions for the needs of the state and local programs. The goal should be creativity and innovation, not only administration.

- ITRE and/or consultants should work in conjunction with NCDOT to provide a pool of information to the State about TDM, developing the tools that will benefit each local program, moving them away from only "activities" and into innovation and solutions, encouraging more employer and developer action. Larger scale, best practices-type projects should be developed.

- NCDOT can work collaboratively through its lead staff to disseminate information about various programs and TDM tools on a routine basis. The existing quarterly TDM coordinator sessions should be continued and expanded to include the "partners" from DENR and other key state agencies. The development of TDM projects featuring new and improved TDM tools should be a goal of this effort.

- A Statewide TDM Awards Program (described in **Appendix E** of this Guidelines report) should be developed as a result of enhanced coordination and improved project management efforts. Increased visibility for the local projects/programs

should also be a goal for NCDOT. Annual awards will be given to the TDM program that (1) achieve the highest reduction in NOx, (2) achieve the highest reduction in vehicle miles traveled, (3) create the most innovation/solutions to congestion and related problems associated with mobility. DENR should be an active participant in the development of this effort.

- NCDOT should conduct market research to identify on-going programs and tools that will be most supported by potential users. In other words, what mechanisms for changing commuter behaviors are working and which ones are not? Citizen and policy-maker awareness of TDM programs needs to be tracked and discussed routinely with the various boards of the local programs.

- TDM programs should be established in Asheville, Hickory, and Fayetteville with the organization and management structure that is appropriate for each community to be determined at a later date. (A TMA structure has been proposed for Asheville.)

- The focus of new program efforts will be quantifiable results and information with an emphasis on the targets necessary to achieve reductions in NOx and VMT goals as described in Senate Bill 953.

4.3 Organization and Program Management

6. To develop effective changes to commute behaviors and to produce the sorts of results that North Carolina is looking for in Senate Bill 953, a comprehensive program of "commuter management" is suggested. A program designed around Florida's Commuter Assistance Program might be pursued as soon as the NCDOT staff person is hired to develop such an initiative. (This program is described in **Appendix F** section of this report.)

   In the meantime, the kinds of individual program information that will help create a more performance-based effort at the local level while also giving the state valuable information for comparative purposes and illustrate progress are:

- number and types of commuters requesting assistance on a monthly basis
- number of commuters contacted and an indication of how they are contacted
- number of commuters changing from their single occupant vehicle to their ridesharing mode or their TDM-related mode
- number of agency vans in service and additional vans participating in any regional initiative in place (Rural Jobs Access)
- number of vehicle trips eliminated for all commuters
- number of vehicle miles (traveled) eliminated
- number of employers contacted and resulting employee participants,
- including mechanism for contact (meetings, direct, Board involvement, etc.)
- description of major accomplishments from each contact, specifying quantifiable information that led to a result or outcome
- number of parking spaces reduced or saved in the service area
- NCDOT and the TDM Coordinators should work together to define additional parameters for measurable objectives, which will lead to results-oriented information.

- This list of "measurables" can be expanded and modified based on actual program experience.

7. *The establishment of TMA's in areas where there are both clear commute-related problems and opportunities for cooperative action should be considered as an effective means of facilitating select demand management activities in specific geographic areas. To begin, organizing a TMA for State Government and one in Asheville will focus demand management efforts on specific geographies and specific organizations to produce effective results.*

   The TMA in Asheville would focus on incorporation of TDM as part of existing "smart growth" and air quality goals, using the Broadway Corridor as a first priority. Improved transit services should also be part of the new TDM package along with expanded vanpool services including a Rural Jobs Access-type initiative.

   A second TMA is recommended for State Government. State Government employees are a unique group with specific needs. Their transportation activities should be united under a TMA. Necessary leadership, oversight and overall program management would be provided by NCDOT, DENR and DOA, with assistance and technical support provided by SMARTCOMMUTE and TTA.

   The immediate focus for the State Government TMA would be the resurrection of the state's earlier teleworking program, but to assure success, a partnership should be formed with NORTEL. NORTEL has an excellent teleworking program, and it is recommended that NCDOT seek a loaned executive or similar position from NORTEL to work directly with the three Secretaries of DOT, DENR and DOA to develop this TMA and execute the teleworking project as the first priority for 2004.

   In addition, the TMA should implement an expanded version of the existing preferential parking program for car and vanpooling. A formal flexible work-hours program should be established and promoted for State Government employees. A subsidized transit pass program specifically for State Government employees, with a strategically dedicated "sales outlet" should be established, and a parking cash-out plan should also be developed.

   A formal study of the state employee parking program, including current parking policies, parking pricing and allocation strategies should be part of this first round of studies and implementation plans. Because there is clearly a relationship between the availability of parking, its configuration/location and commuter's willingness to explore alternatives, NCDOT and DNER should illustrate their leadership in several areas by examining current policies and possible changes as a means of encouraging employee participation in TDM/ridesharing.

- TMA's are recommended for State Government and Asheville to bring focus and recognition to two organizational efforts in varying parts of the state. The TMA's can take advantage of the leadership currently offered by the NCDOT and by the membership and participation of those supporting the TDM Panel from Asheville and from the various offices of State Government.

- Transportation Management Associations (TMA's) are typically non-profit organizations of businesses and developers, but they can also represent local jurisdictions, transit organizations and state governments.

- Specific geographic areas are defined and represented, with the TMA's delivering specific services and responding to specialized needs defined by those within the service area. As the name reflects, management of the transportation problems and issues are at the forefront of the effort.

- TMA's, like the SMARTCOMMUTE@RTP, offer their constituents a combination of services, concentrating on (1) advocacy, for the improvement of services, (2) education and marketing to compel commuters to use alternative services, the (3) facilitation of certain activities that promote TDM such as "guaranteed ride home" programs and ridematching, and (4) the provision of assistance to members in understanding regulations and other guidelines (such as air quality or local transportation regulations).

8. *Where possible, NCDOT should expand/integrate the Rural Jobs Access project into existing ridesharing programs, and improve the marketing and outreach efforts of 2Plus. There should be a focus on performance and specific incentives for advancing this project.*

- This program could benefit from further integration into the ridesharing/TDM marketplace. In Wilmington as an example, there is the possibility of linking the vanpooling program to existing transit services to broaden the overall regional service capability. There may be other opportunities for this type of integration, and NCDOT should explore all possibilities.

- An examination of the existing Rural Job Access program through the SWOT interviews found that there was a need to (1) significantly improve marketing materials, (2) apply program funds more directly to the benefit of the users in the form of incentives and services, (3) develop a consistent name and logo for the program and vans in service, and (4) develop some sort of peer-to-peer communication between participating companies and contacts so that they can better know, understand and translate the benefits of the program but also communicate the availability of van seats, route information, etc. within their companies and within their communities. The current cost-benefit/cost-effectiveness of the program needs to be reassessed.

9. *Reductions in single occupant vehicle travel can only be expected if commuters have a range of convenient travel options and a series of reliable support services and if they gain advantages (e.g., convenience, time, and/or money) through participation. In addition to the more traditional "menu" of TDM services currently provided by most of the local programs across the state, a number of alternative mode "support services" are recommended for development. While some may be considered as innovative, others are natural "partners" to the more traditional program elements. (This is a partial list of the programs and services most likely to generate results, recognizing that some face public acceptance challenges.)*

    - HOV facilities

- Carsharing
- Monetary incentives (e.g., parking cash- out and employee transportation allowance)
- Transit subsidies
- Alternative work schedules
- Guaranteed ride home programs
- Parking management programs (including preferential parking)
- Facilities amenities (on-site conveniences)
- Select development strategies/regulations
- Transit-oriented, pedestrian-oriented development plans
- Access/priority restrictions
- Trip reduction ordinances
- Modified zoning and subdivision control ordinances
- Road/congestion pricing
- VMT tax

These program elements should be considered in all locations where TDM programs currently exist. Other strategies and innovations should be explored with NCDOT. (A complete list of TDM strategies and the implementation-related responsibilities by agency appears in **Appendix G** of this report.)

4.4 Legislative, Zoning, and Planning Tools

10. *Additional Trip Reduction Ordinances or Programs should be developed in select locations. Using the Durham Model, additional Ordinances should be developed in Wilmington, Asheville and the Research Triangle Park. (The Durham County Trip Reduction Program appears in **Appendix H** of this report.)*

- Each of these communities has its own motivations for interest in a model ordinance. In Asheville, there are already strong "Smart Growth" initiatives underway, and these efforts can be translated into components of a TDM ordinance if a support mechanism for this effort can be found. With the air quality problems facing the Asheville area, TDM and transit could work together to address their growth and development issues, producing significant improvements in several categories.

- Wilmington is concerned about its overall quality of life and is looking at TDM as a possible tool to use in conjunction with future development strategies. Former Mayor

Peterson had expressed an interest in an ordinance as a means of dealing with traffic *and* development.

- Because the Research Triangle Park has the ability to control its own development plans and can provide direct input to tenants and employees concerning parking and transportation options, the Park would make a very good laboratory for development of another model ordinance. While the Park is currently covered by the provisions of the Durham County ordinance, this concept would allow the Park the opportunity to focus specifically on the needs and issues within its own boundaries. Evaluation of parking, the need for shuttle and transit services and the impact of the I-40 corridor would be part of the assessment of this effort.

11. *In the major urban areas such as Charlotte, Raleigh and Greensboro, a Model Ordinance for Reduced Parking Requirements based on TDM measures should be introduced.*

- An examination of the parking requirements in each city will be necessary, but NCDOT should begin working with the planning staff, local DOT's, DENR and the business communities/chambers to develop an ordinance or a subset of local ordinances to deal with TDM measures.

- Examination of the parking minimums and maximums would be a good beginning point. Developer education sessions and leadership sessions with the financial community will also need to be part of this effort.

- Using model results from Durham and "best practices" from around the state and the country, NCDOT can create a practical approach to use of various TDM measures in the urban areas.

12. *A Model Ordinance for sidewalk construction associated with new development should be considered. This could be applied to urban, small urban and other locations.*

- Encouragement for pedestrian-friendly development and any opportunity for leaving the automobile at home are being proposed.

- Developers and builders should be encouraged to participate in this part of the TDM initiative. This is an opportunity to integrate transit and planning principles together.

13. *NCDOT and the local TDM coordinators should work with local offices of planning and zoning to develop a "TDM review process" so that TDM strategies and improvements become a part of the local land use, land development and planning processes.*

- Transportation planning at both the state and local levels needs to focus on a wide range of mobility, environmental, and other key factors. Rather than focusing on "alternative transportation planning," the State and its partners should clarify that shared-ride travel modes, factors that influence commuter behavior, and traditional mode and facility planning need to be considered as part of integrated strategies. This approach needs to be "elevated" at the state and local levels, but changing this

planning process will take time. Identifying TDM as an important part of the planning process will be an important first step.

- TDM coordinators need to become more visible in all aspects of their local planning efforts. The "TDM agenda" needs to be prominently and permanently displayed on Planning, Transit, Council and Commission agenda.

- The TDM coordinators should participate in updates to the Long-Range Transportation Plan (LRTP) to insure that TDM strategies are included in this and similar efforts.

4.5 Innovation and Creativity

14. The focus of all ridesharing and TDM programs should become innovation and creativity and not merely administration and operations. There is an opportunity to focus on a number of "best practices" from across the state and to begin to create additional ones. This sort of effort will be necessary to achieve the goals set forth in Senate Bill 953 and to begin to elevate TDM into a more prominent role.

As a beginning, the following projects should be "documented" for their results and effectiveness, and NCDOT should work with the respective program/sponsor to publicize the TDM story and determine the applicability of the tool to other locations.

- NORTEL Teleworking Program, Research Triangle Park

- Fare-Free Transit Service, UNC-CH and Town of Chapel Hill

- SMARTCOMMUTE@RTP, Research Triangle Park, TMA and Teleworking

- Meadowmont/Southern Village, pedestrian and transit-friendly development, Chapel Hill

- Model Trip Reduction Ordinance, Durham County

- EPA's model/decision to build less parking, Research Triangle Park

- The Charlotte Area Commuter Register, a free ridesharing publication

- Blue Cross/Blue Shield of North Carolina, employer programs and support, including vanpooling

15. NCDOT and DENR should embrace the advances in hybrid technologies (gasoline and electric) and other alternative fuels, and develop the necessary programs and policies to advance these efforts.

- Initially, state tax incentives should be developed for automobiles purchased with hybrid engines and similar incentives should be developed for vehicles used for vanpooling as the van technology is introduced.

- Perhaps the more powerful step would be to allow hybrids access to the planned HOV lanes in North Carolina. This should be supported at the federal level and at the state level.

The result would be the dual incentive of boosting interest in the energy-saving vehicles and boosting the interest in HOV at a time when North Carolina and at least two communities (Charlotte and the Triangle) are looking seriously at HOV. Arizona already exempts hybrid owners from HOV restrictions.

(An article detailing these technologies and the HOV related issues is included in **Appendix I** of this report.)

16. *As performance goals are developed, the new more goal-oriented programs should be defined and promoted. The state should support a new set of TDM programs described as "PROGRAMS OF EXCELLENCE" (or some other name). The idea is to recognize the achievers in the state, those meeting the goals set forth in the Senate Bill, and those identified by the Governor or Mayors, or other state/local leadership for meeting transportation, air quality, and environmental goals.*

- Programs should be set up to illustrate the achievements coming from the work of the programs organizing under the new initiative. Those programs achieving specific goals in various categories determined by the state would be recognized through awards and through increased funding.

- Examples of several TDM programs from across the country, along with their particular innovation and the results are included in **Appendix J**.

- Those programs achieving specific goals, especially those aimed toward VMT and air quality as specified in Senate Bill 953 and other similar state documented efforts, would be recognized through awards and increased funding.

17. *Working in cooperation with the Commuter Choice Leadership Initiative (Innovation Transportation Programs & Partnerships), NCDOT and DNER should look for ways to implement a statewide TDM project that would benefit the state and the overall TDM effort. (This overall effort is described in **Appendix K** of this report.)*

- A number of ideas should be explored to make this partnership work, focusing on innovation, the work of the business community, and the role of NCDOT and DENR. A possible demonstration project that would focus on the goals of Senate Bill 953 and the other similar statewide goals should be pursued.

- While a dialogue with this group has just begun, NCDOT should continue to explore all options and opportunities, developing a role for Robin Snyder and her group.

- How can North Carolina become the best workplace for commuters? www.commuterchoice.gov

4.6 Evaluation and Performance Standards

18. *NCDOT needs to develop a more strategic and comparative mechanism for evaluating its existing ridesharing and TDM programs' performance. Currently, all*

programs receive funding on basically a "pass through" basis. It is recommended that funding decisions for this program be changed to a performance-based initiative. Funding should be based on the results needed. Over time, funding and program adjustments could be made to consider performance, innovations, and other factors.

- NCDOT needs to create new standards by which the existing ridesharing programs would be funded. These standards would be based on a number of goals tied to the state's air quality and VMT reduction strategies outlined in Senate Bill 953.

- Programs should be required to demonstrate progress in reducing emissions and VMT in their respective service areas, perhaps on the basis of the indicators introduced in the previously suggested information in #6. NCDOT should work with each program to develop performance goals tied specifically to the program's mission and to the state's overall TDM initiative.

As the TDM management position and Office of Commuter Assistance are established, performance goals can be refined.

4.7 TDM Toolbox Improvements

19. *Some time ago, NCDOT and the ridesharing programs considered a number of TDM "toolbox" elements that were considered necessary to make the state and local programs function more effectively. These elements should be developed and implemented as soon as possible.*

- Ridesharing software for use for carpool and vanpool matching for all programs in urbanized areas; ability to link rural and regional programs

- Website development capabilities for those programs that do not currently have a website; NCDOT "links" to all programs

- Commuter Register capabilities or comparable commuter information systems and outreach

- Establishment of a statewide telephone information system (511) for commuter information

4.8 Vanpooling

20. *North Carolina's vanpooling programs need to be revamped. Comparable programs in the state of Washington indicate nearly 1500 vanpools in operation, and Connecticut has nearly 400. While North Carolina's program has been in operation for nearly 30 years, a quick look at the current vanpool census seems to indicate a number of operational issues. While problems may be related to the overall downturn in the economy in the state, there has been little attempt to document "the issues" impacting demand. The vanpooling project effort needs to be re-assessed and rejuvenated.*

- It is recommended that a "Vanpool SWAT Team" be formed to assist NCDOT in the assessment of how to better utilize existing resources. A number of options should be explored.

- The SWAT Team would be composed of representatives from each of the existing programs that own/operate vans and the 2Plus, Inc., the contract operator of the State's Rural Job Access vanpool program. There would also be a representative from one or more state programs currently operating successful statewide initiatives in other locations. Washington and Connecticut would be recommended.

- An exploration of how to better manage the existing vanpool programs, including possible consolidation of existing pools into a state-managed effort, should be explored.

- The vanpool fleet, once determined, would need a long-term management and operations plan. This could be under the new Office of Commuter Assistance, in a Vanpool Service Center.

- A Statewide Insurance Agreement needs to be developed. This insurance plan would benefit the vanpool fleet and any vanpools that continue to operate independently.

- The provision of maintenance and customer services, and improvements to overall vanpool operations, need to be explored as part of this SWAT Team effort.

- Elevating the role that vanpooling plays in the state's TDM "toolbox" is something that NCDOT and this SWAT Team should focus on as part of their efforts and recommendations. Creating new program goals and objectives, including performance-based goals for the program, would be the first initiative for this program.

5.0 THREE-YEAR PROPOSED ACTION PLAN: TDM STRATEGIES

5.1 Year One

STRATEGY:

1. Establish the "case" for TDM by building a foundation of information and program documentation, illustrating success on multiple levels

   Define TDM program for North Carolina, promoting the mission along with clearly defined local program efforts and measurable program goals and objectives assessed through routine evaluation

   Develop a clear, compelling "body of evidence" describing the value of TDM, based on quantitative results in the various markets statewide, illustrating the status of air quality and environmental issues and particularly to reductions in VMT and NOx as specified by Senate Bill 953. (This should include setting annual reduction goals for VMT and NOx and selection of projects that will move the programs out of their planning and advocacy-only roles as described in the TDM Strategies Matrix.)

   Using the information/feedback provided in the SWOT analysis, develop an expanded program of success which includes broader political support for TDM; increase statewide support in locations such as Asheville and Hickory, use TDM ordinances in more locations such as Wilmington and Asheville, formally link TDM initiatives impacting land use and transportation via policy, and develop specialized programs such as HOV in Charlotte and the Research Triangle Park.

   Demonstrate the value of TDM by documenting benefits and the ability of various efforts to produce measurable results; examples include improved travel time savings, cost savings, vehicle miles traveled, but also air quality and environmental improvements needed to satisfy Senate Bill 953

   Evaluate existing ridesharing/TDM programs and institute new program accountability, encouraging improved performance (Reviewing studies of TDM programs in Washington and Maryland, with their emphasis on performance, will help North Carolina move in this direction.)

   Develop and then document a series of "best practices" from which existing programs can modify their efforts, grow and learn; these will be developed to increase the number of alternatives to single-occupant commuting, focus on the land use/transportation link, examine various commuting innovations, etc.

(Examples of North Carolina programs to model were included in the Guiding Principles document, but others can be developed and used to publicize TDM. The purpose is to improve program effectiveness, enhance the quality of existing efforts and improve the appeal of program options to commuters.)

ANTICIPATED RESULTS:

Establish program credibility, increase program accountability by improving performance/results, elevate role of TDM and ridesharing based on quantifiable results, market and validate benefits of TDM, establishing linkages to other transportation initiatives

STRATEGY:

2. Develop the Office of Commuter Assistance, focusing specifically on improving demand management techniques and increasing innovation, improving program performance and producing a series of new initiatives that will help NCDOT meet trip reduction and air quality goals defined in Senate Bill 953

   Using the mission, goals and objectives from the "case building" in #1, this Office will establish and maintain a clear program identity and the overall direction for TDM and related mobility management, statewide

   Create the new position within NCDOT to staff and manage the Office of Commuter Assistance (This will be a highly visible, senior position designed to oversee all mobility and congestion related issues within in the state. Air quality and environmental planning will be related because of the requirements associated with Senate Bill 953. A comparable organization and program has been referenced for Washington in the Guiding Principles document.)

   Develop a Committee of the Board of Transportation to support the Office of Commuter Assistance, promoting TDM and lobbying/advocating on behalf of mobility-related solutions statewide

   As new air quality, VMT and NOx goals are established, promote TDM as one of the primary mechanisms for solving the problem, in partnership with DENR and others

   Develop tools and training to benefit local programs and enhance their performance; encourage partnering with other TDM programs, states and DOT's to assist in the marketing and management of current TDM programs

   Develop annual awards, a "Program of Excellence" to enhance current program performance at the local level, incentives and necessary market research to increase commuter awareness of TDM and improve stakeholder, political awareness/response to existing programs

ANTICIPATED RESULTS:

Clear direction, focus for statewide efforts and program with effective leadership and management; effective management of local programs with training and monitoring of

performance-based programs; more efficient use of state funding for ridesharing and TDM; new focus on innovation; improved awareness at local level concerning benefit of TDM/ridesharing

STRATEGY:

3. Revamp the existing vanpool program to increase results in several areas: improving number of vans in full operation, enhancing overall management and marketing, elevating the role that vanpooling plays in the state's TDM "toolbox"

   Create new program goals and objectives and a program evaluation plan using an external "SWAT" Team as defined in the Guiding Principles

   Develop a revised management plan for existing vans and evaluate specific program elements including insurance, variable size vehicles, central clearinghouse and multiple state programs

   Evaluate local and statewide marketing options to improve commuter responses to the program; evaluate impact

ANTICIPATED RESULTS:

Centralized vanpool operations, central clearinghouse for insurance (on a statewide basis), multiple options for vehicles, improved placement and tenure of vans, resurrection of such tools as state vanpool census and tools to track performance, increased vans in operation statewide.

STRATEGY:

4. Establish a TMA (Transportation Management Association) for State Government/Employees
   (This recommendation includes the resurrection of an earlier proposal for a teleworking program and a proposed partnership with NORTEL for a "loaned executive" to work directly with the three Secretaries of NCDOT, DENR and DOA to develop the project.)

   Create/implement the program with 3 key elements, (1) preferential parking for car and vanpooling, (2) a flexible work hours program, and (3) subsidized transit pass program with a central sales outlet and parking "cash out"; the teleworking program would be a separate, critical element

   To assure the success of these programs, launch a formal study of state employee parking and pricing. NCDOT, DENR and the new TMA should lead this effort along with SMARTCOMMUTE and TTA

ANTICIPATED RESULTS:

Reductions in VMT, improved air quality, reduction in parking demand, increases in employees teleworking; increased employee parking pricing; specifics will be based on the outcome of the TMA

STRATEGY:

5. Establish a second TMA (Transportation Management Association) in Asheville, focused primarily on "smart growth" and air quality goals

Using a select corridor, such as the Broadway or Biltmore Corridor, TDM measures would be incorporated into existing plans for "smart growth", effective management of transportation resources and improved land planning; improved transit services and vanpooling might also be part of a package of related service improvements

ANTICIPATED RESULTS:

Employer and community-based participation, reductions in VMT, improved air quality, reductions in parking demand; specifics will be based on the outcome of the plans for the TMA

STRATEGY:

6. Working in cooperation with US EPA, create a statewide model for implementation of "Best Work Places for Commuters"

Working with EPA, NCDOT should develop a statewide partnership designed to increase the number of employer-based transportation programs targeted at VMT, NOx reduction; program focus should be on innovative solutions to transportation and mobility problems statewide

ANTICIPATED RESULTS:

Model program statewide with performance-based goals and objectives and employer leadership and participation; increased employer participation in transportation management and ridesharing programs

5.2 Year Two

STRATEGY:

1. Under the new Office of Commuter Assistance, and in conjunction with the new statewide TDM program, develop a more effective program of commuter management; use of evaluative tools and information, measuring results in several categories.

   (These are to be designed around Florida's Commuter Assistance Program and will include quantitative indicators such as the number and type of commuters requesting assistance each month, the number and type of commuters contacted and how, the number of commuters changing mode, etc.)

   Using quantitative information about each program, improve program management and begin to standardize elements tied to performance; establish expectations for program results

(If commuters are not responding to certain types of programs, especially after a number of years, then modify programs and use client feedback to adjust programs and services.)

ANTICIPATED RESULTS:

Improved program management at the state level; improved performance at the local level; modification of programs, creating more meaningful results

STRATEGY:

2. Expand/integrate Rural Job Access project into existing ridesharing/TDM programs, improving overall marketing and outreach of the existing 2Plus vanpool program

   Develop effective linkages to ridesharing/TDM programs in locations such as Wilmington where there can be an integration of markets and services

   Improve the basic tools and materials specifically identified in the Guidelines document, but including such things as client marketing materials, identification of the vans with logo and contact information and developing some sort of peer-to-peer communication network among participating companies so that the translation of program benefits becomes well known; the application of program funds needs to be designed to benefit the users of the program

   Assess the program from a cost/benefit perspective and determine an effective way to market the program

ANTICIPATED RESULTS:

Improve results and cost/benefit position of the Rural Job Access vanpool initiative, integrating it into the TDM and ridesharing programs statewide

STRATEGY:

3. In conjunction with local programs and through the Office of Commuter Assistance, develop a series of support services to be marketed as the "menu of TDM services"; these services should be evaluated within each market, based on customer feedback and market research and "built and developed" based on experience and consumer response

   (A sample list was developed for the Guidelines document and the TDM Strategies Matrix.)

   Evaluate effectiveness of menu of services through client feedback and program performance on an annual basis (NCDOT should help local programs develop the menu as needed)

Share results of evaluation with stakeholders in annual review of program funding and review of services effectiveness

Consider expanded "toolbox" elements to be developed at state level and used to improve local programs: ridesharing software, websites with NCDOT links to all programs, Commuter Register or comparable information system, 511 statewide telephone information system

ANTICIPATED RESULTS:

More consumer-based programs, more evaluations of program efforts, routine review of program effectiveness, routine review of the TDM menu and "toolbox", (designed to increase participation in all programs); over time, improve results in key categories such as VMT, travel time savings, commuter cost savings, air quality indicators

STRATEGY:

4. Establish a series of "model" ordinances and planning tools to positively impact growth and development and minimize congestion in several areas. While each community continues to address air quality, "smart growth" and traffic in specific corridors in their own way, TDM offers effective strategies to be used in conjunction with proposed local actions

   Develop additional Trip Reduction Ordinances (Commute Trip Reduction) in Asheville and Wilmington; consider introducing parking code changes as part of the urban design guidelines/review process in the urban areas (Charlotte, Raleigh, Durham, Chapel Hill and Greensboro), and encourage changes to the sidewalk ordinance to encourage pedestrian-oriented development in all locations

ANTICIPATED RESULTS:

Formally introduce TDM to planning processes at varying levels in communities across the state; accelerate recognition of TDM in urban design/planning relationship statewide, positively impact trip reduction and parking requirements in comprehensive manner

5.3 Year Three

STRATEGY:

1 Establish a TDM review process, introducing TDM strategies and improvements into the local land use, land development and urban design/planning process

Elevate TDM within state and local planning processes by prominently and permanently inserting it into the "planning agenda"

Assure that TDM is a recognized part of the land use/transportation decision-making process on state and local levels

Use local TDM coordinators and long-range planning process to determine continuously effective role for TDM programs and TDM efforts

ANTICIPATED RESULTS:

More trip reduction programs, transit-oriented development and TDM-friendly improvements added to local land use practices; TDM ordinances with mandatory VMT reduction and air quality goals instituted as part of development and planning processes

STRATEGY:

2. Develop a program for advancing new technologies and alternative fuels or other similar innovations along with policies to support these efforts

   Develop state tax incentives for automobiles with hybrid engines; similar incentives should be developed for vans used for pooling as the vans are introduced

   Develop a plan to allow hybrids access to HOV lanes in North Carolina; this will require an examination of policy at the federal and state levels

ANTICIPATED RESULTS:

Increased participation in alternative technologies programs; increase in vanpooling option; increase in HOV participation/support

6.0 MARKETING FRAMEWORK

Marketing Orientation/ From SWOT Analysis

STRENGTHS

- General support for TDM statewide
- Energetic staff, desire to improve performance
- Have basic tools such as TDM Ordinance and other parameters to improve/strengthen program efforts
- There is a growing awareness of land use/transportation linkage

WEAKNESSES

- Leadership/corporate support for TDM has disappeared
- Lack of choice riders on resulting services
- No clear spokesperson for leadership and technical direction
- Little focus for air quality problems/collaboration with partner agencies

OPPORTUNITIES

- NCDOT poised to act on TDM (with state and local partners)
- State government ready to reactivate earlier initiatives with NCDOT support
- Partnership opportunities available with TTA, RTP, Charlotte-Mecklenburg, Wilmington, Rural Job Access and others

THREATS

- Programs lack identity, including NCDOT
- There is no clear performance base, tied to marketing base from which to profit and grow
- All programs need quantifiable results
- There is limited understanding of TDM, its benefits

6.1 Marketing Planning for TDM

Marketing can improve the effectiveness of most individual TDM programs and a number of the individual strategies designed to positively impact commute behavior. The most effective marketing programs are often those developed in cooperation with customers, major stakeholders and policymakers and those that will benefit from the implementation of TDM, including commuters, employers and business organizations such as Chambers and TMA's.

Marketing programs should be built around a program's central mission and should reflect a clear and consistent message about what the program intends to accomplish. Various work elements should be tied back to the central mission and supported by on-going market research and evaluation. Client feedback, integrated into the research, will reflect the appropriateness of program goals, work plans, products and services.

An effective marketing plan can anchor other organizational efforts and contribute to the effective development and success of products and services. Because today's TDM programs have to be strongly appealing in order to lure commuters from their automobiles, TDM marketing plans have to include a mix of strategies to address various markets, changing stakeholders and a broad menu of services.

Ridesharing and TDM programs in North Carolina have focused on the development of a variety of strategies to encourage commuters to change their travel behaviors. The majority of these strategies fall into the planning, advocacy and encouragement category, which are common to many ridesharing and TDM organizations.

The SWOT analysis found that there was a limited understanding of TDM among key stakeholders, employers and other "customers" interviewed as part of the TDM study process. In general, there was a limited understanding of the overall benefits of TDM and the specific results to be achieved through various efforts. Several stakeholders could not "quantify" the effectiveness of the programs. Some could not translate the importance of TDM or the meaning of the work as it related to reductions in congestion or improvements in air quality.

To build a stronger case for the importance and relevance of TDM, and to improve customer and key stakeholder awareness of program benefits, a marketing framework was proposed. The marketing framework would use the findings of the SWOT analysis and the Guidelines document and then, focus on the primary elements of the Three-Year Action Plan.

Key considerations for the marketing framework included the following:

(It should be noted that additional market research and evaluation would be necessary to support these activities. Much of this would need to be accomplished at various stages of implementation.)

6.1.1 Goals of the Overall Marketing Framework

- Introduce the concept of TDM as defined by NCDOT through its program mission, reinforcing its importance/value through various improvements and savings (VMT, NOx as examples)
- Identify and promote the new Office of Commuter Assistance and support local TDM/ridesharing program efforts
- Provide specific information about TDM-related efforts, producing impacts locally and statewide; "feature" models and successes
- Announce "new and improved" products, services, benefits and innovations, including awards

6.1.2 Target Markets

The major target market will be those groups that need a broader understanding of TDM, those that will need to see transportation alternatives as more relevant and appealing. The customer base will include political representation, commuters, key state government officials, other TDM program representatives and those in a position of marketing and supporting transportation policies and programs.

Specific targets, which may be the focus of marketing information as it is developed, may include:

- General Public (targeted in corridors where special promotions may be triggered as a result of "building the case" and enhancing an existing program effort)
- Employers (special case information tied to "Best Place" initiative or model programs, also to help "build the case")
- Elected Officials (all levels, needed for advocacy and understanding)
- Targeted Agency Officials (such as the Board of Transportation, for select advocacy)
- Media (specialized campaigns at the state and local levels)

6.1.3 Broader Benefit

Focused public and political attention on transportation with special emphasis on mobility and congestion-related issues, air quality; the mission is to include the education of various publics about the benefits of TDM for the express purpose of changing attitudes and commute behavior

6.1.4 Strategy Development

1. ESTABLISHING "THE CASE" FOR TDM	
Target Market	Statewide, with appropriate links to local programs
Program Impact/ Improvement	NCDOT, through mission, goals and objectives Companion programs and materials (local)
Results	• Evidence, case-building for pooling and transit, support for alternatives to SOV commuting, measurable improvements, cost-savings and other results. • Illustrate impact: reduce auto use, vehicle miles of travel, travel shifts by mode, environmental/air quality impacts • Illustrate transit ridership increases, HOV-supporting characteristics • Illustrate changes in land use and transit-oriented development models
2. DEVELOP/ENHANCE PROGRAM IDENTITY	
Target Market	Statewide with links to existing NCDOT programs
Program Impact/ Improvement	• Enhanced awareness at state level, local programs • Improved customer and stakeholder understanding of TDM
Results	• Education, outreach designed to support new program and policy • Explanatory information and materials with focus on purpose and need • Encourage support and participation
3. CREATE SPECIFIC OFFICE FOR MANAGEMENT AND PROMOTION	
Target Market	Statewide with links to existing local programs
Program Impact/ Improvement	• Opportunities for improved leadership and improved • program management • Improved customer and stakeholder awareness on multiple levels
4. VANPOOL PROGRAM	
Target Market	• Commuters • Employers, employees • Existing vanpoolers
Program Impact/ Improvement	• Enhanced awareness statewide • Increases in vanpool formation and use • "New and improved" messages/look • Incentives package via new management
Results	• Education, improved program designed around new program and policies • New products and services

	• More vans in operation (improved "indicators")
5. TMA FORMATION - The TMA represents a major opportunity to specifically focus on the provision of service, making various elements of TDM accessible to the communities and consumers they serve. TMA's function as multi modal sales and promotional agents to employers and others, representing a unique brand of outreach and promotion of TDM products, services, information and technical assistance.	
Target Market	• Commuters (in specific markets) • Employers and their employees • Key leaders in each market (State Government and Asheville)
Program Impact/ Improvement	• Enhanced awareness of options to SOV • Increased participation in alternatives to driving alone • Increases in employer participation/support for TDM • Improved key indicators (parking, VMT, air quality, etc.)
Results	• Education and awareness focused on specific programs • Employer-based program with specialized tools and services • Unique focus and scale of activities, often with corporate support for programs
6. DEVELOP "BEST PLACE WORK PLACE" MODEL - This program, if enacted on a statewide basis, can integrate congestion and air quality goals shared by NCDOT and EPA and focus on enlisting the support of employers for achieving those goals. Specific marketing and outreach goals need to be developed based on the prior program experience and success of this program in other parts of the country. NCDOT and EPA may modify employer programs and various initiatives based on products and services that motivate employer involvement and result in "savings" in a number of areas.	
Target Market	• Statewide, with focus on strong market areas as defined by "Work Place" • Criteria Specifically developed list of employers
Program Impact/ Improvement	• More employers participating based on air quality and • other motivators • Benefit from national model and experience • Developing models for improved results
Results	• Expansion of employer efforts • Broadened interest in programs and TDM • Partnering and innovation

TDM Marketing and Communications Framework

Year One

Identity Development

Advertising Tools

Public Relations

Special Promotions

Print Collateral

Print/Signage Advertising

Media Relations

Worksite Promotion

Direct Mail Promotion

Print Collateral Print/Signage Advertising Media Relations

Worksite Promotion Direct Mail Promotion Special Events

"Building the Case"

Activity	Description	Lead Coordinating Organization /Individual	Implementation Dates	Outcome	Special Notes	Comments
Identity Development	"Branding" and concept development	NCDOT in cooperation with partner agencies & local programs	First quarter, first year	Program name, logo and "tag lines"	Test names, test concepts and "message"	Search for a statewide "winner" ("Good Roads State", "First in Flight")
	Baseline awareness studies	NCDOT, local programs	First quarter, first year	Introduce, revitalize & build support; establish constituencies	Use market research to build understanding & change attitudes (change habits)	

Print Collateral Print/Signage Advertising Media Relations

Worksite Promotion Direct Mail Promotion Special Events

"Building the Case"

Activity	Description	Lead Coordinating Organization /Individual	Implementation Dates	Outcome	Special Notes	Comments
Identity Development ——————— Advertising Tools	Print collateral & direct mail with factual information on TDM FAQ's / PSA's	NCDOT with local program coordination *	TBD	Increased awareness & recognition of program and its benefits; "household word" mentality	Make the case for improving air quality, mobility on various levels in multiple locations	
	Newsletters/ electronic communications through senior level corporate support	NCDOT and local level programs *	TBD	New links to state and local efforts, re-establishing the effort and the results		

* Opportunities to develop parallel marketing efforts with local programs

Print Collateral Print/Signage Advertising Media Relations

Worksite Promotion Direct Mail Promotion Special Events

"Building the Case"

Activity	Description	Lead Coordinating Organization /Individual	Implementation Dates	Outcome	Special Notes	Comments
Identity Development ——————— Camera Ready Ads	Clip / ads varying sizes, promoting new names, TDM and benefits (mix a variety of paid and psa)	NCDOT designs, develops and produces in conjunction with overall initiative	Second quarter, first-year (And continue as periodic promotion)	Continues promotion, broad-based marketing sent to media, community, employers, neighborhood "news"		

Print Collateral Print/Signage Advertising Media Relations

Worksite Promotion Direct Mail Promotion Special Events

"Building the Case"

Activity	Description	Lead Coordinating Organization /Individual	Implementation Dates	Outcome	Special Notes	Comments
Identity Development --- Advertising Tools	Websites with local links and "live updates"	NCDOT and local programs	TBD in conjunction with Office of Commuter Assistance "launch"	Requires updating to be effective but can be useful tool		
	Variable message signs Outdoor/highway signage	NCDOT	TBD in conjunction with Office of Commuter Assistance	Consider deployment for initial campaign or "announcement" of program Highway signs may need uniform message		

Print Collateral Print/Signage Advertising Media Relations

Worksite Promotion Direct Mail Promotion Special Events

"Building the Case"

Activity	Description	Lead Coordinating Organization /Individual	Implementation Dates	Outcome	Special Notes	Comments
Identity Development --- Public Relations	Media relations/ contacts Media training Speakers bureau	NCDOT in cooperation with partners and local programs	Immediate but intensifies as Office of Commuter Assistance is launched	Familiarize the public with TDM, the concept and results of efforts, Senate Bill 953	NCDOT and partners need to be ready; want trends to be positive	NCDOT and programs need to be media savvy
	Complete media kit: • News releases • Sample brochures • Posters • Facts/ figures • Camera-ready art Contacts w/ • Bios for follow-up quotes	NCDOT		Media "blitz" but on-going		Create framework of understanding that will grow over time

Print Collateral Print/Signage Advertising Media Relations

Worksite Promotion Direct Mail Promotion Special Events

"Building the Case"

Activity	Description	Lead Coordinating Organization /Individual	Implementation Dates	Outcome	Special Notes	Comments
Identity Development Key Message Development	Information, events, media "attractions"	NCDOT with partners and integration of local programs	TBD as response to "branding" evolves	Strengthen air quality, mobility, cost savings or other elements of marketing messages	Evaluate public response and work directly with media through "face" time	Cultivation of understanding the program, messages, special efforts with media

Print Collateral Print/Signage Advertising Media Relations

Worksite Promotion Direct Mail Promotion Special Events

"Building the Case"

Activity	Description	Lead Coordinating Organization /Individual	Implementation Dates	Outcome	Special Notes	Comments
Identity Development Special Promotions	Work site promotions Employer Meetings ETC promotions	NCDOT sponsorship in conjunction with local programs	TBD	Dedicated attention to TDM and projected results with employers; heightened level of awareness	Good opportunity to re-introduce various public/private partnerships and their results	Promote the need for outcome/ results Repeat the message
	"Fairs" and Community events			Commuters and others motivated by the "frenzy" of interest		

Print Collateral Print/Signage Advertising Media Relations

Worksite Promotion Direct Mail Promotion Special Events

"Building the Case"

Activity	Description	Lead Coordinating Organization /Individual	Implementation Dates	Outcome	Special Notes	Comments
Identity Development --- Establish Dialogue	Follow up calls with media and key stakeholders	NCDOT and partners	TBD.	Routinely verifying that "the message" is out there, the story is being printed that the policy-makers are hearing it	Determine validity of the message and appropriate form	
		Focus on policy-level decision-makers and constant information flow				

7.0 CONCLUDING STATEMENTS

Everyone has a stake in the fight against bad air and congestion. The desire for improved mobility is a national objective. For the most part, the protection of our public health, the quality of our communities and the strength of our transportation system has become a basic arithmetic problem– requiring improvement means that more people need to drive less.

Most people today understand the concepts associated with the more sophisticated definition of "TDM". Shifting the traffic in any one location away from the peak and looking for alternatives that produce a reduction in vehicle miles traveled (VMT) is common in many communities. Through Senate Bill 953, North Carolina has elevated the role of TDM and has formalized the reduction plan for both VMT and emissions of nitrogen oxides (NOx) from all sources by at least 25% by July of 2009. These goals will require attention to the arithmetic.

For some years now, NCDOT and its local ridesharing and TDM programs have focused on the elements of their programs that could be labeled as "planning and advocacy". So-called "carrots" often allowed easier "sales", program participation, and program experience to grow based on community, employer, employee and commuter response. There seemed to be no need for other more stringent "sticks" or regulation, no additional efforts beyond heavy encouragement. Some programs would explain that they are not "there" yet. Many of our programs and some of our "best practices" have probably encouraged people to actually drive *more*...meaning that if you look around the state, you see a lot of anti-TDM development patterns including suburban office parks, houses on ½ acre lots (and more), the preference for cul de sac neighborhoods, suburban outer loop shopping centers that draw development beyond transit's capabilities and non-pedestrian and non-TDM friendly neighborhoods.

But now NCDOT has completed its look at TDM and a number of alternative strategies designed to ignite TDM activities across the state. Agreeing to accept the role of leader is one of the most important first steps in this process. Asking its partners such as DENR and others to assist in implementing viable state programs that will impact state employees is also a very important first step in announcing that this is truly an important initiative.

NCDOT has an opportunity to initiate several changes within the ridesharing/TDM programs that it funds, asking them to become more accountable and making them "performers" as either "programs of excellence" or "national programs of excellence" through a joint initiative with US EPA. Either way, the goal is to make a difference in commuting patterns, pollution and development. Asking employers to move from "planning to do" into "doing" and placing measurable results at the top of the NCDOT importance list should make both the locals and the state proud of the accomplishments while making a recognizable difference in the communities which are served.

Integrating "softer" ridesharing programs into more accountable TDM programs may take time, but this begins with the kind of dialogue identified and established with the SWOT analysis. The need for a routine communication of the purposeful efforts conducted by the TDM programs and led with NCDOT's assistance, will be invaluable to the on-going success of this overall initiative. Leadership again... giving and taking on both sides, building and fortifying these programs so that they can be equipped to make a difference.

NCDOT will be well positioned to take a new, more pivotal role in promoting TDM in both the urban and rural areas of North Carolina if it proceeds with the proposed staff and organizational changes to the TDM initiatives described as a result of this study. Strategies that are measurable can be jointly monitored for progress, publicized and nurtured by NCDOT and its partners (DENR and EPA, as examples).

On an annual basis, NCDOT should encourage each of its existing programs (and its own state government employee-based effort) to develop and pursue at least one TDM innovation. This can be developed with NCDOT's help, with the help of others already involved with TDM (again such as EPA), etc. It is an opportunity to focus on employer and business needs and new ideas; not just re-inventing what has already been tried.

These are exciting times for the program and for NCDOT. If NCDOT can act now on a number of the strategies and recommendations discussed by its leadership and the TDM Panel, they are poised to make a difference. The requirements of Senate Bill 953 are one concern. The health and well being of North Carolina's citizen's are the other.

8.0 APPENDICES

Appendix A	Press Release from State of North Carolina Governor's Office and SB 953
Appendix B	Survey Questionnaire
Appendix C	Interview Schedule and Participants
Appendix D	Position-related information, Washington State's TDM Office (2002)
Appendix E	Statewide TDM Awards Program Examples and the Governor's CommuteSmart Awards
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Appendix K	The Commuter Choice Leadership Initiative and Best Workplaces for Commuters

Appendix A
Press Release from North Carolina Governor's Office and SB 953

Michael F. Easley
Governor

State of North Carolina
Office of the Governor

For Release: **IMMEDIATE**	Contact: Amanda Wherry
Date: January 24, 2003	Phone: (919) 733-5612

GOV. EASLEY NAMES PANEL TO IMPROVE AIR QUALITY

Diverse Group of Government and Business Leaders to Focus on Increasing Commuting Options Reduce Vehicle Emissions

RALEIGH - Gov. Mike Easley has named a panel to improve air quality in North Carolina by reducing vehicle emissions resulting from job-related travel by 25 percent by 2009. The panel will focus on developing a statewide travel demand management (TDM) plan to increase commuting options for workers in both the private and public sectors.

TDM stands for a wide range of options for using existing transportation infrastructure in a more efficient manner - from carpooling, telecommuting, public transit and flexible work hours - all of which aim to reduce the number of cars on the road during the rush hour commute.

"Reducing job-related travel by 25 percent by 2009 is an ambitious goal, but the stakes could not be higher in this effort," said Easley. "As the number of cars on our highways increases, so does the level of ozone pollution, which carries serious consequences for the respiratory health of our citizens. Reducing the number of cars on the highway will also strengthen economic development and improve business efficiency by reducing time lost for commuters. I am confident that this panel will provide the vision and leadership necessary to meet our goal and improve air quality across the state."

The statewide TDM plan will include regional plans at the local level across the state to ensure that the emissions goal is achieved. In addition, the 16-member panel has been tasked to develop strategies to enhance existing TDM programs, foster development of new programs and promote TDM strategies in both rural and metropolitan areas for the public and private sector.

The panel, which held its first meeting on Jan. 6, is made up of representatives of federal, state and local government and business leaders from across the state with support from NCDOT staff and a consultant team. The panel was created in response to recent legislation that calls for a 25 percent reduction of both the nitrogen oxide emission levels and number of vehicle miles traveled in the state, and charges the departments of Transportation, Administration and Environment and Natural Resources to oversee the effort to meet these goals. The plan is scheduled to be complete by August.

-more-

Governor's Press Office
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North Carolina had three of the top 25 metropolitan areas in the country for ozone pollution, as rated by the American Lung Association. The annual national study by The Road Information Program (TRIP) lists those same areas in the top 10 in percentage increase in commuting time from 1990 to 2000. In addition, a large number of counties, both urban and rural, are expected to be identified this year by the U.S. Environmental Protection Agency as being in non-attainment of national air quality standards.

Panel Members

Gene Conti, Chief Deputy Secretary of Transportation, Chair (State Government)
John Phelps, Manager of Facilities and Security for Corning, Inc. in Wilmington (Business)
Jim Palermo, Executive Vice President of Bank of America in Charlotte (Business)
Kennon Borden, Partner with Borden Real Estate in Durham (Developer)
Crystal Bunch, Coordinator of Smart Commute @RTP in the Research Triangle Park (Technical)
Lawless Bean, Coordinator of the Wilmington Regional TDM Program (Technical)
Beau Mills, Director of Intergovernmental Relations for the N.C. Metropolitan Coalition League of Municipalities in Raleigh (Technical)
Nancy Dunn, N.C. Board of Transportation member from Winston-Salem (Transportation)
Marion Cowell, N.C. Board of Transportation member from Charlotte (Transportation)
Ellen Reckhow, Chair of the Durham County Board of Commissioners (Local Government)
Charles Worley, Mayor of Asheville (Local Government)
Bill Laxton, Director of the U.S. Environmental Protection Agency, Office of Administration and Resources Management in RTP (Federal Government)
Dempsey Benton, Chief Deputy Secretary of the N.C. Department of Environment and Natural Resources (State Government)
Judith Bell, Human Resources Partner for the Office of State Personnel (State Government)
Nina Slozburg, Napro Communications in Raleigh (Marketing)
Elaine Lyerly, President of Lyerly Marketing in Charlotte (Marketing)

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GENERAL ASSEMBLY OF North Carolina
SESSION 1999

SESSION LAW 1999-328
SENATE BILL 953

AN ACT TO ENACT THE AMBIENT AIR QUALITY IMPROVEMENT ACT OF 1999.

Whereas, the Constitution of North Carolina declares that the policy of this State is to conserve and protect State lands and waters for the benefit of all North Carolina citizens and to control and limit air pollution within the State; and

Whereas, the State has enacted comprehensive statutory and regulatory protections for reducing air pollution from stationary sources; and

Whereas, ozone air pollution adversely affects the health and welfare of the citizens of North Carolina through the impairment of lung function and exacerbation of asthma and other diseases of the lung; and

Whereas, visibility at some of the State's places of beauty, such as the Great Smoky Mountains National Park and the Blue Ridge Mountain range, has been impaired by ozone air pollution that is created by the reaction of nitrogen oxides (NOx) and other chemicals in sunlight; and

Whereas, the decentralized system of inspection stations effectively uses a public-private partnership to enforce motor vehicle pollution controls; and

Whereas, gains in motor vehicle pollution control technology have been offset by increased vehicle use, resulting in greater emissions of nitrogen oxides (NOx) and greater ozone air pollution; and

Whereas, the sulfur contained in gasoline impedes the effectiveness of catalytic converters, the devices that reduce the amount of pollution emitted from vehicle tailpipes, thereby degrading the emission control systems of vehicles; and

Whereas, new motor vehicle pollution control technology is more sensitive to the sulfur content of fuels and will require new emissions inspection methods; and

Whereas, reducing emissions of nitrogen oxides (NOx) from motor vehicles by twenty-five percent (25%) within the next 10 years will complement the State's stationary source control strategy; and

Whereas, reducing the growth of vehicle miles traveled in the State by twenty-five percent (25%) within the next 10 years will complement the State's controls of nitrogen oxide (NOx) emissions from stationary sources; and

Whereas, leaking underground storage tanks and tanker trucks release quantities of volatile organic compounds into the air, which mix with nitrogen oxides (NOx) to form ground level ozone; and

Whereas, clean burning fuels, alternative fueled vehicles, and low emission vehicle usage should be encouraged statewide; and

Whereas, the State must lead the way in combating ground level ozone pollution from motor vehicles through its own purchases and policies; Now, therefore,

The General Assembly of North Carolina enacts:

PART I. STATEWIDE GOALS

Section 1.1. It shall be the goal of the State to reduce emissions of nitrogen oxides (NOx) from all sources by at least twenty-five percent (25%) by 1 July 2009. It shall be the goal of the State to reduce the growth of vehicle miles traveled in the State by at least twenty-five percent (25%) of that growth that would otherwise occur by 1 July 2009. The Department of Transportation shall evaluate progress toward achieving these goals in each fiscal year and shall report their findings and recommendations as to any measures that may be needed to achieve these goals to the Environmental Review Commission on or before 1 October of each year beginning 1 October 2000.

PART II. SULFUR CONTENT OF MOTOR FUELS

Section 2.1. Article 3 of Chapter 119 of the General Statutes is amended by adding a new section to read:

"**§ 119-26.2. Sulfur content standards.**

(a) No person shall manufacture, sell, or offer for sale gasoline that contains a concentration of sulfur greater than 30 parts per million except that a person may manufacture, sell, or offer for sale gasoline that contains a concentration of sulfur of not more than 80 parts per million if the average concentration of sulfur in the gasoline manufactured, sold, or offered for sale by that person is 30 parts per million or less. The average concentration of sulfur contained in gasoline shall be determined on the basis of a one-year period established by rule.

(b) The Gasoline and Oil Inspection Board shall adopt

rules to implement this section."

Section 2.2. Section 2.1 of this act becomes effective as provided in this section. No later than 1 July 2000, the Governor shall determine whether the United States Environmental Protection Agency has adopted, pursuant to the Notice of Proposed Rulemaking published on 13 May 1999 in the Federal Register, Volume 64, Number 92, Page 26003 et seq., regulations applicable to gasoline manufactured, sold, and offered for sale in this State that limit the sulfur content of gasoline to a concentration equal to or less than the concentration set out in Section 2.1 of this act. If the Governor so determines, the Governor shall issue an Executive Order setting out the date on which Section 2.1 of this act becomes effective, which shall be the date on which the federal regulation becomes effective in this State. Otherwise, Section 2.1 of this act becomes effective 1 January 2004. If the United States Environmental Protection Agency promulgates a regulation that imposes a limit on the concentration of sulfur in gasoline other than that set out in G.S. 119-26.2, as enacted by Section 2.1 of this act, it is the intention of the General Assembly to review the limit established in G.S. 119-26.2. In that event, the Environmental Review Commission shall review the limit on the concentration of sulfur in gasoline and report its findings and recommendations, if any, to the General Assembly.

Section 2.3. G.S. 119-26.1 reads as rewritten:

"§ 119-26.1. ~~Oxygen content standards~~ Content of motor fuels and reformulated gasoline.

(a) Rules adopted pursuant to G.S. 143-215.107(a)(9) to regulate the ~~oxygen~~ content of ~~gasoline~~ motor fuels or to require the use of reformulated gasoline shall be implemented by the Department of Agriculture and Consumer Services and the Gasoline and Oil Inspection Board. Such rules shall be implemented within any area specified by the Environmental Management Commission when the Commission certifies to the Commissioner of Agriculture that implementation:

(1) Will improve the ambient air quality within the specified county or counties;

(2) Is necessary to achieve attainment or preclude violations of the National Ambient Air Quality Standards; or

(3) Is otherwise necessary to meet federal requirements.

(b) The Department of Agriculture and Consumer Services and the Gasoline and Oil Inspection Board may adopt rules to implement this section. Rules shall be consistent with the implementation schedule and rules adopted by the Environmental Management Commission.

(c) The Commissioner of Agriculture may assess and collect civil penalties for violations of rules adopted under G.S. 143-215.107(a)(9) or this section in accordance with G.S. 143-215.114A. The Commissioner of Agriculture may institute a civil action for injunctive relief to restrain, abate, or prevent a violation or threatened violation of rules adopted under G.S. 143-215.107(a)(9) or this section in accordance with G.S. 143-215.114C. The assessment of a civil penalty under this section and G.S. 143-215.114A or institution of a civil action under G.S. 143-215.114C and this section shall not relieve any person from any other penalty or remedy authorized under this Article.

(c1) The clear proceeds of civil penalties assessed pursuant to this subsection shall be remitted to the Civil Penalty and Forfeiture Fund in accordance with G.S. 115C-457.2.

(d) The Commissioner of Agriculture may delegate his powers and duties under this subsection to the Director of the Standards Division of the Department of Agriculture and Consumer Services."

PART III. MOTOR VEHICLE EMISSIONS INSPECTION AND MAINTENANCE

Section 3.1. Article 21B of Chapter 143 of the General Statutes is amended by adding a new section to read:

"ß 143-215.107A. Motor vehicle emissions testing and maintenance program.

(a) General Provisions. --

(1) G.S. 143-215.107(a)(6) shall be implemented as provided in this section.

(2) Motor vehicle emissions inspections shall be performed by a person who holds an emissions inspection mechanic license issued as provided in G.S. 20-183.4A(c) at a station that holds an emissions inspection station license issued under G.S. 20-183.4A(a) or at a place of business that holds an emissions self-inspector license issued as provided in G.S. 20-183.4A(d). Motor vehicle emissions inspections may be performed by a decentralized network of test-and-repair stations as described in 40 Code of Federal Regulations ß 51.353 (1 July 1998 Edition). The Commission may not require that motor vehicle emissions inspections be performed by a network of centralized or decentralized test-only stations.

(b) Type of Test Required. -- Motor vehicle emissions inspections shall be performed using the two-mode Acceleration Simulation Mode (ASM) test described in Federal Register, Volume 57, Number 215, (5 November 1992), Pages 52955 to 52996.

(c) Counties Covered. -- Motor vehicle emissions inspections shall be performed only in the following counties:

Cabarrus, Durham, Forsyth, Gaston, Guilford, Mecklenburg, Orange, Union, and Wake.

(d) Additional Counties. -- The Commission may require that motor vehicle emissions inspections be performed in counties in addition to those set out in subsection (c) of this section. In determining whether to require that motor vehicle emissions inspections be performed in a county, the Commission may consider the population of, and distribution of population in, the county; the projected change in population of, and distribution of population in, the county; the number of vehicles registered in the county; the projected change in the number of vehicles registered in the county; vehicle miles traveled in the county; the projected change in vehicle miles traveled in the county; current and projected commuting patterns in the county; and the current and projected impact of these factors on attainment of air quality standards in the county and in areas outside the county. The Commission may not require that motor vehicle emissions testing be performed in any county with a population of less than 40,000 based on the most recent population estimates prepared by the State Planning Officer. The Commission may not require that motor vehicle emissions testing be performed in any county in which the number of vehicle miles traveled per day is less than 900,000, based on the most recent estimates prepared by the Department of Transportation. In order to disapprove a rule that requires that motor vehicle emissions inspections be performed in one or more additional counties, a bill introduced pursuant to G.S. 150B-21.3(b) must amend subsection (c) of this section to add one or more other counties in which the total population and vehicle miles traveled per day equal or exceed the total population and vehicle miles traveled in the county or counties listed in the rule that the bill would disapprove."

Section 3.2. The Environmental Management Commission shall adopt rules to implement G.S. 143-215.107A(b), as enacted by Section 3.1 of this act. These rules shall become effective on 1 July 2002. The Environmental Management Commission shall not require that motor vehicle emissions inspections be performed in any county pursuant to G.S. 143-215.107A(d), as enacted by Section 3.1 of this act, prior to 1 July 2006. The Environmental Management Commission shall not require motor vehicle emissions inspections for diesel powered vehicles prior to 1 July 2001.

Section 3.3. Effective 1 July 2003, G.S. 143-215.7A(c), as enacted by Section 3.1 of this act, reads as rewritten:

"(c) Motor vehicle emissions inspections shall be performed ~~only~~ in the following counties: Cabarrus,

Catawba, Cumberland, Davidson, Durham, Forsyth, Gaston, Guilford, Iredell, Johnston, Mecklenburg, Orange, Rowan, Union, and Wake."

Section 3.4. Effective 1 January 2004, G.S. 143-215.7A(c), as enacted by Section 3.1 of this act and amended by Section 3.3 of this act, reads as rewritten:

"(c) Motor vehicle emissions inspections shall be performed in the following counties: Alamance, Cabarrus, Catawba, Chatham, Cumberland, Davidson, Durham, Forsyth, Franklin, Gaston, Guilford, Iredell, Johnston, Lee, Lincoln, Mecklenburg, Moore, Orange, Randolph,
Rowan, Stanly, Union, and Wake."

Section 3.5. Effective 1 July 2004, G.S. 143-215.7A(c), as enacted by Section 3.1 of this act and amended by Sections 3.3 and 3.4 of this act, reads as rewritten:

"(c) Motor vehicle emissions inspections shall be performed in the following counties: Alamance, Buncombe, Cabarrus, Catawba, Chatham, Cleveland, Cumberland, Davidson, Durham, Forsyth, Franklin, Gaston, Granville, Guilford, Harnett, Iredell, Johnston, Lee, Lincoln, Mecklenburg, Moore, Orange, Randolph, Rockingham, Rowan, Stanly, Union, and Wake."

Section 3.6. Effective 1 January 2005, G.S. 143-215.7A(c), as enacted by Section 3.1 of this act and amended by Sections 3.3 through 3.5 of this act, reads as rewritten:

"(c) Motor vehicle emissions inspections shall be performed in the following counties: Alamance, Buncombe, Cabarrus, Catawba, Chatham, Cleveland, Cumberland, Davidson, Durham, Edgecombe, Forsyth, Franklin, Gaston, Granville, Guilford, Harnett, Iredell, Johnston, Lee, Lenoir, Lincoln, Mecklenburg, Moore, Nash, Orange, Pitt, Randolph, Robeson, Rockingham, Rowan, Stanly, Union, ~~and Wake~~. Wake, Wayne, and Wilson."

Section 3.7. Effective 1 July 2005, G.S. 143-215.7A(c), as enacted by Section 3.1 of this act and amended by Sections 3.3 through 3.6 of this act, reads as rewritten:

"(c) Motor vehicle emissions inspections shall be performed in the following counties: Alamance, Buncombe, Burke, Cabarrus, Caldwell, Catawba, Chatham, Cleveland, Cumberland, Davidson, Durham, Edgecombe, Forsyth, Franklin, Gaston, Granville, Guilford, Harnett, Haywood, Henderson, Iredell, Johnston, Lee, Lenoir, Lincoln, Mecklenburg, Moore, Nash, Orange, Pitt, Randolph, Robeson, Rockingham, Rowan, Rutherford, Stanly, Stokes, Surry, Union, Wake, Wayne, Wilkes, and Wilson."

Section 3.8. Effective 1 January 2006, G.S. 143-215.7A(c), as enacted by Section 3.1 of this act and amended by Sections 3.3 through 3.7 of this act, reads as rewritten:

"(c) Motor vehicle emissions inspections shall be performed in the following counties: Alamance, Brunswick, Buncombe, Burke,

Cabarrus, Caldwell, Carteret, Catawba, Chatham, Cleveland, Craven, Cumberland, Davidson, Durham, Edgecombe, Forsyth, Franklin, Gaston, Granville, Guilford, Harnett, Haywood, Henderson, Iredell, Johnston, Lee, Lenoir, Lincoln, Mecklenburg, Moore, Nash, New Hanover, Onslow, Orange, Pitt, Randolph, Robeson, Rockingham, Rowan, Rutherford, Stanly, Stokes, Surry, Union, Wake, Wayne, Wilkes, and Wilson."

Section 3.9. Sections 3.3 through 3.8 of this act become effective only if G.S. 20-183.7 is amended to increase the fee for motor vehicle emissions inspections no later than 31 December 2000. G.S. 143-215.107A(b), as enacted by Section 3.1 of this act, and Section 3.2 of this act are repealed effective 1 January 2001 unless, prior to 1 January 2001, G.S. 20-183.7 has been amended to increase the fee for motor vehicle emissions inspection.

Section 3.10. The Department of Environment and Natural Resources, with the assistance of the Division of Motor Vehicles of the Department of Transportation and the affected parties, shall study issues related to costs associated with the motor vehicle emissions inspection and maintenance program. The Department shall determine what constitutes a reasonable fee for motor vehicle emissions inspections under the current program and under the enhanced program to be implemented pursuant to G.S. 143-215.107A(b), as enacted by Section 3.1 of this act. In determining what constitutes a reasonable fee, the Department shall consider the cost of emissions inspection equipment, the useful life of the equipment, the average period of time during which a purchaser of this equipment is able to amortize this cost, telephone charges incurred in connection with the registration denial program, whether a fee should be charged to reinspect a vehicle that fails an emissions test after repairs to the vehicle have been made, and whether the State should purchase emissions inspection equipment purchased prior to 10 June 1999 for use in the current program but that will be rendered obsolete by the enhanced program. The Department shall report its findings and recommendations to the Environmental Review Commission on or before 1 February 2000. The Environmental Review Commission, with the assistance of the Fiscal Research Division of the Legislative Services Office, shall evaluate these recommendations. The Environmental Review Commission shall recommend legislation to amend G.S. 20-183.7 to increase the Fee for motor vehicle emissions inspections to the 2000 Regular Session of the 1999 General Assembly.

Section 3.11. G.S. 20-183.2 reads as rewritten:

"ß 20-183.2. Description of vehicles subject to safety or emissions inspection; definitions.

(a) Safety. -- A motor vehicle is subject to a safety inspection in accordance with this Part if it meets all of the following requirements:

(1) It is subject to registration with the Division under Article 3 of this Chapter.

(2) It is not subject to inspection under 49 C.F.R. Part 396, the federal Motor Carrier Safety Regulations.

(3) It is not a trailer whose gross weight is less than 4,000 pounds or a house trailer.

(b) Emissions. -- A motor vehicle is subject to an emissions inspection in accordance with this Part if it meets all of the following requirements:

(1) It is subject to registration with the Division under Article 3 of this Chapter.

(2) It is not a trailer whose gross weight is less than 4,000 pounds, a house trailer, or a motorcycle.

(3) It is a 1975 or later model.

~~(4) It is powered or designed so that it could be powered by gasoline.~~

(5) It meets any of the following descriptions:

a. It is required to be registered in an emissions county.

b. It is part of a fleet that is operated primarily in an emissions county.

c. It is offered for rent in an emissions county.

d. It is a used vehicle offered for sale by a dealer in an emissions county.

e. It is operated on a federal installation located in an emissions county and it is not a tactical military vehicle. Vehicles operated on a federal installation include those that are owned or leased by employees of the installation and are used to commute to the installation and those owned or operated by the federal agency that conducts business at the installation.

f. It is otherwise required by 40 C.F.R. Part 51 to be subject to an emissions inspection.

(c) Definitions. -- The following definitions apply in this Part:

(1) Emissions county. -- A county ~~in which the State either is required by federal law to conduct emissions testing or has agreed in its State Implementation Plan submitted to the federal Environmental Protection Agency to conduct emissions testing. The State~~ listed in G.S. 143-215.107A(c) or designated by the Environmental Management Commission ~~establishes the emissions counties pursuant to rules adopted under G.S. 143-215.107(a)(6).~~ pursuant to

G.S. 143-215.107A(d) and certified to the Commissioner of Motor Vehicles as a county in which the implementation of a motor vehicle emissions inspection program will improve ambient air quality.

(2) Federal installation. -- An installation that is owned by, leased to, or otherwise regularly used as the place of business of a federal agency."

Section 3.12. G.S. 143-215.107 reads as rewritten:

"ß 143-215.107. Air quality standards and classifications.

(a) Duty to Adopt Plans, Standards, etc. - The Commission is hereby directed and empowered, as rapidly as possible within the limits of funds and facilities available to it, and subject to the procedural requirements of this Article and Article 21:

(1) To prepare and develop, after proper study, a comprehensive plan or plans for the prevention, abatement and control of air pollution in the State or in any designated area of the State.

(2) To determine by means of field sampling and other studies, including the examination of available data collected by any local, State or federal agency or any person, the degree of air contamination and air pollution in the State and the several areas of the State.

(3) To develop and adopt, after proper study, air quality standards applicable to the State as a whole or to any designated area of the State as the Commission deems proper in order to promote the policies and purposes of this Article and Article 21 most effectively.

(4) To collect information or to require reporting from classes of sources which, in the judgment of the Environmental Management Commission, may cause or contribute to air pollution. Any person operating or responsible for the operation of air contaminant sources of any class for which the Commission requires reporting shall make reports containing such information as may be required by the Commission concerning location, size, and height of contaminant outlets, processes employed, fuels used, and the nature and time periods or duration of emissions, and such other information as is relevant to air pollution and available or reasonably capable of being assembled.

(5) To develop and adopt emission control standards as in the judgment of the Commission may be necessary to prohibit, abate, or control air pollution commensurate with established air quality standards. ~~The standards may be applied uniformly to the State as a whole or to any area of the State designated by the Commission.~~ This subdivision does not apply to that portion of the

National Emission Standards for Hazardous Air Pollutants for asbestos that governs demolition and renovation as set out in 40 C.F.R. ß 61.141, 61.145, 61.150, and 61.154 (1 July 1993 edition).

(6) To ~~adopt, when necessary and practicable, a program for testing emissions from motor vehicles and to adopt motor vehicle emission standards in compliance with applicable federal regulations.~~ adopt motor vehicle emissions standards; to adopt, when necessary and practicable, a motor vehicle emissions inspection and maintenance program to improve ambient air quality; to require that motor vehicle emissions be monitored while the vehicle is in operation by means of onboard diagnostic equipment (OBD) installed by the vehicle manufacturer; to require manufacturers of motor vehicles to furnish to the Equipment and Tool Institute and, upon request and at a reasonable charge, to any person who maintains or repairs a motor vehicle, all information necessary to fully make use of the onboard diagnostic equipment and the data compiled by that equipment; to certify to the Commissioner of Motor Vehicles that ambient air quality will be improved by the implementation of a motor vehicle emissions inspection and maintenance program in a county. The Commission shall implement this subdivision as provided in G.S. 143-215.107A.

(7) To develop and adopt standards and plans necessary to implement programs for the prevention of significant deterioration and for the attainment of air quality standards in nonattainment areas.

(8) To develop and adopt standards and plans necessary to implement programs to control acid deposition and to regulate the use of sulfur dioxide allowances and nitrogen oxides (NOx) emissions in accordance with Title IV and implementing regulations adopted by the United States Environmental Protection Agency.

(9) To regulate the ~~oxygen~~ content of ~~gasoline,~~ motor fuels, as defined in G.S. 119-16, to require use of reformulated gasoline as the Commission determines necessary, to implement the requirements of Title II and implementing regulations adopted by the United States Environmental Protection Agency, and to develop standards and plans to implement This subdivision. ~~Rules adopted under this subdivision may specify standards for a particular area of the State that differ from standards specified for other areas as may be necessary to improve ambient air quality within a particular area, achieve attainment or preclude violations of the National Ambient~~

~~Air Quality Standards, or to meet other federal requirements.~~ Rules may authorize the use of marketable oxygen credits for gasoline as provided in federal requirements.

(10) To develop and adopt standards and plans necessary to implement requirements of the federal Clean Air Act and implementing regulations adopted by the United States Environmental Protection Agency.

(11) To develop and adopt economically feasible standards and plans necessary to implement programs to control the emission of odors from animal operations, as defined in G.S. 143-215.10B.

(12) To develop and adopt a program of incentives to promote voluntary reductions of emissions of air contaminants, including, but not limited to, emissions banking and trading and credit for voluntary early reduction of emissions.

(13) To develop and adopt rules governing the certification of persons who inspect vehicle mounted tanks used to transport motor fuel and to require that inspection of these tanks be performed only by certified personnel.

(14) To develop and adopt rules governing the sale and service of mobile source exhaust emissions analyzers and to require that vendors of these analyzers provide adequate surety to purchasers for the performance of the vendor's contractual or other obligations related to the sale and service of analyzers.

(b) Criteria for Standards. -- In developing air quality and emission control standards, motor vehicle emissions standards, motor vehicle emissions inspection and maintenance requirements, rules governing the content of motor fuels or requiring the use of reformulated gasoline, and other standards and plans to improve ambient air quality, the Commission shall ~~recognize~~ consider varying local conditions and requirements and may prescribe uniform standards and plans throughout the State or different standards and plans for different counties or areas as may be necessary and appropriate to ~~facilitate accomplishment of the stated~~ improve ambient air quality in the State or within a particular county or area, achieve attainment or preclude violations of state or national ambient air quality standards, meet other federal requirements, or achieve the purposes of this Article and Article 21.

(c) Chapter 150B of the General Statutes governs the adoption and publication of rules under this Article."

Section 3.13. G.S. 20-183.8F reads as rewritten:

"ß 20-183.8F. Requirements for giving ~~certain emissions~~ license holders notice of violations and for taking summary action.

(a) Finding of Violation. -- When an auditor of the Division finds that ~~an emissions~~ a violation has occurred that could result in the suspension or revocation of an ~~emissions~~ inspection station license, ~~an emissions~~ a self-inspector license, or ~~an emissions~~ a mechanic license, the auditor must give the affected license holder written notice of the finding. The notice must be given within five business days after the violation occurred. The notice must state the period of suspension or revocation that could apply to the violation and any monetary penalty that could apply to the violation. The notice must also inform the license holder of the right to a hearing if the Division charges the license holder with the violation.

(b) Notice of Charges. -- When the Division decides to charge an ~~emissions~~ inspection station, ~~an emissions~~ a self-inspector, or ~~an emissions~~ a mechanic with a violation that could result in the suspension or revocation of the person's ~~emissions~~ license, an auditor of the Division must deliver a written statement of the charges to the affected license holder. The statement of charges must inform the license holder of this right, instruct the person on how to obtain a hearing, and inform the license holder of the effect of not requesting a hearing. The license holder has the right to a hearing before the license is suspended or revoked. G.S. 20-183.8E sets out the procedure for obtaining a hearing.

(c) Exception for Summary Action. -- The right granted by subsection (b) of this section to have a hearing before ~~an emissions~~ a license is suspended or revoked does not apply if the Division summarily suspends or revokes the license after a judge has reviewed and authorized the proposed action. A license issued to an ~~emissions~~ inspection station, ~~an emissions~~ a self-inspector, or ~~an emissions~~ a mechanic is a substantial property interest that cannot be summarily suspended or revoked without judicial review."

Section 13.14. G.S. 20-183.8G reads as rewritten:

"§ 20-183.8G. Administrative and judicial review.

(a) Right to Hearing. -- A person who applies for a license or registration under this Part or who has a license or registration issued under this Part has the right to a hearing when any of the following occurs:

(1) The Division denies the person's application for a license or registration.

(2) The Division delivers to the person a written statement of charges of ~~an emissions~~ a violation that could result in the suspension or revocation of the person's ~~emissions~~ license.

(3) The Division summarily suspends or revokes the person's license following review and authorization of the proposed adverse action by a judge.

(4) The Division assesses a civil penalty against the person.

(5) The Division issues a warning letter to the person.

(6) The Division cancels the person's registration.

(b) Hearing After Statement of Charges. -- When ~~an emissions~~ a license holder receives a statement of charges of ~~an emissions~~ a violation that could result in the suspension or revocation of the person's license, the person can obtain a hearing by making a request for a hearing. The person must make the request to the Division within 10 days after receiving the statement of the charges. A person who does not request a hearing within this time limit waives the right to a hearing. The Division must hold a hearing requested under this subsection within three business days after receiving the request unless the person requesting the hearing asks for additional time to prepare for the hearing. A person may ask for no more than seven additional business days to prepare. If the additional time requested is within this limit, the Division must grant a person the additional time requested. The hearing must be held at the location designated by the Division. Suspension or revocation of the license is stayed until a decision is made following the hearing.

If a person does not request a hearing within the time allowed for making the request, the proposed suspension or revocation becomes effective the day after the time for making the request ends. If a person requests a hearing but does not attend the hearing, the proposed suspension or revocation becomes effective the day after the date set for the hearing.

(c) Hearing After Summary Action. -- When the Division summarily suspends a license issued under this Part after judicial review and authorization of the proposed action, the person whose license was suspended or revoked may obtain a hearing by filing with the Division a written request for a hearing. The request must be filed within 10 days after the person was notified of the summary action. The Division must hold a hearing requested under this subsection within 14 days after receiving the request.

(d) All Other Hearings. -- When this section gives a person the right to a hearing and subsection (b) or (c) of this section does not apply to the hearing, the person may obtain a hearing by filing with the Division a written request for a hearing. The request must be filed within 10 days after the person receives written notice of the action for which a hearing

is requested. The Division must hold a hearing within 90 days after the Division receives the request.

(e) Review by Commissioner. -- The Commissioner may conduct a hearing required under this section or may designate a person to conduct the hearing. When a person designated by the Commissioner holds a hearing and makes a decision, the person who requested the hearing has the right to request the Commissioner to review the decision. The procedure set by the Division governs the review by the Commissioner of a decision made by a person designated by the Commissioner.

(f) Decision. -- A decision made after a hearing on the imposition of a monetary penalty against a motorist for an emissions violation or on a Type I, II, or III emissions violation by an emissions license holder must uphold any monetary penalty, license suspension, license revocation, or warning required by G.S. 20-183.8A or G.S. 20-183.8B, respectively, if the decision contains a finding that the motorist or license holder committed the act for which the monetary penalty, license suspension, license revocation, or warning was imposed. A decision made after a hearing on any other action may uphold or modify the action.

(g) Judicial Review. -- Article 4 of Chapter 150B of the General Statutes governs judicial review of an administrative decision made under this section."

PART IV. STATE AGENCY GOALS, PLANS, DUTIES, AND REPORTS; OTHER PROVISIONS

Section 4.1. As used in this Part, alternative-fueled vehicle means a motor vehicle capable of operating on electricity; natural gas; propane; hydrogen; reformulated gasoline; ethanol; other alcohol fuels, separately or in mixtures of eighty-five percent (85%) or more of alcohol by volume; or fuels, other than alcohol, derived from biological materials. For purposes of this Part, a vehicle that has been converted to operate on a fuel other than the fuel for which it was originally designed is not a new or replacement vehicle.

Section 4.2. It shall be the goal of the State that on and after 1 January 2004 at least seventy-five percent (75%) of the new or replacement light duty cars and trucks purchased by the State will be alternative-fueled vehicles or low emission vehicles. The Department of Administration, the Department of Transportation, and the Department of Environment and Natural Resources shall jointly develop a plan to achieve this goal and to fuel and maintain these vehicles. The Department of Administration shall report on progress in developing and implementing this plan and achieving this goal to the

Environmental Review Commission on 1 September of each year beginning 1 September 2000. For purposes of this section, a light duty car or truck is one that is rated at 8,500 pounds or less Gross Vehicle Weight Rating (GVWR).

Section 4.3. The Department of Public Instruction, the Department of Transportation, and the Department of Environment and Natural Resources shall jointly develop a draft plan for the purchase of school buses under which, beginning 1 January 2004, at least fifty percent (50%) of the new and replacement public school buses purchased for use in counties with a population of at least 100,000, based on the most recent population estimates prepared by the Office of State Planning, will be alternative-fueled or low emission vehicles. These departments shall invite interested parties to participate in the development of the draft plan. The draft plan will consider the infrastructure requirements that would be needed to fuel and maintain these buses and the costs and benefits of implementation of the plan, including the impact on ambient air quality. The Department of Public Instruction shall submit the draft plan to the Environmental Review Commission on or before 1 September 2000.

Section 4.4. The Department of Transportation and the Department of Environment and Natural Resources shall jointly develop a draft plan for the purchase of buses under which, beginning 1 January 2004, at least fifty percent (50%) of the new and replacement buses purchased to provide public transportation in counties in which motor vehicle emissions inspections are required to be performed under subsection (c) or (d) of G.S. 143-215.107A will be alternative-fueled or low emission vehicles. These departments shall invite interested parties to participate in the development of the draft plan. The draft plan will consider the infrastructure requirements that would be needed to fuel and maintain these buses and the costs and benefits of implementation of the plan, including the impact on ambient air quality. The Department of Transportation shall submit the draft plan to the Environmental Review Commission on or before 1 September 2000.

Section 4.5. The Department of Transportation, the Department of Commerce, and the Department of Environment and Natural Resources shall jointly develop recommendations for incentives to increase the use of alternative-fueled and low emission light duty cars and trucks in privately owned fleets. The Department of Environment and Natural Resources shall submit these recommendations to the Environmental Review Commission on or before 1 February 2000. The Department of Environment and Natural Resources shall report on progress in increasing the use of alternative-fueled and low emission light duty cars and trucks in privately owned fleets to the Environmental Review

Commission on or before 1 October of each year beginning 1 October 2001.

Section 4.6. The Department of Administration, the Office of State Personnel, the Department of Transportation, and the Department of Environment and Natural Resources shall jointly develop and periodically update a plan to reduce vehicle miles traveled by State employees and vehicle emissions resulting from job-related travel, including commuting to and from work. The plan shall consider the use of carpooling, vanpooling, public transportation, incentives, and other appropriate strategies. The Office of State Personnel shall report on the development and implementation of the plan to the Joint Legislative Transportation Oversight Committee and the Environmental Review Commission on or before 1 October of each year beginning 1 October 2000.

Section 4.7. The Department of Transportation, the Department of Commerce, and the Department of Environment and Natural Resources shall jointly develop and periodically update a plan to reduce vehicle miles traveled by private sector employees and vehicle emissions resulting from job-related travel, including commuting to and from work. The plan shall consider the use of incentives for both private sector employees and employers, carpooling, vanpooling, public transportation, and other appropriate strategies. The Department of Transportation shall report on the development and implementation of the plan to the Joint Legislative Transportation Oversight Committee and the Environmental Review Commission on or before 1 October of Each year beginning 1 October 2000.

Section 4.8. The Office of State Personnel shall implement a policy that promotes telework/telecommuting for State employees as recommended by the report of the State Auditor entitled "Establishing a Formal Telework/Telecommuting Program for State Employees" and dated October 1997. It shall be the goal of the State to reduce State employee vehicle miles traveled in commuting by twenty percent (20%) without reducing total work hours or productivity. The Office of State Personnel Shall report on progress in implementing this section to The Environmental Review Commission on or before 1 October of each year beginning 1 October 2000.

Section 4.9. The Environmental Management Commission shall initiate rule making to regulate the emissions of nitrogen oxides (NOx) from complex sources pursuant to G.S. 143-215.109 no later than 1 October 1999. The Environmental Management Commission shall report on the progress of this rule making as a part of each quarterly report the Commission makes to the Environmental Review Commission pursuant to G.S. 143B-282(b).

Section 4.10. Chapter 136 of the General Statutes Is amended by adding a new Article to read:

"ARTICLE 16.

"Planning.

"ß 136-200. Definitions.

As used in this Article:

(1) `Conformity' means the extent to which transportation plans, programs, and projects conform to federal air quality requirements as specified in 40 Code of Federal Regulations, Part 93, Subpart A (1 July 1998 Edition).

(2) `Department' means the Department of Transportation.

(3) `Interface' means a relationship between streams of traffic that efficiently and safely maximizes the mobility of people and goods within and through urbanized areas and minimizes transportation related fuel consumption and air pollution.

(4) `Metropolitan Planning Organization' or `MPO' means an agency that is designated as a Metropolitan Planning Organization in accordance with 23 U.S.C. ß 134.

(5) `Regionally significant project' has the same meaning as under 40 Code of Federal Regulations 93.101 (1 July 1998 Edition).

(6) `Regional travel demand model' means a model of a region, defined in the model, that is approved by the Department and each Metropolitan Planning Organization whose boundaries include any part of the region and that uses socioeconomic data and projections to predict demands on a transportation network.

"ß 136-201. Plan for intermodal interface.

When planning a regionally significant transportation project, the Department shall consider design alternatives that will facilitate the cost-effective interface of the project with other existing or planned transportation projects, including highway, airport, rail, bus, bicycle, and pedestrian facilities. The Department of Transportation shall record its consideration of these design alternatives in the planning documents for the project.

"ß 136-202. Metropolitan planning organizations.

(a) Each Metropolitan Planning Organization shall base all transportation plans, metropolitan transportation improvement programs, and conformity determinations on the most recently completed regional travel demand model.

(b) Each Metropolitan Planning Organization shall update its transportation plans in accordance with the scheduling requirements stated in 23 Code of Federal Regulations 450.322 (1 April 1999 Edition).

(c) The Department, the metropolitan planning organizations, and the Department of Environment and Natural

Resources shall jointly evaluate and adjust the regions defined in each regional travel demand model at least once every five years and no later than 1 October of the year following each decennial federal census. The evaluation and adjustment shall be based on decennial census data and the most recent populations estimates certified by the State Planning Officer. The adjustment of these boundaries shall reflect current and projected patterns of population, employment, travel, congestion, commuting, and public transportation use and the effects of these patterns on air quality.

(d) The Department shall report on the evaluation and adjustment of the boundaries of the area served by each Metropolitan Planning Organization to the Joint Legislative Transportation Oversight Committee and the Environmental Review Commission no later than 1 November of each year in which the regions are evaluated and adjusted.

"ß 136-203. Joint study groups.

The Department and the Department of Environment and Natural Resources shall convene a joint study group to examine options to maximize the positive impacts and minimize the adverse impacts on air quality of transportation investments. A joint study group shall be convened for each major travel corridor in which there has been air quality violations within the previous fiscal year or that affects an area in which there has been air quality violations within the previous fiscal year. Each joint study group shall include at least 10 members, half of whom shall be appointed by the Secretary of Transportation and half of whom shall be appointed by the Secretary of Environment and Natural Resources. Each group shall include representatives from the Department and the Department of Environment and Natural Resources, affected units of local government, private businesses, and nonprofit public interest organizations. The Department and the Department of Environment and Natural Resources shall jointly report on the work, findings, and recommendations of each joint study group to the Joint Legislative Transportation Oversight Committee and the Environmental Review Commission on or before 1 October of each year."

Section 4.11. The Department of Transportation and the Department of Environment and Natural Resources shall make the first joint report required by G.S. 136-203, as enacted by Section 4.10 of this act, on or before 1 October 2000.

Section 4.12. G.S. 143-215.94T(a) is amended by adding
a new subdivision to read:

"(12) Tank tightness testing procedures and certification of persons who conduct tank tightness tests."

Section 4.13. G.S. 143B-282(a)(2)h. reads as rewritten:

"h. Governing underground tanks used for the storage of oil or hazardous substances ~~or oil~~ pursuant to ~~Article 21 or Article 21A~~ Articles 21, 21A, or 21B of Chapter 143 of the General ~~Statutes.~~ Statutes, including inspection and testing of these tanks and certification of persons who inspect and test tanks."

PART V. MISCELLANEOUS PROVISIONS

Section 5.1. This act shall not be construed to obligate the General Assembly to appropriate any funds to implement the provisions of this act. Every State agency to which this act applies shall implement the provisions of this act from funds otherwise appropriated or available to that agency.

Section 5.2. The headings to the Parts of this act are intended as a convenience to the reader and are for reference only. The headings do not expand, limit, or define the text of this act.

Section 5.3. If any section or provision of this act is declared unconstitutional or invalid by the courts, the unconstitutional or invalid section or provision does not affect the validity of this act as a whole or any part of this act other than the part declared to be unconstitutional or invalid.

Section 5.4. Except as otherwise provided in this act, this act is effective when it becomes law.

In the General Assembly read three times and ratified this the 20th day of July, 1999.

s/ Dennis A. Wicker
President of the Senate

s/ James B. Black
Speaker of the House of Representatives

s/ James B. Hunt, Jr.
Governor

Approved 10:50 a.m. this 21st day of July, 1999

Appendix B
Survey Questionnaire

Transportation Demand Management
Program Information and Background

Program Name: _____

Contact Person: _____

Street Address: _____

Mailing Address: _____

Phone: _____

Fax: _____

Email: _____ Website: _____

Information is being requested of you to provide background information to the project team that will visit you to learn more about your program. The following is a list of information we would like to have ready by: _____ so the project team can arrive for an interview and analysis of people in and around your organization. The focus is on current policy and practice (those developed in the last five years), although additional information will be useful as background.

1. Please provide copies of the following:
    a. Organization Chart
    b. Mission Statement of definition or purpose of work
    c. Goals and objectives by year for the last five years
    d. Budget for the last five years (make sure different funding levels and funding sources are shown)
    e. Measurements of effectiveness reported for the last five years as well as any type of program evaluation – accountability that is built into the programs
2. Please provide program history: when it started, what were the services / focus areas, champions (individuals and organizations), expected changes for the next few years. In addition, please answer the following
    a. Are you a (a) Commuter Assistance Program operating within a public transportation authority or city department, (b) Transportation Management Association, (c) Statewide Service – please circle those that apply and give background on them (ordinances, …). In addition, if there is a TMA, please complete the employer information separately from the organization.
    b. Please provide a matrix and supporting information of your program activities (check the activity and complete the information)

☐ Carpool Matching / Formation

- Product (s) used to assist with this activity: _____
- Measure of Success: _____

☐ Vanpool Matching

- Organization owned: how many are in operation _____
- Owner operated: how many are in operation _____
- Employer owned: how many are in operation _____
- 3rd Party Vanpools: how many are in operation _____

☐ Supporting Activities:

☐ Guaranteed Ride Home

☐ Preferential Parking

☐ Commuter Benefits (please circle: employer, employee)

☐ Flex – time

☐ Staggered work hours

☐ Telecommuting

☐ Bicycle / Pedestrian

☐ Compressed work week

☐ Transit Program: (please describe)

☐ Upass _____

☐ Shuttle Services _____

☐ Pass programs _____

c. Describe your employer activities – Please create a matrix of the following for employers participating in your program:

   i. Employer Name

ii. Contact Name, Title, Phone Number, email

iii. Address

iv. Number of Employees at this site

v. What are their successes and why?

d. Describe your general public activities – Please create a matrix of the following for employers participating in your program:

i. What are their successes and why?

3. Do you have a Board

a. If yes,

i. What is their function? Do they adopt a work plan and budget each year?

ii. Do you have by laws adopted for them?

iii. What information do you report to them?

iv. How often do they meet? How active / supportive are they? (Give examples)

b. If no,

i. Who approves your workplan?

ii. What is your relationship to them?

iii. What information do you report to them?

4. What are the products / programs marketed by your organization for the last five years (by year)? Please provide productivity factors as they relate to these efforts. For example, number of vehicles owned, number of vanpools in operation, number of passengers carried, number of carpool matches provided and so forth.

5. If you operate vanpools, please describe your maintenance and emergency procedures.

6. What market research have you done in the last five years? What were the changes in your program delivery based on this research?

7. Year end activities

a. Who and how do you report them? (please provide copies of the last five years)

Appendix C

Interview Schedule and Participants

	Name	Interview Date	Other Information
NCDOT	David King	January 3, 2003	NCDOT Deputy Secretary
Smart Commute	Ruth McCullers	January 6, 2003	External Affairs Manager, CISCO
Smart Commute	Susan Clarke	January 6, 2003	Chair, Smart Commute, IBM
Smart Commute	Jamie Nunnelly	January 6, 2003	Director of Communications, Research Triangle Foundation
Smart Commute	Valerie Broadwell	January 6, 2003	US EPA
Smart Commute	Jill Miller Denning	January 6, 2003	Staff Comm., Research Triangle Institute
Smart Commute	Dick Sloane	January 6, 2003	Resource Recovery Specialist, NIEHS
Smart Commute	Joe Milazzo	January 6, 2003	Executive Director, Regional Transportation Alliance
Nortel	Stephen Jones	January 7, 2003	VP Human Resources, NORTEL
Duke University	Dr. Nannerl Keohane	January 7, 2003	President, Duke University
Duke University	Micheal Palmer	January 7, 2003	Director of Community Affairs, Duke University
NC DHHS	Kathy McGhee	January 7, 2003	Dorthea Dix Campus
City of Durham	Marcia Conner	January 7, 2003	City Manager, City of Durham
City of Durham	Cha'ssem Anderson	January 7, 2003	Transportation Planner, City of Durham
Chapel Hill	Cal Horton	January 7, 2003	Town Manager, Town of Chapel Hill
NCDOT	Dan Thomas	January 8, 2003	NCDOT, Statewide Planning
NCDOT	Thomas Wright	January 8, 2003	Office of State Personnel
NCDOT	Judith Bell	January 8, 2003	Office of State Personnel
NCDOT	Dempsey Benton	January 8, 2003	Chief Deputy Secretary, DENR
NCDOT	Jill Vitas	January 8, 2003	DENR
NCDOT	Carlton Myrick	January 8, 2003	Deputy Secretary of the Dept of Administration
NCDOT	Tamra Shaw	January 8, 2003	NCDOT PTD
BSBSNC	Robert Greczyn	January 9, 2003	President and CEO, BCBS of NC
BSBSNC	Michael Patrick	January 9, 2003	CFM, BCBS of NC
Rural Job Access	Ron Byrd	January 9, 2003	Harnett County DSS
Rural Job Access	Ralph Thurman	January 9, 2003	Transportation Manager, Hart Area Rural Transit System
Rural Job Access	Gayle Worley	January 9, 2003	Transportation Program Consultant, PTD, NCDOT
Rural Job Access	David Williford	January 9, 2003	MJ Soffe

	Name	Interview Date	Other Information
Rural Job Access	Michelle Mitchell	January 9, 2003	Pinnacle Staffing Manager, Tyco Plastics
Rural Job Access	Israel Reyes	January 9, 2003	MJ Soffe
Rural Job Access	Johnny Chestnut	January 9, 2003	MJ Soffe
Rural Job Access	Sterling Webster	January 9, 2003	Ramada Inn, Outer Banks (telephone interview)
Rural Job Access	Gayle Overton	January 9, 2003	Comfort Inn, Outer Banks (telephone interview)
Wilmington	Harper Peterson	January 10, 2003	Mayor, City of Wilmington
Wilmington	Dick Scott	January 10, 2003	Board Chair, Wilmington Transit Authority
Wilmington	Albert Eby	January 10, 2003	General Manager, Wilmington Transit Authority
Wilmington	Julia Boseman	January 10, 2003	County Commissioner, New Hanover County
Wilmington	Howard Loving	January 10, 2003	VP Infrastructure, Chamber
Wilmington	Mick Wayne	January 10, 2003	Director of Transportation, County Schools
Wilmington	Al McKenzie	January 10, 2003	Director of Human Resources, City of Wilmington
Wilmington	Ron Moore	January 10, 2003	VP Human Resources New Hanover Regional Medical Center
PART	Larry Williams	January 22, 2003	Mayor of Rural Hall, TAC Chair
PART	Dennis Magovern	January 22, 2003	Special Assistant to the Forsyth County Manager
PART	Greg Turner	January 22, 2003	Assistant City Manager, City of Winston-Salem
PART	Dr. Otis Tillman	January 22, 2003	Piedmont Triad International Airport Authority
PART	Gary Lloyd	January 22, 2003	Employer representative, Wilson-Cooke, former police officer
PART	Sandy Carmany	January 22, 2003	City Council, City of Greensboro, PART Board Chairperson
Asheville	Charles Worley	February 12, 2003	Mayor, City of Asheville
Asheville	Scott Shuford	February 12, 2003	Planning Director, City of Asheville
Asheville	Brownie Newman	February 12, 2003	Western Carolina Alliance
Asheville	Bruce Black	February 12, 2003	Director of Transportation, Asheville Transit System
Asheville	Lou Bissette	February 12, 2003	Former Mayor, Attorney in private practice and chair of citizens group for I-26 committee
Hickory	Tom Carr	February 27, 2003	Executive Director, City of Hickory
Hickory	Keith Stahley	February 27, 2003	Planning Director, City of Hickory
Hickory	Michael Bradshaw	February 27, 2003	Transit Manager, City of Hickory
Hickory	Eric Ben-Davies	February 27, 2003	Transportation Planner, City of Hickory

	Name	Interview Date	Other Information
Hickory	Joe Lutz	February 27, 2003	Manager of Government Affairs, Catawba County Chamber of Commerce
Hickory	John Tippett	February 27, 2003	Western Piedmont Council of Governments

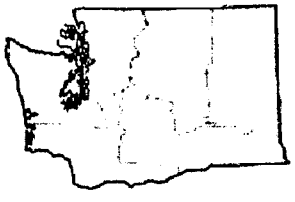
Appendix D

Position Related Information – Washington State TDM Office

COMMUTE INFO More>>

» King County Transit Trip Planner
» Puget Sound Traffic Flow Map
» Rideshare Online
» Washington State Ferries

Click the Map for Community Commute and Travel Listings



Click here to enlarge map

TDM

• TDM Success Stories

CONTACTS

• Counties/Jurisdictions
• Puget Sound TDM Resource Center
• CTR Task Force
• State Support
• Services

RELATED TOPICS

• Rail
• Special Needs Transportation
• Transit

Directory: State Support for Transportation Demand Management

Updated 12/26/2002

Statewide policy and support, Olympic Region support

Transportation Demand Management (TDM) Office, Public Transportation and Rail Division
310 Maple Park Avenue
P. O. Box 47387
Olympia, WA 98504-7387

(360) 705-7846
Fax: (360) 705-6862
tripreduction@wsdot.wa.gov

Statewide TDM policy and information on TDM-related projects statewide
Brian Lagerberg (360) 705-7878 lagerbb@wsdot.wa.gov

Budget information for TDM-related projects statewide
Cathy Silins (360) 705-7919 silinsc@wsdot.wa.gov
Brian Lagerberg (360) 705-7878 lagerbb@wsdot.wa.gov

Support for jurisdictions and employers
T. J. Johnson (360) 705-7508 johnstj@wsdot.wa.gov
Matt Love (360) 705-7877 lovem@wsdot.wa.gov

Data about the Commute Trip Reduction Program
Ed Hillsman (360) 705-7887 hillsme@wsdot.wa.gov

Flexpass information for Olympic Region, Northwest Division, and Washington State Ferries
Diana Hendrickson (360) 705-7845 hendrdi@wsdot.wa.gov

Grants and contracts
Hiep Tran (360) 705-7875 tranh@wsdot.wa.gov
Jennifer Wiens (360) 705-7839 wiensj@wsdot.wa.gov

Park and ride lots, including planning
Kathy Johnston (360) 705-7925 johnstk@wsdot.wa.gov

Vanpool leasing
Hiep Tran (360) 705-7875 tranh@wsdot.wa.gov

WSDOT's internal Commute Trip Reduction Program
Patsy Nedrow (360) 705-7916 nedrowp@wsdot.wa.gov
Diana Hendrickson (360) 705-7845 hendrdi@wsdot.wa.gov

Communications and public involvement
Barbara Davis (360) 705-7874 davisb@wsdot.wa.gov

CTR Task Force meetings or requests for documents
Diane Compton (360) 705-7846 comptod@wsdot.wa.gov

Northwest Washington Policy and Support: Seattle and King, Kitsap, Pierce, and Snohomish counties

TDM Resource Center, Northwest Washington Division
401 Second Ave. S, Suite 300
Seattle, WA 98104-2887

(206) 464-5878
Fax: (206) 464-6084

Division-wide TDM policy and projects (including TDM Action Strategy for Central Puget Sound and Regional TDM Roundtable)
John Shadoff (206) 464-5428 shadofj@wsdot.wa.gov

Corridor planning (Including I-405, Trans-Lake Washington, Alaskan Way Viaduct; Interlocal Corridor TDM Agreements)
Jean Mabry (206) 389-3038 mabryj@wsdot.wa.gov

Land use (research and technical assistance)
Sarah Kavage (206) 389-3287 kavages@wsdot.wa.gov

Park and ride lots and HOV system policy and planning
Charles Prestrud (206) 389-3039 prestrc@wsdot.wa.gov

Support for jurisdictions, agencies, transportation management associations
John Shadoff (206) 464-5428 shadofj@wsdot.wa.gov

Communications and public involvement
Melissa Loomis (206) 389-3244 loomism@wsdot.wa.gov

Market development research (such as vanpooling and proximate commuting)
John Shadoff (206) 464-5428 shadofj@wsdot.wa.gov

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Appendix E
Statewide TDM Awards Program Examples and the Governor's CommuteSmart Awards

Category: ***Ridesharing***

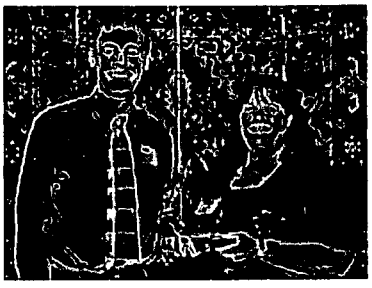
EarthLink, Inc.,
Bellevue

- CTR Program CEO*:
  Garry Betty, Chief Executive Officer
- CTR Program PM*:
  Lori Waters, Facilities Services Manager
  Seattle
- CTR Program ETC*:
  Dorian Yeager, Security Coordinator Seattle

Listen to one of the radio spots featuring this winner!

Local site is model for others nationwide

For some employers with multiple worksites throughout the United States, it might be difficult to get company management to buy into the idea of a commute trip reduction program. For the EarthLink, Inc. work site of Bellevue, not only has management bought into the idea, the Bellevue worksite has become the standard to which other EarthLink worksites aspire. That is why EarthLink has earned a 2002 Commuter Challenge Diamond Award for ridesharing.



Jan. 22, 2003 Awards Ceremony

Accepting EarthLink's Diamond Award for Ridesharing are Employee Transportation Coordinator Dorian Yeager and Facilities Services Manager Lori Waters.

EarthLink has worked to ensure its commute trip reduction program provides a variety of commute options for employees. In fact, 47% of those employees affected by the CTR law now use ridesharing to get to work rather than driving alone. FlexPasses are provided to all full-time employees for free. Vanpool costs are also covered at 100%, and riders can receive an additional incentive of $25 per month for riding in a vanpool with seven or more people. Carpoolers can enjoy free car washes and a $25 per month incentive if they are in a carpool with four or more riders.

Even those employees who bicycle, walk or rollerblade to work are eligible for incentives. EarthLink will give employees up to $150 to purchase a new bike, $100 to purchase new rollerblades, or even a new pair of walking shoes if they use one of these non-motorized commute options.

All new hires are introduced to the program during their orientation process and can get help to find ridesharing partners or determine the transit routes that work best for them. "The CTR program has certainly reduced the amount of employee turnover among users of the program," said Employee Transportation Coordinator Dorian Yeager. "People that use the program elements are much less likely to leave EarthLink." Employees are continually kept up to date on the latest ridesharing information through informational emails, flyers, an internal web site and benefits fairs.

EarthLink has shown its commitment to commute trip reduction efforts through the significant financial investments it has made in ensuring the program continues to grow and thrive. EarthLink created the Rideshare Coordinator position to do just that. With a CTR program tailored to the needs of its employees, Yeager has been able to show corporate management that the vanpool program at the Bellevue site is more cost efficient than independently run programs at other EarthLink worksites throughout the United States.

Commute Program

- Transit and vanpool subsidy
- Showers
- Reserved vanpool parking
- Guaranteed Ride Home
- Internal ridematching
- Flextime and telework

***Some definitions:** An "ETC" is the staff-level employee transportation coordinator responsible for the daily administration of the transportation program; "PM" is the transportation program manager; and "CEO" refers to the top management-level person at the worksite. "SOV" stands for single-occupant vehicle, and "CTR" for commute trip reduction.*

BACK TO LIST OF DIAMOND AWARD WINNERS

BACK TO HOME PAGE

Category: *Ridesharing*

Kenworth Truck Company–Headquarters, Kirkland

- CTR Program CEO*:
  Robert Christensen, General Manager, Kenworth Truck Company and Vice President, PACCAR Inc.
- CTR Program PM*:
  Rennie Wilson, Human Resources Manager
- CTR Program ETC*:
  Michele Wheeler, Senior Human Resources Specialist

Listen to one of the radio spots featuring this winner!

Jan. 22, 2003 Awards Ceremony

Accepting Kenworth Truck Company's Diamond Award for Ridesharing is Human Resources Director Jim Walker.

50% use commute options despite abundant parking and limited transit

Kenworth Truck Company, a division of PACCAR Inc, is a leading manufacturer of heavy and medium duty trucks. With a progressive focus on fuel efficiency and aerodynamics, it should come as no surprise that the company also places a focus on reducing congestion on our roads through an employee commute trip reduction program. Kenworth's commitment has earned it a 2002 Commuter Challenge Diamond Award for ridesharing.

More than 50% of Kenworth employees at the company's Kirkland headquarters have received FlexPasses. More than 22% of the employees regularly use an alternative commute mode instead of driving alone. This percentage is very encouraging given the site's abundance of free parking and lack of easily accessible transit routes. Kenworth provides employees with a variety of subsidy options to meet their specific commuting needs. FlexPasses are offered to employees at no charge, as well as a 60% ferry subsidy. Walkers, bicyclists and carpoolers also are eligible for a monthly subsidy for their use of HOV and non-motorized commute options.

In addition to the subsidies, carpool and vanpool riders also receive free reserved covered parking. Since there is limited covered parking, the fact that HOV users get priority usage and do not have to pay for it, is a significant benefit.

Kenworth's management team has shown their support through their ongoing willingness to finance the program even in a down economy. Aside from being a good corporate citizen, Kenworth benefits from its CTR program because it helps recruit and retain good employees. The company also has made an effort to seek out and work with public agencies to ensure they are able to continue providing their employees with this outstanding benefit.

Commute Program

- Transit and vanpool subsidy
- Reserved HOV parking
- Guaranteed Ride Home
- Internal ridematching
- Flextime

***Some definitions:** An "ETC" is the staff-level employee transportation coordinator responsible for the daily administration of the transportation program; "PM" is the transportation program manager; and "CEO" refers to the top management-level person at the worksite. "SOV" stands for single-occupant vehicle, and "CTR" for commute trip reduction.*

BACK TO LIST OF DIAMOND AWARD WINNERS

BACK TO HOME PAGE

Category: ***Ridesharing***

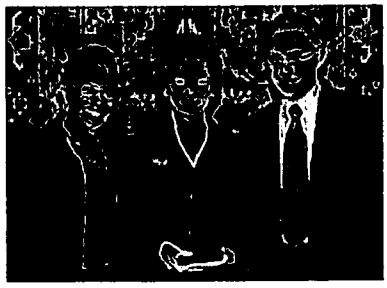
World Vision, Inc.,
Federal Way

- CTR Program CEO*:
  Desmond Capper, Senior Division Director of Corporate Services
- CTR Program PM*:
  Vicki Hulse, Administrative Coordinator to the Senior Division Director
- CTR Program ETC*:
  Cynthia Cronkhite, Administrative Assistant II

Listen to one of the radio spots featuring this winner!

Beating the odds in suburbia

Many employers in suburban locations throughout King County find it difficult to promote ridesharing because of plentiful free parking and little or no easily accessible transit routes nearby. World Vision in Federal Way is one such organization that has beaten the odds and earned a 2002 Commuter Challenge Diamond Award for ridesharing.



Jan. 22, 2003 Awards Ceremony

Accepting World Vision's Diamond Award for Ridesharing are Employee Transportation Coordinator Cynthia Cronkhite, CTR Program Manager Vicki Hulse, and Senior Division Director of Corporate Services Desmond Capper.

World Vision's commute trip reduction program is a good example of what can be done with vanpools and carpools in a suburban setting with very little transit service. Some employees have wanted to ride the bus in the past but were unable to because there were no stops within walking distance. The organization found that carpooling was a good solution, allowing employees to use an alternative commute mode when transit was not an option.

The organization provides a 50% subsidy to employees who vanpool or ride the bus. Showers and lockers are available to those who bicycle or walk to work, and all employees who use alternative commute modes have access to the Guaranteed Ride Home program so they can quickly and easily get home in case of an emergency. Monthly drawings for Commuter Bonus Plus Vouchers are also held to further reward those employees who rideshare, bicycle or walk to work.

A commuter center located in the lunchroom keeps employees informed of all their commute options. Employees also have access to information on the rideshare program through World Vision's intranet site which includes a transportation page. Forms to sign up for carpools and drawings are available here as well as links to RideshareOnline.com and other transit agencies. The transportation coordinator also provides zip code matching each month for those employees looking for carpool partners.

New employees are provided with a complete packet of information explaining the ridesharing programs available at World Vision as well as an application to sign up as a carpooler. "People are told about our program from the time they are first hired. Many are glad the rideshare options are offered and take advantage of them soon after they start working," said Employee Transportation Coordinator Cynthia Cronkhite. "The employees are glad to receive subsidies for their bus and vanpool costs, and it is always exciting to them to be chosen as a winner in the monthly drawings."

The management of World Vision understands the importance of alternative commute options. The rideshare program not only provides important benefits to employees, it also gives the organization an opportunity to show their environmental stewardship. Management further supports the program by participating with other employers in networking events all with the intent to further develop World Vision's commute trip reduction program.

Commute Program

- Transit and vanpool subsidy
- Showers and lockers
- Reserved HOV parking
- Guaranteed Ride Home
- Internal ridematch service
- Flextime and telework

***Some definitions:** An "ETC" is the staff-level employee transportation coordinator responsible for the daily administration of the transportation program; "PM" is the transportation program manager; and "CEO" refers to the top management-level person at the worksite. "SOV" stands for single-occupant vehicle, and "CTR" for commute trip reduction.*

BACK TO LIST OF DIAMOND AWARD WINNERS

BACK TO HOME PAGE

King County employers recognized at Governor's CommuteSmart Awards

Six King County employers were recently among the 15 winners statewide at the Governor's CommuteSmart Awards in Olympia. In addition, four other area employers were also nominated for the awards.The winners were chosen by the Governor's Commute Trip Reduction Task Force and the Washington State Department of Transportation, as state leaders in reducing single occupancy vehicles on our roadways, reducing pollution and fossil fuel consumption, as well as improving the quality of life. Congratulations to all the nominees and recipients of the 2002 Governor's CommuteSmart Awards.

King County CommuteSmart Winners

CH2M HILL
Children's Hospital & Regional Medical Center
Federal Detention Center, Seattle
Navigant International Northwest
SAFECO
Trendwest Resorts

Additional King County Nominees

City of Seattle
First Choice Health, Inc.
KPFF Consulting Engineers
Puget Sound Regional Council

BACK TO COMMUTER CHALLENGE HOME PAGE

COMMUTE & TRAVEL INFO

MOST REQUESTED

- Amtrak *Cascades*
- Puget Sound Traffic Flow Map
- Rideshare Online
- Washington State Ferries

LOCAL INFORMATION

Click the map for commute and travel information for a specific area.

Click here to enlarge map

COMMUTE & TRAVEL

- Accessible Transportation
- Airplane
- Bicycle
- Bus
- Carpool
- Compressed Work Week
- Ferry
- Traffic & Roads
- Train
- Vanpool
- Walk
- Work from Home
- Commute & Travel Homepage

Relax.
There's more than one way to get there.

2003 CommuteSmart news release

2003 Winners and 2003 Nominees

2002 Winners

2001 Winners

2000 Winners

1999 Winners

1998 Winners

On Wednesday, June 11th, the Washington State Department of Transportation announced the winners of the 2003 Governor's CommuteSmart Awards at a ceremony at the Evergreen State College in Olympia. The awards recognize the Washington State employers with the most successful programs encouraging the use of buses, carpools, vanpools, bicycling, walking, working from home, and compressed work weeks.

By promoting alternatives to driving alone, funding subsidies and incentives and providing on-site services, each of the nominated and winning organizations serve as role models for Commute Trip Reduction efforts.

Washington State's Commute Trip Reduction Law was adopted during the 1991 legislative session and incorporated into the Washington Clean Air Act. The goals of the program are to reduce traffic congestion, air pollution and petroleum consumption through employer-based programs that decrease the number of drive-alone commute trips.

Over 1,100 worksites currently participate in the Commute Trip Reduction program in Washington, affecting almost 500,000 employees.

For more information about starting a Commute Trip Reduction program at your worksite, call the Department of Transportation's Transportation Demand Management Office at 360-705-7846.

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Relax.
There's more than one way to get there.

http://www.wsdot.wa.gov/commutesmart/

Appendix F
Florida's Commuter Assistance Program

Approved:

Effective: September 24, 2002
Office: Transit
Topic No.: 725-030-008-g

Thomas F. Barry, Jr., P.E.
Secretary

COMMUTER ASSISTANCE PROGRAM

PURPOSE:

To establish procedures and guidelines to the implementation of the Department's Commuter Assistance Program, identify effective employer-based transportation demand management (TDM) strategies, foster development of public/private partnerships, and fund appropriate eligible recipients to carry out commuter assistance program projects.

AUTHORITY:

Chapters 187 and 341, Florida Statutes (F.S.)

SCOPE:

The requirements or processes related to this procedure affect the State Public Transportation Office, District Offices and recipients of funds administered as part of the commuter assistance program.

DEFINITIONS:

Agency Annual Work Plan - An annual written plan submitted by agencies requesting state participation in local ridesharing projects or Transportation Management Associations (TMAs) and/or Transportation Management Organizations (TMOs). This plan identifies project goals, objectives and related project information, and serves in evaluating a project's progress and success.

Annual Summary Report and Survey - An annual summary report and survey administered by regional or local commuter assistance services. The summary report analyzes the success of the agency efforts for the year. The survey is used to verify monitoring and reporting data. The survey is to be done annually or biannually at the discretion of the District, and with the agreement of the Central Office.

Central Office - For the purposes of this procedure, it means the Department of Transportation, Public Transit Office.

District Office - For the purposes of this procedure, it means the Department of Transportation, District Public Transportation Office.

District Work Plan - An annual written plan identifying District program goals and direction. This serves as a guide for the Districts and grantees in developing individual project work plans. Service to Enterprise Zones should be considered.

Eligible Project Recipients - Local governments or their designees including: Metropolitan Planning Organizations, Regional Planning Councils, Transportation Authorities, or Community Transportation Coordinators designated pursuant to ***Chapter 427, F.S.***, are eligible recipients of matching grants. Private for-profit and private-not-for-profit corporations that have been selected pursuant to Chapter 287, Florida Statutes, may receive funds to operate Regional Commuter Services projects. Transportation Management Associations and/or Transportation Management Organizations created pursuant to ***Chapter 617, F.S.***, may also receive grants.

Enterprise Zone - Areas that chronically display extreme and unacceptable levels of unemployment, physical deterioration, and economic disinvestments, pursuant to ***Chapter 290, F.S.***.

Local Commuter Services - Public or private agencies providing commuter assistance services to a defined local area, usually serving one municipality or county. The local commuter service organization will provide ridematching, marketing, survey, Transportation Management Association and/or Transportation Management Organization support and/or other needed coordination.

Memorandum of Understanding - This is a written agreement between the Regional Commuter Service or the Local Commuter Service office and each existing Transportation Management Association and/or Transportation Management Organization. The agreement outlines the responsibilities of each agency in achieving the goals of the Commuter Assistance Program. The District shall approve the Memorandum of Understanding. This document should be reviewed and updated on a three-year cycle.

Regional Commuter Services - Multi-county agencies, that can be private-not-for-profit corporations, funded by the state, and established to provide the basic support for a network of smaller, localized Transportation Management Association/Transportation Management Organization within a specified region of the state. To the extent feasible, these programs should be placed at an existing regional entity (i.e., regional planning council, metropolitan planning organization, transit agency, or other private agency). This does not preclude other arrangements better suiting community needs. These projects are developed cooperatively between the Central Office and the District and/or Districts involved. Regional Commuter Services will provide ridematching, marketing, survey and other support as determined by the Districts and this procedure.

Statewide Commuter Assistance Annual Report - A report compiled by the Central Office detailing Commuter Assistance activities statewide. This report will include all the data and monitoring compliance figures provided by the projects to the District offices. This report will cover the preceding calendar year.

Telecommuting - A work arrangement, by which selected employees are allowed to do the normal duties and responsibilities of their positions with computers or telecommunications, at home or an alternative worksite other than the employees' usual place of work.

Transportation Demand Management (TDM) Strategies - A set of measures designed to reduce the number of trips made by single occupant vehicles and enhance the regional mobility of all citizens. These strategies can include but are not limited to: traditional ridesharing (carpooling & vanpooling); public transportation, alternative work hours (flextime, compressed work week, etc.), non-motorized transportation (bicycle and pedestrian modes); development and implementation of shuttle services; priority/preferential parking for ridesharers; promotion and distribution of discounted transit passes; and fostering telecommuting programs.

TDM Clearinghouse - Is a service of the Department, currently operated by the Center for Urban Transportation Research, which provides technical support for the Department, local governments and emerging Transportation Management Association and/or Transportation Management Organizations. Services include but are not limited to: strategic planning assistance, evaluations and survey assistance, training, TDM Resource Center and periodic newsletters. The Central Office has monitoring and fiscal responsibilities for the clearinghouse. Major requests need to be coordinated between the District and Central offices before approval to proceed.

Transportation Management Associations / Transportation Management Organizations - The terms Transportation Management Associations or Transportation Management Organizations have been used interchangeably. For the purposes of this procedure the acronym TMA will be used. TMAs are public/private partnerships formed so that employers, developers, building owners, central business districts, downtown merchant associations, and government entities can work collectively to establish policies, programs and services to address local transportation problems. TMAs realize their potential in addressing traffic congestion, air quality, and occasionally, employment issues through TDM strategies. TMAs are established within a limited geographical area to address the transportation management needs of their members. TMAs are expected to obtain private sector financing in addition to public funding.

Transportation Management Initiatives (TMIs) - These are hybrid entities that are the first step in a process in which employers and other interested parties consider collective actions for improving the means to carry people and/or goods. TMIs are usually not legally constituted and may be projects or field offices of larger organizations with broader missions. TMIs are frequently led by an advisory committee of the private sector in partnership with the public sector to solve transportation problems.

GENERAL

Coordinated use of existing transportation resources can provide a responsive, low cost alternative for alleviating urban highway congestion, improving air quality and by that reducing the need for costly highway improvements. The commuter assistance program focuses on the single occupant commuter trip that is the greatest cause of peak hour highway congestion. A coordinated effort to provide alternatives to these commuters, using existing or low cost resources, can be beneficial to the development of public transit statewide and the Department's priority efforts to relieve traffic congestion, improve air quality and to assure energy conservation. The State's Commuter Assistance Program encourages a public/private partnership to provide brokerage services to employers and individuals for: carpools, vanpools, buspools, express bus service, subscription transit service, group taxi services, heavy and light rail and other systems designed to increase vehicle occupancy.

The program encourages the use of transportation demand management strategies including: employee trip reduction planning, Transportation Management Associations, alternative work hour programs, telecommuting, parking management, and bicycle and pedestrian programs.

PROGRAM MANAGEMENT AND IMPLEMENTATION

(1) CENTRAL OFFICE responsibilities shall include:

(a) Maintain continuing communication with the District Offices on matters regarding the Commuter Assistance Program.
(b) Develop and maintain program policies and procedures.
(c) Monitor compliance with established procedures.
(d) Provide training and technical support to Districts and local programs as required, through contracts like the TDM Clearinghouse.
(e) Stay current on national and international methods for promotion of commuter alternatives and transportation demand management, and providing this information to the Districts.
(f) Provide any necessary support for demonstration projects that are statewide or regional in scope or require staffing in excess of district capabilities.
(g) Assure the coordination and implementation of support programs (Transit Corridor and Park and Ride).
(h) Compile data provided by the District into Annual Report.
(i) Provide the latest transit trends and performance measurements.

(2) DISTRICT OFFICE responsibilities shall include:

(a) Maintain communication with the Central Office on program status and implementation.

(b) Establish and maintain communications with local public and private organizations to advise them of the availability of Department financial and technical assistance programs for commuter assistance and transportation demand management.
(c) Establish specific and achievable program objectives for the District, based upon information from local and regional programs. Develop the Annual District Work Plan including project-funding needs for the next two years and assuring that the commitment of Department funds is consistent with the established production schedule. The District Work Plan provides the framework and direction for the commuter assistance activities funded by the District.
(d) Assure the provision of technical assistance in the development of commuter assistance services.
(e) Provide and manage grants to local agencies and the private sector for the implementation of Commuter Assistance Projects. This includes ensuring that grantees or contractors comply with Joint Participation Agreement or contract requirements, and that requirements of this procedure are included in the Joint Participation Agreement or contract.
(f) Ensure that appropriate application of commuter alternatives further the development of public transportation projects in the Districts and the inclusion of private transportation providers.
(g) Perform annual reviews of each agency's progress to determine the effective implementation of the Agency Annual Work Plan. Modifications to the Agency Annual Work Plan will be documented.
(h) Prepare a District Annual Local or Regional Commuter Assistance Service Report summarizing each agency's progress in the implementation of the Agency Annual Work Plans. The report will include the written reports submitted by the agencies detailing successes, mandatory reporting measures, problems and plans. These reports are due in the Central Office by March 1st of each year and will cover the preceding calendar year. This information is necessary for the maintenance of data for the Statewide Commuter Assistance Annual Report. Reports from established TMAs (more than three years old) may be submitted annually and will also be included in those District reports.
(i) Participate, as appropriate, on the Boards of Directors of private-not-for-profit TMAs and Regional Commuter Services Corporations.

(3) Issues not specifically mentioned in this procedure, nor with statewide implications, are left to the discretion of the individual District.

(4) The Districts shall program Commuter Assistance Projects in coordination with the Central Office, the appropriate metropolitan planning organization, local agencies and the private sector to ensure statewide programming to optimize available funding sources.

1. ELIGIBLE PROJECT COSTS

(a) Program administration and operational costs including: salaries, marketing materials, advertising, computerized matching, reporting, purchase of promotional

items as part of public information and education campaigns for the promotion of alternatives to single-occupant vehicle travel (promotional items must first be cleared through the FDOT Comptroller) and other project related costs.
(b) Computer hardware and software necessary to establish trip-matching services, where not redundant or sharing could be a more efficient use of equipment.
(c) Specialized demonstration projects of statewide or regional impact designed to show innovative approaches to commuter assistance.
(d) Other capital purchases for the accomplishment of program objectives.
(e) Other operating expenses for the accomplishment of program objectives, such as a Guaranteed Ride Home Project or vanpool administration.

2. ELIGIBLE GRANT RECIPIENTS

Local governments or their designees including Metropolitan Planning Organizations, Regional Planning Councils, Transportation Authorities, or Community Transportation Coordinators designated pursuant to ***Chapter 427, F.S.***, are eligible recipients of matching grants.

Although funds may be used to administer these projects within local government, recipients should be encouraged to consider subcontracting services to the private sector. Grants may be made to private organizations pursuant to ***Chapter 617, F.S.***

3. FUND PARTICIPATION

(a) Funding for this program will be allocated to the Districts based on a statewide assessment of Commuter Assistance Program need. Allocation requests identified in the Annual District Work Plan will be given first priority.
(b) The Department is authorized to fund up to 100 percent of the eligible costs of commuter assistance projects determined by the District to be regional in scope and application or statewide in nature.
(c) The Department's participation in a local project cannot exceed the amount of local participation.
(d) State funding participation in Federal Transit Administration funded projects shall be at the level defined in ***Chapter 341, F.S.***
(e) The Department's participation in Federal Highway Administration funded projects shall be at the levels required for the particular highway system fund involved according to ***Section 339.08(2), F.S.***
(f) Specific match rates are identified in the Work Program Instructions.

4. WORK PLANS

Each District shall develop an annual work plan for its District Commuter Assistance Program. This plan will detail program goals and objectives for the period October 1

through September 30. The district work plan shall identify annual program goals and emphasis areas, targets for regional and local commuter assistance services, and targets for TMAs. Plans shall be submitted to the Central Office by October 1 of each year and will be used in the development of the Department's Work Program.

5. PROJECT TYPES

5.1 Regional or Local Commuter Services operated by government agencies, transit operators or private contractors under contract to the Department shall be administered in the following manner:

5.1.1 Each agency shall submit an annual work plan consistent with Department and regional goals. The work plan will be incorporated as a "Special Consideration of the Department" in all Joint Participation Agreements, and shall include, at a minimum:

(a) An organization chart identifying all personnel funded by this project
(b) Measurable program goals and objectives with milestones to determine progress in stated emphasis areas consistent with District work plans
(c) A marketing plan identifying market penetration and client service targets
(d) An annual project budget identifying expenses and revenues by source

5.1.2 All commuter assistance service agencies receiving state funding will be required to monitor and report to the District office the following data on an annual basis or as the Joint Participation Agreement may stipulate:

(a) Number of commuters requesting assistance
(b) Number of commuters switching from single occupant vehicles
(c) Number of agency vans in service, and other coordinating agency vans that are participating in the rideshare-matching program (where applicable)
(d) Number of vehicle trips eliminated for all commuters participating in the commuter assistance program
(e) Number of vehicle miles eliminated for all commuters participating in the commuter assistance program
(f) Number of employer contacts and employers participating
(g) Description of major accomplishments
(h) Number of parking spots saved / parking needs reduced
(i) Amount of commuter costs saved

Definitions for each reporting category are provided in ***Attachment A.***

5.1.3 Regional and local commuter assistance service programs shall administer an annual survey to collect and verify data for reporting requirements. This requirement may be waived by the District if the agency can show statistically accurate follow-up compiled in a monthly or quarterly manner. Requests to waive this requirement will be reviewed by the Central Office. Surveys may be accomplished in-house or contracted

out and must not have a sample error greater than 5% and a confidence interval no less than 95%. Refer to survey guidelines in ***Attachment A***.

5.1.4 All projects shall be programmed according to the latest Work Program Instructions and according to the provisions of ***Chapter 341, F.S.***, as follows:

(a) If the local eligible recipient has taken action to secure or designate federal funds as a funding source for a project, in which case the appropriate federal match ratio applies.
(b) If the Central Office has indicated on a project-by-project basis that other funds (e.g., Transit Corridor) can be reasonably anticipated for the project, the appropriate match ratio associated with such funds shall apply.
(c) If the project is regional in scope and no regional financing mechanism exists, the project is eligible to be programmed up to 100% state participation.

5.2 Transportation Management Associations operated as public/private partnerships:

5.2.1 Funding may be provided to TMAs organized as private-not-for-profit corporations, in cooperation with local government, that are established according to local comprehensive plans, other locally adopted plans or regional commuter assistance program goals.

5.2.2 State funds may be granted in the following ratio:

TMAs will be eligible for continued funding at the lesser of $75,000 or 50% of their total budget, provided they are meeting the performance criteria outlined in their existing Joint Participation Agreement. Board member in- kind contributions may count toward local match requirements. However, in-kind contributions must have the prior approval of the District Office. Districts may use ***49 CFR 18.24 (Title 49, Code of Federal Regulation, Part 18.24, "Uniform Administration Requirements for Grants and Cooperative Agreements to State and Local Governments"*** deals with matching and cost sharing. This Federal regulation can be accessed at www.access.gpo.gov/nara/cfr as guidance in determining allowable in-kind contributions. Funding may exceed the $75,000 limit, if the District can justify the need and verify that any commuter assistance program within the District will not be adversely affected. Variation from these levels is permitted with prior consultation with the Central Office.

5.2.3 Grants supporting TMAs may be made directly to the incorporated organization or to the appropriate local governmental agency for pass-through to the TMA following the current Joint Participation Agreement procedure. TMAs receiving these grants shall include the Department as an ex officio member of its Board of Directors during the grant period.

5.2.4 To be eligible for state funding a TMA must send the Department a detailed Agency Annual Work Plan, articles of incorporation as a private not for profit body,

bylaws, geographical boundaries, trip management goals, a financing plan, an institutional structure, and potential membership estimates. Future year work plans will be required. A TMA shall use the Department's TMA Self Evaluation program annually. The District will coordinate with the TMA in the selection of criteria to be used in the Self Evaluation. Results of the evaluation will be reported to the District office annually. Records of services received from regional commuter assistance programs should be maintained. A summary of these activities shall be included with the invoice progress reports provided to the District office pursuant to the requirements outlined in the Joint Participation Agreement.

5.2.5 No TMA will be funded unless the District office has determined that its Agency Annual Work Plan is consistent with regional commuter assistance program plans, metropolitan planning organization transportation plans, local comprehensive plans and regional strategic policy plans.

5.2.6 Funds granted to TMAs under this program are for administrative, planning, marketing and operational purposes only. The Department will not participate in the acquisition of computerized ride matching capabilities unless this service is not available through a regional or local commuter assistance program.

5.2.7 Special projects and operations (shuttles, vanpools, guaranteed ride home programs, transit discounts, etc.) may be funded on a 50% state ratio to established TMAs (more than three years old).

6. PROJECT FILES

The District shall maintain the official project files, which at a minimum, shall include or have readily accessible:

(a) All Joint Participation Agreements and/or Contracts and a copy of any amendments or supplements thereto.
(b) A copy of each invoice and accompanying progress report presented for payment by the grant/contract recipient
(c) Documentation of any official on-site visits and annual evaluations scheduled by the District.
(d) An inventory of all capital acquisitions including description, state participation, current location, and cost when acquired.
(e) All pertinent correspondence regarding the project.
(f) A copy of the agency annual audit (report) performed according to the ***Public Transportation Joint Participation Agreement Procedure***, No. 725-000-005, *and* ***Recipient/Subrecipient Single Audit Procedure***, No. 450-021-001.

7. TRAINING

The basic TDM training is mandatory for all Department Commuter Assistance Program managers and Commuter Assistance Program agency directors. Additionally, the State

Commuter Assistance Office periodically offers training classes that provide the most recent technical assistance and program information available.

8. FORM ACCESS

There are no required forms associated with this procedure.

ATTACHMENT A

1. EVALUATION MEASURE DEFINITIONS

Number of Commuters Requesting Assistance: This is the number of people that request assistance of some sort including:

Carpool match list, Vanpool match list or formation assistance, Transit route and/or schedule information, Telecommuting information, Bicycle route and/or locker/rack information

Number of Commuters Switching Modes: This is the number of people that actually use the information you provide to change their current Single Occupant Vehicle mode to carpooling, vanpooling, transit use, telecommuting, walking and/or bicycling.

This information can be gathered by doing sample survey of commuters assisted on a monthly basis by either phone or mail. Every month contact a random sample of the commuters assisted the previous month to see how many actually used the information you provided. Extrapolate survey results to estimate total. It is recommended that actual data be used where available.

Number of Vans In Service: Report the number of commuter vans on the road and/or the number of vanpoolers. These are vans that are operated either by the CAP agency or any other coordinating agency that participates in the commuter rideshare-matching program operated by the CAP.

Number of Vehicle Trips Eliminated: Using the follow-up survey data or actual data multiply the frequency of alternative mode use by the estimated number of commuters using a shared mode or telecommuting.

Number of Vehicle Miles Eliminated: Using the follow-up survey data take the average trip length times the frequency of use times the number of formations.

Employer Contacts: When reporting include the number of employees at each site. Report number of employer contacts and provide a brief summary of methods of contact used.

Major Accomplishments: When reporting consider the following categories: new transit services initiated and/or improved; education programs initiated; transportation planning initiatives; guaranteed ride home projects initiated; or other implementation activities.

Parking Spots Saved / Parking Needs Reduced: Determined by the number of people using alternative modes at each employment site.

Commuter Costs Saved: Multiply vehicle mile eliminated by the average cost per mile. The American Automobile Association is a good source for the average cost per mile.

2. DISTRICT OPTIONAL EVALUATION MEASURE DEFINITIONS

Gasoline Saved: Multiply the vehicle miles eliminated by the average miles per gallon figure from the American Automobile Association.

Emissions Reduction: Multiply the vehicle miles eliminated by the emission factors for your area. Emission factors are available from the Department of Environmental Protection.

Information Materials Distributed: Categories may include but are not limited to:

Brochures, Information packets, Posters, Surveys

Special Events: Categories may include but are not limited to:

Transportation Fairs. Commuter Fairs, Special Promotions

Media / Community Relations: Categories may include but are not limited to:

Number of Public Service Announcements shown, Number of newspaper articles, Number of news stories, Number of magazine articles

3. SURVEY GUIDELINES

This is meant to be a guide for agencies choosing to administer an internal annual survey.

Probability Samples: Probability samples are those in which everyone has an equal chance or probability of being chosen. The assumption is that the people who are selected are believed to be just like those who are not selected. Types of techniques associated with probability sampling include: simple random sampling, stratified random sampling, and simple random cluster sampling.

Sample Size: Once the sampling methodology has been decided upon, a sample size may be determined. Three issues must be addressed when determining sample size:

sampling error (the degree of precision desire), stratification (the examination of sub segments of the population), and confidence levels (the degree of certainty with which the sample is representative of the population).

Sampling Error: The degree of precision in a survey sample can be determined by calculating the standard error. Specifically, as the sample size increases, the standard error associated with that sample decreases. The issue of precision with a survey sample is an important one.

Stratification: In a stratified sampling, the surveyor draws a sample with a pattern of important characteristics that is the same as the population's. If 80 percent of employees in the target area drive alone to work while 10 percent carpool, then the sample should have the same distribution of modes.

Confidence Levels: The confidence level indicates the degree to which the researcher is confident that the sample is representative. Frequently, the 95 percent confidence level is chosen, meaning that there is a 95 percent chance that the sample and the population will look alike, and a 5 percent chance that it will not.

Example: The following example illustrates the process of determining sample size. Suppose a new Transportation Management Area (TMA) wants to determine mode split for employees in its area. Census data for the region suggests that the carpool rate is 15 percent. The confidence level was chosen to be 95 percent and the standard error 2.5 percent. The following equation is used:

$N = (p)(1-p) / (te/z)^2$
N = unadjusted sample size
p = estimated proportion or incidence of cases
te = tolerable error
z = the standard score of a given confidence level

A new statistic used in this calculation is a tolerable error (te), which is defined as the standard error times the t- statistic (1.96 for a 95 percent confidence interval). Given that p = 0.15, z = 1.96, and the standard error = 0.025, te = 0.05. Thus:

$N = (0.15)(1 -).15) / (0.05 / 1.96)^2$
N = 196

To adjust for the population, the following equation is used:

$N' = N / (1 + (N / P))$
N'= adjusted sample size
N= initial sample size (calculated above)
P= target population

For this scenario, if the target population in the study area is 5,000, then:

N'= 196 / (1 = (196 / 5,000))
N'= 188

Finally, the sample size is determined by accounting for anticipated sample size. Many researchers report results with a 30 percent response rate. Therefore, this example will also anticipate the same.

N = N' / X
n = final sample size
N'= adjusted sample size
X = anticipated response rate

Given this equation, the final sample size for this example is:

n = 188 / 0.30
n = 629

Therefore, in order to determine mode split for its area, the new TMA must distribute 629 surveys to employees of its members. If the TMA is using the simple random sampling technique it would randomly choose 629 names from its database. However, if the TMA wants to use the stratified random sampling technique, the above process should be repeated for each organization. This will allow the TMA to construct a profile of each employer in its area that is statistically significant, and will ensure a statistically significant sample for the entire region as well.

4. EVALUATION MEASURE REPORTING GUIDANCE

This is an example of how an agency could go about compiling the data needed for the reports they are required to submit to the Department. **This is meant to be an example, not a prescribed format.** However, calculations must be based on known real data and mathematically correct. In our example the agency will be called ICAP (Imaginary Commuter Assistance Program).

Number of Commuters Requesting Assistance

ICAP reports the following for Month X:
100 carpool match lists processed
5 new vanpool clients

Number of Commuters Switching Modes

ICAP sends mail back cards to all 100 clients requesting carpool match lists. All the information needed from the vanpoolers is available in their fare payment and registration records.

25 mail back cards are returned by carpoolers with 5 clients reporting that they are carpooling.
5: 100 = 5%

Phone calls are made to the remaining 75 carpool clients. Of those ICAP reaches 30 and finds out 5 more clients are carpooling.

5 + 5: 100 = 10%

Number of Vans in Service

ICAP has 20 vans currently in service. There are additional 45 vans that in service and available for rideshare-matching recommendations. These vans are located in the local transit agency, which has 10 vans in service, and two private van-leasing companies, which have 35 vans in service.

Number of Vehicle Trips Eliminated

The average frequency of carpooling reported on the mail back cards was 3 days a week. The frequency of the vanpoolers is 5 days a week.

10 x 3 x 2 = 60 trips eliminated by carpoolers / week
5 x 5 x 2 = 50 trips eliminated by vanpoolers / week

Vehicle Miles Eliminated

The average carpool trip distance is 10 miles one way. The average vanpool distance is 35 miles one way.

10 x 60 = 600 miles eliminated / week
35 x 50 = 1,750 miles eliminated / week

To get the total number eliminated for the report, multiply by the number of weeks in the report.

Employer Contacts

ICAP reports the following contacts:

13 employers contacted by letter
10 employers contacted by phone
5 employers visited in person

Major Accomplishments

ICAP expanded the guaranteed ride home program to include 3 new employers.

Parking Spaces Saved / Parking Needs Reduced

15 parking spaces saved this period.

Commuter Costs Saved

The American Automobile Association estimates that the average cost per mile for ICAP=s service region is $.40.

$.40 x 600 = $240 saved / week by carpoolers
$.40 x 1,750 = $700 saved / week by vanpoolers.

Appendix G
TDM Characteristics and Strategies

Characteristics of TDM Strategies													
			Enabling Authority				Implementing Authority						
Strategy	Application Market Area	Time Frame To Implement	State	Regional	City/County	Transit Agency	State	Regional	City/County	Transit Agency	Private Sector	Non Profit
Alternative Mode Support Strategies													
Public Education and Promotion	All	Short-long	X	X	X	X	X	X	X	X	X	X
Ridematching Services	Urban & suburban commute trips not well served by transit	Short-medium		X	X	X		X	X	X	X	
Transit Services	Urban & suburban	Short-long		X	X	X		X	X	X	X	
Vanpool Services	Longer urban & suburban commute trips	Short-medium	X	X	X	X	X	X	X	X	X	
Custom Transit Services	Suburban	Medium		X	X	X		X	X	X	X	
Non-Motorized Mode Support	Short commuting & non-commute	Short-long	X	X	X		X	X	X		X	X
HOV Facilities	Congested corridors	Medium-long	X		X		X		X	X		
Park & Ride Lots	Congested corridors	Short-medium	X		X	X	X		X	X	X	
Carsharing	Urban & some suburban areas	Medium								X	X	X
Worksite-Based Strategies													
Monetary Incentives	Commuters	Short								X	X	
Alternative Work Schedules	Commuters	Short									X	
Guaranteed Ride Home	Commuters	Short								X	X	
Parking Management	Commuters	Short-medium			X						X	
Facility Amenities	Large employers and sites in areas with little mixed-use development	Short-medium			X						X	
Transportation Management Associations	Multi-employer sites and areas	Short-medium							X		X	

Characteristics of TDM Strategies												
			Enabling Authority				Implementing Authority					
Strategy	Application Market Area	Time Frame To Implement	State	Regional	City/County	Transit Agency	State	Regional	City/County	Transit Agency	Private Sector	Non Profit
Land Use Strategies												
Compact Residential Development	Urban & suburban	Short-long			X				X		X	X
Compact Employment and Activity Centers	Urban & suburban	Short-long			X				X		X	X
Mixed Land Uses	Urban & suburban	Medium-long			X				X		X	X
Connectivity	Existing or developing suburban areas	Medium	X		X		X		X		X	X
Transit/Pedestrian Friendly Urban Design	Urban & suburban	Short-long	X		X				X	X	X	X
Parking Management	Urban & suburban	Short-long			X				X		X	X
Jobs/Housing Balance	Regional, urban & suburban	Short-long		X	X			X	X		X	
Providing Affordable Housing	All areas	Short-long	X	X	X			X	X		X	X
Development Impact Mitigation	Developing areas	Medium	X		X				X		X	
Public Policy & Regulatory Strategies												
Trip Reduction Ordnances	Congested or rapidly growing areas	Medium	X		X				X	X	X	
Access Priority/Restriction	Highly congested facilities or centers	Long	X		X				X			
Support of New Institutional Relationships	All areas	Short-medium	X		X			X	X	X	X	X

Characteristics of TDM Strategies													
			Enabling Authority				Implementing Authority						
Strategy	Application Market Area	Time Frame To Implement	State	Regional	City/County	Transit Agency	State	Regional	City/County	Transit Agency	Private Sector	Non Profit
Telecommunications Strategies													
Information Services	Any geographic location	Short-medium					X	X	X	X	X	X
Internet-Based Strategies (teleshopping)	Any location or market	Short-medium					X	X	X	X	X	X
Telecommuting (telework)	Any location or market	Short-medium					X	X	X	X	X	X
Pricing Strategies													
Parking Pricing	Dense urban areas; jurisdictional or areawide application	Medium-long	X		X		X	X	X		X	
Gas Tax Increase	Statewide or local: all vehicle trips	Short-long	X	X	X		X	X	X			
Road/Congestion Pricing	Congested routes, road segments or regions	Long	X		X		X		X			
VMT Tax	Statewide or local/regional; all vehicle trips	Medium-long	X		X		X	X	X			
Transit and Vanpool Fare Subsidies	Within operations area; low income, elderly, students	Short-medium				X	X		X	X	X	

Appendix H
Durham's Trip Reduction Program, Durham, NC

COMMUTE TRIP REDUCTION PROGRAM

WHEREAS, traffic congestion in Durham County has created, and will continue to create highways that are overcrowded and present a dancer to the health, safety, and welfare of citizens; and

WHEREAS, ozone levels in Durham County have reached increasingly unhealthy levels, especially during the summer months, leading to the probable violation of federal air quality standards; and

WHEREAS, Session Law 1999-328 sets a goal for the State of North Carolina to reduce emissions of nitrogen oxides from all sources by at least 25% by July 1, 2009 and to reduce the growth of vehicle miles traveled in the State of North Carolina by at least 25% of that growth that would otherwise occur by July 1, 2009; and

WHEREAS, pursuant to N.C.G.S. §§ 153A-121 and 153A-134, the Board of Commissioners has the authority to regulate businesses and employers located in the County of Durham; and

WHEREAS, the Board of Commissioners has determined that it is necessary to mitigate the impact of traffic by regulating businesses which produce significant levels of traffic and congestion due to the number of employees working for the businesses; and

WHEREAS, in order to provide for an orderly process, and due to limited resources to operate the program, it is necessary for the implementation of this program to cover more than one fiscal year.

NOW, THEREFORE, THE BOARD OF COMMISSIONERS FOR THE COUNTY OF DURHAM DOTH ORDAIN:

1) That the Durham County Code of Ordinances is hereby amended by adding, an article, to be numbered Article V. of Chapter 24, which article reads as follows:

Article V. Commute Trip Reduction Program

Sec. 24-116. Creation of Commute Trip Reduction Program.

1. There is hereby created a program to address the issue of traffic congestion in Durham County. In implementing this program, the County may contract with another governmental or quasi-governmental agency to provide for the efficient and effective provision of services and reviews as set out hereafter.

2. The purpose of the program shall be to provide education and consultative services to businesses, industries, and the general public on alternatives to the use of single occupied vehicles to commute to and from work; to provide information on travel demand reduction strategies, which are designed to reduce congestion on the roadways of Durham County; to gather statistical data on transportation usage; to set goals on reduction of peak period

single occupancy vehicle use and average commute trip reduction in vehicle miles traveled; and to provide, to the extent practicable, a program of incentives, including yearly recognition, for businesses and industries which excel in reducing traffic congestion by implementing exceptional travel demand management programs.

Sec. 24-117. Community Goals.

It is recognized that the reduction of single occupancy vehicle use, especially during peak hours, is an important goal for the entire Durham County community in order to reduce congestion on the highways, and to reduce the levels of ozone in the air. The following community-wide goals are therefore adopted:

Year	Percent of Alternate Mode or Non-Peak Commute Trips	Average Commute Trip VMT Reduction (%)
2001	3	2
2002	6	4
2003	9	6
2004	12	8
2005	15	10
2010	20	15

Sec. 24-118. Requirements for Major Employers.

In each year, each Major Employer shall:

1. Provide each full time, part-time, contract, or other employee with information on Alternate Mode options and required travel reduction measures and related incentives. This may include, but is not limited to: any bus routes and schedules, information on any ride share programs, and any bicycle routes. This information shall also be provided to new employees, as described above, at the time of hiring.

2. Participate in a survey and reporting effort, as directed and scheduled by the Lead Agency staff. All surveys or other reporting efforts as approved by the Lead Agency shall represent at least 65% of the total number of employees of the Major Employer. The results of the survey or other reporting efforts which are accurate, verifiable and comparable to a survey for determining single occupancy vehicle use during peak periods and vehicle miles traveled, and as approved by the Lead Agency, shall be used to determine if the traffic congestion and reduction targets have been achieved. Employee participation and trip reduction shall be based on the total number of employees. If a 65% response rate is achieved in the employee survey, then the employer may extrapolate survey results to represent the non-responders.

3. Prepare and submit a travel reduction plan to Lead Agency staff. The Lead Agency staff will assist in preparing the required plans when requested to do so by the employer. Major Employers shall submit plans according to a schedule set by the Lead Agency. If not notified earlier by the Lead Agency, Major Employers shall submit plans by December 31 of each year. One plan may be submitted for each Major Employer, which

l. Establishment of a work-at-home program, including telecommuting, for employees.

m. Establishment of a program of adjustable work hours, which may include compressed workweeks and employee selected starting and stopping, hours. Work hour adjustments should not interfere with or discourage use of ridesharing, and transit.

n. Establishment of a program of parking incentives and disincentives; Such as a fee for parking and/or a "rebate" for employees who do not use the parking, facility.

o. Implementation of other measures designed to reduce Commute Trips such as provision of day-care facilities, restaurant, or emergency ride home services.

D. A Travel Reduction Plan shall meet all the following criteria:

1. The plan shall designate a Transportation Coordinator.

2. The plan shall describe a mechanism for routine distribution of Alternate Mode transportation information to employees.

3. The plan shall accurately and completely describe current and planned travel reduction measures.

4. The plan shall state the travel reduction goals adopted by the Major Employer, including both Alternate Mode or Non-Peak Commute Trips and Average Commute Trip VMT Reduction.

Sec. 24-119. Approval Process.

1. After the Major Employer's proposed travel reduction plan is received, the lead agency shall have 60 days to object to any component of the plan, otherwise the plan is automatically approved. Any such objection shall be based solely on a failure to include a required component in the plan or an obvious mistake in the plan. If the lead agency objects, the plan is not approved and shall be returned to the employer with appropriate comments for review and revision. The employer will then have fifteen work days to resubmit the required plan. Any Major Employer who fails to submit a travel reduction plan, or pay the processing fee, shall be referred to the County Manager by the Lead Agency for possible enforcement action.

2. A processing fee in the amount of two hundred dollars ($200) shall be submitted annually with the travel reduction plan.

Sec. 24-120. Multi-jurisdictional Advisory Board.

A. There is hereby created a Multi-jurisdictional Advisory Board. The Board shall be composed of up to twenty members, one-half of whom shall be representatives of Major Employers, which shall be appointed by the Board of County Commissioners and by each of the City or Town Councils which have allowed this ordinance to be enforced in its jurisdiction or enacted a substantially similar ordinance and have entered into an inter-local government cooperation agreement with the County of Durham, other approving jurisdictions, and the Lead Agency for the administration of this or a substantially similar ordinance. The Board of Commissioners shall appoint the initial four members of the Advisory Board with each additional municipality or political subdivision appointing four members each. Each member shall serve a three-year term with two of the four members from each appointing body serving an initial two-year term in order to provide for staggered terms.

B. The Multi-jurisdictional Advisory Board shall provide guidance to the Lead Agency in implementing and managing the Congestion Management Program. The Advisory Board shall further provide information on congestion management to the County Manager and the Board of County Commissioners, and shall make recommendations to the Board of County Commissioners as to the performance of the Lead Agency.

C. The Multi-jurisdictional Advisory Board shall make an annual report to the Board of County Commissioners and to each of the City or Town Councils which have allowed this ordinance to be enforced in its jurisdiction or enacted a substantially similar ordinance and have entered into an inter-local government cooperation agreement with the County of Durham for the administration of this or a substantially similar ordinance.

Sec. 24-121. Civil penalties.

Any Major Employer who fails to conduct the survey, or other reports as approved by the Lead Agency, of employees as provided herein or who fails to submit a Travel Reduction Plan, as provided herein, shall be subject to a civil penalty in the amount of one hundred dollars ($1 00.00) per week for each week in which the Major Employer fails to comply with this provision, up to a maximum of one thousand dollars ($1,000.00). The County Manager or his designee shall have authority to assess the civil penalty as provided herein. If the Major Employer fails to pay the civil penalty within a reasonable time as determined by the County Manager or his designee, the County Attorney shall have authority to file a suit for the collection of the civil penalty.

Sec. 24-122. Review of Effectiveness of Ordinance.

The Multi-jurisdictional Advisory Board after consultation with the Lead Agency, if other than the County, shall report to the Board of Commissioners, the Durham City Council and Chapel Hill Town Council, if the two municipalities have allowed this ordinance to be enforced in their jurisdictions or enacted a substantially similar ordinance and have entered into an inter-local government cooperation agreement with the County of Durham for the administration of

this or a substantially similar ordinance, and to other jurisdictions which have enacted a substantially similar ordinance and have entered into an inter-local government cooperation agreement as set forth in Sec. 24-120, by December 31, 2002 on the effectiveness of this Ordinance, and shall, as part of this report, make recommendations for changes in the Ordinance or implementing program as deemed appropriate.

Sec. 24-123. Definitions.

1. "Alternate Mode" means any mode of commute and transportation other than the single occupancy motor vehicle, including telecommuting.

2. " Travel Reduction Plan" means a plan submitted by a Major Employer that meets the requirements as set forth in this article.

3. "Carpool" or "Vanpool" means two or more persons traveling in a light duty vehicle (car, truck, or van) to or from work.

4. "Peak Commute Trip" means a trip taken by an employee to or from work during peak hours.

5. "Commute Trip" means a trip taken by an employee to or from work.

6. "Commuter Matching Service" means any system, whether it uses computer or manual methods, which assists in matching employees for the purpose of sharing rides to reduce drive alone travel.

7. "Employer" means a sole proprietor, partnership, corporation, unincorporated association, cooperative, joint venture, agency, department, district, or other individual or entity, either public or private, that employs workers. However, the term "employer" shall not include the State of North Carolina, the United States of America, or any agency thereof.

S. "Full-time equivalent (FTE) employees" means the number of employees the employer would have if the employers work needs were satisfied by employees working 40 hours per work week. The number of full-time equivalent employees for any employer is calculated by dividing the total number of annual work hours paid by the employer, including work hours paid to contract or other workers whether or not considered employees of the major employer, by 2080 work hours in a year.

9. "Lead Agency" means a governmental or quasi-governmental agency shall evaluate Major Employer's travel reduction plans and the results achieved by the Major Employers due to the implementation of the plans, and shall provide consultative and educational programs for businesses, industries, and the general public.

10. "Major Employer" means an employer who employs, during, a 24 hour period, 100 or more full-time equivalent employees with at least 50 employees at a work site for at least six months during the year. Not included in this calculation shall be any employee who is required

by the nature of his work to daily use a personal owned vehicle in his work or is required to commute using, a vehicle owned by the employer.

1 1. "Mode" means the type of conveyance used in transportation including, single occupancy motor vehicle, ride share vehicle (Carpool or Vanpool), transit, bicycle, and walking.

12. "Non-Peak Commute Trip" means a trip taken by an employee to or from work during hours which are not Peak Hours.

13. "Motor Vehicle" means every device in, upon or by which any property is or may be transported or drawn upon a highway by mechanical means including car, van, bus, motorcycle, and all other motorized vehicles.

14. "Peak Hours" mean the hours between 7:00 AM and 9:00 AM or 4:30 PM and 6:30 PM.

15. "'Ridesharing 'means transportation of more than one person for commute purposes, in a motor vehicle, with or without the assistance of a commuter matching service.

16. "Transit" means a bus or other public conveyance system.

17. "Transportation Coordinator" means a person designated by employer as the lead person in developing and implementing a travel -reduction plan. The Transportation Coordinator shall act as the agent for the Major Employer for purposes of this ordinance.

18. "Travel Reduction Plan" means a written report outlining, travel reduction measures, which will be submitted annually by each Major Employer.

19. "Travel Reduction Program" means a program, implementing a travel reduction plan by an employer designed to achieve predetermined reductions in commute trips and vehicle miles traveled through various incentives and disincentives.

20. "Vehicle Occupancy" means the number of occupants in a motor vehicle including the driver.

21. "Vehicle Miles Traveled"(VMT) means the average (mean) number of miles traveled by a motor vehicle for commute trips.

22. "Work Site" means a building or any grouping, of buildings located within Durham County, which are physically contiguous parcels of land or on parcels separated solely by private or public roadways or rights-of-way, and which are owned or operated by the same employer.

2) The provisions of this ordinance are severable, and should any section or part hereof be declared unconstitutional or void, the rest and remainder of the ordinance shall remain in full force and effect.

3) The effective date of this ordinance shall be July 1, 2000, except for Sec. 24-118, which shall be effective only as to Major Employers with 400 or more employees on
July 1, 2000, shall be effective as to Major Employers with 200 or more employees on July 1, 2001, and shall be effective as to the remaining Major Employers on July 1, 2002.

This the 28' day of February, 2000.

INTERLOCAL COOPERATION AGREEMENT
COMMUTE TRIP REDUCTION PROGRAM

This is an Interlocal Cooperation Agreement (hereafter "Agreement") between the City of Durham, North Carolina, (hereafter the "City") a municipal corporation, and the County of Durham, (hereafter the "County") a political subdivision of the State of North Carolina. This Agreement is made pursuant to Chapter 160A, Article 20 of the North Carolina General Statutes. The date this Agreement commences is July 1, 2000.

The City and County agree as follows:

Section I. Purpose:

The purpose of the agreement is to establish an interlocal agreement which addresses county-wide administration of the Commute Trip Reduction Program and ordinance (hereafter "the CTRP program"). The County adopted the CTRP program on February 28, 2000, and the City authorized such program to be effective within the entire City by resolution adopted under the authority of GS 153A-122, passed on April 17, 2000.

Section II. Administration :

The County shall provide for the administration and enforcement of the CTRP program within the County, including all of the City of Durham. This shall include providing any necessary personnel and, in addition, contracting with an outside entity agreeable to the City and to the County (hereafter "outside entity") to provide services and administer the program. On behalf of the City, the City Manager shall have the authority to approve/disapprove the choice of such entity. The City determination regarding such entity shall be indicated through a written letter signed by the City Manager or an Assistant City Manager. The City's assent regarding the outside entity shall be considered continuing unless revoked in writing by the City Manager pursuant to the "Termination; Amendment" section herein. The City acknowledges and consents to the selection of the Research Triangle Regional Public Transportation Authority as the initial entity to provide services and administer the program herein referenced. The County shall provide the City's Transportation Manager advance notice of, and the opportunity to be represented at, all negotiations between the County and the outside entity regarding services, contract amounts, or the implementation and/or administration of the CTRP program. The County shall provide the City's Transportation Manager with copies of all contracts, evaluations, and correspondence regarding performance between the County and the outside entity, and any other relevant information regarding the administration of the CTRP program.

Section III. Duration; Extension :

The term of this Agreement shall be three years, commencing on July 1, 2000 and ending on June 30, 2003, which term may be extended as provided herein. The Agreement may be extended year to year for a total of two additional years without further action by the respective governing bodies of the City and the County, by written agreement signed by the City Manager and the County Manager. Two such extensions shall be possible, which shall make the total duration of this Agreement five years, including extensions.

Section IV. Method of Funding:

1. The County shall fund the CTRP program, reimbursed in part by the City, as provided herein. The yearly amount paid by the County to the outside entity for administration of the CTRP program in Durham County, including the City, is denominated the "Durham contract amount." The County Manager and the City Manager shall meet to consider and make recommendations regarding an annual budget to support the Durham contract amount. The recommendations of the respective Managers shall be submitted to the Board of Commissioners of Durham County and the City Council of the City of Durham. The respective Boards shall each consider such budget recommendations and take such action as they deem appropriate. If the Boards do not agree on the annual budget as submitted by the Managers, the Managers shall meet again to reconsider and submit a modified budget proposal to the Boards. The failure of the respective Boards to agree upon an annual budget after a second attempt shall be grounds for terminating this Agreement.

2. The City shall pay the County a proportionate share of the Durham contract amount. The proportion paid by the City shall be the Durham contract amount divided equally between the City and the County.

3. If the Durham contract amount is not a predetermined yearly amount, but varies month to month, then the County shall bill the City twice a year, each bill representing a six month period, for the City's proportionate costs, starting on or after December 30, 2000. If the Durham contract amount is a predetermined yearly amount, or if the variable monthly amount may be estimated on a yearly basis with reasonable certainty, the County may bill the City at the beginning of each yearly contract period. The City shall pay any bills received within 30 days of receipt.

4. At the end of each fiscal year, the Finance Director of the City and the Finance Director of the County, or their designees, shall conduct a review and reconciliation of amounts paid and payable under this Agreement to ensure that the City and County has each contributed in accordance with its obligations under this Agreement. Such adjustments, refunds, or additional payments as may be necessary to effectuate the reconciliation agreed upon by the respective finance directors shall be promptly made.

Section V. Termination; Amendment:

1. This Agreement may be terminated by either party, with 30 days written notice, for noncompliance with the provisions of this Agreement. In the event of such termination, the parties shall be obligated to pay only for services received as of 30 days from receipt of the termination notice.

2. This Agreement may be amended by action of the governing bodies of the City and the County, or as otherwise provided in this Agreement.

3. Either party may also terminate this Agreement for the upcoming fiscal year for any reason if notice of such termination is received by the other party on or before May 15th prior to the beginning of the July 1 fiscal year.

4. The City may, in addition, terminate this Agreement by written notice effective upon receipt if the County's choice of an outside entity is not acceptable to the City, if the parties are unable to agree on a contract amount as provided in Section IV, or if the services provided for administration of the CTRP program are unacceptable. The City shall notify the County of termination for reasons 1 or 2 above within 45 days of the City's receipt of written notice from the County concerning the identity of the outside entity or the amount of the contract. The City shall notify the County of termination for reasons of unacceptable administration 60 days prior to the date of termination, and shall give the County an opportunity to cure the problems in the outside entity's performance during such time period.

Section VI. General Provisions:

1. This Agreement shall be recorded both in the Office of the Clerk of the City and the Office of the Clerk of the County.

2. The City Manager shall designate persons to carry out the City's obligations under this contract. The County Manager shall designate persons to carry out the County's obligations under this contract.

3. This contract is intended for the benefit of the City and the County and not any other person. No third party rights are created by this contract, and this contract shall be enforceable solely be the parties hereto.

IN WITNESS WHEREOF, the City and County have authorized this Agreement to be executed and attested by their undersigned officers, to be effective from and after July 1, 2000.

CITY OF DURHAM

BY _____
City Manager

ATTEST:

_____
City Clerk

COUNTY OF DURHAM

BY _____
Chairman of the
Board of County Commissioners

ATTEST:

_____
Clerk to the Board of County Commissioners

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act.

_____ 9/7/00
FINANCE OFFICER DATE

CONTRACT COVER SHEET RUSH #68

Contractor's Name: County of Durham

Title and Description: Interlocal Cooperation Agreement – Commute Trip Reduction Program

Total Cost of Contract: $ $33,538 (FY 2000-01) renewable Contract No. CT 071809

Account Code: 5210000-527300 (Transit Administration – Contributions to Other Agencies)

Date of Contract: July 1, 2000

Authorization: (XX) City Council Meeting Date: August 7, 2000

(___) City Manager Date:

Department Contact Person: H. Wesley Parham Phone # 560-4366

		Signature	Date
1.	Dept./Div. Head	Kathryn Kalb	8/30/00
2.	Process Compliance (Procurement Management Services Division)		9-7-00
3.	Finance Officer (Pre-Audit) 9-7-00		9/7/00

3a. ( ) Check if you want Risk Management to review the insurance parts of the contract.

Signature - Risk Manager Date

3b. ( ) Check if you want the City Attorney's Office to review the way the Contractor has signed the Contract.

( ) Check if you want the City Attorney's Office to review the way a bond has been signed.

Signature - Attorney Date

4.	City Manager 9-7-00		9/7/00
5.	City Clerk		9-7-00

Return to Department/Division Head for Distribution.

6. Dept./Div. Head

Department/Division Head return Contract to City Clerk for filing.

Comments: The contract amount will be determined annually as part of the annual budget approval by the City Council. The contract award amount for FY 2000-2001 is $33,538.

Performance Bond Required: Yes (___) No (X) Enclosed (___) Waived by Council (___)

RESOLUTION #8647

RESOLUTION TO PERMIT A COUNTY ORDINANCE REQUIRING COMMUTE TRIP REDUCTIONTO BE ENFORCED WITHIN THE JURISDICTION OF THE CITY OF DURHAM AND TO ADOPT SUCH ORDINANCE IN SUCH PORTIONS OF THE CITY WHERE THE COUNTY ORDINANCE MAY NOT BE ENFORCED

WHEREAS, peak hour traffic congestion and air quality have been identified as critical concerns in Durham; and

WHEREAS, single occupant vehicle use is a major contributor to peak hour traffic congestion; and

WHEREAS, vehicle emissions are a major contributor to air quality concerns in the area; and

WHEREAS, Transportation Demand Management is an effective strategy intended to shift single occupant vehicle use from the peak hours and to reduce vehicle miles of travel; and

WHEREAS, it is in the public interest to reduce peak hour single occupant use and the average commute trip length and associated vehicle miles of travel; and

WHEREAS, a Commute Trip Reduction Program has been developed which would reduce single occupant vehicle use in the peak hours and reduce average commute trip vehicle miles traveled; and

WHEREAS, the Durham Board of County Commissioners approved a Commute Trip Reduction Program for employers of more than 100 employees on February 28, 2000; and

WHEREAS, many of the employers of more than 100 employees in Durham County are located within the City of Durham; and

WHEREAS, it would be more effective and efficient to have one uniform ordinance enforced county-wide.

NOW, THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF DURHAM

Section 1

That the City Council, under the authority of NCGS 153A-122, hereby allows the attached ordinance adopted by Durham County on February 28, 2000 entitled Commute Trip Reduction Program to be enforced within the boundaries of the City of Durham;

Section 2

That to the extent permitted by law, changes in such ordinance that are passed by the County shall also be enforceable within the City of Durham;

Section 3

That if such ordinance is deemed to be unenforceable by the County in such areas of the City that are not located within the County, then the City hereby adopts the ordinance directly for such areas as an ordinance of the City;

Section 4

That this resolution, and the adoption of such ordinance, if necessary, shall be effective from the date of passage of the resolution.

This the 17th day of April, 2000.

APPROVED BY
CITY COUNCIL

APR 17 2000

B. Ann Gray

CITY CLERK

NORTH CAROLINA
DURHAM COUNTY

AGREEMENT TO EXTEND

THIS AGREEMENT TO EXTEND is made and entered into by and between the COUNTY of DURHAM, a political subdivision of the State of North Carolina, (hereinafter "COUNTY"), and the CITY OF DURHAM, a municipal corporation, (hereinafter "CITY"). The date this Agreement commences is July 1, 2003.

WITNESSETH:

WHEREAS, the City and County entered into an Interlocal Cooperation Agreement for the Commute Trip Reduction Program (hereinafter "Interlocal Agreement") dated July 1, 2000; and

WHEREAS, pursuant to Section III of said Agreement, entitled "Duration; Extension', the term of the Agreement was three year, ending June 30, 2003, which term may be extended year to year for 2 additional years without further action by the respective governing bodies of the City and County, by written agreement signed by the City Manger and County Manager.

NOWTHEREFORE, the City and County, through their respective Managers, hereby agree as follows:

1. By this written Agreement to Extend pursuant to Section III of the Interlocal Agreement the parties agree to extend the term for one year from July 1, 2003 to June 30, 2004.

2. The Interlocal Agreement shall remain in full force and effect to the extent not inconsistent with this Agreement to Extend.

IN TESTIMONY WHEREOF, the County of Durham has caused these presents to be signed in its name by its County Manager, and the City of Durham, has caused these presents to be signed in its name by its City Manager, the day and year first written above.

COUNTY OF DURHAM

_____
Michael M. Ruffin, County Manager

ATTEST:

_____
Gary E. Umstead,
Clerk to the Board

(SEAL)

CITY OF DURHAM

_____
Marcia Conner, City Manager

ATTEST:

_____
Ann Gray,
City Clerk

(SEAL)

CHARLOTTE OBSERVER SUNDAY, MARCH 2, 2003

Steering hybrid cars into the mainstream

Boosting their appeal to families with kids could be the key

BY BRAD Foss, Associated Press

VIENNA, Va. — Francine Rosenberger is not a tree hugger. The 35-year-old securities lawyer does not empathize with rants against gas-guzzling vehicles and, truth be told, has no moral opposition to parking a second SUV in her driveway.

Yet there she was at her local Toyota dealership recently peeking under the hood of a Prius, sizing up the gas-electric car designed for high fuel efficiency and low emissions.

What prompted Rosenberger to shop around for an eco-friendly car? A state law that permits hybrid owners to drive Solo in high-occupancy lanes during rush hour. "That saves me time, which is worth more than anything," said the Arlington, Va., mother of two infants, whose eight-mile com mute can take 45 minutes. "The gas mileage is just a bonus."

Toyota Prius owner Lyle Brown of Spotsylvania County, Va., a commander in the Naval reserves, says breezing past rush-hour traffic jams in the restricted commuter lane makes a hybrid vehicle a worthwhile investment.

ROBERT A. MARTIN - ASSOCIATED PRESS PHOTO

Salesmen at the dealership, Koons Toyota, and crosstown rival Rosenthal Honda say pragmatism often trumps idealism among buyers of gas-electric cars, and they should know:

Koons and Rosenthal lead the nation in hybrid sales to consumers. As automakers try to figure out how to give hybrids mainstream appeal, marketing gurus suggest paying more attention to the needs of people like Rosenberger, the soccer moms of tomorrow.

As one marketing executive put it, hybrid technology will either flourish like cell phones or languish like e-books.

Hybrids are powered by a gasoline engine and an electric motor attached to a battery. The electric motor kicks in at low speeds in the Prius and during acceleration in Honda's Civic Hybrid. The battery recharges when the engine is running and when the driver steps on

the brakes. Both cars cost a few thousand dollars more than comparable conventional models, but they get more than 45 miles per gallon.

Prius salesman Dan Scanlan says gas-electric vehicles represent "the beginning of the end for OPEC," an allusion to the argument that hybrids help reduce the country's dependence on foreign oil. But the former radio reporter's sales pitch is otherwise devoid of political or environmental commentary, focused instead on gee-whiz features, such as how the gas-powered engine shuts down when the car stops.

Scanlan also tries to portray hybrid owners as just like everyone else. One moment he's checking the oil of an electric green Prius as Rosenberger looks on, the next he's telling her about a hybrid owner who enjoys an extra hour of sleep now that he uses the HOV lane.

If hybrids are to gain wider acceptance - they made up less than 1 percent of all car sales last year automakers will need "to make these cars practical for families with kids," said Jon Berry, senior research director at New York based market research firm Roper ASW and co-author of "The Influentials," a book about trend-setting consumers.

That means putting gas-electric engines into larger vehicles, bringing down the cost and improving the somewhat sluggish performance - goals the major automakers are working on. Honda learned some of these lessons last year when it introduced the four door Civic Hybrid, which quickly outsold its original hybrid, the two-door Insight, even though the Insight runs about 20 miles; farther on each gallon of gas.

If Virginia consumers are any barometer, a bill in Congress that seeks to give passenger-less hybrids access to HOV lanes nation wide could boost interest around major metropolitan areas. (Arizona already exempts hybrid owners from HOV restrictions.)

Construction has begun on Charlotte's first HOV lanes. They will be on Interstate 77, from just north of uptown to the future Interstate 485 in north Mecklenburg. The lanes should open in fall 2004.

For now, hybrids are on the fringe, a transportation alternative popular with environmentalists, technology buffs and movie stars. About a third of all hybrids are bought in California.

Last year, domestic hybrid sales grew 77 percent to more than 36,000 vehicles. Executives at Honda and Toyota expect combined U.S. sales to reach nearly 40,000 in 2003.

Prius owner Lyle Brown of Spotsylvania County, Va., a 43-year-old Naval reserves commander, says practicality isn't the only reason to own a hybrid.

He told about driving through a hip neighborhood in the nation's capital, when another Prius pull ed up beside him at a red light In side that car were a guy in his 20s and. a pretty woman about the same age. Brown, wearing his khaki-colored Navy uniform, wasn't feeling particularly cool.

That changed, he said, as "the long-haired guy kind of looks down at his car, then he looks down at my car and he nods"

Appendix J

Programs of Excellence

Samples of TDM initiatives from around the country featuring their accomplishments and quantifiable achievements of their significant program efforts.

Measures, Markers and Mileposts, Washington State Department of Transportation, May 31, 2003

There also needs to be a focus on performance-based management efforts. Sample information is included along with the Washington State's "Gray Notebook" as referenced above.

Travel Demand Management (TDM) – Success Stories

Seattle Way-To-Go Household Car Reduction Program (www.cityofseattle.net/waytogo)
Way to Go, Seattle is a new initiative to show people they can save money and make their communities more livable by making more conscious transportation choices, just as they do now with recycling and water conservation. Below is an article and news release about two of the program's trail projects.

"Program to Get Seattleites Out of Second Cars Successful"
Seattle Times, Saturday, March 10, 2001

They rode bicycles or car-pooled or took the bus. They saved up errands and ran them in one trip. They walked to the grocery store or to the kids' soccer match. And, ultimately, they saved themselves hundreds of dollars and avoided dumping 3 tons of greenhouse gas into the atmosphere.

What those 22 Seattle families did not do was use their second cars.

"I didn't think I could do it, says Sharon Griggins-Davis, a Queen Anne resident. "We'd got into some very bad habits of relying on that car."

Hers was one of the families that volunteered to give up their second cars for six weeks as part of a city-sponsored experiment.

As volunteers for "Way to Go, Seattle, the families agreed to take $85 a week from City Hall in exchange for promising to get by with one automobile. Just to be sure, the city recorded their odometer readings.

Participants also agreed to keep journals of how they got around.

Based on city calculations, taking 22 cars off the roads for six weeks saved each family an average of more than $70 per week - even allowing for bus and taxi fares - officials said. It also led to 1,700 fewer car trips through local neighborhoods, 8,100 fewer car-miles and prevented 6,500 pounds of carbon-dioxide emissions - the gas that causes global warming.

"This was not a scientific survey, said Mayor Paul Schell. "It was an educational experiment into how we can do better with what we have."

Some of the families found the task too difficult and reverted to their second cars when the program ended, city officials said. But most said they learned how easy it is to get along with one car. One family has sold its second car and others plan to.

"With two cars, there is always the temptation to use a car when you really don't need it, said Malva Slachowitz, a Ballard participant. "But we learned some things. When we made a shopping list, it was a serious list. When we went on a family outing, we would stop and do an errand."

The experiment appears to have been successful enough to justify another one, Schell said.

Way to Go Seattle! Families Park Their "Extra" Car; All Save Money, Some Give Up Car For Good
News Release, Mayor Paul Schell, September 22, 2001

23 Seattle families completed a City of Seattle pilot program to see if people could get along without their extra car for six weeks. The results are impressive. At least four families liked it so much that they're selling the car. Some families didn't need to participate in the program to be convinced. By determining the cost of owning their car on the City's website, they sold their extra car without even participating in the program!

"We can all take small steps to improve our transportation system," said Mayor Paul Schell. "These families have proven that we can make choices about how to get around and enjoy spending less time in our cars."

All the families in the study saved money, and most saved about $64 per week. The all found they could get around on transit, walking, bicycling and taking taxis when needed for about $21 a week, far less than the $85 per week cost of an average second car. Most families tell us they will continue to take the bus or ride their bike, and think about whether they need to drive to where they want to go.

"We hope more people will see they don't need that extra car," said Jamae Hoffman, project manager. "Families making smart decisions about transportation can cut down on vehicle trips, congestion, gasoline use and, of course, air pollution."

The best experience for Richard Kielbowitz and Linda Lawson of the Hawthorne Hills neighborhood was "watching the price of gas rise for other people". "When we heard reports of traffic jams, we counted our blessings that we were not caught up in them," they said. After participating in the program, Kielbowitz and Lawson sold their second car.

"Before I would have driven north for movies and shopping. Now, I head downtown on the bus," said Lori Goodwin of the Queen Anne neighborhood. "It was a fun experience. Same movies, same shopping, but it was wonderful not to have to deal with a huge parking lot."

Seattle's Strategic Planning Office paid the participating families $85 per week for keeping a daily dairy of their transportation activities and expenses during the six weeks they did not use their extra cars. Families were able to use the $85, the national average cost of owning and operating a second car, for bus fares, joining a Carsharing service, or taxi when needed. Most families spent only about $21 getting around without a car, saving an average of $49 per week. As a result the 23 families made nearly 200 fewer car weekly trips totaling 1,260 miles of travel avoided.

What comes next? Seattle's Strategic Planning Office plans to use these results to encourage others to think about how much it costs them to own and operate their cars, and decide if they, like other families, would rather have the money. The goal of this project is to demonstrate ways to ease neighborhood traffic and vehicle pollution.

Walking, Biking Surpass Driving in Vancouver (www.gvrd.bc.ca)
More people are now moving about by foot and bike than by car in Vancouver, British Columbia, according to a survey by the Greater Vancouver Regional District. Auto trips have actually dropped five percent, the report says. Vancouver City Councilor Gordon Price says, "Though some may find it difficult to believe, there are actually places on the peninsula with less vehicle

congestion than five years ago." Vancouver is famous for its commitment to planning, and every City Council since the early 1990s has stated that the city's transportation priorities would be walking and cycling, followed by transit, goods movement, and cars. "A new way of living is happening in Vancouver as we become the city we said we wanted," Price says. "Great cities are first of all places where most people can walk - and Vancouver is on its way to becoming one of those places."

Hasselt, Belgium Reduces Automobile Travel With Free Transit

(CNN, 2000) 68,000 people live in the Belgium town of Hasselt; another 200,000 people commute in and out every day. Faced with rising debt and traffic congestion, the mayor decided to abandon plans to build a third ring road around the town. Instead, he closed one of the two existing ring roads, planted trees in its place, laid more pedestrian walkways and cycle tracks, increased the frequency and quality of the bus service, and announced that public transport would be free of charge.

A year later the use of public transport has increased by a staggering 800%. The merchants are happy because business has increased; there are fewer accidents, fewer road casualties and there has been an increase in social activity. The same day that the town made the buses free, they also slashed local taxes – the habitants of Hasselt are now paying less than they were 10 years ago. More people are attracted to Hasselt because it is easier to get there, and the extra income has reduced the local taxes. One of the reasons the measure was adopted was a shortage of funds - the city did not have enough money to expand its roads. Free buses were a cheaper alternative, and it worked. The city had been slowly losing population, but since the new measures were adopted, the population has been rising 25 times faster than it was shrinking. Hasselt has been showered with international awards and prizes for the innovative way it has tackled congestion and pollution.

Commute Trip Reduction Programs

Pioneer Pacific Property Management (www.bctransit.com/traveloptions)
Pioneer Pacific Property Management's Station Tower, located at a SkyTrain station in Surrey (a suburb of Vancouver, British Columbia) is home to more than 700 employees of 30 different organizations. By working together, Station Tower has created an extremely effective program. Nearly 50 percent of Station Tower's employees use transportation alternatives.

Known as TravelChoices, the program was commissioned by Intrawest Corporation, the developer of the complex. Each organization in the building has a TravelChoices representative who provides time to administer the program. The trip reduction program enabled Intrawest to reduce the number of parking spaces required by 50 spots. At about $11,000 per spot, that meant $500,000 in savings. The program includes the following features:

- Showers and secure bike lockers are provided for cyclists.
- TravelChoices members have free access to the Gateway fitness facilities, including exercise equipment, showers and lockers.
- A ride-matching service links potential carpool partners within the complex.
- Reserved, preferential parking is available for carpools and vanpools.
- TravelChoices members get guaranteed ride home insurance.
- The TravelBucks incentive program gives its members one TravelBuck for each day they use alternative transportation to and from work.
- Prizes include free coffee, transit FareSaver Tickets, ski passes and rental car certificates.

"Working a trip reduction program into the planning stages of a development is a strategy more property developers should use. It saves money, it's environmentally friendly and it presents potential tenants with another reason to choose your site." Glenda Onstad, Senior Property Manager, Pioneer Pacific Property Management

Alameda County Congestion Management Program (www.accma.ca.gov)
The Alameda County (East San Francisco Bay area, including suburban and rural areas) Congestion Management Program enlisted four employers to provide financial incentives to encourage reduced driving. The table below summarizes the results at the four worksites. The program managers conclude that financial incentives alone typically reduce automobile commute trips by 16-20%, and significantly more if combined with other TDM strategies.

Table 2 **Alameda County Commute Incentive Program**

	Alameda	Albany	Oakland	Pleasanton
Incentive offered	$1.50/day	$2.50/day	$40/mo transit pass	$2.00/day
Average combined fuel savings and financial benefit.	$268/year	$381/year	$407/year	$282/year
Eligible Employees	573	130	400	380
Participants before	12 (3%)	7 (5%)	11 (3%)	147 (40%)
Participants after	108 (19%)	30 (23%)	93 (23%)	130 (34%)

Ernst & Young (www.wageworks.com)
The accounting and management firm Ernst & Young offers a pre-tax commuter transportation and parking benefits to its employees in partnership with WageWorks, starting in 2001. This is projected to save employees 40% of their commuting and work-related parking costs, and reduce the firm's payroll expenses.

"Adding commuter benefits to our innovative benefits offerings is just one more reflection of Ernst & Young's commitment to make the firm a great place to work," says vice chairman of human resources, James L. Freer. "When we surveyed a group of employees regarding what benefits they value, a pre-tax commuter program was the most frequent enhancement by far, with 62% of the respondents asking for it. We are pleased to offer such a program that will make our people's commute to work a bit easier."

CH2M Hill
Upon moving into new offices in the Seattle suburb of Bellevue, WA, the 430 employees of the engineering firm of CH2M Hill were offered $40 per month if they walked, bicycled, carpooled or took transit to work; or free parking if they drove alone. The firm's drive-alone rate declined from 89% to 54%, and stayed there, while the percentage biking or walking increased from 1% to 17% (see table below). With parking demand down by 39%, the firm's problem of 'too many parkers for too few spaces' disappeared. This approach reduced costs to the company, reduced traffic and pollution, while increasing tax revenue.

	Before	After
Drive Alone	89%	54%
Carpool	9%	12%
Bus	1%	17%
Bike, Walk	1%	17%

Car Free Planning

Bogota Car Free Day (www.sinmicarroenbogota.com and in English www.alcaldiabogota.gov.co/sinmicarroenbogota/sinmicarroeng.htm)
The city of Bogota, Columbia first established an official Car Free Day on February 24th, 2000, organized by Mayor Enrique Peñalosa and The Commons, an international environmental organization. This was one of the first Car Free days organized in a developing country. The event was successful and highly popular, and as a result the organizers won the prestigious Stockholm Challenge Award (www.challenge.stockholm.se). Below is the mayor's summary:

> "It was a formidable achievement of Bogata's citizens. A city of seven million inhabitants functioned well without cars. This exercise allowed us to catch a glimpse of what must be the transportation system of the city in ten or fifteen years: an excellent public transportation system and rush hours without cars.
>
> Most important of all, was the sense of community that was present that day. We fortified our confidence in our capacity of making great collective efforts to build a more sustainable and happier city. Surveys revealed that 87% of the citizens were in agreement with the Car Free Day; 89% did not have any difficulty with the transportation system used; 92% said there was no absenteeism at their office, school or university; and 88% said they would like to have another Car Free Day.
>
> Now we want to bring a referendum to our voters, proposing a goal for the year 2015: Between 6:00 a.m. and 9:00 a.m. and between 4:30 p.m. and 7:30 p.m., all cars must be off the streets. Therefore the city should move exclusively in public transport and bicycles.

Campus Transport Management

Stanford University (www.stanford.edu)

Stanford University in Palo Alto, California plans to expand capacity by 25%, adding more than 2.3 million square feet of research and teaching buildings, public facilities and housing without increasing peak period vehicle traffic. By 2000, 1.7 million square feet of new buildings had been developed while automobile commute trips were reduced by 500 per day. To accomplish this the campus transportation management plan includes:

- A 1.5 mile transit mall.
- Free transit system with timed transfers to regional rail.
- Bicycle network.
- Staff parking "cash-out".
- Ridesharing program.
- Other transportation demand management elements.

By using this approach the campus was able to add $500 million in new projects with minimal planning or environmental review required for individual projects. The campus also avoided significant parking and roadway costs. Planners calculate that the University saves nearly $2,000 annually for every commuter shifted out of a car and into another mode. This also reduced regional agency traffic planning costs.

Public benefits included decreased congestion and improved safety on surrounding roadways and the regional traffic system, reduced air, noise and water pollution, and improved local transit options. All of Stanford's transportation services are available to students, employees and the general public.

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Hacienda is a mixed-use planned unit development (PUD) of distinction and quality. At 875 acres, Hacienda is the largest such development in Northern California and has been selected as one of the world's top 10 mixed-use business parks by Site Selection magazine.

Located near the junction of two Interstate freeways (I-580 and I-680), Hacienda is about halfway between San Francisco to the northwest and Silicon Valley to the southwest. Hacienda's central location makes for easy access to all the Bay Area's commercial centers and the region's largest labor pool.

As currently zoned, the park will contain approximately 11 million square feet of office, R&D, commercial and residential space. Construction of the park's infrastructure began in 1982, and the first office building was completed in August 1983.

All infrastructure improvements for Hacienda are complete, and over seven million square feet of space has been developed to date. Land uses allowed by the PUD include 4 & 5-story mid-rise office; 2 & 3-story garden office; 1 & 2-story "office/flex", 16 units/acre residential development and retail/commercial development.

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Hacienda is a high-quality, mixed-use, master planned development situated near the intersection of two Interstate freeways in Pleasanton, California. Hacienda is conveniently located between San Francisco and Silicon Valley. With its instant access to two neighboring Interstate freeways and its advantageous "reverse-commute," companies at Hacienda can easily serve all their Bay Area clients, as well as draw from the Bay Area's largest labor pool and most affordable and rapidly growing housing market.

At 875 gross acres (730 net acres), Hacienda is the largest development of its kind in Northern California. 10,085,279 square feet of existing, mixed-use space is occupied by some 413 companies that locally employ approximately 22,474 people. Under the current PUD, at Hacienda's build-out, the park is expected to contain roughly 11.2 million square feet of mixed-use space and be the work location for 28,000 people.

Because of the innovative approach to planning, traffic mitigation, services and aesthetics taken by The Prudential Realty Group, Hacienda's principal developer, Hacienda retains overwhelming support from local voting residents and elected officials. Hacienda's unique programs and success have been featured in The Wall Street Journal, The San Francisco Chronicle/Examiner, The San Jose Mercury-News, as well as many other local, regional and national publications. Virtually all of the Bay Area's television stations have featured Hacienda. So well regarded are Hacienda's accomplishments, that in December 1988, Site Selection Magazine named Hacienda one of "the ten best business parks in the world."

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2003 BEST WORKPLACES for COMMUTERS™ Hacienda Business Park

Hacienda knows our employees and residents need solutions for their commute. In response, Hacienda has created a nationally recognized comprehensive program to address commuting needs. This program meets all the required conditions to attain the national standard of excellence in commuting programs.

Hacienda is presently home to approximately 20,000 employees and residents, many of whom commute into the park from surrounding cities. Because of the high volume of commuters, a variety of transportation links with outlying areas have been developed to connect park users with destinations at or near their place of business. The following is an overview of the park's current program contained within a review of the various transportation alternatives available to Hacienda users.

In 1984, the developers of Hacienda entered into cooperative discussions with the City of Pleasanton to develop a plan that would control traffic congestion in the newly developed 854 acre park. These discussions resulted in an ordinance aimed at reducing traffic congestion. Under this ordinance, Hacienda was required to oversee park tenant participation to make sure that they were in compliance with the new traffic reduction requirements. The development also coordinated park-wide programs that would aid companies in meeting ordinance goals. Compliance assistance strategies consisted of a free commuter shuttle, carpool and vanpool coordination, development of on-site amenities to assist in the promotion of transportation alternatives and various information campaigns.

In 1994, amendments were made to the city ordinance to allow the City of Pleasanton the ability to receive delegation of the Bay Area Air Quality Management District's Regulation 13-1 and to meet requirements imposed by the Alameda County Congestion Management Agency. The amended ordinance required businesses with 50 or more employees, who begin work between the hours of 6:00 - 10:00 a.m., to meet both congestion management and vehicle reduction goals. Specifically, businesses were asked to achieve an average vehicle ridership of 1.35 persons per car by 1998 and reduce peak hour traffic by 45%.

As noted, Hacienda developed TSM measures that would aid park businesses in meeting city's congestions management objectives. Hacienda's Covenants, Conditions and Restrictions authorize the park to administer, coordinate and enforce transportation requirements. To do this, a comprehensive transportation program was initiated on Hacienda. Since 1985, the Association has continuously provided services to park users to help them realize their individual goals and thus help the city to achieve its goals. The services provided have changed with time to both meet the changing needs of the park population and to insure the highest cost benefit.

In 1995, with passage of the Lewis Bill, mandatory Transportation Management requirements could no longer be

required of employers by government agencies. Because of Hacienda's longstanding commitment to the goals of transportation management, incentive programs to encourage the use of transportation alternatives have continued voluntarily employing the same successful and award-winning approach utilized under the mandatory program.

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Altamont Commuter Express (ACE) www.acerail.com A daily commuter train which runs from Stockton to San Jose via Pleasanton.

- *Ride Guide* www.acerail.com/riding.html
- *Schedules* www.acerail.com/schedule.html

BART San Francisco Bay Area Rapid Transit District

BART www.bart.gov Access to BART news and information, schedules and events as well as features such as online ticket sales.

- *All About Access* www.bart.gov/guide/disabledAccess/overview.asp
- *BART & Buses* www.bart.gov/guide/transit/transit.asp
- *Bikes on BART* www.bart.gov/guide/bikes/bikeoverview.asp
- *Charge-A-Ticket* www.bart.gov/tickets/sales/machines.asp
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- *Tickets by Mail* www.bart.gov/tickets/sales/mailordering.asp
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- *Tickets-To-Go Ordering* www.cdsnet-inc.net/tickets2go/bart.htm
- *Your Regional BART Puls Ticket* www.bart.gov/tickets/types/typesplus.asp

Caltrain

CalTrain www.caltrain.com/caltrain Providing commuter rail service from Gilroy to San Francisco.

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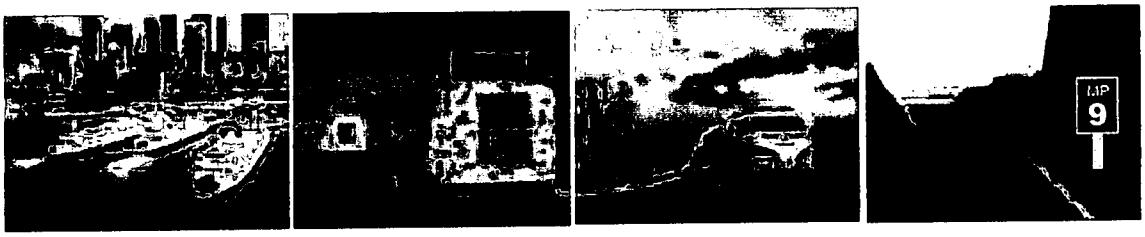
Washington State
Department of Transportation

Measures, Markers and Mileposts

The Gray Notebook for the quarter ending
March 31, 2003

WSDOT's quarterly report to the
Washington State Transportation Commission
on transportation programs and department management

Douglas B. MacDonald
Secretary of Transportation



Measures, Markers and Mileposts
The Gray Notebook for the quarter ending March 31, 2003

9th Edition
Published May 21, 2003

"What gets measured, gets managed."

This periodic report is prepared by WSDOT staff to track a variety of performance and accountability measures for routine review by the Transportation Commission and others. The content and format of this report is expected to develop as time passes. Information is reported on a preliminary basis as appropriate and available for internal management use and is subject to correction and clarification.

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Measures, Markers and Mileposts
The Gray Notebook for the quarter ending March 31, 2003

9th Edition
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A Note from Doug MacDonald

The ninth quarterly Gray Notebook *includes a couple of noteworthy new features.*

First, three sections (pages 32 to 36) provide annual reporting on transportation system benchmarks specifically requested and directed by the legislature in January 2002. These requirements are now set forth in RCW 47.01.012. We are pleased that these topics are now added to the variety of performance measures and reports that have already found their way into the Gray Notebook *on WSDOT's own initiative.*

Second, the section on Measuring Congestion (pages 10 to 13) shows the efforts WSDOT is now making to quantify and describe the important issues of highway performance in the areas of travel times, congestion and delay. Explanatory notes accompanying those sections describe our aims, what we have achieved to date, and what we must continue to do. It is probably true that, to a greater extent than any other Gray Notebook *section, this material is on the cutting edge of transportation system performance measurement. There is much, however, to be done, as you will see.*

We hope you find the Gray Notebook *interesting and useful. For other aspects of WSDOT's accountability efforts, see* www.wsdot.wa.gov/accountability. *And much more will be forthcoming, as we work to meet the accountability and reporting expectations that the legislature has incorporated in the recent 2003 Transportation Funding Package.*

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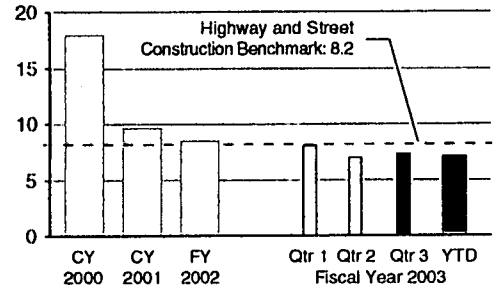
Worker Safety: Quarterly Update

Continuing updates on *Gray Notebook* safety topics – data is shown for calendar years (CY) 2000 and 2001, fiscal year (FY) 2002, and FY 2003 by quarter and by Year-to-Date (YTD).

WSDOT Highway Maintenance Workers

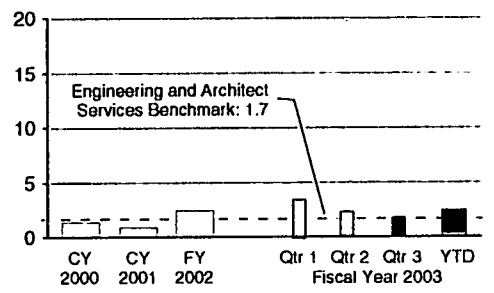
Recordable Injuries per 100 Workers per Fiscal Year



The third quarter recordable injury rate for maintenance was 7.23 injuries per 100 maintenance workers. There were 26 recordable injuries during the third quarter of which 13 were lost workday cases. These lost workday cases accounted for 169 lost workdays during the quarter. This averages 56 lost workdays per lost workday case and a lost workday incident rate of 47 days per 100 maintenance workers per fiscal year. Through three quarters of FY 03, there have been 27 (30%) back injuries. Back injuries continue to be the most frequently injured part of body. Strains accounted for 45% of the total injuries.

WSDOT Highway Engineer Workers

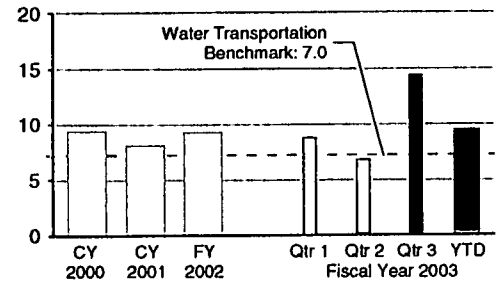
Recordable Injuries per 100 Workers per Fiscal Year



The third quarter recordable injury rate for engineer workers was 1.43 recordable injuries per 100 engineer workers, of which only three injuries resulted in lost workdays. These three lost workday injuries resulted in a total of 25 lost workdays. The average is 8.3 lost workdays per lost workday case and a lost workday incident rate of 5.1 lost workdays per 100 engineering workers per fiscal year. In FY 03, there were nine (23%) back injuries. The second most frequent claim filed was hearing loss. Sprains/strains (33%) were the most frequent nature of injury followed by occupational illness, e.g., Carpel Tunnel Syndrome.

WSDOT Ferry Vessel Workers

Recordable Injuries per 100 Workers per Fiscal Year



The third quarter recordable injury rate for WSF vessel workers was 14.2 recordable injuries per 100 vessel workers. Several injuries reported during the third quarter occurred in previous quarters, increasing the rate for this update. Twenty-nine of the 34 recordable injuries reported during the quarter were lost workday cases. These lost workday cases resulted in 215 lost workdays for an average of 7.4 lost workdays per lost workday case. This is a lost workday incident rate of 89.6 lost workdays per 100 vessel workers per fiscal year. A total of 74 recordable injuries for 1,290 lost workdays have accumulated through three quarters of FY 03. Strains/sprains were the most frequent nature of injury (74%) of all vessel worker injuries through three quarters of FY 03. Back injuries were the most frequent part of body injured (28%).

Source for all charts: WSDOT Safety Office

Accident Prevention Activities

Third Quarter FY 2003

- WSF began safety awareness seminars with all deck crews.
- The Southwest Region's "Special Safety Buddy" system has significantly reduced the region's injuries.
- The WSF conducted ergonomic reviews to identify workstation configuration and tasks, which could result in an injury or occupational illness. Safety inspections were also conducted at random.
- Awarded contract on high visibility clothing to enhance highway and WSF worker visibility.
- WSDOT has begun an agency-wide campaign to educate workers on West Nile Virus (WNV) and how to protect themselves from the virus. Maintenance personnel in all regions are implementing WNV surveillance and control activities in support of the state Department of Health.

Reading the Charts

"Recordable injuries and illnesses" is a standard measure that includes all work related deaths and work related illnesses and injuries, which result in loss of consciousness, restriction of work or motion, transfer to another job, or require medical treatment beyond first aid.

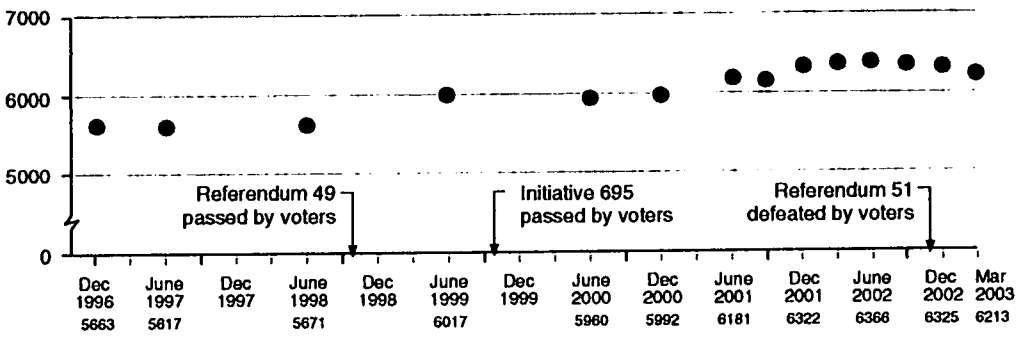
The U.S. Bureau of Labor Statistics provides the selected 2000 national average benchmarks. After discussion with the National Bureau of Labor Statistics, the following benchmarks were selected to provide a more relevant and consistent benchmark.

Maintenance: "Highway and Street Construction" Standard Industry Classification (SIC) 161 (rate 8.2)
Engineering: "Engineering and Architect Services" SIC 871 (rate 1.7)
Ferry vessel workers: "Water Transportation" SIC 44 (rate 7.0)
One worker equals 2,000 hours per year.

WSDOT Workforce Levels

One indicator of the agency's workforce size is the current number of permanent full-time employees on staff. The accompanying chart shows that number at various points since the end of 1996. (The number of "FTEs" [full-time equivalents] will generally exceed the number of full-time employees, since seasonal and part-time work force must also be funded from "FTE" allotments.)

Number of Permanent Full-Time Employees at WSDOT



Source: WSDOT Office of Human Resources.

WSDOT Employee Training Requirements

Maintenance and Safety Training Required by Law

Progress toward achieving training goals for maintenance employees is reported below. The number of required courses and the number of individuals required to complete a given course change periodically. This table shows the status of training completed for eleven of the 24 courses required this quarter.

	Maintenance Workers Requiring Training Mar 03	Total Current Maintenance Workers Trained to Date Mar 03	Maintenance Workers Trained 2nd Quarter FY03	Maintenance Workers Trained 3rd Quarter FY03	Compliance to Date: Target = 90%	Change Since Last Quarter
Safety Courses						
Blood Borne Pathogens	1221	1011	67	43	83%	+4%
First Aid	1456	1397	23	14	96%	+3%
*Hearing Conservation	1340	1211	15	0	90%	-1%
Personal Protective Equipment	1312	561	81	85	43%	+8%
Fall Protection	745	367	60	13	49%	+3%
Flagging & Traffic Control	1121	1085	10	4	97%	+2%
Maintenance Courses						
Drug Free Workplace	353	282	11	45	80%	+13%
Forklift	1183	988	33	12	84%	+1%
*Hazardous Materials Awareness	1022	465	133	1	45%	-2%
Manlift Operations	574	313	99	11	55%	+4%
Excavation, Trenching & Shoring	393	144	8	24	37%	+4%

** The number of workers requiring all training courses increased this quarter, causing the percent completion in these two courses to fall.*

Training for All WSDOT Employees

The following table reflects continued progress on five important workforce courses that are now receiving special emphasis.

	Number Requiring Training**	Number of Employees Trained	Number Trained 2nd Quarter FY03	Number Trained 3rd Quarter FY03	Compliance to Date: Target = 90%	Change Since Last Quarter
Training Courses						
Disability Awareness	7063	2186	199	191	31%	+4%
Ethical Standards	7063	6898	40	58	98%	+2%
Sexual Harassment/Discrimination	7063	3456	397	560	49%	+9%
Valuing Diversity	7063	2731	389	384	39%	+7%
Violence that Affects the Workplace	7063	5410	577	20	77%	+2%

***Courses shown are mandatory for all permanent full-time, part-time, and temporary employees. Diversity training previously offered and completed by 63% of our workforce (1992 to 2002) has been revised and replaced with three separate courses, Valuing Diversity, Sexual Harassment, & Disability Awareness. The new courses are offered as refresher training and first time training. The goal is to have 90% of our workforce trained as resources and time allow.*

Source: WSDOT Office of Human Resources.

Highway Construction Program: Quarterly Update

Meeting WSDOT's Scheduled Advertisement Dates

For the biennium to date, WSDOT has advertised 376 improvement and preservation projects. This represents a 92% delivery rate based on the revised plan of 407 projects. WSDOT's project delivery schedule, according to the Capital Improvement and Preservation Program (CIPP) is shown on the adjacent chart for the quarter ending March 31, 2003. The chart also shows the revision to the planned line, with 429 projects originally scheduled to be advertised to date. This is the result of the $76 million Current Law Budget reduction to the CIPP, from the 2002 Supplemental Budget*.

In quarter seven, 30 projects were not advertised as planned. This can be attributed to the following factors:

- Projects deferrals caused by including insufficient time for design work and delayed scoping and preliminary engineering of projects. This accounted for 11 of the deferrals and one deletion this quarter. Two examples:

  Prosser's I-82 pavement project in a slide area. Additional subsurface testing indicated a more complicated and costly solution would be required to repair the slide area. The project was deleted until an appropriate solution is developed and additional funding is approved

  SR 20, Sidney St. Vicinity to Scenic Heights, south of Oak Harbor. This project would provide better sight distance by modifying the highway alignment and removing trees and utility poles. Further analysis determined the addition of left turn lanes at two locations was needed, which increased right of way acquisition time. Also, additional environmental effort is needed as a result of including Federal funds in this project. The Ad date was delayed two years.

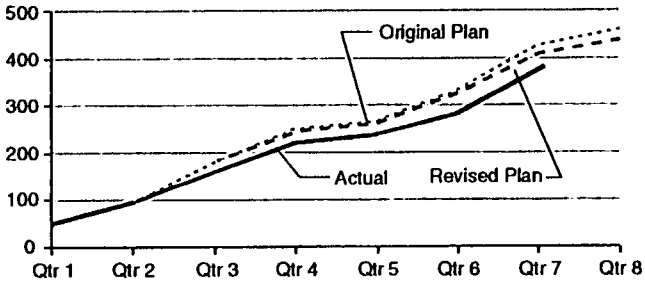
- Projects deferrals as a result of coordination with partner agencies. This accounted for nine of the deferrals this quarter. Two examples:

  Bothell's SR 527 pavement project consists of 2.5 miles of asphalt paving. The City of Bothell requested changes to the project resulting in a two-month delay.

  Waitsburg's SR 12 pavement project, including safety improvements. Delayed three months to address citizen's opposition to project.

Highway Construction Program Delivery

Planned vs. Actual Number of Projects Advertised
2001-2003 Biennium, Quarter 7 Ending March 31, 2003



- Project deferrals as a result of changing project priorities, to eliminate possible conflicts with adjoining projects and adjusting work to available funding. These accounted for nine of the deferrals this quarter. Two examples:

  SR 16, Tacoma Narrows Bridge Electrical. This project makes major electrical repairs to the existing bridge. Because of likely conflict with new second Narrows Bridge this project is deferred to 2005-07 biennium.

  SR 112, Jim Creek Culvert Repair, 30 miles west of Port Angeles. This project repairs a failing culvert, while removing a fish barrier. The Makah Tribe got BIA funds to advertise a paving project in this locale, conflicting with this project. Deferred to the 2003-05 biennium.

These projects will continue to receive focused management attention to ensure project delivery during the remainder of the biennium.

***Adjustments to Original Plan**

Projects deferred or deleted as a result of the Current Law Budget reduction account for nine deferred and one deleted project this quarter. Two examples:

SR 7 Elbe Safety Interchange Facility. *40 miles south of Tacoma. The project constructs a rest area facility. Although the project has Federal earmark available, there is no future I3 subprogram allocation. No new Ad date is proposed.*

SR 3/305 Interchange Vicinity, near Poulsbo. *The project installs signals and adjusts alignment to the interchange. This WSDOT contribution to a developer project was deleted with the program reduction. The developer has since funded the entire project and it is currently under construction.*

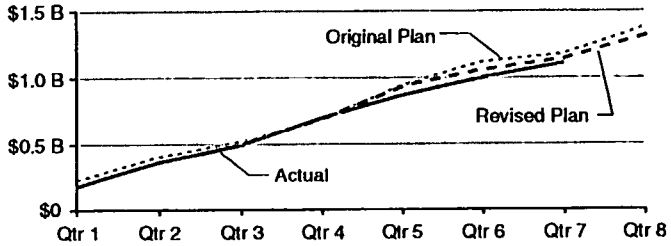
Highway Construction Program Cash Flow

Expenditures through the quarter ending March 31, 2002, are slightly above plan, achieving over 97% of budgeted cash flow. Historically, WSDOT's cash flow for this program is 92% to 95%. The chart reflects the revised plan due to the budget reduction explained above. The expenditure rate reflects the high delivery rate of projects to advertisement in the highway improvement program. This expenditure rate also reflects:

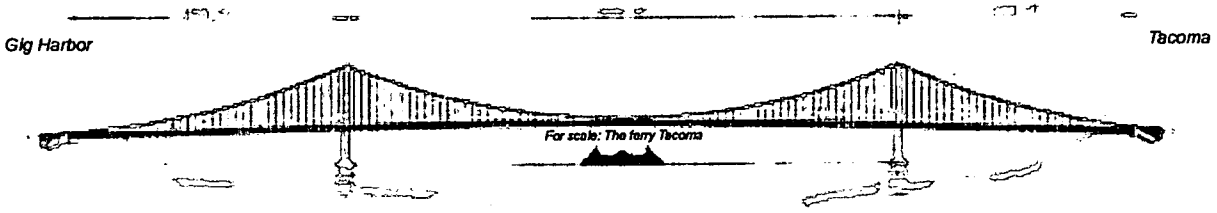
- A Highway Construction Program that included a large number of new construction starts in spring 2001. While these projects were actually started in the last quarter of the 1999-2001 biennium, this work has driven expenditure levels in the current biennium.
- The emphasis in getting projects to advertisement. This has been an important management focus and has been reported throughout the year in the *Gray Notebook*.
- Activity in the regions, often with direct encouragement and support of customer communities, in moving projects "to ad" given the prospects for project deferrals or cancellation in a period of expected budgetary stringency.
- Favorable construction weather, encouraging contractors to speed their work.

Highway Construction Program Cash Flow

Planned vs. Actual Expenditures
2001-2003 Biennium, Quarter 7 Ending March 31, 2003
Dollars in Billions



Sources for all charts: WSDOT Program Management Office.

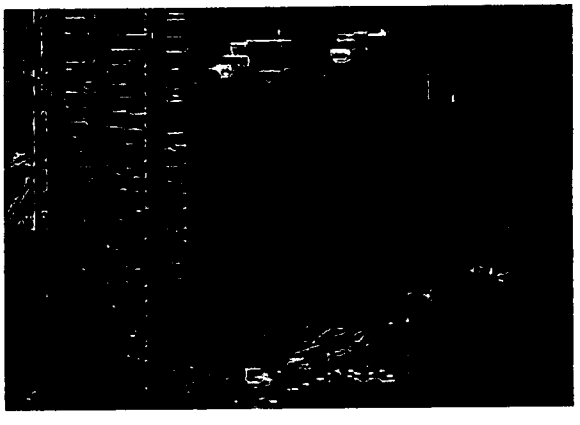


Tacoma Narrows Bridge Project Update

As of March 31, 2003, design/builders Tacoma Narrows Constructors (TNC) have completed 5.2% of the physical construction activity for the new State Route 16 Tacoma Narrows Bridge. Todd Pacific Shipyards Corporation, TNC's subcontractor recently launched two completed giant steel "cutting edges" that will form the bottom of two caissons (bridge foundations) on which the bridge towers will be built. Each cutting edge measures 131 feet long, 81 feet wide and 18 feet high, and weighs about 750 tons. After launch in Seattle, each cutting edge was towed to the Port of Tacoma for caisson wall construction — building up the sides of the cutting edges with reinforced concrete. When the caissons reach 40 feet in height, they will be towed to the new bridge site in June and late July. Once at the site, the construction will continue on the caissons until they are properly embedded into the Narrows seabed. Crews will then begin constructing the bridge towers. In the meantime, dredging, trenching and riprap placement are being done in the Narrows seabed to prepare the caisson landing area.

This complete caisson "cutting edge" slid gracefully into Elliott Bay during a recent launch. It was later towed to the Port of Tacoma for caisson construction. Later this summer it will be moved to the bridge site for further construction.

Other work on the overall project is also continuing. Construction is underway at 24th Street NW in Gig Harbor (seen at right) where crews are building a new overpass and half-diamond interchange. Work is also occurring in the 36th Street NW and 22nd Avenue NW vicinities as crews relocate utilities and do other preparation work to realign local roads, widen and improve intersections, create bicycle facilities, and widen State Route 16 to accommodate future HOV lanes. Concurrent design work also continues. For more information, visit *www.wsdot.wa.gov/projects/sr16narrowsbridge/.*



24th Street Bridge north pier is shown in this recent photo. Bridge girders will be placed on top of the wall.

Highway Safety: Quarterly Update

The highway safety projects tracked on this page are a portion of the construction projects that were described on page three. Of the 56 safety improvement projects originally planned to be advertised by the 7th quarter of the 01-03 biennium, eight projects have been removed due to the Supplemental Budget reductions, for a revised plan of 48 project advertisements. Through the 7th quarter, 33 projects have been advertised. In the 7th quarter, 15 projects were scheduled for Ad under the revised plan. A total of eight projects went to Ad during that period: five originally scheduled projects, one previously delayed project, one project advanced from the 03-05 biennium, and one addition to the program to construct safety improvements with a new federal grant.

From the revised plan of scheduled projects for advertisement in the 7th quarter, 10 were deferred:

- Seven projects were deferred due to design, scoping, right-of-way or environmental issues.

  SR 20, Sidney St. Vicinity to Scenic Heights, south of Oak Harbor. This project would provide better sight distance by modifying the highway alignment and removing trees and utility poles. Further analysis determined the addition of left turn lanes at two locations was needed, which increased right of way acquisition time. Also, additional environmental effort is needed as a result of including Federal funds in this project. The Ad date was delayed two years.

  SR 539, King Tut Road and Bartlett Road, south of Lynden. This project would construct a northbound left turn lane at the King Tut Road intersection. At the Bartlett Road intersection, the project would construct a northbound left turn lane, a northbound right turn pocket, and a southbound left turn lane. Project is delayed to minimize construction impacts to the Guide Meridian Water Association. Right of way acquisition is in process with a project Ad date of February 2004.

  SR 532, at 102nd Ave. NW, in Stanwood. This project would install traffic signals and improve existing sidewalks. During the design phase of the project, it was discovered that county right-of-way plans were not consistent with field conditions and local property owners had encroached on state right of way. Project is delayed one year to update existing right-of-way plan.

  SR 202, near Riverside Park, in Fall City. This project would construct two roundabouts. The portion of the project enhancing pedestrian safety by replacing and installing sidewalks is to be completed as part of another project. The main project will be delayed until 2005-2007 biennium pending acquisition of additional right-of-way when funding is available.

  SR 20, Oak Harbor NCL to Frostad Road, north of Oak Harbor. This project would add a two-way left turn lane from the vicinity of NE Narrows Avenue to Oak Harbor north city limits, add left turn lanes and illumination at Cemetery Road/NE 16th Avenue, Sleeper Road, and Frostad Road, and add passing lanes in the westbound direction. To reduce cost for wetland mitigation, the needs of four projects were designed into one site. The additional time needed to compile environmental documentation and obtain permits for the four projects delayed the Ad date nine months.

  SR 20, near Frostad Road, north of Oak Harbor. This project would add guardrail where needed throughout the project area. Project delayed nine months over issues concerning the wetland mitigation site.

  SR 542, Scenic Viewpoint to Excelsior Trail, on the Mount Baker Highway. This project would install guardrail as needed throughout the project area. Project delayed five months to complete environmental documentation for a biological assessment not previously scoped.

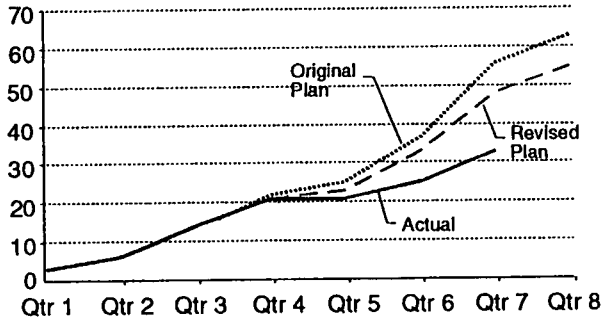
- Three projects were deferred for additional partnership coordination needs.

  I-5, Northbound Ramps at SR 532, east of Stanwood. The original project would have provided a one-lane roundabout at the intersection of the northbound I-5 ramps and SR 532. To accommodate design suggestions from the public and elected officials, the project was delayed. The northbound ramps roundabout is now included in a new revenue project that will also make improvements at the intersection of old SR 99 and SR 532. The expanded project Ad date is Spring 2006

  SR 531, in front of Lakewood High School, west of Arlington. This project would provide a sidewalk in front of Lakewood High School. The delay allowed the school district to deed right of way to the state and locate sidewalks away from the highway. Ad date will be in 2003.

  SR 522, 83rd Place NE, west of Bothell. This project would signalize the intersection at 83rd Place NE and provide an eastbound left turn lane at this intersection. Project delayed to 2005-2007 biennium to enable it to be packaged with other lane-widening projects in the corridor to minimize rework and traffic disruption.

Safety Improvement Program Delivery
Planned vs. Actual Number of Projects Advertised
2001-2003 Biennium, Quarter 7 Ending March 31,2003



Reducing Bicyclist Fatalities

Washington ranked 16th lowest in bicyclist fatality rates in 2001, compared to other states. Eight bicyclists were killed on Washington state highways in 2001. In addition, there were more than 200 reported accidents involving bicyclists, including disabling injury accidents. This may be the tip of the iceberg: a recent FHWA study of hospital emergency department data indicates that between 40 and 60 percent of all bicycle accidents are not captured in highway reporting data.

Consistent with accident trends for pedestrians (see the *Gray Notebook* for the quarter ending December 31, 2002), State Route 99 appears to be the corridor with the largest concentration of bicycle-related accidents from 1995 to 2001. Some of the risk factors at work on SR 99 include vehicle traffic volumes, vehicle speeds, shoulder configurations and illumination conditions.

Traffic Safety Near Schools

In 1999, WSDOT began administering a grant program called Traffic Safety Near Schools. This program has now funded more than 70 projects statewide designed to improve bicyclist and pedestrian safety near schools. However, the program has not been able to fund nearly 90 additional project proposals. The legislature's new transportation budget provides an additional $1.5 million to fund 10 to 12 more projects, leaving about 80 unfunded.

Some of these grants have already had significant impacts on safety. For example, the 155th Street crossing in Kenmore was defined as a high accident area. Since receiving the Traffic Safety Near Schools grant in 2000 to improve sidewalk and pedestrian safety, Kenmore has not had an accident at this location.

Federal Benchmarking Progress

The Federal Highway Administration (FHWA) recently completed a benchmarking study of all states and their bicycle and pedestrian programs. Washington met all pedestrian benchmarking standards and all but one bicycle benchmark, ranking Washington second nationally.

Scoring on Eight Performance Benchmarks

- ☑ Bike/Ped Plan exists
- ☐ Bicycle Plan meets FHWA guidance
- ☑ Accomodates bicycles in highway projects
- ☑ Includes sidewalk in new urban highway projects
- ☑ Includes sidewalks in re-construction projects
- ☑ Sidewalks are generally included in urban projects
- ☑ Statewide Safe Routes Program
- ☑ Other Statewide programs

2001 Bicyclist Fatality Rates by State

Fatalities per 100,000 Population
Source: National Highway Traffic Safety Administration

Ranked lowest fatality rate to highest

Rank	State	Bicyclists Killed	Fatality Rate
1	North Dakota	0	0.00
2	Vermont	0	0.00
3	Arkansas	1	0.04
4	Oklahoma	2	0.06
5	Connecticut	2	0.06
6	Kansas	2	0.07
7	New Hampshire	1	0.08
8	Tennessee	5	0.09
9	Rhode Island	1	0.09
10	Iowa	3	0.10
11	Missouri	6	0.11
12	Montana	1	0.11
13	Pennsylvania	14	0.11
14	Utah	3	0.13
15	South Dakota	1	0.13
16	Washington	8	0.13
17	Alabama	6	0.13
18	Minnesota	7	0.14
19	Ohio	16	0.14
20	Massachusetts	9	0.14
21	Idaho	2	0.15
22	Alaska	1	0.16
23	Wisconsin	9	0.17
24	West Virginia	3	0.17
25	Virginia	13	0.18
26	Nevada	4	0.19
27	Indiana	12	0.20
28	Kentucky	8	0.20
29	Wyoming	1	0.20
30	Maryland	11	0.20
31	New York	41	0.21
32	Texas	46	0.22
33	Illinois	27	0.22
34	Georgia	20	0.24
35	Michigan	24	0.24
36	Colorado	11	0.25
37	Delaware	2	0.25
	U.S. Average		0.26
38	Mississippi	8	0.28
39	Nebraska	5	0.29
40	North Carolina	24	0.29
41	California	105	0.30
42	New Jersey	26	0.31
43	Maine	4	0.31
44	New Mexico	7	0.38
45	Oregon	15	0.43
46	Louisiana	23	0.51
47	Arizona	28	0.53
48	Hawaii	7	0.57
49	South Carolina	24	0.59
50	Florida	127	0.78

Highway Maintenance: Quarterly Update
Safety Rest Areas

Roadside Havens for Weary Travelers

When you need to take a break after slurping down your 32 ounce soft drink and driving another 100 miles on the highway ... when your kids are asking "are we there yet?" when you still have miles to go ... These might be good times to pull into one of Washington's 43 Safety Rest Areas.

Nearly 39 million visitors (more than six visits for every state resident, on average) each year take advantage of these rest areas to use the restroom, take a nap, walk their canine companions, stretch their legs, or unpack their own picnic lunch.

For example, on a typical summer day, the Indian John Hill Safety Rest Area, west of Ellensburg, serves approximately 10,000 visitors, equivalent to twice the student population of Central Washington University in Ellensburg.

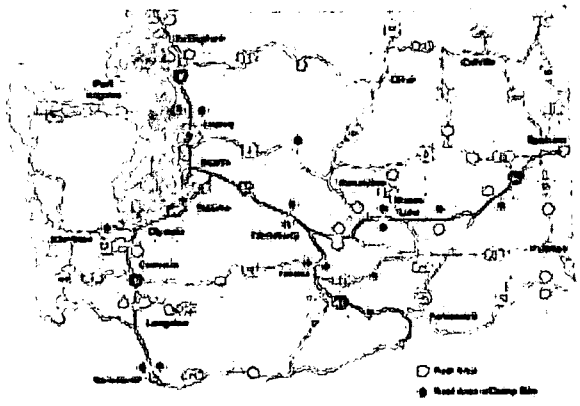
How Are We Doing/Public Feedback

Periodically we ask the public "how are we doing?" In 1997, 6,700 questionnaire forms were returned from our rest areas survey. Ninety-one percent of the respondents rated WSDOT's facilities "good" or "excellent." WSDOT learned that travelers spend on average thirty minutes or less at our facilities, with the heaviest use between 9 am and noon and 2 pm and 6 pm. Restroom cleanliness is most important to customers. Most rest area users are traveling for vacation or pleasure, and more visitors stop at rest areas in the summer months.

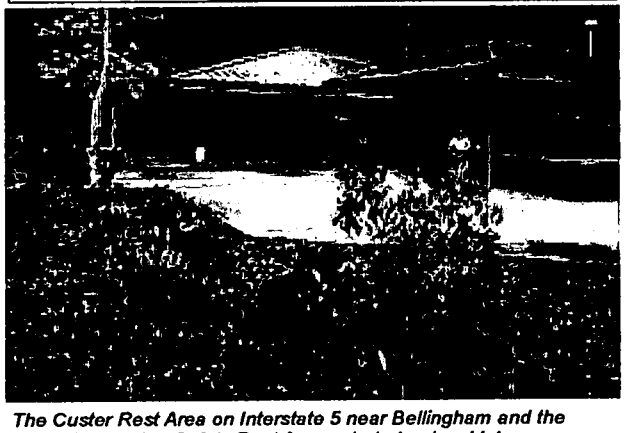
A 2000 telephone survey of 600 citizens concluded that most rest area customers were "satisfied" to "extremely satisfied."

WSDOT will conduct another Safety Rest Area customer survey during the summer and fall of 2003. It will provide valuable customer feedback to ensure that we are focusing on and responding to our customers' needs.

Safety Rest Area Locations and Amenities



WSDOT owns and operates 43 safety rest area facilities. Most facilities provide restrooms, picnic tables, drinking water, telephones, pet areas, motorist information and snack machines. Free coffee is available at some rest areas. For more information on rest area locations and amenities go to www.wsdot.wa.gov/biz/restareas/restareamap.htm.



The Custer Rest Area on Interstate 5 near Bellingham and the Canadian border. Safety Rest Areas started out as highway beautification projects and over time the emphasis has switched to highway safety.

Safety Rest Area Maintenance

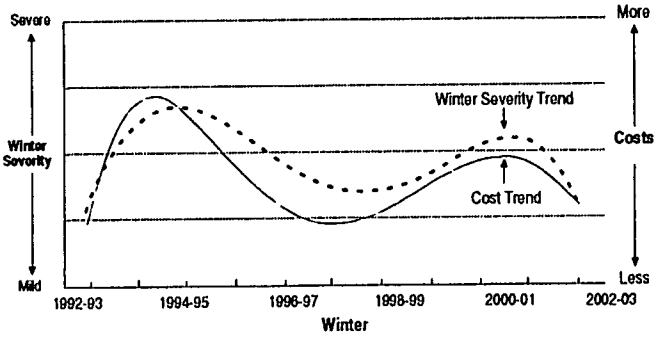
Once a rest area is located and built, WSDOT is responsible for facility and landscape maintenance, garbage disposal, cleaning, and provision of electric, water and sewage treatment utilities. Water and sewer service at remote rest areas can be difficult. In some cases, WSDOT maintains water wells, pumps, delivery systems and water quality monitoring to keep a rest area open to the public. Sewage disposal systems may involve pump stations, surface lagoons, infiltration designs, and/or several-mile-long pipelines connected to offsite treatment facilities.

Highway Maintenance: Quarterly Update
Snow Removal

A Mild Winter Resulted in Lower Snow and Ice Removal Costs

The statewide winter severity and snow and ice operations chart documents the correlation between winter weather conditions and winter maintenance expenditures over time. Maintenance crews, equipment and materials were ready to do winter storm battle, but overall, it was a mild winter without major incidents and costs were down.

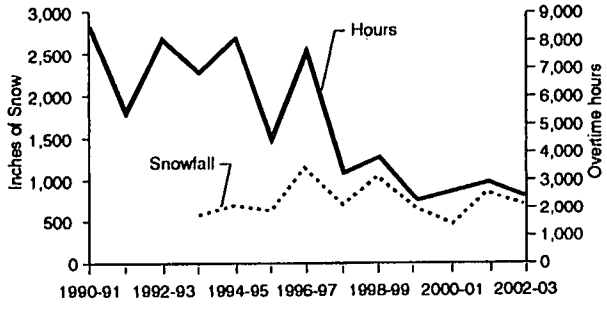
Statewide Winter Severity and Snow and Ice Operations Costs



Wenatchee Maintenance Area Measures Overtime Hours and Snowfall

The Wenatchee maintenance area is tracking the trend of significant reduction in winter overtime hour levels made possible by advances in technology, work shift efficiencies, and the effective application of anti-ice chemicals.

Snow and Ice Control
Overtime Hours per Snowfall Amount
North Central Region, Wenatchee Maintenance Area
Winter Seasons, 1990 to 2003

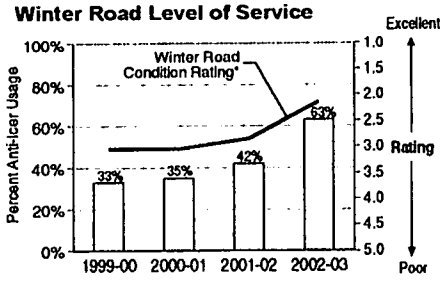


**Accumulated snowfall measured at six shed locations in the Wenatchee Maintenance Area.*

Winter Roadway Condition Level of Service and Anti-Icer Chemicals

WSDOT tracks winter roadway conditions from November 1 to March 31 every year. Maintenance areas assess road conditions during this period every week at 160 different locations throughout the state. Highways are rated for bare pavement and other factors that enhance safe winter driving conditions. This chart shows a correlation between increased anti-icer use and better roadway conditions.

Statewide Anti-icer Use and Winter Road Level of Service



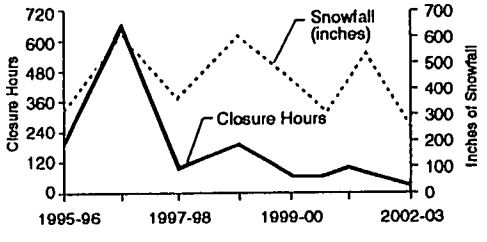
**Performance rating from WSDOT's Maintenance Accountability Process (MAP)*

Keeping Mountain Pass Highway Closures to a Minimum

Interstate 90 Snoqualmie Pass Winter Closure Hours and Snowfall

This chart shows that pass closure hours have decreased while snowfall levels have followed a steady trend. This winter Snoqualmie Pass received 255 inches of snowfall and was closed a total of 11 hours, 31 minutes (8 hours, 59 minutes eastbound; 2 hours, 32 minutes westbound). Snoqualmie Pass normally receives 442 inches of snow a year (based on the 53-year average) and is typically closed for winter snow and ice removal operations 66 hours eastbound and 55 hours westbound (based on the 10-year average).

Snoqualmie Pass Winter Closure Hours
Accumulated Annual Hours and Inches of Snowfall
Interstate 90 Winter Seasons, 1995 to 2003



Footnote: WSDOT is analyzing field data from this winter's salt pilot project and will report findings in a future Gray Notebook. *See September 30, 2002 for other* Gray Notebook *winter measures.*

Measuring Congestion: Annual Update

As many highway users have correctly suspected, the drop in regional employment is linked with a lessening of traffic congestion on many Central Puget Sound highways. The trend lines for employment and for average weekday traffic volumes are generally very similar. They each showed rapid growth during the 1990s that has tailed off in the last couple of years. The traffic volume pattern does vary somewhat from location to location. For example, a significant reduction since 2000 has occurred on the highways crossing Lake Washington, while the number of commuters on SR 167 in King County has actually increased during the same period. Other interesting stories in the data:

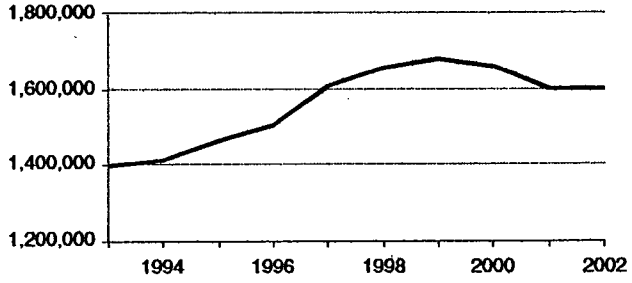
- The recent trends have affected all modes. HOV lane volumes are generally down. Transit ridership is down. Ferry ridership is down. (Details of this data have not been included in this Gray Notebook but are separately available from WSDOT.)
- The number of accidents have decreased significantly, accompanying the slackened traffic volumes. We don't know the extent to which congestion has been lessened because of fewer accidents, or how much the drop in accidents has resulted from reduced congestion. Each tendency clearly reinforces the other.
- Examples of recently completed highway projects are clearly shown to have benefited traffic conditions.

Peak period congestion is still prevalent in many corridors, especially in the peak direction. The freeway system in the Puget Sound region has little if any surplus capacity around the peak periods. An economic rebound will likely result in a resumption of the trends toward increased congestion experienced through much of the 1990s. This is why *now* is when improvements must be taken in hand to deal with future conditions.

Traffic and Employment

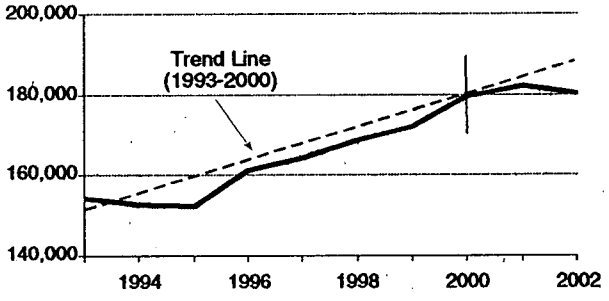
It should not come as a surprise that the levels of Puget Sound region traffic have been affected by the trends in regional employment. The graph to the right shows that employment in the Puget Sound region grew at a brisk pace during the latter part of the 1990s, peaking in 1999. Since then, employment has fallen by nearly 80,000. Fewer individuals are now traveling to work on the region's highways during peak periods.

Total Employment - Puget Sound Region



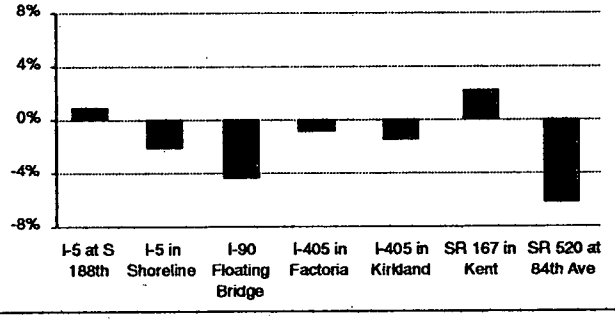
WSDOT analyzed several years of traffic volumes from the month of March for several locations in King, Pierce and Snohomish Counties. Traffic volumes on Puget Sound regional highways generally peaked in 2000 or 2001 following nearly a decade of rapid growth. Since then, the traffic volumes have remained relatively flat or have slightly decreased as shown on the typical graph depicting traffic volume on I-5 at Fife. This diminished growth of volume is found on a number of corridors; some corridors, in fact, have experienced actual decreases.

March Average Weekday Traffic Volumes
I-5 at HWY 99 in Fife



A snapshot of the weekday volumes for the month of March, comparing 2000 with 2003 for seven locations in King, Pierce and Snohomish Counties indicates a reduction in volumes on all but two of the seven locations (see the graph to the right).

March Average Weekday Volumes
Percent change: 2000 to 2003

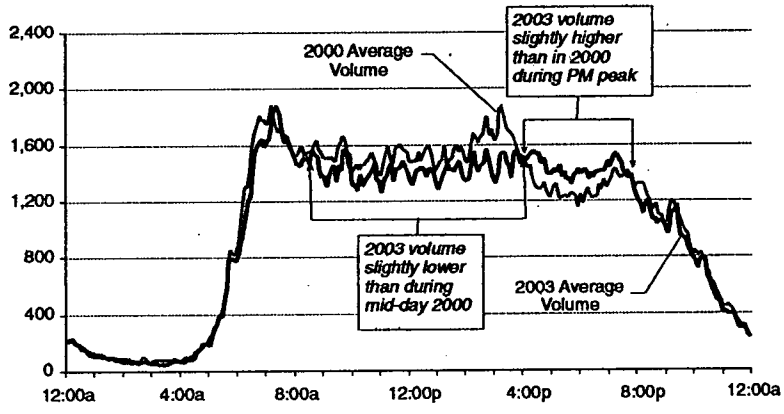


Traffic Volumes and Speed on SR 520: Comparing March 2003

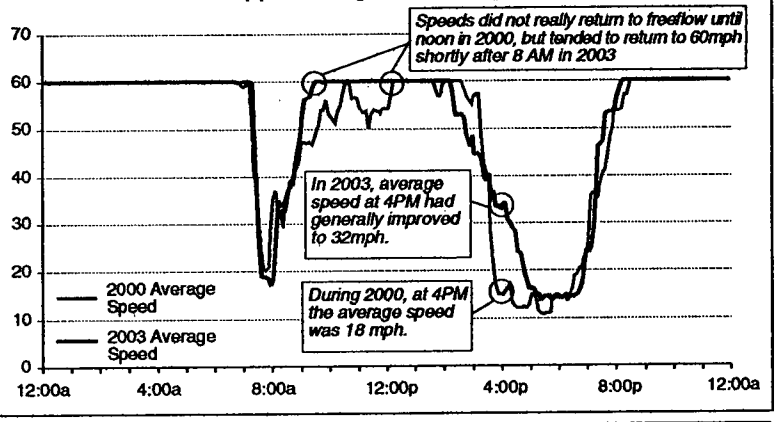
The two graphs to the right display data for SR 520 in the vicinity of the high rises, to use the traffic reporter's venacular. The top graph charts average traffic volumes across 24 hours for 2000 and 2003. The bottom graph, in turn, charts the speed of traffic. On westbound SR 520 travel speeds have increased throughout much of the day. This facility is still congested, but the duration of afternoon peak is shorter. Increased travel speeds allow more vehicle throughput, which results in higher traffic volumes as evident during the PM Peak in the volume graph to the above right.

Travel speeds have improved in many corridors, with mid-day slowdowns reduced or eliminated, and peak periods are shorter and less severe.

Average Weekday Travel Volumes
SR 520 Westbound Approaching the Floating Bridge



Average Weekday Travel Speeds
SR 520 Westbound Approaching the Floating Bridge



Traffic Accidents on I-405: Comparing 2002 to 2001

Between 2001 and 2002 WSDOT determined that there has been a reduction in traffic accidents on I-405. Higher traffic congestion generally leads to a greater frequency of accidents. The greater the number of accidents, the worse congestion becomes. Were accidents down because congestion was down? Or was congestion down because accidents were down? The adjacent table shows that the total number of accidents in both directions, except northbound during the AM peak period, on I-405 between Bellevue and Tukwila decreased significantly from 2001 to 2002.

Accident Comparison
I-405 (Tukwila to Bellevue)

Northbound	2001	2002	% Change
AM Peak Period (Tu,W,Th)	90	90	0%
PM Peak Period (Tu,W,Th)	73	49	-33%
All Day (Tu,W,Th)	278	203	-27%

Southbound	2001	2002	% Change
AM Peak Period (Tu,W,Th)	45	32	-29%
PM Peak Period (Tu,W,Th)	105	71	-32%
All Day (Tu,W,Th)	232	180	-22%

Distribution of Traffic Between Freeways and Arterials 1999-2003

Traffic trends between 1999 – 2003 at the following locations show that volumes on other highways and major arterials has generally held steady since 1999, similar to trends found throughout the Puget Sound region. This suggests that travel demand around the region has moderated rather than shifting from freeways to arterials or vice versa.

Location	1999	2000	2001	2002	2003
Rucker Ave. 42nd St in Everett	33,504	32,213	–	35,190	–
Hwy 99 at Raye St in Seattle	–	82,283	84,114	82,253	82,247
148th Ave in Bellevue	35,200	36,600	33,900	35,700	–

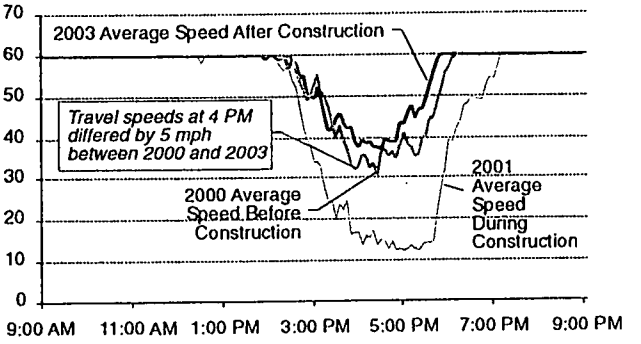
Highway Improvements Have Reduced Congestion

Two examples of how traffic conditions change as a result of highway improvement projects can be seen from the new HOV lane on southbound I-5 from the vicinity of Southcenter to Federal Way, completed in late 2002, and the new off ramp from southbound I-405 to southbound SR 167, completed in April 2003. Unfortunately, construction itself often slows traffic, as plainly demonstrated in this section of I-5 in 2001.

I-5 Southbound HOV Lane

The project added a HOV lane to I-5. The graph to the right shows that in the year 2000 before construction travel speeds at 4 pm averaged 33 mph. In the following year 2001 during construction travel speeds at 4 pm averaged 17 mph. The travel speeds at 4 pm after project completion have increased to approximately 38 mph.

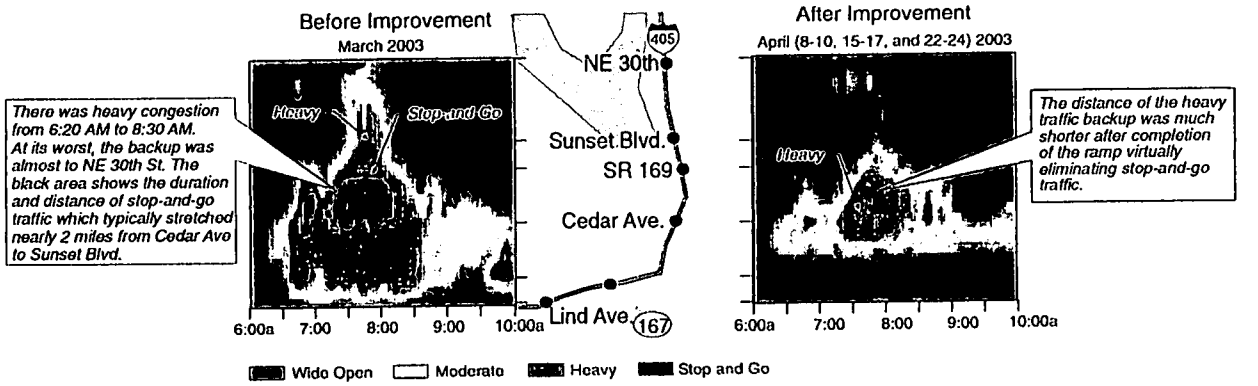
Average Weekday Travel Speeds
I-5 SB near SeaTac



I-405 – SR 167 Ramp Separation

The new off ramp from southbound I-405 to southbound SR 167 opened to traffic Sunday, April 6. Three weeks after opening to traffic, the conditions on southbound I-405 had generally improved during the morning peak. Highway speeds on I-405 increased and back-ups decreased. Vehicle throughput on the ramp has increased by about 13% and on the mainline by about 8%.

Average Weekday Congestion
I-405 Southbound



Ramp: Average Weekday Hourly Volumes
Southbound I-405 to Southbound SR 167 Ramp

Daytime volume increased by about 13 %

Ramp throughput increased between 6-10 AM.

Time	Before Ramp Opening*	After Ramp Opening	Improved Throughput
6:00	1,239	1,271	32
7:00	1,187	1,425	237
8:00	1,138	1,279	141
9:00	1,136	1,243	107
10:00	1,129	1,279	150

Mainline: Average Weekday Hourly Volumes
Southbound I-405 at Benson Road

Daytime volume increased by about 8 %

Mainline throughput increased between 6-10 AM.

Time	Before Ramp Opening	After Ramp Opening	Improved Throughput
6:00	4,075	4,202	126
7:00	4,314	4,647	333
8:00	4,183	4,240	57
9:00	3,803	3,859	56
10:00	3,577	3,829	252

** September and October 2001 ramp data.*

Travel Time Measures: Annual Update

In May 2002, WSDOT launched its first dynamic, real travel time information website for eleven commute routes in the Puget Sound region (find at *www.wsdot.wa.gov/pugetsoundtraffic/traveltimes/*). This popular service has since been widely used by commuters and TV and radio news programs. The averages of real travel time data has been compiled for 2002 and compared against travel time data archived from 2001.

Improved Travel Times

Small but significant decreases in average peak travel times in 2002 as compared to 2001 occurred on four of the most heavily traveled routes. These changes have been summarized in the table below. Another noticeable improvement on these four routes was in the measure of 95% Reliable Travel Time. This is probably the most important measure for everyday commuters. It uses data from days throughout the year to compute a good approximation of "worst case" travel. Ninety-five percent of the days, travel time equals or betters this marker. If commuters allow for their trip to equal the 95% reliable travel time, they can expect to travel the route on time, on 95 percent of their trips, or 19 working days out of 20.

On these particular routes, traffic volumes during commute hours remained almost unchanged in the two comparison years. Why then, did travel times improve? One possible explanation, although not easy to prove with the existing data resources, is the expansion of WSDOT's Incident Response Program on these routes (see the September 30, 2002 *Gray Notebook*). Among other things, the Incident Response Program has helped to speed the clearance of disabled vehicles – about half of all incidents affecting the roadways. These and other incidents are what cause "Non-Recurrent Congestion" (the back-ups resulting from factors other than the inherent roadway capacity limitations - which, by contrast, is regarded as "Recurrent Congestion"). WSDOT has postulated that roadways are very likely operating under the influence of incidents or other causes of Non-Recurrent Congestion (severe bad weather, for example) when travel times exceed twice the free flow travel time. On these routes, the 2001 to 2002 comparison shows significant decreases in the daily peak commute times when the roadway is experiencing two times free flow congestion status. Smarter, more attentive highway management – *like the Incident Response Program and the Joint Operations Policy Statement (national-model operating agreement between WSDOT and the Washington State Patrol) – are almost surely contributing benefits to travelers in reduced delay.*

2001 & 2002 Peak Travel Times – Highlighted Improvements

			Average Peak Travel Time			Number of Days When Peak Travel Times Exceeded 2 X Freeflow			*95% Reliable Travel Time		
Route	Route Description	Miles	2001	2002	Change	2001	2002	Change	2001	2002	Change
I-5	SeaTac to Seattle (AM)	13	24 min.	23 min.	-1 min.	84	44	-16%	31 min.	28 min.	-3 min.
I-405	Tukwila to Bellevue (AM	13.5	31 min.	30 min.	-1 min.	198	178	-10%	43 min.	41 min.	-2 min.
I-405	Bothell to Bellevue (AM)	9.7	20 min.	19 min.	-1 min.	142	127	-7%	27 min.	26 min.	-1 min.
SR-167	Renton to Auburn (PM)	9.8	22 min.	19 min.	-3 min.	133	92	-18%	39 min.	37 min.	-2 min.

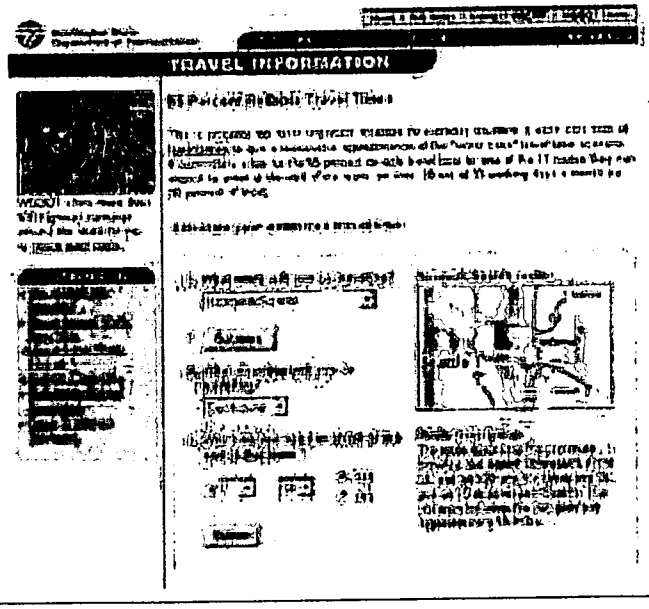
**95% Reliable Travel Times: You can expect to be on time for work 19 out of 20 working days a month (or 95% of your trips,) if you allow for the 95% Reliable Travel Time.*

The travel times in the above table are the highest recorded travel times measured during the AM or PM peak period. These travel times represent the worst case congested condition.

New Dynamic 95 Percent Reliable Travel Time Service – Now Available On-line

Over the past year, WSDOT has continued to refine and enhance real time commuter information and has developed a new web page that provides a specific 95% Reliable Travel Time. It allows the commuter to pick one of 11 Puget Sound commute routes, the direction of travel and the time they need to arrive. The result will be the suggested time needed to begin the commute in order to arrive on time 95% of the time. The 95% Reliable Travel Times are available in 5-minute intervals (from 6 am to 7 pm). The commuter will need to add the time necessary to travel to the chosen commute route from their point of origin, and again for when they leave the commute route to their destination.

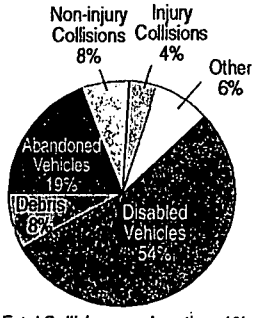
To calculate the 95% Reliable Travel Time for your commute, visit: www.wsdot.wa.gov/pugetsoundtraffic/traveltimes/reliability.



Incident Response: Quarterly Update

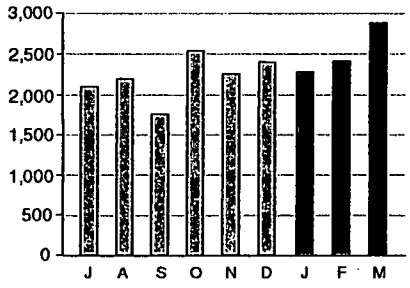
Program Totals

The Incident Response (IR) Program Totals graph shows the first quarter of 2003 compared to the baseline that began in July 2002, with the rollout of the expanded Incident Response program. The IR Program Totals includes all types of responses and incident durations.



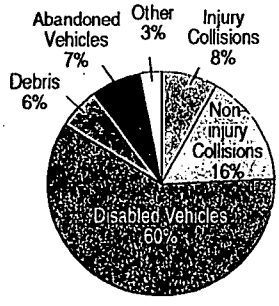
Fatal Collisions are less than 1%

Total Number of Responses by Month
July 2002 to March 2003

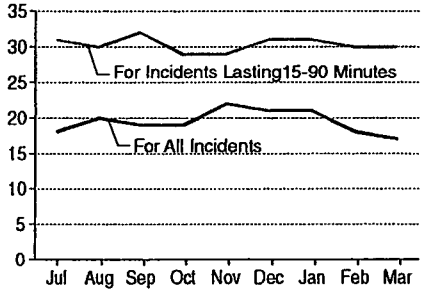


Incidents Lasting 15 to 90 Minutes

Incidents that last more than 15 minutes typically have multiple responders and/or other jurisdictions (e.g., WSP, Registered Tow Truck Operators, etc.) working collaboratively to clear the scene. WSDOT is taking a closer look at these types of incidents in order to find ways to further reduce the time it takes to clear these incidents.

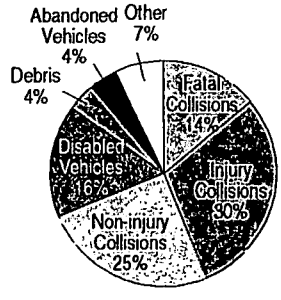


Incident Response: Average Clearance Time (Minutes)
July 2002 to March 2003

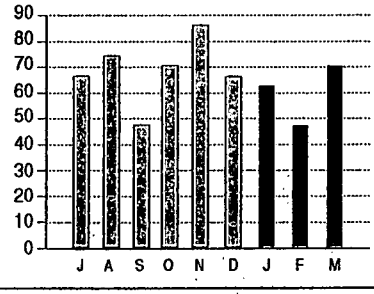


Clearing Incidents Within 90 Minutes

Incidents that last 90 minutes and longer are the most severe and often involve collisions. These incidents are being monitored as required in the Joint Operations Policy Statement between WSDOT and the WSP in order to find ways to further reduce the time it takes to clear these incidents.



Number of Over 90-Minute Incidents
July 2002 to March 2003



Examples of Incidents Over 90 Minutes

- January 6 – A semi traveling east on SR 14 near Forest Hill ran into the ditch causing the truck and trailer to come apart. It took 12 hours and 22 minutes to clear the scene.
- January 18 – A vehicle traveling west on SR 164 (Enumclaw Rd. near Auburn) collided with a power pole, closing lanes in both directions. The pole was damaged enough to need replacement. A WSDOT Incident Response unit performed traffic control until the power company flaggers arrived. It took 7 hours and 37 minutes for WSDOT to clear the scene.
- January 30 – A vehicle northbound on SR 7 near 224th St. sideswiped 2 vehicles and collided with a third, ran over the signal controller, blacking out the intersection, and came to rest after hitting the gas pumps at the Shell station. Injured driver indicated there was a bomb in the vehicle. WSDOT evacuated the area and closed the highway until the WSP bomb squad arrived and cleared the vehicle. It took 8 hours to clear the scene. No bomb was found.
- March 3 – A semi hauling a low boy trailer with an oversized load traveling north-bound on I-5 just South of Chehalis broke loose and high-centered on the left side of the off ramp. WSDOT was not notified for almost 10 hours that the incident had occurred. Total clearance time was 18 hours and 30 minutes.
- March 9 – A vehicle lost control traveling southbound on I-5 near Chehalis hit the median barrier displacing it into the northbound lanes. A semi traveling northbound collided with it and rolled. Numerous vehicles hit the resulting debris. It took 12 hours and 21 minutes to clear the scene.

Non-Collision Responses

Stopped vehicles on freeways and major highways – in a travel lane or even on a shoulder – distract approaching drivers, delay traffic, cause back-ups, and pose safety hazards for approaching traffic and for the occupants of the stopped vehicles. Problems on the roadway that lead to stopped vehicles range from major pile-ups to minor stalls. Incident response is a continual task that WSDOT provides with the Washington State Patrol, local fire departments, and others. Every incident response helps limit delay and increase safety. "Helping drivers, clearing roads," the motto of incident response, is a cost-effective highway management strategy – and WSDOT's routine efforts also free up WSP resources for the enforcement activities uniquely in its competence.

Snapshot of Service Actions for Non-Collision Responses

January to March 2003

Total Incident Responses = 7,527

- 929 Collisions
- 6,598 Non-Collisions

Service Actions Taken for Non-Collision Responses

January to March 2003

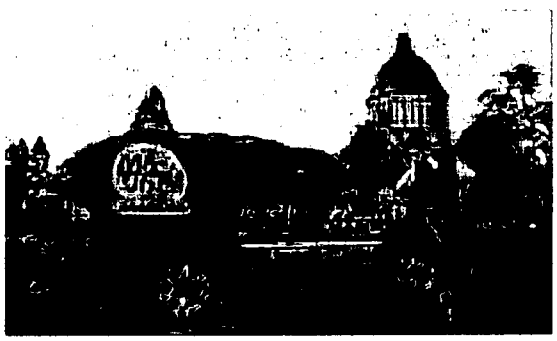
	Jan	Feb	Mar
Traffic Control	539	435	478
Provided Fuel	200	247	241
Changed Flat Tire	179	167	185
Minor Repair	81	111	102
Pushed Vehicle	121	120	152
Towed Vehicle	58	33	56
Cleared Debris	204	237	306

New Service Patrol and Motorist Assistance Van Contracts Awarded

The Registered Tow Truck Operators (RTTO) Service Patrols rolled into action on March 24, 2003 with a new contract that replaced the Service Patrol Pilot Project contract that began in July 2000. The new contract creates a partnership between WSDOT and the private tow industry in order to augment the roving Incident Response Teams during peak traffic periods.

The Mixx 96.1 Motorist Assistance Van (MAV) also rolled into action in Olympia under a new service contract for the MAV Pilot Program, which also began on March 24, 2003. The Mixx 96.1 MAV will obtain and report traffic flow information to WSDOT and will provide media coverage for WSDOT's Incident Response program.

Hansen's Towing deploys two trucks in the Seattle area and Bill's Towing deploys one truck in the Tacoma area.



Jack Archer and his Mixx 96.1 Freeway Hero MAV.

Separately, WSDOT also contracts with the Washington State Patrol to deploy two Cadet Service Patrol units in the Seattle area and one in the Tacoma area, both during peak traffic periods.

WSP Cadets and RTTO Service Patrols responded to more than 4,000 Incidents during the 2002 phase of the pilot program.

Incident Management Assessment Identifies Areas for Improvement

The Federal Highways Administration (FHWA) recently initiated a national "self-assessment" of multi-agency programs, which manage traffic incidents. The Traffic Incident Management Self-assessments were conducted in the 75 most congested metropolitan areas throughout the country – the Seattle / Tacoma region being number 13 on the national list. WSDOT led local agencies in a regional self-assessment in March 2003.

The purpose of the self-assessment tool is to identify areas for improvement; to identify areas for which FHWA can provide training, guidance or funding, and to give FHWA a baseline for future re-measurement. The local assessment overall program score was 63.2 percent, which is very good compared with many other states, but shows that there is room for improvement.

Environmental Programs: Management System

A formal Environmental Management System (EMS) is a tool used by enterprises across the country and around the world to improve environmental performance and compliance. An EMS generally is made up of seven building blocks specifically focused on a particular line of business or activity. These seven building blocks are:

- Written procedures
- Training
- Monitoring
- Corrective Action
- Record Keeping
- Performance Measurement
- Auditing

In the EMS now being constructed at WSDOT, current focus is on assembling the seven fundamental blocks in relation to construction, maintenance and operations, the materials lab and modal programs such as Washington State Ferries, aviation, and rail.

Environmental Compliance Assurance: Tracking Violations and Corrective Actions

As an important step in developing a full-scale EMS, WSDOT in September 2002 began an agency-wide effort to consolidate information on environmental violations and compliance activities. This will supplement prior practice where this information was maintained within regional or program offices, which allowed little opportunity to note trends and develop performance measures to strengthen the agency's overall environmental compliance and performance.

The effort that began in 2002 included data collection for a 2001 and 2002 agency baseline, and relied on localized record-keeping and personal interviews with managers around the agency. The resulting baseline information is shown on the next page.

Violations and Compliance: Whence the Rules?

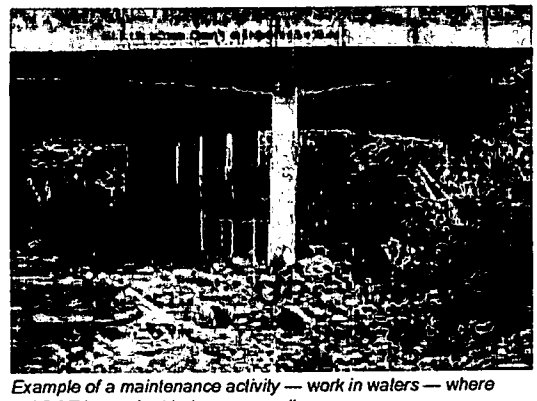
Laws

Many laws establish (either through statute or administrative regulation) prescriptive requirements and prohibitions to protect the environment. When they apply to WSDOT, they generally apply to everyone else, too. It is, for example, a violation of the Clean Water Act for any person (including the Washington State Ferries) to allow hydraulic oil or diesel fuel to be spilled into the navigable waters of the United States. The law is violated when such an event occurs; serious legal consequences can follow.

Example of an activity — operating ferry terminal ramps — where WSDOT is not required to have an environmental permit, but is required to comply with environmental regulations to protect water quality.

Permits

WSDOT does not require a permit to load fuel on the ferries. But it does require a permit for the routine discharge of stormwater into streams or other water bodies from a highway drainage conduit. State and federal permit requirements cover everything from maintenance activities in streams and wetlands to the cutting of trees for highway construction and the management of stormwater runoff from highways. Many permits are issued with specific terms and conditions (for example, stream protection conditions for placing of rip rap around a bridge abutment). Some permit conditions are "boilerplate;" others are intensively negotiated on a situation-by-situation basis. In any event, the permit condition is violated if WSDOT fails to meet the requirement. Again, serious legal consequences can follow.



Example of a maintenance activity — work in waters — where WSDOT is required to have a permit.

Environmental Compliance Assurance: Tracking Violations

WSDOT self-monitors for "non-compliance events," whether or not such matters are actually taken up as formal "violations" by regulatory agencies or officials.

In 2001, WSDOT had 17 non-compliance events, with 15 of those events resulting in a formal violation. In 2002, WSDOT had 29 non-compliance events, although only 14 of those events resulted in a formal violation. This data includes reporting from construction, maintenance, and the ferry service.

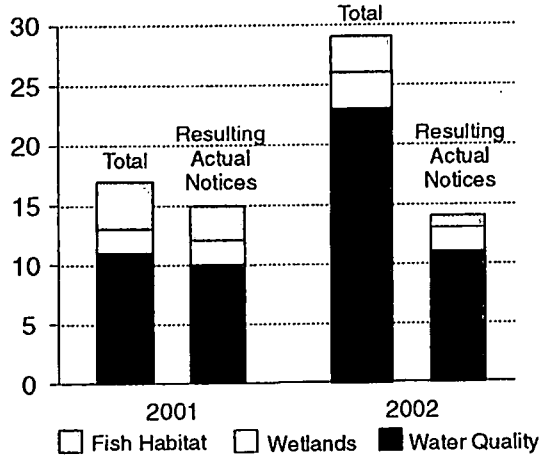
Most of the non-compliance events involved water quality regulations (11 in 2001 and 23 in 2002). Wetland regulations were associated with two of the non-compliance events in 2001 and three of the events in 2002. The balance of non-compliance events was related to regulations protecting fish habitat (four in 2001 and three in 2002).

The 2002 data shows a significant increase in total non-compliance events over those reported in 2001. Most of the increase is related to water quality violations associated with road construction projects, including both accidental spills and violation of water quality standards. The number of non-compliance events at Washington State Ferries dropped slightly from 2001 to 2002.

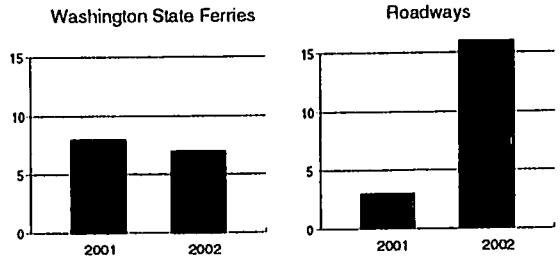
Non-compliance events related to wetlands and fish habitat remained relatively stable from 2001 to 2002.

Data for 2001 and 2002 were obtained through an interview process initiated in September 2002. Since these data represent project managers' "best memory" of the occurrence of a particular event, the increase in reported events in 2002 could be related, in part, to people's ability to recall more recent events.

Non-Compliance Events
2001-2002



State Water Quality Standards and Clean Water Act Non-Compliance Events



Source: WSDOT Environmental Affairs Office

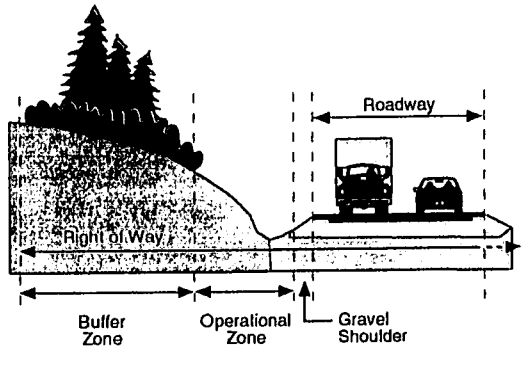
Integrated Vegetation Management

In addition to the compliance measures described above, WSDOT also tracks compliance with herbicide and pesticide application laws covering the products and procedures used to maintain roadsides and wetland mitigation sites. Over the last two years there were nine non-compliance events (all formal notices), three of which were overspray violations affecting upland vegetation. The remaining non-compliance events were failures that did not impact the environment (inaccurate record keeping, failure to use gloves during application, failure to post correct phone numbers on equipment). WSDOT believes that none of the non-compliance events directly affected wetlands, fish habitat, or water quality.

In 2002, the number of violations dropped by one from 2001, although as shown in the table below, the number of herbicide applications actually increased.

All of these matters are under close review as WSDOT intensifies its Integrated Vegetation Management program for 2003 with the intention, among other things, of relying on no greater quantities of herbicide than necessary for vegetation management purposes.

	2001	2002
Non-Compliance Events	5	4
# Product Applications	2,271	3,399



Gravel Shoulder – Vegetation Free Area
Maintained with herbicides where necessary to allow surface water drainage off the pavement and into the ditch.

Operational Zone – Grass or Small Trees and Shrubs
Herbicides are used very selectively for control of noxious weeds, and sometimes for brush control.

Buffer Zone – Natural/Native Vegetation
The IVM approach encourages stable self-sustaining vegetation with limited use of mowing, herbicides, tree removal and other methods as necessary.

EMS Compliance Assurance Procedures

Four components of the EMS approach have received special attention as WSDOT has worked toward EMS implementation in recent months.

Written Procedures

In March 2003, Environmental Compliance Assurance Procedures were issued for construction, maintenance, and Washington State Ferries. These procedures provide guidance to help employees recognize, avoid and correct non-compliance events. The procedures outline for everyone, from field staff to executive management, a clear, consistent process for reporting and managing non-compliance events.

Unauthorized placement of fill below the ordinary high water mark of Issaquah Creek (right side of photo) under the Sunset Interchange.

Training

Training in the new compliance assurance procedures will be incorporated into 21 courses offered to different levels of staff throughout the agency and to our liaisons at the resource agencies. Ten of the 21 courses are already being offered, and five additional courses are in development. Six more needed courses have been identified; they will be developed soon. Since issuance of the compliance procedures, 850 of approximately 1,200 regional engineering and environmental staff have received instruction on the procedures.

Record Keeping (Tracking)

Paper tracking of compliance events will be replaced by an interim, on-line database in May 2003. This interim database is expected to be upgraded in October to an Environmental Permit Compliance System (EPCS), which will enable WSDOT to track environmental permit features (such as time required to obtain permits, monitoring and condition requirements, etc.) and correlate permit conditions and requirements with non-compliance events.

Auditing

WSDOT is working with the resource agencies to develop an auditing procedure that would include an annual audit of both open and recently closed WSDOT construction sites, and an annual evaluation and comparison of non-compliance event data recorded by WSDOT and the resource agencies.

See Protecting Streams from Construction Site Erosion and Runoff, *page 20, for an update on the inspection of 29 WSDOT construction sites.*

Environmental Programs: Environmental Impact Statement (EIS) Tracking

WSDOT and others analyze impacts of proposed transportation projects under the National Environmental Policy Act (NEPA), and its state counterpart, the State Environmental Policy Act (SEPA). Particularly over the last decade, NEPA processes have presented many challenges: what should be their scope and level of detail? how much should they cost? how long should they take?

While projects sometimes can be processed under NEPA by an "Environmental Assessment" or categorical exclusion, projects that may result in significant adverse impacts to the environment trigger preparation of a NEPA *Environmental Impact Statement* (EIS). The essentials of a project – including measures to avoid impacts and the major environmental as well as transportation features – are defined in the EIS documents. The process covers potential environmental impacts (not only on water and air quality or on endangered species, but also on cultural resources and on low income or minority communities,) and how those impacts might be avoided, minimized or mitigated. Resource and regulatory agencies, tribes, other governmental entities and the public at large are all involved in developing EISs.

Important Step in Project Delivery

Before finalizing a project's design, environmental assessment and documentation including an EIS if required, must be completed. Delays in completing these documents stall other activities required to deliver the project. This is evident in FHWA's findings in a national study of experience around the country that it takes nine to 19 years to plan, gain approval for, and build a new federally-funded project with significant environmental impacts ("Timely Completion of Highway Construction Projects," GAO-02-1067T, 2002).

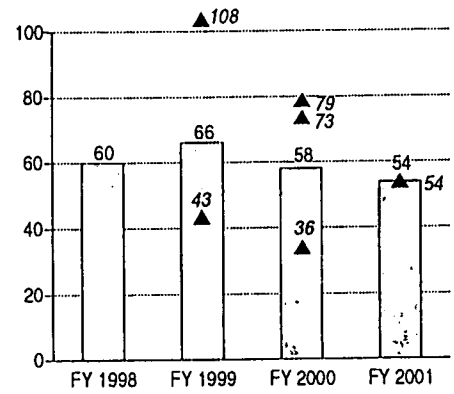
In Washington, EIS processing times are longer than the national medians compiled by FHWA. This, however is a common experience among the other western states (FHWA, Berger Baseline Studies, 2003). Endangered species issues also complicated project delivery in this state.

Next Steps

WSDOT is working to implement a tracking system for environmental documents under development. To improve EIS completion times, WSDOT's next step is to negotiate timelines with the key resource and regulatory agencies.

National Median Processing Times for Environmental Impact Statements

Number of Months



▲ *WSDOT Actuals for completed EISs each year*

Source: FHWA 2002 Milepost Report

By 2007, FHWA hopes to achieve two performance goals demonstrating improved timeliness of environmental process:

- Decreasing the median EIS completion times from 54 to 36 months.
- Negotiating and meeting 90% of EIS production schedules.

FHWA Analysis

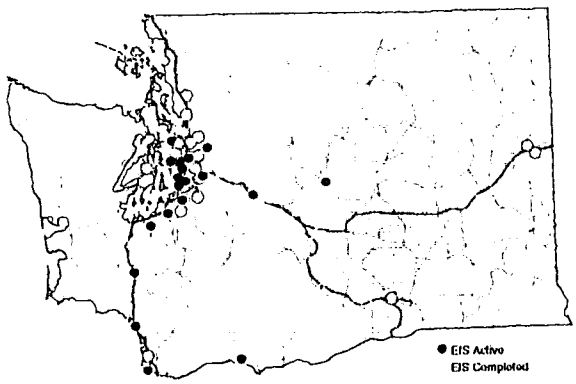
NEPA-Related Factors Contributing to Delay of Transportation Projects:

- Lack of funding for EIS, or low priority;
- Local controversy;
- Complex project, no specific reason.

Other delay factors included: Resource agency reviews and tribal consultation, wetlands, environmental justice issues, changes in project scope, and poor consultant work.

Source: September 2000 FHWA review of 89 EIS Projects in progress 5 years or more without a Record of Decision (ROD)

WSDOT Active and Completed EISs



Since 1989, WSDOT has completed 24 NEPA EISs. In addition, 19 EISs are in development (or active status) at this time.

Environmental Programs: Protecting Streams from Construction Site Erosion and Runoff

Erosion control at construction sites is an important WSDOT responsibility for stream protection. Previous editions of the *Gray Notebook* have included information on assessing construction site erosion control efforts and monitoring stormwater runoff. In the fall of 2002, all 29 moderate and high-risk construction sites were visited and assessed for the thoroughness of erosion plans, plan implementation, and effectiveness of protection measures.

Compliance

The following table shows compliance with minimum requirements that the Department of Ecology requires WSDOT to include in its erosion control plans, plus internal performance measures* from WSDOT's erosion control program.

Erosion and Sediment Control Requirements	Percent of 29 projects that are in compliance
* Contractor trained in proper use of erosion/sediment control measures	100%
Clearing limits/sensitive area boundaries identified and respected by contractor	100%
Utility trenches excavated in a manner to reduce erosion risk	100%
Water removal processes minimize erosion and sedimentation risks	100%
Construction access routes stabilized to prevent tracking of mud onto streets	98%
Effectiveness of sediment trapping measures	96%
Effectiveness of erosion control measures	91%
Sediment trapping measures installed prior to soil disturbing activities	90%
Stormwater conveyance channels stabilized	90%
Flow controlled to minimize offsite erosion	87%
* Would runoff meet water quality standards if storm occurred (no last-minute changes needed)	86%
Would adjacent property and water bodies be protected if storm occurred (no last-minute changes needed)	83%
Erosion and sediment control measures removed when no longer needed	81%
Protect storm drains from sediment	74%
Erosion and sediment control measures properly maintained	70%
Protect cut & fill slopes from concentrated stormwater runoff	67%
* Amount of disturbed soil actually covered with erosion control measures	65%
* Erosion control plans are on site and up to date	56%

Assessment Results

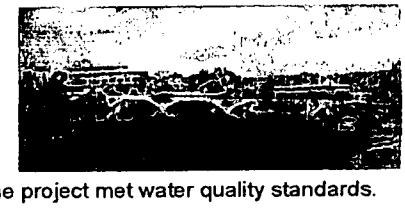
Of the 29 projects assessed, 23 successfully prevented erosion. Four had minor problems that were corrected without regulatory agency involvement or significant repair costs. Two had major problems triggering regulatory agency involvement.

There is room for improvement. With a baseline established, WSDOT is focusing training, planning, and contract enforcement on issues most needing improvement. Future results will be compared to this baseline. WSDOT will also use water quality monitoring data (see the *Gray Notebook* from December 31, 2001, page 21) to verify that the assessment program accurately reflects the effectiveness of plans in protecting water quality.

Example Sites

This steep slope near Mukilteo is typical of sites that can cause minor erosion problems. Erosion blankets made of plant fibers and grass seeding can prevent problems. The rock channel conveys water away preventing further erosion.

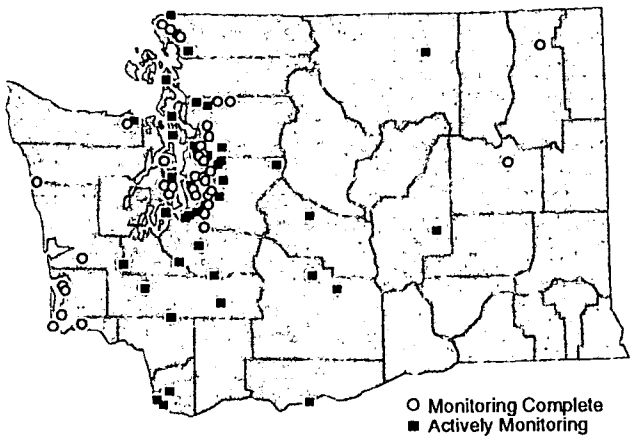
WSDOT experienced major challenges removing this bridge over the Spokane River. Pier removal activities noticeably muddied the water and heightened concern among regulators. Water quality monitoring data (like that shown in the December 31, 2001 *Gray Notebook*), however, showed that the project met water quality standards.



Environmental Programs: Replacement Wetlands

WSDOT has been mitigating for unavoidable wetland loss with replacement wetlands for more than a decade. The state's Executive Order 89-10 mandates that the actions of state agencies result in no net loss of wetlands. During the permitting process for replacement wetland sites, *success standards* are developed and the *monitoring period* is determined. After construction, data is collected and analyzed to determine if success standards are being met. If regulatory requirements are met at the end of the monitoring period, the replacement wetland is considered successful, and *monitoring is complete*. Monitoring and reporting on the status of replacement wetlands is critical to the success of the program as seen by both the public and the resource protection agencies.

WSDOT Replacement Wetlands
1988 - 2002



Types of Mitigation

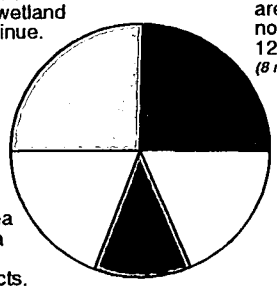
When impacts to wetlands are unavoidable, wetlands are enhanced, restored, created, or preserved to achieve the no net loss policy. In this effort, WSDOT uses a variety of strategies including mitigation banking and advance mitigation. Mitigation banking compensates for many small impacts in one mitigation site in advance of a transportation project. Advance mitigation is building replacement wetlands before unavoidable impacts take place.

Since 2001, monitoring has begun on 5 recently constructed replacement wetlands comprising 16 acres in total. For additional detail on monitoring replacement wetlands and pictures of the different types of projects, see *The Gray Notebook* for the quarter ending March 31, 2002, page 14.

WSDOT Replacement Wetlands: 1988-2002
Total Acreage of Wetland Projects
101 Sites, 476 Acres

Preservation
Protecting wetlands from future development insures that valuable wetland functions continue.
117 Acres
(same as March 2001)

Creation
The establishment of wetland area and functions, where none previously existed.
122 Acres
(8 more acres since March 2001)



Buffer
An upland area that protects a wetland from adverse impacts.
91 Acres
(3 more acres since March 2001)

Enhancement
Improvements to an existing degraded wetland to increase or augment wetland function.
89 Acres
(4 more acres since March 2001)

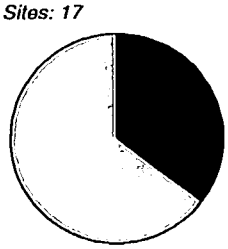
Restoration
Reestablishes a wetland area and/or function, where wetlands previously existed but were no longer present.
57 Acres
(1 more acre since March 2001)

Meeting Standards in 2002

In 2002, biologists monitored a total of 46 *active* replacement sites, ranging from one to seven years in age. Of these, 17 sites had a total of 56 individual success standards to be met in 2002. See the next page for the success rate of sites that have *completed monitoring*.

Replacement Wetlands: 2002 Standards
Number of Sites: 17

11 Sites Met Some Standards
31.02 Acres



6 Sites Met All Standards
15.22 Acres

WSDOT reported to regulators the results of sites with standards to be met in 2002 on a site by site basis in the 2002 Annual Monitoring reports. Visit www.wsdot.wa.gov/environment/eao/welmon/#2002%20Sites for more information about the 2002 results.

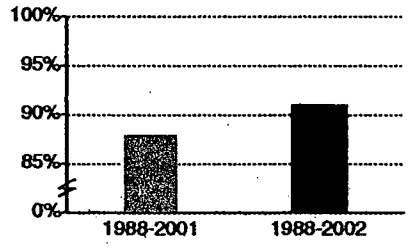
Measuring the Success of Replacement Wetlands

In 2002, WSDOT completed five years of monitoring the highly successful State Route (SR) 18 Pumpkin Patch replacement wetland constructed in 1997 to compensate for improvements to SR 18. The goal was to restore 0.8 acres of wetland that had been converted to agricultural use. Improvement actions included excavating a better connection to an existing wetland associated with the Green River and planting native shrubs and trees. All of the final success standards were met or exceeded during the five-year monitoring period. The chart at right shows WSDOT's overall success rate for sites that have completed monitoring.

Developing success standards for replacement wetlands is an integral part of the wetlands permitting process between WSDOT, the Department of Ecology (DOE), the Department of Fish and Wildlife, the U.S. Army Corps of Engineers (USACE), tribes, cities, and counties. Historically, the most common standards have included water presence and saturated soil, vegetation characteristics (especially for native plant species), and wildlife habitat diversity. Meeting *success standards* is one goal, but achieving planned wetland *functions* is another, as shown in the example on the next page. WSDOT continues to work closely with DOE, USACE and others to develop reliable and ecologically meaningful functions-based success standards.

Replacement Wetlands*: Monitoring Complete

Success Rate



** Includes acreage not yet designated for mitigation credit.*

Source: WSDOT Environmental Affairs Office.

Successful sites have met their regulatory requirements. For unsuccessful sites, it is unlikely that all success standards will ever be met.

From 1988 through 2001, monitoring was completed for 34 sites, of which 30 sites (222 acres) met regulatory requirements and are considered successful.

Four sites (5 acres) had hydrology problems and only met some success standards. There are no practical solutions to "fix" the hydrology at these sites. Hydrology is the most difficult factor of a replacement wetland to predict. For example, one site near Patterson Creek in King County was constructed, and then its source of water was reduced. Another nearby site has experienced more water than expected, and planted woody vegetation has been unable to survive.

In 2002, monitoring was completed on 13 additional sites (23 acres). These sites met their regulatory requirements, bringing the success rate to 43 of 47 sites from 1988 to 2002.

New Directions in Wetland Mitigation

The U.S. Army Corps of Engineers (USACE) recently released new guidance for compensatory mitigation projects, and in conjunction with the Environmental Protection Agency, crafted the National Wetlands Mitigation Action Plan. Both can be viewed at *www.usace.army.mil/inet/functions/cw/hot_topics/corps_epa.htm.*

The action plan's purpose is to improve the performance and results of replacement wetlands. One area of emphasis is increased reliance on functions assessment. Fortunately, WSDOT has anticipated this progression of wetland mitigation science and is already largely in step with the new criteria for measuring and monitoring performance. Examples include:

- WSDOT's *Wetland Functions Characterization Tool for Linear Projects*, developed in 2000, has been recommended for use by resource agencies and the Society of Wetland Scientists to determine the functions of impacted wetlands and replacement wetlands.
- An interdisciplinary team, including federal, state, and local agencies and private consultants, contributed to the widely recognized WSDOT document, *Success Standards for Wetland Mitigation Projects – A Guideline.*
- WSDOT participates in technical committees, such as the recent effort to update the Washington State Wetland Rating System, and the development of the Wetland Functional Assessment Methods, Vol. 1 and 2.

Case Study: Blaine Replacement Wetland

The Blaine replacement wetland illustrates the need for WSDOT and the Wetland Mitigation Technical Group to continue development of functions-based success standards. In 2001 the WSDOT Blaine replacement wetland achieved its planned functions, but did not meet two of its success standards.

The table shows the 2001 success standards for the Blaine site. One success standard required 75 percent cover by native vegetation in the forested and scrub-shrub zones on the site by the fifth year, but the site achieved only 57 percent woody cover. On average, by the fifth year, such WSDOT replacement wetlands sites achieve about 50 percent woody cover. So this site, while not yet meeting the high standard set for it, is still above average. A recent WSDOT study found that most sites do not achieve 75 percent woody cover until the eighth year. The full report, *Benchmarks for Stand Development of Forested and Scrub-Shrub Plant Communities*, can be found at *www.wsdot.wa.gov/eesc/design/roadside/default.htm#sos*. The Blaine replacement wetland should achieve 75 percent woody cover within a few years.

Blaine Replacement Wetland Success

Fifth Year Success Standards	2001 Results
Less than 10% cover of reed canarygrass	Not met (21%)
75% native vegetation cover in forested and scrub-shrub zones	Not met (57%)
80% native vegetation cover in emergent zone	Nearly met (79%)
Provide storm water storage capacity	Standard met
Ponding or saturation to the surface in the spring	Standard met
80% cover by wetland species in emergent zone	Standard met (93%)
50% aerial cover by woody species in forested and scrub-shrub zones	Standard met (57%)
Differences in height between forested and scrub-shrub zones	Standard met

Success standards need to be measurable, achievable and meaningful. Complex natural processes determine how replacement wetlands develop. A decade of experience shows that some standards are not feasible, even for very promising sites. WSDOT continues to work with regulatory agencies to refine approaches for replacement wetlands and has conducted research on older mitigation sites to provide a scientific basis for determining appropriate success standards.

Another success standard required that the site show less than 10 percent cover by reed canarygrass, a widespread invasive grass. The control of tenacious invasive plants is important in replacement wetlands, especially during the period of plant establishment. Despite aggressive weed control efforts, the site in the fifth year had 21 percent cover of reed canary-grass. Where the tree and shrub canopy is developing dense shade, the reed canarygrass is very thin and is not competing successfully with the woody vegetation. This trend is expected to continue. While this success standard was not met, reed canarygrass nevertheless can make a substantial contribution to water-quality enhancement functions in a wetland.

Despite not achieving all of its standards, wetland functions that have been successfully created at the Blaine site include:

- Depressions to hold stormwater runoff, which can lessen downstream flooding.
- General suitability for wildlife habitat, especially for invertebrates, amphibians and wetland dependent birds.
- The potential to improve water quality by removing sediment, nutrients, and toxicants.

For more information about the Blaine replacement wetland, see the WSDOT 2001 Rail Report at *www.wsdot.wa.gov/environment/eao/wetmon/default.htm#2001%20Sites*.

Blaine Replacement Wetland Costs

The costs to build and maintain a replacement wetland can vary greatly, depending on several factors. One variable is the price of land purchased to build a new site. Land is more expensive in Renton than in Skykomish, for example.

Site terrain also makes a difference. When excavation is needed to create wetland in an upland area, the construction cost is greater. The costs of the completed Blaine replacement wetland are shown as an example.

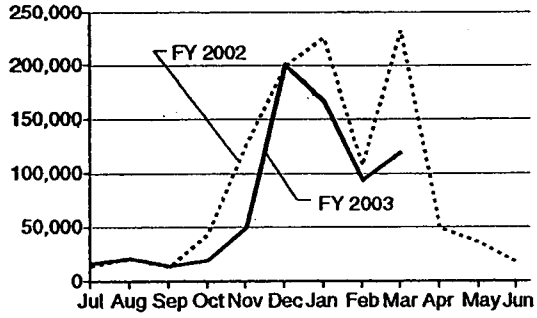
Cost Detail: Blaine Replacement Wetland

Activity	Cost
Land purchase	$80,000
Construction and plant establishment	$338,000
Site management and monitoring	$30,500
Total	$448,500

Traveler Information

WSDOT supplies traveler information in several formats, including on the Web, via changeable message signboards, highway advisory short-wave radio, and over the phone at 1-800-695-ROAD. Nearly all the traveler information on television and radio news statewide is based on WSDOT information. For an overview, see the September 30, 2002 edition of the *Gray Notebook.*

Number of Calls to 1-800-695-ROAD
Fiscal Years 2002 and 2003

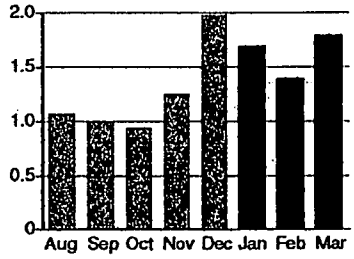


The volume of calls to 1-800-695-ROAD spikes in winter months.

On the Web

WSDOT continues to monitor and establish a baseline of customer usage of WSDOT's traveler information on the Internet. As expected, usage increased with winter storms.

Traveler Website Daily Usage
Average Daily Page Views, in Millions



Milder mountain weather in February meant less use than in the other two months this quarter. The highest number of daily page views (5.4 million) for the quarter came on March 7. The highest number of page views on a Sunday recorded to date happened on January 12 with 2.2 million page views. The camera at Snoqualmie Pass West Summit had more than three times the normal use for a Sunday. Usage was highest from 6 to 11 a.m. in the morning. A possible contributing factor may have been Washington State University students returning to school in Pullman to begin classes the next day.

Source for all charts: WSDOT Communications Office.

Advanced Traveler Information System Case Study

A 1999 case study in the Washington, DC metropolitan area found that travelers using an Internet-based Advanced Traveler Information Service (ATIS) improved their on-time reliability by 5% to 16% compared to travelers not using the service. The study simulated the experience of commuters with a need to be on time using a prospective pre-trip traveler information system. Results from the case study include:

- Peak-period commuters who did not use ATIS were three to six times more likely to arrive late than counterparts who used ATIS.
- Peak-period commuters who used ATIS were more frequently on time than nonusers who scheduled conservatively.
- Late shock, the surprise of arriving late, was reduced by 81% through ATIS use.

More information on this case study is available at www.itsdocs.fhwa.dot.gov//JPODOCS/REPTS_TE/index.html#Table2.7.1.

WSDOT Web Site Feedback

Below is a sample of recent traveler website feedback:

January 4, 2003
I need to thank you for your excellent web pages! So much information! Easy to get around! VERY WELL DONE!!!!!

January 8, 2003
This site is great, it's clear, easy to navigate and has all the info I need. I go from Wenatchee to Seattle every week for business and need pass info in the winter. This site has made getting this info quickly. Thanks for getting it right.

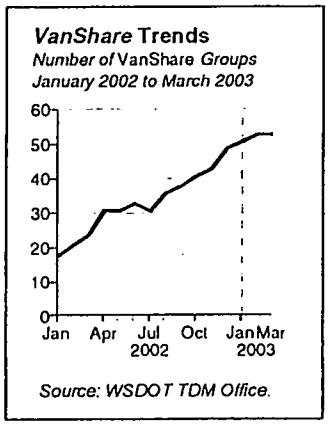
January 12, 2003
Today was the first time I had to send my son back to WSU in the winter and found your website very helpful to know what condition Snoqualmie Pass was in.

January 20, 2003
Just wanted to say the information provided and format is proving to be an excellent tool for a traveler deciding whether to assault the mountain pass roadways or not. This is one of the most useful websites I've ever seen. Thanks.

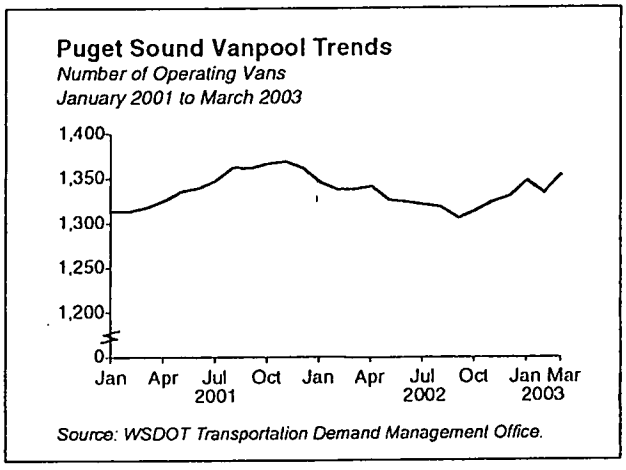
Commute Trip Reduction: Quarterly Update

Vanpools in the Puget Sound Region

The number of public vanpools on the road in the Puget Sound Region has increased 3.7 percent since September 2002. In the first quarter of 2003, the King County Metro *VanShare* program continued its upward trend from 2002, while Kitsap Transit added its first *VanShare* group.



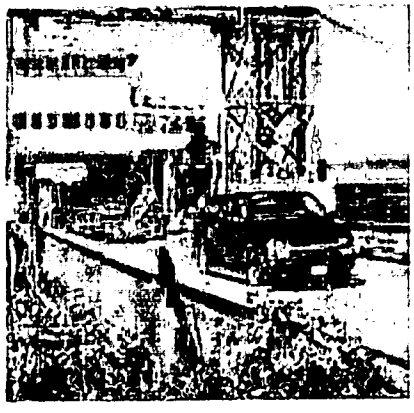
Source: WSDOT TDM Office.



Source: WSDOT Transportation Demand Management Office.

Quarterly Regional Vanpool Highlights

- WSDOT maintains a fleet of 42 vans intended to help vanpool systems meet short- and long-term needs. At the end of the quarter, 95% of the vans were in use: 20 eight-passenger and 20 15-passenger vehicles were under contract.
- King County Rideshare Operations completed a 12-month Duwamish Rideshare Plus project at the end of March, sponsored by the Manufacturing Industrial Council. Rideshare Plus staff provided personalized ridematching services and promotional incentives to Duwamish commuters and formed one Vanpool group, 7 *VanShare* groups and 23 carpools.
- At the end of the quarter, 213 of Pierce Transit's 216 vans were in operation (98.6 percent use). PT anticipates 100 percent of the vans will be in operation in April and will use reserve fleet vehicles for vanpooling in May while it awaits the arrival of 20 new vans.
- Community Transit finished its vanpool promotion "1.2.3 Free" in March. Fourteen new vanpool groups are on the road and 36 new riders were added to existing vans.



CTR Data Collection Aids Local Jurisdictions and Private Utilities

- Avista Utilities receives a special operating order allowing them to run a thermal energy generating plant beyond the permitted hours. The special order required Avista to develop and implement an environmental project to offset the emissions produced during the additional operating time. As part of this effort, Avista provided funding to Spokane County to expand its CTR program.
- Local governments have made use of the CTR performance measurement to assess the impacts of growth on transportation facilities. The City of Bellevue, for example, calculates that it saves between $40,000 and $50,000 annually because of the data it receives from employers implementing CTR. Without CTR data and the program's collection tools, the City would need to create and manage a different mechanism to monitor its transportation concurrency program required under the Growth Management Act.

Eastgate Park and Ride Expansion

Park and ride lots on the Interstate 90 corridor at Issaquah, Eastgate, South Bellevue, and Mercer Island are frequently full; lack of additional park and ride capacity deters many commuters from making greater use of transit service in the corridor. In 2000, WSDOT partnered with transit agencies in Snohomish, King, Pierce, and Kitsap Counties to determine current and future park and ride needs. The *Puget Sound Park and Ride System Update* projected that the I-90 corridor had the biggest deficit, with demand exceeding supply by more than 1,200 stalls. King County Metro has since revised that number to 2,000 based on current ridership trends and growing demand.

In April 2003, King County Metro began construction of a five-story park and ride garage located at the WSDOT-owned Eastgate facility. WSDOT was also part of the original design team. The surface lot contained 724 parking spaces prior to construction. When the new garage is completed in June 2004, there will be nearly 1,700 spaces on the site – 350 surface stalls plus 1,321 stalls in the new five-story structure. Access, safety, and security features will reflect the suggestions made by users from local communities. Some parking will remain open at the permanent Eastgate lot throughout construction.

Favorable economic conditions for public works projects have already made their mark on the project. Metro budgeted $33 million, including the costs of environmental analysis, site redesign, construction, and other parts of the project. Construction was estimated at $18 million. The winning low bid contractor's bid price for construction was only $13.2 million. The project is expected to take one year.

For more information visit www.metrokc.gov/kcdot/alts/eastgate/easthome.htm.

Construction began as scheduled on April 14, 2003. After erecting construction fencing, the crew from contractor Baugh-Skanska removed old paving from the majority of the site. Much of the pavement will be crushed and reused.

The interim parking lot is being fully utilized.

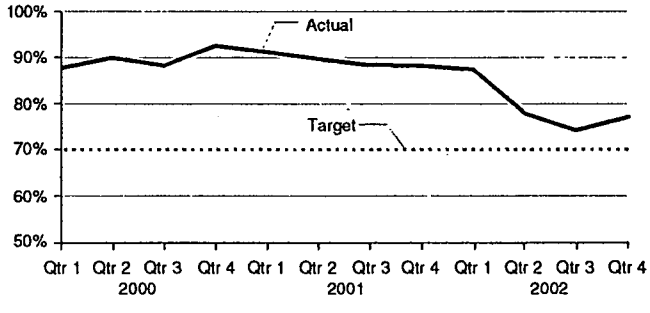
Park and Ride Lot Occupancy at WSDOT-Owned Sites in King County

During the fourth quarter of calendar year 2002, occupancy of the 8,500 parking spaces in the 32 WSDOT lots in King County averaged 77%, marking a slight upswing in usage after several quarters of decline. About 59% of WSDOT's park and ride lots in King County surpassed the target of 70% occupancy during the quarter, up from 53% last quarter. Parked cars regularly exceeded maximum capacity at six lots.

**Data availability has a lag of three months to allow the transit systems to collect and analyze the data. Data for the first quarter of 2003 will be available in the next* Gray Notebook.

WSDOT-Owned King County Park and Ride Lots

*Percent of Capacity Used: 2000-2002**



Source: WSDOT analysis of King County Metro data.

Washington State Ferries: Quarterly Update

Customer Feedback

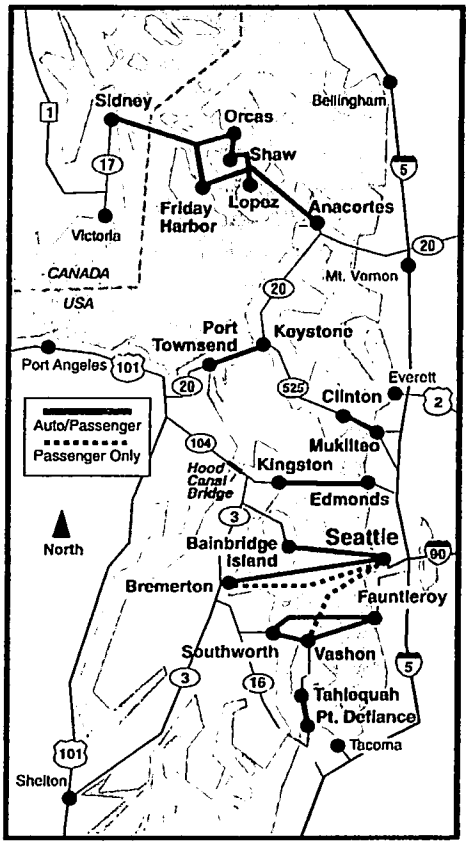
WSF collects customer complaints, compliments, comments, and suggestions. This information is recorded in the Automated Operating Support System (AOSS) database for measurement and action, based on date base cross tabulation and analysis.

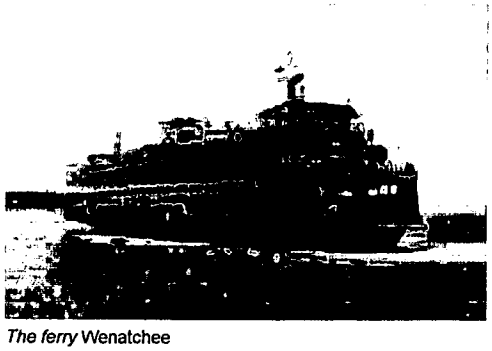
The charts show trends in the data for the last four fiscal years and the first three quarters of fiscal year 2003 (July 1 – March 31, 2003).

Customer complaints were down for the second consecutive quarter and down 19 percent from the preceding quarter.

Complaints were down in nearly every category. Bicycle issues were down 70 percent, food service complaints down 68 percent, and facilities / vessel issues were down 74 percent from the preceding quarter. Numbers of ticket-related complaints were very similar to last quarter.

In one category not shown below, complaints regarding smoking issues were up 139 percent over the preceding quarter. A total of 13 smoking issue complaints were received in this quarter.

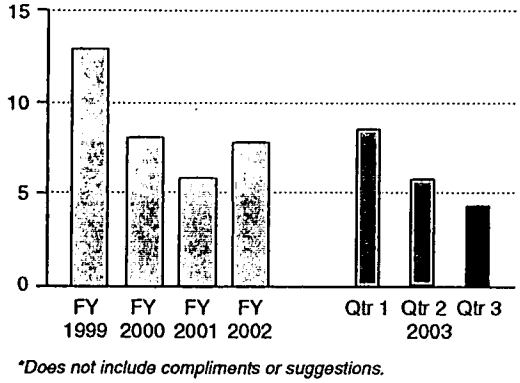




The ferry Wenatchee

Total Customer Complaints

*Complaints per 100,000 Customers**

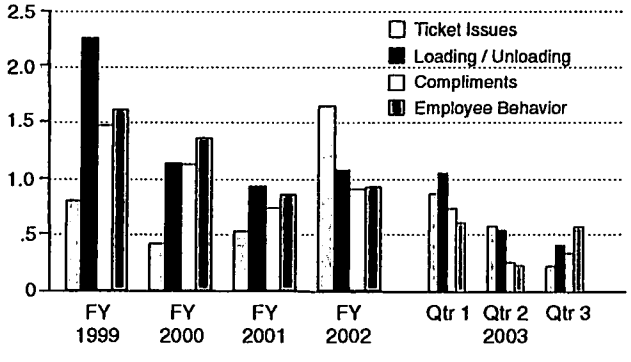


**Does not include compliments or suggestions.*

Source for all charts: WSF.

Most Common Customer Comments

Top Four Comment Types per 100,000 Customers



On-Time Performance

The table below compares WSF on-time performance for the third quarters of fiscal years 2002 and 2003. Overall performance improved over last year for two major reasons. On-time performance, the most important factor influencing customer satisfaction, has been increasingly emphasized since 2000. Also, a drop in the number of ferried vehicles reduced loading times.

The almost two-minute improvement on the international run is due to reduced processing time for Canadian Customs and U.S. Immigrations in Sidney, B.C. resulting from recent security improvements. Improvement on the Point Defiance-Tahlequah run is due to the *Quinault* (10 knot vessel) replacing the *Rhododendron* (8 knot vessel) for 30 days while the slower vessel was in maintenance.

On-Time Performance Delivery

	Third Quarter Fiscal Year 2002			Third Quarter Fiscal Year 2003		
Route	Number of Trips	Percent of Trips Within 10 Minutes of Schedule	All Trips Average Delay From Scheduled Sailing Time	Number of Trips	Percent of Trips Within 10 Minutes of Schedule	All Trips Average Delay From Scheduled Sailing Time
San Juan Domestic	6,443	94%	2.7 minutes	5,057	90%	2.5 minutes
International Route	176	84%	3.7 minutes	59	93%	1.9 minutes
Edmonds/Kingston	4,564	94%	3.1 minutes	4,384	97%	2.5 minutes
Passenger-Only: Seattle/Bremerton	1,564	95%	2.8 minutes	1,634	97%	2.5 minutes
Passenger-Only: Seattle/Vashon	1,041	94%	2.4 minutes	982	98%	1.9 minutes
Fauntleroy/Vashon/Southworth	9,534	91%	4.3 minutes	10,197	94%	3.2 minutes
Keystone/Port Townsend	1,852	96%	2.4 minutes	1,701	96%	2.4 minutes
Mukilteo/Clinton	6,178	98%	2.0 minutes	5,450	99%	1.8 minutes
Point Defiance/Tahlequah	2,708	93%	4.0 minutes	2,702	95%	3.2 minutes
Seattle/Bainbridge Island	4,031	96%	2.8 minutes	3,806	97%	2.7 minutes
Seattle/Bremerton	2,563	98%	2.7 minutes	2,449	98%	2.2 minutes
Total	40,654	94%	3.0 minutes	38,421	95%	2.6 minutes

A trip is considered to be on time if it departs within ten minutes of the published scheduled sailing time. Missed trips are not reported in this measure. They are included in the following measure (Trip Reliability).

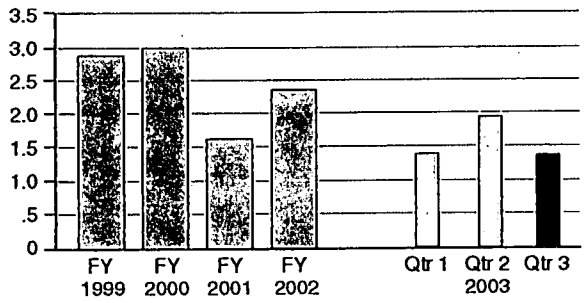
Trip Reliability

WSF scheduled 42,627 trips during the third quarter of fiscal year 2003. Of these trips, 161 were cancelled.

The chart below shows a system-wide average reliability index. Assuming that a commuter worked 200 days per year and made 400 trips on WSF, the statistical likelihood is that 1.5 ferry trips would be cancelled. This rating represents a 22% higher reliability rating than the preceding quarter. Additionally, this rating represents a 43% increase in reliability over the same period in fiscal year 2002. The increase in trip reliability is directly related to high vessel reliability. There have only been 2 other FY quarters in the last 17 quarters with fewer trips cancelled due to vessel failures.

Trip Reliability Index

Missed Trips per 400 Sailings

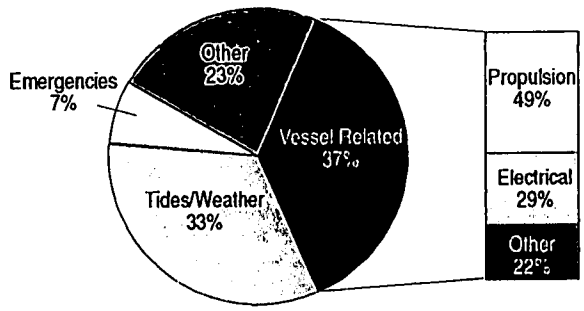


Trip Reliability Index Number = $\frac{\text{Cancelled Trips}}{\text{Total Scheduled Trips}}$ X 400 (Average Annual Number of Commute Trips)

Source: WSDOT / Washington State Ferries.

Most Common Trip Cancellation Causes

Third Quarter, Fiscal Year 2003



Total cancellations were down 52% compared to the same period last year. Two Evergreen state class vessels serving the busy Fauntleroy – Vashon – Southworth routes accounted for approximately one half of all electrical related trip cancellations. Electrical problems on the Tillikum (Jan 11) and the Evergreen State (Jan 24) were repaired quickly, but due to the trip volumes on this route resulted in a total of 16 missed trips. This triangular route annually accounts for ¼ of all trips system wide.

Ridership and Revenues

The Legislature's Joint Task Force on Ferries (JTFF), comprised of legislators, citizens, ferry management, and ferry workers was formed in 2000. The Task Force reviewed the workings of the WSF system and made recommendations including tariff increases designed to raise the farebox recovery rate to 80 percent of operating costs over six years. The Transportation Commission instituted this recommendation and approved tariff increases of 20 percent in June 2001 and 12.5 percent in May 2002.

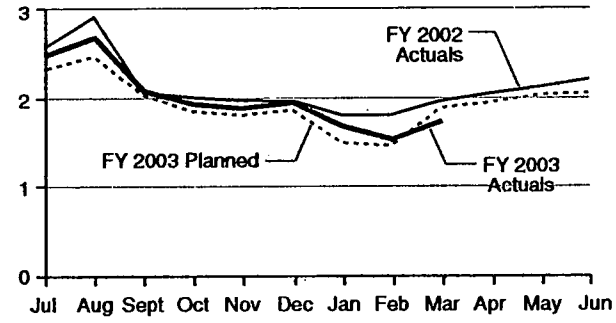
New tariffs were designed to recover higher total revenues even though the number of riders might fall slightly when the price of the trip went up. WSF anticipates ridership will fall from the previous year because of the fare increase and that the amount of total fares would go up.

Fiscal year to date, ridership has exceeded the plan by 4 percent or 737,000 riders. Revenues have exceeded the plan by 4.2 percent or $3.5 million (based on June, 2002 forecast).

Although actual ridership has exceeded the plan for the first nine months of fiscal year 2003, March 2003 was the first month in two years where the actuals were lower than the plan. Actual ridership was 3.6 percent lower than plan and nearly 10 percent lower than the same month last year. Contributing factors include weekend service disruptions at Mukilteo due to construction and the fact that Easter Sunday (a high volume weekend) occurred in April this year and March last year.

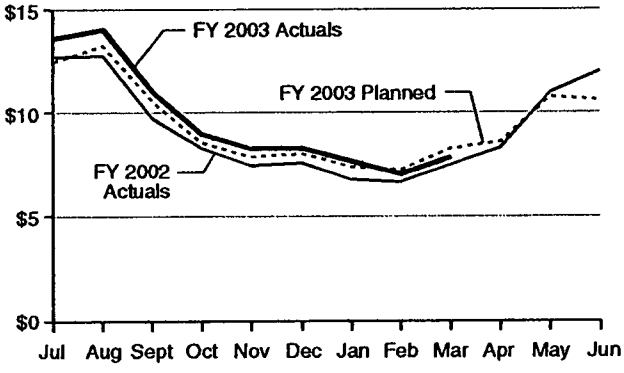
Ferries Ridership by Month

In Millions



Ferries Farebox Revenues by Month

Dollars in Millions



Capital Expenditure Performance

WSDOT makes capital investments in the ferry system through the Washington State Ferries Construction Program. The program preserves existing and builds new ferry terminals and vessels. This infrastructure program supports the ferry system's delivery of responsible and reliable marine transportation services.

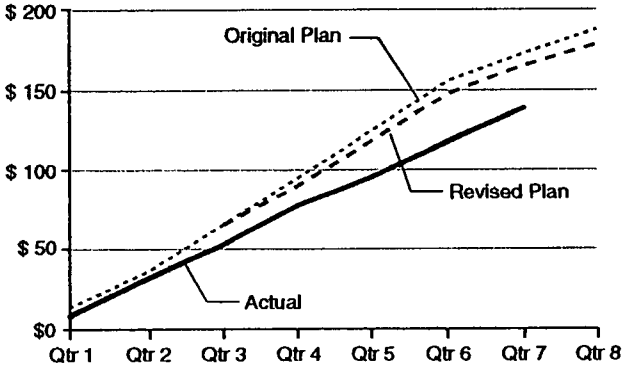
At the end of the 7th quarter of the 2001-2003 biennium, the program has spent $139.3 million (84%) of its planned biennial expenditures of $165.8 million. The program's projected under spending is due to the decision not to acquire a replacement vessel for the *MV Kalama* and *MV Skagit*, cancellation of the project to upgrade the *MV Chelan*, and deferral of the *MV Elwha* Propulsion Control Project to the 2003-2005 biennium.

"Original Funds Available" are based on the Capital Improvement and Preservation Program adopted by the Transportation Commission in October 2001.

"Planned Biennial Expenditures" reflect a $10 million appropriation reduction enacted by the 2002 Legislature.

WSF Construction Program Expenditures

2001-2003 Biennium, Quarter 7, ending March 31, 2003
Planned vs. Actual



Program expenditures are grouped into spending on terminal construction, vessel construction, and emergency repairs of terminals and vessels.

Sources for all charts: WSDOT / Washington State Ferries.

State-Supported Amtrak *Cascades* Service: Quarterly Update

Ridership

Ridership on state-supported Amtrak *Cascades* trains was 84,009 for the first three months of 2003. This is essentially no change from the same period in 2002. The steady ridership level occurred despite the region's ongoing economic recession and traveler concerns stemming from international events.

WSDOT's Schools on Trains program made a significant contribution to ridership. More than 2,500 students from 56 schools rode the Amtrak *Cascades* in January, February and March 2003.

Other actions taken to support ridership and market visibility for the Amtrak *Cascades* in the first three months of 2003 included cooperative promotions with Snohomish County Tourism, the Seattle King County Convention and Visitors Bureau, the Tacoma Rainiers, and the Washington State History Museum.

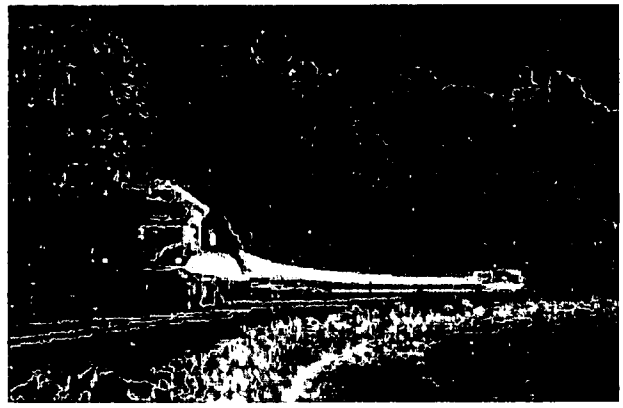
On-time Performance

On-time performance for state-supported Amtrak *Cascades* trains averaged 78.4 percent for the first three months of 2003. This represents an improvement over the first three months of the preceding year, when the on-time performance averaged 72.2 percent. The majority of the delays were caused by interference with freight trains and speed restrictions through areas where rail line repair and upgrade work was taking place.

Customer Satisfaction

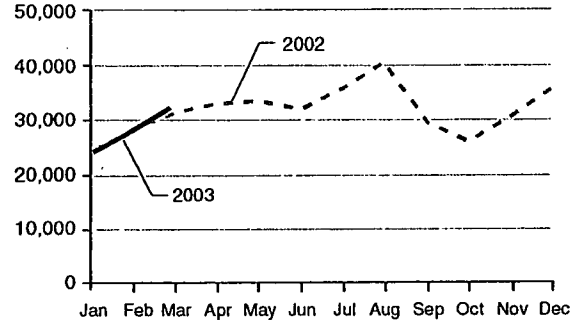
Amtrak's Customer Satisfaction Index (CSI) is based on surveys of riders using the service. The scores represent three-month rolling averages. The CSI goal for the Amtrak *Cascades* is a score of 92 or better. In the most recent survey period, the average score for the Amtrak *Cascades* was 89, which was the same score for the preceding survey period and one of the highest scores in the nation. Customers expressed high degrees of satisfaction with the trains' smooth and comfortable ride, the friendliness and helpfulness of train conductors, and information provided on train services and safety. Areas needing improvement include the quality and variety of on-board food.

WSDOT also gathers information directly from Amtrak *Cascades* riders through on-board customer comment cards. Feedback taken from these comment cards during the first quarter of 2003 included



State-Supported Amtrak *Cascades* Monthly Ridership

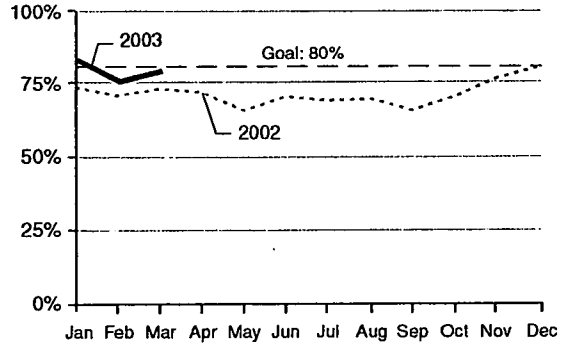
Number of Passengers



Source: Amtrak and WSDOT Rail Office.

State-Supported Amtrak *Cascades* On-Time Performance

2003 vs. 2002 Percent On-Time
2002 Average: 70.8%



The on-time performance goal for the Amtrak Cascades is 80% or better. A train is considered on-time if it arrives at its final destination within 10 minutes or less of the scheduled arrival time.
Source: Amtrak and WSDOT Rail Office.

numerous requests for more service between major cities, better on-time performance, and smoother reservation and ticketing processes. WSDOT is working with Amtrak and others to address these issues.

The Future of Amtrak

WSDOT partners with Amtrak to operate Amtrak *Cascades* service between Portland, Seattle, Bellingham, and Vancouver, BC. Amtrak is also responsible for long-distance routes that serve Washington State, including the *Coast Starlight* and the *Empire Builder*. In February 2003, Congress and the Bush Administration approved $1.05 billion in funding for Amtrak through September 2003. As part of the funding agreement and the railroads' ongoing reform activities, Amtrak is required to provide extensive reports to Congress and the Administration, including detailed business plans.

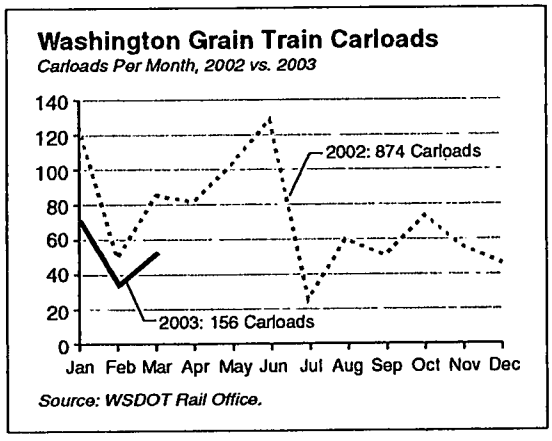
It is anticipated that improved information-sharing between the railroad and the federal government will help Congress and the Administration gain a better understanding of the nation's passenger rail network and the investments necessary to make it a more viable transportation option for the traveling public.

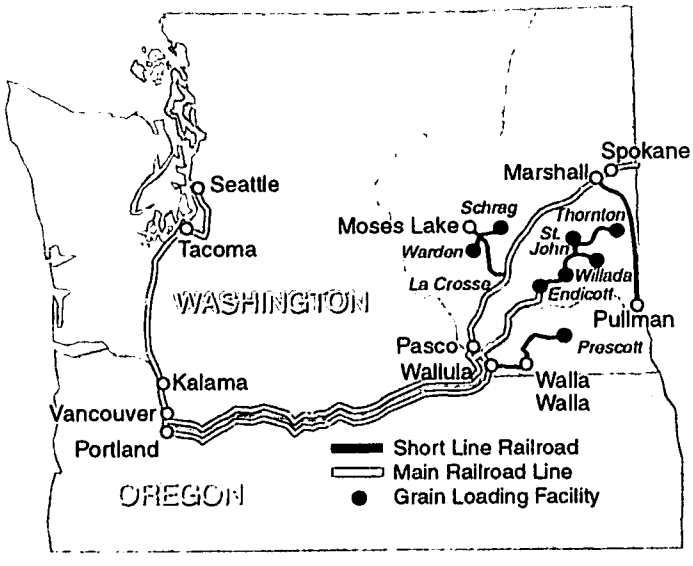
This same funding package approved by Congress and the Bush Administration included $31.8 billion for federal highways, $13.6 billion for aviation, and $7.2 billion for transit through September 2003.

Washington Grain Train Update

In the first three months of 2003, the Washington Grain Train carried 156 carloads of grain to Columbia River ports. This represents a 39.5 percent decline over the same period in 2002.

The decline in grain train car loadings was caused by the Union Pacific Railroad taking longer than usual to cycle full 25-car sets between eastern Washington and Columbia River deep water ports. Corrective measures have been implemented and grain train car loads are beginning to rebound. WSDOT continues to work with the Union Pacific Railroad to ensure that grain train cars are being fully optimized by shippers using the service.





In March, rail cars for the third Washington Grain Train began arriving in eastern Washington after being delivered free of charge by the Burlington Northern and Santa Fe Railway. The full 29-car set began service between Pullman and the main line connection at Marshall, southwest of Spokane, in April 2003.

The communities that will be served by the third Washington Grain Train are Plaza, Rosalia, Oakesdale, Palouse, and Fallon, Washington.

Benchmark: Administrative Efficiency

RCW 47.01.012 establishes a policy goal that WSDOT's administrative costs as a percentage of transportation spending should fall into the lowest 25 percent ("most efficient quartile") among all 50 states. The Transportation Commission has incorporated this suggested benchmark for national comparison and established an internal administrative cost benchmark for WSDOT.

WSDOT's Benchmark

WSDOT's *internal* administrative benchmark reflects the agency's administrative cost in relation to its total expenditures. For FY 2002, WSDOT's administrative allocation was 3.8 percent — $59,862,950 of the agency's total expenditures of $1,568,546,491.

National Comparisons

For national comparison, WSDOT uses the Federal Highway Administration's (FHWA) annual *Highway Statistics* report, which compiles expenditure and performance information from the states. To develop a benchmark, the Transportation Commission and WSDOT referred to FHWA's guidance and *Item A.4.a. General administration and miscellaneous expenditures.*

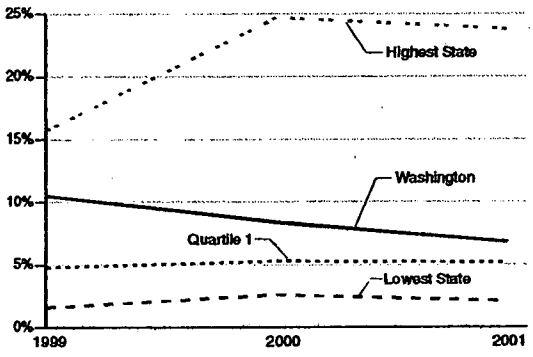
State DOTs use different methods to track and report data to FHWA and differ widely in structure and function. For example, some state transportation departments include driver licensing, which in Washington is part of the Department of Licensing (DOL). Some states report lower administrative costs than WSDOT by allocating certain expenses to specific projects and excluding miscellaneous non-DOT expenses from their administrative cost reports. Other states generally also include information from non-DOT transportation agencies in their FHWA reports, but the mix is inconsistent and may include law enforcement, safety, interest payments, and bond retirement.

WSDOT's national benchmark compares each state's reported *A.4.a.* administrative cost to the total of that state's capital outlay, maintenance, and operations expenditures (core functions of a state department of transportation.). The table at right shows that using this national comparison, Washington ranks as the 21st lowest state with 6.8 percent administrative costs for 2001.

In past years, WSDOT included administrative costs for other transportation agencies, such as the County Road Administration Board and DOL, in FHWA administrative cost reports. Following FHWA guidance, some of these non-WSDOT costs will be moved out of *A.4.a.* in WSDOT's FY 2002 report.

Washington Administrative Cost Target

Percent of Capital Outlay, Maintenance, and Operations Expenditures, 1999-2001



This chart shows Washington's nationally-reported administrative cost percentage for 1999, 2000, and 2001. Washington is showing progress toward meeting the first quartile target set by the Legislature in 2002. The agency has moved from the top of the last quartile for 1999 to the middle of the second quartile for the 2001 report, at 6.8%.

Source: WSDOT analysis of FHWA data.

A number of variables affect administrative costs from year to year. Increases or decreases in the size of the WSDOT construction program affects the percentage of administrative costs compared to total agency cost. In addition, the costs of services provided by other state agencies have been increasing in recent years. Most of these services are mandatory and beyond WSDOT's control. Self-insurance costs continue to increase dramatically.

2001 National Administrative Cost Comparison

State	Admin. Percent	Rank
Colorado	2.1%	1
Arkansas	2.2%	2
Indiana	2.4%	3
Wyoming	2.7%	4
New Mexico	2.8%	5
Kentucky	3.0%	6
Missouri	3.2%	7
Pennsylvania	3.9%	8
Maine	4.2%	9
Maryland	4.5%	10
West Virginia	4.6%	11
Florida	4.8%	12
Iowa	5.1%	13
Alabama	5.2%	14
Georgia	5.6%	15
Michigan	5.6%	16
Virginia	5.9%	17
Alaska	6.5%	18
Idaho	6.6%	19
New York	6.7%	20
Washington	**6.8%**	**21**
New Hampshire	6.8%	22
Illinois	6.9%	23
North Carolina	6.9%	24
Kansas	7.0%	25
Median	**7.2%**	
Texas	7.5%	26
Vermont	7.5%	27
Mississippi	8.2%	28
Massachusetts	8.3%	29
Oklahoma	8.3%	30
Nevada	8.6%	31
Minnesota	8.8%	32
South Carolina	8.9%	33
Oregon	9.1%	34
Utah	9.1%	35
South Dakota	9.2%	36
Delaware	9.5%	37
Rhode Island	9.8%	38
Nebraska	9.9%	39
Tennessee	10.3%	40
Ohio	10.6%	41
Wisconsin	11.6%	42
Connecticut	11.8%	43
New Jersey	12.2%	44
California	13.0%	45
Montana	13.8%	46
Arizona	16.0%	47
North Dakota	16.6%	48
Louisiana	23.4%	49
Hawaii	23.8%	50

Source: WSDOT analysis of FHWA data.

Benchmark: Transit Efficiency

RCW 47.01.012 also requires the Washington State Transportation Commission to establish a cost efficiency benchmark for the state's public transit agencies.

To address this mandate, the Commission's Benchmark Committee worked with the Washington State Transit Association (WSTA). WSTA proposed the following four measures that address cost efficiency, cost effectiveness, and service effectiveness.

- Operating cost per total hour
- Operating cost per passenger mile
- Boardings per revenue hour
- Operating cost per boarding

Efficiency and effectiveness measures evaluate the ability of a transit agency to provide service and meet the demand for transit services given existing resources.

Distinguishing between different types of services and system sizes is essential for valid benchmarking. The four adopted benchmarks compile statewide averages for fixed-route (scheduled) service at urban, small urban, and rural transit agencies, and statewide averages for demand response (on-call paratransit) and vanpool services. The performance of individual systems can be compared to these benchmarks.

The results for six urban transit systems are used below to highlight the differences that exist between systems. The six systems are Community Transit (CT), Clark County (C-TRAN), King County's Metro Transit Division, Everett Transit, Pierce Transit, and Spokane Transit Authority.

For more information about transit in Washington, see WSDOT's Annual Summary of Public Transportation Systems. *The latest summary is available at* www.wsdot.wa.gov/transit/library/2001_summary/2001_summary.cfm.

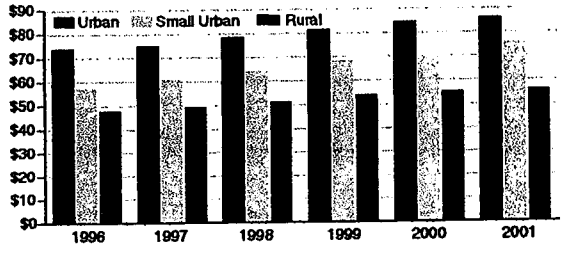
Operating Cost Per Total Hour: Cost Efficiency

Costs are related to the size of the transit system and the nature of the area served. Larger transit systems are more complex and incur costs for fixed facilities (transit centers, park and ride lots, etc.), security, and other costs that smaller systems do not have. They also operate larger equipment in metropolitan areas with higher wages.

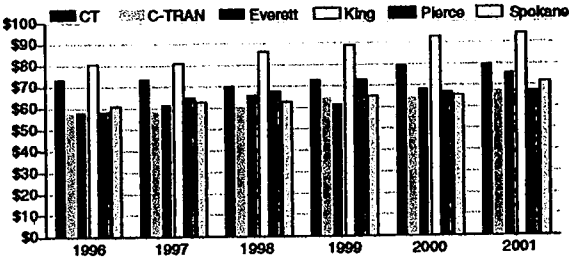
The average cost per hour for the rural and urban systems increased approximately 17% from 1996 to 2001, in line with inflation over this period. Average cost per hour for the small urban systems increased at a higher rate (31.9%). This appears to be due to significant service reductions by these systems in 2000 and 2001, resulting in fixed costs being spread over fewer service hours.

The highest costs in urban transit systems are experienced by King County Metro. Metro operates a fleet of articulated and electric trolley buses as well as the bus tunnel, park-and-ride lots, and numerous other fixed facilities.

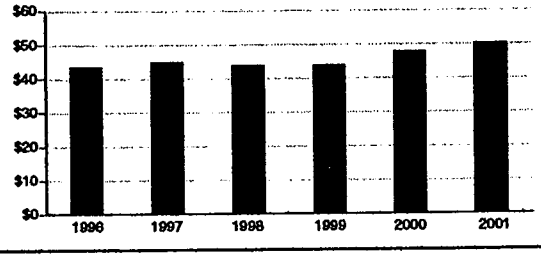
Average Fixed Route Cost per Total Hour
Washington State Average by Transit System Size, 1996-2001



Fixed Route Cost per Total Hour for Six Systems
Six Urban Transit Systems in Washington, 1996-2001



Demand Response Service: Average Cost per Total Hour
Washington State Average for All Transit Systems, 1996-2001



The statewide average cost for demand response service is significantly lower than the fixed-route average cost. This is primarily due to the lower wage rates of demand response drivers. First, this service is contracted out by many systems to private or private non-profit agencies, who often pay less in wages and benefits than the public systems. Second, some transit systems pay their demand response drivers a lower compensation than their fixed-route drivers.

Boardings Per Revenue Hour: Service Effectiveness

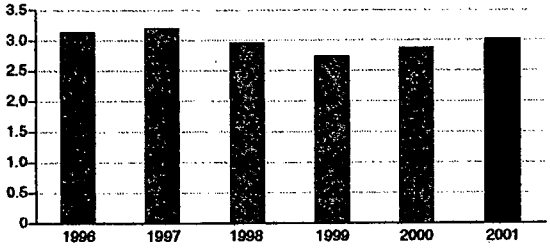
Boardings per revenue hour are the number of passenger boardings for every hour a transit vehicle is transporting passengers. This measure increases with population density and the type of service — urban local service, for example, shows higher boardings per revenue hour than express service.

Performance has been relatively constant for the urban and small urban systems but has dropped among rural systems. The loss of both sales tax equalization and Motor Vehicle Excise Tax funding and the general economic downturn in rural Washington has forced rural systems to reduce service levels and increase fares, resulting in fewer passengers while spreading fixed costs over fewer hours of service.

King County Metro, with more than 30 boardings per revenue hour, exceeds the other urban systems in this measure. C-TRAN has seen this measure decline as a function of the increase of express service in its service mix.

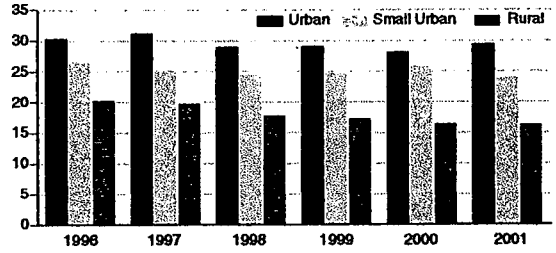
Demand Response Service: Average Boardings per Revenue Hour

Washington State Average for All Transit Systems, 1996-2001



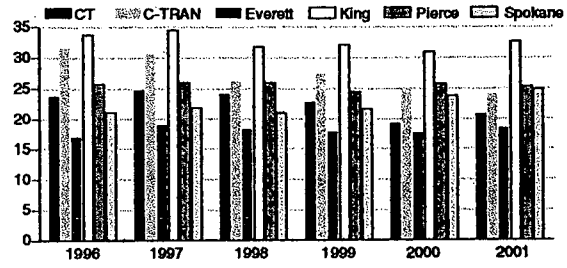
Average Fixed Route Boardings per Revenue Hour

Washington State Average by Transit System Size, 1996-2001



Fixed Route Boardings per Revenue Hour for Six Systems

Six Urban Transit Systems in Washington, 1996-2001



Increases in this measure for demand response service since 1999 are related to service area reductions and the elimination of the least productive services by some transit agencies. As these least productive services, usually serving low-density suburban or rural areas, are eliminated, the associated demand response service is also discontinued. Demand responsive trips in these areas tend to have long trip lengths and are difficult to group with other rides.

Operating Cost Per Passenger Mile: Cost Effectiveness

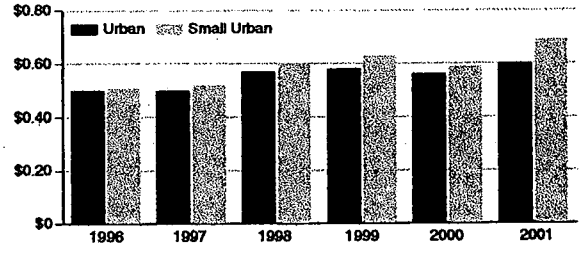
Passenger miles are the transit parallel to vehicle miles traveled. Passenger mile information is not collected for rural systems. Also, this measure does not apply to demand response service.

The trend for this measure generally reflects inflationary cost increases. The cost per passenger mile increased sharply for small urban systems from 2000 to 2001 due to significant service reductions and fare increases during 2000 by several systems in this category.

The chart illustrates the low cost per passenger mile rate of Community Transit — a system with a high level of express service — while Everett Transit, a system with little express service and short average trip length, has a higher cost per passenger-mile. Spokane's cost per passenger-mile reflects its lack of an extensive express route system such as those operated by the Puget Sound area systems.

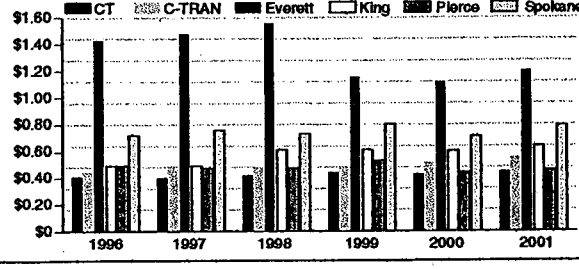
Average Fixed Route Cost per Passenger Mile

Washington State Average by Transit System Size, 1996-2001



Fixed Route Cost per Passenger Mile for Six Systems

Six Urban Transit Systems in Washington, 1996-2001



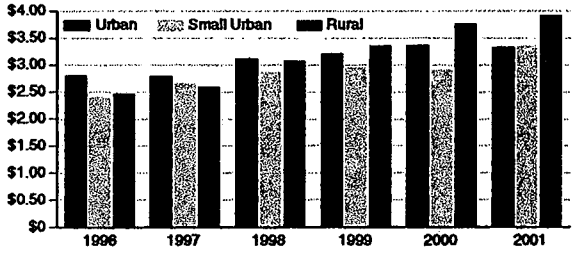
Operating Cost Per Boarding: Cost Effectiveness

Operating cost per boarding measures the cost of carrying one passenger on a single bus trip. An important consideration is that passenger trips can vary greatly in distance. On some systems the average trip length is three miles. On other systems the average trip length is 11 miles. It is reasonable to expect that the latter system would have a higher cost per boarding. Rural transit service will generally be more expensive on a per passenger basis than urban service, largely due to lower population densities and longer trip lengths.

The cost has increased per boarding at approximately the rate of inflation for urban systems, while rural and small urban systems have seen the cost per boarding increase at a much higher rate. Small urban systems saw a significant increase from 2000 to 2001 because service reductions increased the cost per hour of service; also, increased fares led to fewer passengers. Rural systems faced these issues as well, and their cost effectiveness in this measure was hit particularly hard by increased health care and other employee costs.

Average Fixed Route Cost per Boarding

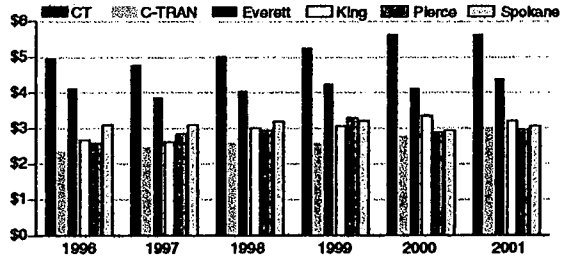
Washington State Average by Transit System Size, 1996-2001



This chart illustrates the effect of the type of service on cost per boarding and the limitations of using a single measure to determine the effectiveness of a transit system. Community Transit has a significantly higher cost per boarding than other systems due to the high level of express service it operates. Express service experiences fewer boardings per hour than local service but has much longer trip lengths. Despite the high cost per boarding, Community Transit has the lowest cost per passenger mile of any of the urban systems. The overall cost per boarding has been held relatively constant over this period among the large urban systems.

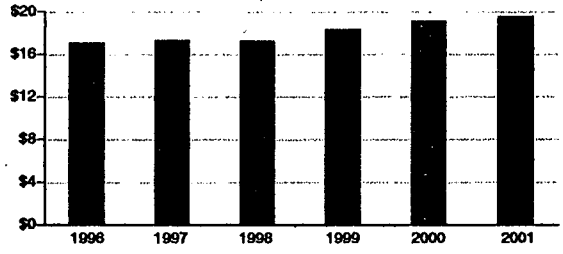
Fixed Route Cost per Boarding for Six Systems

Six Urban Transit Systems in Washington, 1996-2001



Demand Response Service: Average Cost per Boarding

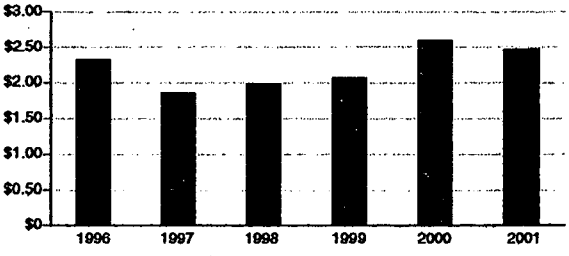
Washington State Average for All Transit Systems, 1996-2001



The cost per boarding for demand response service is approximately six times the cost per boarding for fixed-routes service. This measure was constant from 1996 to 1998 with costs increasing due to inflation and increased employee costs since 1999.

Vanpool Service: Average Cost per Boarding

Washington State Average for All Transit Systems, 1996-2001



Operating cost per boarding is the only statewide benchmark for vanpool service. The cost-effectiveness of the vanpool program is particularly impressive, considering average trip lengths and that vanpool passenger fares cover a substantial portion of the program's operating and capital costs in many systems. Some systems choose to subsidize vanpool fares to make the service as attractive as possible.

Benchmark: Vehicle Miles Traveled Per Capita

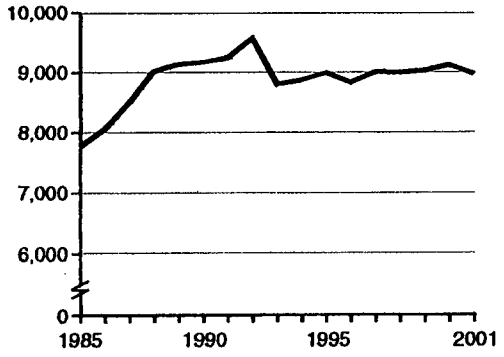
RCW 47.01.012 requires tracking the state's vehicle miles traveled (VMT) per capita, with a goal that it be maintained at 2000 levels. In 2000, the state's population traveled 9,133 vehicle miles per person on all roadways.

The chart shows that VMT per capita dipped below the 2000 level in 2001 to 8,982 miles per person — a decline of 1.7 percent. In the last twenty years, VMT has grown faster than the population (Washington's population has grown about 40 percent, while VMT has grown 60 percent). However, since the late 1980s, VMT per capita in Washington state has hovered very close to 9,000 miles per person per year (the apparent drop from 1992 to 1993 is actually due to a change in the way VMT is calculated)*. Statistics for 2002 will be available in July 2003.

Washington has less vehicle travel per capita than most other states, ranking 41st highest in 2001.

Washington State Travel Growth

*Annual Vehicle Miles Traveled per Capita, 1985 to 2001**



** Vehicle miles traveled for 1993 and later years reflects a change in VMT data calculation, accounting for the drop from 1992 to 1993.*

Source: WSDOT Transportation Data Office.

2001 VMT per Capita by State

Rank	State	VMT per Capita
1	Wyoming	17,445
2	Vermont	15,686
3	Georgia	12,870
4	Alabama	12,716
5	New Mexico	12,701
6	Mississippi	12,592
7	Oklahoma	12,580
8	Missouri	12,013
9	Tennessee	11,783
10	Indiana	11,713
29	Texas	10,139
30	Michigan	9,908
31	Oregon	9,905
32	New Hampshire	9,780
33	Colorado	9,723
34	Maryland	9,673
35	Arizona	9,583
36	Florida	9,494
37	Ohio	9,372
38	Louisiana	9,221
39	California	9,006
40	Connecticut	9,005
41	Washington	8,962
42	Nevada	8,693
43	Pennsylvania	8,383
44	Massachusetts	8,310
45	Illinois	8,255
46	New Jersey	8,100
47	Rhode Island	7,546
48	Alaska	7,436
49	Hawaii	7,101
50	New York	6,876

Note: The slight difference between the results for Washington by WSDOT's Transportation Data Office (at left) and this table reflect data adjustments by FHWA.

Source: Federal Highway Administration and the U.S. Department of Commerce.

***How VMT is Calculated**

Statewide VMT is based on sample data gathered and reported for the Highway Performance Monitoring System (HPMS).

VMT is estimated for the non-sampled mileage. In 1991, new federal legislation required a complete system inventory as the Federal Aid highway system changed and the National Highway System (NHS) was created. At the same time, HPMS data reporting increased to include all principal arterials and NHS routes. This additional data allowed actual calculations on mileage that had been estimated in previous years.

For 1993, the first reporting year for HPMS which reflected the system re-inventory and NHS, the VMT was more accurate than had been possible in the past. Current annual VMT calculations are based on more actual data than was available before 1993, since the calculations now include the total principal arterial mileage and NHS.

Special Features

Hot Mix Asphalt Pavement Delivery Update

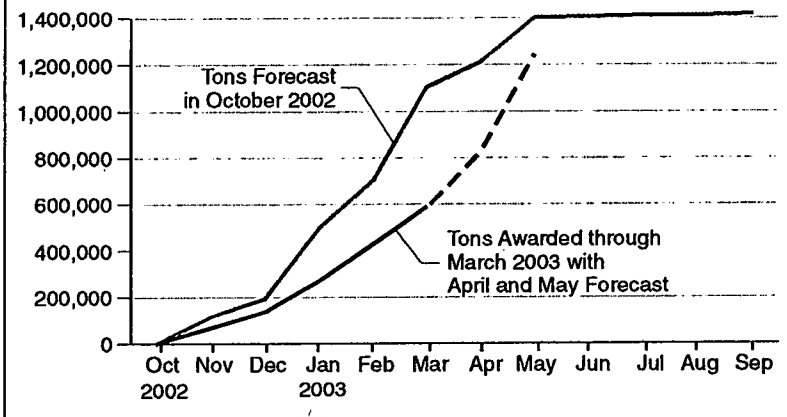
In October of 2002, WSDOT forecasted that 1,417,126 tons of Hot Mix Asphalt (HMA) would be awarded to contractors from October 2002 through September 2003. During the first six months, October 2002 through March 2003, 63 projects were forecast to be awarded with a combined total of 1,104,753 tons of HMA.

Tons of HMA awarded has not kept up with the forecast. The actual tally at the end of March is 43 projects awarded with 587,182 tons of HMA. This trails the forecast by 517,571 tons. The reduction of awarded projects and consequently the reduction of tons of HMA awarded are in part related to highway construction program advertisement delays (see details on "Meeting WSDOT's Scheduled Advertisement Dates" on page 3 of this edition).

The gap between forecast and actual tons awarded is projected to catch up in the coming months. By the end of May the gap should be reduced by about two thirds as the number of tons awarded should be within approximately 150,000 tons of the forecast. The final October tally of tons awarded is anticipated to be very close to the forecast.

In previous editions of the Gray Notebook, *this item has been referred to as Asphalt Concrete Pavement Delivery. The name change brings WSDOT in line with terminology used by other state DOTs.*

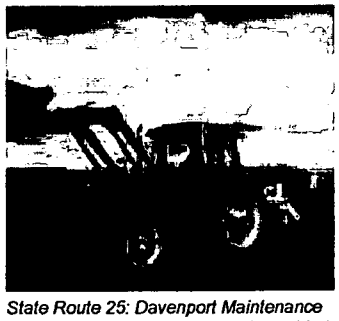
Hot Mix Asphalt Pavement Tons
Projected and Awarded Tons Delivered
October 2002 through March 2003



Source: WSDOT Construction Office.

Innovative and Cost Effective Maintenance Practices: Living Snow Fence Planted on State Route 25

This spring the WSDOT Davenport Maintenance Area and the U.S. Department of Agriculture's Natural Resource Conservation Service joined forces to plant a "Living Snow Fence" adjacent to State Route (SR) 25 in Lincoln County. Blowing and drifting snow creates hazardous conditions and increases maintenance costs. Sometimes drifting snow even causes miles of roadways to be closed. Snow fences reduce these impacts. The living snow fence, made of plant materials such as grasses, shrubs and trees, effectively reduces snow drifts. The snow fence is 800 feet long and consists of twin staggered rows of Rocky Mountain juniper trees, growing through a fabric mulch material that will control weeds and keep moisture in the ground. More than 500 trees were planted. The live fence should be fully effective in 5 to 7 years. Another approach is a temporary (plastic) snow fence that was installed this year on SR 547 near Sumas. The Bellingham maintenance operations superintendent reported, tongue-in-cheek: "It did a great job of keeping snow off the road! It didn't snow."



State Route 25: Davenport Maintenance Superintendent Dale Luiten walks behind the equipment tamping down the soil around the little trees.

On the planting machine feeding the little trees into the mechanism is Maintenance Lead Tech Tom Page. Rocky Mountain juniper trees with good site preparation will grow one foot a year.

Highlights of Program Activities

Quarter Ending March 31, 2003

Project Starts, Completions, Updates

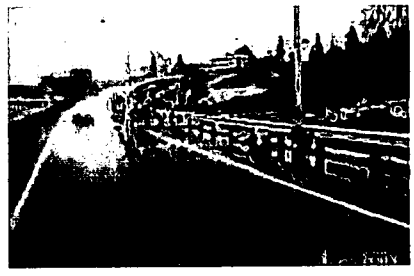
- The Puget Sound Regional Council of Governments contributed $1.2 million toward planning activities and environmental studies of the Alaska Way Viaduct and seawall in Seattle. These funds, along with $2 million secured by Sen. Patty Murray and $5 million committed by the City of Seattle, prevented a shut down of the project at the end of the year. The project needs at least $15 million more to finish the environmental analysis and select the best option for the project. Substantial additional funding is required for further design and construction. For more information, visit the project website at: *www.wsdot.wa.gov/projects/viaduct.*

- Crews began deck replacement for the 73-year old Lewis & Clark Bridge, on State Route (SR) 433 between Longview, Washington, and Rainier, Oregon. The contractor for the project, Max J. Kuney Company, submitted a bid $10.8 million below the engineer's estimates, a potential saving of $5.4 million each for Washington and Oregon taxpayers. The bridge will be closed some nights and weekends during construction. Project information is available on the Web at *www.wsdot.wa.gov/projects/lewisclarkbridge*. The project is scheduled for completion in December 2004.

Lewis and Clark Bridge

- The first half of the I-90 Sunset Way Interchange opened to traffic in January. Two new roadways and a new ramp from Sunset Way to westbound I-90 provide much needed access to the Sammamish Plateau, Issaquah Highlands, and the new Microsoft Campus. This is one of three separate, but interrelated projects being constructed. The full interchange is scheduled for completion in August 2003.

- A new ramp opened from Interstate 405 to SE 8th Street in Bellevue, two months ahead of schedule. The project is part of a series of projects, called Access Downtown, to improve access to Bellevue along the I-405 corridor. The new elevated-ramp will draw drivers away from other heavily used interchanges at NE 4th and NE 8th Streets. Project partners include the City of Bellevue, Sound Transit, Federal Highway Administration and WSDOT.



New ramp on I-405, Bellevue

- A project to reconstruct a section of Interstate 5 in Bellingham that was delayed a year due to higher than acceptable contractors' bids, was successfully re-advertised, with bids coming in nearly $1 million less than the lowest bid received a year ago. The $6.9 million project will improve I-5 between Samish Way and Sunset Drive (State Route 542). Work begins this spring.

- The U.S. 12 Wishkah Bridge in Aberdeen was reopened to traffic after a 35-day complete closure. A detour was in place while the steel grate bridge deck was removed and rebuilt. The pedestrian walkways, maintenance ladders, steps and platforms were also replaced, and the bridge has been strengthened for resistance to seismic forces.

- Workers will begin installing advance-warning beacons at three intersections on U.S. 2 and U.S. 97 between Cashmere and Leavenworth this spring with a goal of completing the project before the summer tourist season. The beacons increase safety by alerting motorists that they are approaching a signalized intersection. Locations of the beacon systems are at the Cotlets Street and Aplets Street intersections with U.S. 2 & 97 in Cashmere, and at the Main Street intersection with U.S. 2 at Peshastin.

- With limited ability to expand major corridors, making the most efficient use of existing pavement is critical. For this reason, the Transportation Commission changed a long-standing policy by implementing WSDOT recommendations to open some Central Puget Sound freeway high-occupancy-vehicle (HOV) lanes to all users from 7 p.m. to 5 a.m. as a two-year demonstration project, and to explore allowing single drivers to buy into under used HOV lanes during the day (known as HOT lanes). The goal is to improve the usage of these HOV lanes, while not harming transit or carpool travel times. The nighttime opening will be implemented by late summer, while a HOT lane proposal will be developed by fall 2003.

- The HOV Pilot Project in Vancouver was extended for another 24 months, following a careful review of four evaluation reports compiled between October 31, 2001 and October 31, 2002. The reports indicated that between July 2002 and October 2002 the number of people in the HOV lane jumped from 70 percent of those in the general-purpose lanes to 90 percent. WSDOT's decision took into consideration the recommendations of the Southwest Regional Transportation Council, C-Tran's Board, the Port of Vancouver, and a national HOV lane peer review panel.

Legal matters

- The U.S. Army Corps of Engineers fined WSDOT and its contractor, Kiewit Construction Company, for violations of the Federal Clean Water Act, stemming from work on the I-90 Sunset Interchange in Issaquah. A $25,000 civil penalty was assessed to each party for conducting unapproved work in sensitive waters within the work zone. WSDOT cooperated fully during the Corps investigation and was already implementing a new environmental compliance process to prevent similar occurrences in the future.

Savings and Efficiencies

- WSDOT's digital production of aerial photography images is more efficient since switching from Digital Linear Tape technology to Digital Video Disc (DVD). The old technology required considerable time to transfer images to tape, due to the large file size. As an example, a transfer of five images was a nearly two-hour process. With the DVD technology, the same data can now be transferred in 30 minutes. The result is lower production costs and faster delivery of products to WSDOT's clients.

Innovations and Awards

- Kim Willoughby, Pavement Structures Engineer for WSDOT's Materials Lab in Tumwater, was part of a multi-agency team honored with the K.B. Woods Award by the Transportation Research Board in Washington, D.C. The K.B. Woods award is given annually for the best research paper in the area of design and construction of transportation facilities. Willoughby's team demonstrated the feasibility of an online web database for monitoring the lifetime performance of hot-mix asphalts.
- WSDOT's Tacoma Project Office earned an honorable mention in the state's "Partnership for Excellence Contract Administration" award program for its work in administering the City of Tacoma's Museum of Glass Bridge project. The annual awards, sponsored by WSDOT and the Associated General Contractors of Washington, recognize achievements in Contractor-WSDOT partnerships that result in the delivery of transportation projects in a timely, professional and responsive manner.

New WSDOT Information Sources

- WSDOT introduced a new handbook, *Building Projects that Build Communities*, to help local agencies and WSDOT deliver successful transportation projects. The handbook implements the Context Sensitive Solutions initiative which encourages partnering to develop a transportation facility that fits its surroundings and preserves scenic, aesthetic, historic, and environmental resources and community values, while maintaining safety and mobility. *Building Projects that Build Communities* was distributed to all public transportation agencies in the state and is available on-line at *www.wsdot.wa.gov/biz/csd.*

Grants Received and Grants Awarded

- Federal and State transportation grants of over $1 million helped pay for safety improvements on Irondale Road, between SR 19 and SR 16 north of Port Hadlock in Jefferson County. The roadway shoulder was widened to improve sight distance for motorists and provide a safer area for bicyclists and pedestrians.

Special Events

- WSDOT's Aviation Division hosted the annual Aviation Hall of Fame Awards banquet during the 20th annual Northwest Aviation Conference and Trade Show in Puyallup. Aviation Director John Sibold presented a number of awards, including Airport of the Year, Airport Manager of the Year, and Airport Volunteer of the Year. The conference drew over 10,000 participants and provided an opportunity for pilots to register with the Aviation Division.
- Tribal Employment Rights Office (TERO) Conferences were held in Lakewood and Spokane, with contractors, tribal representatives, union representatives, and state and federal transportation officials attending. The meetings were to draw attention to tribal employment rights when construction contracts are within reservation lands.

Gray Notebook Subject Index

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Americans with Disabilities Act (ADA) Information

Persons with disabilities may request this information be prepared and supplied in alternate formats by calling the Washington State Department of Transportation ADA Accommodation Hotline collect (206) 389-2839. Persons with hearing impairments may access Washington State Telecommunications Relay Service at TTY 1-800-833-6388, Tele-Braille 1-800-833-6385, Voice 1-800-833-6384, and ask to be connected to (360) 705-7097.

Civil Rights Act of 1964, Title VI Statement to Public

Washington State Department of Transportation (WSDOT) hereby gives public notice that it is the policy of the department to assure full compliance with Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987, and related statutes and regulations in all programs and activities. Persons wishing information may call the WSDOT Office of Equal Opportunity at (360) 705-7098.

Other WSDOT Information Available

The Washington State Department of Transportation has a vast amount of traveler information available (including Puget Sound area traffic, mountain pass reports, highway closures, ferry schedules, and more). Call the WSDOT statewide toll-free number: *1-800-695-ROAD.* In the Seattle area: (206) DOT-HIWY [368-4499].

For additional information about highway traffic flow and cameras, ferry routes and schedules, Amtrak *Cascades* rail, and other transportation operations, as well as WSDOT programs and projects, visit *www.wsdot.wa.gov*

For this or a previous edition of the *Gray Notebook*, visit *www.wsdot.wa.gov/accountability*

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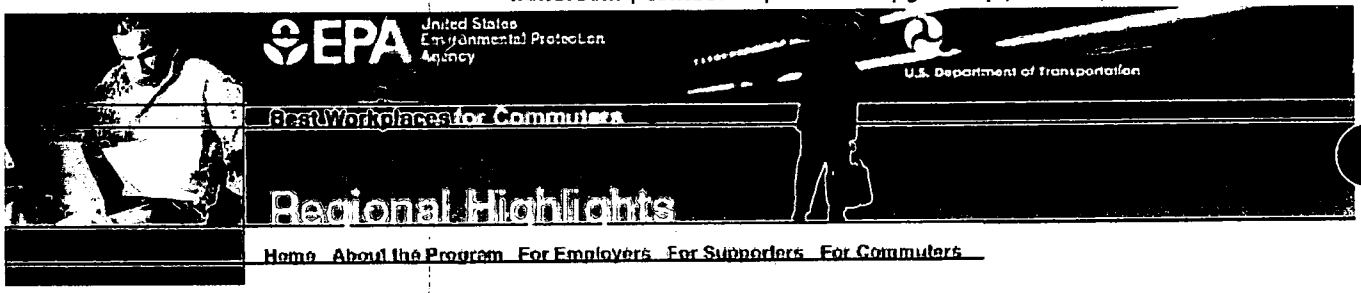
Appendix K
The Commuter Choice Leadership Initiative and Best Workplaces for Commuters



About the Campaign

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Greater Tucson Area

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PDF files must be downloaded and viewed with the free Adobe Acrobat Reader 5.0.

San Francisco Bay Area's Best Workplaces for Commuters℠

EPA is partnering with employers, local and regional government agencies, and community and environmental groups to improve the quality of life in the Bay Area. Read below to find out how, or review some facts about traffic and air quality in the Bay Area to learn why.

Get on the list!

If you have not already applied for The Bay Area's Best Workplaces for Commuters℠ 2003 list, be sure to apply by September 12, 2003, to be recognized by Bay Area media in late October.

2003
BEST
Workplaces
for Commuters℠
Bay Area

The media has already shown interest in the 2003 list in advance of the fall announcement. Check out "New program boosts commuter choices," East Bay Business Times, June 23, 2003.

2003 Media Materials

Media Release (PDF - 245 KB)
Preliminary 2003 Best Workplaces for Commuters List (PDF - 197 KB)
Backgrounder on Coalition
(PDF - 277 KB)
Fast Facts (PDF - 279 KB)

Click here to review all of the impressive newsprint and television media coverage from the 2002 campaign, including a TV spot on KRON 4 TV.

EPA Welcomes Best Workplaces for Commuters Districts

EPA is excited to announce California's first ever Best Workplaces for Commuters Districts: Bishop Ranch and Hacienda Business Parks. These districts offer comprehensive commuter benefits packages that meet the *National Standard of Excellence* to all employers and their employees located within the business parks.

Media Release (PDF - 223 KB)

The Bay Area's Best Workplaces for Commuters

On October 24, 2002, The Bay Area's Best Workplaces for Commuters Coalition recognized 84 employers for being placed on the first-ever list of The Bay Area's Best Workplaces for Commuters. The list spotlights Bay Area employers committed to improving quality of life for harried commuters while also reducing traffic and air pollution. Click here to learn more about The Bay Area's Best Workplaces for Commuters.

Click here to learn about all the local organizations that make Best Workplaces possible.

Past Events

EPA Region 9 recognizes employers who meet the *National Standard of Excellence*. Learn more.

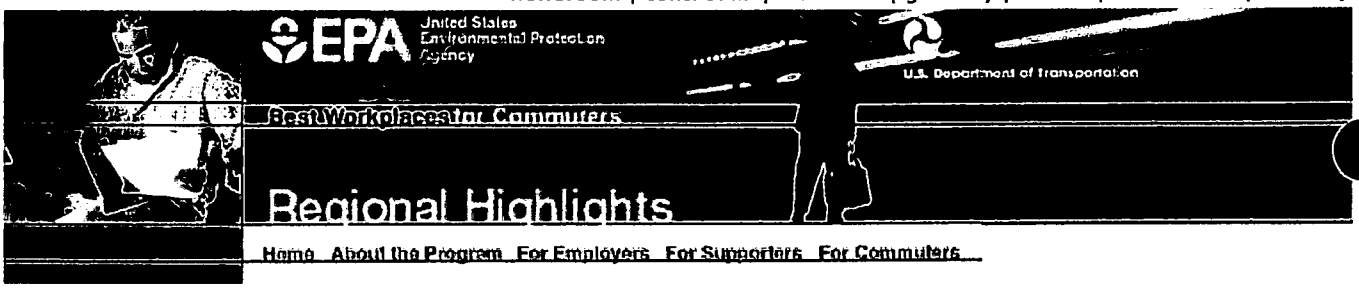
Strategic marketing workshops target transportation demand management professionals in the Bay Area. Learn more.

Best Workplaces for Commuters Profiles

Review the list of Best Workplaces for Commuters in the San Francisco Bay Area.

Review the list of supporting organizations in the San Francisco Bay Area.

Photo of Golden Gate Bridge courtesy of San Francisco Convention & Visitors Bureau.



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New England
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San Francisco Bay Area Commuting Facts

The Bay Area's Best Workplaces for Commuters[SM]

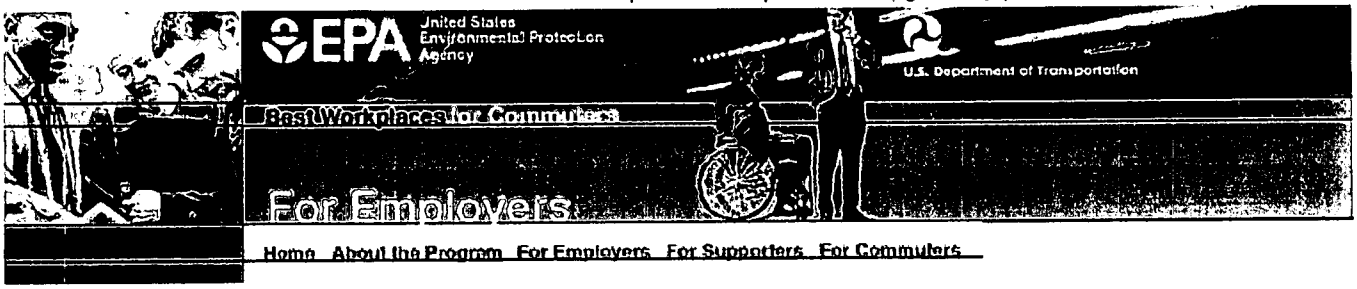
- In 2002, more than 80 employers were recognized on the first annual Bay Area's Bay Area's Best Workplaces for Commuters[SM] list.
- The 150,000 commuters covered by last year's Bay Area's Best Workplaces for Commuters list will help reduce 105,000 metric tons of carbon dioxide per year, a reduction equivalent to planting 1.3 million trees each year.
- The list for 2003 is still being developed. Deadline for enrolling online is August 29, 2003. The final list will be announced to the media on October 23, 2003.

Local Commuting

- More than 3.3 million people commute each day in the Bay Area, and more than 70 percent of them drive to work alone. (Census 2000 Supplementary Survey)
- The average annual Bay Area traffic delay per capita for 2000 was 41 hours compared to 27 hours nationally. (Texas Transportation Institute)
- In total, congestion cost the Bay Area $3.2 million-$795 per person-in 2000. (Texas Transportation Institute)
- More than 11 percent of Bay Area workers commute two hours a day-one hour in each direction. (Census 2000 Supplementary Survey)
- Bay Area residents perceive traffic as the number one regional problem. (Bay Area Council's 2002 Quality of Life Survey)

Health

- Walking to work gives you a 20 percent less chance of getting breast cancer, a 30 percent less chance of getting heart disease, a 50 percent less chance of diabetes, and would help you live longer and healthier into old age. (Nurse's Health Study, Archives of Internal Medicine; New England Journal of Medicine)
- About 60 percent of Americans lead completely sedentary lifestyles, and 40 percent are clinically overweight. (1998 report of the American Medical Association)
- Research conducted in 1999 by the Centers for Disease Control found that "obesity and overweight are linked to the nation's number one killer--heart disease--as well as diabetes and other chronic conditions." The report also states that one reason for Americans' sedentary lifestyle is that "walking and cycling have been replaced by



Why Join?
Do I Qualify?
Online Enrollment
Employer Reporting
Employer Profiles
Employer Resources
Employer FAQs

Employer Agreement

Enrollment Date: 09/26/2003

Employer Information

Employer Name:

Nature of Business:

Number of Employees (company-wide):

Recruiting Organization:

(The organization or agency that encouraged you to sign up for the program)

Primary Contact

Name: Title:

Address: City:

State: Zip:

Phone: Fax:

E-mail:

Manager

(Person who oversees administration of commuter benefits program)

☐ Same as above

Name: Title:

Address: City:

State: Zip:

Phone: Fax:

E-mail:

Media Contact

☐ Same as Primary Contact

☐ Same as Manager

Name: Title:

Address: City:

automobile travel for all but the shortest distances." (October 27, 1999 issue of the JAMA)

Air Quality

- Almost 70 percent of the Bay Area's carbon monoxide comes from motor vehicles. (EPA Region 9; Bay Area Air Quality Management District Emissions Inventory)

- For 20 to 30 days per year, air pollution levels in the Bay Area violate state and federal health standards. (BAAQMD emissions inventory)

National Commuting

- The average annual delay per peak-road traveler in 75 urban areas climbed to 62 hours in 2000 from 16 hours in 1982. The total cost of congestion in 2000 came to $67.5 billion, which was the value of 3.6 billion hours of delay and 5.7 billion gallons of excess fuel consumed, not to mention lost worker productivity. (Texas Transportation Institute)

- Nearly 50 percent of workers describe their commutes as unsatisfying or stressful, and 36 percent say they would be willing to take a 10 percent pay cut or more for a shorter commute. (HR Magazine Survey, Oct. 2001)

- Employees with commuter benefits are 8 times more likely to use transit than those who don't have them. (2001 Xylo survey)

State: Zip:

Phone: Fax:

E-mail:

Work Site Information

How many work sites are you enrolling?

How many employees (total) work at the sites?

How many of these employees are eligible for commuter benefits?

Next

Emission Control Strategies for Diesel Engines

I. Introduction

Emissions from diesel engines contribute greatly to the nation's air quality problems. Diesel engines emit fine particulates and nitrogen oxides that contribute to the formation of ground level ozone. Particulate matter and ozone pose serious health problems to the public by causing lung damage and aggravating existing respiratory diseases such as asthma. In addition, diesel exhaust is thought to be a human carcinogen.

Collectively diesel powered vehicles contribute nearly half of the nitrogen oxides and more than two-thirds of all particulates from transportation in the United States. Even with the more stringent heavy-duty highway engine standards starting in 2004 and 2007, existing diesel vehicles will continue to emit large amounts of Nitrogen Oxides (NOx) and particulate matter (PM).

Fortunately there are options to help control pollution from the existing fleet, including oxidation catalysts, particulate filters, low sulfur diesel, bio-diesel, and emulsified diesel.

II. Emission Control Options

A **Diesel Oxidation Catalyst** (DOC) is a device that uses a chemical process to break down pollutants in the exhaust stream into less harmful components. They look like a muffler and act like the catalytic converter on a car. Diesel oxidation catalysts can reduce emissions of particulate (PM) by 20 % and hydrocarbons (HC) by 50 % and carbon monoxide (CO) by approximately 40 %. DOCs cost about $1,000 to $2,000 for buses. They can be installed on any new or used bus and run on regular diesel fuel. Field experience suggests it takes about 1 to 3 hours to install an oxidation catalyst. The use of ultra low sulfur diesel with the DOC will greatly enhance its ability to reduce harmful emissions.

Diesel Particulate Matter Filters are ceramic devices that collect particulate matter in the exhaust stream. The high temperature of the exhaust heats the ceramic structure and allows the particles inside to break down (or oxidize) into less harmful components. The regeneration process produces an ash on the filter that must be cleaned off about every 60,000 miles. They can be installed on new and used buses, but must be used in conjunction with ultra-low sulfur diesel (ULSD) with a sulfur content of less than 15 parts per million in order to be effective. The combination of PM filters and ULSD can reduce emissions of PM, HC, and CÓ by 60 to 90 percent. Diesel Particulate Matter Filters cost between $5,000 and $10,000 and take approximately 6 to 8 hours to install.

The use of **Ultra-Low Sulfur Diesel (ULSD)** by itself can reduce PM emission by 5 to 9 % depending on the level of sulfur in the fuel. The use of both ULSD and a diesel particulate matter filter can reduce emissions by 90 %. ULSD is currently available only

in parts of the country and can cost from 8 to 25 cents more per gal than regular diesel. In 2006 it should be available nation wide.

Bio-diesel is a renewable fuel that can be manufactured from new or used vegetable oils or animal fats and is biodegradable. The use of bio-diesel will reduce the particulate matter (PM), carbon monoxide (CO) and hydrocarbons (HC) but NOx emissions actually increase. The B20 blend, which is 20% bio-diesel and 80% diesel, can be used in existing engines without modifications and should reduce the PM emissions by about 10% but can add 15 to 30 cents per gallon over the cost of regular diesel. The use of B100 (pure bio-diesel) will require engine modifications and cost any where from $.75 to $1.25 over regular diesel, but could reduce PM emissions by 40%.

Emulsified Diesel is a blend of diesel fuel, water (introduced at the microscopic level), and other additives that reduces PM and NOx emissions but also reduces the energy content of the fuel. This fuel does not seem to work well in vehicles that have high pressure fuel systems (fuel injection) but seems to do ok in vehicles with low pressure fuel systems. A second concern is that if a unit is fueled with emulsified diesel and is allowed to stays idle for several months, the water can separate from the diesel and cause engine problems. The use of this fuel can help reduce NOx emissions by 5% to 30% and the PM emissions by 20% to 50% but at a cost of about $.20 per gallon over regular diesel.

III. Conclusions

The State of North Carolina has taken the first step towards addressing air pollution resulting from the use of diesel engines. The Division of Air Quality is committed to opt-in to California's 2007 Heavy Duty Diesel Engine Program to ensure that any delays to the federal program due to the trucking industry will not mean a delay in obtaining emission benefits in our State. North Carolina is also looking at anti-idling and will be installing truck stop electrification through a pilot program. In addition, through the Mobile Source Emissions Reduction Grant program, 5 bus fleets across North Carolina will receive funding for the purchase and installation of diesel oxidation catalysts on school buses. These grants totaling $350,000 will retrofit over 350 buses but this is just a fraction of the State's school bus fleet.

Retrofitting existing diesel engines is a cost effective method to help obtain cleaner air for North Carolina. Should you have any additional questions about the Mobile Source Emissions Reduction Grant program or diesel retrofits, please feel free to contact me at (919) 733-1498 or by e-mail at heather.hildebrandt@ncmail.net.

May 5, 2004 ERC Meeting
EXHIBIT J

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: George Givens
Environmental Review Commission Counsel

FROM: William G. Ross, Jr.

DATE: December 17, 2003

RE: Report on Underground Storage Tanks

Pursuant to G.S. 143-215.94M and S.L. 2003-340, Section 2, I am transmitting a report on underground storage tanks. This annual report describes the status of leaking petroleum underground storage tanks, the state cleanup funds, and the Groundwater Protection Loan Fund.

The report was prepared by DENR's Division of Waste Management. If you have any questions or would like additional information, please contact Grover Nicholson at 733-1300.

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REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION ON THE NORTH CAROLINA UNDERGROUND STORAGE TANK PROGRAM INCLUDING THE PAY-FOR-PERFORMANCE INITIATIVE

5 May 2004

A: The Universe of Underground Storage Tanks (as of 30 April 2004)

1. In North Carolina, there are 11,976 UST facilities which have 33,627 tanks.

2. These facilities are owned by 5,432 owners.

3. Of these 33,627 tanks, 31,000 are regulated and 2,627 are commercial heating oil tanks.

4. Of the 31,000 regulated USTs, 4970 (16%) were installed more than 30 years ago; 6705 (22%) were installed 20-29 years ago; 12660 (41%) were installed 19-10 years ago; and 637 (21%) were installed less than 10 years ago.

5. There are also an estimated 250,000 home heating oil tanks in the state. These are unregulated tanks.

B: The UST Program's Corrective Action Progress (as of 30 April 2004)

1. Since the programs inception, we have recorded 19,473 incidents of leaking tank systems.

2. We have closed 10,103 of these incidents.

3. Presently, we are dealing with 9,370 active incidents: 2,707 are High-Risk; 1,303 are Intermediate-Risk; 2,337 are Low-Risk; and 3,023 are Unconfirmed-Risk.

4. In 2003, about 67 new releases were reported each month. The majority of these new releases (about 68%) were from home heating oil tanks.

5. Default Low-Risk incidents were a special category of Unconfirmed-Risk incidents. We began evaluating them in June 2000, at which time, there were 2,840 such incidents. Evaluations of these incidents are now complete.

6. In addition, there have been 5,705 "clean closures" of tank systems. These were closures where there was no release of petroleum (and therefore no reported incident).

7. We have 36 incident managers in the seven regional offices. Together with the seven regional supervisors, we have 41.5 FTE working on UST release incidents. Since the bulk of the work is being done on High-Risk, Intermediate-Risk and Unconfirmed-Risk incidents, each incident manager works on about 169 incidents.

C: The UST Program's Compliance Progress

1. We have 11 inspectors to assure compliance of the 11,976 UST facilities, or an average of 1088 facilities per inspector.

2. Typically, each inspector can inspect up to 200 facilities per year, including file reviews, inspection set-ups, the on-site inspections, follow-up meetings with the facilities, data entry, reports, and enforcement (about 40% to 50% of inspections find violations). That means, at present, we can inspect each facility once every four years. Right now, our overall compliance rate is about 60%. Our goals are to increase our inspections to at least once every two years and to increase the compliance rate to 90%.

3. We are taking several steps to increase both the inspection rate and the compliance rate. We have adjusted the 11 regional areas to even out the inspector workload, and we have home-based the inspectors to reduce their travel time to facilities. We are focusing on faster up-front training for new inspectors and follow-up training to ensure consistency. We are working with facility owners, equipment contractors, and consultants to educate them about the requirements to prevent tank system releases. We are assisting some tank owners in the organization of their certifications and records so that inspection time is shortened.

4. Session Law 2003-352 authorized the EMC to develop rules requiring secondary containment for all non-tank portions of a UST system at the time of installation or replacement. We have begun the rulemaking process and intend to have the new rules in effect by 1 July 2005

D: The Commercial Fund

1. Since the inception of the Commercial Trust Fund in 1988, it has received about $347 million and disbursed about $324 million. 93% of that money has gone toward cleanup of releases from USTs and third-party claims. 7% of the money has been used to administer the UST program.

2. As of 23 April 2004, the balance of the Commercial Fund was $678,211. Claims pending against the Commercial Fund total $30,348,988.

3. In June 2002, in order to stabilize the Commercial Fund, we instituted a procedure to pay out of the Fund each month only an amount equal to the Fund receipts for the month. Claims against the Fund are paid in the order in which they are received. Right now, the time between a complete claim being submitted and being paid is approximately 347 days.

4. On average, 195 claims are made against the Commercial Fund each month. The average submitted claim amount is about $13,000.

E: The Non-Commercial Fund

1. Since the inception of the Non-Commercial Trust Fund in 1988, we have received about $73 million and disbursed about $64 million. About 87% of that money has gone toward cleanup of releases from USTs. 13% of the money has been used to administer the UST Program.

2. As of 23 April 2004, the balance of the Non-Commercial Fund was $1,286,290. Claims pending against the Non-Commercial Fund total $5,522,473.

3. On average, 85 claims are made against the Non-Commercial Fund each month. The average submitted claim amount is about $10,700.

4. Claims against the Fund are paid in the order in which they are received. Right now, the time between a complete claim being submitted and being paid is approximately 98 days.

F: Program Improvements to Increase Fund Viability

1. Without sacrificing protection of public health and the environment, adjust remediation policies to lower remediation costs. We have already done this by limiting some Low-Risk site excavations and by modifying the over-excavation policy and eliminating some site assessment steps. We are also engaged in a rulemaking process that will make analytical requirements less cumbersome and more site-specific. This same rulemaking process will also eliminate a non-vital assessment requirement for releases from regulated USTs.

2. Session Law 2003-352 strengthened the concept that the Funds will only reimburse the costs that are reasonable and necessary to conduct risk assessments

and to implement approved cost-effective cleanups. We have implemented, and continue to implement, this concept by providing guidance on reasonable and necessary costs to incident managers.

3. Session Law 2003-352 also directed the Department to consider the availability of funds in the Commercial Fund when determing a schedule for further assessment and cleanup. This portion of the law was implemented by notifying tank owners and operators that the Department would direct and reimburse higher risk incidents before directing and reimbursing those of lower risk, such as Intermediate Risk incidents without contaminated soil or significant free product.

4. Institute Pay-For-Performance.

Pay for Performance

On October 15, 2001, House Bill 1063 was enacted by the North Carolina General Assembly. This bill give the Division of Waste Management's Underground Storage Tank program the authority to allow performance-based cleanups of sites where petroleum has been discharged or released from underground storage tanks. Sites selected for the pilot program will be posted for competitive bidding in the North Carolina Interactive Purchasing System. A performance-based contract will be awarded to the qualified environmental services firm that submits the lowest, technically qualified bid for an acceptable remedial proposal for the advertised site. A series of milestones (generally percentage reductions in contaminate levels in the soil and groundwater) must be achieved before payments are made to the cleanup firm from the Commercial or Non-Commercial Fund.

On November 2, 2001, the Division of Waste Management convened a stakeholders workgroup consisting of representatives of the Professional Engineers of North Carolina, the Consulting Engineers Council of North Carolina, the North Carolina Board for the Licensing of Geologists and the North Carolina Petroleum Marketer's Association to develop a temporary rule. A follow-up meeting on November 9, 2001 resulted in the further refinement of the rule and the discussions of the contract and bidding procedures proposed for use with the rule.

The proposed temporary rule was presented to the Groundwater Committee of the Environmental Management Commission on December 12, 2001 and received a favorable vote to proceed to full commission review in February 2002. On February 14, 2002, the EMC voted to approve the publication of the temporary rule in the North Carolina Register. The temporary rule was published for public comment between March 15 and April 15, 2002 in Volume 16, Issue 18, p. 2019 of the NC Register. No comments were received. The Commission adopted the temporary rule on May 14, 2002. On July 11, 2002 the Commission voted to allow the Division of Waste Management to proceed with permanent rule making and to publish the permanent rule in the NC Register. The permanent rule is pending publication in the September 2004 Issue of the NC Register.

In July of 2003, House Bill 897 was passed that allowed $2.5 million from the Commercial Fund and $250,000 from the Non-Commercial Fund to be allocated for the Pay-for-Performance Program in each fiscal year. At this time, there are five sites, two Federal-Lead and three responsible party lead sites awaiting the finalization of the PFP contract language. Currently, the contract language is being reviewed by the Attorney General's Office. Pending approval, UST Staff will meet with representatives of the Purchase and Services Division and the Department of Administration to finalize the PFP contract submittal procedure. Once completed, the five sites will be sampled to provide an up to date analytical picture of the contamination levels remaining and then the contracts will be placed in the Interactive Purchasing System for awarding.

Annual Report to the
North Carolina General Assembly

The Status of Leaking Petroleum Underground Storage Tanks, the State Cleanup Funds, and the Groundwater Protection Loan Fund

SEPTEMBER 1, 2003

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NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

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Division of Waste Management

Department of Environment and Natural Resources

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Appendices (available upon request - please contact Jane Comer at 919.733.1302)

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Appendix C - LUSTs closed out 7/1/88-6/30/03

EXECUTIVE SUMMARY

The Department of Environment and Natural Resources is required to prepare an annual report on the status of leaking petroleum underground storage tanks.

North Carolina's underground storage tank program is administered by the Division of Waste Management's UST Section in DENR. The UST Section enforces UST regulations and manages funds used to perform cleanups of petroleum UST discharges or releases. The program was initiated in 1988 in response to growing reports of USTs leaking petroleum into soil and drinking water supplies. Funding for the program has been provided by the Commercial and Noncommercial Trust Funds, the Groundwater Protection Loan Fund, the Federal UST Regulatory Grant and the Federal Leaking UST Fund.

This is the summary of the statistics described in this report for the period July 1, 2002 through June 30, 2003.

Commercial Fund Revenues	$27,055,759
Commercial Fund Total Expenditures	$28,829,373
Noncommercial Fund Revenues	$ 7,664,329
Noncommercial Fund Total Expenditures	$11,065,297
Petroleum UST Incidents - Reported	908
Petroleum UST Incidents - Closed Out	841

This is the summary of the statistics for the entire history of the UST program (7/1/88 -6/30/03).

Commercial Fund Revenues	$346,851,044
Commercial Fund Total Expenditures	$344,635,763
Noncommercial Fund Revenues	$ 73,349,575
Noncommercial Fund Total Expenditures	$ 70,775,263
Petroleum UST Incidents - Reported	18,170
Petroleum UST Incidents - Closed Out	8,948

As of June 30, 2003, the status of the Commercial and Noncommercial Funds was:

Commercial Fund Balance	$2,184,943
Commercial Fund Claims Pending	$30,704,618
Noncommercial Fund Balance	$2,576,307
Noncommercial Fund Claims Pending	$6,115,573

The initiation of expedited claim reviews beginning May 2001 has contributed to an increase in payments from the Commercial Fund. A significant backlog of pending claims was processed and, as a result, reimbursement costs nearly doubled during the six-month period between July 1, 2001 and December 31, 2001. Payment increases have continued since this time. An evaluation of the claims paid during the twelve month period from July 1, 2001 through June 30, 2002 indicate a significant increase in payments for costs associated with comprehensive site assessments and corrective action plans. This is partly due to re-examining low or undetermined risk sites and an increase of enforcement efforts. Beginning on June 17, 2002, reimbursements from the Commercial Fund have only been made, as funds are available. This has resulted in a delay of reimbursement of claims from the Commercial Fund. Transfers to the Noncommercial

Fund of $3,418,990 in accordance with NCGS 119-18(b) have placed an additional drain on the Commercial fund.

The Noncommercial Fund is not currently able to meet all obligations based on the current rate of claims submitted. Claims pending exceed the Noncommercial balance for the first time since the inception of the Fund.

FUNDING FOR THE UNDERGROUND STORAGE TANK PROGRAM

Program funding is provided by revenues from the Commercial and Noncommercial Trust Funds and the Groundwater Protection Loan Fund. The Federal UST Regulatory Grant and the Federal Leaking UST Fund are provided by the Environmental Protection Agency. Of the 99 staff positions assigned to the UST program, state revenue funds 68 positions and 31 are supported by federal grants.

Commercial and Noncommercial Trust Funds

The Leaking Petroleum Underground Storage Tank Cleanup Act of 1988* established two separate funds: the Commercial Trust Fund and the Noncommercial Trust Fund. Both may be used to reimburse eligible UST owners, operators and landowners for reasonable and necessary costs incurred as a result of environmental cleanup and third party liability claims. Additionally, both funds enable UST Section staff to:

- record and track UST release incidents;
- register and permit commercial USTs, manage a database and receive annual UST operating fee payments;
- identify responsible parties;
- provide technical assistance to tank owners and operators;
- inspect USTs to ensure compliance with UST regulations;
- monitor site cleanups;
- review site assessments and corrective action plans;
- evaluate innovative assessment and cleanup technologies;
- review reimbursement claim procedures;
- manage contracts for cleanups designated as "State Lead";
- inspect and monitor land applications of contaminated soil; and
- identify and evaluate abandoned petroleum USTs.

The UST Section has the authority to contract for the cleanup of petroleum UST incidents if the owner or operator cannot be identified or located, if the owner or operator is financially unable to perform cleanup, or if the owner or operator refuses to perform the required cleanup. In the latter case, the section is authorized by general statute to recover costs incurred during assessment and cleanup activities.

Sources of funding for the Commercial Trust Fund include:

- a motor fuel and kerosene inspection tax,
- an excise tax (0.297 cents per gallon) on motor fuel and kerosene sales,
- annual payment of UST operating fees,
- costs recovered from UST owners and operators for State Lead sites,
- loan collection and interest for the Groundwater Protection Loan Fund, and
- interest earned on the account.

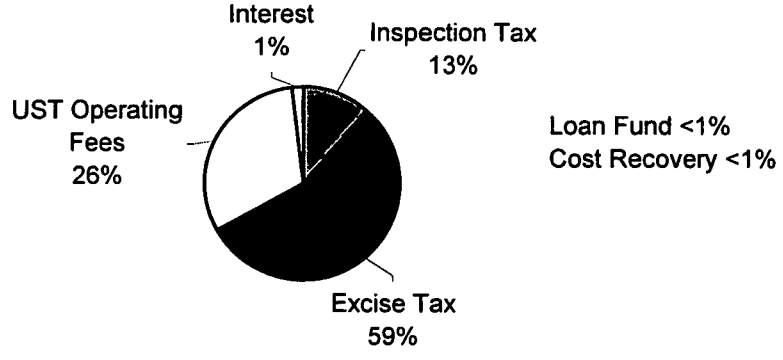
General Statute 143-215.94A et.seq.

Owners and operators are required to pay annual operating fees to receive operating permits and to be eligible for the Commercial Fund. Annual fees for commercial USTs began at a rate of $30 for tanks with a capacity equal to or less than 3,500 gallons (small tanks) and $60 for tanks with a capacity in excess of 3,500 gallons (large tanks). Tank fees increased annually from 1989 to 1993. From 1993 to 1997, fees were $150 for small tanks and $225 for large tanks. Beginning January 1, 1997, annual fees were increased to $200 for commercial USTs with a capacity equal to or less than 3,500 gallons and $300 for commercial USTs with capacity in excess of 3,500 gallons. Revenues received for the Commercial Fund for the twelve-month period from July 1, 2002 to June 30, 2003 were approximately $27 million (Table 1). The relative contributions to the Commercial Fund from each of the funding sources are illustrated in Figure 1.

Table 1 - Commercial Trust Fund Revenues
7/1/02 - 6/30/03

Motor Fuel & Kerosene Inspection Tax	$ 3,948,292
Motor Fuel & Kerosene Excise Tax	$ 18,052,511[1]
UST Operating Fees	$ 8,087,033
State Lead Cost Recovery	$ 23,224
Interest	$ 182,692
Loan Fund Collection and Interest	$ 60,995
Payback Settlements	$ 120,000
Transfers to Noncommercial	$ (3,418,990)
Total Commercial Revenues	**$ 27,055,757**

Figure 1 - Commercial Fund Revenue Sources



Funding for the Noncommercial Trust Fund is provided by a motor fuel and kerosene inspection tax and excise taxes (0.047 cents per gallon) on kerosene and motor fuel sales.[2] Owners and operators of noncommercial USTs are not required to pay annual operating fees. Revenues received for the Noncommercial Fund for FY 2002-03 were approximately $7,664,329 million (Table 2).

[1] Includes a $3,000,000 gasoline tax advance, transferred on 3-26-03
[2] House Bill # 681 of 1993

Table 2 - Noncommercial Trust Fund Revenues
7/1/02 - 6/30/03

Motor Fuel & Kerosene Inspection Tax	$ 2,378,180
Motor Fuel & Kerosene Excise Tax	$ 1,698,292
Interest	$ 168,867
Transfer from Commercial Fund	$ 3,418,990
Total Noncommercial Revenues	**$ 7,664,329**

Groundwater Protection Loan Fund

The Groundwater Protection Loan Fund Program was created in 1991.* It provided financial assistance to owners of commercial USTs who replaced or upgraded their tanks to meet the performance standards required for all USTs by December 22, 1998. Administrative rules implementing the program were adopted by DENR and became effective December 1, 1992. Revenues for the fund were generated through a 0.0025 cent (one quarter of one cent) per gallon motor fuel excise tax received from January 1, 1992 through December 31, 1994.

*Session Laws 1991, c. 538, s. 25 - G.S. 143-215.94P

Federal UST Regulatory Grant Program

This program promotes compliance with UST regulations. It provides the state's UST Section with $186,675 per year to fund three positions in the DWM central office. The positions provide technical assistance to the owners and operators of USTs, develop materials, conduct educational activities, train regional staff and conduct UST inspections.

Federal Leaking UST Fund

The Federal Leaking UST Trust Fund is used to clean up petroleum contamination from leaking USTs, provide potable water to affected third-parties, perform emergency activities, relocate residents affected by leaking USTs and conduct enforcement activities. This fund is limited to USTs regulated by federal agencies, primarily commercial tanks used for storing motor fuels. Tanks used for heating oil and those used for farm or residential uses (1,100 gallons capacity or less) are not covered by this fund.

Individuals (i.e., owners/operators) do not have access to the fund. Only the federal government and states with cooperative agreements with the EPA can draw on the fund. It may be used in situations when: (1) the responsible party cannot be identified; (2) the responsible party is financially unable to pay for the cleanup; or (3) the responsible party is unwilling and refuses to undertake assessment and/or cleanup actions.

Since the state's UST program began in 1988, the Federal Leaking UST Fund has made 18 awards totaling $36,849,569 to the state's UST Section. As of June 30, 2003, the state spent

$35,455,025 from these awards. Of this amount, $16,498,130 was spent for cleanup-related activities and $3,390,154 for enforcement actions. Administrative, operating, travel and equipment costs totaled $15,566,741.

The program is obligated to seek recovery of all costs incurred during state lead cleanups. As of June 30, 2003, the UST Section had recovered $1,545,763 in federal cleanup money through cost recovery actions. Of this amount, $748,487 came from the North Carolina Commercial Fund for sites determined eligible for Commercial Fund coverage after cleanup activities had begun. Cost recovery funds totaling $1,510,183 were returned to the Federal Trust Fund to be used for additional corrective action expenditures.

The EPA approved $2,033,793 for North Carolina from the Leaking UST Fund for FY 2002-2003.

PETROLEUM UST INCIDENTS

Discharges or releases from petroleum USTs are reported to DENR regional offices where they are added to an incident management database. Table 3 lists the number of incidents reported and closed out in each region during the twelve-month period from July 1, 2002 through June 30, 2003. It also shows the number of incidents reported and closed out since the UST program began in 1988.

Beginning January 2, 1998, the UST Section implemented risk-based corrective action rules for petroleum UST incidents. Discharges or releases under these rules receive a risk classification of "high," "intermediate," or "low" based on the potential threat to human health and the environment. Of the total number of UST incidents closed since 1988, 55 percent were closed following implementation of Risk-Based Corrective Action. The total number of open incidents has generally increased since 1988; however, recent data indicates the trend may be leveling off (see Figure 2, page 5).

Table 3 - Petroleum UST Incidents by Region[1]

REGION	7/1/02 - 6/30/03		7/1/88 - 6/30/03	
	Reported	Closed	Reported	Closed
Asheville	62	52	1,893	1,139
Fayetteville	54	42	1,305	533
Mooresville	162	155	3,802	2,061
Raleigh	211	179	3,606	1,544
Washington	155	117	2,285	1,092
Wilmington	65	77	1,349	528
Winston-Salem	199	219	3,930	2,051
TOTAL	**908**	**841**	**18,170**	**8,948**

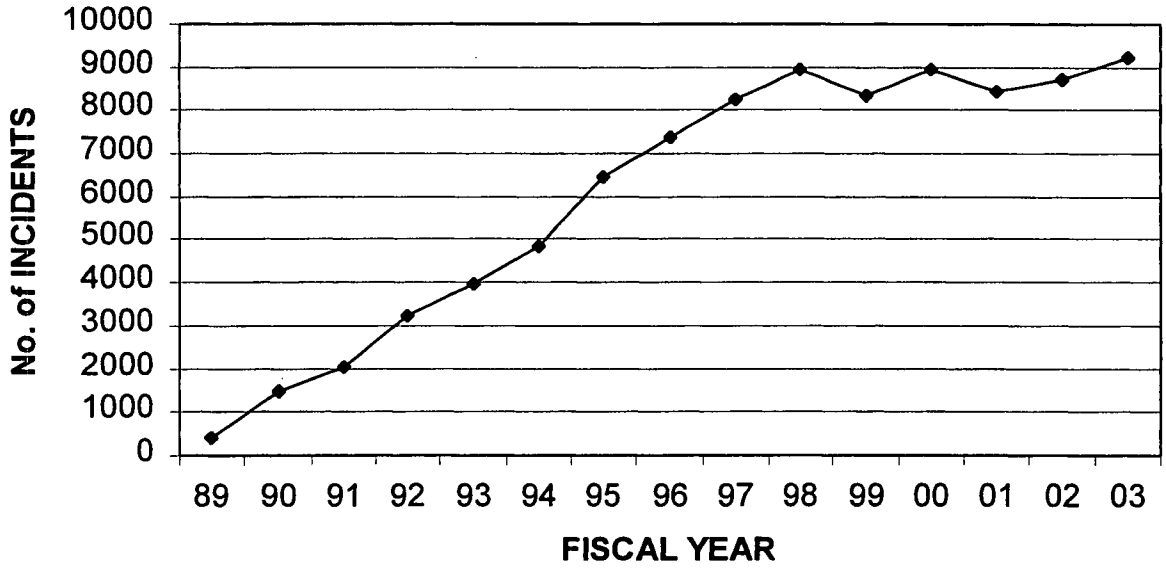
Total reported releases affecting groundwater that have been closed out:	2,741
Total reported releases closed out since implementation of RBCA[2]:	4,880
Total remaining open sites:	9,222
Estimated open commercial sites[3]:	7,562
Estimated open noncommercial sites[3]:	1,660

[1] Incident numbers vary slightly from last year's data due to a database conversion.

[2] Risk-based corrective action implemented 1/2/98.

[3] Based on an average of past data (84%) and the current twelve month period (55%) approximately 82 percent of the reported releases are from commercial sites, while the other 18 percent are from noncommercial sites.

Figure 2 - Open UST Incidents



RECEIPTS AND DISBURSEMENTS: COMMERCIAL AND NONCOMMERCIAL TRUST FUNDS AND GROUNDWATER PROTECTION LOAN FUND

Commercial and Noncommercial Funds

UST owners, operators and landowners may submit reimbursement claims for reasonable and necessary costs incurred during environmental assessment and cleanup activities. Claims may be submitted if the eligibility requirements for the trust funds are met. Deductibles that must be met before receiving reimbursement from the Commercial Fund range from $20,000 to $75,000. Noncommercial Fund deductibles are $0 for UST owners and operators, and $5,000 for landowners. Table 4 lists the receipts and disbursements by fiscal year for both funds for the period July 1, 1988 to June 30, 2003.

Table 4 - Receipts & Disbursements for Cleanups
7/1/88 - 6/30/03

FISCAL YEAR	RECEIPTS		DISBURSEMENTS[1]	
	Commercial	Noncommercial	Commercial	Noncommercial
FY 88-89	$ 2,337,685	$ 0	$ 14,768	$ 0
FY 89-90	5,773,632	2,905,035	79,080	0
FY 90-91	7,330,573	2,934,347	1,616,760	564,206
FY 91-92	13,484,008	3,018,344	4,409,229	2,143,155
FY 92-93	18,032,784	7,693,288	9,651,948	4,069,497
FY 93-94	24,438,966	3,404,086	22,904,802	2,012,312
FY 94-95	56,037,135[2]	5,194,725	37,405,510	2,900,368
FY 95-96	28,178,768	5,215,550	44,060,639	5,029,109
FY 96-97	28,564,034	5,587,781	44,163,273	5,924,799
FY 97-98	27,291,220	5,717,592	30,267,392	3,869,091
FY 98-99	26,783,344	5,945,461	16,104,152	2,776,105
FY 99-00	27,178,623	5,636,563	22,820,069[3]	5,028,505
FY 00-01	27,240,303	5,811,666	24,566,132[4]	7,890,618[5]
FY 01-02	27,124,210	6,620,808[6]	36,872,426	9,182,320
FY 02-03	27,055,759	7,664,329[7]	26,498,565	9,898,806
TOTAL	**$346,851,044**	**$ 73,349,575**	**$321,434,745**	**$ 61,288,891**

[1] Does not include administrative costs.
[2] Commercial receipts for FY 94-95 included $31,288,889 that was transferred from the Groundwater Protection Loan Fund.
[3] Adjustment due to a transfer from the Commercial Fund to the Federal Trust Fund of $288,117 as a cleanup expenditure rather than as an administrative cost.
[4] $33,866 transferred to Federal Trust Fund as a cleanup expenditure.
[5] $2 million transferred out of Noncommercial Fund to the state's General Fund.
[6] Includes transfer of $784,382 from Circle K Settlement Fund
[7] Includes transfer of $3,418,990 of motor fuel and kerosene tax from Commercial to Noncommercial due to balance below $5 million - General Statute 119-18(b).

The administrative budget for the state-funded portion of the UST program is derived from the Commercial and Noncommercial Funds. Table 5 lists past administrative expenditures since the beginning of the UST program.

Table 5 - Administrative Expenditures

FISCAL YEAR	COMMERCIAL	NONCOMMERCIAL
FY 89-90	$ 201,255	$ 201,254
FY 90-91	547,595	547,595
FY 91-92	517,221	517,221
FY 92-93	601,687	601,686
FY 93-94	694,424	694,423
FY 94-95	666,270	666,270
FY 95-96	2,322,632	783,684
FY 96-97	2,623,339	801,143
FY 97-98	2,530,036	667,724
FY 98-99	2,567,668	620,574
FY 99-00	2,579,540*	570,738
FY 00-01	2,730,236	733,811
FY 01-02	2,397,264	913,755
FY 02-03	2,221,851	1,166,494
TOTAL	**$ 23,201,018**	**$9,486,372**

Incorporating the administrative costs into receipts and cleanup disbursements yields these Commercial and Noncommercial Fund balances:

Commercial Fund Balance (as of June 30, 2003)	**$ 2,184,943**
Noncommercial Fund Balance (as of June 30, 2003)	**$ 2,576,307**

* Adjustment due to a transfer of $288,117 from the Commercial Fund to the Federal Trust Fund as a cleanup expenditure rather than an administrative cost.

Groundwater Protection Loan Fund

After the Groundwater Protection Loan Fund was created, 11 North Carolina banks agreed to administer the loan program. As of June 30, 1995, four loans totaling $1,228,350 had been closed. After this date, remaining funds of $31,288,889 were deposited into the Commercial Trust Fund. Loan repayments are also deposited into the Commercial Fund. During the twelve-month period ending June 30, 2003, $41,911 was repaid. Total receipts for the Loan Fund since its inception in January 1992 are $33,036,751.

CLAIMS AGAINST THE CLEANUP FUNDS

Claims against both the Commercial and Noncommercial Funds are processed on a "first-come, first-served" basis. The status of all claims requesting reimbursement from both funds that were received as of June 30, 2003 is presented in Table 6. These claims only include costs claimed to date, and do not represent the total costs for cleanups.

UST Section staff have supervised contract cleanups at 308 commercial and noncommercial sites (Table 6, 241 commercial and 67 noncommercial). Currently, DENR has four contracts with environmental engineering/geology firms that perform a range of assessment and cleanup actions. The term of these contracts is 18 months with an option to renew for an additional 18 months.

Table 6 - Claims Against the Cleanup Funds
7/1/88 - 6/30/03

	Commercial Fund		Noncommercial Fund	
	Number	Cost	Number	Cost
Claims Paid	19,674	$309,421,532	6,503	$ 55,038,729
Incidents Denied Totally [1]	33	$ 4,573,040	4	$ 59,845
Claims Denied Partially [2]	12,369	$ 61,701,870	3,280	$ 7,925,122
Total Deductibles Paid	-------	$ 63,625,153	-------	$ 330,366
Claims Pending	2,023	$ 30,704,618	646	$ 6,115,573
Contracted Cleanups [3]	241	$ 8,667,428	67	$ 2,136,456

[1] Ineligible
[2] Excessive or undocumented costs
[3] State Lead actions undertaken or completed

COMMERCIAL AND NONCOMMERCIAL FUND BALANCES AND PROJECTED NEEDS

Commercial Fund

As of June 30, 2003, the Commercial Fund balance was $2,184,943 with pending claims of $30,704,618 (see Figure 3, Page 9). Since January 1, 2002, the difference between the fund balance and the pending amount has continued to increase (see Figure 4, Page 9). During the six-month period from July 1, 2001 to December 2001, expedited reviews were initiated in an effort to reduce claim review time. While the claim review time has been reduced, the result has been a delay in issuance of the reimbursement checks, since the Commercial Fund can only pay out what has been received for the month. Claim amounts continue to increase as well as the backlog of claims awaiting payment. Revenues, however, remain steady.

Figure 3 - Commercial Fund Balance and Claims Pending

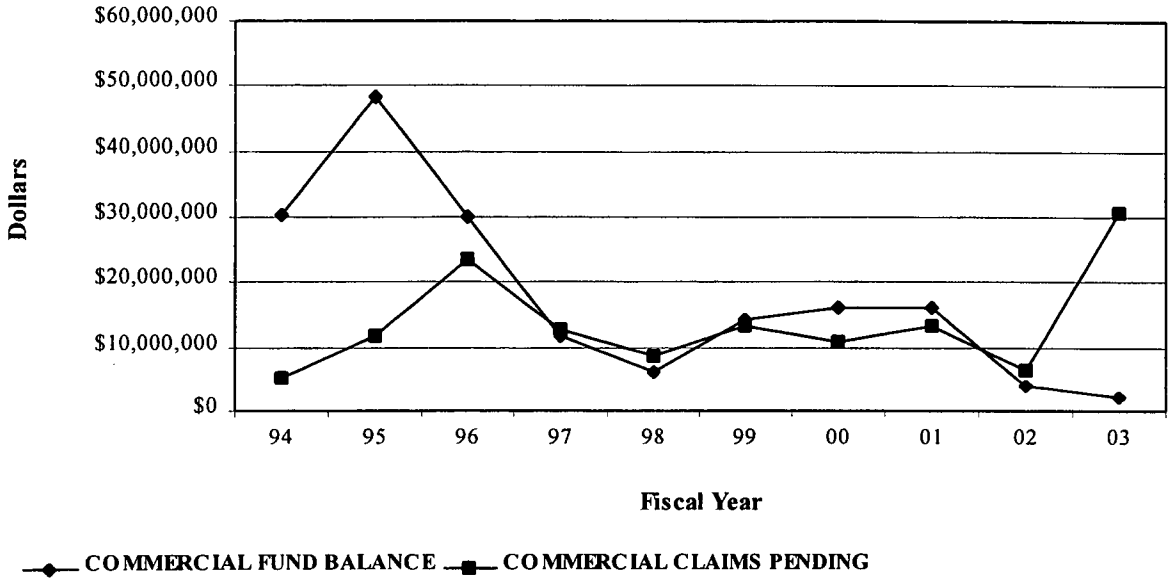


Figure 4 - Commercial Fund Balance Minus Claims Pending

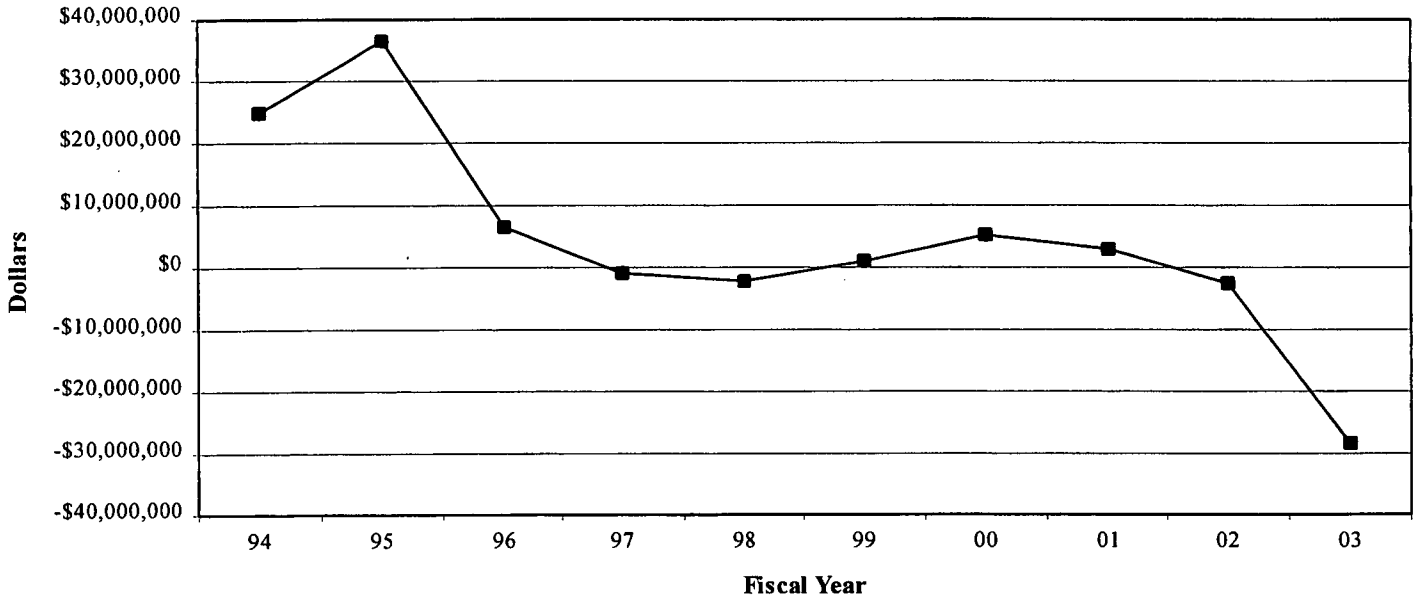


Table 7 - Total Commercial Fund Revenues and Expenditures
7/1/01 – 6/30/03

Total Commercial Revenues (see Table 1, page 2)	**$27,055,759**
Total Claims and Contracted Cleanups	$26,498,565
Administrative Costs	$ 2,221,851
Total Commercial Expenditures	**$28,720,416**

One initiative which may affect a future demand on the Commercial Fund is pay-for-performance based cleanups. On October 1, 2001, the General Assembly ratified House Bill 1063, which allows responsible parties to participate in the pay-for-performance program on a voluntary basis. Pay-for-performance is a reimbursement method that requires cleanup goals to be met before payments can be made to environmental consultants. This reimbursement method requires the Trust Fund to obligate the contracted cleanup costs. Pay-for-performance obligations may initially place a higher demand on the Trust Fund, but should greatly decrease the costs of cleanups and thus result in a lesser burden to the Trust Fund.

Another factor that may effect future demands on the Commercial Fund is third-party claims. There are currently several pending third-party claims under review which have the potential to place a burden of many hundreds of thousands of dollars on the Commercial Fund. Other third party claims may be planned that have not yet been submitted for review.

After UST operating fees were raised on January 1, 1997, revenue from this funding source declined through the end of FY 1998-99 (see Table 8). This decrease was likely due to the reduction in the number of registered USTs that occurred as a result of the federal 1998 upgrade regulations. The number of registered USTs continued to decrease during the period from July 1, 2002 to June 30, 2003. However, UST operating fees have remained stable.

Table 8 - Commercial UST Population and Operating Fee Revenue

Fiscal Year	No. of Commercial USTs Billed	Operating Fee Revenue
FY 1996-97	37,776	$ 10,839,975
FY 1997-98	36,563	$ 10,008,917
FY 1998-99	34,428	$ 8,697,468
FY 1999-00	33,558	$ 8,844,093
FY 2000-01	33,776	$ 8,464,019
FY 2001-02	32,839	$ 8,553,715
FY 2002-03	31,155	$ 8,087,033

At present, approximately 7,562 commercial incidents have yet to be closed out. With minor work performed in accordance with the risk based rules, many of these sites may receive "no further action" letters. However, some will require additional assessment and corrective action, that will subsequently result in additional demands on the Commercial Fund.

Data tracking improvements are being made to the UST incident management database. These changes will enable the UST Section to better predict the number of incident closures and project Commercial Fund expenditures.

UST systems pose a substantial threat to human health and the environment. On average, over 1,200 leaks are reported each year. Maintaining the quality of North Carolina's drinking water depends on preventing releases to the environment. Direct education and technical assistance for tank owners and operators is critical. Only education and assistance ensure responsible handling of petroleum products, including methyl tertiary-butyl ether, and early detection in the event of a leak.

North Carolina currently has about 31,155 active regulated USTs at 12,450 facilities. Of that number, we estimate 40 to 50 percent are located within 500 feet of both domestic and public drinking water supplies. Our inspection data show that over 30 percent of tank owners and operators do not comply with UST regulations. These regulations cover proper operation and maintenance, with an emphasis on leak detection. If we are to preserve the quality of North Carolina's drinking water, improving compliance must be a future priority.

Noncommercial Fund

As of June 30, 2002, the Noncommercial Fund balance was $2,576,307. The total for pending claims stood at $6,115,573. Based on the past 12 month period, it appears that demands on the Fund will increase. We anticipate this will result in delayed claim payments, just as the Commercial Fund was affected(see Figure 5).

Figure 5 - Noncommercial Fund Balance and Claims Pending

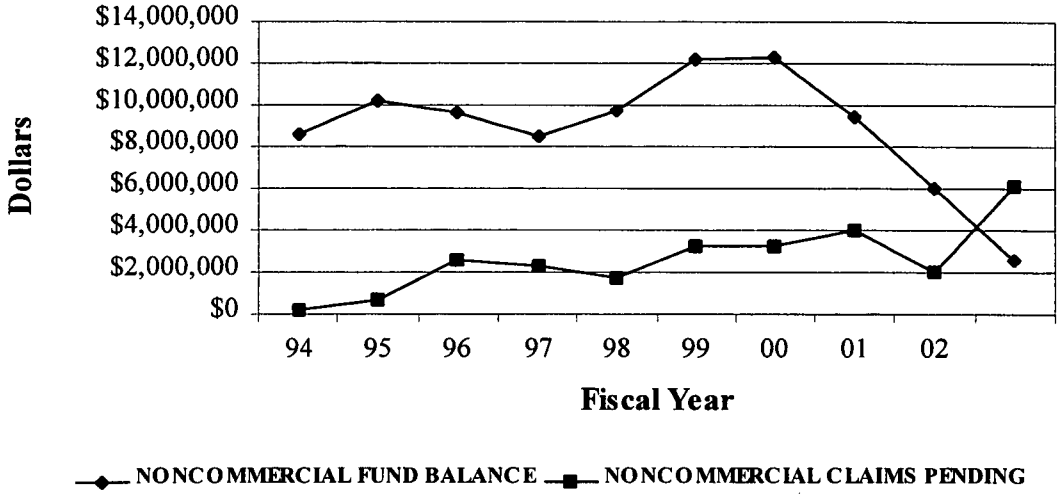


Figure 6 - Noncommercial Fund Balance Minus Claims Pending

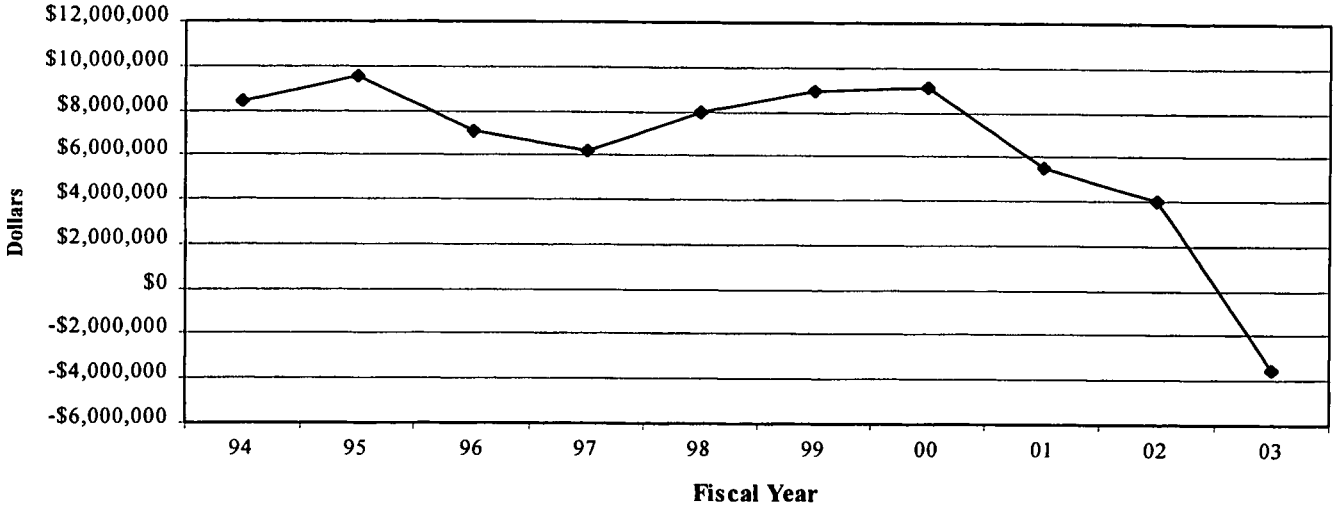


Table 9 - Total Noncommercial Fund Revenues and Expenditures
7/1/01-6/30/03

Total Noncommercial Revenues (see Table 2, page 3)	**$7,664,329**
Total Claims and Contracted Cleanups	$ 9,898,806
Administrative Costs	$ 1,166,494
Total Noncommercial Expenditures	**$11,065,300**

Table 10 shows the estimated cost to complete cleanups for noncommercial incidents reported from July 1, 2002 to June 30, 2003. It should be noted, however, that cleanups can easily extend over several years and costs may vary greatly.

Table 10 - Estimate of Cleanup Costs for Noncommercial Incidents
Reported July 1, 2002 - June 30, 2003

Region	Incidents*	Total Estimated Cleanup Cost**
Asheville	28	$ 1,750,000
Fayetteville	24	$ 1,500,000
Mooresville	73	$ 4,562,500
Raleigh	95	$ 5,937,500
Washington	70	$ 4,375,000
Wilmington	30	$ 1,875,000
Winston-Salem	90	$ 5,625,000
Total	**410**	**$25,625,000**

* Calculations of the last twelve-month period indicate that approximately 45 percent of reported new releases are from noncommercial sites.

** An average cost of $62,500 is used as an estimate of total cleanup costs for noncommercial sites.

PAY FOR PERFORMANCE

On October 15, 2001, House Bill 1063 was enacted by the North Carolina General Assembly. This bill give the Division of Waste Management's Underground Storage Tank program the authority to allow performance-based cleanups of sites where petroleum has been discharged or released from underground storage tanks. Sites selected for the pilot program will be posted for competitive bidding in the North Carolina Interactive Purchasing System. A performance-based contract will be awarded to the qualified environmental services firm that submits the lowest, technically qualified bid for an acceptable remedial proposal for the advertised site. A series of milestones (generally percentage reductions in contaminate levels in the soil and groundwater) must be achieved before payments are made to the cleanup firm from the Commercial or Non-Commercial Fund.

On November 2, 2001, the Division of Waste Management convened a stakeholders workgroup consisting of representatives of the Professional Engineers of North Carolina, the Consulting Engineers Council of North Carolina, the North Carolina Board for the Licensing of Geologists and the North Carolina Petroleum Marketer's Association to develop a temporary rule. A follow-up meeting on November 9, 2001 resulted in the further refinement of the rule and the discussions of the contract and bidding procedures proposed for use with the rule.

The proposed temporary rule was presented to the Groundwater Committee of the Environmental Management Commission on December 12, 2001 and received a favorable vote to proceed to full commission review in February 2002. On February 14, 2002, the EMC voted to approve the publication of the temporary rule in the North Carolina Register. The temporary rule was published for public comment between March 15 and April 15, 2002 in Volume 16, Issue 18, p. 2019 of the NC Register. No comments were received. The Commission adopted the temporary rule on May 14, 2002.

Unobligated funds were not available from the Commercial Fund during the FY 2002-03 to use for pay-for-performance. Unobligated funds were available from the Noncommercial Fund during FY 2002-03. Statements offering and describing pay-for-performance were placed in all eligibility letters for Noncommercial sites during this period. However, no noncommercial sites have been offered to the Trust Fund during this fiscal period.

RECOMMENDATIONS

Based on the results of this report, the UST Section makes the following recommendations for the Commercial and Noncommercial Trust Funds:

- Additional revenue should be made available for continued expedited payment of Commercial Fund claims and future expedited payment for the Noncommercial Fund claims.

- Responsible parties of UST releases should continue to be encouraged to consider pay-for-performance cleanups at their sites. Pay-for-performance is a reimbursement method that requires cleanup goals to be met before payments can be made to environmental consultants. PFP programs in other states have dramatically reduced the costs for cleanups. Costs are down 66 percent in Florida and 50 percent in South Carolina. PFP also accelerates the rate of cleanups. The Department of Environment and Natural Resources will monitor the obligated costs for pay-for-performance contracts and the potential cleanup cost savings of the PFP program.

Presentation to North Carolina Environmental Review Commission

Sen. Daniel Clodfelter,
Rep. Daniel McComas
& Sen. Charles Albertson,
Co-Chair

Commonwealth
Acceptance

May 5, 2004 ERC Meeting
EXHIBIT K

Virginia's Experience

•VA's petroleum fund has had at least two multi-year periods where the volume of claims exceeds revenue. Fund balance would be depleted & long payment queue would result

•Most recent incident began in 1998 and peaked in mid 2001. Backlog of approved claims in queue reached $24 million. Claimants were waiting > 1 year to receive reimbursement.

•Long payment delays created cash flow problems for RP's, which slowed the pace of clean ups. Delays in clean ups and other marketplace distortions drove up costs, thereby wasting taxpayer money

•No political support for tax increase. DEQ looked for other solutions. Commonwealth Acceptance worked with VA DEQ and **Virginia Resources Authority ("VRA") Accelerated Claim Payment Program.** Purpose is to provide liquidity to Virginia Petroleum fund claimants. Virginia's Governor Mark Warner announced the VRA Program in May 2002

•VRA Program is not "lending". Program works by tank owners assigning (selling) approved claims to VRA. VRA pays the RP or their environmental consultant, as directed.

•VRA Program has proved successful. Over 2,300 claims totaling more than $23,000,000 have participated. About 2/3 of all claims submitted for reimbursement are <u>voluntarily</u> participating

•Does not cost taxpayers any money. Not debt to the state, the fund or the RP's/consultants

•All stakeholders (state, fund, DEQ, taxpayers, RP's & consultants) are winners

•The Association of State LUST Fund Administrators presented Virginia with its 2003 "**Innovation and Policy**" award for creating VRA Program

What is NATLUST ?

•Virginia's VRA Program being morphed into a national claim financing program. Issue of LUST fund insolvency > $ 1 billion nationally

•Economies of scale with financing will drive down costs to all participants, including Virginia's stakeholders. Will be permanent solution to VA's periodic bouts of LUST fund insolvency

•NATLUST will function much like VRA Program, where it will provide liquidity by purchasing approved claims from RP's, effectively stepping into their shoes to wait in the queue for reimbursement. Participation by RP's is voluntary and on claim-by-claim basis

•By providing liquidity, NATLUST will help promote the fund's statutory goals, which typically include meeting EPA's financial responsibility regulations, as well as promoting a cleaner environment & improved public health through the timely removal of leaking tanks

•Legally, it is intended to be organized as a 501(c)(3) nonstock, nonprofit corporation and as an instrumentality of Virginia and each other state in which it does business

•The intention is to make NATLUST financing available in states where the appropriate state regulatory agency, political leaders and stakeholders consensually agree that such financing would be beneficial

•NATLUST will be governed by an independent board. Participating states will be invited to appoint a representative

•No "political" risk to NC's stakeholders from other participating states. Each state's claims will be held in separate trust

VRA/NATLUST – How It Works

•**Two-Step Payment**. NATLUST will provide liquidity by purchasing approved claims from NC's RP's using a "two-step" payment process.

•**Initial Payment.** Immediately upon DENR issuing a decision letter on a that has been assigned to NATLUST, NATLUST will issue an initial payment check equal to, say, 92% of the amount approved by DENR. At this point, NATLUST will step into the shoes of the RP and will wait for DENR to reimburse the claim

•**Residual Payment.** Immediately upon DENR reimbursing the claim, NATLUST will issue a second, residual payment check equal to the other 8%, less NATLUST's pro-rata carrying costs for that particular claim

•**Simple Structure = Low Costs**. Two-step payment method allows credit providers to focus on the fund's creditworthiness---not the RP; low administration costs; no guesswork as to carrying costs

•**What are Carrying Costs?** Just like the VRA Program, NATLUST's carrying costs are (a) the costs of its borrowed money, plus (b) the cost of managing the program, and (c) the amortization of legal/other organizational costs. NATLUST will allocate costs on a pro-rata basis based on the size of each claim and the number of days it takes until the claim is reimbursed. This is fair as all parties – big and small – are treated equally

Benefits To North Carolina

- Immediate liquidity eliminates financial pain caused by long payment delays
- NATLUST financing improves voluntary cooperation, thereby facilitating the identification & timely removal of LUST's, leading to a cleaner environment
- NATLUST financing is not debt to DENR, NC's taxpayers or the RP's/consultants
- NATLUST will be self-supporting-- the program's participants---and not NC's taxpayers or DENR---will bear the program's costs
- Saves taxpayer money by eliminating distortions & inefficiencies caused by payment delays
- NATLUST financing will help preserve NC's commercial LUST fund as a viable mechanism for meeting EPA's financial assurance regulations
- NATLUST does not prejudice NC legislature, administration or DENR's sovereign right to make changes to NC's LUST fund program
- NATLUST financing does not prejudice DENR's ability to seek cost recovery from RP's and/or consultants
- NATLUST has no involvement with how DENR conducts technical aspects of LUST clean ups. No involvement with the actual claim review/approval process
- Virginia's experience suggests that the "Direct Pay" (paying consultant) feature fosters better cooperation from consultants, which will have a financial incentive to follow DENR's rules
- Participation by RP's & consultants is voluntary. Those who do not participate are unharmed
- Virginia's DEQ found that the program reduces management work load

Specific Items NATLUST Needs to Provide Financing

Non legislative options to facilitate NATLUST implementation being considered; however, recent conference call between McGuire Woods and George Givens suggests that legislation may be warranted:

•To provide evidence that NATLUST is lessening the burdens of government in NC and that, for federal tax law purposes, NATLUST is an instrumentality NC, thereby allowing its stakeholders the ability to benefit from low interest rate tax-exempt bond financing (IRS technical requirements)

•To "signal" to NATLUST's credit providers ---without legally binding future legislatures and administrations ---that North Carolina's political leaders believe allowing its tank owners the option of obtaining low-cost liquidity is desirable from a public policy perspective. Such support will be instrumental in obtaining low-cost financing

•To clarify DENR's ability to make direct reimbursements to NATLUST (DENR is researching whether present administrative regulations prohibit or otherwise impede direct reimbursements)

•To make clear that NATLUST can rely on DENR's claim decisions when issued, without prejudicing DENR's right to seek cost recovery from RP. NATLUST must be able to rely on DENR's decisions with 100% confidence. If DENR discovers errors after approving a claim, DENR must recover from the RP and/or their consultant, not NATLUST (However, NATLUST, as an instrumentality of NC, will cooperate with DENR to protect NC's fund)

Contact Information

Primary NATLUST Organizer:

Lindsay Trittipoe
Commonwealth Acceptance, LLC.
VRA Accelerated Payment Program Manager
Richmond, Virginia
(804) 358-6661
LT@comm-accept.com

NATLUST Website: www.natlust.org

Key Individuals & Organizations Who Are Assisting & Advising:
www.natlust.org/links.html

Information about Virginia's Virginia Resources Authority Accelerated Claim Payment Program can be found at www.vpstf.org and www.virginiaresources.org

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: George Givens
Environmental Review Commission Counsel

FROM: William G. Ross, Jr. WGRj

DATE: December 3, 2003

RE: 2003 Annual Report on the Wetlands Restoration Program

Attached is the 2003 Annual Report outlining the activities of the Wetlands Restoration Program during fiscal year 2002–03. This report was prepared for the Environmental Review Commission of the General Assembly as required by the enabling legislation for the Wetlands Restoration Program (G.S. 143-214.13). The report provides an overview of the progress made in implementing the Wetlands Restoration Program, current projects and initiatives, statewide wetland and stream impacts and compensatory mitigation requirements associated with Section 404 permits, and the use of the funds deposited into the Wetlands Restoration Fund.

If you have any questions concerning this report or the activities of the Wetlands Restoration Program, please contact Ron Ferrell at 919-733-5219.

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR

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Status Report May 5, 2004
Wetlands Restoration Program / Ecosystem Enhancement Program
Provided as of March 31, 2004

- I will focus on issue areas raised in past presentations and discussions with the ERC.
  a) more implementation of restoration projects and not just watershed planning
  b) more significant engaging of the private sector in construction
  c) better coordination with DOT
- The WRP continues to be actively used as a process for meeting wetland mitigation requirements by those needing Federal & State Permits in NC. It is an option available to public and private entities, not a requirement. Other choices include owner initiated project, private providers.
  July 2003 – 03/31/04 – 107 permits (3 quarters)
  Since 1998 – 492 permits
  68% -- private sector
  20% --DOT
  12% -- other government agencies
- On a monetary level:
  71% -- DOT
  24% -- private
  5% -- other government
- Total Accepted – Table 1
  - 320,642 Lf Stream channels
  - 360 acres wetlands
  - 284 acres riparian buffers
- Target for 12/31/03 – the mitigation accepted through 12/31/02 – Col. 2
  - WRP – on a statewide level & river basin level
  - Projects underway exceed mitigation target, however, we are expected to provide mitigation in sub-watersheds where the Wetland loss occurred.
- In that context, The Program has achieved 90% of the target.
- Steps are being taken to get most of the remaining 10% by July 2004.

Financial Update

- Acct 2980 is the appropriation account from several years ago, that is being completed.
- 2981 – this is the compensatory, in lieu payment funds. Expenditures reflect the increased level of implementation through contracts.
- We have a number of private – full delivery contracts that are likely to be awarded by June or July of the year.
- 2982 – Riparian Buffer Fund
- A number of private full delivery contracts are likely to be awarded in June.

To the issued of moving beyond planning into implementation, look at the bar charts on Pages 3 through 5.

- Overall expenditures major step up in 2002 & then in 2003
- Major increase in 02 for design to get sites ready. In 03 – increase in construction.

- In 2000 – 5 projects in construction
- 2001 – 6 projects
- 2002 – 15 projects
- 2003 – 41 projects in construction

To the issue of engaging private sector over and about the standard design, bid, construction contract process;

- To full delivery by Private entities,
- This has been a high priority for the program

➢ Since summer of 02, proposal processes have been used to secure riparian buffers, wetland restoration, and stream channel restoration.

- $7,660,347 in full delivery contracts awarded, following a competitive process.
- We are in the middle of a major full delivery proposal process that has an overall estimated value of $68 million.
- Proposals are being reviewed and we expect awards in June – July 04. This includes mitigation for WRP and DOT.

Working with DOT

➢ During the past year, we have executed the organizational changes that have been described in the Ecosystem Enhancement Program outlined in 2003.

- 2 major agreements signed
  a) Tri-Party – DENR/DOT/Corp of Engineers
  b) Bi-Party – DENR/DOT

➢ The mitigation programs of DENR, WRP and DOT have been merged into the EEP.

➢ We will continue to manage the WRP Program as a separate accountability element within EEP. We will expect to achieve improvements in securing mitigation by looking at the combined needs of the programs.

➢ The $68 million full delivery is an example. Our experience is showing that as projects increase in size or area, the cost per acre decreases.

Challenges for 2004

- Balancing out workload on a multi-year schedule to allow private sector to better understand our timing for proposal / bid requests.
- Achieving 100% mitigation delivery for WRP – compensatory program
- Addressing those sub-watersheds where needs are great and options few – urban areas / Upper Cape Fear example.
- Improved decision making process and turn around time on RFPs.
- Continue to increase restoration construction level.

2003-2004

ENVIRONMENTAL REVIEW COMMISSION

MINUTES

STATUS REPORT
N.C. WETLANDS RESTORATION PROGRAM

To Environmental Review Commission
May 5, 2004

By Dempsey Benton
Chief Deputy Secretary, NCDENR

Table 1. Summary of Mitigation Requirements and Projects Implemented

Type	Total Mitigation	Total Mitigation	NCWRP Mitigation Projects			
	Accepted 12/31/03[1]	Due 12/31/03[2]	Constructed	Instituted[4]	2003 RFP[5]	Total
Streams (linear feet)	320,642	233,472	98,864	150,930	63,000	312,794
Total Wetlands (acres)	359	283	85	230	145	672
Riparian Wetlands (acres)	274	212	109	240	135	484
Non-riparian Wetlands (acres)	85	70	30	95	10	135
Buffer (acres)	284	169	161		150	311

[1]Total mitigation amount specified in 404/401.

[2]In accordance with 1998 MOU, all mitigation requirements assumed by 11/8/2001, were due by 11/8/2002. All mitigation requirements now due within 12 months of receipt of payment.

[3]This number reflects the amount of restoration projects implemented to meet compensatory mitigation requirements. The NCWRP has implemented additional projects to address the cumulative and historical loss of wetland and riparian area functions.

[4]Instituted, as defined in 1998 MOU, means that a site has been acquired and has designer assigned; will be constructed within 2 years.

[5]Represents the portion of the EEP Request for Proposals for Full Delivery Projects issued in December 2003 to meet WRP mitigation requirements

Table 2.
NC DENR Wetlands Trust Fund – Wetlands Restoration
Account activity from 6/30/02 through 3/31/04

Account 2980		
Balance as of 6/30/03		$1,978,457
Revenue as of 3/31/04		
Receipts	0	
Interest	$47,088	
Expenditures		($133,553)
Balance as of 3/31/04		$1,891,992
Current contractual encumbrances		($1,820,919)
Balance of unencumbered funds		$71,073
Account 2981		
Balance as of 6/30/03		*$40,452,387*
Revenue as of 3/31/04		
Receipts	$17,845,280	
Interest	$1,147,798	
Expenditures		($10,539,268)
Balance as of 3/31/04		*$48,906,197*
Current contractual encumbrances		($15,438,845)
Balance of unencumbered funds		*$33,467,352*
Account 2982		
Balance as of 6/30/03		*$5,513,590*
Revenue as of 3/31/04		
Receipts	$5,073,241	
Interest	$179,569	
Expenditures		($164,604)
Balance as of 3/31/04		*$10,601,7965*
Current contractual encumbrances		($838,695)
Balance of unencumbered funds		*$9,763,101*

Table 3
Annual expenditures and encumbered ($)
Wetlands Trust Fund accounts 2980 & 2981

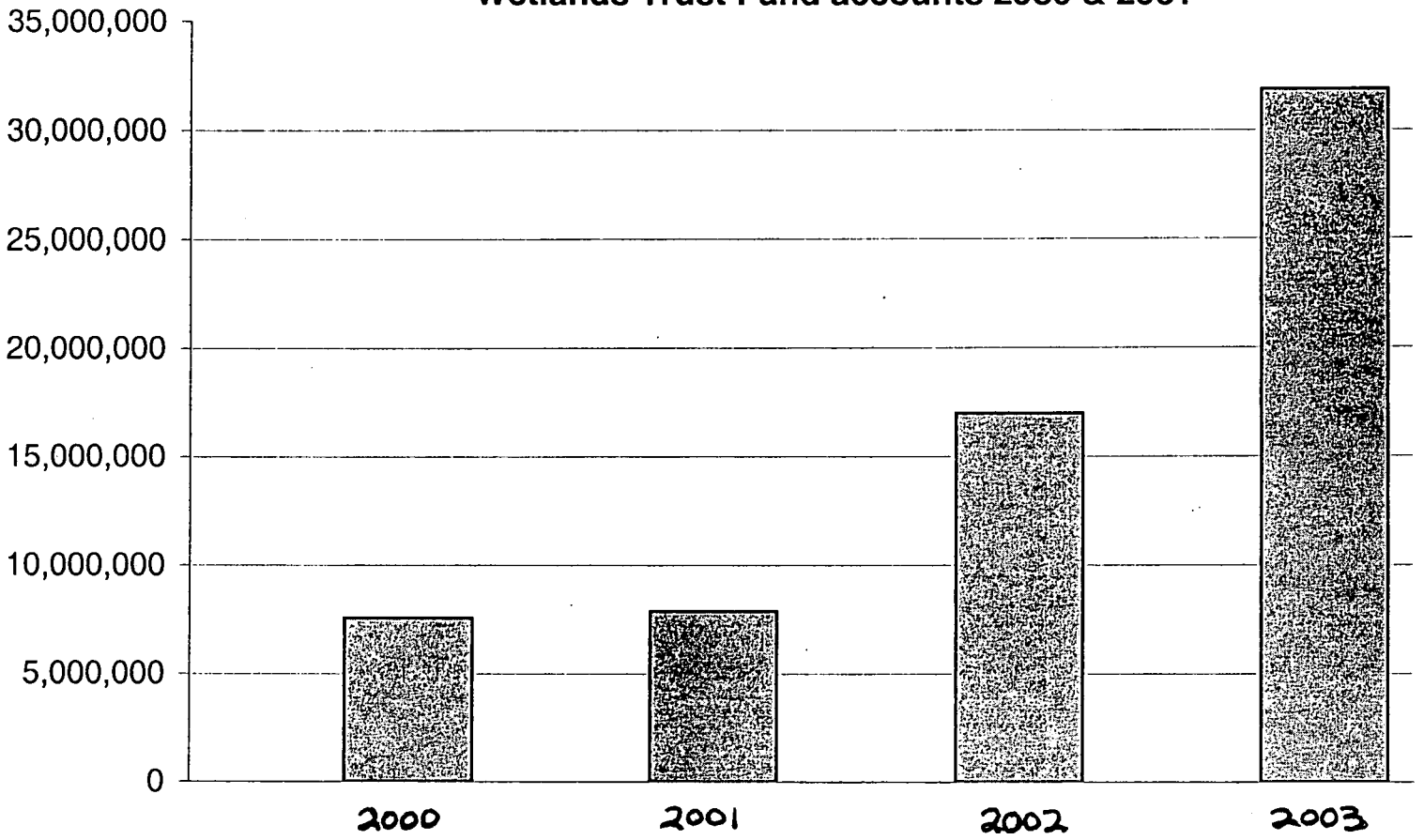


Table 4
Amount ($) encumbered in design/construction management contracts

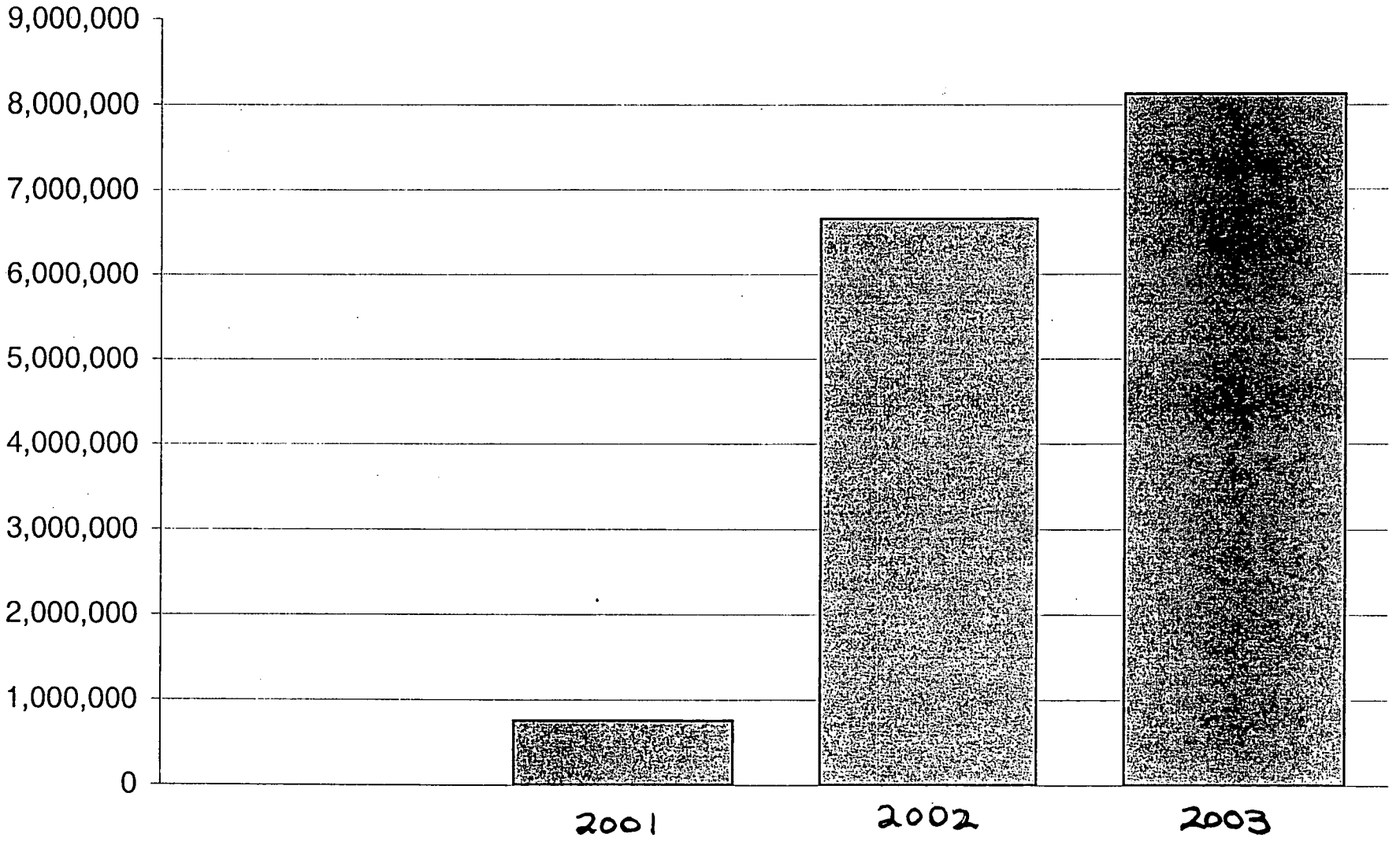


Table 5
Amount ($) encumbered in constuction contracts

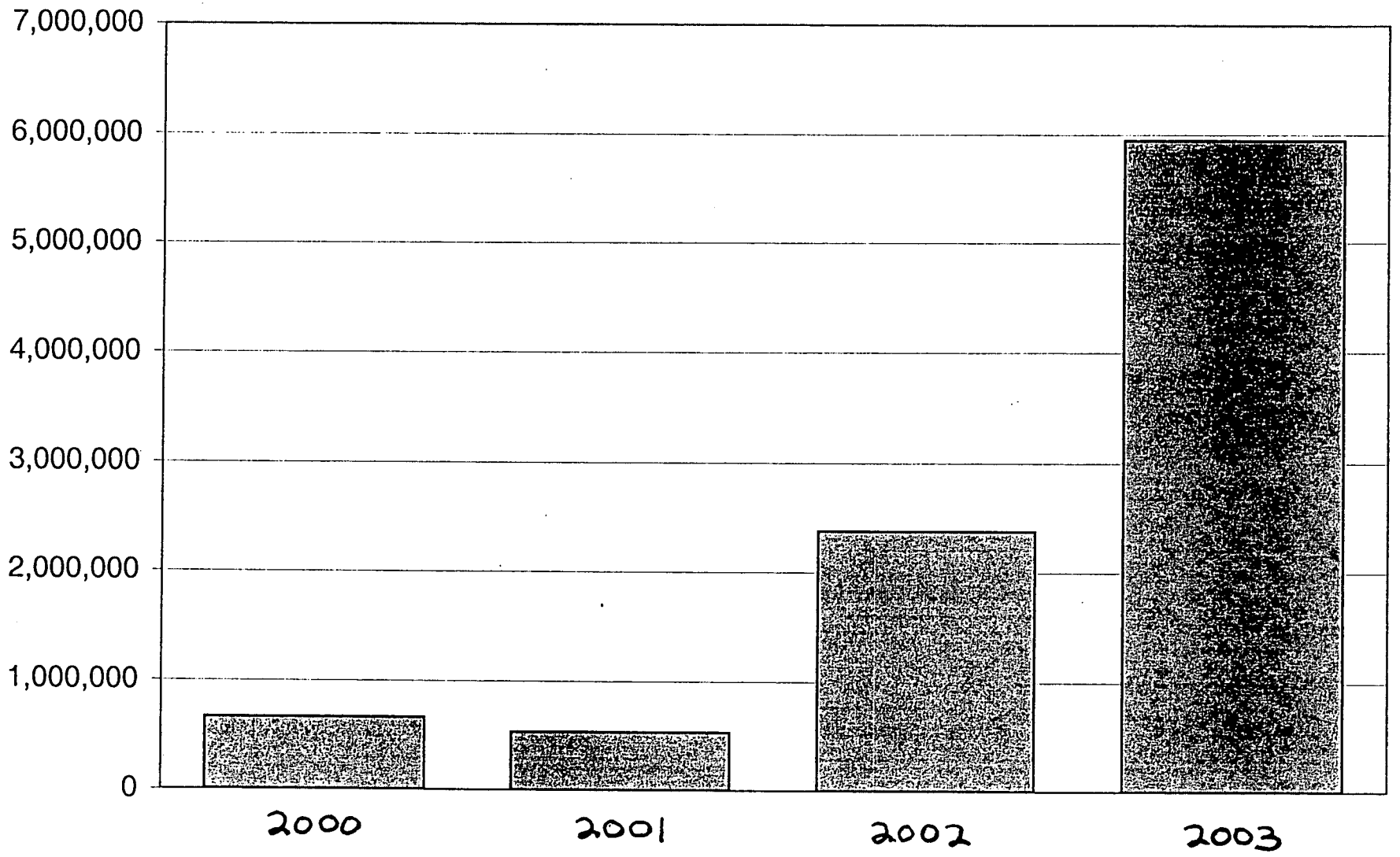


Table 6 Request for Proposal Summary

RFP #	Location	Restoration Requested	# Firms Responding	Total offered	# Sites	Contract Award
16-EW02048	Neuse	Buffer 150 acres	6	400.35 acres	16	151 acres $3,285,547
16-AW03001	Cape Fear 03030002	Riparian wl- 45 acres	1	12 acres	1	12 acres $1,260,000
16-AW03002	Cape Fear 03030004	Riparian wl- 25 acres	2	35 acres	2	No contract awarded*
16-AW03003	Catawba 03050101	Streams- 10,000 linear feet	3	23,900 linear feet	3	10,000 linear feet $1,895,400
16-AW03004	Catawba 03050103	Riparian wl- 20 acres Streams 9,000linear feet	1	2,950 linear feet	1	2,950 linear feet $625,400
16-AW03005	Tar Pamlico 03020101	Non-riparian wl- 30 acres	4	210 acres	7	30 acres $594,000
16-AW03010	Pasquotank 03010205	Riparian- 180 acres Non-riparian 275 acres	Proposals due 2/28/03			
					Total	$7,660,347 Buffer-151 acres Wetlands-42 acres Streams-12,950 linear feet

*No acceptable proposals were received

List of Firms submitting bids:

Environmental Banc & Exchange, LLC
Greene Environmental
KCI Associates of NC, PA
Land Management, Inc
The Louis Berger Group, Inc
Restoration Systems, LLC
Rummel, Klepper, and Kahl
Spaulding and Norris, PA

Table 7

Basin-Cataloging Unit	Pending Contract Amount
Neuse-03020201	$ 11,050,000.00
Cape Fear-03030002	$ 1,485,000.00
Cape Fear-03030004	$ 4,880,000.00
Catawba-03050101	$ 9,440,000.00
Catawba-03050103	No Submittals
Broad-03050105	$ 1,000,000.00
Yadkin-03040201	$ 4,370,000.00
Chowan-03010203/04	No Submittals
Cape Fear-03030003	$ 5,000,000.00
Tar-Pamlico-03020104/05	$ -
White Oak-03030001	No Submittals
Cape Fear-03030007	$ 3,250,000.00
Pasquotank-03010205	$ 12,300,000.00
Neuse-Buffers	$ 3,305,000.00
Cape Fear-03030005	$ 12,000,000.00
Total	**$ 68,080,000.00**

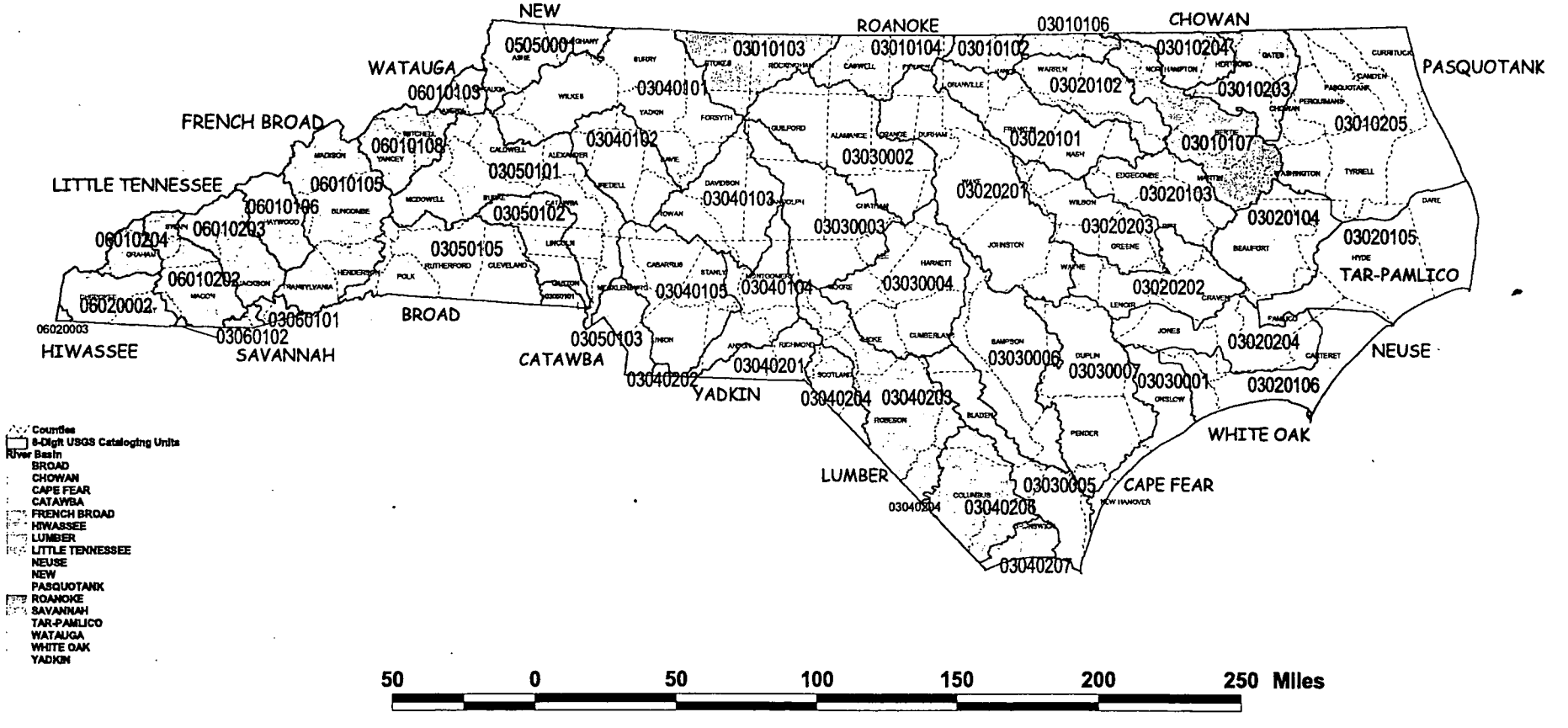
BASIN/UNIT #	NEED	SITE NAME	COUNTY	PROVIDER	WMU R	WMU NR	SMU
Neuse-03020201	25R, 25NR; 37000ST	Cox	Johnston	EBX	25.0	16.9	6900
		Dismal Bay	Johnston	Restoration Systems	0.0	25.0	0
		Polecat Swamp	Johnston	Restoration Systems	17.0	0.0	0
		Lowell Mill (Dam)	Johnston	Restoration Systems	0.0	0.0	34990
		Forrest Creek	Orange	Earthmark	0.0	0.0	8160
		Moccasin	Johnston	Earthmark	0.0	19.2	0
		Rains Mill	Johnston	Earthmark	25.0	7.0	5300
		Watson	Orange/Durham	Louis Berger	0.0	14.9	0
	TOTALS				**67.0**	**83.0**	**55350**
Cape Fear-03030002	50R	Foster	Alamance	Louis Berger	6.0	0.0	0
		Waynick	Rockingham	Restoration Systems	4.2	0.0	0
		Haw R. Swamp Canal	Guilford/Rockingham	Restoration Systems	19.5	0.0	0
	TOTALS				**29.7**	**0.0**	**0**
Cape Fear-03030004	45R, 15NR; 37000ST	Denton	Harnett	Earthmark	0.0	0.0	3900
		Beaverdam Swamp	Harnett	EBX	0.0	0.0	10100
		Hillcrest Bay	Hoke	Earthmark	0.0	27.0	0
		Lick Creek	Lee	Restoration Systems	0.0	0.0	9500
	TOTALS				**0.0**	**27.0**	**23500**
Catawba-03050101	45R; 41000ST	North Fork	McDowell	Louis Berger	0.0	0.0	3800
		Bailey Fork	Burke	Wetlands Resource Ctr	0.0	0.0	5256
		South Muddy Creek	Burke	Wetlands Resource Ctr	0.0	0.0	14030
		Buffalo Shoals	Iredell	American Wetlands	0.0	0.0	6505
		South Fork Hoppers Ck	McDowell	EBX	5.6	0.0	7200
		North Muddy Creek	McDowell	EBX	0.0	0.0	2580
		Bailey Fork	Burke	EBX	13.9	0.0	9220
		Silver Creek	Burke	EBX	0.0	0.0	6779
		Reeds Creek	Iredell	Earthmark	5.3	0.0	1914
	TOTALS				**24.8**	**0.0**	**57284**

BASIN-CAT #	NEED	SITE NAME	COUNTY	PROVIDER	WMU R	WMU NR	SMU
Catawba-03050103	30R	NONE					
	TOTALS				0.0	0.0	0
Broad-03050105	10R; 5000ST	Cane Creek	Rutherford	Restoration Systems	0.0	0.0	5305
		Cleghorn Creek	Rutherford	EBX	0.0	0.0	5000
	TOTALS				0.0	0.0	10305
Yadkin-03040201	100R, 50NR; 8000ST	Jones Creek	Anson	EBX	26.0	0.0	4032
		Waterfall Farm	Richmond	EBX	6.0	0.0	1750
		City Pond (Phase II)	Anson	EBX	0.0	0.0	4757
		McDonalds Pond	Richmond	International Paper	23.4	0.0	4363
		Morgan	Anson	Louis Berger	0.0	0.0	3875
	TOTALS				55.4	0.0	18777
Chowan-03010203/04	20R, 20NR; 3000ST	NONE					
	TOTALS				0.0	0.0	0

BASIN-CAT #	NEED	SITE NAME	COUNTY	PROVIDER	WMU R	WMU NR	SMU
Cape Fear-03030003	**25000ST**	Little Pocket	Lee	EBX	0.0	0.0	25000
		Carbonton (Dam)	Moore	Restoration Systems	0.0	0.0	25000
		Sandy Creek	Randolph	Earthmark	0.0	0.0	4000
		Sugg	Randolph	KCI	0.0	0.0	6245
		Moffitt	Randolph	KCI	0.0	0.0	4085
		Bear Creek Tribs	Chatham	Earthmark	0.0	0.0	6490
		Allen	Randolph	KCI	0.0	0.0	2491
	TOTALS				**0.0**	**0.0**	**73311**
Tar-Pam-03020104/05	**25R; 3000ST**	Juniper Bay	Hyde	Louis Berger	31.0	0.0	0
	TOTALS				**31.0**	**0.0**	**0**
White Oak-03030001	**3000ST**	NONE					
	TOTALS				**0.0**	**0.0**	**0**
Cape Fear-03030007	**25R; 10000ST**	Freeman	Pender	Louis Berger	31.0	0.0	0
		Pittman	Pender	Louis Berger	21.0	0.0	0
		Haw Branch	Onslow	EBX	25.0	0.0	10000
	TOTALS				**77.0**	**0.0**	**10000**

BASIN-CAT #	NEED	SITE NAME	COUNTY	PROVIDER	WMU R	WMU NR	SMU	BMU
Pasquotank-03010205	**180R, 275NR**	Hidden Lake	Tyrrell	Hidden Lake LLC	0.0	88.5	0	
		Second Creek	Tyrrell	EBX	60.0	140.0	0	
		Little Alligator River	Tyrrell	Restoration Systems	100.0	140.0	0	
		Dismal Swamp	Tyrrell	Great Dismal Swamp	180.0	275.0	0	
		Phelps Parcel	Washington	Wetlands Resource Ctr	0.0	275.0	0	
		Forbes Parcel	Washington	Wetlands Resource Ctr	110.0	0.0	0	
	TOTALS				**450.0**	**918.5**	**0**	
Neuse-Buffers								
03020201	**50BMU**	Rains Mill	Johnston	Earthmark	0.0	0.0	0	4.0
03020202	**25BMU**	Bircher Farm	Craven	EBX	0.0	0.0	0	25.0
		Walnut Creek	Wayne	Restoration Systems	0.0	0.0	0	25.0
03020203	**50BMU**	Moye Farm	Greene	Greene Environmental	0.0	0.0	0	37.1
03020204	**25BMU**	NONE			0.0	0.0	0	0.0
	TOTALS				**0.0**	**0.0**	**0**	**91.1**
Cape Fear-03030005	**1000NR**	Sessoms Bay	Bladen	EBX	0.0	1000.0	0	
		Ready Branch	Brunswick	International Paper	0.0	1000.0	0	
		Barra Farms II	Cumberland	ECOBANK	0.0	1094.0	0	
	TOTALS				**0.0**	**3094.0**	**0**	

USGS 8-Digit Cataloging Units
North Carolina



Wetlands Restoration Program

2003 Annual Report

N.C. Wetlands Restoration Program
NCDENR

NCDENR

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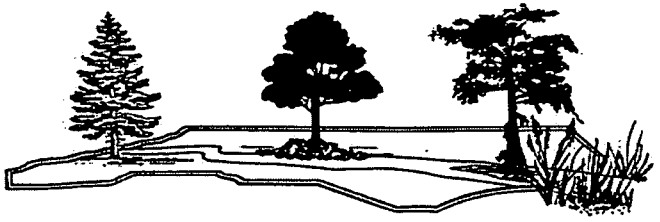

N.C. Wetlands Restoration Program
NCDENR

2003 Annual Report

State of North Carolina
Michael F. Easley, Governor

Department of Environment and Natural Resources
William G. Ross Jr., Secretary

Wetlands Restoration Program
Ronald E. Ferrell, Program Manager

This report is for program activities from July 1, 2002 to June 30, 2003

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Program Overview

During fiscal year 2002-2003, the N.C. Wetlands Restoration Program (NCWRP) made significant progress in both planning and implementation. Highlights in the planning area include the integration of key NCWRP information regarding Targeted Local Watersheds into the N.C. Department of Environment and Natural Resources (DENR), Division of Water Quality's Basinwide Water Quality Management Plans. This increases programmatic visibility and also fosters efficiency among DENR divisions with overlapping tasks (e.g., public outreach, reporting).

Summaries of information in the basinwide plans are available on the NCWRP website. Watershed Restoration Plans for five river basins were completed this fiscal year.

Also, with regard to planning, the NCWRP continues to embark upon Local Watershed Planning to identify high quality compensatory mitigation projects in a watershed context to offset unavoidable impacts associated with transportation improvement projects and other development-related activities. Information on Local Watershed Planning is on the NCWRP website.

During this past fiscal year, efforts have resulted in a total of 37 stream and wetland restoration projects that are either completed or in construction, totaling 127,632 linear feet of streams and 466.9 acres of wetlands. An additional 35 projects are in the design phase and upon completion will result in the restoration of 91,480 linear feet of streams and 478.5 acres of wetlands. In addition, policies have been developed and implemented for improved riparian plantings as well as vegetation monitoring techniques.

Finally, the program is currently undergoing significant changes as it combines forces with the mitigation program of the N.C. Department of Transportation (NCDOT) to develop the Ecosystem Enhancement Program. This exciting new program is receiving national recognition in areas of organizational innovation and collaboration. Programmatic development is proceeding quickly and details on its progress will be available soon.

NCWRP Website -- http://h2o.enr.state.nc.us/wrp
Basinwide Water Quality Plans -- http://h2o.enr.state.nc.us/basinwide/
Local Watershed Plans -- http://h2o.enr.state.nc.us/wrp/plans/localplan.htm

The North Carolina Wetlands Restoration Program is an innovative, nonregulatory program established by the North Carolina General Assembly in 1996 to restore wetlands, streams and streamside (riparian) areas throughout the state.

This document has been approved by:

Ronald E. Ferrell, Program Manager
NC Wetlands Restoration Program

Date: November 24, 2003

This document has been prepared to fulfill the annual reporting requirements of the N.C. Wetlands Restoration Program as described in NCGS 143-214.13.

Section 1 — Accomplishments

The last fiscal year (FY) brought significant activity for the NCWRP. Planning activities, particularly related to Local Watershed Planning, have been accelerated, and the program has more projects underway than ever before. In addition, a new program that will combine the mitigation resources of the NCWRP and the NCDOT is being developed. These movements highlight the success of the program's basic premise, which is to improve the ecological effectiveness of compensatory mitigation projects {NCGS 143-214.9 (4)}.

Planning Initiatives

Watershed Restoration Plans

The 1996 legislation creating the NCWRP requires development of "basinwide plans for wetlands and riparian area restoration" for each of the state's 17 river basins in accordance with the basinwide schedule established by the N.C. Department of Environment and Natural Resources, Division of Water Quality (DWQ). The primary goals of the plans include water quality protection, flood prevention, restoration/protection of fisheries and wildlife habitat and enhanced recreational opportunities. The centerpiece of each plan is the identification of high-priority Targeted Local Watersheds (TLWs) within which there are documented needs and opportunities for stream, wetlands and riparian buffer restoration and preservation.

The NCWRP website contains an in-depth description of the methodology used to target these high-priority local watersheds. It is contained within the *Guide to the NCWRP's Watershed Restoration Planning Strategy (version 1),* which is online at http://h2o.enr.state.nc.us/wrp/pdf/restplans/Planning%20Guide.pdf.

The Planning Branch of NCWRP has been preparing and updating these plans since 1997, working closely with DWQ's Basinwide Planning staff in the context of its 5-year planning cycle (a staggered timeline for producing Basinwide Water Quality Management Plans for the 17 river basins in North Carolina). Originally called *Basinwide Wetlands and Riparian Restoration Plans*, these plan updates are now titled *Watershed Restoration Plans*, reflecting NCWRP's evolution towards a comprehensive watershed-scale approach to

Watershed Restoration Plans — FY 2003 Activities

During FY 2003, from July 2002 through June 2003, *Watershed Restoration Plans* for the following basins were produced by the NCWRP (in chronological order): Chowan; Pasquotank; Neuse; Broad; and Yadkin-Pee Dee. The development of these plans included a standard sequence of steps conducted by NCWRP in soliciting input from interested citizens, environmental groups, other DENR state agencies, and resource professionals living and working in the river basins. This sequence begins with NCWRP Planners making presentations at DWQ basinwide water quality planning workshops at strategically located venues in the basins, and includes the active solicitation of review comments by local resource agency professionals on draft Targeted Local Watersheds.

In addition to the completion of the five Watershed Restoration Plans noted above, NCWRP planners participated in DWQ's initial planning workshops for the Lumber and Tar-Pamlico basins (in the winter of 2002 and spring of 2003, respectively), marking the beginning of the plan preparation/update cycle for these two basins.

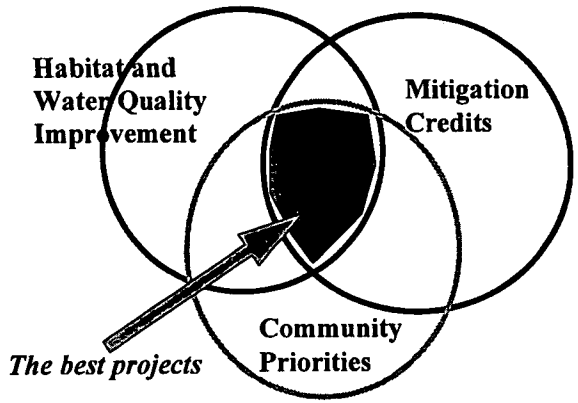
improve the ecological effectiveness of compensatory mitigation efforts.

Beginning with preparation of the Neuse River basin plan update (final DWQ Water Quality Plan completed July 2002), the NCWRP began integrating the Watershed Restoration Plan materials and information (e.g., maps and tables summarizing Targeted Local Watersheds, rationale for selection of specific TLWs, summary of NCWRP restoration projects) directly into the DWQ basinwide water quality plans, which are online: http://h2o.enr.state.nc.us/basinwide. Summaries of the Watershed Restoration Plan for each river basin are also available online at http://h2o.enr.state.nc.us/wrp/publications/pubs2.htm.

Local Watershed Plans

The NCWRP continues the development and implementation of Local Watershed Plans (LWP) throughout North Carolina. The primary purpose of the Local Watershed Plans is to identify the causes of watershed degradation and to develop strategies addressing these problems that are consistent with the objectives of local communities. This process ensures that compensatory mitigation projects are designed and located to replace those functions within each watershed that provide the maximum benefits in restoring and protecting our natural resources while addressing local priorities.

Figure 1-1 NCWRP Identification of High Quality Projects



The NCWRP uses watershed planning to identify projects that will generate the most environmental benefit while meeting community needs and satisfying compensatory mitigation requirements.

Projects that achieve these goals while addressing compensatory mitigation requirements realize multiple complementary objectives and are the kind of projects the NCWRP strives to implement through watershed planning (Figure 1-1). The 2000 Annual Report for NCWRP contains a detailed explanation of the Local Watershed Planning process.

During FY 02-03, work continued on three LWPs initiated in previous reporting periods, while eight additional efforts were begun. During this calendar year, several of the first plans developed by the NCWRP will be completed. A number of these are already yielding restoration projects that further community priorities and address demonstrated watershed needs.

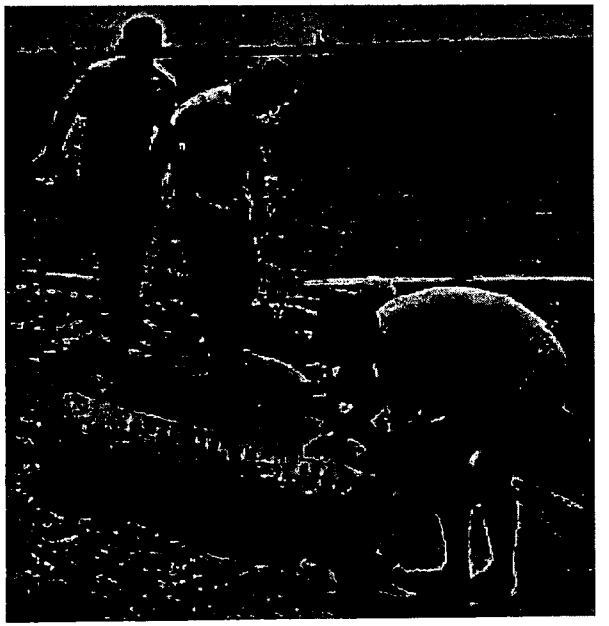
The first two plans completed by the program (New Hanover County in the Cape Fear River basin and Mud Creek in the French Broad River basin) are now available online (http://h2o.enr.state.nc.us/wrp/plans/localplan.htm). These plans demonstrate the ability of watershed planning to attract additional resources for project implementation beyond mitigation. New Hanover County received a $150,000 U.S. Environmental Protection Agency (EPA) Cooperative Agreement grant to implement best management practices (BMPs) to address priorities identified in the plan. In addition, North Carolina State University

secured an EPA 319 grant for $700,000 to implement additional BMPs consistent with the New Hanover County Local Watershed Plan. In Mud Creek, a watershed coordinator located in Henderson County has been funded for two years with EPA (104b3) grant dollars to pursue the implementation of the agreed-upon restoration plan. The concentration of a variety of complementary projects in small watersheds is one of the goals of NCWRP's Local Watershed Planning Initiative, and these types of additional funds and activities are a very positive step toward realizing that goal.

The number of projects implemented by the NCWRP that are a direct result of Local Watershed Planning activities is increasing dramatically. In nine LWP watersheds, there are over 20 projects underway that were identified based on documented watershed needs. These projects include stream restoration, wetland restoration, BMPs and preservation. The majority of these efforts are in cooperation with local entities such as local governments, land trusts and resource agencies. As planning projects continue to mature, this trend will continue to accelerate.

A summary of the location and status of each LWP is provided in Appendix B, Table B-2. Additional information is also available through the NCWRP website, http://h2o.enr.state.nc.us/wrp/index.htm.

Bogaboo Creek



Planting Marsh Grass, Hammocks Beach

Implementation Efforts

At the end of FY 02-03, 72 projects were at or beyond the initial design phase (Table 1-1). The phases of project implementation are described in the text box on page 7. Twenty-six projects were complete, resulting in the restoration, enhancement or preservation of 462.9 acres of wetlands, 66,832 linear feet of streams and 156.5 acres of riparian buffer. Another 11 projects were in construction by the end of FY 02-03 which will provide an additional restoration, enhancement or preservation of four acres of wetlands, 60,800 linear feet of stream and 91.7 acres of riparian buffer. The 37 projects will provide restoration, enhancement or preservation of 466.9 acres of wetlands, 127,632 linear feet of stream and 248.2 acres of riparian buffer. Collectively, these 72 projects will result in the restoration, enhancement or preservation of 945.4 acres of wetlands, 219,112 linear feet of stream and 354 acres of riparian buffer (Table 1-1).

These projects are located throughout North Carolina in 11 different river basins and 34 counties. Seventy-three percent of these projects are located with Targeted Local Watersheds that have been identified by the NCWRP planning process as watersheds in need of restoration activities.

The NCWRP continues to work with landowners, federal, state and local government agencies,

continued page 13

Phases of Implementation

1. Site Identification
The 'on-the-ground' assessment by NCWRP personnel and private consultants of potential project sites identified through the basinwide and local watershed planning processes.

2. Site Acquisition
The process by which landowners participate in the process by agreeing to the protection of viable project sites through donation or purchase of conservation easements, or through fee simple purchase.

3. Site Assessment
The preliminary step of project design that involves measurement and documentation of existing conditions and functions of viable project sites and the surrounding watershed. Project goals, targeted functions and a conceptual design are established at this stage.

4. Project Design
The production of a final design that provides specifications and drawings to be used for necessary permits, and to guide the construction of the restoration project.

5. Site Restoration
The construction phase of a project in which the physical structure of a site is modified to change the hydrological, geomorphology and biological components of a restoration site.

6. Post-Monitoring
The collection, evaluation and reporting of data following construction to determine if restored sites are meeting project goals. Post-monitoring can extend to five years after restoration activities and will involve the remediation of sites that are not meeting success criteria.

7. Long-Term Maintenance and Management
The periodic inspection of sites after the post-monitoring phase to ensure the protection of sites against unauthorized activities and to identify and implement maintenance.

Table 1-1 Restoration Sites by River Basin Implementation

Project Name	Project ID	Map Location Number	River Basin	Cataloging Unit	County	Wetland (ac.)			Stream (linear feet)	Buffer (acres)	Project Status*
						R/C	Enh	Pres			
Price Park	CF-002-GU-S-PP	15	Cape Fear	3030002	Guilford				1,710	2.8	6
Gillespie Golf Course	CF-002-GU-S-GGC	18	Cape Fear	3030002	Guilford				3,000	3.4	6
Suck Creek	CF-003-MO-S-SC	25	Cape Fear	3030003	Moore				2,700	1.5	6
Sandy Creek	CF-002-DU-SW-SC	27	Cape Fear	3030002	Durham	3			3,000		6
Haw River	CF-002-RK-P-HR	54	Cape Fear	3030002	Rockingham			80			6
Wells Creek	CF-002-AL-S-WC	20	Cape Fear	3030002	Alamance				5,000	5.7	5
Hillsdale Park	CF-002-GU-S-HP	17	Cape Fear	3030002	Guilford				5,000	5.7	5
Tributary to South Fork	CF-002-AL-S-HNP	24	Cape Fear	3030002	Alamance				5,000	5.2	5
Reedy Branch	CF-002-AL-S-RB	22	Cape Fear	3030002	Alamance				2,500	5.7	5
Brown Bark Park	CF-002-GU-S-BBP	16	Cape Fear	3030002	Guilford				2,630	3.0	4
Benbow Park	CF-002-GU-S-BP	19	Cape Fear	3030002	Guilford				1,200	1.4	4
Little Beaver Creek	CF-002-WK-SW-LBC	36	Cape Fear	3030002	Wake	5			5,000		4
Jumping Run Creek	CF-004-HN-SW-JRC	37	Cape Fear	3030004	Harnett	75			5,500		4
Cross Creek	CF-004-CB-S-CC	38	Cape Fear	3030004	Cumberland				2,400	5.0	4
Forest Hills	CF-002-DU-S-FH	28	Cape Fear	3030002	Durham				3,000	5.5	4
Pine Valley	CF-001-NH-S-PV	50	Cape Fear	3030001	New Hanover				2,500	2.9	4
Mary's Creek	CF-002-AL-S-DX	23	Cape Fear	3030002	Alamance				2,500	2.9	4
Cane Creek	CF-002-AL-S-MP	21	Cape Fear	3030002	Alamance				1,500	1.7	4
Little River	CF-004-MO-W-LR	68	Cape Fear	3030004	Moore	75		33			4
		Cape Fear Total				**158**	**0**	**113**	**54,140**	**52**	

Project Type: R/C -- Restoration/Creation; E -- Enhancement; P -- Preservation

* Project status: 1. Restoration site assessment; 2. Site acquisition phase; 3. Initial design; 4. Design phase; 5.Construction phase; 6. Post-construction monitoring

Table 1-1 Continued next page

Continued from previous page: Table 1-1 Restoration Sites by River Basin Implementation

Project Name	Project ID	Map Location Number	River Basin	Cataloging Unit	County	Wetland (ac.)			Stream (linear feet)	Buffer (acres)	Project Status*
						R/C	Enh	Pres			
Payne Dairy	CT-101-AX-S-PD	4	Catawba	3050101	Alexander		3		7,000	12.9	6
Lyle Creek	CT-101-CT-S-WP	5	Catawba	3050101	Catawba				2,300	12.6	6
Brown Branch	CT-101-CL-S-BB	51	Catawba	3050101	Caldwell				7,000	8.0	6
Little Sugar Creek at Freedom Park	CT-103-MK-S-FP	14	Catawba	3050103	Mecklenburg				4,400	6.0	5
Irwin Creek	CT-103-MK-S-WR	56	Catawba	3050103	Mecklenburg				5,000	6.9	4
Stewart Creek	CT-103-MK-S-RS	12	Catawba	3050103	Mecklenburg				6,800	9.4	4
McIntyre Creek	CT-103-MK-S-MC	11	Catawba	3050103	Mecklenburg				5,350	7.4	4
Eco-Park	CT-101-MK-S-EP	72	Catawba	3050101	Mecklenburg	2	8		2,000	4.5	3
			Catawba Total			**2**	**11**	**0**	**39,850**	**67.7**	
High Vista	FB-105-BN-S-HV	1	French Broad	6010105	Buncombe				3,500	4.3	6
Clear Creek	FB-105-HD-S-CC	3	French Broad	6010105	Henderson				1,200	6.4	5
Hendersonville	FB-105-HD-W-HW	57	French Broad	6050105	Henderson	15					4
King's Creek	FB-105-TR-S-KC	2	French Broad	6050105	Transylvania				2,300	5.2	3
			French Broad Total			**15**	**0**	**0**	**7,000**	**15.9**	
Middle Swamp Creek	LU-203-RB-W-MSC	58	Lumber	3040203	Robeson	6	5				4
			Lumber Total			**6**	**5**	**0**	**0**	**0.0**	
Hominy Swamp Creek	NU-203-WS-S-HSC	41	Neuse	3020203	Wilson				2,232	5.0	6
Beamon's Run	NU-203-GN-B-BR	43	Neuse	3020203	Greene					19.0	6
Howell Woods	NU-201-JS-W-HW	42	Neuse	3020201	Johnston	20	80			5.0	6
Kentwood Park	NU-201-WK-S-KP	33	Neuse	3020201	Wake				3,000	5.5	6
Chavis Park	NU-201-WK-S-CP	32	Neuse	3020201	Wake				2,500	4.6	6
Smith/Austin Creek	NU-201-WK-SWB-SAC	30	Neuse	3020201	Wake				9,500	32.0	6

Project Type: R/C -- Restoration/Creation; E -- Enhancement; P -- Preservation; * Project status: 1. Restoration site assessment; 2. Site acquisition phase; 3. Initial design; 4. Design phase; 5.Construction phase; 6. Post-construction monitoring

Table 1-1 Continued next page

Continued from previous page: Table 1-1 Restoration Sites by River Basin Implementation

Project Name	Project ID	Map Location Number	River Basin	Cataloging Unit	County	Wetland (ac.)			Stream (linear feet)	Buffer (acres)	Project Status*
						R/C	Enh	Pres			
Richland Creek	NU-201-WK-S-RC	34	Neuse	3020201	Wake				300	0.5	6
Bertie Creek	NU-201-WK-S-BC	31	Neuse	3020201	Wake				1,200	2.2	4
Stillhouse Creek	NU-201-DU-S-SC	59	Neuse	3020201	Durham				1,200	2.8	4
Whitelace Creek	NU-202-LN-SW-WC	44	Neuse	3020202	Lenoir	10	5		3,000	0.0	4
Prestonwood G.C.	NU-201-WK-S-PW	35	Neuse	3020201	Wake				3,000	3.4	4
Wake Forest C.C.	NU-201-WK-S-WF	29	Neuse	3020201	Wake				3,400	3.9	4
Ellerbee Creek	NU-201-DU-S-EC	26	Neuse	3020201	Durham				2,500	2.9	4
		Neuse Total				**30**	**85**	**0**	**31,832**	**86.8**	
Brush Creek	NW-001-AG-S-BC	60	New	5050001	Alleghany				4,000	7.3	6
		New Total				**0**	**0**	**0**	**4,000**	**7.3**	
Knobs Creek	PA-205-PA-P-KC	62	Pasquotank	3010205	Pasquotank			19			6
Charles Creek	PA-105-PA-SW-CC	61	Pasquotank	3010105	Pasquotank	2			1,500	1.7	4
Richard Watts	PA-205-PE-SW-RW	67	Pasquotank	3010205	Perquimans	47			1,500		3
		Pasquotank Total				**49**	**0**	**19**	**3,000**	**1.7**	
Snow Creek	RN-103/104-SK-S-SC	8	Roanoke	03010103/04	Stokes				3,000	3.4	4
		Roanoke Total				**0**	**0**	**0**	**3,000**	**3.4**	
Bear Swamp Creek	TP-101-FR-S-BSC	39	Tar-Pamlico	3020101	Franklin				1,500	3.4	6
Louisburg	TP-101-FR-S-LB	40	Tar-Pamlico	3020101	Franklin				1,700	3.9	4
Billy's Creek	TP-101-FR-S-BC	69	Tar-Pamlico	3020101	Franklin				1,800	4.1	4
East Tarboro Canal	TP-103-ED-SW-ETC	70	Tar-Pamlico	3020103	Edgecombe	16			7,000		3
UT Hendricks Creek	TP-103-ED-SW-HC	71	Tar-Pamlico	3020103	Edgecombe	2			1,500		3
		Tar-Pamlico Total				**18**	**0**	**0**	**13,500**	**11.4**	

Project Type: R/C -- Restoration/Creation; E -- Enhancement; P -- Preservation
* Project status: 1. Restoration site assessment; 2. Site acquisition phase; 3. Initial design; 4. Design phase; 5.Construction phase; 6. Post-construction monitoring

Table 1-1 Continued next page

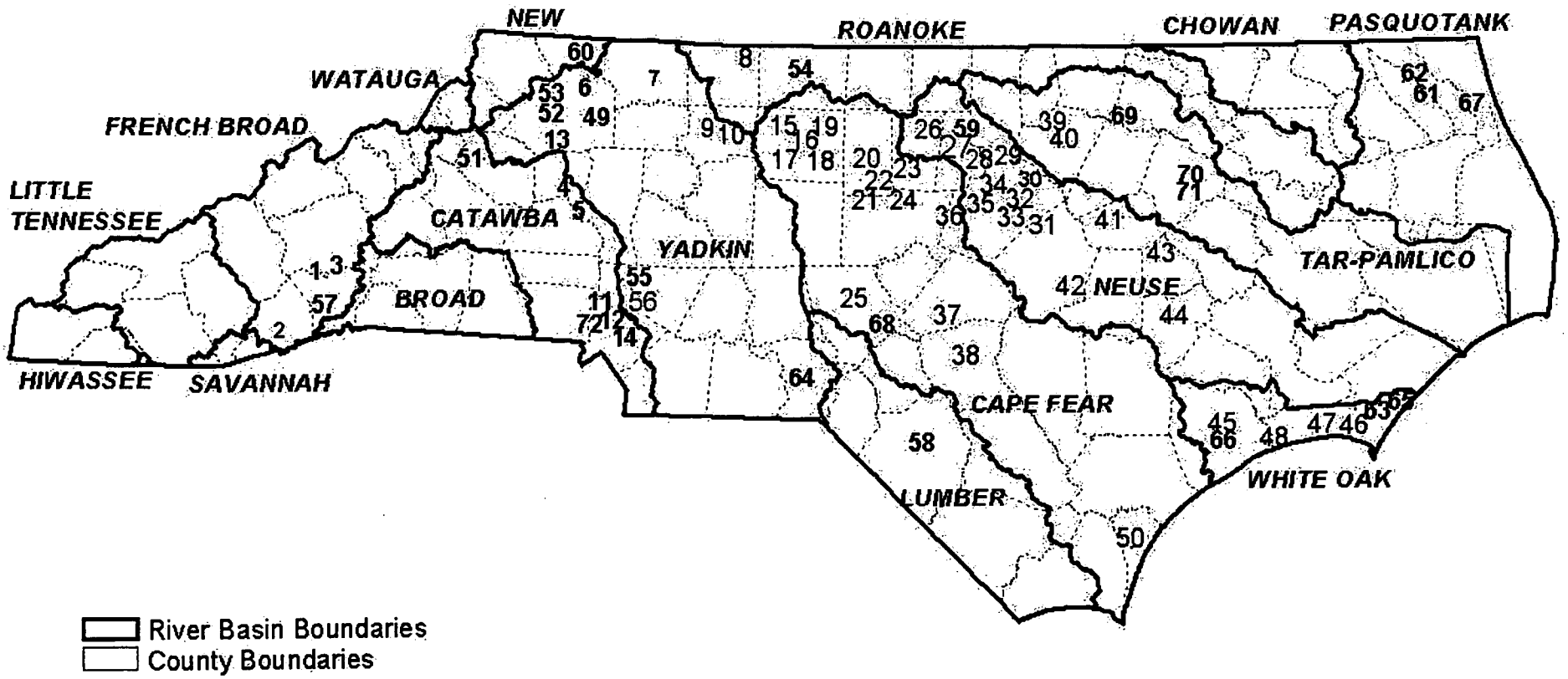
Continued from previous page: Table 1-1 Restoration Sites by River Basin Implementation

Project Name	Project ID	Map Location Number	River Basin	Cataloging Unit	County	Wetland (ac.)			Stream (linear feet)	Buffer (acres)	Project Status*
						R/C	Enh	Pres			
Sturgeon City (Phase I)	WO-001-ON-W-SC1	45	White Oak	3030001	Onslow	3					6
Hammock's State Park	WO-106-ON-W-HSP	48	White Oak	3020106	Onslow	0.3					6
Jumping Run Creek	WO-106-CR-W-JRC	47	White Oak	3020106	Carteret	4.4					6
North River	WO-106-CR-W-NR	63	White Oak	3020106	Carteret	250					6
Maritime Museum	WO-106-CR-W-MM	46	White Oak	3020107	Carteret	0.2					6
Sturgeon City (Phase II)	WO-001-ON-W-SC2	66	White Oak	3030001	Onslow	2.5					4
North River (II)	WO-106-CR-W-NR(II)	65	White Oak	3020106	Carteret	165					4
			White Oak Total			**425.4**	**0**	**0**	**0**	**0.0**	
Stone Mountain	YD-101-WL-S-SM	6	Yadkin	3040101	Wilkes				9,590	19.5	6
Beaver Creek	YD-101-SU-S-BC	7	Yadkin	3040101	Surry				4,000	9.2	6
Bugaboo Creek	YD-101-WL-S-BC	49	Yadkin	3040101	Wilkes				5,500	9.2	5
Cato	YD-105-MK-S-CA	55	Yadkin	3040105	Mecklenburg				2,200	5.0	5
Warrior Creek	YD-101-WL-S-WC	13	Yadkin	3040101	Wilkes				8,500	6.8	5
Purlear Creek	YD-101-WL-SW-PC	52	Yadkin	3040101	Wilkes	2	2		17,000	31.0	5
Silas Creek	YD-101-FS-S-SP	9	Yadkin	3040101	Forsyth				4,500	5.0	5
Brushy Fork	YD-101-FS-S-BF	10	Yadkin	3040101	Forsyth				5,000	6.9	4
Purlear Creek (II)	YD-101-WL-SW-PC(II)	53	Yadkin	3040101	Wilkes				4,500	10.3	4
Hall Branch	YD-101-RD-SW-HB	64	Yadkin	3040201	Richmond	5			2,000	4.5	3
			Yadkin Total			**7**	**2**	**0**	**62,790**	**107.4**	
			Compensatory Mitigation		**Total**	**304.9**	**103**	**132**	**219,112**	**335.0**	
					Total	**710.4**	**103**	**132**	**219,112**	**354.0**	

Project Type: R/C -- Restoration/Creation; E -- Enhancement; P -- Preservation

* Project status: 1. Restoration site assessment; 2. Site acquisition phase; 3. Initial design; 4. Design phase; 5.Construction phase; 6. Post-construction monitoring

Figure 1-3 NCWRP Project Sites



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non-profit conservation groups and others to identify and implement restoration projects. Twenty-six projects are in the land-acquisition phase and will result in the restoration, enhancement and preservation of 268 acres of wetlands, 85,950 linear feet of stream and 186.75 acres of riparian buffer (Table 1-2). Negotiations with landowners and/or property acquisition are underway for these projects with anticipated construction dates late in FY 03-04 or early FY 04-05.

To afford an opportunity for private mitigation providers to provide fully restored sites to the NCWRP, a Request for Proposals to restore 150 acres of riparian buffer in the Neuse River basin was issued in May 2002. Four contracts were awarded for a total of 151 acres of riparian buffer restoration. Requests for Proposals for wetland and stream restoration were issued in June 2002. Four contracts were awarded and will result in the restoration of 42 acres of wetlands, 12,950 linear feet of streams and 29.8 acres of riparian buffer once complete (Table 1-3).

Table 1-2 NCWRP Projects in Acquisition Phase

Project	River Basin	Cataloging Unit	County	Stream (Linear Feet)	Wetland Restoration/ Preservation (Acres)	Riparian Buffer (Acres)
Montgomery Tract	Cape Fear	3030002	Rockingham		250	
Torrence Creek	Catawba	3050101	Mecklenburg	10,000	3	23
Lower Creek	Catawba	3050101	Caldwell	5,000		11
Hackers Branch	Catawba	3050103	Mecklenburg	1,800		3
Davie Park	Catawba	3050103	Mecklenburg	1,500		2
Coulwood Branch	Catawba	3050103	Mecklenburg	2,000		4
Little Sugar/Park Road	Catawba	3050103	Mecklenburg	5,000		9
Little Sugar/Downtown	Catawba	3050103	Mecklenburg	3,500		8
Caldwell Station Creek	Catawba	3050103	Mecklenburg	2,000	12	4
Six Mile Tributary	Catawba	3050103	Union	3,900	3	9
Trent Cove Branch	Hiwassee	6020002	Clay	3,900		9
Palms Apartments	Neuse	3020201	Wake	2,200		5
Cheviot Hills	Neuse	3020201	Wake	3,000		6
Paschal Golf Course	Neuse	3020201	Wake	2,850		6
Northgate Park	Neuse	3020201	Durham	3,000		6
Umstead Park	Neuse	3020201	Wake			2
Ocracoke	Tar-Pamlico	3020105	Hyde			0.75
Mills Creek	Yadkin	3040101	Forsyth	3,000		6
Ararat River	Yadkin	3040101	Surry	2,500		5
Naked Creek	Yadkin	3040101	Wilkes	5,500		12
Big Warrior Creek (II)	Yadkin	3040101	Wilkes	7,000		16
Little Warrior	Yadkin	3040101	Wilkes	6,000		13
Toby Creek	Yadkin	3040105	Mecklenburg	1,400		3
Afton Run	Yadkin	3040105	Cabarrus	1,500		3
Ramah Creek	Yadkin	3040105	Mecklenburg	5,000		11
Dye Branch	Yadkin	3040105	Iredell	4,400		10
Total				85,950	268	186.75

Table 1-3 Request for Proposal Projects

Project Name – Company	River Basin	Cataloging Unit	County	Stream (Linear Feet)	Wetland: Restoration/ Preservation (Acres)	Riparian Buffer (Acres)
Hargett/Tucker Farm -- EBX	Neuse	N/A	Jones			17.5
Moye Farm -- Greene Environmental	Neuse	N/A	Greene			37.1
McCotter Raines Farm II -- Land Management	Neuse	N/A	Jones			24.4
Casey Dairy -- Restoration Systems	Neuse	N/A	Wayne			72
FCWR03 -- KCI	Tar-Pamlico	3020101	Franklin		30	
Haw River -- Restoration Systems	Cape Fear	3030002	Guilford		12	
Four Mile Creek -- Spaulding & Norris	Catawba	3050103	Mecklenburg	2,950		6.8
Zack's Fork Creek -- Spaulding & Norris	Catawba	3050101	Caldwell	3,900		9
Elk Shoals Creek -- Restoration Systems	Catawba	3050101	Catawba	6,100		14
Total				12,950	42	180.8

Ecosystem Enhancement Program

A new program that will combine the mitigation resources of the NCWRP and the NCDOT is being implemented. Although the Ecosystem Enhancement Program (EEP) was formally established in July 2003, significant work on program development occurred during FY 03. While NCWRP will be greatly influenced by this new initiative, the main components of NCWRP, including watershed planning, the in-lieu fee program and high-quality restoration projects, will be maintained.

Within the DENR, the EEP will provide high-quality compensatory mitigation for the NCDOT as well as other development impacts statewide. These needs will be met in advance of impacts, will provide functional replacement of impacts and will be addressed through a watershed approach.

A Memorandum of Agreement (MOA) regarding EEP between the partnering agencies [NCDENR, NCDOT and the U.S. Army Corps of Engineers (COE)] was signed into effect on July 22, 2003. Key provisions of the MOA include:

- Executing the requirements placed on the DENR by the enabling legislation for NCWRP (NCGS 143-214.8, et seq.).

- Enhancing the natural resources of North Carolina by addressing watershed needs.

- Fully satisfying compensatory mitigation requirements for authorized impacts on a programmatic, watershed-level basis.

- Providing in-ground, functioning compensatory mitigation for authorized impacts in advance of the actual impacts.

- Satisfying the compensatory wetland, stream and buffer mitigation needs of the NCDOT transportation program.

- Providing a means for organizing, steering, funding and implementing ecosystem enhancement efforts in the state.

The Ecosystem Enhancement Program

Purpose

The purpose of the Ecosystem Enhancement Program (EEP) is to provide a comprehensive, natural resource enhancement program that identifies ecosystem needs at the local watershed level and preserves, enhances and restores ecological functions within the target watersheds while addressing impacts from anticipated N.C. Department of Transportation transportation projects and other development.

Mission

The EEP mission is to restore, enhance, preserve and protect the functions associated with wetlands, streams and riparian areas including, but not limited to, those necessary for the restoration, maintenance and protection of water quality and riparian habitats throughout North Carolina.

Section 2 — Compensatory Mitigation Requirements

One of the functions of the NCWRP is to provide a compensatory mitigation option to permit applicants throughout North Carolina (NCGS 143-214.9). The option to pay a fee to the NCWRP to satisfy compensatory mitigation requirements of Section 404 permits and 401 Water Quality Certifications has been available since November 1998. The NCWRP also accepts payments for riparian buffer mitigation requirements in the Neuse, Tar-Pamlico, Catawba and Cape Fear river basins and nitrogen offset payments in the Neuse River basin. This section summarizes the accepted payments and the progress made in implementing projects to meet these obligations. [Please refer to Appendix A of this report and the 1999 NCWRP Annual Report for additional information concerning the Memorandum of Agreement between the COE and the NCWRP.]

Section 404/401 Water Quality Certification Mitigation Requirements

The compensatory mitigation requirements for 65 permits allowed by Section 404 or 401 certifications were accepted during FY 02-03. The mitigation requirements of these permits/certifications total 18,968 linear feet of streams and 46.49 acres of wetlands (Table 2.1). Since 1998, the compensatory mitigation requirements of 308 Section 404 permits and 401 Water Quality Certifications have been accepted. The cumulative mitigation requirements accepted by the NCWRP total 238,005 linear feet of streams and 304.47 acres of wetlands in 13 of the state's 17 river basins.

Table 2-1 Compensatory Mitigation Requirements Accepted NCWRP by River Basin

River Basin	Mitigation Requirements Accepted Fiscal Year 2002-2003		Cumulative mitigation requirements accepted since November 1998	
	Stream mitigation (feet)	Wetlands Mitigation (acres)	Stream mitigation (feet)	Wetlands Mitigation (acres)
Broad	0	0	800	0
Cape Fear	2,223	13.85	63,272	123.76
Catawba	1,919	1.14	73,396	21.85
Chowan	0	0	0	0
French Broad	2,808	2.25	9,306	2.39
Hiwassee	0	0	0	0
Little Tennessee	0	0	0	0
Lumber	0	2.66	0	7.10
Neuse	10,706	7.17	40,634	61.15
New	0	0.48	1,780	1.68
Pasquotank	0	0	1,047	9.32
Roanoke	0	0.80	3,676	9.52
Savannah	0	0	0	0
Tar-Pamlico	0	0.62	1,808	34.42
Watauga	0	0	0	0
White Oak	0	15.8	0	20.81
Yadkin	1,212	1.72	42,286	12.47
Totals	18,868	46.49	238,005	304.47

Riparian Buffer Mitigation

The NCWRP accepted 28 riparian buffer mitigation impacts for FY 02-03. These payments require the restoration of 103.22 acres of buffer in the Neuse River basin and 1.45 acres of buffer restoration in the Tar-Pamlico River basin, for a total of 104.67 acres. Since 1999 (effective date of the Riparian Area Buffer Rules for the Neuse River basin), the buffer mitigation requirements of 77 projects have been accepted by the NCWRP. Approximately 90 percent of these payments are for impacts within the Neuse River basin and 10 percent of the payments are for impacts within the Tar-Pamlico River basin. No payments have been received for buffer impacts in the Catawba River basin or the Randleman Water Supply Watershed. Cumulative riparian buffer mitigation requirements in the Neuse and Tar-Pamlico river basins are shown in Table 2-2.

Nitrogen Offset Payments in the Neuse River Basin

As required by *Nutrient Sensitive Waters Management Strategy: Basinwide Stormwater Requirements* (15A NCAC 2B .0235), designated local governments within the Neuse River basin are required to implement a model plan. The plan is to address nitrogen reductions for both existing and new development within their jurisdictions. Developers have the option of partially offsetting their nitrogen loads through payments to the NCWRP (15A NCAC 2B .0240).

A total of 236 nitrogen-offset payments were received during FY 02-03 (Appendix D, Table D-2). These payments require the implementation of projects that will provide 3,700 pounds of nitrogen reduction per year over a 30-year period within the Neuse River basin. Payments accepted during FY 00-01 required the removal of 66.77 pounds of nitrogen per year over a 30-year period. For payments accepted in FY 01-02, the required nitrogen removal per year over a 30-year period is 2,861.04 pounds. Cumulatively, the required nitrogen removal per year is 6,627.81 pounds. The NCWRP is presently working with the local governments affected by the rule to identify proposals for projects that will remove the required pounds of nitrogen. If the proposals are accepted by the NCWRP, the project will be funded from the payments received by the NCWRP. One project has been approved for funding by the NCWRP, and proposals for three projects are being prepared for approval. The goal of the NCWRP is to fund projects that cumulatively will remove 6,627.81 pounds of nitrogen per year in the Neuse River basin over a 30-year period.

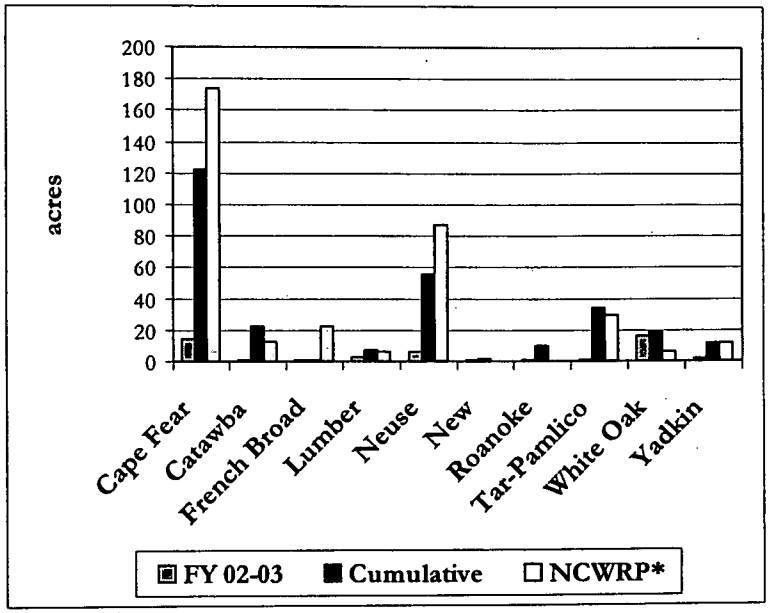
Table 2-2 Riparian Buffer Compensatory Mitigation Requirements Accepted by NCWRP

River Basin/ Watershed	Mitigation requirements accepted Fiscal Year 2002-2003 (acres)	Cumulative mitigation requirements accepted since June 1999 (acres)
Neuse	103.219	175.61
Tar-Pamlico	1.45	1.64
Catawba	0	0
Randleman Water Supply Watershed	0	0
Total	104.669	177.25

Progress in Meeting Compensatory Mitigation Requirements For Fiscal Year 02-03

The NCWRP accepted a total of 65 Section 404 permits and 401 Water Quality Certifications during FY 02-03. Eighty-nine percent of the total Section 404 permits and 401 Water Quality Certifications have projects where the property has been acquired (and protected in perpetuity), and the project is either in design, construction or a monitoring phase. There are 20 Section 404 permits and eight 401 Water Quality Certifications with mitigation due by June 30, 2003 that are not covered by the current list of NCWRP project assets. Permit compliance decreased by 1 percent for Section 404 permits and 2 percent for 401 Water Quality Certifications from the previous fiscal year. The primary reason for the slight decrease of compliance with the increased amount of projects was due to the schedule of when the mitigation accepted was due. Seventy-two percent of the total stream mitigation and 67 percent of the total wetland mitigation that the NCWRP had accepted since the program's inception came due in the first half of FY 02-03.

Figure 2-1 Progress in Meeting Compensatory Mitigation Requirements by River Basin for Wetlands



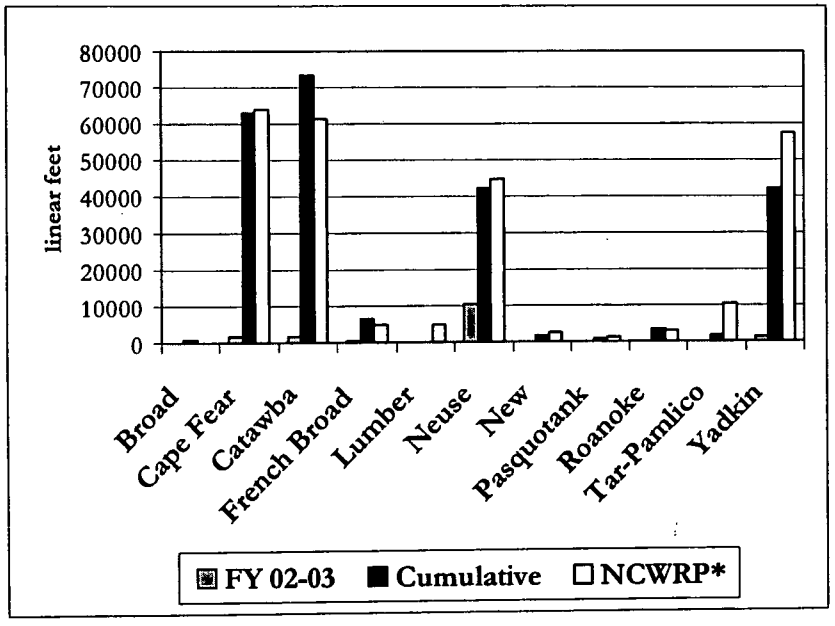
** NCWRP Project Assets*

Wetland Mitigation Requirements

The NCWRP has accepted wetland mitigation in 10 different river basins. On a statewide basis, the amount of NCWRP project assets for wetland restoration (304.9 acres) just exceeds the assumed mitigation requirements (304.47 acres). The NCWRP currently meets or exceeds the wetland mitigation accepted in five of those river basins (Figure 2-1). Twenty-three wetland restoration and enhancement projects have been initiated that will restore 304.9 acres of wetlands (Table 1-1). These projects will meet the compensatory mitigation requirements of 83 percent of the permits due for implementation by the NCWRP through the end of FY 02-03. Although the restoration acreage may exceed the mitigation required on a river basin scale, when examined on a river basin cataloging unit (CU) basis as required in the COE Memorandum of Understanding (Appendix A) the mitigation requirements in some CUs have not been totally met.

Additional projects that will restore 45.66 acres of wetlands are needed to meet the end of FY 02-03 outstanding mitigation needs. These impacts are located in the Cape Fear, Catawba, New, Roanoke, Tar Pamlico and Yadkin

Figure 2-2 Progress in Meeting Compensatory Mitigation Requirements by River Basin for Streams



** NCWRP Project Assets*

river basins. These projects are needed to meet the compensatory mitigation requirements of nineteen* 404 permits and four 401 Water Quality Certifications.

The permit needs by river basin for wetland mitigation requirements are:

- Cape Fear: four 404 permits (10.22 acres).
- Catawba: twelve 404 permits, one 401 certification (16.81 acres).
- New: one 404 permit (1.2 acres).
- Roanoke: two 404 permits (8.72 acres).
- Tar-Pamlico: one 401 certification (7.04 acres).
- Yadkin: two 401 certifications (1.67 acres).

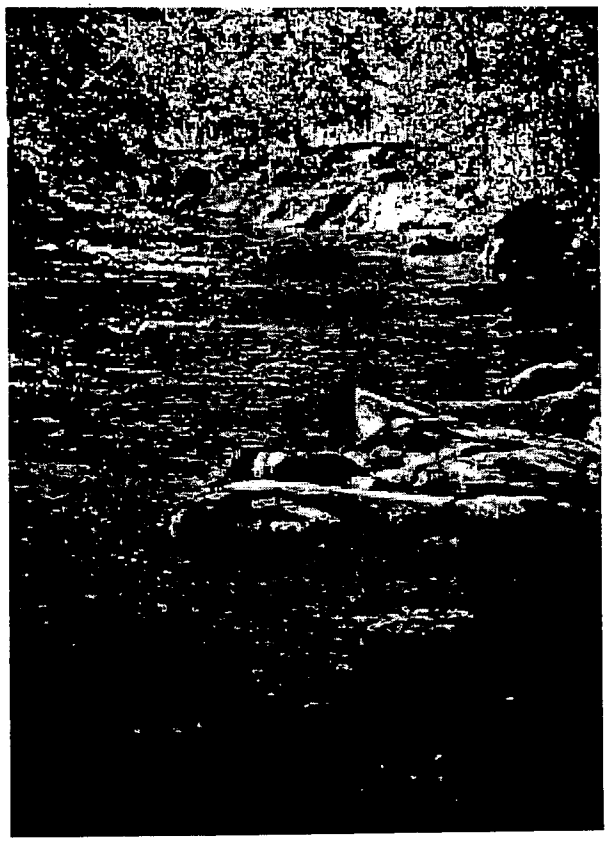
Stream Mitigation Requirements

The NCWRP has accepted stream mitigation impacts in 11 different river basins. NCWRP projects approximate or exceed the mitigation accepted for eight of those river basins (Figure 2-2). Fifty-eight projects have been implemented that will restore 219,112 linear feet of streams. These projects will meet the compensatory mitigation requirements of 88 percent of permits assumed by the NCWRP through the end of FY 02-03 (Table 1-1). Additional projects that will restore 34,603 linear feet of streams are needed in the Broad, Cape Fear, Catawba, Roanoke and Tar Pamlico river basins to meet specific permit requirements of five* 404 permits and four 401 Water Quality Certifications.

The permit needs by river basin for stream mitigation requirements are:

- Broad: one 401 certification (800 linear feet).
- Cape Fear: two 404 permits, one 401 certifications (14,080 linear feet).
- Catawba: two 404 permits (18,298 linear feet).
- Roanoke: one 404 permit (770 linear feet).
- Tar-Pamlico: two 401 certification (655 linear feet).

** Note: In the previous two sections, four 404 permits have both stream and wetland mitigation requirements.*



Stone Mountain

Permit compliance decreased by 5 percent for streams between FY 01-02 and FY 02-03. As stated earlier, the primary reason for the decrease in compliance was the schedule of when the mitigation accepted was due.

Riparian Buffer Mitigation Requirements

The NCWRP has accepted 77 impacts for buffer restoration since 1998. In FY 02-03, 29 buffer impacts were accepted. The acreage for the projects accepted is 103.75 acres, with 102.19 acres in the Neuse River basin and 1.56 acres in the Tar-Pamlico River basin. The NCWRP has six riparian buffer restoration sites as assets to date. Four of these sites are full delivery projects, and two are NCWRP projects.

The NCWRP currently has 177.7 acres of riparian buffer assets in the Neuse River basin. To date the Riparian Buffer Mitigation Fund has been paid for 175.61 acres of Neuse buffer mitigation. A total of 2.04 acres of Neuse buffer mitigation in Carteret, Craven and Pamlico counties have not been debited from the NCWRP buffer assets because these impacts are downstream of the NCWRP restoration project assets. The NCWRP will be requesting full delivery proposals in Craven and Pamlico counties.

Full delivery projects

A designer or consultant delivers a restored site (including property acquisition, design, construction and monitoring) and is paid based on a low-bid per acre or linear foot cost

The NCWRP has accepted eight riparian buffer impacts in the Tar Pamlico River basin. These riparian buffer mitigation requirements total 1.64 acres. The NCWRP has a buffer restoration project in design on Ocracoke Island that will have an asset of 0.75 acres. There is an option being considered in Beaufort County for an additional one acre of riparian buffer restoration.

Section 3 – Trust Funds

Wetlands Trust Fund

The Wetlands Trust Fund was established by the N.C. General Assembly as a repository for funds to restore, create, enhance and preserve wetlands and riparian areas throughout the state. Three accounts have been established within the Wetlands Trust Fund: Account 2980 – Wetland Restoration; Account 2981 – Compensatory Mitigation; and Account 2982 – Riparian Buffer.

Account 2980 is the repository for appropriations received from the General Assembly. This account is used to implement restoration projects to compensate for cumulative losses of wetlands and riparian areas associated with projects that are below the threshold that triggers the compensatory mitigation requirement.

Account 2981 is the repository for payments made to the NCWRP to satisfy the compensatory mitigation requirements of Section 404 permits, 401 Water Quality Certifications and nitrogen offset payments. Payments to this account and the interest earned are used to implement projects designed to meet the compensatory mitigation requirements of projects accepted by the NCWRP and to implement projects to reduce nitrogen loading within the Neuse River basin.

Account 2982 is the repository for payments to satisfy the buffer mitigation requirements for permitted impacts to riparian buffers in the Neuse, Tar-Pamlico and Catawba river basins. Payments to this account and the interest earned are used to implement riparian buffer restoration projects within these river basins.

During FY 02-03, the NCWRP received 79 payments for compensatory mitigation associated with Section 404/401 permits and permitted riparian buffer impacts. Fifty-six of the payments (71 percent) were received from the private sector, nine payments (11 percent) were received from NCDOT and 14 payments (18 percent) were received from other state, federal and local government agencies. NCWRP received 236 nitrogen offset payments.

Of the payments received, 24 percent were for stream restoration and 11 percent for wetland restoration associated with Section 404/401 permits. Riparian buffer payments comprised 50 percent, with the remaining 15 percent for nitrogen offset payments. Appendix D contains a complete listing of payments.

Income/Expenditures

Account 2980 – Wetlands Restoration Fund

The beginning balance of Account 2980 in FY 02-03 was $3,261,917. A total of $105,559 was deposited into this account during the fiscal year. Income received during the fiscal year was derived from the interest earned on this account.

Hammocks Beach Restoration Site

Total expenditures for FY 02-03 were $1,339,980. These funds were expended for activities associated with the restoration, enhancement or preservation of wetland, streams and riparian areas. Of the remaining balance, $1,966,001 is encumbered for activities associated with the restoration and enhancement of wetlands, streams and riparian areas. At the end of FY 02-03, the unencumbered balance of Account 2980 was $12,456 (Table 3-1).

Account 2981 – Compensatory Mitigation Fund

The beginning balance of Account 2981 in FY 02-03 was $42,595,995. A total of $8,399,744 was deposited into this account during the fiscal year. An additional payment of $2.5 million was received from NCDOT for local watershed planning initiatives. Compensatory mitigation deposits were 56 percent less than last year. The economic downturn probably contributed to the reduction in payments from both the private sector and government agencies. NCDOT payments were possibly reduced due to anticipation of alternative mitigation available through the Ecosystem Enhancement Program.

Income received during the fiscal year was derived from payments to satisfy the compensatory mitigation requirements of Section 404 permits and 401 Water Quality Certifications, nitrogen offset payments as required by 15A NCAC 2B .0242 and the interest earned on the funds within this account. Total expenditures for FY 02-03 were $11,381,930. These funds were expended for activities associated with the restoration, enhancement or preservation of wetland, streams and riparian areas. Of the remaining balance, $17,235,294 was encumbered. At the end of FY 02-03, the unencumbered balance of Account 2981 was $23,217,093 (Table 3-2).

The unencumbered balance is reserved for the implementation of projects to meet the compensatory mitigation requirements of Section 404 permits and 401 Water Quality Certifications accepted by the NCWRP, watershed assessments and nitrogen reduction projects. These projects will restore and enhance approximately 48,400 linear feet of streams, 55 acres of wetlands and 100 acres of riparian buffers. Approximately 6,700 pounds of nitrogen per year will be removed through the implementation of nitrogen reduction projects in the Neuse River basin at a cost of $2.2 million. Of the remaining unencumbered funds, $4.9 million is reserved for the development of Local Watershed Plans as required by the Memorandum of Agreement with the NCDOT. (Please refer to Section 2 and Appendix D for additional informa-

Table 3-1 Wetlands Trust Fund - Wetlands Restoration

Account 2980		
Balance on 7/1/02		*$ 3,261,917*
Revenue (FY 02-03)		$ 105,559
Receipts	0	
Interest	$ 105,559	
Expenditures		$ (1,339,980)
Site identification	0	
Site acquisition	0	
Design/construction management	$ (1,198,802)	
Construction	0	
Monitoring	$ (116,273)	
Maintenance/management	$ (24,905)	
Balance as of 6/30/03		*$ 1,978,457*
Current contractual encumbrances		$ (1,966,001)
Balance of unencumbered funds		*$ 12,456*

Table 3-2 Wetlands Trust Fund - Compensatory Mitigation

Account 2981		
Balance on 7/1/02		*$ 42,595,995*
Revenue (FY 02-03)		$ 8,399,744
Compensatory mitigation payments	$ 3,576,485	
Nitrogen offset payments	$ 1,220,999	
DOT/MOU	$ 2,500,000	
Interest	$ 1,940,840	
Expenditures (FY 02-03)		$ (11,381,930)
Site identification (including LWP)	$ (1,638,418)	
Site acquisition	$ (1,130,862)	
Project design/construction management	$ 4,514,826	
Construction	$ (3,584,255)	
Monitoring	$ (11,069)	
Maintenance/management	$ (15,414)	
Administration	$ (487,056)	
Refunds	$ (6,619)	
Balance as of 6/30/02		*$ 40,452,387*
Current contractual encumbrances		$ (17,235,294)
Balance of unencumbered funds		*$ 23,217,093*

Table 3-3 Wetlands Trust Fund - Riparian Buffer Restoration

Account 2982		
Balance as of 7/1/02		*$ 3,309,390*
Revenue (FY 02-03)		$ 5,325,025
Compensatory mitigation payments	$ 4,251,742	
Interest	$ 234,705	
Expenditures		$ (2,282,248)
Balance as of 6/30/02		*$ 5,513,590*
Current contractual encumbrances		$ (1,003,299)
Balance of unencumbered funds		*$ 4,510,291*

tion concerning compensatory mitigation requirements assumed by the NCWRP. Information concerning the Memorandum of Agreement with the NCDOT can be found in Appendix B.)

Account 2982– Riparian Buffer Fund

The beginning balance of Account 2982 in FY 02-03 was $3,309,390. During the fiscal year, $5,325,025 was deposited into this account. Income received during this fiscal year was derived from payments for the compensatory mitigation requirements associated with permitted impacts to buffers and the interest earned on the funds within the account. Four new contracts were encumbered, totaling $3,285,547. During FY 02-03, $2,282,248 was expended from this account for four full-delivery restoration projects. At the end of FY 02-03, the unencumbered balance of Account 2982 was $4,510,291. These funds are reserved for buffer restoration in the Neuse and Tar-Pamlico River basins (Table 3-3).

Summary

During FY 02 – 03, the pace of expenditures increased significantly (Figure 3-1). This increase is associated with expenditures for design and implementation of restoration projects and the initiation of several comprehensive Local Watershed Plans. Although the planning process resulted in some delay in the implementation of projects, the benefits associated with the implementation of high quality projects identified through the watershed planning process will be long-term. In addition to expenditures, as of June 30, 2003, more than $20 million remained encumbered in 102 active contracts in the Wetlands Trust Fund accounts (Table 3-4). Of this total, 63 new contractual agreements totaling $15,316,778 were encumbered during FY 02-03. These contracts will provide local watershed planning, site identification, design, construction, construction management and monitoring of the restored sites. The pace of expenditures will continue to increase as the planning process matures, and the NCWRP increases the efficiency of its implementation processes.

Figure 3-1 NCWRP Expenditures from Accounts 2980 and 2981 since 1996

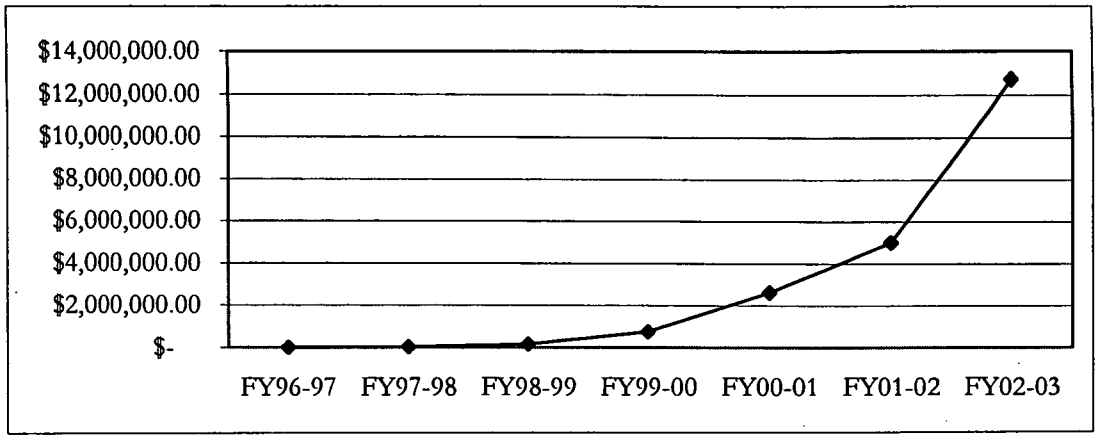
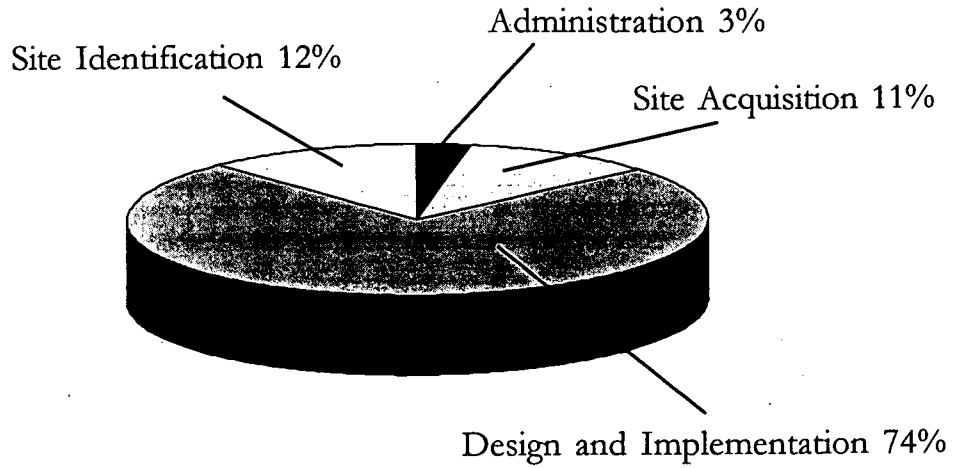


Figure 3-2 Project Expenditures by Major Category from Accounts 2980, 2981 and 2982



Based on total expenditures of $ 15,004,157

Table 3-4 Contractual Encumbrances for the Wetlands Trust Fund Accounts 2980, 2981 and 2982

Contractor	Encumbrance Remaining	Contractor	Encumbrance Remaining
A & D Environmental	$444,705.00	Hunter Construction Group, Inc	$222,155.60
Arcadis	$200,020.73	KCI Associates of NC, Inc.	$710,227.55
Barry Rosch	$7,615.00	Kimley Horn	$254,991.72
Becky L. Ward Consulting	$17,404.08	Land Management Group, Inc.	$92,720.00
Biohabitats, Inc.	$10,208.50	Law Engineering	$337,814.30
Blue Land Water Infrastructure	$452,960.25	L-J Inc.	$804,044.94
Buck Engineering	$528,897.99	Natural Areas Ecosystem	$54,217.07
Camp Dresser & McKee	$180,854.63	Natural Resources Conservation Service	$833,054.06
Cape Fear River Assembly	$54,319.00	NCSU Sponsored Programs	$1,182,205.30
CH2MHill	$198,479.38	North State Environmental, Inc.	$574,675.30
City of Hendersonville	$97,263.00	Polovick Construction Co., Inc.	$200.00
City of Jacksonville	$192,072.24	Restoration Systems	$2,872,130.00
City of Wilmington	$20,000.00	Republic Building Services	$5,542.00
Decision Support Professionals	$189,880.05	SEI Environmental	$321,876.69
Dewberry and Davis	$70,858.80	Shamrock Environmental	$2,019,237.08
Division of Soil and Water Conservation Service	$1,155,000.00	Soil and Environmental Company	$489,933.25
Division of Water Quality Lab	$87,708.00	Soil and Water Conservation Service	$421,500.00
Division of Water Quality Sampling	$938,385.00	Spaulding and Norris	$1,190,220.00
Dixie Grading Company	$178,347.20	Stantec Consulting	$174,935.02
DOA-State Property Office	$210,598.45	Sungate Design Group, PA	$167,100.00
Earth Tech	$716,689.32	Tennesee Valley Authority	$4,000.00
East Carolina University	$42,241.00	Tetra Tech	$321,863.03
EBX-Neuse, I LLC	$264,600.00	Treefrog Resources	$7,000.00
Ecologic	$84,423.00	URS Corporation, North Carolina	$162,069.89
Ecoscience	$264,822.78	West Contracting, Inc.	$270,038.49
Green Environmental Services	$223,249.25	Wilkes Soil and Water	$188,723.95
HDR Engineering	$244,160.62		

Section 4 — Analysis of Restoration Costs

The NCWRP evaluates the cost of restoration projects on an annual basis. It compares this cost to the Schedule of Fees (NCGS 143-214.13) and the cost of restoration projects implemented by the private mitigation banking industry. (Please refer to Section 5 of the 2001 NCWRP Annual Report for information on the methods used in this analysis.)

Stream Restoration Projects

The construction of 17 stream restoration projects was completed by the end of FY 02-03. Eight of these projects are located in urban areas and nine are in rural areas. These projects restored 64,101 linear feet of stream at an overall average cost per linear foot of $129.31. As shown on Tables 4.1 and 4.2, there is a significant difference in the costs of urban and rural projects. The average per linear foot cost of urban projects is $168.77 while the average per linear foot cost of rural projects is $113.53.

The higher costs of urban projects result from a number of factors. Most urban stream settings have numerous constraints that must be addressed during the design and construction of projects, including roads, sewer lines, water lines power lines, fiber optic cables and gas lines. These constraints must be avoided or relocated during a stream restoration project. They also influence the design and maintenance of the restoration project, further increasing project cost. Other common constraints in urban situations include numerous road crossings, protect-

Table 4-1 Stream Restoration Costs for Urban Projects

Urban Project	Hominy Swamp	Price Park	Smith/Austin	Kentwood Park	Chavis Park	Richland Creek	Clear Creek	Sandy Creek
Site identification	$2,450	$1,690	$4,750	$1,800	$2,250	$0	$1,080	$1,000
Site acquisition	$2,500	$62,526	$300,368	$12,711	$0	$0	$3,935	$66,718
Project design	$123,903	$86,380	$240,717	$93,559	$72,461	$17,533	$64,320	$26,194
Construction management	$12,600	$21,666	$136,323	$38,334	$30,329	$35,302	$44,978	$10,000
Site restoration	$322,618	$154,789	$446,602	$94,862	$281,703	$57,942	$199,436	$100,517
Monitoring*	$51,000	$74,035	$112,380	$61,604	$57,060	$7,500	$49,320	1,040
Long-term management	$3,000	$3,000	$3,000	$3,000	$3,000	$1,000	$3,000	$1,000
Length (ft)	2,232	1,710	9,500	1,800	2,500	850	1,300	1,500
Total cost	$518,071	$403,786	$1,244,141	$305,870	$446,723	$119,277	$366,069	$206,469
Cost/linear foot	$232	$227	$131	$170	$179	$140	$282	$138
Project status	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring

** Projected Cost for five-year period*

ing city park equipment and ensuring the compatibility of the project with surrounding buildings and structures.

The cost of restoration in urban areas is also increased significantly. Suitable stream reaches available for restoration tend to be shorter than those in rural areas due to higher density of land ownership and smaller parcel size. Shorter restoration projects decrease the "economies of scale" for urban projects since the initial mobilization of equipment is one of the larger costs in constructing stream restoration projects. The cost of construction staging and delivering equipment becomes more economical as project length increases.

Wetland Restoration Projects

Seven wetland restoration projects were constructed by the end of FY 02-03. Three involved the restoration of coastal wetlands; three involved the restoration/enhancement of riparian wetlands; and one project restored non-riparian wetlands. Six of these projects were located in the coastal plain physiographic region and one in the Piedmont region. They resulted in the restoration and enhancement of 364.6 acres of wetlands.

Table 4-2 Stream Restoration Costs for Rural Projects

Rural Project	Payne Dairy	Stone Mountain	Brush Creek	County Line Creek	Lyle Creek	Brown Branch	Beaver Creek	Bear Swamp	Suck Creek
Site identification	$3,700	$5,200	$2,200	$1,750	$1,150	$3,500	$2,200	$750	$1,825
Site acquisition	$86,965	$0	$864	$30,414	$35,166	$0	$2,300	$6,902	$2,738
Project design	$178,357	$242.78	$109,690	$97,663	$72,522	$104,164	$90,858	$44,300	$80,688
Construction management	$64,234	$76,708	$58,020	$41,354	$36,679	$67,052	$50,447	$17,440	$28,247
Site restoration	$413,221	$656,230	$228,280	$196,098	$88,045	$261,521	$265,038	$87,537	$244,805
Monitoring*	$73,732	$73,000	$43,900	$56,025	$52,758	$64,033	$59,137	$58,098	$43,827
Long-term management	$9,500	$9,500	$5,250	$5,250	$5,250	$9,500	$9,500	$5,250	$5,250
Length (ft)	6,997	10,622	3,590	3,500	2,300	5,400	4,300	1,500	3,000
Total cost	$829,709	$1,063,419	$448,204	$428,554	$291,571	$509,770	$479,481	$220,277	$407,380
Cost/linear foot	**$119**	**$111**	**$125**	**$122**	**$127**	**$94**	**$111**	**$147**	**$136**
Project status	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring

** Projected Cost for five-year period*

Riparian Wetlands

The construction of three riparian wetland restoration projects was complete by the end of FY 02-03, resulting in the restoration and enhancement of 107.6 acres of wetlands (Table 4.3). The Jumping Run Creek project, located in an urban setting in Carteret County, had an average cost per acre of $25,085. The Howell Woods project, located in a rural area of Johnston County, involved the restoration/ enhancement of riparian wetlands in the flood-plain of the Neuse River. Wetland hydrology and vegetation was restored and enhanced at an average cost per acre of $13,188. The Sandy Creek Wetland Restoration site, located on an abandoned wastewater treatment facility in Durham, resulted in an average cost per acre of $43,569.

Table 4-3 Costs of Riparian Wetland Restoration

Project	Jumping Run Creek	Howell Woods	Sandy Creek
Site identification	$4,050	$5,695	$500
Site acquisition	$0.00	$252,157	$17,282
Project design	$16,125	$66,916	$20,000
Construction management	$12,500	$48,734	$8,425
Site Restoration	$66,000	$183,577	$59,000
Post monitoring*	$8,250	$56,064	$25,000
Long-term management*	$3,450	$6,700	$500
Restoration acres	4.4	47	3
Wetland type	Riparian (urban)	Riparian (rural)	Riparian (urban)
Total cost	$110,375	$619,843	$130,707
Cost/acre	$25,085	$13,188	$43,569
Project status	Monitoring	Monitoring	Monitoring

* *Estimated costs*

Coastal Wetlands

The construction of three coastal wetland restoration projects was complete by the end of FY 01-02 resulting in the restoration of and enhancement of 4.11 acres of wetlands at an average cost of $101,148 per acre. (Please refer to Section 5 of the 2001 NCWRP Annual Report for additional information on these projects.)

Non-riparian wetlands

The NCWRP completed the first phase of the North River wetland restoration project located in Carteret County. Phase I is 250 acres of non-riparian wetland restoration; Phase II will encompass another 165 acres of restoration. Total cost for Phase I of the project was $1,187,253 resulting in a per acre cost of $4,749.

Conclusions

Two conclusions can be made from examining riparian wetland costs. First, riparian wetland restoration costs are higher than non-riparian wetland restoration because the complexity of the hydrology of a riparian wetland leads to increased design and monitoring costs. Second, on any restoration project, economies of scale govern the overall costs. As the project size increases, cost per acre decreases. Therefore, comparing the three riparian projects results in the Howell Woods site having the lowest cost per acre because of its much larger size.

Cost Analysis of Private Mitigation Bank Restoration Projects

The enabling legislation for the NCWRP requires an annual cost comparison on a per acre basis between the restoration costs of NCWRP and private mitigation banks. To obtain the data necessary to accomplish this task, a survey requesting restoration cost information is annually sent to the sponsor of each approved bank (Table 4.4). There were no responses received from this year's Private Mitigation Bank Survey, which was sent in early August 2003. (Please refer to the 2002 NCWRP Annual Report survey data.) During FY 99-00, responses were received from two sponsors, Triangle Group and EcoBank, representing four separate mitigation banks. The average per acre cost for non-riparian wetlands for these four banks was $9,665 (page 41, 2000 NCWRP Annual Report). During FY 01-02, only EcoBank responded with a cost of $8,675 per acre of non-riparian wetland restoration (page 4-3, 2002 NCWRP Annual Report).

As noted, the NCWRP completed a non-riparian wetland restoration project at $4,749 per acre on the North River.

Comparison of Restoration Costs with Schedule of Fees

The NC Wetlands Restoration Program utilizes the cost of its projects and the costs reported by the mitigation banking industry to determine actual costs of restoration compared to the Schedule of Fees (found at 15A NCAC 2R .0402). This comparison ensures that the schedule accurately reflects the cost of restoration.

Based on the results of the analysis of restoration costs conducted two years ago, rulemaking was initiated during FY 01-02 to increase the fee for stream restoration. A public hearing on the proposed increase was held in July 2002. This rule was approved, increasing stream restoration fees to $200 per linear foot beginning April 1, 2003.

Although the overall average on completed projects is $129.31, the NCWRP is seeing a trend of increased cost for stream restoration projects. Long-term maintenance, management and monitoring are projected costs and as these costs are incurred, the NCWRP is finding the average per foot costs are rising. In the first few years of a stream project and before vegetation has had a chance to help provide stability of streambanks, these projects are vulnerable to storms. Maintenance issues can also lead to additional costs. Moreover, the NCWRP is initiating more urban stream projects and the per-foot costs are higher.

Based on the comparison of actual costs for riparian wetlands, non-riparian wetlands and coastal wetlands with the Schedule of Fees, no adjustment to the Schedule of Fees for these categories is recommended at this time.

Barch Mill

Middle Cape Fear

Table 4-4 Approved Mitigation Banks in North Carolina

Mitigation Bank Name[1]	County	River Basin	Cataloging Unit	Restoration Type	Sponsor
Scuppernong River Corridor Mitigation Bank	Tyrrell	Pasquotank	3010205	Non-Riparian	Green Vest, LLC
Great Dismal Swamp Restoration Bank	Pasquotank, Perquimans	Pasquotank	3010205	Non-Riparian	Great Dismal Swamp Mitigation
Hidden Lake Mitigation Bank	Tyrrell	Pasquotank	3010205	Non-Riparian	Green Vest, LLC
Barra Farms Cape Fear Regional Mitigation Bank	Cumberland	Cape Fear	3030005	Non-Riparian, Stream	EcoBank, LLC
Greater Sandy Run Wetland Mitigation Bank	Onslow	White Oak	3030001	Non-Riparian	Camp LeJeune Marine Base
Flat Swamp Wetland Mitigation and Stream Restoration Bank	Craven	Neuse	3020202	Non-Riparian, Stream	Green Vest, LLC
NEU-CON Mitigation Bank	Lenoir, Jones, Greene	Neuse	03020202 03020203 03020204	Non-Riparian, Stream	Environmental Banc and Exchange, LLC
Fisher River Mitigation Bank	Surry	Yadkin	3040101	Riparian	American Wetlands
Bear Creek-Mill Branch	Wayne	Neuse	3020202	Riparian	Restoration Systems, LLC.
Deep Creek	Yadkin	Yadkin	3040101	Riparian, Stream	American Wetlands

[1]*The mitigation banks included in this table have a mitigation banking instrument that has been signed by some or all of the federal and state review agencies*

Green Vest, LLC
1001 Capability Dr. Suite 312
Raleigh, NC 27606
(919) 831-1234

EcoBank, LLC
1555 Howell Branch Rd.
Winter Park, FL 32789
(407) 629-6044

American Wetlands
11876 Sunrise Valley Dr. Suite 200
Reston, VA 20191

Great Dismal Mitigation Bank, LLC
Winthrop, Stimson, Putnam & Roberts
1133 Connecticut Ave. NW
Washington, DC 20036

Environmental Banc & Exchange, LLC
1119-M Whisperwood Court
Greensboro, NC 27104
(336) 851-5902

Restoration Systems, LLC.
1101 Haynes St. Suite 203
Raleigh, NC 27604
(919) 755-9490

Section 5 — Statewide Wetland and Stream Losses and Gains

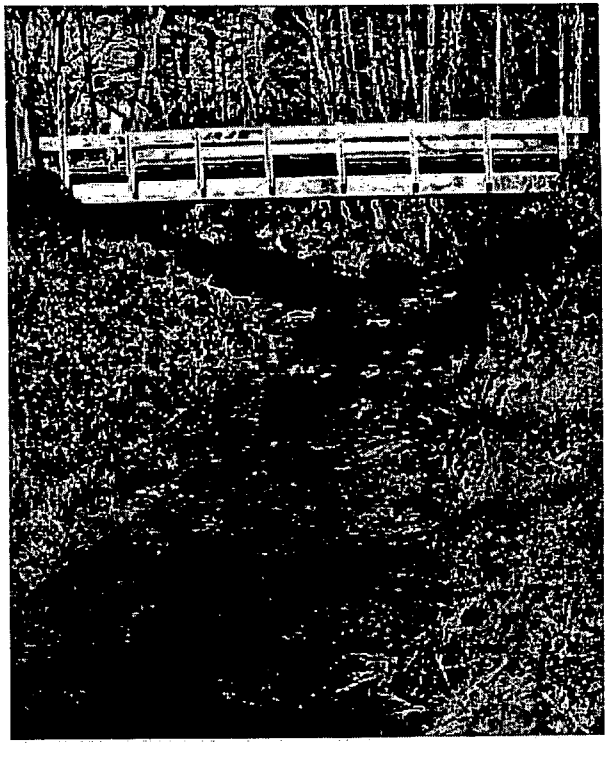
DENR is one of the agencies responsible for protecting and restoring the functions and values of and streams across the state. The N.C. Wildlife Resources Commission, EPA, COE, U.S. Fish and Wildlife Service, National Marine Fisheries Association, local governments and countless non-profit organizations are all working to maintain and add to North Carolina's remaining inventory of wetlands and streams. Despite the collaborative efforts of these groups, there is still an annual net loss of streams in North Carolina and a net loss of wetlands in some river basins.

The COE, DWQ and the Division of Land Resources within DENR regulate construction activities near streams and wetlands. The intent of these regulatory programs is to minimize the impact of construction projects to these valuable resources and to ensure that unavoidable impacts are addressed through mitigation projects. DENR also funds restoration projects to help offset stream and wetland impacts through the NCWRP, the 319 Program, Clean Water Management Trust Fund and Division of Water Resources Grant Program.

This section presents a summary of information gathered by the NCWRP concerning statewide wetland and stream losses and gains that occurred in the state during FY 02-03. This information represents the activities of the DWQ as well as other agencies and programs working to protect and restore wetlands and streams across the state. Wetland, stream and buffer losses and gains are tracked through the Wetland/401 Unit of the DWQ and are presented below under the heading Regulatory Losses and Gains. Information about other programs is presented later in this section under the heading Non-Regulatory Gains.

Regulatory Losses and Gains

The information in this section is based on the 401 Water Quality Certification database maintained by DWQ's Wetland/401 Unit. This database tracks wetland and stream losses that are authorized through the issuance of a 401 Water Quality Certification. The issuance of a 401 Water Quality Certification by the DWQ is required before the US Army Corps of Engineers can issue a Section 404 Permit authorizing the fill or alteration of wetlands and/or streams. Although in the majority of cases the impacts authorized by the 401 Water Quality Certification are consistent with the impacts authorized by the Section 404 Permit, it should be noted that the amount of impact authorized by the Section 404 Permit may be less than that authorized by the 401 Water Quality Certification and, in some cases, a Section 404 Permit may never be issued. In addition, the authorized impacts may not occur during the same fiscal year and in some cases may never occur. The DWQ is increasing its efforts to monitor and track the impacts that actually occur during each fiscal year. Questions regarding regulatory wetlands losses and gains should be directed to Mr. John Dorney with the DWQ Wetland/401 Unit at (919) 733-9646.



Middle Cape Fear

In addition to the wetland and stream impacts tracked in the database, an unknown amount of permanent wetland and stream losses occurs. First, projects that affect less than one-third of an acre of wetlands or less than 150 linear feet of stream are not required to receive written confirmation from DWQ and, therefore, might not be reported. Second, the magnitude of unauthorized impacts to wetlands and streams is still being assessed. DWQ is working to resolve this issue.

Permitted Wetlands Impacts

During FY 02-03, DWQ issued Water Quality Certifications authorizing 297.4 acres of wetland impact. Table 5-1 summarizes the permitted wetland impacts that occurred throughout the state by river basin. The majority of these impacts occur in river basins that flow through the coastal plain.

Permitted Stream Impacts

During the FY 02-03, Water Quality Certifications were issued authorizing 191,708

Table 5-1 Losses and Gains for North Carolina Wetlands During FY 2002 - 2003

WETLANDS						
Basin	Impacts < 1 ac	Impacts > 1 ac	Total Impacts	Mitigation	Gain or loss	
Broad	0.3	0.0	0.3	0.0	-0.3	
Cape Fear	13.6	89.0	102.6	91.8	-10.8	
Catawba	4.9	1.5	6.4	0.0	-6.4	
Chowan	0.8	0.0	0.8	0.0	-0.8	
French Broad	1.0	1.1	2.1	1.9	-0.2	
Hiwassee	0.0	0.0	0.0	0.0	0.0	
Little Tennessee	0.2	0.0	0.2	0.0	-0.2	
Lumber	2.9	31.7	34.6	57.8	23.2	(+)
Neuse	16.4	49.7	66.1	91.9	25.8	(+)
New	0.7	0.0	0.7	0.6	-0.1	
Pasquotank	12.3	10.9	23.2	19.2	-4.0	
Roanoke	0.8	4.3	5.1	3.2	-1.9	
Savannah	0.0	0.0	0.0	0.0	0.0	
Tar-Pamlico	5.0	0.0	5.0	0.0	-5.0	
Watauga	0.0	0.0	0.0	0.0	0.0	
White Oak	3.2	9.5	12.7	18.9	6.2	(+)
Yadkin-Pee Dee	3.7	34.0	37.7	66.4	28.7	(+)
TOTALS:	65.7	231.7	297.4	351.7	54.3	(+)

linear feet of permanent stream impact (Table 5-2). The majority of these impacts occur in the piedmont and mountain regions of the state and in urban areas. The State of North Carolina does not require mitigation for impacts to intermittent streams, but impacts to these streams are reported. The reported loss of 63,664 linear feet of stream is partially attributable to intermittent streams.

Permitted Riparian Buffer Impacts in the Catawba, Neuse and Tar-Pamlico River Basins

The Riparian Buffer Rules are currently in effect for the Catawba, Neuse and Tar-Pamlico river basins. These rules apply to 50-foot wide riparian buffers directly adjacent to surface waters including intermittent and perennial streams, lakes, ponds and estuaries. Activities within riparian buffers are categorized as exempt, allowable, allowable with mitigation or prohibited. The Wetland/401 Unit regulates activities in riparian buffers and maintains the database of riparian buffer losses that are permitted through the issuance of an Authorization Certificate. During FY 02-03, 54.18 acres of buffer impact in the Neuse River basin and 2.27 acres in the Tar Pamlico River basin were authorized. There was 0.02 acre of riparian buffer impact in the Catawba River basin during the FY 02-03 (Table 5-3).

Compensatory Mitigation

The purpose of compensatory mitigation is to replace wetland and stream functions that are lost through permitted impacts to stream and wetlands.

DWQ issued sixty-three 401 Water Quality Certifications during FY 02-03 that required wetland or stream mitigation. Of those, 53 certifications were satisfied through payment to the NCWRP. Compensatory mitigation requirements for three of the certifications were satisfied through payment to private mitigation banks. The applicants conducted mitigation for 17 of the certifications. Some 401 certification requirements had mitigation satisfied through a combination of NCWRP, private mitigation banks and the applicant.

Table 5-2 Losses and Gains for North Carolina Streams During FY 2002 - 2003

STREAMS					
Basin	Impacts <150 ft	Impacts ≥150 ft	Total Impacts	Mitigation	Gain or Loss
Broad	788	628	1,416	255	-1,161
Cape Fear	6,115	33,421	39,536	31,648	-7,888
Catawba	5,696	31,574	37,270	17,364	-19,906
Chowan	0	0	0	0	0
French Broad	3,841	19,184	23,025	17,150	-5,875
Hiwassee	437	0	437	0	-437
Little Tennessee	1,972	4,427	6,399	4,602	-1,797
Lumber	981	7,600	8,581	7,600	-981
Neuse	8,428	18,233	26,661	21,438	-5,223
New	1,696	1,526	3,222	20	-3,202
Pasquotank	336	300	636	0	-636
Roanoke	1,303	4,950	6,253	1,050	-5,203
Savannah	408	0	408	0	-408
Tar-Pamlico	1,888	2,271	4,159	300	-3,859
Watauga	244	210	454	0	-454
White Oak	420	3,811	4,231	3,210	-421
Yadkin-Pee Dee	6,856	22,164	29,020	22,807	-6,213
TOTALS:	41,409	150,299	191,708	127,444	-63,664

Wetlands

During FY 02-03, 351.7 acres of wetland restoration and creation was required as compensatory mitigation through the issuance of 401 Water Quality Certifications (Table 5-1). The statewide compensatory mitigation requirements for wetlands exceeded authorized impacts by 54.3 acres. Twenty two percent (65.7 acres) of this total wetland impact is attributed to projects that impact less than one acre of wetland and, therefore, do not require compensatory mitigation as a condition of the 401 Water Quality Certification.

Streams

The compensatory mitigation requirements of the 401 Water Quality Certifications issued during FY 02-03 totaled 127,444 linear feet of stream (Table 5-2). The authorized stream impacts exceeded the compensatory mitigation requirements for stream restoration in all but one river basin. The authorized impacts statewide exceeded the compensatory mitigation requirements by 63,664 feet. This substantial difference between permitted stream impacts and compensatory mitigation requirements is attributable to two factors. First, stream impacts must exceed the minimum threshold of 150 linear feet before compensatory mitigation is required. Second, mitigation is only required for impacts to perennial streams. No mitigation was required for the loss of intermittent streams which are included in the total impacts.

The purpose of compensatory mitigation is to replace wetland and stream functions that are lost through permitted impacts to stream and wetlands.

Non-Regulatory Gains

In addition to restoration projects associated with compensatory mitigation requirements, numerous state, federal and local government agencies as well as non-profit organizations are involved in restoration activities. In order to determine the magnitude of these efforts and to provide a mechanism to share information on restoration efforts, the NCWRP conducted a survey to collect information concerning the amount of wetlands and streams that were restored, created, enhanced and preserved during the FY 02-03 (Appendix C, Table C-1). Based on the results of this survey, 35 acres of wetland restoration and 1,800 linear feet of stream restoration were completed during the FY 02-03. A listing of these projects, the organizations that received the survey and a copy of the survey are provided in Appendix C.

Table 5-3 Losses and Gains for North Carolina Buffers During FY 2002 - 2003

BUFFERS						
Basin	Impacts < 1 ac	Impacts > 1 ac	Total Impacts	Mitigation	Gain or loss	
Catawba	0.02	0	0.02	0	-0.02	
Neuse	12.28	41.9	54.18	70.71	16.53	(+)
Tar-Pamlico	2.27	0	2.27	0.22	-2.05	
TOTALS:	14.57	41.9	56.47	70.93	14.46	(+)

The NCWRP is committed to tracking stream and wetland restoration efforts that are conducted outside of regulatory requirements. The data for wetland and stream restoration presented in this section should be evaluated with the following caveat: The distinction between restoration and enhancement is difficult to discern. Projects that are categorized by survey respondents as restoration projects may actually be enhancement projects.

The NCWRP makes every effort to notify appropriate organizations about the restoration project survey; however, it is likely that some restoration projects completed during FY 02-03 are not recorded in the NCWRP database. The NCWRP is continuing to improve methods of data collection to increase the accuracy this information.

Net Gains/Losses of Wetlands and Streams Including Regulatory and Non-Regulatory Gains in Wetlands and Streams

As depicted in Tables 5-4 through 5-6, when regulatory losses, compensatory mitigation requirements and non-mitigation projects are combined, there is a net gain of 61.5 acres of wetlands and a net loss of 61,864 linear feet of streams for the state during FY 02-03. Additional wetland, riparian and buffer preservation efforts were also reported (Appendix C, Table C-1). Preservation of 676 acres of wetlands, 41,801 of riparian buffer and 69,750 linear feet of streams were reported.

Table 5-4 Net Gains/Losses of Acres of Wetlands by River Basin, FY 2002-2003

River Basin	Regulatory gains or losses (acres)	Non-regulatory gains for restoration/ creation (acres)	Net gains/ losses (acres)
Broad	-0.3	0	-0.3
Cape Fear	-38.6	0	-38.6
Catawba	-6.4	0	-6.4
Chowan	-0.8	0	-0.8
French Broad	-0.2	0	-0.2
Hiwassee	0.0	0	0.0
Little Tennessee	-0.2	0	-0.2
Lumber	23.2	0	23.2
Neuse	25.8	0	25.8
New	-0.1	0	-0.1
Pasquotank	-4.0	35	31.0
Roanoke	-1.9	0	-1.9
Savannah	0.0	0	0.0
Tar-Pamlico	-5.0	0	-5.0
Watauga	0.0	0	0.0
White Oak	6.2	0	6.2
Yadkin-PeeDee	28.7	0	28.7
TOTALS:	26.5	35	61.5

Table 5-5 Net Gains/Losses of Feet of Streams by River Basin, FY 2002-2003

River Basin	Regulatory gains or losses (feet)	Non-regulatory gains for restoration/creation (feet)	Net gains/ losses (feet)
Broad	-1,161	0	-1,161
Cape Fear	-7,888	0	-7,888
Catawba	-19,906	0	-19,906
Chowan	0	0	0
French Broad	-5,875	0	-5,875
Hiwassee	-437	0	-437
Little Tennessee	-1,797	0	-1,797
Lumber	-981	0	-981
Neuse	-5,223	0	-5,223
New	-3,202	400	-2,802
Pasquotank	-636	0	-636
Roanoke	-5,203	1,400	-3,803
Savannah	-408	0	-408
Tar-Pamlico	-3,859	0	-3,859
Watauga	-454	0	-454
White Oak	-421	0	-421
Yadkin-PeeDee	-6,213	0	-6,213
TOTALS:	-63,664	1800	-61,864

Table 5-6 Net Gains/Losses of Acres of Riparian Buffer by River Basin, FY 2002-2003

River Basin	Regulatory gains or losses (acres)	Non-regulatory gains for restoration/ creation (acres)	Net gains/ losses (acres)
Catawba	-0.02	0	-0.02
Neuse	16.53	0	16.53
Tar-Pamlico	-2.05	0	-2.05
TOTALS:	14.46	0	14.46

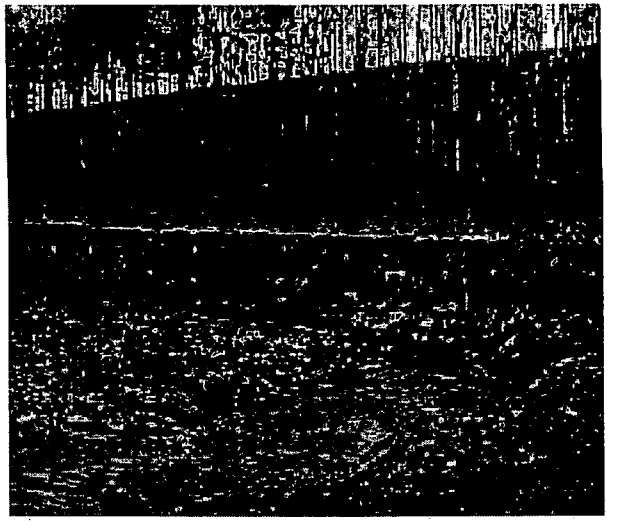
Appendix A – The N.C. Wetlands Restoration Program 2003 Annual Report to the U.S. Army Corps of Engineers

As required by paragraph VI of the Memorandum of Understanding (MOU) between the U.S. Army Corps of Engineers Wilmington District (COE)and NCWRP, a report documenting NCWRP's activities related to the MOU has been prepared and is submitted to the COE for review.

The majority of the information concerning the activities of the NCWRP is documented in the main body and appendices of this report that has been prepared for the Environmental Review Commission of the N.C. General Assembly as required by the enabling legislation for the NCWRP. The 2003 Annual Report, including this appendix, documents all activities of the NCWRP during FY 02-03 (July 1, 2002, through June 30, 2003). This appendix will address the specific reporting requirements found in Paragraphs V and VI of the MOU.

Memorandum of Understanding: Reporting Requirements

As specified in paragraphs V and VI of the MOU, the following information is presented in this report: the administrative costs associated with the MOU; a summary of monitoring results of projects that have been implemented; an accounting of the amount of restoration, creation, enhancement or preservation that has been conducted in each river basin by catalog unit; an accounting of the acres of mitigation required by Section 404 permits in each river basin by catalog unit; documentation concerning the implementation of projects in accordance with the time frame specified in the MOU; and an accounting of the funds that have been paid into the Wetlands Restoration Fund to satisfy the compensatory mitigation requirements of Section 404 permits.



Little Bagaboo Creek

Administrative Costs Associated with Implementation of the MOU

The salaries, travel and other operating expenses of eight positions are funded through the Compensatory Mitigation Fund (Account 2981). The cost of these positions during FY 02-03 was $487,056, the equivalent of 6.7 percent of the payments to Account 2981, an increase of 4 percent from last year. This is related to changes in both the administration costs and payments. Support for four NCWRP positions were permanently shifted from the operating budget to the receipt-supported Trust Fund during state government's budget crisis. Payments to the Wetlands Restoration Trust Funds were 57 percent less than last year. Administrative costs are incorporated within the fee structure and will not reduce the funding available for compensatory mitigation projects. Less than 4.3 percent of the expenditures were related to these administrative costs.

Summary of Monitoring Results of Projects

As required by Paragraph IV of the MOU, monitoring reports and as-built plans for each project will be submitted to the COE upon completion of each project. In addition, the appropriate COE Regulatory Field Office is notified during the planning and design phase of each project to provide an opportunity for input during the design phase of the project.

The NCWRP has constructed 21 projects and is monitoring these projects in accordance with the

MOU (Table A-1). The monitoring reports contain hydrological, fluvial geomorphological and vegetative monitoring data as appropriate for each project as well as project specific data necessary to ensure success of the restoration project. The first monitoring report for each constructed project is submitted to NCWRP during the fall after the first full growing season after the initial planting of vegetation. Monitoring continues for at least five full growing seasons after planting or until after all success criteria have been met. The full monitoring reports for all projects are submitted to the COE by January 1 of each year and are available for review at the NCWRP office located at 320 West Jones Street, Raleigh, North Carolina.

The second year of monitoring was complete for three projects (YD-101-WL-S-SM, Stone Mountain; CT-101-AX-S-PD, Payne Dairy; and WO-001-ON-W-SC1, Sturgeon City) during FY 02-03. Three projects completed the first year of monitoring during FY 02-03 (NU-203-WS-H-HSC, Hominy Swamp; CF-0020GU-S-PP, Price Park; and NW-001-AG-S-BC, Brush Creek). Following is a summary of the results of these reports. Eleven additional projects will complete the first year of monitoring during FY 03-04 (Table A-1).

Monitoring of Stream Restoration Projects

The monitoring of stream restoration projects involves the measurement of fluvial geomorphologic and vegetative parameters. Fluvial geomorphologic parameters include the measurement of channel dimension (cross-sections), pattern (sinuosity) and profile (channel slope). In addition, channel substrate is measured by performing pebble counts at identified pool and riffle cross-sections. Vegetative monitoring focuses on the survival, growth and diversity of vegetation within the riparian buffer of stream restoration projects.

Stream Restoration Success Criteria

The success criteria for stream restoration projects are based on the stability of the fluvial geomorphological parameters. Channel stability is primarily based on the measurement of dimension and slope. The success criteria has been met when there is no significant difference between the measurements for dimension and slope in the restored channel and the range for these parameters for the reference stream. A significant change is defined as a value that falls outside the specified range in the morphological table for the reference stream type.

Vegetative monitoring focuses on the survival, growth and diversity of planted species in the riparian area (30-50 feet on both sides of the stream). The vegetative success criterion is met by documenting the survival and growth of at least 320 trees per acre of the species selected for each site. In addition, the species composition of the riparian buffer must meet the species diversity criteria established for each project based on site-specific conditions.

Hominy Swamp Creek

Monitoring of Wetland Restoration Projects

The monitoring of wetland restoration/ enhancement projects involves the measurement of the hydrological and vegetative parameters. Hydrologic monitoring includes the measurement of groundwater hydrology, i.e., the depth from the surface to the groundwater table throughout the year. Vegetative monitoring focuses on the survival, growth and diversity of vegetation within the riparian buffer of stream restoration projects.

Table A-1 Status of Monitoring for NCWRP Projects

Project Name	Project Number	Project Type	River Basin	Cataloging Unit	County	Date Construction	Date Planted	First Monitoring
Stone Mountain	YD-101-WL-S-SM	S	Yadkin	03040101	Wilkes	Jul-00	Feb-01	Nov-01
Payne Dairy	CT-101-AX-S-PD	S	Catawba	03050101	Alexander	Mar-01	Mar-01	Nov-01
Sturgeon City (Phase I)	WO-001-ON-W-SC1	W	White Oak	03030001	Onslow	Mar-01	Mar-01	Nov-01
Hominy Swamp Creek	NU-203-WS-S-HSC	S	Neuse	03020203	Wilson	Aug-01	Dec-01	Nov-02
Price Park	CF-002-GU-S-PP	S	Cape Fear	03030002	Guilford	Jul-01	Dec-01	Nov-02
Brush Creek	NW-001-AG-S-BC	S	New	05050001	Alleghany	Jun-01	Dec-01	Nov-02
High Vista	FB-105-BN-S-HV	S	French Broad	06010105	Buncombe	Aug-02	Dec-02	Nov-03
Wike Property	CT-101-CT-S-WP	S	Catawba	03050101	Catawba	Jul-02	Dec-02	Nov-03
Howell Woods	NU-201-JS-W-HW	W	Neuse	03020201	Johnston	Jul-02	Dec-02	Nov-03
Kentwood Park	NU-201-WK-S-KP	S	Neuse	03020201	Wake	Aug-02	Dec-02	Nov-03
Chavis Park	NU-201-WK-S-CP	S	Neuse	03020201	Wake	Aug-02	Dec-02	Nov-03
Smith/Austin Creek	NU-201-WK-SWB-SAC	S,W,B	Neuse	03020201	Wake	Aug-02	Dec-02	Nov-03
Brown Branch	CT-101-CL-S-BB	S	Catawba	03050101	Caldwell	Sep-02	Dec-02	Nov-03
Beaver Creek	YD-101-SU-S-BC	S	Yadkin	03040101	Surry	Aug-02	Dec-02	Nov-03
Bear Swamp Creek	TP-101-FR-S-BSC	S	Tar-Pamlico	03020101	Franklin	Jul-02	Dec-02	Nov-03
Sandy Creek	CF-002-DU-SW-SC	S,W	Cape Fear	03030002	Durham	Apr-03	Apr-03	Nov-03
Clear Creek	FB-105-HD-S-CC	S	French Broad	06010105	Henderson	Apr-03	Dec-03	Nov-04
Suck Creek	CF-003-MO-S-SC	S	Cape Fear	03030003	Moore	Apr-03	Dec-03	Nov-04
Hillsdale Park	CF-002-GU-S-HP	S	Cape Fear	03030002	Guilford	Jun-03	Dec-03	Nov-04
Gillespie Golf Course	CF-002-GU-S-GGC	S	Cape Fear	03030002	Guilford	Aug-03	Dec-03	Nov-04
Bugaboo Creek	YD-101-WL-S-BC	S	Yadkin	03040101	Wilkes	Aug-03	Dec-03	Nov-04

Project Type: S -- Stream; W -- Wetland; B -- Riparian Buffer

Wetland Restoration/Enhancement Success Criteria

Hydrological restoration is achieved when the restored site meets the hydrological success criteria based on site-specific conditions associated with landscape position and soil types. At a minimum and as the primary hydrological success criterion, monitoring must document that the groundwater table is within 12 inches of the ground surface from 5 to 12 percent of the growing season. As a second hydrological success criterion, the NCWRP monitors reference wetlands that are similar in type and landscape position. Data collected from reference sites are compared to similar information related to the restoration site. Success for this hydrological criterion is achieved when the hydroperiod of the restored site is within plus or minus 10 percent of the hydroperiod of the reference site.

Vegetative monitoring focuses on the survival, growth and diversity of planted species within the restored/enhanced wetland. The vegetative success criterion is met by documenting the survival and growth of at least 320 trees per acre of the species selected for each site. In addition, the species composition of the restored/enhanced wetland must meet the species diversity criteria established for each project based on site-specific conditions.

Summary of Monitoring Results

YD-101-WL-S-SM - Stone Mountain (Second Year Report)

A stream restoration project consisting of 7,000 linear feet of restoration and 2,590 of enhancement was performed on the East Prong of the Roaring River in Stone Mountain State Park in 2000. The primary goals of this project were to improve water quality and habitat by returning the river channel to a stable pattern, dimension and profile.

Fluvial Geomorphology

Stream cross-sections (dimension) exhibited little to no change from years 2000 to 2002. Minor changes in pool dimension (e.g., pool deepening and riffle dimensions or some instance of channel narrowing) indicate stability within the channel. Longitudinal profile surveys confirmed some pool deepening, little to no change in riffles slopes and proper functioning of grade control structures. The average channel slope of the project is very similar to the conditions following construction in the year 2000.

Stone Mountain

Vegetation

The average density of surviving planted trees is 840 trees per acre. With the exception of one location, all the monitoring plots have at least a density of 320 surviving trees per acre. Natural regeneration of several desirable species (e.g., sycamore, tulip poplar and river birch) was exhibited in monitoring plots and throughout the site. The diversity of species within each plot is within the range established for this project.

Remedial Actions

A large log cross vane was repaired in Reach 2 in the year 2001. In November 2002, two log cross vanes in Reach 2 and 4 were replaced with rock cross vanes.

To ensure adequate diversity and continued survival of a minimum of 320 stems per acre, additional planting (live stakes and bare root seedlings) was performed during winter 2002-03. While the monitoring reports maintain the vegetative success criteria has been met, NCWRP staff have walked the site with North Carolina State University (NCSU) plant

specialists and determined that more remedial action is warranted. Several large spaces in the riparian area lack the appropriate seedling density.

Deer browse continues to be a major problem. The NCWRP and NCSU staff determined that the first phase of remedial activity will begin with planting larger trees close to the stream bank for the winter of 2003-04. Phase II will include additional plantings of larger trees in the outer riparian area. The necessity to phase the planting is related to the availability of commercially grown trees that meet the projects specifications for height and root-collar diameter.

CT-101-AX-S-PD - Payne Dairy (Second Year Report)

A stream restoration project was performed on a 7,000 linear foot reach of Jumping Run Creek in Alexander County. Priority I restoration was performed on 5,180 feet of stream channel. The remainder of the project consisted of 470 linear feet of Enhancement I and 1,350 linear feet of Enhancement II. The entire 7,000 linear foot reach was fenced to remove cattle from the stream on an active dairy farm. The primary goals of this project were to improve water quality and habitat through the restoration of a stable channel and restore the vegetation in the adjacent riparian buffer.

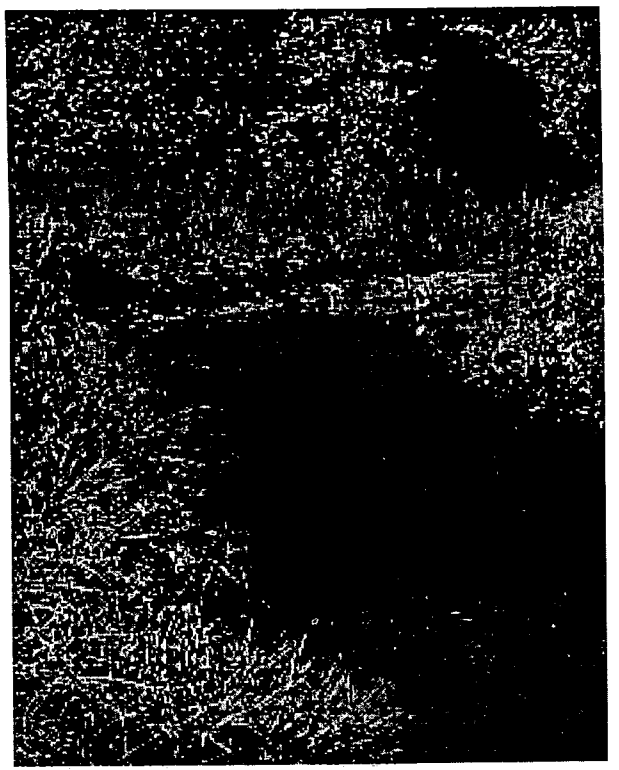
Fluvial Geomorphology

The second year of monitoring shows stable channel dimensions and profiles that match the conditions of the post-construction and first year topographical surveys. The majority of rock vanes were functioning properly with the exception of several structures that experienced some damage from past storm events. At these locations, the channel profile has adjusted resulting in localized degradation, i.e., head cutting. The majority of structures that experienced damage are located in the upper portions of the project where the average channel slope is highest. Lower sections of the project are not experiencing changes in dimension and profile.

The second year's topographical survey of the restored stream channel shows the horizontal alignment to be stable with little indication of bank erosion and no appearance of bank failures or shoot cut-offs.

Vegetation

The average density (i.e., survival) of the planted trees in the riparian buffer was less than 320 stems per acre; therefore, the success criteria for restoring vegetation was not met. The survival of live stakes within the bankfull channel exceeded the requirement of 320 stems per acre. In addition, the herbaceous vegetation on the floodplain and the streambanks provides 100 percent cover resulting in stabilization of the soil on the floodplain and the streambanks.



Payne Dairy

Remedial Actions

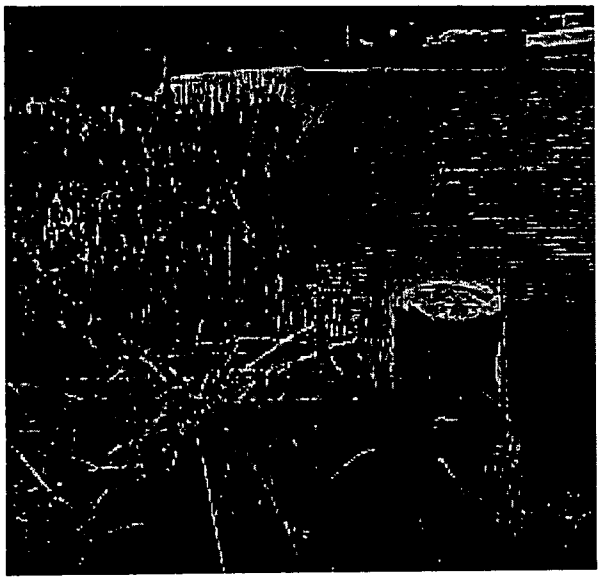
Damaged grade control structures will be repaired. The riparian buffer areas were replanted in the spring of 2002 but have yet to meet the success criteria for tree species density. Aggressive management of competitive and invasive species (e.g., *Festuca* sp. and *Ligustrum* sp.) will be undertaken to improve the survival and growth of planted species. Additional plantings are scheduled for late 2003.

WO-001-ON-W-SC1 - Sturgeon City

(Second Year Report)
Three acres of brackish coastal marsh and tidal creek were restored at the site of an abandoned wastewater treatment plant on Wilson Bay in Jacksonville, North Carolina. This project involved the removal of fill and debris that had been used to fill the marsh. The area was graded to the elevation of adjacent marshes and planted with giant cordgrass (*Spartina cynosuroides*) and other species. The goal of the project was to stabilize the shoreline with native vegetation and to improve water quality and habitat through the restoration of the marsh. This project is just one of the actions taken to improve the water quality of Wilson Bay and demonstrates how compensatory mitigation projects can be incorporated into watershed scale projects.

Vegetation and Hydrology
The hydrological restoration of this project is dependent on the constructed topography of the site which was based on the elevations of surrounding and adjacent marsh areas. As such, the survival of the reestablished marsh plant communities, which are sensitive to minor differences in hydroperiod, will be used as a proxy for hydrological restoration. All monitoring plots for vegetation exhibit high survival of planted species and exceed the success criterion of 25 percent cover. The species composition within the planted marsh community has not changed from the composition reported by the post-construction survey or the first year's monitoring report.

Remedial Actions
Invasive herbaceous plants (e.g., *Digitaria* sp.) observed in some plots will continue to be monitored with actions taken as necessary to ensure that these species do not impede the growth of desired species.



Sturgeon City

NU-203-WS-H-HSC – Hominy Swamp (First Year Report)
In the year 2001, 2,232 linear feet of stream restoration was performed in Wilson City Recreational Park in Wilson, North Carolina. The project's objectives were to stabilize severe stream bank erosion, minimize channel migration and improve the stream's aquatic habitat. A Priority 1 stream restoration methodology was implemented and a riparian plant community was planted in a 50-foot wide area leading away from both sides of the stream.

Fluvial Geomorphology
A comparison of the as-built and monitored conditions of June 2002 indicates that the stream geometry is consistent with the original design parameters, such as riffle cross-sectional area, width to depth ratios and average water surface slope.

All rock and log cross vanes appeared to have little damage and are functioning as designed. Where bank erosion has occurred, it has been minimal and associated with isolated areas that experience pedestrian traffic within the bankfull channel. The erosion is likely exacerbated by trampling of planted species, especially live stakes that would lend to bank stability.

Vegetation
Results from the monitoring of riparian vegetation after one full growing season show that survival of planted species is poor and does

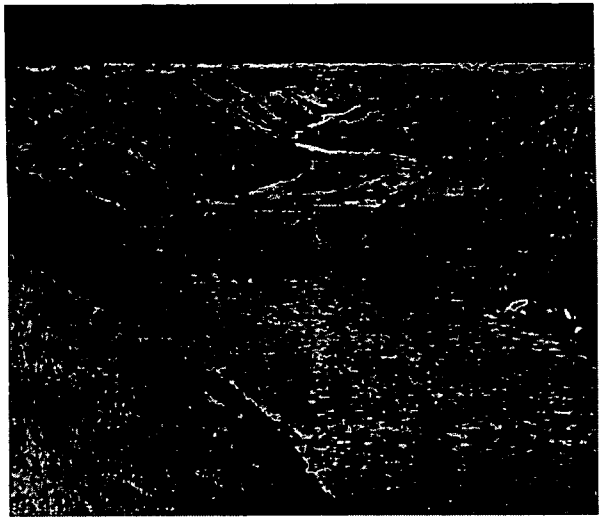
not meet the success criteria. Bare root seedling mortality after the initial planting was directly attributable to over 200 plants being pulled and left on the ground by park visitors. In addition, maintenance staff mowed many of the trees that were left; only the live stakes on the stream bank survived the first planting.

Remedial Actions
Riparian areas that exhibited poor survival were re-planted in 2002. Staff have met with park maintenance and emphasized the easement boundary. Mowings inside the easement area have halted and riparian boundary markers have since been installed.

CF-0020GU-S-PP, Price Park (First Year Report)

In the year 2001, approximately 1,775 feet of Priority 1 stream restoration was performed on an unnamed tributary to Horsepen Creek in Greensboro, North Carolina. The stream was previously a 1,400-foot long channel that had been straightened and widened in the 1930s to convey floodwater. A riparian plant community was planted in the winter of 2002.

Fluvial Geomorphology
The site is meeting the success criteria for maintaining a stable geomorphology. The stream's longitudinal profile that was surveyed during the first year of monitoring matches the profile surveyed shortly after construction and is maintaining the average channel slope set forth



Brush Creek

in the project's design parameters. There was a slight deepening of pool features that is considered a natural adjustment. The location and elevation of rock structures are nearly identical to the as-built conditions which supports the visual assessment that the structures are stable and functioning properly. Surveys of various cross-sections of the channel did not indicate a significant change in channel dimension. The pattern of the stream is unchanged from the as-built condition.

Vegetation
The survival of the planted riparian vegetation for the first year of monitoring was poor and does not currently meet the density needed to meet the success criteria for establishing vegetation. The high mortality of the bare root seedlings was due to the extreme drought conditions when the seedlings were planted and throughout the growing season for the first year.

Remedial Actions
The restoration site will be replanted in the winter of 2003-2004 with appropriate site preparation and maintenance.

NW-001-AG-S-BC, Brush Creek (First Year Report)

The Brush Creek stream restoration project was constructed in 2001. The project consists of approximately 2,300 feet of enhancement and stabilization on Brush Creek and approximately 950 feet of restoration on Little Pine Creek, a tributary to Brush Creek. Brush Creek and Little Pine Creek were previously exhibiting severe bank erosion and failure as well as a subsequent degradation of aquatic habitat. Both streams are classified for the protection of trout propagation and survival.

Fluvial Geomorphology
Surveys of cross-sections on both streams show that their dimensions have not changed significantly compared to the as-built dimensions. There is some visual evidence of channel adjustments in some areas, such as instances of localized bank erosion on Little Pine Creek. These areas can be addressed through additional toe protection and contouring of stream banks.

The survey of stream profile for the first year matches that of the restored conditions. With the exception of a local area of bank erosion, the surveys of the streams' dimension and profile match the conditions of the site shortly after construction.

Vegetation
A survey of the density of plantes reports that seedling survival was below the success criteria of 320 stems per acre. The herbaceous vegetation on both the streambank (and toe) and floodplain provides 100 percent coverage to stabilize the soil.

Remedial Actions
The areas of bank erosion on Little Pine Creek will be repaired in the year 2003. A supplementary planting plan is being developed, and the site will be replanted in the winter of 2003-2004.

Accounting of the Amount of Restoration, Creation, Enhancement or Preservation Conducted in Each River Basin by Catalog Unit

The NCWRP currently has 67 projects that meet the definition of "instituted" and will be used to meet the compensatory mitigation requirements of Section 404 permits (Table 1-1). These 67 projects will collectively restore, enhance and preserve approximately 539.9 acres of wetlands, 219,112 linear feet of stream channel and 335 acres of riparian buffer. As defined in the MOU, "instituted" means that a site has been identified, the property has been acquired and a contractor has been assigned to design the project. An additional 26 projects in the acquisition phase will result in the restoration, enhancement or preservation of 268 acres of wetlands, 85,950 linear feet of stream and 186.75 acres of riparian buffer (Table 1-2).

Instituted – A site has been identified, the property has been acquired and a contractor has been assigned to design the project

Accounting of the Compensatory Mitigation Required by Section 404 Permits Assumed by NCWRP in Each River Basin by Catalog Unit

During FY 02-03, the NCWRP assumed the compensatory mitigation requirements of 57 Section 404 permits. The compensatory mitigation requirements of these permits require the restoration of 16,646 linear feet of stream channel and 33.3008 acres of wetlands (Table A-2). Payments to fund mitigation projects associated with these impacts totaled $3,228,515 (Table A-3).

Since the effective date of the MOU (Nov. 4, 1998) the NCWRP has assumed the compensatory mitigation requirements of 174 Section 404 permits. The cumulative compensatory requirements of these permits require the restoration of 201,308 linear feet of stream channel and 236.732 acres of wetlands. The impacts accepted are distributed among 11 river basins and 23 catalog units (Table A-4).

Documentation Concerning the Implementation of Projects in Accordance with the Timeframe Specified in the MOU

As stipulated in paragraph IV of the MOU, the NCWRP has a specified amount of time from the date a payment for compensatory mitigation is received to implement projects that satisfy the compensatory mitigation requirement. The long-term goal of the NCWRP is to identify and implement projects that are incorporated into watershed restoration strategies in advance of permitted impacts. Although significant progress has been made in achieving this goal, the current emphasis of the NCWRP is compliance with the timeframes established by the MOU. This section will examine the progress NCWRP has made in meeting the compensatory mitigation requirements of Section 404 permits from the initiation of the MOU through the end of FY 02-03.

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Table A-2 Section 404 Compensatory Mitigation Accepted During FY 2002 – 2003

COE Number	River Basin	Cataloging Unit	Payment Date	Mitigation Due Date	Mitigation Requirement				
					Stream (linear feet)			Wetland (acres)	
					cold	cool	warm	riparian	non-riparian
200230574	Yadkin	3040105	6/20/2002	6/20/2003			292		
200120974	Neuse	3020201	6/27/2002	6/27/2003			302		
200230135	French Broad	6010105	7/2/2002	7/2/2003				0.58	
200100296	Cape Fear	3030004	7/2/2002	7/2/2003				3.7	
199402926	White Oak	3030001	7/8/2002	7/8/2003				5.93	
200230204	French Broad	6010105	7/8/2002	7/8/2003			2428	1.5	
199700923, 199700924, 199700925	Cape Fear	3030002	7/9/2002	7/9/2003				1.76	
200220819	Neuse	3020201	7/11/2002	7/11/2003			6254		
200220894, 200220895	Roanoke	3010107	7/26/2002	7/26/2003					0.8
200220332	Catawba	3050103	8/9/2002	8/9/2003			298		
200120825	Tar-Pamlico	3020101	8/13/2002	8/13/2003				0.62	
200021887	Neuse	3020201	9/12/2002	9/12/2003				0.11	
200200091	Cape Fear	3040203	9/18/2002	9/18/2003				0.48	
200220906	Cape Fear	3030002	9/24/2002	9/24/2003		285		0.82	
200200442	Cape Fear	3030005	9/24/2002	9/24/2003				0.2	
200100555	Cape Fear	3030001	10/9/2002	10/9/2003					0.24
199700175	Neuse	3020201	10/14/2002	10/14/2003			582	2.26	2.52
200231208	Yadkin	3040105	10/28/2002	10/28/2003			450		
200221113	Neuse	3020201	11/19/2002	11/19/2003			340		
200130682	French Broad	6010105	11/26/2002	11/26/2003		380			
200231321	Catawba	3050101	11/26/2002	11/26/2003			375		
200221185	Neuse	3020201	11/26/2002	11/26/2003			167		
200200010	Cape Fear	3030001	11/26/2002	11/26/2003					0.376
200200438	Cape Fear	3030001	11/27/2002	11/26/2003					0.489
200221320, 200221321, 200221322	Neuse	3020201	12/9/2002	12/9/2003			574		

Table A-2 Continued next page

Continued from previous page: Table A-2 Section 404 Compensatory Mitigation Accepted During FY 2002 – 2003

COE Number	River Basin	Cataloging Unit	Payment Date	Mitigation Due Date	Mitigation Requirement				
					Stream (linear feet)			Wetland (acres)	
					cold	cool	warm	riparian	non-riparian
200200945	Cape Fear	3030001	12/18/2002	12/18/2003					0.33
200230878, 200230879	Catawba	3050101	12/31/2002	12/31/2003			255		
200231309, 200230752	Yadkin	3040105	1/13/2003	1/13/2004		470		1.72	
200200731	Cape Fear	3030004	1/16/2003	1/16/2004					0.3
200231320	Catawba	3050103	2/5/2003	2/5/2004			250		
200330098	Catawba	3050101	2/12/2003	2/12/2004			174		
200220875	Neuse	3020201	2/27/2003	2/27/2004			215		
200120271, 200221123	Neuse	3020201	2/27/2003	2/27/2004				0.88	
200320410	Neuse	3020201	3/21/2003	3/21/2004			288		
200300439	Cape Fear	3030005	3/26/2003	3/20/2004					0.15
200201284	Cape Fear	3030001	3/26/2003	3/24/2003					0.128
200120507	Cape Fear	3020002	4/5/2003	4/4/2004				0.44	
200120766	Neuse	3020201	5/2/2003	5/2/2004				0.9	
200201110	Cape Fear	3030007	5/7/2003	5/6/2004				0.8	
200200390	Cape Fear	3030007	5/7/2003	5/6/2004				0.8198	
200200569	Cape Fear	3030007	5/7/2003	5/6/2004				0.482	0.096
199801874	Lumber	3040203	5/7/2003	5/6/2004				1.6	
200200250	Cape Fear	3030005	5/16/2003	5/15/2004					0.81
200231120	Catawba	3050103	5/23/2003	5/22/2004			185		
200201323	Cape Fear	3030005	6/5/2003	6/4/2004				0.9	
200330434	New	5050001	6/12/2003	6/11/2004				0.48	
200300278	Lumber	3040203	6/17/2003	6/16/2004				0.58	
200320621	Cape Fear	3030002	6/24/2003	6/24/2004			480		
200220949	Neuse	3020201	6/25/2003	6/24/2004			1602		
				Totals	**0**	**1,135**	**15,511**	**27.5618**	**6.239**
			Total Stream Footage				**16,646**		
			Total Wetland Acreage					**33.8008**	

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Since its inception, the NCWRP has accepted 238,005 linear feet of stream and 304.47 acres of wetland mitigation (401 and 404) in North Carolina. The NCWRP has restoration projects which will restore 304.9 acres of wetlands and 219,112 linear feet of stream. A summary of statewide wetland and stream mitigation status can be found in Section 2.

In accordance with the schedule established by the MOU, there were 174 Section 404 permits with compensatory mitigation requirements due by the end of FY 02-03 (Table A-4). The mitigation requirements of 89 percent of these permits were met by projects that were instituted by the end of FY 02-03. The mitigation for 78 percent of the permits was provided within the timeframe established in the MOU. The mitigation requirements met for FY 02-03 fell 3 percent over the previous fiscal year. The permits that met the timeframe established in the MOU fell 6 percent. The primary factor for the slight decrease in compliance was directly related to the amount of wetland and stream mitigation that came due last fiscal year. Of the total amount of wetland and stream mitigation due cumulatively for the program, 72 percent of the total stream linear footage and 67 percent of the total wetland acreage came due in FY 02-03.

Horsepen Creek Tributary, Price Park

The NCWRP has assumed the responsibility of Section 404 permits with compensatory mitigation requirements totaling 236.732 acres of wetlands and 201,308 linear feet of stream channel (Table A-4). The NCWRP has instituted projects that will result in the restoration, enhancement or preservation of 539.9 acres of wetlands and 219,112 linear feet of stream channel.

Although the total amount of restoration instituted by the NCWRP exceeds the total amount of required mitigation on a statewide basis, there are mitigation obligations that have not been met. Specifically, at the end of FY 02-03, there were 20 permits for which the mitigation requirements were not met. A number of actions have been initiated to address these outstanding requirements, including the allocation of additional staff resources to the watersheds of concern, the development of Local Watershed Plans in these areas to assist in the identification of appropriate projects and the issuance of Requests for Proposals for wetland and stream restoration.

Accounting of the Funds Paid into the Wetlands Restoration Fund to Satisfy the Compensatory Mitigation Requirements of Section 404 permits

As required by the MOU, the NCWRP has established a separate account – 2981: Compensatory Mitigation within the DENR Wetlands Trust Fund – as a repository for all payments made to the NCWRP to satisfy Section 404 compensatory mitigation requirements. As reflected in Section 3 of the 2001 NCWRP Annual Report, Compensatory Mitigation Account 2981 is a repository for payments that satisfy both Section 404 permit and 401 Water Quality Certification compensatory mitigation requirements. During FY 02-03, payments to Account 2981 to satisfy the compensatory mitigation requirements of Section 404 permits totaled $3,228,515. These payments fulfill the compensatory mitigation requirements of 57 permits (Table A-2 and A-3). Since the effective date of the MOU, Nov. 4, 1998, 165 payments associated with 230 Section 404 permits have been accepted totaling $30,774,985. These were made to Account 2981 to satisfy the compensatory mitigation requirements of Section 404 permits.

Section 5 of this report explains the use of the funds deposited into Account 2981 during FY 02-03.

Additional Actions Taken To Implement the Memorandum of Understanding

Development of Planting Specifications

The NCWRP developed planting specifications to improve the survivability of riparian plantings during FY 02-03. These new specifications will be used for all plantings beginning December 2003.

The NCWRP staff focused on several areas for improving past successes. First, the new specifications require that the construction contractor provide a qualified supervisor with planting experience. The supervisor must have at least one of several listed certifications or registrations (for example, registered forester or registered landscape contractor). Second, the plants themselves must meet minimum requirements. For example, bareroot seedlings must have four first-order lateral roots that exceed one millimeter in diameter. In addition, hardwood bareroot seedlings must have a minimum root collar diameter of 3/8 inch. These characteristics will ensure that larger, healthier specimens will be planted, and those not meeting the specifications will be culled. Finally, the specifications also cover the planting techniques.

Table A-3 Section 404 Compensatory Mitigation Payments

404 Permit Number	Payment Date	Stream (linear feet)	Non-Riparian Wetland Acres	Riparian Wetland Acres	Payment Amount
199402926	7/8/2002			5.93	$ 144,000
199700175	10/14/2002	582	2.52	2.26	$ 177,750
199801874	5/7/2003			1.6	$ 38,400
199930123	7/22/2002				$ 30,000
200021887	9/12/2002			0.11	$ 6,000
200100296	7/2/2002			3.7	$ 90,000
200100555	10/9/2002		0.24		$ 3,000
200101147	4/7/2003				$ 120,000
200120507	4/5/2003			0.44	$ 12,000
200120766	5/2/2003			0.9	$ 24,000
200120825	8/13/2002			0.62	$ 18,000
200130682	11/26/2002	380			$ 47,500
200200010	11/26/2002		0.376		$ 6,000
200200091	9/18/2002			0.48	$ 12,000
200200250	5/16/2003		0.81		$ 21,000
200200390	5/7/2003			0.8198	$ 24,000
200200438	11/26/2002			0.489	$ 6,000
200200442	9/24/2002			0.2	$ 6,000
200200569	5/7/2003		0.096	0.482	$ 18,000
200200731	1/16/2003		0.3		$ 6,000
200200945	12/18/2002		0.33		$ 6,000
200201110	5/7/2003			0.8	$ 24,000
200201284	3/25/2003		0.128		$ 3,000
200201323	6/5/2003			0.9	$ 24,000
200220332	8/9/2002	298			$ 37,250
200220819	7/11/2002	6,254			$ 781,750
200220875	2/27/2003	215			$ 26,875
200220906	9/24/2002	285		0.82	$ 59,625

Table A-3 Continued next page

Continued from previous page: Table A-3 Section 404 Compensatory Mitigation Payments

404 Permit Number	Payment Date	Stream (linear feet)	Non-Riparian Wetland Acres	Riparian Wetland Acres	Payment Amount
200220949	6/25/2003	1,602			$ 320,400
200221113	11/19/2002	340			$ 42,500
200221185	11/26/2002	167			$ 20,875
200230135	7/2/2002			0.58	$ 18,000
200230204	7/8/2002	2,428		1.5	$ 339,500
200230574	6/20/2002	292			$ 36,500
200231120	5/23/2003	185			$ 23,125
200231208	10/14/2002	450			$ 56,250
200231320	2/5/2003	250			$ 34,375
200231321	11/26/2002	375			$ 46,875
200300278	6/17/2003			0.58	$ 18,000
200300439	3/21/2003		0.15		$ 3,000
200320410	3/21/2003	288			$ 36,000
200320621	6/24/2003	480			$ 96,000
200330098	2/12/2003	174			$ 37,000
200330434	6/12/2003			0.48	$ 12,000
199700923, 1997009224, 1997009225	7/8/2002			1.76	$ 48,000
200120271, 200221123	2/27/2003	0		0.88	$ 44,750
200120974, 200220453	6/27/2002	302			$ 37,750
200220894, 200220895	7/26/2002		0.8		$ 12,000
200221320, 200221321, 200221322	12/9/2002	574			$ 35,875
200230878, 200230879	12/31/2002	255			$ 31,875
200231309, 200230752	1/13/2003	470		1.72	$ 100,750
SUMs STREAM, WETLANDS		8,632	0.95	7.50	$ 1,451,400

The planting techniques cover storage of seedlings, transport, handling and actual planting. The new specifications require all hardwood seedlings be planted with a shovel or an auger to ensure the proper depth and size of hole. Moreover, payment will be based on the percentage of seedlings planted correctly. NCWRP requires all designers to include these new planting specifications in bid documents.

Advisory Team Activities

The MOU between DENR and the COE (see Appendix B, 1998 Annual Report) requires the NCWRP to convene an Advisory Team to review the progress of the NCWRP in meeting compensatory mitigation requirements of Section 404 permits.

The NCWRP held four Advisory Team meetings during FY 02-03. The first meeting was held in Raleigh on Aug. 14, 2002, and the main topics were the Endangered Species process in NCWRP projects and the introduction of dam removals as mitigation options. The second meeting was held in Raleigh on Oct. 16, 2002, and the main topics were compliance with the MOU, Endangered Species and urban stream restoration issues. The third meeting was held in Charlotte on Jan. 16, 2003. The primary agenda items were urban stream restoration and stream monitoring issues. The group also went on-site to several potential projects to utilize the new COE quality of stream rating sheet. The fourth meeting was held in Asheville on April 23, 2003.

The primary topic was the introduction of the new planting specifications and monitoring protocol offered by NCWRP. In addition, bankfull verification and urban stream issues were discussed.

Quarterly Progress Reports

The NCWRP acknowledges the need to provide information to the COE and other interested parties concerning the progress it has made in meeting assumed compensatory mitigation requirements of Section 404 projects. Although the Annual Report meets the reporting requirements of the Memorandum of Understanding, the NCWRP started providing quarterly reports to COE in January 2003.

Table A-4 Cumulative Compensatory Mitigation Requirements November 4, 1998 to June 30, 2003

Basin	Catloging Unit	Wetlands		Streams		
		Non-Riparian	Riparian	Cold	Cool	Warm
Cape Fear	3030001	2.246				
Cape Fear	3030002	1.06	41.14		480	40,825
Cape Fear	3030003					185
Cape Fear	3030004	0.8	38.42			5,594
Cape Fear	3030005	5.04	1.52			
Cape Fear	3030007	3.316	9.1			9,569
Catawba	3050101	0.52	7.39	3746	3664	26,801
Catawba	3050103		9.84			28,998
French Broad	6010105		2.08		4,189	3,290
Lumber	3040203		7.01			
Neuse	3020201	3.45	32.15			31,819
Neuse	3020202	7	0.75			2,483
Neuse	3020204					374
New (mountain)	5050001		1.68	410	320	
New (coastal plain)	3030001	1	5.93			
Pasquotank	3010205	5.46	2.42			
Roanoke	3010103					2,906
Roanoke	3010107	0.8	8.43			770
Tar-Pamlico	3020101	26.76	0.62			212
Tar-Pamlico	3020103					1,198
Yadkin	3040101		3.25		26,010	3,833
Yadkin	3040201	5.08	0.75			532
Yadkin	3040103					3,100
Yadkin	3040105		1.72		470	742
Totals		62.532	174.2	4,156	34,663	162,489
Total Wetland (acres)		236.732				
Total Stream (feet)						201,308

Table A-5 Cumulative Required Compensatory Mitigation and NCWRP Restoration Projects (404 Only) Due By June 30, 2003

			Mitigation Requirement *										
COE Number	River Basin	Cataloging Unit	Stream (linear feet)			Wetland (acres)		Mitigation Due Date	Date Instituted[1]	Project Code	Mitigation Requirement Met	Mitigation Needed	
			cold	cool	warm	riparian	non-riparian				✓	Stream (linear ft)	Wetland (acres)
199921172, 200020339, 200021898	Cape Fear	3030002			1,116			11/14/2001	4/5/2000	CF-002-GU-S-PP	✓		
199502585	Neuse	3020201				2.37		12/1/2001	7/15/1999	NU-201JS-W-HW	✓		
199302820	Cape Fear	3030004			2,686			12/2/2001	7/24/2001, 4/9/2002	CF-004-HN-SW-JRC, CF-004-CB-S-CC	✓		
199830659	French Broad	6010105		780				12/2/2001	9/25/2001, 7/9/2001	FB-105-HD-S-CC, FB-105-BN-S-HV	✓		
200021861	Neuse	3020201				0.47		12/6/2001	7/15/1999	NU-201-JS-W-HW	✓		
199417015	Roanoke	3010103			2,906			12/14/2001	3/26/2002	RN-103/104-SK-S-SC	✓		
200021946, 200021887	Neuse	3020201			189			12/28/2001	6/30/1999	NU-201-WK-S-KP	✓		
						0.11		12/28/2001	7/15/1999	NU-201-JS-W-HW	✓		
199705426	Neuse	3020202			2,483			1/22/2002	5/30/2002	NU-202-LN-SW-WC	✓		
200021484-86	Yadkin	3040101			406			1/22/2002	4/23/2002	YD-101-FS-S-SP	✓		
200100100	Cape Fear	3030005					0.98	1/24/2002	1/22/2002	CF-005-BR-SW-BS	✓		
199820685	Cape Fear	3030002			268			2/3/2002	11/27/2001	CF-002-GU-S-GGC	✓		
199831147	French Broad	6010105		1,285				2/14/2002	7/9/2001	FB-105-BN-S-HV	✓		
199801874	Lumber	3040203				1.6		2/20/2002	7/21/2002	LU-203-RB-W-MSC	✓		
200000991	Cape Fear	3030004			100			2/28/2002	8/13/2001	CF-004-HN-SW-JRC	✓		
						28.2		2/28/2002	8/13/2001	CF-004-HN-SW-JRC	✓		

*Description of mitigation required. Warm, cool or cold stream restoration is sometimes specified on the Section 404 permit. Non-riparian or riparian restoration is specified for all permits that require wetland mitigation. [1]As defined in COE/DENR MOU

Table A-5 Continued next page

Continued from previous page: Table A-5 Cumulative Required Compensatory Mitigation and NCWRP Restoration Projects

			Mitigation Requirement *										
COE Number	River Basin	Cataloging Unit	Stream (linear feet)			Wetland (acres)		Mitigation Due Date	Date Instituted[1]	Project Code	Mitigation Requirement Met	Mitigation Needed	
			cold	cool	warm	riparian	non-riparian				✓	Stream (linear ft)	Wetland (acres)
200001398	Yadkin	3040201				0.75		3/1/2002	6/21/2003	YD-201-RI-SW-HB	✓		
199831046	Catawba	3050103			1,400			3/6/2002	4/16/2002	CT-103-MK-S-MC	✓		
						3.9		3/6/2002	8/21/2003	CT-003-MK-S-EP	✓		
199921144	Neuse	3020201			372			3/27/2002	11/1/2001	NU-201-DU-S-SC	✓		
199602420, 200021006	Yadkin	3040101		3,642				3/27/2002	5/5/1999	YD-101-WL-S-SM	✓		
200120090	New	5050001	410					4/19/2002	4/4/2000	NW-001-AG-S-BC	✓		
200120287, 200120288	Tar-Pamlico	3020101			212			4/19/2002	5/16/2001	TP-101-FR-S-BSC	✓		
200120708, 200020902	Neuse	3020201					0.43	4/19/2002	7/15/1999	NU-201-JS-W-HW	✓		
					1,249			4/19/2002	1/3/2001	NU-201-WK-SWB-SAC	✓		
						1.16		4/19/2002	7/15/1999	NU-201-JS-W-HW	✓		
199920910	Cape Fear	3030002				0.82		4/25/2002	9/25/2001	CF-002-WK-SW-LBC	✓		
199931141	Catawba	3050101	3,746					4/28/2002	5/29/2001	CT-101-CL-S-BB	✓		
						1.56		4/28/2002			×		1.56
199930003, 199931059, 199931060, 199931061, 199931062, 199931063	French Broad	6010105		1,744				4/28/2002	7/9/2001	FB-105-BN-S-HV	✓		
199300197	Cape Fear	3030004			1,148			5/1/2002	8/13/2001	CF-004-HN-SW-JRC	✓		

*Description of mitigation required. Warm, cool or cold stream restoration is sometimes specified on the Section 404 permit. Non-riparian or riparian restoration is specified for all permits that require wetland mitigation. [1]As defined in COE/DENR MOU

Table A-5 Continued next page

Continued from previous page: Table A-5 Cumulative Required Compensatory Mitigation and NCWRP Restoration Projects

			Mitigation Requirement *										
COE Number	River Basin	Cataloging Unit	Stream (linear feet)			Wetland (acres)		Mitigation Due Date	Date Instituted[1]	Project Code	Mitigation Requirement Met	Mitigation Needed	
			cold	cool	warm	riparian	non-riparian				✓	Stream (linear ft)	Wetland (acres)
199501526	Cape Fear	3030002			3,494			5/1/2002	9/25/2001, 3/26/2002	CF-002-WK-SW-LBC, CF-002-DU-SW-SC	✓		
						4		5/1/2002	9/25/2001	CF-002-WK-SW-LBC	✓		
199820670	Yadkin	3040101		2,560				5/1/2002	5/5/1999	YD-101-WL-S-SM	✓		
199920326	Neuse	3020201			532			5/1/2002	1/3/2001	NU-201-WK-SWB-SAC	✓		
199603343	Lumber	3040203				2.75		5/17/2002	7/21/2002	LU-203-RB-W-MSC	✓		
199500032	Roanoke	3010107				3		5/20/2002			×		3
199820755, 199821133	Neuse	3020201			480			5/20/2002	1/3/2001	NU-201-WK-SWB-SAC	✓		
200021059	Cape Fear	3030002			1,368			5/21/2002	11/27/2001	CF-002-GU-S-HP	✓		
199402528	Yadkin	3040101		2,928				5/25/2002	4/25/2001	YD-101-SU-S-BC	✓		
						3.25		5/25/2002	5/14/2002	YD-101-WL-SW-PC	✓		
199601917, 199700884	Neuse	3020201			10,226			5/25/2002	1/3/2001, 5/2/2002	NU-201-WK-SWB-SAC, NU-201-DU-S-EC	✓		
200120770	Neuse	3020201				0.658		6/5/2002	7/15/1999	NU-201-JS-W-HW	✓		
199603836	Cape Fear	3030007			875			6/6/2002	5/2/2002	CF-001-NH-S-PV	✓		
200030933 - 942	Catawba	3050103			742			6/6/2002	4/16/2002	CT-103-MK-S-MC	✓		
200110187, 200110384	Tar-Pamlico	3020103			1,198			6/6/2002	7/29/2003	TP-003-ED-S-TC	✓		
200020715, 200021152	Neuse	3020201				0.163		6/11/2002	7/15/1999	NU-201-JS-W-HW	✓		

*Description of mitigation required. Warm, cool or cold stream restoration is sometimes specified on the Section 404 permit. Non-riparian or riparian restoration is specified for all permits that require wetland mitigation. [1]As defined in COE/DENR MOU

Table A-5 Continued next page

Continued from previous page: Table A-5 Cumulative Required Compensatory Mitigation and NCWRP Restoration Projects

			Mitigation Requirement *										
COE Number	River Basin	Cataloging Unit	Stream (linear feet)			Wetland (acres)		Mitigation Due Date	Date Instituted[1]	Project Code	Mitigation Requirement Met	Mitigation Needed	
			cold	cool	warm	riparian	non-riparian				✓	Stream (linear ft)	Wetland (acres)
199304806	Cape Fear	3030004			1,660			6/12/2002	8/13/2001	CF-004-HN-SW-JRC	✓		
200011238	Pasquotank	3010205					5.46	6/12/2002	9/31/02	PA-105-PA-W-HT	✓		
200020223-224, 200020538	Cape Fear	3030002			155			6/22/2002	11/27/2001	CF-002-GU-S-GGC	✓		
200120354	Neuse	3020201			135			6/29/2002	5/2/2002	NU-201-DU-S-EC	✓		
						0.28		6/29/2002	7/15/1999	NU-201-JS-W-HW	✓		
200031430	Catawba	3050101			16,574			7/6/2002			×	16,574	
							0.52	7/6/2002			×		0.52
200120158	Yadkin	3040103			3,100			7/16/2002	6/4/2002	YD-101-FS-S-BF	✓		
199800680	Yadkin	3040201			290			7/17/2002	6/21/2003	YD-201-RI-SW-HB	✓		
							2.88	7/17/2002	6/21/2003	YD-201-RI-SW-HB	✓		
199920734	Cape Fear	3030002				0.84		7/18/2002	3/26/2002	CF-002-DU-SW-SC	✓		
199930891	Catawba	3050101			210			7/26/2002	2/24/1999	CT-101-AX-S-PD	✓		
199820919	Cape Fear	3030002			1,005			7/29/2002	11/27/2001	CF-002-GU-S-HP	✓		
200100510, 199300309	Cape Fear	3030007					2.56	8/14/2002			×		2.56
200120939	Neuse	3020201				0.3087		8/14/2002	7/15/1999	NU-201-JS-W-HW	✓		
199502585	Cape Fear	3030002				1.14		8/17/2002	3/26/2002	CF-002-DU-SW-SC	✓		

*Description of mitigation required. Warm, cool or cold stream restoration is sometimes specified on the Section 404 permit. Non-riparian or riparian restoration is specified for all permits that require wetland mitigation. [1]As defined in COE/DENR MOU

Table A-5 Continued next page

Continued from previous page: Table A-5 Cumulative Required Compensatory Mitigation and NCWRP Restoration Projects

			Mitigation Requirement *									
COE Number	River Basin	Cataloging Unit	Stream (linear feet)			Wetland (acres)		Mitigation Due Date	Date Instituted[1]	Project Code	Mitigation Requirement Met	Mitigation Needed
			cold	cool	warm	riparian	non-riparian				✓	Stream (linear ft)	Wetland (acres)
199502886	Cape Fear	3030002			23,862			9/5/2002	11/27/01, 11/27/01, 11/27/01, 9/25/01, 3/26/02, 3/26/02, 3/26/02, 5/1/02, 6/14/02	CF-002-GU-S-HP, CF-002-GU-S-BP, CF-002-GU-S-BBP, CF-002-WK-SW-LBC, CF-002-AL-S-HNP, CF-002-AL-S-WC, CF-002-DU-SW-SC, CF-002-AL-S-RB, CF-002-AL-S-DX	✓		
						29.46		9/5/2002	3/15/02, 10/23/2001, 3/1/2003, 5/9/2002	CF-002-WK-SW-LBC, CF-002-DU-SW-SC, Haw River RFP, CF-002-RK-P-HR	✓		
199604215	French Broad	6010105		862				9/8/2002	5/19/2003	FB-005-TR-S-KC	✓		
199601876	Neuse	3020201			920			9/18/2002	6/30/1999	NU-201-WK-S-KP	✓		
199920833	Yadkin	3040101		12,760				9/18/2002	3/29/99, 4/25/01, 11/27/01, 4/9/02	YD-101-WL-S-SM, YD-101-SU-S-BC, YD-101-WL-S-BC, YD-101-WL-S-WC	✓		
199930586	Catawba	3050103			941			9/18/2002	4/16/2002	CT-103-MK-S-MC	✓		
200001592, 200001598	Yadkin	3040201			242			9/24/2002	6/21/2003	YD-201-RI-SW-HB	✓		
199601404	Roanoke	3010107			770			9/27/2002			×	770	
						5.43		9/27/2002			×		5.43

Table A-5 Continued next page

Continued from previous page: Table A-5 Cumulative Required Compensatory Mitigation and NCWRP Restoration Projects

			Mitigation Requirement *										
COE Number	River Basin	Cataloging Unit	Stream (linear feet)			Wetland (acres)		Mitigation Due Date	Date Instituted[1]	Project Code	Mitigation Requirement Met	Mitigation Needed	
			cold	cool	warm	riparian	non-riparian				✓	Stream (linear ft)	Wetland (acres)
199601926	Yadkin	3040101		7,048				9/27/2002	4/9/2002, 5/14/02	YD-101-WL-S-WC, YD-101-WL-SW-PC	✓		
199602560	Cape Fear	3030007			178			9/27/2002	4/1/2002	CF-001-NH-S-PV	✓		
200030264-271	Catawba	3050103			1,054			9/27/2002	4/16/2002	CT-103-MK-S-MC	✓		
						5.94		9/27/2002			×		5.94
200120868	Neuse	3020201				0.32		10/3/2002	7/15/1999	NU-201-JS-W-HW	✓		
199820154	Neuse	3020201				8.4		10/4/2002	7/15/1999	NU-201-JS-W-HW	✓		
199930776	Catawba	03050101, 03050103			24,128			10/4/2002			×	24,128	
						5.25		10/4/2002			×		5.25
199830188	Catawba	3050101			2,199			10/5/2002	3/6/2001	CT-101-CT-S-WP	✓		
199400662, 199500517	Tar-Pamlico	3020101					26.76	10/5/2002	3/1/2003	KCI RFP	✓		
200210001-26	Pasquotank	3010205				2.42		10/15/2002	9/31/02	PA-105-PA-SW-CC	✓		
199820947	Neuse	3020201			260			10/17/2002	12/6/2001	NU-201-WK-S-BC	✓		
199911192	Neuse	3020202					7	10/22/2002	5/30/2002	NU-202-LN-SW-WC	✓		
						0.75		10/22/2002	5/30/2002	NU-202-LN-SW-WC	✓		
200021074	Neuse	3020201				4.54		10/22/2002	7/15/1999	NU-201-JS-W-HW	✓		
200120284	Neuse	3020201				0.45		10/22/2002	7/15/1999	NU-201-JS-W-HW	✓		
199601917, 199700884	Neuse	3020201				4		10/22/2002	7/15/1999	NU-201-JS-W-HW	✓		
199821210	Neuse	3020201			500			10/23/2002	12/6/2001	NU-201-WK-S-BC	✓		
200020203	Yadkin	3040101			499			10/24/2002	4/23/2002,	YD-101-FS-S-SP,	✓		

*Description of mitigation required. Warm, cool or cold stream restoration is sometimes specified on the Section 404 permit. Non-riparian or riparian restoration is specified for all permits that require wetland mitigation. [1]As defined in COE/DENR MOU

Table A-5 Continued next page

Continued from previous page: Table A-5 Cumulative Required Compensatory Mitigation and NCWRP Restoration Projects

			Mitigation Requirement *									
COE Number	River Basin	Cataloging Unit	Stream (linear feet)			Wetland (acres)		Mitigation Due Date	Date Instituted[1]	Project Code	Mitigation Requirement Met	Mitigation Needed
			cold	cool	warm	riparian	non-riparian				✓	Stream (linear ft)	Wetland (acres)
199702363	Catawba	3050101		3,664				10/26/2002			✓		
199931229, 199931000	Catawba	3050101			190			10/26/2002	3/6/2001	CT-101-CT-S-WP	✓		
199402773, 200020184	Cape Fear	3030002			3,700			10/26/2002	6/14/02, 5/22/02	CF-002-AL-S-DX CF-002-DU-S-FH	✓		
199403552	Cape Fear	3030007			8,516			10/31/2002			×	8,516	
						7		10/31/2002			×		7
199920857	New	5050001				1.2		10/31/2002			×		1.2
200220055	New	5050001	320					11/8/2002	10/6/1999	NW-001-AG-S-BC	✓		
200110916	Neuse	3020204			374			11/24/2002	5/30/2002	NU-202-LN-SW-WC	✓		
200120353	Cape Fear	3030002			5,304			12/17/2002			×	5,304	
						0.52		12/17/2002	3/26/2002	CF-002-DU-SW-SC	✓		
							1.06	12/17/2002	3/1/2003	Haw River RFP	✓		
200100628	Cape Fear	3030005				0.42		12/20/2002	1/22/2002	CF-005-BR-SW-BS	✓		
200200226	Cape Fear	3030004				0.88		2/19/2003	8/13/2001	CF-004-HN-SW-JRC	✓		
199820937	Cape Fear	3030004				5.64		1/3/2002	2/13/2001	CF-004-HN-SW-JRC	✓		
200020732	Cape Fear	3030002				1.34		2/22/2003	3/1/2003	Haw River RFP	✓		
200121014, 200220223	Cape Fear	3030002			268			3/14/2003	5/22/2002	CF-002-DU-S-FH	✓		
200100007	Cape Fear	3030005					3.1	4/5/2003	1/22/2002	CF-005-BR-SW-BS	✓		
200101075	Cape Fear	3030007					0.66	4/5/2003			×		0.66
200230067	Catawba	3050101			220			4/11/2003	3/6/2001	CT-101-CT-S-WP	✓		
200200226	Neuse	3020201			302			6/27/2003	11/1/2001	NU-201-DU-S-SC	✓		

*Description of mitigation required. Warm, cool or cold stream restoration is sometimes specified on the Section 404 permit. Non-riparian or riparian restoration is specified for all permits that require wetland mitigation. [1]As defined in COE/DENR MOU

Table A-5 Continued next page

Continued from previous page: Table A-5 Cumulative Required Compensatory Mitigation and NCWRP Restoration Projects

			Mitigation Requirement *										
COE Number	River Basin	Cataloging Unit	Stream (linear feet)			Wetland (acres)		Mitigation Due Date	Date Instituted[1]	Project Code	Mitigation Requirement Met	Mitigation Needed	
			cold	cool	warm	riparian	non-riparian				✓	Stream (linear ft)	Wetland (acres)
200220329	Cape Fear	3030003			185			4/22/2003	9/25/2001	CF-003-MO-S-SC	✓		
199920268	Neuse	3020201			490			4/24/2003	7/1/2002	NU-201-WK-S-PW	✓		
						1.75		4/24/2003	7/15/1999	NU-201-JS-W-HW	✓		
200101048	Yadkin	3040201					2.2	5/13/2003	6/21/2003	YD-201-RI-SW-HB	✓		
200120036	Neuse	3020201				0.88		5/22/2003	7/15/1999	NU-201-JS-W-HW	✓		
200100576	Cape Fear	3030004					0.5	5/23/2003	8/13/2001	CF-004-HN-SW-JRC	✓		
200120869, 200121149	Neuse	3020201				0.054		5/29/2003	7/15/1999	NU-201-JS-W-HW	✓		
200031274	Catawba	3050101			5,895			6/3/2003	3/1/2003	Elk Shoals RFP	✓		
						0.58		6/3/2003			×		0.58
200121286	Neuse	3020201					0.5	6/5/2003	7/15/1999	NU-201-JS-W-HW	✓		
199601836	Neuse	3020201			5,172			6/6/2003	7/18/2002	NU-201-WK-S-WF	✓		
						2.2		6/6/2003	7/15/1999	NU-201-JS-W-HW	✓		
200100555, 199403372	White Oak	3030001					1	6/12/2003	8/3/1999	WO-001-ON-W-SC1	✓		
199930472, 200230730	Catawba	3050101			709			6/14/2003	3/1/2003	Elk Shoals RFP	✓		
200120682	Neuse	3020201			332			6/20/2003	11/1/2001	NU-201-DU-S-SC	✓		
2002230574	Yadkin	3040105			292			6/20/2003	1/22/2002	YD-105-MK-S-CA	✓		
Totals			4476	37,273	144,239	141.36	55.61					58,956	33.95

*Description of mitigation required. Warm, cool or cold stream restoration is sometimes specified on the Section 404 permit. Non-riparian or riparian restoration is specified for all permits that require wetland mitigation.

[1]As defined in COE/DENR MOU

Appendix B — The N.C. Wetlands Restoration Program 2003 Annual Report to the N.C. Department of Transportation

Department of Environment and Natural Resources and Department of Transportation Memorandum of Understanding

On July 7, 1999, the N.C. Department of Environment and Natural Resources (DENR) and the N.C. Department of Transportation (NCDOT) signed a Memorandum of Understanding (MOU) designed to help address future NCDOT compensatory mitigation needs while protecting and improving water quality and habitat through the restoration of wetlands and streams as well as other activities that restore the biological, chemical and physical integrity of the waters of the state (refer to MOU copy within Appendix B of the 2000 WRP Annual Report). The agreement calls for the NCDOT to pay the DENR Wetlands Trust Fund $2.5 million annually for a period of seven years through 2006. These resources are allocated strictly for the development of Local Watershed Plans (LWP) within cataloging units (CU) where the NCDOT is anticipating compensatory mitigation needs. Pursuant to the 1999 MOU, the NCWRP completed or initiated a total of 15 planning efforts. (Refer to Table B-1 for a summary of related receipts and expenditures.)

Table B-1 Receipts and Expenditures Related to the Memorandum of Understanding with NCDOT

Local Watershed Plan	FY 00-01	FY 01-02	FY 02-03	Total
Broad			9,284	**9,284**
Catawba		57,705	342,290	**399,995**
Lower Yadkin		79,191	53,549	**132,740**
Middle Cape Fear		81,513	369,723	**451,236**
Lower Cape Fear	110,728	287,023	8,912	**406,663**
French Broad	17,543	49,000	3,350	**69,893**
Pasquotank		101,208	106,612	**207,820**
Upper Cape Fear		112,865	419,049	**531,914**
Upper Yadkin		35,137	325,646	**360,783**
Subtotal	**128,271**	**803,642**	**1,638,415**	**2,570,328**
Administrative	167,163	255,351	487,056	**909,570**
Total Expenditures	295,434	1,058,993	2,125,471	**3,479,898**
Total Receipts				10,000,000

NCWRP Progress in Development of Local Watershed Plans

Significant progress has been made with Local Watershed Planning initiatives this past fiscal year. From July 1, 2002, through June 30, 2003, the NCWRP completed two Local Watershed Planning efforts (New Hanover County in the Lower Cape Fear River basin and Mud Creek in the French Broad River basin) and continues Local Watershed Planning in 13 other local watersheds within nine CUs across the state. Six of these plans are scheduled for completion by December 2003 and three others are well under way with completion scheduled during 2004. A summary of the status of each Local Watershed Plan is provided in Table B-2.

During FY 01-02, an agreement between NCDOT and the NCWRP was developed describing the CU that each agency is responsible for mitigation within and when those responsibilities are effective. This agreement is included in the FY 01-02 NCWRP Annual Report in Appendix B, which is online at http://h2o.enr.state.nc.us/wrp/publications/2002_WRP_Annual_Report.htm. Since this agreement was established, the NCWRP has assumed responsibility of Cape Fear CU 03030007, effective January 2003, in addition to other CUs the NCWRP already had as its responsibility.

The implementation of LWPs across North Carolina to meet projected NCDOT mitigation needs has generated a number of important benefits at local, state and national levels. Highlights of these benefits include:

- At the ***local*** level, communities and local governments are working with the NCWRP to help identify watershed needs and feasible solutions to address them. Data generated during the planning process is being used to attain grant funds to implement solutions that cannot be implemented with mitigation funds. These efforts enhance and complement restoration projects implemented by the NCWRP to meet anticipated NCDOT mitigation needs. Additionally, the planning process is promoting education and awareness of water quality and habitat issues at a local scale. This is generating community support for project implementation as well as community involvement in watershed solutions.

- At the ***state*** level, Local Watershed Planning has laid the groundwork for the development of an innovative new program, the Ecosystem Enhancement Program (EEP), that will provide all of NCDOT's mitigation needs across the state beginning in January 2005. During this past fiscal year, significant progress on the development of this program was made. Part of this progress is directly related to work of the Watershed Needs Assessment Team which is charged with developing watershed assessment methods to be used by EEP. Their efforts have directly and significantly benefited from the NCWRP's Local Watershed Planning projects.

- ***Nationally***, the experiences generated through the Local Watershed Planning process are adding to a growing database of watershed planning and management examples. In late 2002, the federal government released a National Wetlands Mitigation Action Plan which is available online at: http://www.epa.gov/owow/wetlands/NWMAP122402signed.pdf that called for the integration of compensatory mitigation into a watershed context, among other things. North Carolina anticipates playing a critical role in satisfying this action item given the experience gained through Local Watershed Planning.

The implementation of Local Watershed Plans across North Carolina ... has generated a number of important benefits at local, state and national levels.

Status of Other Provisions Outlined in the Memorandum of Understanding

Beyond the development and implementation of LWPs, other provisions of the MOU include: development of a North Carolina Watershed Restoration Policy Committee, NCDOT involvement in LWP implementation and an NCDOT commitment to minimize impacts to certain types of wetland, stream and riparian habitats. The policy committee has not been established due to the implications of the development of EEP. The NCWRP continues to involve NCDOT in LWP activities.

Another component of the MOU is a commitment by the NCDOT to increase the avoidance and minimization of impacts to high quality resources. As part of the Permit Process Improvement Initiative involving NCDENR, NCDOT, COE and other regulatory agencies, the High Quality Resources Identification Team

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Table B-2 Summary of Current Local Watershed Planning Initiatives

River Basin	8-Digit CU	14-Digit HU	Local Watershed Name	Comments/Status	Completion Year	Contact / Plan Lead
Lower Cape Fear	3030007	03030007140010	Northeast Cape Fear	Completed December 2002	2002	Bonnie Duncan Bonnie.Duncan@ncmail.net (919) 733-5315
Upper Neuse	3020201	03020201060010 03020201050010	Lake Rogers & Ellerbe Creek	Building from EPA grant for the Upper Neuse Basin Association. Anticipated completion at the end of 2003.	2003	George Norris George.Norris@ncmail.net (919) 733-5312
Middle Neuse	3020203	03020203020040	Hominy Swamp Creek	Building off of an EPA grant. Conducted internal GIS analysis of watershed.	2003	Jocelyn Elliott Jocelyn.Elliott@ncmail.net (919) 716-1921
French Broad	6010105	06010105030020 06010105030030 06010105030040	Mud Creek	Completed December 2002.	2002	Kristin Cozza Kristin.Cozza@ncmail.net (704) 364-2733
Upper Cape Fear	3030002	03030002010010 03030002010030	Troublesome and Little Troublesome Creeks	Watershed assessment components nearly complete; stakeholder effort well underway.	2003	Hal Bryson Hal.Bryson@ncmail.net (919) 715-7452
Upper Cape Fear	3030002	03030002060100 03030002060070 03030002060080	Morgan and Little Creeks	Watershed characterization nearly complete and stakeholder process well underway.	2004	Bonnie Duncan Bonnie.Duncan@ncmail.net (919) 733-5315
Middle Cape Fear	3030004	03030004070010 03030004070020	Crane Creek	Assessment complete; stakeholder effort well underway.	2003	Jim Stanfill Jim.Stanfill@ncmail.net (919) 218-6872

Continued from previous page: Table B-2 Summary of Current Local Watershed Planning Initiatives

River Basin	8-Digit CU	14-Digit HU	Local Watershed Name	Comments/Status	Completion Year	Contact / Plan Lead
Middle Cape Fear	3030004	03030004020010 03030004030010 03030004040010	Kenneth Creek / Harris Lake	Watershed characterization in progress; stakeholder team established.	2004	Bonnie Duncan Bonnie.Duncan@ncmail.net (919) 733-5315
Catawba	03050101, 03050103	03050101170010 03050101170020 03050103020020 03050103020030 03050103020040 03050103020050	McDowell, Long, Sugar / Irwin, Little Sugar, McMullen, and McAlpine Creeks	Working with City and County stakeholders. Compilation and analysis of final assessment data is nearly complete.	2003	Jocelyn Elliott Jocelyn.Elliott@ncmail.net (919) 716-1921
Pasquotank	3010205	03010205050010 03010205010020 03010205040010	Pasquotank River	Watershed assessment is nearing completion and stakeholder effort well underway.	2003	Bonnie Duncan Bonnie.Duncan@ncmail.net (919) 733-5315
Lower Yadkin	3040105	03040105010020 03040105010010	Clarke Creek, West Branch Rocky River	Watershed assessment is nearly complete. Working primarily with local resource professionals as stakeholders.	2003	Hal Bryson Hal.Bryson@ncmail.net (919) 715-7452
Lower Yadkin	3040105	03040105010030 03040105010040 03040105010050 03040105020010	Coddle, Mallard, Reedy Creeks and Rocky River	Watershed assessment will build upon information; stakeholder team participating in the Clarke Creek, West Branch and Rocky River Plan. This is considered Phase II of the initial plan.	2005	Hal Bryson Hal.Bryson@ncmail.net (919) 715-7452
Upper Yadkin	3040101	03040101010100 03040101020010 03040101010110	Lewis Fork, Tucker Hole, Warrior Creek	Watershed assessment nearing completion. Working primarily with local resource professionals as stakeholders.	2003	Kristin Cozza Kristin.Cozza@ncmail.net (704) 364-2733
Broad	3050105	03050105070020	Cathey's Creek	Watershed characterization initiated along with public involvement.	2004	Kristin Cozza

Table B-3 Payments Accepted from NCDOT for Compensatory Mitigation

TIP number	401 Cert. Nu.	404 Permit Nu.	River Basin	Catalog Unit	County				Unit	Type	Date Payment Received	Payment Amount
						wetland	stream	buffer				
U-2107	11433	199402926	White Oak	3030001	Onslow	6.0			Acres	Wetland	7/8/2002	$ 144,000.00
U-3403C	11512	200230135	French Broad	6010105	Buncombe	0.8			Acres	Wetland	7/2/2002	$ 18,000.00
R-2547 and R-2641	11689	200220819	Neuse	3020201	Wake		6,254	3,648,150	Sq. Feet	Buffer	7/11/2002	$ 4,283,974.00
R-2214A	11715	200230204	French Broad	6010105	Henderson	2	2,428		Feet	Stream	7/8/2002	$ 339,500.00
B-3199	11809	200220264	Neuse	3020201	Johnston			12,948	Sq. Feet	Buffer	6/26/2002	$ 12,430.08
R-2907	20205	199700175	Neuse	3020201	Wake	5	582	40,964	Sq. Feet	Buffer	10/14/2002	$ 217,058.54
B-3527	20387	200220742, 200220743, 200220744	Neuse	3020201	Wake			1,544	Sq. Feet	Buffer	6/27/2002	$ 1,482.24
SR1128 (no TIP assigned)	20553	200220894, 200220895	Roanoke	3010107	Halifax	0.8			Acres	Wetland	7/26/2002	$ 12,000.00
I-306C	21677	200220949	Neuse	3020201	Durham		1,602	235,709	Sq. Feet	Buffer	6/25/2003	$ 546,680.64
												$ 5,575,125.50

Continued from page 60

has been initiated. This team will identify the types and locations of High Quality Resources throughout North Carolina. Their product is expected to be available by the end of 2003. In unison with the LWP approach, this team works to ensure that proactive planning to protect critical areas occurs in advance of road development impacts.

In accordance with the MOU, the NCWRP provides mitigation for NCDOT projects within 12 watersheds. During FY 02-03, nine projects were permitted with the NCWRP assuming the mitigation requirements (Table B-3). The NCWRP will assume responsibility for two additional watersheds during FY 03-04, Pasquotank CU 03010205 and Yadkin CU 03040105.

Appendix C — Statewide Restoration Survey

The N.C. Wetlands Restoration Program (NCWRP) mailed a survey to state, federal and local government agencies as well as non-profit organizations involved in restoration activities in an attempt to determine what restoration efforts were occurring across the state. The purpose of the survey was to collected details about restoration of wetlands and streams that were restored, created, enhanced or preserved during FY 02-03. Sixty organizations were canvassed and responses documented the restoration of 35 acres of wetlands and 1,800 linear feet of stream. The majority of activities reported by respondents were related to preservation.

This appendix lists the organizations who received the survey, a copy of the survey and the results.

Surveyed Organizations

The following organizations received the NCWRP survey on restoration efforts:

1) Wake County Soil and Water Conservation District
2) City of Raleigh Public Works
3) Wake County Cooperative Extension Service
4) The Conservation Fund
5) N.C. Division of Coastal Management
6) North Carolina State University, Water Quality Group
7) N.C. Division of Water Resources
8) The Nature Conservancy
9) N.C. Clean Water Management Trust Fund
10) N.C.Office of Conservation and Community Affairs
11) N.C. Division of Water Quality
12) The Conservation Trust forNorth Carolina
13) N.C.Division of Parks and Recreation
14) The North Carolina Coastal Federation
15) The Neuse River Foundation
16) The Pamlico-Tar River Foundation
17) North Carolina State University Water Resources Research Institute
18) Ducks Unlimited
19) N.C. Coastal Land Trust
20) N.C. Audubon Society
21) U.S. Fish and Wildlife Service
22) Piedmont Land Conservancy
23) U.S. Department of Agriculture
24) N.C. Division of Land Resources
25) Haw River Association
26) Eno River Association
27) RiverLink (French Broad)
28) Foothills Conservancy
29) N.C. Department of Forest Resources
30) Triangle Land Conservancy
31) Pigeon River Fund
32) Carolina Mountain Conservancy
33) Catawba Land Conservancy
34) Blue Ridge Rural Land Trust
35) Tar River Land Conservancy
36) High Country Conservancy
37) U.S. Environmental Protection Agency
38) The New River Foundation
39) The North Carolina Forestry Association
40) North Carolina Earthshare
41) Ellerbe Creek Watershed Association
42) Mecklenburg County Stormwater Services
43) Triangle Region Council of Governments
44) N.C. Fisheries Association
45) Triad Region Council of Governments
46) U.S. Army Corps of Engineers
47) Orange Water and Sewer Authority
48) N.C.Natural Resources and Conservation Service
49) N.C. Division of Soil and Water Conservation
50) Albemarle Resource Conservation and Development
51) N.C. State Cooperative Extension Service
52) N.C. Division of Marine Fisheries
53) N.C. Wildlife Resources Commission
54) N.C. League of Municipalities
55) North Carolina State University Forestry Extension Program
56) Lumber River Conservancy
57) Sandhills Area Land Trust
58) Carolina Power & Light
59) Duke Power
60) Progress Energy

North Carolina Wetland, Stream and Riparian Restoration, Creation, Enhancement and Preservation Survey for Fiscal Year 2002-2003

PROGRAM INFORMATION: *If your organization has more than one program conducting wetland or stream restoration, please fill out separate surveys for each program or make note of which projects are associated with different programs.*

1. **Program Title / Agency:**_____

2. **Program Representative and Contact Information:**

   Name_____

   Address_____

   Phone:_____ Fax:_____

   E-Mail:_____

PROJECT INFORMATION: *Please provide as much of the requested information as possible for each wetland/stream project.*

- Only include NON-COMPENSATORY MITIGATION projects initiated or completed between July 1, 2002 – June 30, 2003.
- List information for each project individually. You will need to make copies of the survey if you initiated or completed more than one project during the last fiscal year.
- Provide details on projects completed before fiscal year 2002 - 2003 by noting the appropriate fiscal year for each project on your survey.

1. **Project Name / Number:**_____
   (assigned by your program or organization)

2. **Purpose of the Project:** *general information about your project's purpose (i.e. to improve water quality, to reopen closed shellfish waters, improve fisheries and wildlife habitat, etc.).*

   _____

   _____

   _____

3. **Project Completion Date or Target Date of Completion:** *(Month/Year) Include the percentage of your project that was completed by June 30, 2003, if you provided a targeted project completion date.*

   Completion or Targeted Completion Date: _____

   % of Project Completed as of June 30, 2003: _____

4. **Project Funding Source(s) / Partners Involved:** *List any programs or granting entities that are funding your project and any other partners involved with your project.*

   _____

   _____

   _____

5. **Location Reference(s):** *The River basin, subbasin, county, 14-digit hydrologic unit – or whatever geographical unit your program uses for referencing projects.*

   River Basin:

____Broad	____Little Tennessee	____Savannah
____Cape Fear	____Lumber	____Tar-Pamlico
____Catawba	____Neuse	____Watauga
____Chowan	____New	____White Oak
____Hiwassee	____Roanoke	____Pasquotank
____French Broad	____Yadkin-Pee Dee	

   Subbasin (if known):

   Subbasin Number: _____

   USGS 14-Digit Hydrologic Unit: _____

   County:_____ Nearest Town:_____

6. **Type of legal instrument used to protect restored/protected project properties:** *If you are using conservation easements, please indicate the term length (i.e. 10, 15, 30 years or perpetuity).*

____Conservation Easement (number of years_____or permanent).

____Purchase Fee-Simple

____Contract (number of years_____)

7. **Project Activities:** *Review the definitions below, and then complete the table by placing a check next to the activities that apply to this project. Specify the number of acres / feet where appropriate.*

Wetland Restoration: Re-establish wetland hydrology and vegetation in an area where it previously existed.

Wetland Enhancement: Increase one or more of the functions of an existing wetland by manipulating vegetation or hydrology.

Wetland Creation: Establishing wetland hydrology, vegetation and soils in an area where wetlands did not exist in the recent past.

Stream Restoration: The process of converting an unstable, altered or degraded stream corridor, including adjacent riparian zone and floodprone areas to its natural or referenced, stable conditions considering recent and future watershed conditions. This process also includes restoring the geomorphic dimension, pattern, and profile as well as biological and chemical integrity, including transport of water and sediment produced by the stream's watershed in order to achieve dynamic equilibrium.

Stream Enhancement: Protecting and/or enhancing stream stability and functions by establishing vegetated buffers; increasing buffer width, and/or stabilizing streambanks using bioengineering techniques.

Wetlands and Stream Segment Preservation: Protecting wetlands and stream segments by purchasing, donating or conveying a conservation easement to an appropriate government or non-profit agency to manage.

Nonwetland Riparian Buffer Restoration: Establishing a vegetated buffer (minimum 25 ft. width) and maximizing sheet flow through buffer by receiving concentrated flow areas.

Nonwetland Riparian Buffer Enhancement: Increasing width of existing vegetated buffer and maximizing sheet flow through buffer by reducing concentrated flow amounts.

Nonwetland Riparian Buffer Preservation: Preserving existing forested buffers (minimum 25 ft. width).

Wetland

Please Check	Specify Acres
_____Restoration	_____Acres
_____Enhancement	_____Acres
_____Creation	_____Acres
_____Preservation	_____Acres

Stream

Please Check	Specify Feet
_____Restoration	_____Feet
_____Enhancement	_____Feet
_____Creation	_____Feet
_____Preservation	_____Feet

Non-Wetland Riparian Buffers

Please Check	Specify Square Feet	or Acres
_____Restoration	_____Sq. Feet	_____Acres
_____Enhancement	_____Sq. Feet	_____Acres
_____Creation	_____Sq. Feet	_____Acres
_____Preservation	_____Sq. Feet	_____Acres

Send completed surveys, by September 12, 2003, to:

NC Wetlands Restoration Program
1619 Mail Service Center
Raleigh, NC 27699-1619
Or Fax: (919) 733-5321.

Questions? Call (919) 733-5312 or send e-mail to George.Norris@ncmail.net.

Table C-1 2003 Results of Restoration Survey

Project Name	Program/Agency Name	River Basin	Stream Length – feet			Wetlands - acres				Buffers - acres	
			R	E	P	R	E	P	C	R	P
Kitty Hawk Wocds	Division of Coastal Management	Pasquotank						24			
Buxton Woods	Division of Coastal Management	Pasquotank						6			
Flowers Tract	N.C. Coastal Land Trust	Tar-Pamlico						120			
Petiford Creek	N.C. Coastal Land Trust	White Oak			15,000			150			50
Ward Farm	N.C. Coastal Land Trust	Cape Fear			15,000			177			4
Gaul Tract	N.C. Coastal Land Trust	Tar-Pamlico			6,000			80			20
Henry Farm	N.C. Coastal Land Trust	Cape Fear			14,000			100			15
Morgan Swamp	N.C. Coastal Land Trust	Neuse			2,100			19			9.6
Brackett Bluff	Catawba Lands Conservancy	Yadkin			2,400						
Cook Preserve	Catawba Lands Conservancy	Catawba			1,350						
Pharr West	Catawba Lands Conservancy	Catawba			2,400						
Catawba Creek	Catawba Lands Conservancy	Catawba			5,000						
Legacy Shares	Catawba Lands Conservancy	Catawba			4,300						
Sandy Creek	Piedmont Land Conservancy	Cape Fear									144

Project Type: R -- Restoration; E -- Enhancement; P -- Preservation; C -- Creation

Table C-1 Continued next page

Continued from previous page: Table C-1 2003 Results of Restoration Survey

Project Name	Program/Agency Name	River Basin	Stream Length -- feet			Wetlands - acres				Buffers - acres	
			R	E	P	R	E	P	C	R	P
Pacolet River	Pacolet Are Conservancy	Broad									457
Dry Creek	Chapel Hill	Cape Fear									105
Guinea Mill	Currituck County	Pasquotank				35					40
Salt Works	Ducks Unlimited	White Oak									444
Tyrell	Ducks Unlimited	Pasquotank									700
Pamlico County	Ducks Unlimited	Neuse									354
Waccamaw	N.C. Wildlife Resources	Lumber									2530
Johnson tract	N.C. Wildlife Resources	Roanoke									71
Beck Tract	N.C. Wildlife Resources	White Oak									3598
Todd Greenway	N.C. Natural Resources and Conservation Services	New									44
Bear Garden	Nature Conservancy	Cape Fear									14391
Jennette	N.C. Aquarium Society	Pasquotank									5
Goose Creek	N.C. Wildlife Resources	Tar-Pamlico									303
Mulford Creek	N.C. Forest Resources	Cape Fear									777
Town Creek	N.C. Coastal Land Trust	Cape Fear									250

Project Type: R -- Restoration; E -- Enhancement; P -- Preservation; C -- Creation

Table C-1 Continued next page

Continued from previous page: Table C-1 2003 Results of Restoration Survey

Project Name	Program/Agency Name	River Basin	Stream Length - feet			Wetlands - acres				Buffers - acres	
			R	E	P	R	E	P	C	R	P
Linville George	Conservation Trust Fund of North Carolina	Catawba									314
Lions Watch Creek	Roanoke Rapids	Roanoke	1,400								2
Cedar Creek	Wake County Parks	Neuse									112
Roaring Creek	Southern Appalachian Highland Conservancy	French Broad									184
Dan River	Piedmont Land Conservancy	Roanoke									19
Second Creek	N.C. Wildlife Resources	Pasquotank									5401
Eno River State Park	N.C. Divisin of Parks and Recreation	Neuse									71
Roanoke Island Greenway	N.C. Wildlife Resources	Pasquotank									38
Cooleemee	Pilot View Resource, Conservation & Development	Yadkin									93
Shocco Creek	N.C. Wildlife Resources	Tar-Pamlico									1623
Town Creek	N.C. Coastal Land Trust	Cape Fear									580
Fishing Creek	Nature Conservancy	Tar-Pamlico									201
Wilson Creek	Caldwell County	Catawba			2,200						4
Big Pine Creek	Blue Ridge Parkway Foundation	New	400								
Alligator River	N.C. Wildlife Resources	Tar-Pamlico									8848
Totals			1800	0.00	69,750.00	35.00	0.00	676.00	0.00	0.00	41,801.60

Project Type: R -- Restoration; E -- Enhancement; P -- Preservation; C -- Creation

Appendix D – Payments to the Wetlands Trust Fund

Table D-1 Trust Funds

Payment Date	Applicant	404 Permit Nu.	401 Certification Nu.	Stream (linear feet)	Non Riparian Wetland (acres)	Riparian Wetland (acres)	Buffer (square feet)	Payment Amount
6/20/2002	UNC-Charlottee (College of Nursing)	2002230574	020320	292				$ 36,500
6/26/2002	Beddington Creek Bridge	200220264	011809				12,948	$ 12,430
6/27/2002	Toscana Road, Pulte Homes	200120974	020058	302			50,312	$ 86,050
6/27/2002	DOT Lower Barton's		020387				1,544	$ 1,482
7/2/2002	Ammo Holding Area	200100296	010942			3.7		$ 90,000
7/2/2002	Sardis Road	200230135	011512			0.75		$ 18,000
7/8/2002	Jacksonville Bypass	199402926	011433			6.00		$ 144,000
7/8/2002	US 25 widening	200230204	011715	2,428		1.5		$ 339,500
7/8/2002	Ashley Downs, Olive Chapel	199700923, 199700924, 199700925	970588			1.76		$ 48,000
7/11/2002	NC Dept of Transportation	200220819	011689	6,254			3,648,150	$ 4,283,974
7/11/2002	Village at Beacon Hill, Marsh Creek		020171				1,350	$ 1,296
7/22/2002	Caldwell Community College	199930123	010087			1.14		$ 30,000
7/26/2002	Sand Pit Road	200220894, 200220895	020553		0.8			$ 12,000
7/30/2002	Wyntree Subdivision		020416				100	$ 96
8/7/2002	Homestead Townhouses		020378	300				$ 37,500
8/9/2002	Briarmeade		020740	298				$ 37,250
8/13/2002	Royal Homes Fashion	200120825	011126			0.62		$ 18,000
8/20/2002	Brogdnen Water District		010031				12,600	$ 12,096
8/21/2002	Taxiway L. Extension RDU Airport		020897				60,812	$ 58,380
9/2/2002	Johnsdale Road Sanitary Sewer Extension		020419				20,496	$ 19,676

Table D-1 Continued next page

Continued from previous page: Table D-1 Trust Funds

Payment Date	Applicant	404 Permit Nu.	401 Certification Nu.	Stream (linear feet)	Non Riparian Wetland (acres)	Riparian Wetland (acres)	Buffer (square feet)	Payment Amount
9/12/2002	Highwoods Properties	200021887		189		0.11		$ 6,000
9/12/2002	Buffalo Road Widening Phase I	200221364	001386	204			15,555	$ 40,433
9/18/2002	Werner buffer	200130682	010564				5,904	$ 5,668
9/18/2002	Patrick Road Extension	200200091	011590			0.48		$ 12,000
9/24/2002	Appleton Way	200200442	021055			0.2		$ 6,000
9/24/2002	Burlingrton-Alamance Airport Authority	200220906	021307	285		0.82		$ 59,625
9/24/2002	Lake Boone Trail Widening Mitigation		020562				3,918	$ 3,761
10/9/2002	Pointe Sommerset Subdivision	200100555	950207		0.24			$ 3,000
10/14/2002	DOT NC55 Sunset Lake	199700175	020205	582	2.52	2.76	40,946	$ 217,059
10/14/2002	Z-Max Industrial Park	200231208	021276	450				$ 56,250
10/30/2002	None: Check for Richland Creek Restoration							$ 65,987
11/19/2002	None: Check for Rock Hill Road							$ 9,000
11/19/2002	Glade Park Road Extension		020767				31,401	$ 30,145
11/19/2002	Glade Park Road Extension	200221113	020767	340				$ 42,500
11/26/2002	Ingles Market	200130682	010654	380				$ 47,500
11/26/2002	Zimmer parcels - Monkey Junciton	200200010	011572		0.376			$ 6,000
11/26/2002	Rowland Business Park	200221185	020243	167			14,884	$ 35,163
11/26/2002	Zimmer Parcels & Monkey Junction	200200438	021165			0.489		$ 6,000
11/26/2002	Dixie River Road	200231321	021410	375				$ 46,875
12/9/2002	Sunshine on Sound Cottage, Soundshores		021019				204	$ 196
12/9/2002	Chastain II	200221320, 200221321, 200221322	021049	574			2,700	$ 38,467

Table D-1 Continued next page

Continued from previous page: Table D-1 Trust Funds

Payment Date	Applicant	404 Permit Nu.	401 Certification Nu.	Stream (linear feet)	Non Riparian Wetland (acres)	Riparian Wetland (acres)	Buffer (square feet)	Payment Amount
12/9/2002	Nevarom Office Plaza		990711				57,600	$ 55,296
12/18/2002	JR Lewis Access Road	200200945	021538			0.33		$ 6,000
12/31/2002	Monteith Park Road Residential Community	200230878, 200230879	020769	255				$ 31,875
1/2/2003	None: Check is for 3M property easement maintenance							$ 20,760
1/8/2003	Friendship Missionary Baptist Church Phase		021519	235				$ 29,375
1/13/2003	Covington Meadows	200221019, 200221020	020717				11,418	$ 10,961
1/13/2003	Eastfield Village & Prosperity Village Connector	200231309, 200230752	021411	470		1.72		$ 100,750
1/13/2003	Moore County Airport Sewer	200200731			0.3			$ 6,000
1/21/2003	2416 Turtle Bay Drive		021531				408	$ 392
1/31/2003	Windcrest Farms PUD	200320423	020536	259				$ 32,375
2/5/2003	Villages of Seven Eagles	200231320	021430	275				$ 34,375
2/12/2003	Riverbend	200330098	021671	296				$ 37,000
2/20/2003	Waverly Point Phase IV & V	200221358 (noMitReq)	021182	192				$ 24,000
2/26/2003	Oyster Creek Subdivision, Lot 40		030102				1,080	$ 1,037
2/27/2003	Strickland Road Widening	200120271, 200221123	020438	166		0.88	92,417	$ 133,470
2/27/2003	Dove Landing	200220875	020577	215				$ 26,875
3/10/2003	Apex Peakway at Bradley Terrace	200320338	010385	170				$ 21,250
3/11/2003	Greenville Utilities (Westside sewer)	200310322	030212				61,830	$ 59,357
3/21/2003	Sunset Forest, LLC	200320410	990026	288				$ 36,000
3/21/2003	Turtle Creek, Lot 17	200300439			0.15			$ 3,000

Table D-1 Continued next page

Continued from previous page: Table D-1 Trust Funds

Payment Date	Applicant	404 Permit Nu.	401 Certification Nu.	Stream (linear feet)	Non Riparian Wetland (acres)	Riparian Wetland (acres)	Buffer (square feet)	Payment Amount
3/25/2003	Wayne Stone Property		030050				2,390	$ 2,294
3/25/2003	Keels Residence	200201284			0.128			$ 3,000
4/5/2003	Meridian Parkway Business Campus	200120507				0.22		$ 12,000
4/7/2003	Onslow County Landfill Expansion	200101147	011215		9.8			$ 120,000
4/30/2003	Runnymede Road		010407				7,470	$ 7,171
5/2/2003	Princeton Manor Subdivision	202120766	021409			0.45		$ 24,000
5/7/2003	Wastewater Collection Lines (Kings Grant III)	200201110	020290			1		$ 24,000
5/7/2003	Wastewater Collection Lines (Kings Grant III)	200200569	021164			0.75		$ 18,000
5/7/2003	Wastewater Collection Line (Brookfield)	200200390	030210			1		$ 24,000
5/7/2003	Fairmont Wastewater Treatment Plant	199801874	990872			1.6		$ 38,400
5/12/2003	Henson Forest Subdivision	200221454	020866	700				$ 87,500
5/16/2003	Still Meadow Village	200200250	020018		1.62			$ 21,000
5/23/2003	Versage Residential Community	200231120	021099	185				$ 23,125
5/28/2003	Glenkirk PUD	200320144 200320793	030120				34,751	$ 33,361
6/5/2003	Morganton & Clifdale Road	200201323	021388			1		$ 24,000
6/12/2003	Canaway Subdivision	200330434	030265			0.48		$ 12,000
6/17/2003	Morgan Wood Subdivision	200300278	030385			0.58		$ 18,000
6/24/2003	Green Level/Durham Road	200320621	030330	480				$ 96,000
6/25/2003	I-85 Widening	200220949	021677	1,602			235,709	$ 546,681
	SUM: BUFFER, STREAM, WETLANDS			19,208	15.934	30.339	4,428,897	$ 7,828,539

Table D-2 Nitrogen Offset Payments Accepted During FY 2002 - 2003

Payment Date	Payment Amount	Municipality	Applicant
6/20/2002	$38,478.00	City of Raleigh	Braefield Subdivision
6/27/2002	$8,343.65	Town of Cary	Macgregor Ridge
6/27/2002	$4,480.74	City of Raleigh	Allen Kelly Co.
7/2/2002	$218.40	City of Durham	Currin Patterson Retail Store (Roxboro Road)
7/9/2002	$38,909.05	City of Durham	Brassfield
7/9/2002	$8,749.00	City of Raleigh	Morrisette Paper
7/9/2002	$4,636.59	City of New Bern	New Bern Church of God
7/12/2002	$2,944.32	City of Durham	Emmanuel Pentecostal Temple
7/12/2002	$15,630.00	City of Durham	Teer Asphalt Plant Modifications
7/15/2002	$1,786.34	City of Wilson	Chili's (Westpoint Subdivision)
7/15/2002	$132.00	Johnston County	United Christians Baptist Church
7/15/2002	$23,742.55	Town of Garner	White Oak Crossing
7/17/2002	$10,204.33	Town of Cary	Tryon Office Center
7/17/2002	$28,553.94	City of Raleigh	Chastain II
7/17/2002	$2,708.71	City of Raleigh	Vantage Pointe
7/17/2002	$235.62	City of Goldsboro	Laughlin Poultry Farms
7/22/2002	$5,920.20	City of Durham	Alexander Crossing
7/22/2002	$2,320.75	City of Raleigh	Achievement School
7/24/2002	$2,570.83	City of Raleigh	Alvin Moore (Tran 44519)
7/25/2002	$8,322.60	City of Raleigh	Avallon
7/25/2002	$4,948.68	City of Raleigh	Centennial Village
7/25/2002	$1,764.18	City of Raleigh	Covenant Church of Raleigh
7/30/2002	$2,258.03	Town of Garner	North State Bank
7/30/2002	$540.54	City of New Bern	Eastern Nephrology
7/30/2002	$10,596.96	City of Raleigh	Fred Anderson Toyota
7/30/2002	$2,161.00	City of Raleigh	Mercury Street Warehouse
8/6/2002	$703.23	City of Goldsboro	Bundy Dental Office
8/6/2002	$2,306.58	City of Raleigh	Magnolia Glen
8/7/2002	$71.00	City of Raleigh	Mercury Street Warehouse
8/7/2002	$564.14	City of Raleigh	North Raleigh Presbyterian Church
8/15/2002	$4,482.89	Town of Garner	White Oak Business Park
8/15/2002	$2,875.00	City of Havelock	Havelock High School
8/15/2002	$2,781.32	City of Raleigh	Race Trac Petroleum
8/20/2002	$1,058.64	City of Raleigh	Caraleigh Mills
8/20/2002	$778.78	City of Kinston	East Carolina Mortgage
8/20/2002	$3,778.93	City of Raleigh	Thomas J. Wilson Office Building
8/20/2002	$935.85	City of Durham	UDI Business & Training Center
8/21/2002	$1,153.00	City of Durham	Cole Mill Road Church of Christ
8/26/2002	$25,613.00	City of Raleigh	Grace Christian School
8/26/2002	$343.20	City of Raleigh	Curtis Drive Subdivision

Table D-2 Continued next page

Continued from previous page: Table D-2 Nitrogen Offset Payments Accepted During FY 2002 - 2003

Payment Date	Payment Amount	Municipality	Applicant
8/30/2002	$1,844.70	City of Raleigh	Social Security Building
8/30/2002	$417.19	City of Raleigh	Pointe View Townes
9/2/2002	$4,234.76	City of Goldsboro	Head Start Program
9/4/2002	$412.99	City of Raleigh	Forrestal Drive Subdivision
9/4/2002	$2,659.71	City of Raleigh	Commerce Park Lot 1
9/9/2002	$1,741.74	City of Goldsboro	Affordable Self-Storage
9/9/2002	$2,931.72	City of Raleigh	Ivy Hills Elderly Apartments
9/9/2002	$1,198.30	City of Durham	Hillsborough Road Commercial
9/9/2002	$1,515.53	City of Durham	Durham Urology
9/10/2002	$2,468.47	City of Raleigh	Eckerd Store # 3924
9/12/2002	$1,113.09	Town of Cary	Western Wake Expansion
9/18/2002	$1,701.81	City of Raleigh	New Bethel Church
9/20/2002	$15,977.94	City of Goldsboro	New Hope Plaza
9/20/2003	$6,819.78	City of Wilson	Charleston Commercial Park
9/20/2002	$6,061.52	City of Raleigh	Friendship Baptist Church
9/24/2002	$32,705.11	City of Durham	Alexander Village at Briar Creek
9/25/2002	$6,076.03	Town of Garner	Sigma Electric
9/30/2002	$471.68	City of Wilson	Employment Security Commission
9/30/2002	$4,971.78	City of Goldsboro	Goldsboro-Raleigh District Churches of Christ
9/30/2002	$1,194.14	City of Wendell	Revised Stormwater Management
9/30/2002	$2,349.44	Town of Garner	Alexander Properties
10/8/2002	$504.50	City of Raleigh	Singletary Office Building
10/8/2002	$588.38	Town of Garner	North State Bank
10/9/2002	$11,380.00	City of Raleigh	Bennington Subdivision
10/9/2002	$4,778.00	City of Durham	North Pointe Drive
10/15/2002	**$6,322.37**	**City of Raleigh**	**Cardinal Self Storage $6,322.37 refunded**
10/15/2002	$109,848.55	City of Raleigh	Poyner Place
10/17/2002	$538.53	City of Raleigh	Milner Memorial Presbyterian Church
10/17/2002	$275.88	City of Raleigh	Capital Car Wash
10/17/2002	$29,698.02	Town of Cary	St. Charles Place
10/17/2002	$5,311.02	Johnston County	Smithfield Elementary School
10/17/2002	$2,705.41	City of Raleigh	Lennox Chase Apartments
10/22/2002	$10,267.88	City of Raleigh	Open Door Baptist
10/22/2002	$379.50	City of Raleigh	Alvin Moore
10/22/2002	$5,435.10	Town of Smithfield	Smith-Sawyer Project
10/22/2002	$473.88	City of Durham	Lane Hoover Equipment Shop
10/28/2002	$1,857.84	City of Raleigh	North raleigh Church of the Nazarene
10/28/2002	$554.40	City of Raleigh	Groves Edge Subdivision
10/28/2002	$945.53	City of Raleigh	New Bookstore
10/28/2002	$1,127.12	City of Raleigh	Bellaire Townes
10/30/2002	$2,109.36	City of Havelock	Legacy Housing Project
10/30/2002	$2,112.00	City of Havelock	Taco Bell Building

Table D-2 Continued next page

Continued from previous page: Table D-2 Nitrogen Offset Payments Accepted During FY 2002 - 2003

Payment Date	Payment Amount	Municipality	Applicant
10/30/2002	$12,517.56	City of Goldsboro	Packing Center Expansion
11/6/2002	$22.57	County of Wayne	Davis Street extension
11/6/2002	$346.37	County of Wayne	Thourghfare Fire Department
11/6/2002	$2,112.33	County of Wayne	Ellis Harrell Mini Storage
11/6/2002	$114.83	County of Wayne	Apartment Building
11/6/2002	$530.24	County of Wayne	Latino Park Mobile Home Park
11/7/2002	$2,310.66	Johnston County	Patriots Point Phase I
11/7/2002	$13,196.80	City of Durham	Chewning Middle School
11/19/2002	$28,857.84	City of Raleigh	Quarry Pointe
11/19/2002	$8,372.02	Town of Garner	White Oak Phase III Rex Wellness Center
11/19/2002	$4,308.00	City of Raleigh	Millbrook Office Park
11/19/2002	$664.32	City fo Raleigh	St. Mark's Episcopal Church
11/19/2002	$382.24	City of Raleigh	Cardinal Gibbons
11/19/2002	$392.70	City of Raleigh	North Ridge Plaza
11/19/2002	$5,992.00	City of Raleigh	Brook Forest
11/19/2002	$1,531.39	City of Wilson	Eagles Car Wash
11/26/2002	$1,862.19	Town of Cary	BJ's Gas Station
11/26/2002	$1,552.30	City of Durham	Imperial Cornerj's Bojangles
11/26/2002	$4,852.85	City of Raleigh	C & F Food Distribution
11/26/2002	12/1/1905	City of Durham	Homestead Heights Townhomes
11/26/2002	$3,481.53	City of Raleigh	Brighton Subdivision
11/27/2002	$3,130.71	City of Wilson	Mt. Calvary Church Phase I
12/2/2002	$10,302.60	City of Greensboro	Page Road Apartments
12/9/2002	$259.54	City of Raleigh	Cardinal Gibbons
12/9/2002	$9,965.67	City of Raleigh	Villagegreen Apartments
12/9/2002	$130.85	City of Raleigh	Caraleigh
12/9/2002	$3,242.51	Town of Garner	Sigma Electric Modication
12/9/2002	$339.90	City of Durham	Triangle Day School
12/12/2002	$20,325.43	Town of Cary	Westwood Baptist Church
12/12/2002	$1,017.46	County of Wayne	Water Treatment Plant
12/12/2002	$841.50	County of Wayne	Brent King Insurance
12/12/2002	$1,773.16	County of Wayne	All-Pro Plumbing
12/12/2002	$1,091.38	County of Wayne	Daniels & Daniels Construction
12/12/2002	$1,202.85	County of Wayne	Professional Turf
12/12/2002	$466.02	City of Goldsboro	Wages Head Start
12/12/2002	$6,212.25	Town of Cary	SRI Venkateswara Temple
12/16/2002	$1,536.05	City of Raleigh	Conley & Gordon
12/16/2002	$2,664.09	City of Raleigh	Ashworth Estates - Phase I
12/16/2002	$9,400.02	City of Raleigh	Ashworth Estates - Camden Park

Table D-2 Continued next page

Continued from previous page: Table D-2 Nitrogen Offset Payments Accepted During FY 2002 - 2003

Payment Date	Payment Amount	Municipality	Applicant
12/18/2002	$2,753.49	City fo Goldsboro	State Employee's Credit Union
12/18/2002	$12,239.37	City of Raleigh	Crescent Ridge Townehomes
12/18/2002	$3,831.30	City of Durham	Coastal Federal Credit Union
12/18/2002	$2,871.00	Town of Cary	Coastal Federal Credit Union
12/18/2002	$9,881.85	City of Raleigh	Southtech Office Building
12/18/2002	$8,400.48	City of Raleigh	Avallon Subdivision
12/27/2002	$4,542.02	Town of Smithfield	Johnston Christian Academy
12/27/2002	$1,743.45	City of Goldsboro	Royall Commerce Park
12/27/2002	$2,813.25	City of Raleigh	Creedmoor Office Buidling
1/2/2003	$6,199.00	City of Raleigh	Long Lake Tract 10
1/6/2003	$1,912.00	City of New Bern	Craven Regional Medical Center
1/7/2003	$8,834.86	City of Raleigh	Walnut Creek Business Park, Phase 3
1/7/2003	$2,847.37	Johnston County	Glen Road Townhomes
1/7/2003	$5,717.25	Johnston County	Lancaster Downs Office Park
1/9/2003	$1,669.00	City of Raleigh	E.G. Properties
1/9/2003	$10,571.45	City of Raleigh	Strickland Corners
1/9/2003	$337.59	City of Raleigh	Gethsemane Seventh Day Adventist
1/9/2003	$2,575.00	City of Raleigh	South Central Church of Christ
1/9/2003	$3,182.20	Town of Smithfield	KS Bank, Brightleaf Boulevard
1/13/2003	$3,124.34	Town of Cary	The Pantry
1/16/2003	$1,919.80	City of Raleigh	Briar Stream
1/16/2003	$2,346.43	City of Goldsboro	Huntington Manor
1/17/2003	$1,687.95	City of Wilson	US Bankruptcy Court Addition
1/22/2003	$112.00	City of Raleigh	Long Lake Tract 10
1/22/2003	$34,865.55	City of Durham	NC 98 & Sherren Road Development
1/22/2003	$1,307.95	City of Raleigh	Wake County Nursing Center
1/22/2003	$11,024.64	Town of Cary	Carpenter Elementary School
1/27/2003	$778.80	City of Raleigh	909 Spring Forest Road
1/27/2003	$8,778.50	City of Raleigh	Food Runners
1/29/2003	$1,760.00	City of Durham	Durham County Animal Shelter
1/29/2003	$1,536.00	City of Raleigh	North Ridge Plaza 2
1/29/2003	$3,465.76	City of Raleigh	Royal Pines Apartments
1/31/2003	$569.94	Town of Garner	Alexander Property Modification
2/5/2003	$2,055.47	City of Durham	DATA Operations Facility
2/5/2003	$2,440.02	Orange County	Sports Endeavors, Inc.
2/17/2003	$1,766.69	City of Raleigh	Hollander Place
2/20/2003	$4,513.70	Town of Cary	Kingswood Elementary School

Table D-2 Continued next page

Continued from previous page: Table D-2 Nitrogen Offset Payments Accepted During FY 2002 - 2003

Payment Date	Payment Amount	Municipality	Applicant
2/20/2003	$2,541.23	City of Raleigh	Gray Funeral Home
2/20/2003	$2,092.00	City of Raleigh	Lot 5 Tryon Industrial Park
2/25/2003	$5,197.50	City of Raleigh	Habitat for Humanity - Rose Lane
2/25/2003	$1,777.45	City of Raleigh	Automotive Retail Shop
2/25/2003	$1,262.75	City of Raleigh	Pearl Ridge # 3
2/25/2003	$2,009.70	City of Durham	Jerry's Custom Paint & Body
2/27/2003	$2,081.00	City of Durham	Durham Coca Cola Bottling Company
2/27/2003	$3,489.55	City of Durham	Heartland Durham Page Pointe
3/3/2003	$6,200.09	City of Raleigh	Oaks at Brier Creek
3/3/2003	$4,649.04	City of Raleigh	Meadows at Brier Creek
3/4/2003	$3,108.60	City of Raleigh	State Employee's Credit Union
3/4/2003	$5,554.56	City of Durham	State Employee's Credit Union
3/5/2003	$7,741.01	City of Raleigh	Brentmoor Apartments
3/5/2003	$6,467.59	City of Raleigh	Professional Park at Pleasant Valley
3/5/2003	$2,619.94	City of Raleigh	Globe Associates
3/7/2003	$4,581.92	City of Raleigh	Ebenezer United Methodist Church
3/10/2003	$145.00	City of Durham	NC School of Science & Mathematics
3/10/2003	$10,654.34	Town of Smithfield	Industrial Technology Building, JCC
3/14/2003	$1,152.36	City of Durham	Windemere Ridge in Durham
3/14/2003	$4,181.76	City of Raleigh	Bethel House of God
3/17/2003	$3,535.77	Town of Cary	East Cary Middle School
3/21/2003	$162.15	City of Raleigh	Eckerd Store
3/21/2003	$2,104.57	City of Raleigh	Pearl Ridge #3
3/25/2003	$2,159.78	City of Goldsboro	Hurry Clean Car Wash
3/25/2003	$1,650.00	City of Raleigh	Cliffs at Grove Barton
3/28/2003	$4,409.46	Town of Cary	Glenkirk PHase I
3/31/2003	$18,801.46	City of Raleigh	Triangle Town Center, Phase 2
3/31/2003	$2,327.45	City of Wilson	Morgan's Ridge II
4/1/2003	$1,680.49	City of Goldsboro	Millers Chapel AME Zion Church
4/8/2003	$4,887.43	City of Raleigh	Lakes Estates Subdivision
4/8/2003	$439.16	City of Durham	Center of My Joy Elder Care Facility
4/8/2003	$402.73	City of Durham	McDonalds Durham Roxboro Road
4/9/2003	$1,989.82	City of Raleigh	Stonehaven
4/9/2003	$26,190.50	City of Raleigh	Dutchman Creek Subdivision
4/14/2003	$760.52	City of Raleigh	Leyland Heights
4/16/2003	$4,330.20	City of Raleigh	Thornton Commons Townhomes
4/17/2003	$4,728.90	Town of Garner	SPCA
4/21/2003	$4,081.98	City of Wilson	Wilson County ABC Board

Table D-2 Continued next page

Continued from previous page: Table D-2 Nitrogen Offset Payments Accepted During FY 2002 - 2003

Payment Date	Payment Amount	Municipality	Applicant
4/21/2003	$2,034.54	City of Raleigh	Hodges Creek Apartments
4/22/2003	$2,095.50	Town of Garner	Apex Steel
4/24/2003	$225.74	City of Durham	Imperial Corners Bojangles
4/24/2003	$7,106.22	City of Goldsboro	North Carolina Warehousing
4/24/2003	$6,271.08	City of Raleigh	Dunn/Boatwright Subdivision
4/24/2003	$1,764.37	City of Raleigh	Savannah Ridge Subdivision
4/28/2003	$268.42	Town of Smithfield	Spring Branch Corners
4/29/2003	$7,191.00	City of Durham	Amberlynn Valley Townhomes
5/1/2003	$11,381.30	City of Raleigh	Weslyn Subdivision
5/5/2003	$5,054.94	City of Wilson	Parkwood Village
5/6/2003	$2,031.67	Wake County	Calvary Baptist Temple
5/7/2003	$8,019.00	City of Raleigh	Watkins Motor Lines
5/9/2003	$1,964.41	City of Raleigh	Trademark 82
5/12/2003	$3,410.75	City of Goldsboro	Short Stop Convenience Store #51
5/12/2003	$2,593.44	City of Raleigh	Hale High School
5/13/2003	$1,279.55	City of Kinston	Wendy's Development (SP03-002)
5/14/2003	$5,989.50	City of Raleigh	State Employee's Credit Union
5/14/2003	$2,191.53	City of Goldsboro	Carolina Nephrology
5/14/2003	$1,704.78	City of New Bern	Holton Dental Clinic
5/16/2003	$1,382.30	City of Kinston	Britthaven of Kinston
5/21/2003	$1,318.68	Wake County	Midway Baptist Church
5/21/2003	$446.00	City of Durham	Kyrian & Kyrain Enterprises, Inc.
5/21/2003	$3,187.80	City of Raleigh	Windsor Springs
5/21/2003	$5,689.58	City of Raleigh	Rex View Medical
5/22/2003	$4,823.28	City of Durham	Clinical Trial Services warehouse addition
5/23/2003	$1,144.44	Wake County	Midway Baptist Church
5/28/2003	$11,967.32	City of Raleigh	Idlewood Village
5/30/2003	$1,587.96	City of Kinston	Kinston Pulmonary Associates, PA
5/30/2003	$1,340.00	City of Durham	Tripple S Rentals
6/4/2003	$1,017.32	City of Raleigh	Nancy F. Baker
6/5/2003	$4,220.00	City of Raleigh	Trinity Baptist Church
6/5/2003	$2,576.64	Durham County	Kemp's Seafood House
6/6/2003	$5,554.56	City of Raleigh	Walgreen's at 64 and New Hope
6/9/2003	$462.00	City of Raleigh	Kent Ridge Townhomes
6/10/2003	$1,584.00	City of Raleigh	Pridgen Auto
6/11/2003	$4,270.60	City of Raleigh	Masons' Landscapes
6/17/2003	$3,445.49	City of Raleigh	World Trade Center Park
6/20/2003	$1,168.10	Orange County	St. Mary's School
6/20/2003	$4,781.70	City of Raleigh	Pet Dairy Distribution
6/20/2003	$3,179.88	City of Kinston	Ruby Tuesday
Total FY 02-03	$1,220,999		

Appendix E – Property Inventory

Property Name	County	River Basin	Linear Feet	Acres Surveyed	Type of Acquisition	Acquisition Date
Basket Creek-Wesleyan Boulevard	Nash	Tar-Pamlico		41.5	Easement	5/14/1997
Holloman Wetland	Greene	Neuse		27.5	Easement	10/31/1997
Buckhead Subdivision	Cumberland	Cape Fear		4.56	Easement	12/1/1998
Chavis Park	Wake	Neuse	2,500	4.6	MOU	2/15/1999
Barra Farms	Cumberland	Cape Fear		622.94	Easement	3/19/1999
Stone Mountain State Park	Wilkes	Yadkin	10,622	24.36	Easement	5/5/1999
Hammock's Beach State Park	Onslow	White Oak		0.3	Easement	7/23/1999
Carteret-Craven EMC Wetland	Carteret	White Oak		4.14	Easement	11/19/1999
Payne Dairy	Alexander	Catawba	7,000	40.22	Easement	12/30/1999
Price Park	Guilford	Cape Fear	1,710	2.8	MOU	4/5/2000
Hoffman Forest Preservation Site	Onslow	White Oak		100	Fee Simple	4/6/2000
Nucor Steel Mill Site	Hertford	Chowan		150.27	Fee Simple	4/18/2000
Brush Creek	Alleghany	New	4,000	2.89	Easement	5/9/2000
Brush Creek	Alleghany	New	Above	7.78	Easement	5/9/2000
Contentnea Creek, Neuse River	Greene	Neuse		80	Easement	8/18/2000
Providence Road	Mecklenburg	Yadkin		8.809	Easement	9/27/2000
Providence Flat Swamp Forest	Mecklenburg			17.9	Easement	9/27/2000
Beamon's Run	Greene	Neuse		19.0	Easement	11/27/2000
Wilson Bay-Sturgeon City	Onslow	Onslow		3.06	Easement	12/18/2000
Hobbs Road	Guilford	Cape Fear		3.31	Easement	3/27/2001
Beaver Creek	Surry	Yadkin	4,000	9.2	Easement	4/25/2001
Bear Swamp Creek	Franklin	Tar-Pamlico	1,500	3.4	Easement	5/16/2001
Irwin Creek	Mecklenburg	Catawba	5,000	6.9	MOU	5/25/2001
Stewart Creek	Mecklenburg	Catawba	6,800	9.4	MOU	5/25/2001
Hominy Swamp Creek	Wilson	Neuse	2,232	3.9	Easement	6/6/2001
Reed Creek	Buncombe	French Broad	1,500	1.32	Easement	6/25/2001
High Vista	Buncombe	French Broad	3,500	4.3	Easement	7/9/2001
Jumping Run Creek	Harnett	Cape Fear	5,500	75.0	MOU	7/24/2001
Smith-Austin Creek	Wake	Neuse	9,500	33.42	Fee Simple	9/8/2001

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Property Name	County	River Basin	Linear Feet	Acres Surveyed	Type of Acquisition	Acquisition Date
Clear Creek	Henderson	French Broad	1,300	6.397	Easement	10/16/2001
Sandy Creek	Durham	Cape Fear	3,000	10.39	Easement	10/23/2001
Stillhouse Creek	Durham	Neuse	1,200	2.8	Easement	11/1/2001
Benbow Park	Guilford	Cape Fear	1,200	1.4	MOU	11/27/2001
Brown Bark Park	Guilford	Cape Fear	2,630	3.0	MOU	11/27/2001
Gillespie Golf Course	Guilford	Cape Fear	3,000	3.4	MOU	11/27/2001
Hillsdale Park	Guilford	Cape Fear	5,000	5.7	MOU	11/27/2001
Bertie Creek	Wake	Neuse	1,200	2.2	MOU	12/6/2001
Scott-Lamb Wetland	Pasquotank	Pasquotank		22.64	Fee Simple	12/31/2001
Howell Woods	Johnston	Neuse		139.86	Easement	2/8/2002
Little Beaver Creek	Wake	Cape Fear	5,000	40.924	Easement	3/15/2002
Snow Creek	Stokes	Roanoke	3,000	3.4	Easement	3/26/2002
Cross Creek	Cumberland	Cape Fear	2,400	5.0	Easement	4/9/2002
McIntyre Creek	Mecklenburg	Catawba	5,350	7.4	MOU	4/16/2002
Wike Stream	Catawba	Catawba	2,300	12.42	Easement	4/19/2002
Brown Branch	Caldwell	Catawba	6,500	8	MOU	4/28/2002
Forest Hills	Durham	Cape Fear	3,000	5.5	Easement	5/1/2002
Reedy Branch	Alamance	Cape Fear	2,500	5.7	Easement	5/1/2002
Ellerbee Creek	Durham	Neuse	2,500	2.9	Easement	5/2/2002
Billy's Creek	Franklin	Tar-Pamlico	1,800	4.1	Easement	5/6/2002
Haw River-Bouchard Preservation Site	Rockingham	Cape Fear		95.431	Easement	5/9/2002
Purlear Creek	Wilkes	Yadkin	17,000	31.0	Easement	5/14/2002
Mud Creek (Brevard Church Property)	Henderson	French Broad		14	Easement	5/15/2002
Middle Swamp Creek	Robeson	Lumber		11.0	MOU	5/17/2002
Whitelace Creek	Lenoir	Neuse	3,000	0.0	Easement	5/30/2002
Mine Site	Chatham	Cape Fear		38.4	Easement	5/30/2002
Moncure Site	Lee	Cape Fear		13.5	Easement	5/30/2002
Brushy Fork	Forsyth	Yadkin	5,000	6.9	Easement	6/4/2002
Pine Valley	New Hanover	Cape Fear	2,500	2.9	MOU	6/6/2002

Table E-1 Continued next page

Continued from previous page: Table E-1 Property Index

Property Name	County	River Basin	Linear Feet	Acres Surveyed	Type of Acquisition	Acquisition Date
County Line Stream	Buncombe	French Broad	3,500	0.077	Easement	6/29/2002
County Line Stream	Henderson	French Broad	Above	6.543	Easement	6/29/2002
Prestonwood G.C.	Wake	Neuse	3,000	3.4	MOU	7/1/2002
Maritime Museum	Carteret	White Oak		0.89	Easement	7/1/2002
Murphy Farm	Franklin	Tar-Pamlico	2,000	4.17	Easement	7/1/2002
Wake Forest C.C.	Wake	Neuse	3,400	3.9	Easement	7/18/2002
Boiling Springs	Brunswick	Cape Fear	1,500	Allocation	Easement	8/8/2002
Richland Creek	Wake	Neuse	300	0.5	Easement	8/12/2002
Cane Creek	Alamance	Cape Fear	1,500	1.7	Easement	9/5/2002
Purlear Creek (II)	Wilkes	Yadkin	4,500	10.3	Easement	9/27/2002
Maritime Museum	Carteret	White Oak		0.89	Easement	9/30/2002
Charles Creek	Pasquotank	Pasquotank	1,500	1.7	MOU	9/31/2002
Little Beaver Creek	Wake	Cape Fear	5,000	7.5	Easement	10/2/2002
Hendersonville	Henderson	French Broad		14.0	Easement	10/15/2002
Little Bugaboo Creek (five owners)	Wilkes	Yadkin		11.03	Easement	12/10/2002-03/12/2003
Louisburg Creek	Franklin	Tar-Pamlico		3.02	Easement	12/13/2002-01/14/2003
East Group Buffer	Pitt			2.28	Easement	12/27/2002
Knobs Creek	Pasquotank	Pasquotank				12/31/2002
North River	Carteret	White Oak			MOU	12/31/2002
North River (II)	Carteret	White Oak			MOU	12/31/2002
Cato Stream	Mecklenburg	Yadkin		6.322	Easement	1/8/2003
Chavis Branch, (Chavis Park)	Wake	Neuse		4.63	Easement	2/10/2003
Bushy Branch, (Kentwood Park)	Wake	Neuse		2.906	Easement	2/10/2003
Carper-Harris Wetland	Pasqoutank	Pasquotank		67.81	Easement	3/14/2003
Suck Creek	Moore	Cape Fear	2,700	9.22	Easement	3/17/2003
Kiser Stream and Flood Plain	Alamance	Cape Fear		15.53	Easement	3/27/2003
UT to South Fork Creek (two owners)	Alamance	Cape Fear	5,000	26.5	Easement	3/27/2003-5/16/2003
Little River Wetland	Moore	Cape Fear		125.77	Easement	3/28/2003
Big Warrior Creek	Wilkes	Yadkin	8,500	3.063	Easement	5/08/2003-5/12/2003
Total				2063.392		

Low-Level Radioactive Waste Management in North Carolina

submitted to the

North Carolina General Assembly

by the

North Carolina Radiation Protection Commission

April 2003

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Summary

The 1999 session of the General Assembly of North Carolina directed the North Carolina Radiation Protection Commission (Commission) to review and study the current and projected availability and adequacy of facilities for the management of low-level radioactive waste (LLRW) produced by North Carolina generators, and to formulate a recommended plan for complying with North Carolina's responsibilities under the Federal Low-Level Radioactive Waste Policy Act of 1980 and Low-Level Radioactive Waste Policy Amendments Act of 1985 (see Appendix B). The Commission was directed to report its findings and recommendations to the General Assembly on or before May 15, 2000. A "Plan for Low Level Radioactive Waste Management in North Carolina" was submitted by the Commission to the General Assembly on April 7, 2000. In its April 7, 2000 report, the Commission recommended that LLRW management in North Carolina be reviewed by the Commission every three years, or sooner if needed, with the results and recommendations reported to the General Assembly.

This report presents the results of the first review. The Commission concluded that the recommendations in its April 7, 2000 report remain valid. These recommendations are included in this report, and they are attached as Appendix A.

It was determined in this review that a disposal facility is currently available for all LLRW streams produced by North Carolina generators, except for certain mixed wastes. The volumes of these mixed wastes are small, and they can be safely stored on site. Hence, the Commission's conclusion remains that North Carolina does not need a central facility for storage or disposal of LLRW as long as North Carolina waste generators have access to existing out-of-state disposal and treatment facilities. The Commission recognizes that predicting the long-term future of LLRW management and problems is not possible, and the Commission recommends that LLRW management in North Carolina be reviewed by the Commission every three years, or sooner if needed, with the results and recommendations reported to the General Assembly.

The Commission emphasizes its recommendation that assistance by the Radiation Protection Section (RPS) of the Department of Environment and Natural Resources, in the form of information exchange, should be provided to all LLRW generators in North Carolina. It is the Commission's opinion that this technical assistance facilitates the safe management of LLRW in North Carolina, and that it helps to preclude the need for a central LLRW facility within the State.

Introduction

The 1999 session of the General Assembly of North Carolina directed the North Carolina Radiation Protection Commission (Commission) to review and study the current and projected availability and adequacy of facilities for the management of low-level radioactive waste (LLRW) produced by North Carolina generators and to formulate a recommended plan for complying with North Carolina's responsibilities under the Federal Low-Level Radioactive Waste Policy Act of 1980 and Low-Level Radioactive Waste Policy Amendments Act of 1985 (see Appendix B). The Commission was directed to report its findings and recommendations to the General Assembly on or before May 15, 2000. A "Plan for Low Level Radioactive Waste Management in North Carolina" was submitted by the Commission to the General Assembly on April 7, 2000. A summary of the findings and recommendations in the plan, as well as the process followed in developing the plan, is presented in the next section of this report. In its April 7, 2000 report, the Commission recommended that LLRW management in North Carolina be reviewed by the Commission every three years, or sooner if needed, with the results and recommendations reported to the General Assembly. This report presents the results of the first periodic review.

The Commission's Low-Level Radioactive Waste Management Committee (Committee) was assigned the task of reviewing the current status of LLRW management in North Carolina and for submitting a draft report of the results of the review to the Commission. The Committee met on March 20, 2002 to discuss the review process and a report outline. The Committee met again on May 22, 2002 to review the current status of LLRW management and to discuss findings and recommendations; on July 10, 2002 to review a draft report; and on January 29, 2003 to update the draft report and submit it to the Commission for approval at their February 2003 meeting. The Commission met on February 28, 2003 and approved the report for printing and submission to the North Carolina General Assembly.

The Committee and Commission solicited public comments at each of these meetings.

Plan for LLRW Management in North Carolina (April 7, 2000)

At its July 23, 1999 meeting, the Commission assigned to its Low-Level Radioactive Waste Management Committee (Committee) the task of reviewing and studying the current and projected availability and adequacy of facilities for the management of LLRW produced by North Carolina generators, and of formulating a recommended plan for LLRW management in North Carolina. The Committee was instructed to report back with a draft plan to the Commission at its February 25, 2000 meeting.

At its initial meeting in August 1999, the Committee developed a process for performing its assigned tasks that included extensive public involvement. The Committee established the goal of developing a LLRW management plan that would be supported by the public and by waste generators. Public meetings were held in September to obtain verbal comments on the management of North Carolina's LLRW, and written comments were also solicited. The Committee held a series of meetings, with active public participation, during the period of October through December 1999, to discuss comments received, define key issues, and work toward a consensus on recommendations for each issue.

The Committee met in January 2000, with public participation, to review and discuss its draft report. In February, the draft report was distributed to the full Commission and to the public for review and comment. Public meetings were held in February to discuss the draft report and to receive comments. The Committee met in March, again with public participation, to discuss and act on comments received regarding the draft report. The report was finalized in March and approved by the Commission on April 7, 2000. The Committee's process resulted in the development of a LLRW management plan for the State of North Carolina with broad support from the public and from waste generators, who actively participated in its development.

As a result of this process, the Commission concluded that the current Federal Low-Level Radioactive Waste Policy Act of 1980 and the Low-Level Radioactive Waste Policy Act Amendments of 1985 were not working. This conclusion was compatible with the findings of the U.S. General Accounting Office (GAO) in the 1999 study of the success of the compacting process advocated in these federal acts. Accordingly, the Commission recommended that North Carolina should advocate for repeal or revision of these federal acts in favor of opening the national disposal market for LLRW to private industry under the regulatory control of Agreement States and the U.S. Nuclear Regulatory Commission (NRC). This was one of the three options identified in the GAO report.

The Commission further concluded that North Carolina does not need a central facility for storage or disposal of LLRW as long as North Carolina waste generators have continued access to existing out-of-state disposal and treatment facilities. Since predicting the long-term future of LLRW management and problems is not possible, the Commission recommended that LLRW management in North Carolina be reviewed by the Commission every three years, or sooner if needed, with the results and recommendations reported to the General Assembly. The Commission noted that two North Carolina waste generators would eventually need access to a disposal facility for the higher concentration of radioactivity contained in their Class B and C waste. Two other generators were storing a small volume of Class A waste which was not acceptable for disposal at the existing facility in Utah. However, it was determined that these waste generators could safely store these wastes awaiting some future disposal option.

The Commission recommended that assistance by the then Division of Radiation Protection (DRP)[1], in the form of information exchange be provided to all LLRW generators in North Carolina. The Commission also recommended that coordination, education and assistance by DRP be provided to other government agencies. The Commission agreed that additional resources were needed by the DRP to support its ongoing efforts to assure that LLRW is managed safely.

The Commission identified several options for dealing with the generators' LLRW in the long term, including the possible siting of processing, treatment and disposal facilities in North Carolina. However, the Commission decided not to make a specific recommendation for the long-term because of the uncertain future of the national policy on LLRW and because, for the foreseeable future, North Carolina generators would be able to safely store waste for which there was no out-of-state disposal option. For the same reasons, the Commission recommended that the existing prohibition on licensing any LLRW facility that would accept LLRW from the public, or from another person for a fee [G.S. 104E-7 (b)], remain in effect until changes in the national policy on LLRW disposal or operational circumstances dictated differently. The Commission concluded that the current statutes and regulations were adequate to ensure public health and safety for the management of LLRW within North Carolina.

[1] DRP became RPS during a re-organization of the Department of Environment and Natural Resources in July 2002.

Current Status of LLRW Management

North Carolina LLRW generators have several options available for the management of their LLRW. Processing facilities throughout the United States are currently accepting LLRW and using a variety of management techniques for processing.

Chem Nuclear – Barnwell

Chem-Nuclear's Barnwell, South Carolina, waste management facility is the only commercial Low-Level Radioactive Waste (LLRW) disposal facility in America that has operated without regulatory interruption. The 235-acre facility occupies property owned by the State of South Carolina and leased to Chem-Nuclear Systems. The Barnwell Waste Management Facility operates under the authority of Radioactive Material License 097 issued by the South Carolina Department of Health and Environmental Control (DHEC). Since the disposal facility began operation in 1971, about 28 million cubic feet or 90% of the available disposal volume has been used. The Barnwell site accepts Class A, B and C wastes for disposal.

Under South Carolina law, the Barnwell facility will ramp-down the total annual volume received at the site through the six-fiscal-year period that ends June 30, 2008. After that, the facility will only receive waste from generators in South Carolina and the other two Atlantic Compact states. The maximum waste disposal volumes that Barnwell is allowed to receive are listed below:

160,000 cubic feet in fiscal year 2001	50,000 cubic feet in fiscal year 2005
80,000 cubic feet in fiscal year 2002	45,000 cubic feet in fiscal year 2006
70,000 cubic feet in fiscal year 2003	40,000 cubic feet in fiscal year 2007
60,000 cubic feet in fiscal year 2004	35,000 cubic feet in fiscal year 2008

The State of South Carolina would like to enter into agreements with interested generators to reserve specific volumes of waste each year through 2008. This will allow generators some stability in planning their disposal needs. It will provide the State of South Carolina with a better basis for projecting disposal costs and revenues. South Carolina would like to reserve a significant portion of the available volume each year beginning now through 2008 through agreements of this type. The remainder of the volume that is not reserved through such agreements and is not set aside for Atlantic Compact regional generators will be made available to generators without such agreements each year on a space-available basis.

Envirocare of Utah

The Envirocare facility in Clive, Utah is located in a remote arid climate naturally suited for disposal within the Tooele Hazardous Industry District. The site is more than 45 miles from the nearest population center, in an area of naturally poor-quality groundwater, over 20 miles from drinkable water, and it provides good conditions for containment due to approximately 7 inches annual precipitation, low-permeability clay soils, and a stable geology.

The Envirocare disposal facility can accept Class A waste and also uranium mill tailings for disposal. Envirocare can also accept some mixed waste with variable concentration limits.

In November 1999, Envirocare submitted a license application to the Utah Radiation Control Board to dispose of Class B and C LLRW. The Executive Secretary of the Utah Radiation Control Board issued a final decision in July 2001 to approve Envirocare's request for a license to accept and dispose of containerized Class B and C LLRW. Based on a review by the Utah Division of Radiation Control (DRC) and its contractor, URS Corporation, of Envirocare's application, supporting technical documents and public comments, it was determined that the proposed facility could be safely operated in accordance with state laws. The license was conditional on the approval of the Utah Legislature and Governor.

In July 2001, Envirocare determined that it would not seek legislative or gubernatorial approval to dispose of Class B and C LLRW at that time. This decision was likely influenced by public concerns about the proposal and by controversy over an unrelated proposal by the Goshute Tribe and Private Fuel Storage (PFS) to accept high-level spent fuel rods from nuclear power plants.

Status of North Carolina Generators

Currently, disposal is available for almost all LLRW produced by North Carolina generators at either the Barnwell site or the Envirocare facility. For the small amount of remaining LLRW, on-site storage is a safe alternative.

Commission Recommendations and Supporting Findings

Based on this review the Commission has concluded that the recommendations in its April 7, 2000 report remain valid. These recommendations are included in this report as Appendix A.

RPS has determined that a disposal option is currently available for all LLRW streams produced by North Carolina generators, except for certain mixed wastes. The volumes of these mixed wastes are small, and they can be safely stored on site. Hence, the Commission's conclusion remains that North Carolina does not need a central facility for storage or disposal of LLRW as long as North Carolina waste generators have access to existing out-of-state disposal and treatment facilities. The Commission recognizes that predicting the long-term future of LLRW management and problems is not possible, and the Commission recommends that LLRW management in North Carolina be reviewed by the Commission every three years, or sooner if needed, with the results and recommendations reported to the General Assembly.

The Commission emphasizes its recommendation that assistance by the Radiation Protection Section (RPS), in the form of information exchange, should be provided to all LLRW generators in North Carolina. It is the Commission's opinion that this technical assistance facilitates the safe management of LLRW in North Carolina, and that it helps to preclude the need for a central LLRW facility within the State.

Appendix A

April 7, 2000 Commission Recommendations and Supporting Findings

The Commission identified four key issues of concern for LLRW management in North Carolina. These issues were discussed at length at several Committee meetings, with extensive participation by both LLRW generators and the public. Recommendations and findings for each of these issues are provided in the remaining four subsections. The four issues are:

1. Failure of the LLRW Policy Act of 1980 and Amendments of 1985

Recommendation: The Commission recommends opening the national disposal market for LLRW to private industry under the regulatory control of North Carolina, the other Agreement States and the U.S. Nuclear Regulatory Commission. The Commission specifically recommends that the General Assembly be a strong voice through the North Carolina Congressional Delegation and the National Conference of State Legislatures in working for a change in national policy for the management of LLRW.

Findings: The Committee received comments from members of the general public and North Carolina LLRW generators concerning this issue. The consensus of the comments and the Committee's opinion was that the LLRW Policy Act has failed to provide a solution for the management of the nation's LLRW. Many different reasons were noted as to why the LLRW Policy Act failed: 1) Waste volumes have dramatically decreased since the inception of the LLRW Policy Act and the United States does not need 10 different disposal sites. 2) Extensive efforts of the State of North Carolina, the Southeast Compact and other compacts have been unsuccessful. 3) Better ways have been found to handle LLRW since the 1980s. Accordingly, the Committee concludes that the current Federal Low-Level Radioactive Waste Policy Act of 1980 and the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRW Policy Act) are not working.

The Committee reviewed the GAO report dated September 17, 1999 entitled "Low-Level Radioactive Wastes: States Are Not Developing Disposal Facilities." This report outlines the obstacles states have encountered in their attempts to comply with the LLRW Policy Act. The GAO report states, "By the end of 1998, states, acting alone or in compacts, had collectively spent almost $600 million attempting to develop new disposal facilities. However, none of these efforts have been successful." In brief, the GAO reported three options for LLRW management: 1) Retain the present compact system and allow compacts and individual states to exercise control. 2) Abandon the compact approach in favor of opening the disposal market to private industry. 3) Abandon the compact approach and allow the DOE to provide sufficient disposal capacity for the commercial LLRW generated. The GAO report notes that the option of using an existing DOE facility would have to address the willingness – or unwillingness – of any state or states to serve as host for a disposal facility. The GAO report made no recommendation for a preferred option.

Both public comments and Committee discussions have reflected a desire that North Carolina maintain the ability to exercise regulatory oversight of LLRW for whatever option is recommended. The Commission does not support the present compact system and the continued spending of monies on a failed concept. The Commission agreed that the best option is for Congress to abandon the compact approach and open the disposal market to the private industry.

The Commission's recommendation is supported by the position statement of the national Health Physics Society, made up of specialists in radiation safety, which contains the conclusion that "the LLRW Policy Act should be amended or replaced to allow existing facilities and commercial development to provide access to existing and new waste disposal capacity." A similar view has also been expressed by one national LLRW industry executive.

2. Status of LLRW Management in North Carolina

Recommendation: The Commission recommends that North Carolina not establish a central facility for storage or disposal of LLRW at this time as long as North Carolina waste generators have continued access to the existing out-of-state disposal and treatment facilities. The Commission further recommends that LLRW management in North Carolina be reviewed every three years, or sooner if needed, with the results and recommendations reported to the General Assembly.

Findings: The Committee received comments from members of the general public and from generators concerning this issue. Most of these comments were that a central LLRW facility in North Carolina is not needed. Some comments from members of the public suggested that the LLRW for the entire State should be stored at nuclear power plant sites. In discussing the feasibility of utility storage for all of North Carolina's LLRW, a number of obstacles were noted:

1) The NRC licenses under which the utilities operate do not allow for the storage of LLRW from other generators;
2) The utilities are not prepared to handle all the different types of waste streams that are produced throughout North Carolina;
3) Several generators expressed opposition to utility storage because of the liability issue; and,
4) The utilities do not wish to get into the waste storage business.

Committee discussion turned to whether North Carolina needs a central LLRW facility. Most generators indicated that they were satisfied with the current disposal and treatment options available to them. The consensus of generators present at the Committee meetings was that a central LLRW facility is not needed, as long as they have access to the existing disposal and treatment facilities.

Three comments on the draft report, which was distributed for public review, stated that North Carolina should establish a LLRW disposal facility within the State. None of these comments was from a waste generator.

The DRP staff also conducted a survey of North Carolina generators to determine the current and projected availability and adequacy of facilities for the management of LLRW. North Carolina LLRW generators are managing their waste by a combination of processing and treatment options and disposal at an existing site in Utah. The results of this survey are included as Attachment D [in the April 7, 2000 Commission report]. After reviewing the results of this survey, the Committee concluded that North Carolina does not need a central LLRW facility at this time, if the generators continue to have access to existing disposal and treatment facilities.

Consideration was also given to the higher activity Class B and C waste that is primarily generated by the nuclear utilities. Currently, there is no disposal option available to North Carolina generators for Class B and C wastes. The nuclear utilities are currently storing their Class B and C waste at the nuclear power plants. Eventually, North Carolina LLRW generators will need access to a disposal facility for these wastes.

In summary, the Committee does not recommend that a disposal facility be established in the State at this time for the following reasons:

- There is no immediate need for a LLRW disposal facility in the State. As long as current out-of-state disposal and treatment facilities are available to North Carolina LLRW generators, LLRW generated in North Carolina can be safely managed. Other than Class B and C wastes, LLRW can be treated and disposed of at the currently available facilities. Class B and C wastes can be safely stored at the three nuclear power plant sites where they are generated.
- The current national LLRW policy is not working and the future policy is uncertain. It is the Committee's opinion that it is not prudent to spend additional money pursuing a LLRW disposal facility in North Carolina in view of the uncertain national policy and lack of current need for such a facility.
- The Committee recognizes that predicting the long-term future of LLRW management is not possible. Thus, the Committee recommends that LLRW management in North Carolina be reviewed by the Commission every three years, or sooner if the need arises, with results and recommendations reported to the General Assembly.

3. Need for Continued Assistance by DRP to North Carolina Generators in Managing LLRW

Recommendation: The Commission recommends that assistance be provided to both state and federally licensed generators to facilitate and strengthen LLRW management in North Carolina. This assistance should be in the form of information exchange with all LLRW generators, and coordination, education and assistance to other government agencies. The Commission further recommends that the DRP allocate sufficient staff resources to provide this assistance and expand its efforts to identify all options for commercial management and disposal of LLRW.

Findings: The Committee discussed the current assistance that the DRP is providing to North Carolina generators in managing LLRW. The DRP noted that many generators are still unsure about disposal options available to them. The Committee concluded that the assistance provided by DRP to waste generators on management options is an important factor in the ability to manage LLRW without a central LLRW facility.

The Committee discussed whether assistance should be provided to the federally licensed facilities or only to those generators that the DRP regulates. The federally licensed entities include nuclear power plants, nuclear fuel fabrication facilities, federal medical centers, federal research facilities and military installations. Comments were made by persons from federally licensed facilities that they would like to continue the ongoing relationship with the DRP.

The Committee concluded that there would be no confusion caused by the DRP offering assistance to a licensee because the assistance is provided through the administrative section of DRP that is not responsible for regulatory oversight of these facilities. Also, the DRP administrative section doesn't give technical direction, but rather facilitates a two-way information exchange between the DRP and generators throughout the State. This type of assistance creates a more proactive approach to the State's management of LLRW.

The Committee agreed that DRP staff should make on-site visits to processing, treatment and disposal facilities to become familiar with management options that are available to North Carolina generators. Such on-site visits would not be considered audits but efforts to obtain the latest

information on available waste management options in order to better educate North Carolina's generators.

The Committee discussed the need for more staff resources to provide assistance to the State's generators. The Committee agreed that this assistance should also encompass coordination, education and assistance to other government agencies with regard to LLRW. North Carolina is responsible for the management of its LLRW, and the State and waste generators need to work together to find the best management techniques available. The Committee concluded that additional staff resources to support this effort by the DRP are needed in its ongoing efforts to assure that LLRW is managed safely and that radiation exposures are kept as low as reasonably achievable. The DRP reported it would allocate sufficient staff resources to provide this assistance.

4. Adequacy of North Carolina LLRW Management Legislation and Regulations

Recommendation: The Commission recommends that the existing prohibition against licensing any LLRW facility which would accept LLRW from the public, or from another person for a fee [G.S. 104E-7 (b)], remain in effect until changes in the national policy on LLRW disposal or operational circumstances dictate differently.

Findings: The Committee considered the question of whether North Carolina's current statutes and regulations are adequate to ensure the safe management of LLRW by North Carolina waste generators. At the request of the Committee, the DRP reviewed the current Commission regulations with regard to health and safety. Based on the DRP's findings, the Committee concluded that the regulations are adequate to allow for the safe management of LLRW in North Carolina by State-licensed generators. The DRP review also noted that under Commission rules, the DRP could include special limiting conditions in specific licenses for circumstances that may arise in the future. The NRC regulates and controls the management of LLRW for federally licensed facilities under rules that are compatible with the Commission's rules.

There were lengthy Committee and public discussions concerning the possibility of a future LLRW facility within North Carolina. Session Law 1999-357 stipulates that the Department of Environment and Natural Resources shall not issue or consider any such license applications for the development of a LLRW facility prior to action by the General Assembly establishing a plan for future management of LLRW. G.S. 104-F currently stipulates that the state agency charged with siting, constructing and operating a LLRW facility is the North Carolina LLRW Management Authority. The Authority has been relieved of these responsibilities and is to complete its business by June 30, 2000 according to the enacted provisions of Session Law 1999-357.

As discussed more fully elsewhere in this report, the Committee has concluded that North Carolina does not need a central facility for storage or disposal of LLRW at this time, as long as North Carolina LLRW generators have continued access to the existing out-of-state disposal and treatment facilities. However, access to a disposal facility for LLRW Class B and C wastes will be needed eventually.

The Committee identified the following long-term options for LLRW management:

- No prohibition of any LLRW facility and allow private industry to operate under State regulation;
- Allow the State to develop a facility to be operated under contract by an organization not generating LLRW;

- Allow a consortium of generators to deal with their own waste;
- Prohibit disposal facilities within the State, but allow processing and treatment facilities;
- Prohibit any LLRW processing, treatment or disposal facility within the state; and
- Challenge the ban of North Carolina waste disposal at Barnwell, SC

It may be helpful in future legislation concerning LLRW facilities to create a distinction between disposal facilities and processing or treatment facilities. For example, disposal facilities could be prohibited, but processing and treatment facilities could be allowed. Consideration of this option would be important if North Carolina generators should, for any reason, lose access to existing processing and treatment facilities.

The Committee has no formal recommendations on which option would be the best for North Carolina in the long term. However, it does recommend that the existing prohibition against licensing any LLRW facility which would accept LLRW from the public, or from another person for a fee [G.S. 104E-7 (b)], remain in effect until changes in the national policy or operational circumstances dictate differently.

The Commission decided not to make a recommendation for the long-term because the national policy on LLRW disposal is uncertain and because North Carolina does not currently need a central LLRW facility.

Appendix B

1999 Session S.L. 1999-357

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 1999

SESSION LAW 1999-357
SENATE BILL 247

AN ACT TO WITHDRAW NORTH CAROLINA FROM THE SOUTHEAST INTERSTATE LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT COMPACT, TO LIMIT THE AUTHORITY OF THE LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT AUTHORITY AND TO DIRECT THE RADIATION PROTECTION COMMISSION TO STUDY AND FORMULATE A PLAN FOR LOW-LEVEL RADIOACTIVE WASTE MANAGEMENT.

The General Assembly of North Carolina enacts:

Section 1. In accordance with the provisions of G.S. 104F-1, Article VII, Section (g) of the General Statutes, North Carolina hereby withdraws from membership as a party state in the Southeast Interstate Low-Level Radioactive Waste Management Compact.

Section 2. Chapter 104F of the General Statutes is repealed.

Section 3. Notwithstanding any provision of Chapter 104G of the General Statutes to the contrary, the sole function of the North Carolina Low-Level Radioactive Waste Management Authority shall be to take all necessary actions to complete the process of closure and restoration of the proposed Wake County low-level radioactive waste site, and to finalize all other responsibilities and business of the Authority relating to closure and restoration on or before June 30, 2000.

Section 4. Chapter 104G of the General Statutes is repealed effective July 1, 2000.

Section 5. The North Carolina Radiation Protection Commission is directed to review and study the current and projected availability and adequacy of facilities for the management of low-level radioactive waste produced by North Carolina generators, and to formulate a recommended plan for complying with North Carolina's responsibilities under the Low-Level Radioactive Waste Policy Act of 1980, Pub. L. No. 96-573, 94 Stat. 3347, and the Low-Level Radioactive Waste Policy Amendments Act of 1985, Pub. L. 99-240, 99 Stat. 1842, 42 U.S.C. 202 lb, et seq. The Commission shall report its findings and recommendations to the General Assembly on or before May 15, 2000. No license application for a low-level radioactive waste facility shall be issued or considered by the Department of Environment and Natural Resources prior to action by the General Assembly establishing a plan for future management of low-level radioactive waste.

Section 6. Sections 1, 2, 3, 5, and 6 of this act are effective when they become law. Section 4 of this act becomes effective July 1, 2000.

In the General Assembly read three times and ratified this the 20th day of July, 1999.

s/ Marc Basnight
President Pro Tempore of the Senate

s/ James B. Black
Speaker of the House of Representatives

s/ James B. Hunt, Jr.
Governor

Approved 10:15 a.m. this 26th day of July, 1999

Appendix C

Radiation Protection Commission

Commission Members	Commission Position
Allen M. Mabry, CHP	Atomic Energy, Other Than Power Generation
Ronald S. DeMars, D.C.	Chiropractor
Donald A. Tyndall, D.D.S.	Dentist, North Carolina Dental Society
Daniel D. Sprau, Dr.P.H.	Environmental Protection
Carmine M. Plott, Ph.D., CHP	Expert from the State-At-Large
Charles W. Welby, Ph.D.	Faculty, Institution of Higher Learning
Wayne R. Thomann, Ph.D.	Hospital Administrator
Billy H. Webster	Nuclear Electric Utility
William H. McCartney, M.D.	Physician, North Carolina Medical Society
Rhonda S. Cohen, D.P.M.	Podiatrist
Charles Barry Burns, MSPH	Radiologic Technologist
Beverly O. Hall	Radiation Protection Section
David Mallette	Department of Insurance
William D. Rippy, M.D.	Commission for Health Services
Robert K. Andrews, Jr.	Board of Transportation
Michael S. Wilkins	Utilities Commission
Marion E. Deerhake	Environmental Management Commission
John H. Johnson	Department of Labor
Bernadine S. Ballance	Industrial Commission
Kenneth B. Taylor, Ph.D.	Division of Emergency Management
Robert J. Fitzgerald	Medical Care Commission

Commission Counsel	
Jennie Wilhelm Mau	Assistant Attorney General

Appendix D

Low-Level Radioactive Waste Management Committee

Allen M. Mabry, CHP, Chairman of LLRW Management Committee
Radiation Protection Commission
Member Representing Atomic Energy, Other than Power Generation

Beverly O. Hall
Ex-Officio Member of Radiation Protection Commission
Section Chief of Radiation Protection Section

David Mallette
Ex-Officio Member of Radiation Protection Commission
Representing the Department of Insurance

Billy Webster
Radiation Protection Commission
Member Representing Nuclear Electric Utility

Charles Welby, PhD
Radiation Protection Commission
Member Representing Faculty of Institution of Higher Learning

Marion E. Deerhake
Ex-Officio Member of Radiation Protection Commission
Representing the Environmental Management Commission

Jennie Wilhelm Mau, Assistant Attorney General
Counsel to Committee

Wendy B. Tingle, Radioactive Waste Coordinator
Radiation Protection Section
Staff to Committee

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February 2003

DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
May 11, 2004

The Environmental Review Commission (ERC) met on Tuesday 11 May 2004 at 1:30 p.m. in Room 643 of the Legislative Office Building.

Senator Daniel Clodfelter presided over the 11 May 2004 meeting. The following members were present: Senators Albertson, Dorsett, Swindell and Weinstein, and Representatives Fox, Gibson, LaRoque, Weiss and Williams. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Jennifer McGinnis, Assistant Commission Counsel, Tim Dodge, Research Assistant, and Mary Watson, Commission Clerk were also present.

On 27 April 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Senator Clodfelter called the meeting to order and called on co-chairs for their remarks.

George Givens, Commission Counsel, was asked to explain the agenda.

Mr. Givens said that he had distributed to each member of packet of draft legislative proposals for consideration by the Environmental Review Commission for recommendation to the 2004 Regular Session of the 2003 General Assembly. A copy of this packet is listed as **Exhibit D**.

Senator Clodfelter said that the meeting was not designed to debate the merits of the packet of bills but to make them eligible for consideration.

Mr. Givens read the title of the first bill in the packet, State Natural and Historic Preserve Removals. Mr. Lewis Ledford, State Parks Division, said that the proposed legislation on State Natural and Historic Preserve Removals would include removal of a section of less than one-half acre on Kildaire Farm Road and reallocate a track of property, 104 acres, in Pilot Mountain to the Division of Historic Sites and Cultural Resources. Both remain in the State Property Administration.

Senator Weinstein made the motion that this bill be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens listed Item 2 in the package, Lower Haw River State Natural Area, authorizes DENR to add Lower Haw River State Natural Area to the State Park's System.

Mr. Ledford said that this was a 900-acre track of land acquired from Duke University.

Senator Albertson made the motion that this bill be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens listed Item 3 in the package, Tax Credit for Certain Real Property Donations.

Mr. Eddie Finch, Department of Revenue, explained that this legislation recodified the statute and combines the corporate and individual income statues in one place and increases the maximum credit involving certain pass through entities to make it consistent for corporations and pass through entities.

Senator Swindell made the motion that this bill be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens listed the next two items in the packet, 4.1, Phase II Stormwater Management –1 and 4.2, Phase II Stormwater Management-2.

Senator Clodfelter said that the co-chairs met this morning and decided to let both versions go forward for debate in the two respective committees during the short session.

Mr. Givens said that this is a matter that is very contentious. Version 4.1 is supported by League of Municipalities, supported by DENR and acceptable to the County Commissioners and environmental groups. Version 4.2 only offers protection to cities from action by the EPA or third party law suits for failure to file permit applications on time.

Senator Weinstein made the motion that these two bills be submitted together as part of the package draft legislation.

Representative Williams said he was concerned about 4.1 and asked if we were committed to putting both versions forward.

Senator Clodfelter said that while the 605 process is underway, both drafts should be kept in play. If they do not reach resolution, the shorter form would probably go forward in the respective House and Senate committees.

Representative Williams said that he is much more in favor of version 4.2.

Mr. Givens said that in 4.1, sections 7 and 8, the text would be added and rules would be removed from cross-reference before the bill is submitted to committees.

The motion passed.

Mr. Givens listed Item 5, Dry-cleaning Solvent Cleanup Act Amendments. This legislation addresses reimbursement for claimants who began the cleanup process before the law went into effect. It raises the cap to 25 percent.

Senator Weinstein made the motion that this bill be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens said that item 6, Phosphorous Nutrient Mgt./Animal Feedlots, is intended to allow DENR to meet the state permit requirements consistent with federal requirements as recommended by the Environmental Review Commission.

Representative Gibson asked if negotiations were still ongoing with regard to dry litter and poultry.

Mr. Steve Woodson, Poultry Association, said they have been working on this both at the federal and state level.

Senator Albertson said that it was his understanding that this bill is a work in progress.

Mr. Givens said that was his understanding as well.

Representative Gibson urged members to support this legislation and made the motion that this bill be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens explained that item 7, Limit Liability for Environmental Cleanup, is an act to promote economic development by facilitating the reuse of contaminated real property by limiting the liability of purchasers of contaminated property in circumstances where the seller of the property or another party assumes responsibility for response, remediation, and natural resources restoration of the property. This legislation does not deal with risk base and does not involve paying a fee for damage to natural resources.

Mr. Givens said that Dexter Matthews, Division of Waste Management, DENR, Mr. Preston Howard of MCIC have both spoken to him about this bill and are optimistic that this bill can be worked out during the short session.

Senator Clodfelter said that he agreed that the legislation needs further work. He added that this legislation is a slight expansion of the Brownfields concept, which has been very successful.

Senator Weinstein made the motion that this bill be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens explained that item 8, Water Conservation/Submeters, is an act to promote water conservation in multi-family residential properties by amending various state laws regarding the use of submeters in consecutive water systems in light of changes in policy related to water testing requirements and water conservation by the United States Environmental Protection Agency, as recommended by the ERC.

Mr. Givens said that EPA had reversed its policy and now favors submetering where there are reasonable assurances that water quality might be impaired. This bill reverses course to match the EPA's reversal of policy.

Senator Clodfelter said that the co-chairs have asked Mr. Givens to convene a working group to represent this legislation as well as representing apartment owners and tenant interests.

Representative Williams made the motion that this bill be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens explained that items 9, Environmental Reports Amendments, an act to amend various environmental reporting requirements, as recommended by the Environmental Review Commission, and Item 10, Environmental Technical Corrections, an act to make clarifying, conforming, and technical amendments to various laws related to the Environment, Public Health, and natural resources, as recommended by the ERC are adjustments to reporting requirements under the Sedimentation Pollution Control Act.

Senator Clodfelter asked for permission to include both items 9 and 10 in the same motion.

Senator Albertson made the motion that both items 9 and 10 be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens explained that item 11, ABC Licensees to Recycle Beverage Containers, is an act to require holders of certain ABC permits to recycle all recyclable beverage containers, as recommended by the ERC.

Mr. Givens said that this legislation promotes licensing of groups in the State who hold on-site ABC licenses and says that if they serve alcohol, they will recycle their glass and aluminum beverage containers.

Representative Hackney said that this was a work in progress and also pertains to pallet and computers. Green jobs are increasing in North Carolina and it is important that we have a steady flow of recycled product.

Representative Hackney made the motion that item 11 be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens said that item 12, Leaking UST Fund Liquidity, is an act to improve and accelerate processing of claims under the leaking petroleum underground storage tank cleanup program, as recommended by the ERC.

Mr. Givens said there is currently a $30 million deficit in the leaking UST fund and this bill addresses the possibility of North Carolina setting up a national entity in which North Carolina could participate to get consultants and other responsible parties, now experiencing delays, to get them paid quickly.

Senator Clodfelter said that this may be an item we need to work out in the 2005 long session, but he feels it is worth moving forward this in the short session.

Senator Swindell made the motion that item 12 be submitted as part of the package draft legislation.

The motion passed.

Mr. Givens said Sen. Soles and Representative Hill requested that item 13, Septic System Setbacks for Pre-1977 Lots, because of a situation in Brunswick County.

Mr. Givens explained that this legislation is an act to clarify that a septic tank system that is for a lot platted friar to July 1, 1977, and that is operated in soils that are in soil group 1, may be located ten feet or more from any other septic tank system, as recommended by the ERC.

Representative Williams made the motion that this bill be submitted as part of the package draft legislation.

Representative Hackney asked Mr. Givens how many times the General Assembly had killed this bill in the past.

Mr. Givens said that he did not know the answer to this question.

Representative Hackney asked if DENR supported the legislation.

Mr. Givens said that it was his understanding that DENR did support the legislation.

Representative Hackney asked Sen. Clodfelter if he thought ERC wanted to include this bill in the package legislation.

Representative Gibson encouraged members to support this legislation.

The motion passed.

Mr. Givens explained item 14, Hatteras Village/Temp. Unvegetated Beach Area, an act to designate as temporary unvegetated beach areas certain oceanfront areas on Hatteras Island where the vegetation line was destroyed by Hurricane Isabel and the remnants of the vegetation line were buried by the construction of an emergency berm, as recommended by the ERC.

Mr. Givens said that this legislation would allow the use of a DOT photograph that shows where the line was before the hurricane came along and the berm was built. It is his understanding that the Coastal Resources Commission voted to rule amendment in January that would do this; however, this would be a more expedited way of achieving that.

Senator Swindell made the motion that item 14 be submitted as part of the package draft legislation.

The motion passed.

Senator Clodfelter said that the co-chairs would discuss the sponsoring and filing of these bills. He told members that if anyone was interested in being the sponsor of one of these bills, to please let Mr. Givens know, by the end of this week.

The meeting was adjourned at 2:00 p.m.

Senator Daniel Clodfelter	Mary R. Watson
Presiding Co-Chair	Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Handout: Packet of draft legislative proposals for consideration by the Environmental Review Commission for recommendation to the 2004 Regular Session of the 2003 General Assembly

May 11, 2004 ERC Meeting
EXHIBIT A

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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27 April 2004

TO: Environmental Review Commission – Members and Interested Parties

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Meetings - 5 May and 11 May 2004**

COMMISSION MEETING – 5 May 2004:

The Environmental Review Commission will meet at 9:30 a.m. on Wednesday 5 May 2004 in Room 643 of the Legislative Office Building in Raleigh.

At this meeting, the Commission will hear reports from State agencies, consider studies for which the Commission is responsible, discuss topics to be considered at future meetings, and attend to other matters. Listed below are potential agenda topics for this meeting.

1) Information item on the NC GreenPower Program

2) Status report on the One-Stop Permit Assistance and Coordination Program. (S.L. 2001-424, Sec. 19.6)

3) Report on the Express Review Pilot Program and whether the Pilot Program be continued or expanded (S.L. 2003-284, Sec. 11.4A(e))

4) Information item on the Transportation Demand Management Program

5) Update on the status of designation of nonattainment areas to comply with the revised national ambient air quality standard (NAAQS) for ozone (the 8-hour standard)

6) Annual report on implementation of S.L. 2002-4 (Clean Smokestacks Act) (S.L. 2002-4, Sec. 14)

7) Report on issues related to the Leaking Petroleum Underground Storage Tank Cleanup Program (S.L. 2003-352, Sec. 12.(a))

8) Annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund (G.S. 143-215.94M)

9) Information item on the Virginia Resources Authority's accelerated claim payment program for underground storage tank fund claims and the development of a national accelerated claim payment program (NATLUST)

10) Annual report on implementation of the Wetlands Restoration Program and use of the Wetlands Restoration Fund (G.S. 143-214.13)

11) Annual report on the effectiveness of projects funded under the Agricultural Cost Share Program for Nonpoint Source Pollution Control (G.S. 143-215.74(e))

12) Update on issues related to the Phase II stormwater rules

13) Report on the management of low-level radioactive waste in North Carolina (G.S. 120-70.33(7))

14) Consideration of legislative proposals for recommendation to the 2004 Regular Session of the General Assembly

15) Other matters related to the Commission's powers and duties under G.S. 120-10.43

COMMISSION MEETING – 11 May 2004:

The 2004 Regular Session is scheduled to begin at 12:00 noon on Monday 10 May. The Commission normally meets shortly after the beginning of the session to complete work on legislative proposals prior to the commission/ committee bill request deadline, which in 2004 is 4:00 p.m. Wednesday 12 May. **A Commission meeting at 2:30 p.m. on Tuesday 11 May in Room 643 of the Legislative Office Building is tentatively scheduled for this purpose.** The agenda for the meeting may also include any unfinished agenda items from the 5 May meeting of the Commission and any other matters related to the Commission's powers and duties under G.S. 120-10.43.

FUTURE MEETINGS:

The Commission may meet at other times while the General Assembly is in session (G.S. 120-70.44). If the Commission meets while the General Assembly is in session, written notice will not be mailed to persons on the mailing list. Rather, notice will be given at a session of the Senate and House of Representatives as provided by G.S. 143-318 (b). The Commission will resume a schedule of regular monthly meetings following adjournment of the 2003 Session of the General Assembly. Mailed notices of Commission meetings will resume at that time.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below.

Phase II Stormwater Management Working Group
2:00 p.m. Tuesday 27 April 2004– 605 Legislative Office Building

Leaking Petroleum Underground Storage Tank Working Group
10:00 a.m. Tuesday 4 May 2004– 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel at (919) 733-2578.

May 11, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 5-11-04
Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Lisa Martin	NC Home Builders Assoc.
Beth Anne Mumford	NCPC
Marie Soutter	Weyerhaeuser
Nancy Thompson	MCIC
Michelle Coon	Weyerhaeuser
Colleen Kochanek	AANC
W H Potter Jr	NCDS&CAR/Nat. Waters Co
Lisa Perry	Duke Energy
Jeremy Smith	Intern - Sen. Albertson
Lorin Mueller	NCCOPS

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION 5-11-09

Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Lisa Glover	NCAGO/DOT
Mary P. Thompson	NC DENR
BRUCE NICHOLSON	NC DENR
Angi McMillan	TNC
Christine Wunsche Andrea Reese	NC PIRG
David Vogel	NC DENR
Jim HAVEN	GLOBAL WARMING INITIATIVES
DAVID BRAM	OSBM
Johnny Gray	OSBM
Angie Harris	Margie Taylor
Steve Woodson	NC Farm Bureau

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — May 11, 04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Tom Beason	NC Environmental Defense
Bill Hale	Jordan Price Law Firm
Kim Hibbard	NCLM
Lucius Pullen	NC Mining Assoc.
Eddie Caldwell	Hafer & Caldwell, P.A.
Sara Brodnax	NC Conservation Council
Michael Nekrn	NC conservation Council
Tamara Cheng	NC Nature Conservancy
Kristin Walker	NC Nature Conservancy
Craig Koller	NC Nature Conservancy
Anita Watkins	NCLM

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION 5-11-04

Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Samuel Taylor	NCALC
Robin Smith	DENR
David Knight	NC Sierra Club, NCWF
Percy Harrison	Greensboro NC
Chris Edwards	A Cleaner World Dry Cleaners High Point NC
Bill Flannery	DENR
T REEDER	DWQ
Jack Butler	DWM
Steph Burns	LEPP
Tony Adams	NCDAA
Amy Fullam	Hunton & Wms

May 11, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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AGENDA
1:30 p.m. Tuesday 11 May 2004
Room 643 Legislative Office Building

1. Call to order
   Senator Daniel G. Clodfelter, Presiding

2. Introductory remarks by Cochairs
   Senator Daniel G. Clodfelter
   Senator Charles W. Albertson
   Representative Daniel F. McComas
   Representative Pryor A. Gibson

3. Consideration of legislative proposals for recommendation to the 2004 Regular Session of the General Assembly
   George F. Givens, Commission Counsel

4. Commission discussion and announcements

5. Adjourn

SCHEDULE OF FUTURE MEETINGS:

The Commission may meet at other times while the General Assembly is in session (G.S. 120-70.44). If the Commission meets while the General Assembly is in session, written notice will not be mailed to persons on the mailing list. Rather, notice will be given at a session of the Senate and House of Representatives as provided by G.S. 143-318.12(b) and by email when possible. The Commission will resume a schedule of regular monthly meetings following adjournment of the 2004 Session of the General Assembly. Mailed notices of Commission meetings for those who request them will resume at that time.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Phase II Stormwater Management Working Group
10:00 a.m. Friday 14 May 2004 – 605 Legislative Office Building

May 11, 2004 ERC Meeting
EXHIBIT D

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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11 May 2004

To: Members of the Environmental Review Commission

From: George F. Givens, Commission Counsel

Re: Draft legislative proposals

Attached are the legislative proposals for consideration by the Environmental Review Commission for recommendation to the 2004 Regular Session of the 2003 General Assembly.

LEGISLATIVE PROPOSALS

#	Short Title	Drafting Code
1.	State Nat. & Hist. Preserve Removals.	2003-RIz-9 [v.7]
2.	Lower Haw River State Natural Area.	2003-RIz-10 [v.3]
3.	Tax Credit for Certain Real Prop. Donations.	2003-RIz-11 [v.5]
4.1	Phase II Stormwater Management-1.	2003-SBz-31 [v.8]
4.2	Phase II Stormwater Management-2.	2003-RTz-31 [v.2]
5.	Drycleaning Solvent Cleanup Act Amendments.	2003-SYz-22 [v.5]
6.	Phosphorous Nutrient Mgt./Animal Feedlots.	2003-SYz-23 [v.5]
7.	Limit Liability for Environmental Cleanups.	2003-RTfz-30 [v.4]
8.	Water Conservation/Submeters.	2003-SYz-24 [v.4]
9.	Environmental Reports Amendments.	2003-SYz-21 [v.4]
10.	Environmental Technical Corrections.	2003-SYz-20 [v.6]
11.	ABC Licensees' to Recycle Beverage Containers.	2003-LDz-114 [v.7]

12.	Leaking UST Fund Liquidity.	2003-SYz-25 [v.3]
13.	Septic System Setbacks for Pre-1977 Lots.	2003-LDz-115 [v.9]
14.	Hatteras Village/Temp. Unvegetated Beach Area.	2003-LH-216A [v.6]

Please contact George Givens, Jeff Hudson, Jennifer McGinnis, or Tim Dodge at (919) 733-2578 if you have any questions or comments.

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

U D

BILL DRAFT 2003-RIz-9 [v.7] (4/2)

#1

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 10:02:23 AM

Short Title: State Nat. & Hist. Preserve Removals. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO REMOVE CERTAIN LANDS FROM THE STATE NATURE AND HISTORIC PRESERVE AND TO DELETE A PORTION OF A PARK FROM THE STATE PARKS SYSTEM, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

Whereas, Section 5 of Article XIV of the Constitution of North Carolina authorizes the dedication of State and local government properties as part of the State Nature and Historic Preserve upon acceptance by a law enacted by a three-fifths vote of the members of each house of the General Assembly and provides for removal of properties from the State Nature and Historic Preserve by a law enacted by a three-fifths vote of the members of each house of the General Assembly; and

Whereas, the General Assembly enacted the State Nature and Historic Preserve Dedication Act, Chapter 443 of the 1973 Session Laws, to prescribe the conditions and procedures under which properties may be specifically dedicated for the purposes set out in Section 5 of Article XIV of the Constitution of North Carolina; and

Whereas, G.S. 113-44.14 provides for additions to, and deletions from, the State Parks System upon authorization by the General Assembly; Now, therefore,

The General Assembly of North Carolina enacts:

SECTION 1. G.S. 143-260.10 reads as rewritten:

"**§ 143-260.10. Components of State Nature and Historic Preserve.**

The following are components of the State Nature and Historic Preserve accepted by the North Carolina General Assembly pursuant to G.S. 143-260.8:

(1) All lands and waters within the boundaries of the following units of the State Parks System as of 6 May 2003: Baldhead Island State Natural Area, Bay Tree Lake State Park, Beech Creek Bog State Natural Area, Bullhead Mountain State Natural Area, Bushy Lake State Natural Area, Carolina Beach State Park, Cliffs of the Neuse

State Park, Chowan Swamp State Natural Area, Dismal Swamp State Natural Area, Elk Knob State Natural Area, Fort Fisher State Recreation Area, Fort Macon State Park, Goose Creek State Park, Gorges State Park, Hammocks Beach State Park, ~~Hemlock Bluffs State Natural Area~~, Jones Lake State Park, Lake James State Park, Lake Norman State Park, Lake Waccamaw State Park, Lea Island State Natural Area, Lumber River State Park, Medoc Mountain State Park, Merchants Millpond State Park, Mitchells Millpond State Natural Area, Mount Mitchell State Park, Occoneechee Mountain State Natural Area, Pettigrew State Park, Pilot Mountain State Park, Raven Rock State Park, Run Hill State Natural Area, Singletary Lake State Park, Theodore Roosevelt State Natural Area, and Weymouth Woods-Sandhills Nature Preserve.

...

(18) All land and waters within the boundaries of Hemlock Bluffs State Natural Area as of May 6, 2003 with the exception of the following tracts: The portion of that certain tract or parcel of land at Hemlock Bluffs State Natural Area in Wake County, Swift Creek Township, described in Deed Book 2461, Page 037, containing 2,025 square feet and being the portion of this tract shown as proposed R/W on the drawing prepared by Titan Atlantic Group entitled "Right of Way Acquisition Map for Town of Cary Widening of Kildaire Farm Road (SR 1300) from Autumgate Drive to Palace Green" sheet 1 of 3 bearing the preparer's file name Town of Cary Case File No. TOC 01-37, dated 26 September 2003, and filed with the State Property Office; and the portion of those certain tracts or parcels of land at Hemlock Bluffs State Natural Area in Wake County, Swift Creek Township, described in Deed Book 4670, Page 420, containing 24,092 square feet and being the portion of these tracts shown as proposed R/W on the drawing prepared by Titan Atlantic Group entitled "Right of Way Acquisition Map for Town of Cary Widening of Kildaire Farm Road (SR 1300) from Autumgate Drive to Palace Green" sheet 3 of 3 bearing the preparer's file name Town of Cary Case File No. TOC 01-37, dated 26 September 2003, and filed with the State Property Office. The tracts excluded from the State Nature and Historic Preserve under this subdivision are deleted from the State Parks System pursuant to G.S. 113-44.14. The State of North Carolina may only exchange this land for other land for the expansion of Hemlock Bluffs State Natural Area or sell this land and use the proceeds for that purpose. The State may not otherwise sell or exchange this land."

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SECTION 2. The following tracts of land are removed from the State Nature and Historic Preserve pursuant to Section 5 of Article XIV of the Constitution of North Carolina: The portion of that certain tract or parcel of land at Hemlock Bluffs State Natural Area in Wake County, Swift Creek Township, described in Deed Book 2461,

Page 037, containing 2,025 square feet and being the portion of this tract shown as proposed R/W on the drawing prepared by Titan Atlantic Group entitled "Right of Way Acquisition Map for Town of Cary Widening of Kildiare Farm Road (SR 1300) from Autumgate Drive to Palace Green" sheet 1 of 3 bearing the preparer's file name Town of Cary Case File No. TOC 01-37, dated 26 September 2003, and filed with the State Property Office; and the portion of those certain tracts or parcels of land at Hemlock Bluffs State Natural Area in Wake County, Swift Creek Township, described in Deed Book 4670, Page 420, containing 24,092 square feet and being the portion of these tracts shown as proposed R/W on the drawing prepared by Titan Atlantic Group entitled "Right of Way Acquisition Map for Town of Cary Widening of Kildiare Farm Road (SR 1300) from Autumgate Drive to Palace Green" sheet 3 of 3 bearing the preparer's file name Town of Cary Case File No. TOC 01-37, dated 26 September 2003, and filed with the State Property Office.

SECTION 3. The following tract is removed from the State Parks System pursuant to G.S. 113-44.14: The portion of that certain tract or parcel of land at Pilot Mountain State Park in Surry County, Shoals Township, described in Plat Book 21, Page 76, containing 104.280 acres, and shown as the "Horne Creek Living Historical Park" on the drawing prepared by Joe L. Cooke, bearing the preparer's file name Dwg. 3/330, dated 23 March 2004, and filed with the State Property Office. This property may be reallocated to the Department of Cultural Resources for its use of the property as the Horne Creek Farm State Historic Site. This property will remain in the State Nature and Historic Preserve.

SECTION 4. In accordance with G.S. 143-260.8(e), the Secretary of State is directed to forward a certified copy of this act to the register of deeds of each county in which any portion of the property removed by this act as part of the State Nature and Historic Preserve is located.

SECTION 5. This act is effective when it becomes law.

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

U D

BILL DRAFT 2003-RIz-10 [v.3] (4/28)

#2

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 9:44:32 AM

Short Title:	Lower Haw River State Natural Area.	(Public)
Sponsors:	Unknown.	
Referred to:		

A BILL TO BE ENTITLED

AN ACT TO AUTHORIZE THE ADDITION OF THE LOWER HAW RIVER STATE NATURAL AREA TO THE STATE PARKS SYSTEM, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

Whereas, Section 5 of Article XIV of the Constitution of North Carolina states that it shall be a proper function of the State of North Carolina to acquire and preserve park, recreational, and scenic areas, and in every other appropriate way to preserve as a part of the common heritage of this State, its open lands and places of beauty; and

Whereas, the 1987 General Assembly enacted the State Parks Act, which declares that the State of North Carolina offers unique archaeological, geologic, biological, scenic, and recreational resources, and that these resources are part of the heritage of the people of the State, which should be preserved and managed by the people for their use and for the use of their visitors and descendants; and

Whereas, the Lower Haw River in Chatham County is considered nationally significant for its biological resources including several rare species and possesses biological, scenic, and recreational resources of statewide significance; Now, therefore,

The General Assembly of North Carolina enacts:

SECTION 1. The General Assembly authorizes the Department of Environment and Natural Resources to add the Lower Haw River State Natural Area to the State Parks System as provided by G.S. 113-44.14(b).

SECTION 2. This act is effective when it becomes law.

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FOR REVIEW ONLY

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2003

U D

BILL DRAFT 2003-RIz-11 [v.5] (5/7)

#3

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/11/2004 11:59:06 AM

Short Title: Tax Credit for Certain Real Prop. Donations. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO RECODIFY THE CREDIT FOR CERTAIN REAL PROPERTY DONATIONS AND TO INCREASE THE CREDIT FOR CERTAIN PASS-THROUGH ENTITIES, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. Article 4 of Chapter 105 of the General Statutes is amended by adding a new Part to read:

" Part 6. Tax Credit for Certain Real Property Donations.

"**§ 105-163.021. Tax credit allowed.**

(a) Qualified donation. -- A person who makes a qualified donation of an interest in real property located in North Carolina during the taxable year that is useful for (i) public beach access or use, (ii) public access to public waters or trails, (iii) fish and wildlife conservation, or (iv) other similar land conservation purposes is allowed a credit against the tax imposed by Article 4 of this Chapter equal to twenty-five percent (25%) of the fair market value of the donated property interest. To be eligible for this credit, the interest in property must be donated in perpetuity to and accepted by the State, a local government, or a body that is both organized to receive and administer lands for conservation purposes and qualified to receive charitable contributions under the Code. Lands required to be dedicated pursuant to local governmental regulation or ordinance and dedications made to increase building density levels permitted under a regulation or ordinance are not eligible for this credit. To support the credit allowed by this section, the taxpayer must file with the income tax return for the taxable year in which the credit is claimed a certification by the Department of Environment and Natural Resources that the property donated is suitable for one or more of the valid public benefits set forth in this subsection. The certification for a qualified donation made by a pass-through entity must be filed by the pass-through entity.

(b) Corporations. – The aggregate amount of credit allowed to a corporation in a taxable year under this section for one or more qualified donations, whether made directly or indirectly as owner of a pass-through entity, may not exceed five hundred thousand dollars ($500,000). That portion of a qualifying donation that is the basis for a credit allowed under this section is not eligible for deduction as a charitable contribution under G.S. 105-130.9.

(b1) Individuals. – The aggregate amount of credit allowed to an individual in a taxable year under this section for one or more qualified donations, whether made directly or indirectly as owner of a pass-through entity, may not exceed two hundred fifty thousand dollars ($250,000). In the case of property owned by a married couple, if both spouses are required to file North Carolina income tax returns, the credit allowed by this section may be claimed only if the spouses file a joint return. If only one spouse is required to file a North Carolina income tax return, that spouse may claim the credit allowed by this section on a separate return.

(b2) Pass-through entities. – The aggregate amount of credit allowed to a pass-through entity in a taxable year under this section for one or more qualified donations, whether made directly or indirectly as owner of another pass-through entity, may not exceed five hundred thousand dollars ($500,000). Each individual who is an owner of a pass-through entity is allowed as a credit an amount equal to the owner's allocated share of the credit to which the pass-through entity is eligible under this subsection, not to exceed $250,000. Each corporation that is an owner of a pass-through entity is allowed as a credit an amount equal to the owner's allocated share of the credit to which the pass-through entity is eligible under this subsection, not to exceed $500,000.

(c) Cap; carryforward. – The credit allowed by this section may not exceed the amount of tax imposed by Article 4 of this Chapter for the taxable year reduced by the sum of all credits allowed, except payments of tax made by or on behalf of the taxpayer. Any unused portion of this credit may be carried forward for the next succeeding five years.

(d) Marshland. – In the case of marshland for which a claim has been filed pursuant to G.S. 113-205, the offer of donation must be made before December 31, 2003 to qualify for the credit allowed by this section."

SECTION 2. G.S. 105-130.34 is repealed.

SECTION 3. G.S. 105-151.12 is repealed.

SECTION 4. This act is effective for taxable years beginning on or after January 1, 2005.

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

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BILL DRAFT 2003-SBz-31 [v.8] (4/28)

#4.1

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/11/2004 11:45:40 AM

Short Title: Phase II Stormwater Management-1. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO PROVIDE FOR THE IMPLEMENTATION OF FEDERAL PHASE II STORMWATER MANAGEMENT REQUIREMENTS, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. Phase II Stormwater Permit Application and Standards. – An application for a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management submitted by a local government designated as an urbanized area under the 1990 or 2000 census by the Bureau of the Census shall be deemed timely received if the application was submitted to the Department of Environment and Natural Resources in accordance with the application schedule set out in Section 6 of the temporary rule adopted by the Environmental Management Commission on 10 October 2002. To obtain a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management under this Section, an applicant shall develop, implement, and enforce a stormwater management plan approved by the Department that satisfies the six minimum control measures required by 40 Code of Federal Regulations § 122.34(b) (1 July 2003 Edition). The evaluation of the post-construction stormwater management measures required by 40 Code of Federal Regulations § 122.34(b)(5) (1 July 2003 Edition) shall be conducted as provided in Section 10 of the temporary rule adopted by the Environmental Management Commission on 10 October 2002. A municipality with a population of less than 1,000, including a municipality designated by the 1990 or 2000 census, is not required to obtain a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management unless the municipality is shown to be contributing to an impairment of State waters, as determined under the requirements of § 33 U.S.C. 1313(d).

SECTION 2. New Development. – New development or redevelopment in any area designated as an urbanized area under the 1990 or 2000 census by the Bureau of the Census or under procedures established in Section 7 of this act, and located in a local jurisdiction that does not administer either a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management or a local stormwater management program approved pursuant to Section 5 of this act shall comply with the standards set out in Section 10 of the temporary rule adopted by the Environmental Management Commission on 10 October 2002. The Department of Environment and Natural Resources shall administer and enforce these standards in these areas.

SECTION 3. Coordination of Phase II and other Stormwater Management Programs. – In any circumstance where any stormwater control requirement under a Phase II National Pollutant Discharge Elimination System (NPDES) stormwater management permit conflicts or overlaps with any stormwater control requirement under any other water quality program, the more stringent requirement shall apply. The Secretary of Environment and Natural Resources or the Secretary's designee shall resolve any dispute as to whether there is a conflict or overlap between or among stormwater management requirements and shall determine which requirement shall be deemed the most stringent.

SECTION 4. General Permit. – After the Department of Environment and Natural Resources has issued a Phase II National Pollutant Discharge Elimination System (NPDES) general permit for stormwater management, a local government that has applied for a permit under Section 1 of this act may submit a notice of intent to be covered under the general permit to the Department. The Department shall treat an application for a permit under Section 1 of this act as an application for an individual permit unless the applicant submits a notice of intent to be covered under a general permit under this Section.

SECTION 5. Voluntary Delegation to Local Governments. – A local government whose jurisdiction includes an area designated as an urbanized area under the 1990 or 2000 census by the Bureau of the Census or a local government designated pursuant to Section 7 of this act may submit to the Department of Environment and Natural Resources for its approval a stormwater management program for its jurisdiction, and to this end local governments are authorized to adopt ordinances and regulations necessary to establish and enforce stormwater management programs. Local governments are authorized to create or designate agencies or subdivisions of local government to administer and enforce the programs. An ordinance adopted by a local government shall at least meet and may exceed the minimum requirements of this act and the six minimum control measures required by 40 Code of Federal Regulations § 122.34(b) (1 July 2003 Edition). Two or more units of local government are authorized to establish a joint program and to enter into any agreements that are necessary for the proper administration and enforcement of the program. The resolutions establishing any joint program must be duly recorded in the minutes of the governing body of each unit of local government participating in the program, and a certified copy of each resolution must be filed with the Department. The Department shall review each program submitted and within 90 days of receipt thereof shall notify the local government

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submitting the program that it has been approved, approved with modifications, or disapproved. The Department shall only approve a program upon determining that its standards equal or exceed those of this act and the six minimum control measures required by 40 Code of Federal Regulations § 122.34(b) (1 July 2003 Edition). If the Department determines that any local government is failing to administer or enforce an approved stormwater management program, it shall notify the local government in writing and shall specify the deficiencies of administration and enforcement. If the local government has not taken corrective action within 30 days of receipt of notification from the Department, the Department shall assume administration and enforcement of the program until such time as the local government indicates its willingness and ability to resume administration and enforcement of the program.

SECTION 6. Phase II Stormwater Implementation Deadlines. –

(1) For a permit application submitted by a local government that was designated as an urbanized area under the 1990 census by the Bureau of the Census, the Department of Environment and Natural Resources shall send a draft permit decision to public notice by 1 November 2004.

(2) For a permit application submitted by a local government that was designated as an urbanized area under the 2000 census by the Bureau of the Census, the Department of Environment and Natural Resources shall send a draft permit decision to public notice by 1 May 2005.

(3) A local government shall adopt post-construction stormwater management measures that become effective within 24 months after the date on which a permit is issued.

SECTION 7. Designation Process – The provisions of proposed 15A NCAC 2H .0151 (Public Entity Designations) as adopted by the Environmental Management Commission on 11 December 2003 shall govern the designation of local governments not designated as urbanized areas under the 1990 or 2000 census by the Bureau of the Census that must obtain a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management.

SECTION 8. Petition Process – The provisions of proposed 15A NCAC 2H .0152 (Petitions) as adopted by the Environmental Management Commission on 11 December 2003 shall govern the process by which a petition may be submitted to the Department of Environment and Natural Resources to require a local government to obtain a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management.

SECTION 9. Design Manual; Model Ordinance. – Consistent with G.S. 150B-2(8a)h., the Division of Water Quality, in consultation with the Division of Land Resources, Division of Soil and Water Conservation, and North Carolina State University, shall develop a design manual to assist local governments in determining which controls are best suited to the unique characteristics of the jurisdiction. Pursuant to G.S. 143-214.7(c), the Environmental Management Commission shall develop a model ordinance in cooperation with local governments that shall include both

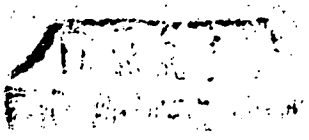
structural and nonstructural best management practices adequate to meet the standards. The design manual and model ordinance shall be completed by 1 October 2005.

SECTION 10. Construction of Act. –

(1) Nothing in this act shall be construed to limit the authority of the Environmental Management Commission or any unit of local government to adopt stormwater management requirements that exceed the requirements of this act.

(2) This act shall not be construed to affect pending litigation.

SECTION 11. Section 2 of this act becomes effective 1 July 2006. All other sections of this act become effective when the act becomes law.



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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

U D

BILL DRAFT 2003-RTz-31 [v.2] (5/11)

#4.2

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/11/2004 11:49:24 AM

Short Title: Phase II Stormwater Management-2. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO PROVIDE FOR THE IMPLEMENTATION OF FEDERAL PHASE II STORMWATER MANAGEMENT REQUIREMENTS, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. Phase II Stormwater Permit Application and Standards. – An application for a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management submitted by a local government designated as an urbanized area under the 1990 or 2000 census by the Bureau of the Census shall be deemed timely received if the application was submitted to the Department of Environment and Natural Resources in accordance with the application schedule set out in Section 6 of the temporary rule adopted by the Environmental Management Commission on 10 October 2002. To obtain a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management under this Section, an applicant shall develop, implement, and enforce a stormwater management plan approved by the Department that satisfies the six minimum control measures required by 40 Code of Federal Regulations § 122.34(b) (1 July 2003 Edition). The evaluation of the post-construction stormwater management measures required by 40 Code of Federal Regulations § 122.34(b)(5) (1 July 2003 Edition) shall be conducted as provided in Section 10 of the temporary rule adopted by the Environmental Management Commission on 10 October 2002. A municipality with a population of less than 1,000, including a municipality designated by the 1990 or 2000 census, is not required to obtain a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management unless the municipality is shown to be contributing to an impairment of State waters, as determined under the requirements of § 33 U.S.C. 1313(d).

SECTION 2. Phase II Stormwater Implementation Deadlines. –

(1) For a permit application submitted by a local government that was designated as an urbanized area under the 1990 census by the Bureau of the Census, the Department of Environment and Natural Resources shall send a draft permit decision to public notice by 1 November 2004.

(2) For a permit application submitted by a local government that was designated as an urbanized area under the 2000 census by the Bureau of the Census, the Department of Environment and Natural Resources shall send a draft permit decision to public notice by 1 May 2005.

(3) A local government shall adopt post-construction stormwater management measures that become effective within 24 months after the date on which a permit is issued.

SECTION 3. This act is effective when it becomes law.

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

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BILL DRAFT 2003-SYz-22 [v.5] (5/4)

#5

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 9:17:14 AM

Short Title: Dry Cleaning Solvent Cleanup Act Amendments. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO INCREASE THE PERCENTAGE OF REVENUE CREDITED TO THE DRY-CLEANING SOLVENT CLEANUP FUND THAT MAY BE USED TO PAY COSTS OF ASSESSMENT OR REMEDIATION OF DRY-CLEANING SOLVENT CONTAMINATION THAT OCCURRED PRIOR TO 1 JULY 2001, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. Section 2.(c) of S.L. 2001-265 reads as rewritten:

"SECTION 2.(c) The total of all payments made pursuant to this section in a single fiscal year shall not exceed ~~ten percent (10%)~~twenty-five percent (25%) of the revenues credited to the Dry-Cleaning Solvent Cleanup Fund in the preceding fiscal year."

SECTION 2. This act becomes effective 1 July 2004.

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

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BILL DRAFT 2003-SYz-23 [v.5] (5/6)

#6

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 11:23:17 AM

Short Title: Phosphorous Nutrient Mgt./Animal Feedlots. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO IMPLEMENT REQUIREMENTS APPLICABLE TO NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMITS AND ANIMAL WASTE MANAGEMENT PLANS GOVERNING ANIMAL FEEDING OPERATIONS TO MAKE THE STATE PERMIT REQUIREMENTS CONSISTENT WITH FEDERAL REQUIREMENTS, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. G.S. 143-215.10B reads as rewritten:

"**§ 143-215.10B. Definitions.**

As used in this Part:

(1) "Animal operation" means any agricultural ~~farming~~ feedlot activity involving 250 or more swine, 100 or more confined cattle, 75 or more horses, 1,000 or more sheep, or 30,000 or more confined poultry with a liquid animal waste management ~~system.~~system, or any smaller agricultural feedlot activity with a liquid animal waste management system that discharges to the surface waters of the State. A public livestock market regulated under Article 35 of Chapter 106 of the General Statutes is an animal operation for purposes of this Part.

(2) "Animal waste" means livestock or poultry excreta or a mixture of excreta with feed, bedding, litter, or other materials from an animal operation.

(3) "Animal waste management system" means a combination of structures and nonstructural practices serving a feedlot that provide for the collection, treatment, storage, or land application of animal waste.

(4) "Division" means the Division of Water Quality of the Department.

(4a) "Dry litter poultry facility" means any agricultural feedlot activity involving poultry that does not utilize a liquid animal waste management system.

(5) "Feedlot" means a lot or building or combination of lots and buildings intended for the confined feeding, breeding, raising, or holding of animals and either specifically designed as a confinement area in which animal waste may accumulate or where the concentration of animals is such that an established vegetative cover cannot be maintained. A building or lot is not a feedlot unless animals are confined for 45 or more days, which may or may not be consecutive, in a 12-month period. Pastures shall not be considered feedlots for purposes of this Part.

(6) "Technical specialist" means an individual designated by the Soil and Water Conservation Commission, pursuant to rules adopted by that Commission, to certify animal waste management plans."

SECTION 2. G.S. 143-215.10C reads as rewritten:

"**§ 143-215.10C. Applications and permits.**

(a) No person shall construct or operate an animal waste management system for an animal operation or a dry litter poultry facility subject to federal discharge permit regulations without first obtaining an individual permit or a general permit under this ~~Article.~~section. The Commission shall develop a system of individual and general permits for animal operations and dry litter poultry facilities based on species, number of animals, and other relevant factors. It is the intent of the General Assembly that most animal waste management systems be permitted under a general permit. The Commission, in its discretion, may require that an animal waste management system be permitted under an individual permit if the Commission determines that an individual permit is necessary to protect water quality, public health, or the environment.

(b) An animal waste management system shall be designed, constructed, and operated so that the animal operation served by the animal waste management system does not cause pollution in the waters of the State except as may result because of rainfall from a storm event more severe than the 25-year, 24-hour ~~storm.~~storm of the 100-year, 24-hour storm if required by federal discharge permit regulations.

(c) The Commission shall act on a permit application as quickly as possible and may conduct any inquiry or investigation it considers necessary before acting on an application.

(d) All applications for permits or for renewal of an existing permit shall be in writing, and the Commission may prescribe the form of the applications. All applications shall include an animal waste management system plan approved by a technical specialist. The Commission may require an applicant to submit additional information the Commission considers necessary to evaluate the application. Permits and renewals issued pursuant to this section shall be effective until the date specified therein or until rescinded unless modified or revoked by the Commission.

(e) Animal waste management plans for animal operations shall include all of the following components:

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(1) A checklist of potential odor sources and a choice of site-specific, cost-effective remedial best management practices to minimize those sources.

(2) A checklist of potential insect sources and a choice of site-specific, cost-effective best management practices to minimize insect problems.

(3) Provisions that set forth acceptable methods of disposing of mortalities.

(4) Provisions regarding best management practices for riparian buffers or equivalent controls, particularly along perennial streams.

(5) Provisions regarding the use of emergency spillways and site-specific emergency management plans that set forth operating procedures to follow during emergencies in order to minimize the risk of environmental damage.

(6) Provisions regarding periodic testing of waste products used as nutrient sources as close to the time of application as practical and at least within 60 days of the date of application and periodic testing, at least annually, of soils at crop sites where the waste products are applied. Nitrogen shall be the rate-determining ~~element.~~element, except that phosphorous provisions of the most current nutrient management standard approved by the Soil and Water Conservation Commission or the Natural Resources Conservation Service of the United States Department of Agriculture may also be a rate-determining factor for facilities subject to federal discharge permit regulations. Zinc and copper levels in the soils shall be monitored, and alternative crop sites shall be used when these metals approach excess levels.

(7) Provisions regarding waste utilization plans that assure a balance between nitrogen application rates and nitrogen crop requirements, that assure that lime is applied to maintain pH in the optimum range for crop production, and that include corrective action, including revisions to the waste utilization plan based on data of crop yields and crops analysis, that will be taken if this balance is not achieved as determined by testing conducted pursuant to subdivision (6) of this subsection.

(8) Provisions regarding the completion and maintenance of records on forms developed by the Department, which records shall include information addressed in subdivisions (6) and (7) of this subsection, including the dates and rates that waste products are applied to soils at crop sites, and shall be made available upon request by the Department.

(f) ~~Any operator of an animal operation with a dry litter animal waste management system~~Animal waste management plans for dry litter poultry facilities not subject to federal discharge permit requirements, but involving 30,000 or more birds shall develop an animal waste management plan that complies with the testing and

record-keeping requirements under subdivisions (6) through (8) of subsection (e) of this section. Any operator of this type of animal waste management system shall retain records required under this section and by the Department on-site for three years.

(f1) Animal waste management plans for dry litter poultry facilities subject to federal discharge permit regulations shall include the components listed in subsection (e) of this section.

(g) The Commission shall encourage the development of alternative and innovative animal waste management technologies. The Commission shall provide sufficient flexibility in the regulatory process to allow for the timely evaluation of alternative and innovative animal waste management technologies and shall encourage operators of animal waste management systems to participate in the evaluation of these technologies. The Commission shall provide sufficient flexibility in the regulatory process to allow for the prompt implementation of alternative and innovative animal waste management technologies that are demonstrated to provide improved protection to public health and the environment.

(h) The owner or operator of an animal waste management system shall:

(1) In the event of a discharge of 1,000 gallons or more of animal waste to the surface waters of the State, issue a press release to all print and electronic news media that provide general coverage in the county where the discharge occurred setting out the details of the discharge. The owner or operator shall issue the press release within 48 hours after the owner or operator has determined that the discharge has reached the surface waters of the State. The owner or operator shall retain a copy of the press release and a list of the news media to which it was distributed for at least one year after the discharge and shall provide a copy of the press release and the list of the news media to which it was distributed to any person upon request.

(2) In the event of a discharge of 15,000 gallons or more of animal waste to the surface waters of the State, publish a notice of the discharge in a newspaper having general circulation in the county in which the discharge occurs and in each county downstream from the point of discharge that is significantly affected by the discharge. The Secretary shall determine, at the Secretary's sole discretion, which counties are significantly affected by the discharge and shall approve the form and content of the notice and the newspapers in which the notice is to be published. The notice shall be captioned "NOTICE OF DISCHARGE OF ANIMAL WASTE". The owner or operator shall publish the notice within 10 days after the Secretary has determined the counties that are significantly affected by the discharge and approved the form and content of the notice and the newspapers in which the notice is to be published. The owner or operator shall file a copy of the notice and proof of publication with the Department within 30 days after the notice is published. Publication of a notice of discharge under this

subdivision is in addition to the requirement to issue a press release under subdivision (1) of this subsection.

(i) A person who obtains an individual permit under G.S. 143-215.1 for an animal waste management system that serves a public livestock market shall not be required to obtain a permit under this Part and is not subject to the requirements of this Part.

(j) New and expanding animal operations or dry litter poultry facilities subject to federal discharge permit regulations must apply for and receive coverage under a discharge permit and comply with the phosphorous provisions of the most current nutrient management standard before receiving a permit or stocking animals.

(k) Existing animal operations subject to federal discharge permit regulation shall comply with the phosphorous provisions of the most current nutrient management standard on or before 1 July 2007.

(l) Existing dry litter poultry facilities subject to federal discharge permit regulations or that have been notified by the Department that they are subject to federal discharge permit regulation because of an unpermitted discharge must apply for and receive coverage under a discharge permit by 13 April 2008."

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SECTION 3. G.S. 143-215.10G(a) reads as rewritten:

"(a) Department shall charge an annual permit fee of all animal operations and dry litter poultry facilities that are subject to a permit under G.S. 143-215.10C for animal waste management systems according to the following schedule:

(1) For a system with a design capacity of 38,500 or more and less than 100,000 pounds steady state live weight, fifty dollars ($50.00).

(2) For a system with a design capacity of 100,000 or more and less than 800,000 pounds steady state live weight, one hundred fifty dollars ($150.00).

(3) For a system with a design capacity of 800,000 pounds or more steady state live weight, three hundred dollars ($300.00)."

SECTION 4. The Department of Environment and Natural Resources shall evaluate the application of phosphorous provisions of the most current nutrient management standard approved by the Soil and Water Conservation Commission or the Natural Resources Conservation Service of the United States Department of Agriculture to permitted animal operations and dry litter poultry facilities as provided in subsections (j), (k), and (l) of section 143-215.10C. In the course of the study required by this section, the Department shall also consider the application of the phosphorous provisions of the nutrient management standard to existing animal operations and dry litter poultry facilities not subject to the permit requirements of subsections (j), (k), and (l) of section 143-215.10C. The Department shall give emphasis to the proper role for non-regulatory programs and the development of innovative partnerships with producers and business interests in the livestock and poultry industry in its recommendations for these small and medium sized animal facilities. If the Department recommends that a regulatory process be implemented, the Department shall propose an implementation schedule for compliance with the phosphorous provisions of the

nutrient management standard. The Department shall report its findings and recommendations to the Environmental Review Commission on or before 1 April 2008.

SECTION 5. This act becomes effective 1 January 2005.

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

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BILL DRAFT 2003-RTfz-30 [v.4] (5/9)

#7

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 10:16:25 AM

Short Title: Limit Liability for Environmental Cleanups. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO PROMOTE ECONOMIC DEVELOPMENT BY FACILITATING THE REUSE OF CONTAMINATED REAL PROPERTY BY LIMITING THE LIABILITY OF PURCHASERS OF CONTAMINATED PROPERTY IN CIRCUMSTANCES WHERE THE SELLER OF THE PROPERTY OR ANOTHER PARTY ASSUMES RESPONSIBILITY FOR RESPONSE, REMEDIATION, AND NATURAL RESOURCES RESTORATION OF THE PROPERTY, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. G.S. 130A-310 is amended by adding a new subdivision to read:

"(1a) 'Contiguous property owner' means a person who owns real property that touches along a boundary or at a point real property that is contaminated by a release of a hazardous substance."

SECTION 2. G.S. 143-215.77 is amended by adding a new subdivision to read:

"(2a) 'Contiguous property owner' means a person who owns real property that touches along a boundary or at a point real property that is contaminated by a release of a hazardous substance."

SECTION 3. G.S. 130A-310.3 is amended by adding a new subsection to read:

"(b1) A responsible party who satisfies the Secretary that the responsible party has completed a remedial action for hazardous substances at an inactive hazardous substance or waste disposal site pursuant to this Part shall not be required to perform any remedial action for the same release pursuant to Article 21 or Article 21A of Chapter 143 of the General Statutes."

SECTION 4. G.S. 130A-310.7 reads as rewritten:

"§ 130A-310.7. Action for reimbursement; liability of responsible parties; notification of completed remedial action.

(a) ~~Notwithstanding any other provision or rule of law, and subject~~Subject only to the defenses set forth in this ~~subsection, any person who:~~section, a responsible party is a person who causes or contributes to the existence of an inactive hazardous substance or waste disposal site by any of the following:

(1) ~~Discharges or deposits; or~~Discharging, releasing, or depositing any hazardous substance.

(2) ~~Contracts or arranges for any discharge or deposit; or~~Contracting or arranging for a discharge, release, or deposit of any hazardous substance.

(3) ~~Accepts for discharge or deposit; or~~Accepting any hazardous substance.

(4) ~~Transports or arranges for transport for the purpose of discharge or deposit~~Transporting or arranging for the transport of any hazardous substance for the purpose of discharging, releasing, or depositing any hazardous substance.

(5) Owning or operating a site that contains any hazardous substance.

(6) Owning or operating a site at the time of discharge, release, or deposit of any hazardous substance.

~~any hazardous substance, the result of which discharge or deposit is the existence of an inactive hazardous substance or waste disposal site, shall be considered a responsible party.~~

(a1) Neither an innocent landowner who is a bona fide purchaser of ~~the~~ any real property comprising an inactive hazardous substance or waste disposal site without knowledge or without a reasonable basis for knowing that a hazardous substance or waste ~~disposal~~ discharge, release, deposit, or disposal had occurred nor a contiguous property owner shall not be considered a responsible party if the landowner or contiguous property owner establishes all of the following to the satisfaction of the Secretary:

(1) All of the discharge, release, deposit, or disposal of hazardous substances or waste at the site occurred before the owner acquired the site; or the disposal was solely the result of:

a. An act of God; or

b. An act of war; or

c. An intentional act or omission of a third party who is not an employee or agent of the owner or who does not have a contractual relationship with the owner.

(2) On or before the date of purchase, the owner made all appropriate inquiries into the previous ownership and uses of the property in accordance with generally accepted and customary commercial standards and practices. The Secretary shall take into account any specialized knowledge or experience on the part of the owner, the relationship of the purchase price to the value of the property if the

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property were not contaminated, commonly known or reasonably ascertainable information about the property, and whether the contamination is detectable by appropriate inspection. In the case of property that is used for residential or similar purposes at the time of its purchase by an entity that is neither governmental nor commercial, a site inspection and title search that does not reveal information that would cause a reasonable person to make further investigation shall satisfy the requirements of this subdivision.

(3) The owner has provided all legally required notices with respect to the discovery of a discharge, release, deposit, or disposal of any hazardous substance or waste at the property.

(4) The owner has exercised appropriate care with respect to hazardous substances found at the property by taking reasonable steps to do all of the following:

a. Stopping any continuing discharge, release, deposit, or disposal.

b. Preventing any threatened future discharge, release, deposit, or disposal.

c. Conducting remedial measures approved by the Secretary that prevent or limit human, environmental, or natural resources exposure to any hazardous substance or waste discharged, released, deposited, or disposed of at the property and make the property safe for its intended use. Measures may include the application of institutional controls and other means of preventing exposure

(5) The owner has provided and continues to provide full cooperation, assistance, and access to persons who are authorized to conduct any response, remedial action, or natural resources restoration at the property, including any cooperation and access necessary to install, operate, maintain, or secure any completed or partial response, remedial action, or natural resources restoration at the property.

(6) The owner has complied and continues to comply with any land-use restrictions established or relied on in connection with the response, remedial action, or natural resources restoration at the property.

(7) The owner has not impeded and continues to not impede the effectiveness or integrity of any institutional control employed at the property in connection with a response, remedial action, or natural resources restoration.

(8) The owner has complied or has agreed to comply with any requirement to record any land-use restrictions that may be required by the Secretary.

(9) The owner has complied and continues to comply with any request for information or administrative subpoena issued by the Secretary.

(10) The owner is not liable, potentially liable, or affiliated with any other person who is liable or potentially liable for any cost associated with

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the response, remedial action, or natural resources restoration at the property through any of the following:

a. Any direct or indirect familial relationship.

b. Any contractual, corporate, or financial relations, other than a contractual, corporate, or financial relationship that is created by an instrument through which title to the property is conveyed, an instrument through which sale or purchase of the property is financed, or by a contract for the sale of goods or services.

c. A reorganization in bankruptcy of a business entity that is liable or potentially liable.

(a2) A bona fide purchaser of any real property comprising an inactive hazardous substance or waste disposal site with knowledge or with a reasonable basis for knowing that a hazardous substance or waste discharge, release, deposit, or disposal had occurred shall not be considered a responsible party if the purchaser establishes all of the following to the satisfaction of the Secretary:

(1) All of the discharge, release, deposit, or disposal of hazardous substances or waste at the site occurred before the purchaser acquired the site; or the disposal was solely the result of:

a. An act of God; or

b. An act of war; or

c. An intentional act or omission of a third party who is not an employee or agent of the purchaser or who does not have a contractual relationship with the purchaser.

(2) On or before the date of purchase, the purchaser made all appropriate inquiries into the previous ownership and uses of the property in accordance with generally accepted and customary commercial standards and practices. The Secretary shall take into account any specialized knowledge or experience on the part of the purchaser, the relationship of the purchase price to the value of the property if the property were not contaminated, commonly known or reasonably ascertainable information about the property, and whether the contamination is detectable by appropriate inspection. In the case of property that is used for residential or similar purposes at the time of its purchase by an entity that is neither governmental nor commercial, a site inspection and title search that does not reveal information that would cause a reasonable person to make further investigation shall satisfy the requirements of this subdivision.

(3) The purchaser has provided all legally required notices with respect to the discovery of a discharge, release, deposit, or disposal of any hazardous substance or waste at the property.

(4) The purchaser has exercised appropriate care with respect to hazardous substances found at the property by taking reasonable steps to do all of the following:

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a. Stopping any continuing discharge, release, deposit, or disposal.
b. Preventing any threatened future discharge, release, deposit, or disposal.
c. Conducting remedial measures approved by the Secretary that prevent or limit human, environmental, or natural resources exposure to any hazardous substance or waste discharged, released, deposited, or disposed of at the property and make the property safe for its intended use. Measures may include the application of institutional controls and other means of preventing exposure. Measures need not include soil or groundwater remediation by the purchaser other than those measures necessary to make the property safe for its intended use.

(5) The purchaser has demonstrated that the seller or another responsible party has provided financial assurance equivalent to the full cost of implementation of the response, remedial action, or natural resources restoration at the property to unrestricted use standards, as defined in G.S. 130A-310.31. Financial assurance mechanisms may include, under terms and conditions approved by the Secretary, letters of credit, insurance, surety bonds, and trust funds.

(6) The purchaser has provided and continues to provide full cooperation, assistance, and access to persons who are authorized to conduct any response, remedial action, or natural resources restoration at the property, including any cooperation and access necessary to install, operate, maintain, or secure any completed or partial response, remedial action, or natural resources restoration at the property. To the extent practical, response, remedial action, and natural resources restoration activities will be undertaken so as not to interference with use of the property and structures on the property. The purchaser shall not erect any new structure that would interfere with any required response, remedial action, or natural resources restoration activity until the activity has been completed.

(7) The purchaser has complied and continues to comply with any land-use restrictions established or relied on in connection with the response, remedial action, or natural resources restoration at the property.

(8) The purchaser has not impeded and continues to not impede the effectiveness or integrity of any institutional control employed at the property in connection with a response, remedial action, or natural resources restoration.

(9) The purchaser has complied or has agreed to comply with any requirement to record any land-use restrictions that may be required by the Secretary.

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(10) The purchaser has complied and continues to comply with any request for information or administrative subpoena issued by the Secretary.

(11) The purchaser is not liable, potentially liable, or affiliated with any other person who is liable or potentially liable for any cost associated with the response, remedial action, or natural resources restoration at the property through any of the following:

a. Any direct or indirect familial relationship.

b. Any contractual, corporate, or financial relations, other than a contractual, corporate, or financial relationship that is created by an instrument through which title to the property is conveyed, an instrument through which sale or purchase of the property is financed, or by a contract for the sale of goods or services.

c. A reorganization in bankruptcy of a business entity that is liable or potentially liable.

(a3) A purchaser of any real property comprising an inactive hazardous substance or waste disposal site may submit a written request to the Secretary for a determination that the purchaser has met all the conditions set out in subsection (a2) of this section. A determination may be made subject to the purchaser meeting all the conditions in subsection (a2) of this section on or after closing that cannot reasonably be met prior to closing. A request for a determination that a purchaser has met all the conditions set out in subsection (a2) of this section must be accompanied by a fee of one thousand dollars ($1,000.00) to defray administrative costs of making the determination. The Secretary shall develop and implement procedures to provide expeditious review of requests for determinations so as to expedite real estate transactions involving contaminated properties.

(a4) A person whose interest or ownership in ~~the~~ real property comprising an inactive hazardous substance or waste disposal site is solely based on or derived from a security interest in the property shall not be considered a responsible party unless the person at any time manages, operates, or participates in the management or operation of, any facility located on the real property. A responsible party shall be directly liable to the State for any or all of the reasonably necessary expenses of developing and implementing a remedial action program for ~~such site.~~ the property. The Secretary shall bring an action for reimbursement of the Inactive Hazardous Sites Cleanup Fund in the name of the State in the superior court of Wake County, the county in which the site is ~~located~~ located, or in an appropriate federal court to recover such sum and the cost of bringing the action. The State must show that a danger to the public health or the environment existed and that the State complied with the provisions of this Part.

(b) ~~There shall be no liability under this section for a person who can establish by a preponderance of the evidence that the danger to the public health or the environment caused by the site was caused solely by:~~

~~(1) An act of God; or~~

~~(2) An act of war; or~~

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~~(3) An intentional act or omission of a third party (but this defense shall not be available if the act or omission is that of an employee or agent of the defendant, or if the act or omission occurs in connection with a contractual relationship with the defendant); or~~

~~(4) Any combination of the above causes.~~

The State shall have a lien on any property with respect to which the State has unrecovered costs for a response, remedial action, or natural resources restoration. The amount of the lien shall be the amount of the unrecovered costs. A lien under this subsection shall be superior to all other liens on the property.

(c) The definitions set out in G.S. 130A-310.31(b) apply to this subsection. Any person may submit a written request to the Department for a determination that a site that is subject to this Part has been remediated to unrestricted use standards as provided in Part 5 of Article 9 of Chapter 130A of the General Statutes. A request for a determination that a site has been remediated to unrestricted use standards shall be accompanied by a fee required by G.S. 130A-310.39(a)(2). If the Department determines that the site has been remediated to unrestricted use standards, the Department shall issue a written notification that no further remediation will be required at the site. The notification shall state that no further remediation will be required at the site unless the Department later determines, based on new information or information not previously provided to the Department, that the site has not been remediated to unrestricted use standards or that the Department was provided with false or incomplete information. Under any of those circumstances, the Department may withdraw the notification and require responsible parties to remediate the site to unrestricted use standards."

SECTION 5. G.S. 143-215.3 is amended by adding a new subsection to read:

"(g) The provisions of subdivisions (a), (a1), (a2), (a3), (a4), and (b) of G.S. 130A-310.7 govern responsibility for a release, discharge, deposit, or disposal of oil, hazardous substances, waste, or other contaminants regulated under this Article or under Article 21A of this Chapter, including any release or discharge of petroleum from an underground storage tank or an above ground storage tank."

SECTION 6. G.S. 130A-310.31(b)(3) reads as rewritten:

"(3) 'Brownfields property' or 'brownfields site' means abandoned, idled, or underused property at which expansion or redevelopment is hindered by actual environmental contamination or the possibility of environmental contamination and that is or may be subject to remediation ~~under any~~ under:

a. Any State remedial ~~program other than Part 2A of Article 21A of Chapter 143 of the General Statutes or that is or may be subject to remediation under the~~ program or

b. The Comprehensive Environmental Response, Compensation and Liability Act of 1980, as ~~amended (42 U.S.C. § 9601 et seq.).~~amended, (42. U.S.C. § 9601 et seq.) except for property

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listed on the National Priorities List pursuant to 42 U.S.C. § 9605."

SECTION 7. G.S. 130A-310.31(b)(10) reads as rewritten:

"(10) 'Prospective developer' means any person ~~who desires~~ with a bona fide, demonstrable desire to either buy or sell a brownfields property for the purpose of developing or redeveloping that brownfields property and who did not cause or contribute to the contamination at the brownfields property."

SECTION 8. G.S. 130A-310.34(b) reads as rewritten:

"(b) Publication of the approved summary of the Notice of Intent in the North Carolina Register and publication in a newspaper of general circulation shall begin a public comment period of at least ~~60~~ 30 days from the later date of publication. During the public comment period, members of the public, residents of the community in which the brownfields property is located, and local governments having jurisdiction over the brownfields property may submit comment on the proposed brownfields agreement, including methods and degree of remediation, future land uses, and impact on local employment."

SECTION 9. G.S. 130A-310.34(c) reads as rewritten:

"(c) Any person who desires a public meeting on a proposed brownfields agreement shall submit a written request for a public meeting to the Department within ~~30~~21 days after the public comment period begins. The Department shall consider all requests for a public meeting and shall hold a public meeting if the Department determines that there is significant public interest in the proposed brownfields agreement. If the Department decides to hold a public meeting, the Department shall, at least ~~30~~15 days prior to the public meeting, mail written notice of the public meeting to all persons who requested the public meeting and to any other person who had previously requested notice. The Department shall also direct the prospective developer to publish, at least ~~30~~15 days prior to the date of the public meeting, a notice of the public meeting at least one time in a newspaper having general circulation in such county where the brownfields property is located. In any county in which there is more than one newspaper having general circulation, the Department shall direct the prospective developer to publish a copy of the notice in as many newspapers having general circulation in the county as the Department in its discretion determines to be necessary to assure that the notice is generally available throughout the county. The Department shall prescribe the form and content of the notice to be published. The Department shall prescribe the procedures to be followed in the public meeting. The Department shall take detailed minutes of the meeting. The minutes shall include any written comments, exhibits, or documents presented at the meeting."

SECTION 10. G.S. 130A-310.37(c) reads as rewritten:

"(c) The Department shall not enter into a brownfields agreement for ~~a brownfields site that is identified by the United States Environmental Protection Agency as a federal Superfund site pursuant to 40 Code of Federal Regulations, Part 300 (1 July 1996 Edition).~~any site listed on the National Priorities List pursuant to CERCLA/SARA."

SECTION 11. G.S. 105-277.13(a) reads as rewritten:

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"(a) Qualifying improvements on brownfields properties are designated a special class of property under Article V, Sec. 2(2) of the North Carolina Constitution and shall be appraised, assessed, and taxed in accordance with this section. ~~An~~ Except as provided in this subsection, an owner of land who is protected from liability for remediation pursuant to G.S. 130A-310.33(a) is entitled to the partial exclusion provided by this section for the first five taxable years beginning after completion of qualifying improvements made after the later of July 1, 2000, or the date of the brownfields agreement. If a person who caused or contributed to contamination at a brownfields property holds any ownership interest in the property, that person is not eligible for the partial exclusion. After property has qualified for the exclusion provided by this section, the assessor for the county in which the property is located shall annually appraise the improvements made to the property during the period of time that the owner is entitled to the exclusion."

SECTION 12: This act becomes effective 1 July 2004.

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

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BILL DRAFT 2003-SYz-24 [v.4] (5/6)

#8

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 10:52:04 AM

Short Title: Water Conservation/Submeters. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO PROMOTE WATER CONSERVATION IN MULTI-FAMILY RESIDENTIAL PROPERTIES BY AMENDING VARIOUS STATE LAWS REGARDING THE USE OF SUBMETERS IN CONSECUTIVE WATER SYSTEMS IN LIGHT OF CHANGES IN POLICY RELATED TO WATER TESTING REQUIREMENTS AND WATER CONSERVATION BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. G.S. 42-3 reads as rewritten:

"**§ 42-3. Term forfeited for nonpayment of rent.**

In all verbal or written leases of real property of any kind in which is fixed a definite time for the payment of the rent reserved therein, there shall be implied a forfeiture of the term upon failure to pay the rent within 10 days after a demand is made by the lessor or his agent on said lessee for all past-due rent, and the lessor may forthwith enter and dispossess the tenant without having declared such forfeiture or reserved the right of reentry in the lease. Where a written lease ~~establishes a monthly rent that includes~~authorizes allocation to the tenant of the cost of water and sewer services ~~under G.S. 62-110(g), the terms "rent" and "rental payment", as used in this Chapter, mean base rent only.~~ pursuant to G.S. 42-42.1, there shall be implied a forfeiture of the term upon failure by the tenant to pay for water and sewer services within 25 days after a bill is sent by the lessor or the lessor's agent to the lessee for the cost of water and sewer service."

SECTION 2. G.S. 42-26(b) is repealed.

SECTION 3. G.S. 43-33 reads as rewritten:

"**§ 42-33. Rent and costs tendered by tenant.**

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If, in any action brought to recover the possession of demised premises upon a forfeiture for the nonpayment of ~~rent,~~rent or nonpayment of the cost of water and sewer services, the tenant, before judgment given in such action, pays or tenders the ~~rent due~~rent, the costs due for water and sewer services, and the costs of the action, all further proceedings in such action shall cease. If the plaintiff further prosecutes his action, and the defendant pays into court for the use of the plaintiff a sum equal to that which shall be found to be due, and the costs, to the time of such payment, or to the time of a tender and refusal, if one has occurred, the defendant shall recover from the plaintiff all subsequent costs; the plaintiff shall be allowed to receive the sum paid into court for his use, and the proceedings shall be stayed."

SECTION 4. Article 5 of Chapter 42 of the General Statutes is amended by adding a new section to read:

"**§ 42-42.1. Water Conservation.**

(a) For the purpose of encouraging water conservation, pursuant to a written rental agreement, a landlord may allocate the cost of providing water and sewer service to a tenant. The cost allocated to the tenant cannot exceed the actual price of the water and sewer service paid by the landlord, plus a reasonable administrative fee. The administrative fee cannot exceed $3.75 per month per tenant. Allocation of the cost for water and sewer service by the landlord to the tenant may be computed by using equipment that measures the tenant's actual use of hot water, cold water, or both, and calculates the tenant's usage as a percentage of the total water used on the premises.

(b) All equipment used to measure water usage must comply with guidelines promulgated by the American Water Works Association.

(c) The landlord shall maintain records for a minimum of twelve months that demonstrate how each tenant's allocated costs were calculated for water and sewer service. Upon advanced written notice to the landlord, a tenant may inspect these records during reasonable business hours and may obtain a copy of the records at a reasonable cost, not to exceed $.25 per page.

(d) Bills for water and sewer service sent by the landlord to the tenant shall contain all the following information:

(1) The amount of water and sewer services allocated to the tenant during the billing period.

(2) Beginning and ending dates for the billing period.

(3) The due date for payment of the bill.

(4) The past due date which is the first date that a late fee can be imposed.

(5) Any late fee that will be applied if the bill is not paid by the past due date.

(6) A telephone number and address that the tenant can use to obtain more information about the bill.

(e) The landlord may not disconnect or terminate the tenant's water and sewer services due to the tenant's nonpayment of the amount due for water and sewer services."

SECTION 5. G.S. 42-46(d) reads as rewritten:

"(d) ~~A lessor shall not charge a late fee to a lessee because of the lessee's failure to pay additional rent for water and sewer services provided pursuant to G.S. 62-110(g).~~ If agreed to in a written rental agreement, a landlord may charge a tenant a fee not to exceed $5.00 per month if payment has not been received by the landlord within 25 days of billing for costs allocated to the tenant for water and sewer service."

SECTION 6. G.S. 42-51 reads as rewritten:

"**§ 42-51. Permitted uses of the deposit.**

Security deposits for residential dwelling units shall be permitted only for the tenant's possible nonpayment of ~~base~~ rent and ~~additional rent~~costs for water and sewer ~~services provided pursuant to G.S. 62-110(g),~~services, damage to the premises, nonfulfillment of rental period, any unpaid bills ~~which~~ that become a lien against the demised property due to the tenant's occupancy, costs of re-renting the premises after breach by the tenant, costs of removal and storage of tenant's property after a summary ejectment proceeding or court costs in connection with terminating a tenancy. The security deposit shall not exceed an amount equal to two weeks' rent if a tenancy is week to week, one and one-half months' rent if a tenancy is month to month, and two months' rent for terms greater than month to month. These deposits must be fully accounted for by the landlord as set forth in G.S. 42-52."

SECTION 7. G.S. 62-110(g) reads as rewritten:

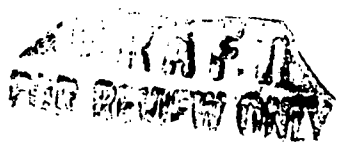
"(g) ~~For the purpose of encouraging water conservation, the Commission may, consistent with the public interest, adopt procedures that allow a lessor, pursuant to a written rental agreement, to allocate the costs for providing water and sewer service on a metered use basis to persons who occupy the same contiguous premises. A written rental agreement shall specify a monthly rent that shall be the sum of the base rent plus additional rent at a rate that does not exceed the actual purchase price of the water and sewer service to the provider plus a reasonable administrative fee. The Commission shall issue rules to define contiguous premises and to implement this subsection. In issuing the rule to define contiguous premises, the Commission shall consider contiguous premises where manufactured homes, as defined in G.S. 143-145(7), or spaces for manufactured homes are rented. Notwithstanding any other provision of this Chapter, the Commission shall determine the extent to which the services shall be regulated and, to the extent necessary to protect the public interest, regulate the terms, conditions, and rates that may be allocated for the services. Nothing in this subsection shall be construed to alter the rights, obligations, or remedies of persons providing water and sewer services and their customers under any other provision of law.~~ The Commission shall not have jurisdiction over the allocation of the costs of providing water and sewer service by landlords to tenants pursuant to G.S. 42-42.1."

SECTION 8. G.S. 130A-315(d) reads as rewritten:

"(d) When a person that receives water from a public water system is authorized ~~by the Utilities Commission, pursuant to G.S. 62-110(g), to install sub-meters and~~ to allocate the costs for providing water ~~service to persons who occupy the same contiguous premises,~~and sewer service pursuant to G.S. 42-42.1, that person shall be regulated as a consecutive water system. The monitoring, analysis, and record-keeping requirements applicable to consecutive water systems under this section shall be

satisfied by the monitoring, analysis, and record keeping performed by the supplying water system and submitted to the Department in compliance with this section. The supplying water system shall perform the same level of monitoring, analysis, and record keeping that the supplying system would perform if the person that receives the water had not been authorized to allocate the costs for providing water service under G.S. ~~62-110(g),~~42-42.1, but the supplying water system shall not be required to perform additional monitoring, analysis, and record keeping. A supplying water system is not responsible for operation, maintenance, or repair of the consecutive water system."

SECTION 9. This act becomes effective 1 July 2004.



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GENERAL ASSEMBLY OF NORTH CAROLINA

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BILL DRAFT 2003-SYz-21 [v.4] (4/29)

#9

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 9:14:37 AM

Short Title: Environmental Reports Amendments. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO AMEND VARIOUS ENVIRONMENTAL REPORTING REQUIREMENTS, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. Article 4 of Chapter 113A of the General Statutes is amended by adding a new section to read:

"**§ 113A-67. Annual report.**

The Department shall report to the Environmental Review Commission on the implementation of this Article on or before 1 October of each year. The Department shall include in the report an analysis of how well the implementation of the Sedimentation Pollution Control Act of 1973 is preventing the sedimentation of streams, rivers, lakes, and other waters of the State. The report shall also include a review of the effectiveness of local erosion and sedimentation control programs."

SECTION 2. G.S. 113A-235(c) reads as rewritten:

"(c) Report. – The Department shall report on the implementation of this Article to the Environmental Review Commission no later than 1 ~~November~~ October of each year. The Department shall maintain an inventory of all conservation easements held by the Department. The inventory shall be included in the report required by this subsection."

SECTION 3. G.S. 113A-241(c) reads as rewritten:

"(c) The Secretary of Environment and Natural Resources shall report to the Governor and the Environmental Review Commission on or before 1 ~~September~~ October of each year on the State's progress towards attaining the goal established in this section."

SECTION 4. G.S. 143-215.107C(b) reads as rewritten:

"(b) It shall be the goal of the State that on and after 1 January 2004 at least seventy-five percent (75%) of the new or replacement light duty cars and trucks purchased by the State will be alternative-fueled vehicles or low emission vehicles. The Department of Administration, the Department of Transportation, and the Department of Environment and Natural Resources shall jointly develop a plan to achieve this goal and to fuel and maintain these vehicles. ~~The Department of Administration shall report on progress in developing and implementing this plan and achieving this goal to the Environmental Review Commission on 1 September of each year beginning 1 September 2000.~~ For purposes of this section, a light duty car or truck is one that is rated at 8,500 pounds or less Gross Vehicle Weight Rating (GVWR)."

SECTION 5. G.S. 143-355.1 is amended by adding a new subsection to read:

"(g) The Council shall report on the implementation of this section to the Secretary, the Governor, and the Environmental Review Commission no later than 1 October of each year. The report shall include a review of drought advisories issued by the Council and any recommendations to improve coordination among local, State, and federal agencies; public water systems; and water users to improve the management and mitigation of the harmful effects of drought."

SECTION 6. The Department of Environment and Natural Resources shall submit the first report required by G.S. 113A-67, as enacted by Section 1 of this act, to the Environmental Review Commission on or before 1 October 2005. The Drought Management Advisory Council shall submit the first report required by G.S. 143-355.1 as enacted by Section 5 of this act, to the Secretary of Environment and Natural Resources, the Governor, and the Environmental Review Commission on or before 1 October 2005.

SECTION 7. This act is effective when it becomes law.

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

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BILL DRAFT 2003-SYz-20 [v.6] (4/29)

#10

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 10:54:09 AM

Short Title: Environmental Technical Corrections. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO MAKE CLARIFYING, CONFORMING, AND TECHNICAL AMENDMENTS TO VARIOUS LAWS RELATED TO THE ENVIRONMENT, PUBLIC HEALTH, AND NATURAL RESOURCES, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. G.S. 113-301.1 reads as rewritten:

"**§ 113-301.1. Wildlife Resources Commission obligated to make efforts to notify members of the public who may be affected by operative provisions of statutes and ~~regulations.~~rules.**

(a) The Wildlife Resources Commission must prepare and distribute to license agents informational materials relating to hunting, fishing, trapping, and boating laws and ~~regulations~~ rules administered by the Wildlife Resources Commission. The materials furnished an agent should be appropriate to the types of licenses ~~he~~ the agent customarily handles, and in a quantity reasonably anticipated to be sufficient to meet the needs of licensees obtaining licenses from the agent.

(b) In issuing new licenses and permits from the Raleigh office ~~by mail~~by mail, the Wildlife Resources Commission must generally inform the licensee or permittee of governing provisions of law and ~~regulations~~ rules applicable to the type of license or permit secured. In issuing renewal licenses and permits by mail, the Wildlife Resources Commission must inform the licensee or permittee of any substantial changes in the law or ~~regulations which~~ rules that may affect the activities of the licensee or permittee.

(c) After adopting regulations ~~which~~ that impose new restrictions upon the activities of members of the public who do not normally hold licenses or permits to engage in the activity in question, the Wildlife Resources Commission must take appropriate steps to publicize the new restrictions. These steps may include press

releases to the media, informing local authorities, and other forms of communication that give promise of reaching the segment of the public affected.

(d) After adopting new restrictions on hunting, fishing, trapping, or boating at a time other than when usual annual changes in the ~~regulations~~ rules affecting those activities are adopted, the Wildlife Resources Commission must take appropriate steps to publicize the new restrictions in a manner designed to reach persons who may be affected.

(e) Repealed by Session Laws 1987, c. 827, s. 9."

SECTION 2. G.S. 113A-115.1(b) reads as rewritten:

"(b) No person shall construct a permanent erosion control structure in an ocean shoreline. The Commission shall not permit the construction of a temporary erosion control structure that consists of anything other than sandbags in an ocean shoreline. This section shall not apply to (i) any permanent erosion control structure that is approved pursuant to an exception set out in a rule adopted by the Commission prior to 1 July 2003 or (ii) any permanent erosion control structure that was originally constructed prior to 1 July 1974 and that has since been in continuous use to protect an inlet that is maintained for navigation. This section shall not be construed to limit the authority of the Commission to adopt rules to designate or protect areas of environmental concern, to govern the use of sandbags, or to govern the use of erosion ~~coastal~~ control structures in estuarine shorelines."

SECTION 3. G.S. 121-34 reads as rewritten:

"**§ 121-34. Short title.**

The title of this Article shall be known as the ~~"Historic~~'Conservation and Historic Preservation ~~and Conservation~~ Agreements Act.'"

SECTION 4. G.S. 121-42 reads as rewritten:

"**§ 121-42. Citation of Article.**

This Article shall be known and may be cited as ~~"Uniform Conservation~~the 'Conservation and Historic Preservation ~~Agreement~~ Agreements Act.'"

SECTION 5. This act is effective when it becomes law.

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

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BILL DRAFT 2003-LDz-114 [v.7] (4/20)

#11

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 10:05:20 AM

Short Title: ABC Licensees to Recycle Beverage Containers. (Public)

Sponsors: Unknown.

Referred to:

A BILL TO BE ENTITLED

AN ACT TO REQUIRE HOLDERS OF CERTAIN ABC PERMITS TO RECYCLE ALL RECYCLABLE BEVERAGE CONTAINERS, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. Article 10 of Chapter 18B of the General Statutes is amended by adding a new section to read:

"**§ 18B-1006.1. Additional requirement for certain permittees to recycle beverage containers.**

Holders of on-premises malt beverage permits, on-premises unfortified wine permits, on-premises fortified wine permits, and mixed beverages permits shall separate, store, and provide for the collection for recycling of all recyclable beverage containers of all beverages sold at retail on the premises. A permittee has satisfied the requirements of this section if it follows a recycling program that is based upon the model recycling program developed by the North Carolina Alcoholic Beverage Control Commission under G.S. 130A-309.14."

SECTION 2. G.S. 130A-309.14 is amended by adding a new subsection to read:

"(m) The North Carolina Alcoholic Beverage Control Commission, with assistance from the Department, shall develop a model recycling program for holders of on-premises malt beverage permits, on-premises unfortified wine permits, on-premises fortified wine permits, and mixed beverages permits under G.S. 18B-1001 that are required to recycle beverage containers under G.S. 18B-1006.1. The North Carolina Alcoholic Beverage Control Commission may adopt rules to comply with this section."

SECTION 3. This act becomes effective October 1, 2004.

DRAFT
FOR REVIEW ONLY

GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

U D

BILL DRAFT 2003-SYz-25 [v.3] (5/10)

#12

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/10/2004 11:13:52 AM

Short Title: Leaking UST Fund Liquidity. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT IMPROVE AND ACCELERATE PROCESSING OF CLAIMS UNDER THE LEAKING PETROLEUM UNDERGROUND STORAGE TANK CLEANUP PROGRAM, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. Part 2A of Article 21A of Chapter 143 of the General Statutes is amended by adding a new section to read:

"**§ 143-215.94Q. Liquidity Program.**

(a) The General Assembly finds that the Department and the State have existing obligations under this Part, including the obligation under G.S. 143-215.94E to pay claims for reimbursement duly filed with the Department by owners, operators and landowners from the Commercial Fund and the Noncommercial Fund, which obligations impose substantial burdens on the State. The General Assembly has previously found under G.S. 143–215.94V that solvency of the Commercial Fund and the Noncommercial Fund is essential to the goals of the underground storage tank program. The General Assembly finds that:

(1) An appropriate means of managing and ensuring the solvency of the Funds is a liquidity program that will facilitate the sale of claims made against the Commercial Fund and the Noncommercial Fund by owners, operators and landowners who may require liquidity in anticipation of the ultimate payment of the claims by the Commercial Fund and the Noncommercial Fund.

(2) The most cost-effective means to provide a liquidity program is for the Department to arrange for and incur obligations to provide funding to be used to purchase claims or in lieu thereof to participate in the

establishment and operation of a non-profit organization that will incur the liquidity obligations and purchase the claims.

(3) Cost-efficiency may be improved if the non-profit organization operates in one or more states in addition to the State.

(b) The Department, acting by and through the Secretary, is hereby authorized to enter into discussions with the incorporator of a non-profit corporation to be formed to provide liquidity for owners, operators and landowners with claims against the Commercial Fund and the Noncommercial Fund and against similar funds in one or more other states and with officials of appropriate agencies or political subdivisions of such other states. If the Secretary makes a written determination that he reasonably expects that claimholders participating in the liquidity program will benefit from the State's participation in the liquidity program, the Department is authorized to enter into agreements with the non-profit corporation and other agencies or political subdivisions to establish a liquidity program.

(c) The State may be represented on the governing body of the non-profit corporation by one or more directors, as provided in the organizational documents of the non-profit corporation, each of whom shall be appointed by and serve at the pleasure of the Governor. The Office of Budget and Management may provide advice and guidance to any director appointed under this subsection on any financial matters relating to the non-profit corporation and its operation of the liquidity program, including its annual budget and financial statements.

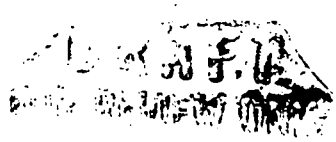
(d) The Department may make payments with respect to any claim made by an owner, operator or landowner under G.S. 143-215.94E directly to the non-profit corporation, provided that the owner, operator or landowner shall have delivered to the Department a copy of an assignment showing the non-profit corporation as assignee of such claim. The Department shall develop and approve the claim assignment form.

(e) If the Secretary is unable to make the finding described in subsection (b) of this section with respect to the non-profit corporation, the Department is authorized to arrange for and incur liquidity obligations and use the proceeds thereof to provide liquidity either directly or through one or more non-profit organizations to owners, operators or landowners holding claims against the Commercial and Noncommercial Fund.

(f) Under no circumstances will the Department be authorized in any agreement relating to the liquidity program entered into with the non-profit corporation, any agency or political subdivision of any other state, any other for-profit or non-profit organization or provider of liquidity obligations to commit in any way to make payments in excess of the aggregate face amount of approved claims against the Commercial and Noncommercial Fund purchased under the liquidity program. No liquidity obligation shall constitute an obligation of the State, the Department or any other agency, department or political subdivision of the State, payable from other than the approved claims against the Commercial or Noncommercial Fun purchased with the proceeds thereof, and nothing in this section shall be deemed to amend G.S. 143-215.94J or otherwise change the limitation of the State's liability contained in that section.

(g) The Department is directed to implement this section expeditiously. The implementation of a Liquidity Program through the Department will provide a significant service to the State by reducing its administrative burden of maintaining the solvency of the Funds."

SECTION 2. This act is effective when it becomes law.



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FOR REVIEW ONLY

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2003

U D

BILL DRAFT 2003-LDz-115 [v.9] (4/28)

#13

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/9/2004 5:39:55 PM

Short Title: Septic System Setbacks for Pre-1977 Lots. (Public)

Sponsors: .

Referred to:

A BILL TO BE ENTITLED

AN ACT TO CLARIFY THAT A SEPTIC TANK SYSTEM THAT IS FOR A LOT PLATTED PRIOR TO JULY 1, 1977, AND THAT IS OPERATED IN SOILS THAT ARE IN SOIL GROUP 1 MAY BE LOCATED TEN FEET OR MORE FROM ANY OTHER SEPTIC TANK SYSTEM, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. G.S. 130A-335(e) reads as rewritten:

"(e) The rules of the Commission and the rules of the local board of health shall address at least the following: Wastewater characteristics; Design unit; Design capacity; Design volume; Criteria for the design, installation, operation, maintenance and performance of wastewater collection, treatment and disposal systems; Soil morphology and drainage; Topography and landscape position; Depth to seasonally high water table, rock and water impeding formations; Proximity to water supply wells, shellfish waters, estuaries, marshes, wetlands, areas subject to frequent flooding, streams, lakes, swamps and other bodies of surface or groundwaters; Density of wastewater collection, treatment and disposal systems in a geographical area; Requirements for issuance, suspension and revocation of permits; and Other factors which affect the effective operation and performance of wastewater collection, treatment and disposal systems. The rules regarding required design capacity and required design volume for wastewater systems shall provide that exceptions may be granted upon a showing that a system is adequate to meet actual daily water consumption. This subsection is subject to subsection (e1) of this section."

SECTION 2. G.S. 130A-335 is amended by adding a new subsection to read:

"(e1) A septic tank system that is for a lot that was platted prior to July 1, 1977 and that is operated in soils that are classified as Soil Group 1 may be located 10 feet or

more from any other septic tank system. Soils are classified as Soil Group 1 when the local health department evaluates the soil texture and characterizes the soils in accordance with Commission rules as sandy texture soils."

SECTION 3. This act is effective when it becomes law and applies to applications for permits made on or after that date.

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FOR REVIEW ONLY

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 2003

H D

BILL DRAFT 2003-LHz-216A [v.6] (5/10)

#14

(THIS IS A DRAFT AND IS NOT READY FOR INTRODUCTION)
5/11/2004 9:59:52 AM

Short Title:	Hatteras Village/Temp. Unvegetated Beach Area.	(Public)
Sponsors:	Representative.	
Referred to:		

A BILL TO BE ENTITLED

AN ACT TO DESIGNATE AS TEMPORARY UNVEGETATED BEACH AREAS CERTAIN OCEANFRONT AREAS ON HATTERAS ISLAND WHERE THE VEGETATION LINE WAS DESTROYED BY HURRICANE ISABEL AND THE REMNANTS OF THE VEGETATION LINE WERE BURIED BY THE CONSTRUCTION OF AN EMERGENCY BERM, AS RECOMMENDED BY THE ENVIRONMENTAL REVIEW COMMISSION.

The General Assembly of North Carolina enacts:

SECTION 1. For purposes of implementing Article 7 of Chapter 113A of the General Statutes and rules adopted pursuant to that Article and notwithstanding any provision of that Article or those rules to the contrary, there are hereby designated as temporary unvegetated beach areas those oceanfront areas on Hatteras Island west of the new inlet breach in Dare County in which the vegetation line as shown on North Carolina Department of Transportation aerial photographs dated 2 June 2003, was destroyed as a result of Hurricane Isabel on 18 September 2003, and the remnants of which were subsequently buried by the construction of an emergency berm. This designation shall continue until stable, natural vegetation is reestablished or until the area is permanently designated as an unvegetated beach area pursuant to 15A NCAC 07H .0304(4)(a).

SECTION 2. This act is effective when it becomes law and expires when a permanent rule that makes the designation set out in Section 1 of this act becomes effective.

DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
October 21, 2004

The Environmental Review Commission (ERC) met on Thursday 21 October 2004 at 9:30 a.m. in Room 643 of the Legislative Office Building.

Representative Pryor Gibson presided over the 21 October 2004 meeting. The following members were present: Senators Albertson, Clodfelter, Dorsett, Horton, Kinnaird, and Weinstein, and Representatives Fox, Gibson, Hackney, McComas, Weiss and Williams. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Tim Dodge, Research Assistant, and Mary Watson, Commission Clerk were also present.

On 7 October 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Representative Gibson called the meeting to order and welcomed members and visitors attending the meeting.

George Givens, Commission Counsel, was asked to explain the agenda. He asked members to sign their reimbursement forms and asked visitor to sign the attendance sheet.

Mr. Givens said that he had distributed to each member, copies of a packet of reports related to today's agenda, read-only reports, and reports held for future presentations. These reports are listed as **Exhibit D**.

Also reports were handed out that are required by law to be made to the Commission. These reports, entitled Review of Legislative Action on the Environment, are listed as **Exhibit E**.

Mr. Givens said that rather than having reports driven agenda, he was trying a new approach of having a program driven agenda based on reports of the divisions. Today we would hear from the Division of Water Quality and the Division of Waste Management.

Mr. Givens said that the next meeting of the ERC is scheduled for 19 November 2004. On 18 November 2004, the ERC will meet jointly with the Joint Legislative Commission on Seafood and Aquaculture at 11:00 a.m. in Room 643.

Dr. David H. Moreau, Chairman, Environmental Management Commission gave a quarterly report by the Environmental Management

Commission (EMC) as to its operations, activities, programs, and progress during 2004.

Dr. Moreau said that the most significant action addressed by EMC in the past quarter was the requirements for emission controls from heavy-duty diesel vehicles.

Dr. Moreau said that after the application of the federal regulations in the revisions to the Clean Air Act of 1990, after the revision to the state implementation plan and after the Clean Smokestacks Act, the largest single source remaining for nitrogen oxides is those from heavy-duty diesel vehicles. This constitutes about 25 percent of the total emissions of nitrogen oxides in North Carolina.

Dr. Moreau said that controlling these emissions is critical to achieving the ozone standards and avoiding federal sanctions on highway funds as a result.

Dr. Moreau said that EPA adopted a rule in 2001 that set the standards for the 2007 model year for the heavy-duty engines. They also adopted as a part of the clean air act, that the State of California as the only state that could set state specific standards. However, they did allow other states to adopt the California standards.

Dr. Moreau said that if everything goes on schedule, the rules would make any action by the State of North Carolina unnecessary.

Dr. Moreau said there had been concern that EPA would delay implementation of the 2007 model year regulations. Therefore, North Carolina has adopted to insure that we will stay on course to meet our compliance schedules for ozone.

Dr. Moreau said that a proposal was sent to public hearing to adopt the California standards. Those hearings were held and the action taken this month was to adopt those regulations. The hope is that the federal rules will come into play.

Dr. Moreau said that concern has been raised that we were taking action that would put us at a disadvantage to surrounding states. But, given the uncertainties about the implementation of the federal regulations, we will have to wait and see.

Senator Clodfelter asked Dr. Moreau how many other states had adopted the California standards.

Dr. Moreau said that between eight and thirteen states currently have the California standards under consideration. As to dates of adoption, he did not have an answer.

Mr. Givens said that there were about six states that have already adopted the California standards, all in the northeast.

Dr. Moreau said the other significant action taken by EMC addresses the coastal waters. For many years fecal coloform has been the indicator organism to identify the presence of pollution. It is the indicator of the presence of sewage.

Dr. Moreau said there has been increasing concern in the scientific community that the crudeness of that indicator required the adoption of a new standard indicating pollution in the coastal waters. There has been some delay by EPA in providing guidance for this standard. The deadline expired in April 2004 and EPA started to promulgate rules for all of the states that had not yet adopted this.

Dr. Moreau said that North Carolina's delay was in large part due to the fact that EPA had failed to provide sufficient guidance.

Dr. Moreau said that when these standards have been proposed and have gone to public hearing.

Dr. Moreau said that less significant actions by EMC are reclassification of a portion of Rocky River to permit construction of an enlargement of water supply reservoir for Siler City.

Dr. Moreau said that EMC has approved a final Catawba River Basin water quality plan and responded to objections from the Rules Review commission regarding a series of air quality rules.

Senator Clodfelter asked Dr. Moreau what percentage of vehicles account for heavy-duty diesel emissions.

Dr. Moreau said that he would provide this information to Sen. Clodfelter.

Representative Williams asked Dr. Moreau to what extent would adoption of the California standards limit or hurt our businesses in this state in competing with other states.

Dr. Moreau said that the rules apply to any engine that is sold or registered in North Carolina and applies only to model years 2008 and after. If the federal rule goes into effect all states would be covered and in the exact same situation. The California is exactly the same as the federal rule, at this time.

Representative Williams asked Dr. Moreau if we implement these California standards, the trucks registered in North Carolina would have to follow these rules and yet trucks operating from out of state would not be covered by this rule.

Representative Williams asked Dr. Moreau if this would make trucking companies based in North Carolina look at other bases for their operations that do not implement the California rule.

Dr. Moreau said that this is an argument being put forward.

Senator Clodfelter asked Dr. Moreau for a list of the states that have this issue under consideration.

Dr. Moreau said that he has this information and will provide it to Sen. Clodfelter.

Representative McComas asked that he be included in the packet of information and added that we need to be careful that we do not become another California.

Dr. Moreau emphasized the fact that the standards North Carolina adopted are the federal standards. By doing this, we are ensuring that those vehicles would come under federal regulation in model year 2008. The standards are not different; the concern is that EPA may slide.

Dr. Moreau said that we have no idea what EPA may comes up with. And, if EPA changes, we would have to take a look at what the nature of those changes is.

Representative McComas asked Dr. Moreau if he was aware of the new emission standards coming out in 2007.

Dr. Moreau said that he was aware of the new emission standards coming out in 2007; however, under North Carolina's regulations under EPA, we cannot get these rules into effect before model year 2008. Industry has to be given a two-year lead-time before the standards can actually be implemented.

Representative Hackney asked Dr. Moreau if the rule applied only to new trucks.

Dr. Moreau said that the rule applies to new trucks only and does not apply to used trucks.

Dr. Moreau added that the question had come up from Duke Power regarding new trucks that were bought and registered in South Carolina could be moved into North Carolina.

Dr. Moreau said that the answer was yes.

Mr. Givens said that the issue here was that there were basically two standards: a national standard and a California standard. Under the Clean Air Act, individual states can opt for one or the other, the California standard being higher.

Dr. Moreau said that it was his understanding that California adopted the federal standard, the only question here is whether or not EPA is going to

change its federal standard and then the California standard would remain unchanged.

Mr. Givens said that air quality is the major focus for the November meeting and clarification on this issue would be provided to members at that time.

Mr. Alan W. Klimek, Director, Division of Water Quality, Department of Environment and Natural Resources (DENR), gave a report on the programs, activities, and priorities of the Division of Water Quality. A copy of the Annual report on Progress in developing and implementing basinwide water quality management plans and the annual report on permitting and inspecting animal waste management systems/Animal Waste Compliance Report are both included in the Exhibit D packet of information. A copy of Mr. Klimek's slides is listed as **Exhibit F**.

Mr. Klimek spoke on several of the biggest sources: animal, wastewater and stormwater, and how these three are tied into management plans.

Mr. Klimek said that there are about 2500 farms, which have soil and water inspections once a year. During the dry years, discharges are low and in the wetter years are around 150. Freeboard violations are when the lagoons are too high and this is also correlated with wet weather events.

Mr. Klimek said that one of the encouraging things is that violations for over application have gone down from 200 to 100.

Mr. Givens asked Mr. Klimek if compliance was better and was that why we have had a good year.

Mr. Klimek said that we have had a good year. Even with all of the hurricanes and full lagoons, there were no violations.

Mr. Klimek said that a summary of discharges to surface water from wastewater treatment plants showed the number of facilities being regulated has gone down. One of the reasons is from plant closures and some facilities that have connected to larger sources.

Mr. Klimek said that most major facilities are inspected each year and two thirds of the minor facilities are inspected each year with a total of three quarter of a million to on million dollars in penalties. The majority of these violations are permitting limit violations.

Representative Williams asked Mr. Klimek if he had a number of the violations per year.

Mr. Klimek said it was around 700 violations.

Mr. Klimek said that the state is in the third cycle of basinwide management planning.

Mr. Klimek said that a plan is done on all 17 major river basins in the state every five year. The Tar Pamlico River Basin was done this year. It has a very significant management strategy.

Mr. Klimek said the Tar Pam showed a reduction from agriculture from 1992-2000 of 35 percent, which exceeds the 30 percent reduction goal.

Senator Horton asked if the 30 percent reduction goal was achieved in the Tar Pamlico River Basin.

Mr. Klimek answered in the affirmative.

Senator Clodfelter asked Mr. Klimek if based on the trend line, were they meeting their target. How does the 18 percent compare to the target.

Mr. Klimek said that 30 percent of what is coming in has translated to 18 percent in the river.

Mr. Klimek said that whole affluent toxicity tests were conducted in major facilities. Compliance has gone up from 85 percent compliance to 95 percent compliance.

Mr. Klimek said that with regard to stormwater, the urbanized areas that fall under the Phase II requirements are: education and outreach, public involvement, corrected illegal discharges, post construction site runoff controls and pollution prevention measures.

Mr. Klimek said that they have begun a lot with the outreach efforts. There is a grant with NCSU with twenty to thirty stormwater workshops with different communities.

Mr. Klimek said there are 123 municipalities that fall under the Phase II stormwater; permit applications have been received for 113. They are working with the Institute of Government to develop a model ordinance. A contractor has been hired to work with the design manual and the cities will be responsible within their jurisdiction.

Mr. Klimek said that of the total 40,000 miles of streams in North Carolina, only about 30 percent of them are rated. Of those, one-fourth is impaired.

Mr. Klimek said that the major cause of the impairment is biological integrity, mercury, low-dissolved oxygen, fecal coloform and sediment.

Representative Hackney asked Mr. Klimek where our emphasis should be to make the next major step in reducing that 25 percent of impaired streams.

Mr. Klimek said that it should be going with the Phase II and existing stormwater programs.

Representative Hackney said that these programs did not reach most of the streams.

Mr. Klimek asked Representative Hackney if he was referring to going back and fixing the streams that are impaired.

Representative Hackney said that he was talking about the 25 percent of the impaired streams and the applicability of the stormwater regulations.

Mr. Klimek said that Phase I addresses the new development and we will have to keep looking at the coast to make sure our stormwater requirements are adequate.

Mr. Klimek said that a whole new issue would be retrofitting. We have shifted from a point source focus to more of a nonpoint focus.

Representative said that most of the big developments in Chatham County are not in municipal areas but in the country.

Mr. Klimek said that this is a problem that needs to be addressed in the future.

Senator Kinnaird asked Mr. Klimek if we had adopted the rules turned down by the Rules Review Commission, would we address what Representative Hackney is talking about.

Mr. Klimek said that there would have been a wider coverage into some of those counties; however, the minimum federal requirements have been met.

Mr. Klimek concluded by showing a slide of the estuarine waters. One of the biggest causes of problems in these waters is Chlorophyll A or algaeblumes.

Senator Kinnaird asked Mr. Klimek how much economic loss comes from that fecal coloform.

Mr. Klimek said that there is an impact every time we close shellfish waters.

Mr. Klimek said that from 1990-2000, good improvements have been made in all three regions of the state, coastal, piedmont and mountains, with regard to fecal coloform and turbidity. With regard to dissolved oxygen, the problems are going up on the coast. This is being looked out to see if there is a trend that needs to be studied.

Representative Williams asked Mr. Klimek what the cause was of the dissolved oxygen increase at the coast.

Mr. Klimek said that the cause is unsure. It could be a cumulative load going down and settling in at the coast.

Mr. Klimek said that reorganization has been occurring in the Water Quality Division.

Senator Albertson asked if water quality was improved in the Neuse River basin.

Mr. Klimek answered in the affirmative.

Representative Weiss asked Mr. Klimek about an application in place that would greatly increase the load of nitrogen into the Neuse and would flow down to Raleigh's drinking water supply.

Mr. Klimek said this issue was currently out to public hearing.

Representative Weiss asked what the distance would be between where they are getting credit and where those credits would be used.

Mr. Klimek said that if you discharge at the top of the basin, only about ten percent would reach down here.

Representative Weiss asked about the trade downstream to upstream.

Mr. Klimek said that if there were no dam or Falls Lake, we would not have concern about nutrients.

Senator Albertson asked Mr. Klimek to address best management practices or BMP's.

Mr. Klimek said that BMP's being applied were using different nutrients on crops, field borders and water gates on the coast. About $100 million dollars of state cost share funds have been spent on these BMP's.

Representative Williams asked Mr. Klimek what the major cause was for closing shellfish waters.

Mr. Klimek said that the major cause was fecal coloform.

Representative Williams asked if any of this pollution was caused by cities on the coast and upstream that are dumping.

Mr. Klimek said that most of the municipalities were treating their waste properly and staying within their standards.

Representative Williams asked if the shopping center he showed in the slide was built with the erosion control and stormwater runoff measures that are currently in place. And, what was the cause of that stream having the problem with water if all of those measures were taken and were there not enough measures in place.

Mr. Klimek said that there were not requirements for stormwater controls at that shopping center at that time.

Representative Weiss asked Mr. Klimek what percentage of the streams was monitored in North Carolina.

Mr. Klimek said it was thirty percent.

Representative Weiss asked if monitoring of thirty percent of the streams was enough to be making good decision about water quality.

Mr. Klimek said that the program was very strong and they were measuring more problems.

Senator Dorsett asked Mr. Klimek about the reorganization and if they had been in the reorganization long enough to determine if this has happened and to what extent it has happened.

Mr. Klimek said that the express permitting program, which the General Assembly approved on a pilot project, has been extremely successful.

Mr. Givens asked Mr. Klimek if he would provide to the ERC a revised composite map showing all of the different stormwater management programs and composite areas.

Mr. Grover Nicholson, Chief, Underground Storage Tank Section, Division of Waste Management, DENR, gave a report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund. A copy of The Status Of Leaking Petroleum Underground Storage Tanks, The State Cleanup Funds, and The Groundwater Protection Loan Fund is listed as **Exhibit G**.

Mr. Givens said that the ERC and Joint Transportation Oversight Committees are jointly charged with studying the issue of solution arising from 2004 transfer of some million plus dollars from the Highway Trust Fund to the budget bill.

Senator Kinnaird asked if this money has to be paid back to the Highway Trust Fund.

Mr. Givens said that there was no provision that requires that it be paid back.

Mr. Nicholson said that a copy of the annual report was included in the packet listed as Exhibit D.

Mr. Nicholson said that as of June 30, 2004, the commercial fund pending balance is just over $30 million and the non-commercial balance is $5.6 million. Since that time, new legislation gave the funds an additional $32

million from the gasoline excise tax. A large lump sum of these funds was received in September 2004.

Mr. Nicholson said that the amount of claims pending in the commercial fund is slightly over $15 million and a little over $4 million in the non-commercial fund. That pending amount is no only claims that have been approved that are awaiting payment, but also claims that are in the systems that are presently being reviewed.

Mr. Nicholson said that another provision of the new legislation was that if reimbursement could not be made of approved claims within 90 days, they are not allowed to pre-approve further work. This is being tracked closely. Because of that influx of money, they are paying approved claims within 90 days at this point.

Representative Hackney asked Mr. Nicholson at what point was that 90-day provision going to start causing problems.

Mr. Nicholson said that what the 90 provision does is to make sure pending claims are paid before further work is approved with two exceptions: if the release would create an emergency situation, they can go ahead and pre-approve work regardless of the amount in the fund and the second is if the tank owner chooses to be reimbursed after everyone else is paid.

Representative Hackney asked Mr. Nicholson if any of the older claims will achieve closure soon or are the older ones are just accumulating more money and the newer ones are piling on top.

Mr. Nicholson said they have closed over 10,000 incidences since they began and that is over half of the 20,000 that have been reported.

Mr. Nicholson said that they are seeing a trend that the newly reported leases are slowing down.

Representative Hackney asked Mr. Nicholson was the main cause is for the new releases. New tanks in the ground should not be leaking.

Mr. Nicholson said they are getting anywhere from between 200 to 400 new releases each year. All of the new releases are either coming from upgraded systems or from systems that should be upgraded.

Representative Hackney asked Mr. Nicholson to explain what he means by upgraded systems.

Mr. Nicholson said that an upgraded system is one that is upgraded to the 1998 standards. By 1998, all UST systems had to have leak detection, financial responsibility, overfill and spill prevention and corrosion protection.

Representative Hackney asked if those new and upgraded systems were leaking or is it the transition to those systems that have discovered leaks.

Mr. Nicholson said that it was both upgraded systems leaking and they are finding leaks they didn't know existed until now from old systems.

Senator Kinnaird asked why new systems are leaking.

Mr. Nicholson said that he has EPA's leak autopsy report where they were asking the same questions. Primarily, systems are leaking because of mechanical failure in the piping and improper installation. Tanks are only causing about 16 percent of releases and piping is 31 percent. Tanks are leaking because of corrosion problems. Steel tanks are corroding. Thirty two percent of the leaks are coming from dispensers, 16 percent from spills and overfills and five percent from other sources.

Representative Gibson asked if these spills were substantially smaller than those in the past.

Mr. Nicholson said that he did not know the answer to that question.

Senator Kinnaird asked Mr. Nicholson if these tanks have double and triple linings and if so, why are they leaking.

Mr. Nicholson said that last year, as part of the legislation, they were able to get secondary containment, which is a combination of double wall and monitoring between the two walls, on the piping only. This rule will go into effect June 2005 for new installations.

Mr. Nicholson said that most of the 31,000 regulated tanks in North Carolina are single wall and mostly steel. In 1998, tanks were required to have corrosion protection. EPA's report shows that this protects these steel tanks from corrosion, but the primary cause of tank failure is still corrosion.

Senator Clodfelter asked Mr. Nicholson if the financial responsibility requirements associated with the new systems would mean that we would not have claims presented but have a financial mechanism in place that would deal with any problems with new systems.

Senator Clodfelter if we were getting any claims presented against the fund as a result of leaks from new systems.

Mr. Nicholson answered in the affirmative.

Senator Clodfelter asked Mr. Nicholson what is wrong with our financial responsibility requirements with the new standards.

Mr. Nicholson said that the financial responsibility requirements that the federal government set out in 1998 and that the state adopted have not changed. It is still essentially that tank owners must have $1 million in some sort of financial vehicle to pay for some type of remediation if there is a leak and pay for bodily injury and property damage to third parties.

Senator Clodfelter asked Mr. Nicholson if folks are complying with those requirements, why are we getting claims presented against the fund at all with respect to systems that meet the new standards.

Mr. Nicholson said that in North Carolina, the fund is the main financial vehicle. North Carolina is providing that $1 million coverage through the fund. Tank owners have to pay an initial $20,000 if they are in compliance with the 1998 upgrade and an initial $100,000 for third party claims.

Mr. Nicholson said that North Carolina actually provides $1.5 million for coverage per incident and the fund pays the difference.

Mr. Nicholson said that the purpose of the UST program is to prevent petroleum underground storage tanks from leaking. They also regulate hazardous substance UST's.

Mr. Nicholson said that the standards are set to prevent tanks from leaking as well as helping people clean up leaks when they do occur.

Mr. Nicholson said that of the 19,000 reported releases since the inception of the program, we have closed over 10,000 of them.

Mr. Nicholson said that this program has done a lot of good for the environment over the years.

Mr. Nicholson said that the tank fees are $200 for tanks holding less than 3500 gallons and $300 per year for tanks holding more than 3500.

Mr. Nicholson said that 28 percent of the tanks in the ground are over 20 years old. There is a distinct link between the age of the tank and the propensity of that tank to have a leak.

Mr. Nicholson said that the legislature directed risk classifications of high, medium, low and unconfirmed. A high risk is a release that has either impacted somebody's water supply or has a high propensity to do that. The risk classification tells what to do to clean up the tank and how quickly they need to have it cleaned up.

Mr. Nicholson said they are always worried about the high-risk releases. An intermediate risk release has not impacted anyone's water supply but could be impacting surface water. A low risk release is one that does not fall either into the high or intermediate risk categories.

Mr. Nicholson said that since the inception of the UST program in 1998, there has been a general increase in the number of reported releases. Part of this is caused by the increased environmental awareness of property owners, buyers and lending institutions. Part of this is due to a switch from heating oil to gas.

Mr. Nicholson said that when the balance in the commercial fund became very low, they have seen a lot of marketing done. The number of reported releases should remain flat or decrease.

Mr. Nicholson said that in the non-commercial arena they are sure they will see an increase in the number of releases due to property transfers.

Senator Horton asked Mr. Nicholson to define a release in terms of quantity.

Mr. Nicholson said that a release is a discharge of over 25 gallons.

Senator Horton asked Mr. Nicholson if anything less than 25 gallons is not considered a release.

Mr. Nicholson said that it is not if it is cleaned up immediately; however, there is a report that has to be made on the release.

Senator Horton asked Mr. Nicholson when the program would end.

Mr. Nicholson said that it would end when all of the releases are cleaned up. One of the problems with the program is that there is not enough control over the money.

Representative Gibson said that one day this program has to end.

Senator Clodfelter said that if the charts were right, the changes in standards over time would have some improvement in the commercial tank releases. At that point, when most of the tanks that are complying with the new standards, the private insurance market can then provide coverage for the releases that do occur. What kind of incentive are we providing in the non-commercial market to drive down the number of incidents so that the State can get out of being the insurer of those.

Mr. Nicholson said that now the driver for a non-commercial tank to not report a release is not there. There is a fund that will pay 100 percent of the cost of cleanup and third party claims.

Senator Clodfelter asked what incentive there is for a homeowner to clean up a home heating oil tank that leaks.

Mr. Nicholson said the homeowner has a free insurance policy. He agreed that there is a need for incentives for homeowners.

Senator Kinnaird asked Mr. Nicholson why we don't require better construction with the steel tanks. And, if we required better construction, who would be impacted and how would they react. Is the identification that there is a UST not on the deed. How do we shift the liability onto the owner and off of the taxpayer.

Mr. Nicholson said that the only thing that goes on the deed is a notice of residual petroleum. They are allowed to have a risk based claim cleanup.

Mr. Nicholson said that from the commercial point of view, a secondarily contained tank costs about twice as much as a single wall tank.

Senator Kinnaird asked if it was then a cost shifting.

Mr. Nicholson answered in the affirmative.

Senator Kinnaird if the homeowner would eventually say they could not take on this liability.

Mr. Nicholson said that a home heating oil tank is not regulated and does not get inspected. However, North Carolina does provide for cleanup in the case of a leak. It would help a homeowner to have a good, sound tank on his property.

Senator Clodfelter said that if someone put in a state of the art system with all of the property containment, they might pay us less than someone who is taking a risking.

Senator Albertson asked Mr. Nicholson how we could let the tanks sit on a site for years and not do anything if these sites pose a problem.

Mr. Nicholson said that one of the reasons for the risk-based system is because of what Senator Albertson expressed concern over. The State has money from EPA to provide alternative water for people with contaminated tanks. When the responsible party takes action, the risk of that site can be brought down.

Mr. Nicholson added that the law states that if there is a release, it has to be cleaned up. There has clearly been a disconnection between the Fund and the amount of work being done out there, which has been slowing the system down.

Mr. Nicholson said that they have been pushing the clean-ups, regardless of the amount of money in the Fund. The new legislation that went into effect on October 1, 2004 directs DENR to slow down the program. If he can't pay the claim within 90 days of approving it, no further work can be approved.

Representative Gibson asked Mr. Nicholson to let him know volume metrically when we are going to end this program.

Senator Kinnaird said it was up to us, as a public policy decision, to say we have to require better construction and change the liability.

Representative Weiss asked Mr. Nicholson if there are state of the art programs in other states where this is work. If it is true that we are cleaning up sites because of the way tanks are made and we are still allowing that

same design of tank to go into the ground, we are making a huge mistake and we will always be in this business.

Mr. Nicholson said that before 1998, there were no regulations. After 1998, the federal government and North Carolina adopted the federal law and rules that required leak detection, financial responsibility and sample. They are not going out and letting people put in the kind of tank they could put in before 1998.

Mr. Dexter R. Matthews, Director, gave a report on the programs, activities, and priorities of the Division of Waste Management (DWM).

Mr. Matthews said that the mission of the DWM is to prevent harmful release of waste to the environment and clean up existing contamination. DWM includes the solid waste section, the superfund section and the hazardous waste section.

Mr. Matthews said that DWM received $1 million for the national priority list (NPL) funded by EPA at 90 percent. The State is required to come with a 10 percent cost share.

Mr. Matthews said that they have been prioritizing sites into the dry cleaning program, which would allow a state-lead cleanup of dry cleaning sites across the State.

Mr. Matthews said they hope to be moving faster on the risk-based rules for the dry cleaning sites. They hope to have these rules implemented by next year.

Mr. Matthews said there is currently a balance of $15 million in the dry cleaning clean-up program and they certified 99 sites into that program.

Mr. Matthews in the UST program, every high-risk site was reclassified in order to control the rate of expenditure out of the Fund.

Mr. Matthews said that in the Solid Waste Program, North Carolina is a net exporter of solid waste. We export just under one million tons of waste per year and we important 100,000 tons.

Mr. Matthews named the Regal Ridge LLC Waste Management Proposal for a landfill in Brunswick County, which would include out of state waste. New Hanover County has a proposal for an industrial waste landfill

Mr. Matthews added that conversations have been had with State Ports to bring in barges of waste into Wilmington and transferring that waste to a facility in Sampson County.

Mr. Matthews said there is also a proposal for a waste industries landfill in Camden County, adjacent to the Great Dismal Swamp. There is also a proposal for a C&D recycling facility along the Intracoastal Waterway in Hyde County.

Mr. Matthews said that with all of these proposed facilities, we would then become a net importer instead of a net exporter of waste.

Senator Kinnaird asked if North Carolina really wants to import waste and whatever happened to recycling.

Mr. Matthews said that we have been going in the wrong direction with regard to waste reduction and we are nowhere near achieving a 40 percent reduction.

Senator Kinnaird asked Mr. Matthews why we aren't working toward making sure everyone recycles.

Representative McComas asked Mr. Matthews if laws are in place to induce out of state recyclers to come in and establish themselves.

Mr. Matthews said that are no laws on the books that he is aware of that would be a tax incentive for businesses to come into our State; however, there are tax breaks for recycling and resource recovery equipment at facilities.

Senator Albertson asked Mr. Matthews if there was no law that prohibits bringing waste into North Carolina.

Mr. Matthews said that there is protection under the U. S. Commerce Clause that would allow waste to come in from out of state.

Senator Albertson asked Mr. Matthews if we have any say so as to whether or not we allow waste to come into our state.

Mr. Matthews said that the closest we come to this is the approval from local governments. There have been several bills proposed in Congress that would give states authority in regulating out of state waste.

Representative Gibson asked Mr. Matthews if it was fair to say that every single solid waste facility in North Carolina, in its franchise agreement with the operator, is on top of what is allowed to come into the state.

Mr. Givens asked Mr. Matthews what the service area includes.

Mr. Matthews said it was everything east of the Mississippi River.

Representative Gibson added that for the some of the landfills, there is an economy of scale, i.e. what tonnage can make the landfill viable.

Senator Albertson asked Mr. Matthews if waste comes from out of state that shortens the lifespan of a facility and affect surrounding counties and their ability to dispose of waste.

Mr. Matthews said it would reduce the capacity.

Senator Albertson asked if the local government has the ability to make that decision.

Mr. Matthews said that that if the service area changes, it would have to go back through the local government for approval.

Senator Albertson said that he believes that importing waste into our state poses some long-range problems for us.

Mr. Matthews said that the Brownfield's Program has completed 50 agreements with 55 more agreements in progress. This program gives liability protection to a prospective developer of a site that otherwise would not be redeveloped.

Mr. Matthews said that the Brownfield's program has been very successful.

Mr. Matthews said that in the Hazardous Waste Program, some activities that have been a draw on staff resources and funds are some industries that have had financial difficulties.

Mr. Matthews said that in some cases, they had funds to work with these industries and in other cases they called EPA for help.

Representative McComas asked Mr. Matthews if, when a company went into bankruptcy, environmental clean up costs were non dischargeable.

Mr. Matthews said that is an issue in question. If you show that it is an ongoing continuing release at the site, they had more success than just having environmental contamination at the site and being able to get funding out of bankruptcy.

Representative McComas asked Mr. Matthews if the liability of contamination could be transferred to director and officers of the corporations.

Mr. Matthews said there has been some success with this.

Representative McComas asked what the status is for Holtercam.

Mr. Matthews said that sources are being removed at the site and is being paid for by EPA.

Senator Kinnaird asked if remediation is free because the taxpayers pick up the bill.

Mr. Matthews said that it has been taxpayer money used on a number of these sites.

Representative Hackney asked Mr. Matthews how much money is currently in the inactive sites fund.

Mr. Matthews said there is an orphan site contract that should complete this year and should deplete the fund.

Representative Hackney asked Mr. Matthews if we have any money coming into the fund.

Mr. Matthews said that there is no money coming into the fund.

Representative Hackney asked if there would be any money left for monitoring.

Mr. Matthews said there would be no money left for monitoring orphan sites.

Representative Hackney said that this was something that ERC needs to address. This is something that is going from bad to worse.

Mr. Matthews agreed with Representative Hackney.

Mr. Givens asked if Mr. Matthews if we think that we reducing the rate at which new ones are being created.

Mr. Matthews said that he is referring to the sites that do not have a viable responsible party.

Representative Gibson asked Mr. Matthews what he suggests that we do with regard to funding.

Mr. Matthews said that the inactive sites cleanup program needs a funding source.

Representative Gibson asked how much it would cost.

Mr. Matthews said that the projections are listed in the handout in Exhibit D. The Superfund Program at NPL sites is $2.8 million, currently available, including the $1 million he mentioned earlier. It is projected that three records of decision on sites for cleanup will be completed this year with estimates of $3 million needed.

Mr. Matthews said that EPA projects that two additional records of decision will be signed in FY 2006-07 that will produce about a $2.2 million need for state funds.

Mr. Matthews commented that the UST program looking at the potential of privatizing UST releases. Something they have been interested in the last several years is whether or not new releases from UST's could be privatized and owners and operators taken off of the Fund. This needs to be seriously looked at by the ERC and Transportation Oversight Committee as a possibility.

Mr. Matthews pointed out that we currently have 11 staff members who are doing inspections at 11,000 facilities across the State. This means they are inspected every four or five years. The UST program has a compliance rate of 55 percent, the lowest compliance rate for permitted facilities of any of the other environmental programs that are annually reported on by DENR.

Mr. Matthews concluded by saying that last session Representative McComas and Senator Clodfelter introduced bills that would expand the Brownfield's program by allowing them to issue Brownfield agreements to UST sites and provide liability protection for those who are interested in purchasing property that is a viable site.

Representative Hackney asked Mr. Matthews if his department is moving toward partial cleanups.

Mr. Matthews said that what the bill would do is to provide financial assurance for the full remediation of the site. The Department would gain financial assurance before remediation is done. Liability protection would be given to the purchaser of the site but not to the responsible party.

Representative Hackney asked if these were orphan sites.

Mr. Matthews said they would not be orphan sites but would be sites where a business is ongoing but the purchaser has concerns about moving or selling the site because of contamination.

Representative Gibson asked how we went from a struggle with one Brownfield's agreement to fifty.

Mr. Matthews said that this is a success story. One of the reasons is that the program started with only one person and after received an EPA grant to hire additional staff.

Representative Gibson asked if the program would survive when the EPA grant goes away.

Mr. Matthews said that he could not answer that question but there is plenty of opportunity with the orphan sites.

Representative Gibson asked if the commercial hazardous waste facilities going down in annual tonnage was due to generating less hazardous waste.

Mr. Matthews said that there has been a great deal of effort in reducing the amount of hazardous waste being generated by the staff and the staff of pollution prevention and environmental assistance. Also, moving from a large quantity generator to a small quantity generator has fewer fees involved.

Senator Kinnaird asked Mr. Matthews what it would take for this state to acquire and enforce waste reduction through recycling.

Mr. Matthews said that you could either pass requirements for recycling or you could charge for waste disposal.

Senator Kinnaird asked if the county commissioner association would be all over us if we required recycling.

Mr. Matthews said that every landfill in the state has tip fees and many local governments operate those sites off of tip fees for waste coming into the facility.

Mr. Givens said that prohibition put on unlined landfills, and lined landfills being more costly to build, and the landfill capacity of unlined landfills is running out. In 1989, SB 115 was to shift the solid waste business away from single counties and cities to consortium of counties and to private sectors. Recycling requires two things: a reliable supply of material and something to do with them when you throw them in the bin. The cost of all of this exceeds the cost of dumping in a landfill. Until you raise that cost, and one way to raise that cost is a tipping fee, nothing will change.

Mr. Givens said that there is any talk about increasing tipping fees at the state level; the local government folks would be down here in a flash.

Representative Gibson asked Mr. Matthews in the scoring of the new sites coming online, are we seeing a reduction in average of a lesser problem score than we have seen in the past.

Mr. Matthews answered Representative Gibson's question by saying that he couldn't say the risk of those sites, in general, is less than in the past. He could say that many of the worst sites on the NPL have been addressed.

Senator Kinnaird asked what an NPL is.

Mr. Matthews said that NPL is the national priority list.

Senator Kinnaird asked if the ERC was going to the coast.

Mr. Givens said that the co-chairs would be meeting to discuss what we would be doing. The current plan in November is to have a joint meeting with Seafood and Aquaculture in Raleigh.

Mr. Givens said that an optional field trip is being considered to the coast that would not be associated with a meeting.

The meeting was adjourned at 12:25 p.m.

Representative Pryor Gibson
Presiding Co-Chair

Mary R. Watson
Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Reports to Related to Agenda on Water Quality and Hazardous Waste Management, Read only reports, and reports held for future presentations
EXHIBIT E:	Review of Legislative Action on the Environment
EXHIBIT F:	Slide presentation by Alan Klimek on Basinwide Water Quality Management Plan
Exhibit G:	Report Made By Grover Nicholson On The Status Of Leaking Petroleum Underground Storage Tanks, The State Cleanup Funds, And The Groundwater Protection Loan Fund

October 21, 2004 ERC Meeting
EXHIBIT A

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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7 October 2004

TO: Members of the Environmental Review Commission
Interested Parties

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Commission Meeting**
Notice of Planning Meeting
Rescheduling of Joint Meeting (ERC and JLCSA) and Written Comments
Schedule of Future Meetings
Meetings of Interested Parties (605 Working Groups)
Additional Information

COMMISSION MEETING:

The Environmental Review Commission (ERC) will meet at 9:30 a.m. Thursday 21 October 2004 in Room 643 of the Legislative Office Building in Raleigh.

At this meeting, the ERC will begin or continue studies for which the ERC is responsible, hear reports from State agencies, discuss topics to be considered at future meetings, and attend to other matters. Listed below are potential agenda topics for this meeting and for future meetings. More specific information regarding the agenda for the 21 October meeting of the ERC will be developed at the staff planning meeting discussed below.

STUDY TOPICS:

General:

1) Study the overall effectiveness of the State's efforts to protect the environment and conserve the natural resources of NC (S.L. 2004-161, sec. 19.2)

2) Study the development of a plan to share floodplain mapping information (S.L. 2004-161, Sec. 19.3)

3) Study issues related to the Fair Bargain Act and the revocation of contracts under certain circumstances (S.L. 2004-161, Sec. 19.7)

Air Quality:

4) Study whether the State should modify the current highway use tax so that all or a portion of the highway use tax paid on a private passenger vehicle is based on the fuel efficiency rating of the vehicle (S.L. 2004-161, Sec. 19.10(1))

5) Study whether the State should modify the current vehicle registration fee so that all or a portion of the annual vehicle registration renewal fee for a passenger vehicle is based on the vehicle miles traveled by the vehicle (S.L. 2004-161, Sec. 19.10(2))

6) Study establishment of a Clean Air Trust Fund (S.L. 2004-161, Sec. 19.6)

Water Quality:

7) Study various approaches to prevent and reduce stormwater pollution throughout the State (S.L. 2004-161, Sec. 19.11)

8) Study the feasibility of encouraging permeable surfaces as a deterrent to stormwater runoff (S.L. 2004-161, Sec. 19.8)

9) Study ways to protect a property owner whose land is adjacent to or downstream from a site on which alterations of the existing flow of stormwater will occur (S.L. 2004-161, sec. 19.9)

10) Study issues related to the Leaking Petroleum Underground Storage Tank (UST) Cleanup Program (S.L. 2003-352, Sec. 12)

11) Study the role of the State and DENR in implementing the Leaking UST Cleanup Program (S.L. 2004-124, Sec. 30.10.(f))

Water Quantity:

12) Study water restriction guidelines created by DENR and implemented by local governments, including an evaluation of economic impacts and recommendations for establishing consistency across the State with respect to classes of water use (S.L. 2004-161, Sec. 19.4)

13) Study the issue of the development and funding of regional water supply systems (S.L. 2004-161, Sec. 19.5)

REPORT TOPICS:

General:

14) Quarterly report on the activities of the Environmental Management Commission (G.S. 143B-282(b))

15) Annual report on the cost of implementing the Mining Act of 1971 (G.S. 74-54.1(c))

16) Semiannual report on agency litter enforcement, litter prevention, and litter removal efforts (G.S. 147-12(b))

17) Report on the One-Stop Permit Assistance and Coordination Program (S.L. 2004-124, Sec. 12.12)

18) Biennial report on the state of the environment (G.S. 143B-279.5)

19) Annual report on the cost of the State's environmental permitting programs contained within the Department of Environment and Natural Resources (DENR) (G.S. 143-215.3A(c))

Air Quality:

20) Annual report on implementation of S.L. 2002-4 (Clean Smokestacks Act) (S.L. 2002-4, Sec. 14)

21) Annual report on issues related to the development and implementation of standards and plans to implement programs to control emissions of mercury and carbon dioxide from coal-fired generating units and other stationary sources of air pollution (S.L. 2002-4, Sec. 12-13)

22) Annual report on increasing the use of alternative-fueled and low-emissions light-duty cars and trucks in privately owned fleets (G.S. 143-215.107C(c))

23) Annual report on development and implementation of a plan to reduce vehicle miles traveled by private sector employees and vehicle emissions resulting from job-related travel, including commuting to and from work (G.S. 143-215.107C(e))

24) Annual report on development and implementation of a plan to reduce vehicle miles traveled by State employees and vehicle emissions resulting from job-related travel, including commuting to and from work (S.L. 1999-328(4.6))

25) Annual report on promotion of telework/telecommuting for State employees and achieving the goal of reducing State employee vehicle miles traveled in commuting by 20% without reducing total work hours or productivity (S.L. 1999-328(4.8))

Hazardous Waste Management:

26) Annual report on the Inactive Hazardous Sites Program (G.S. 130A-310.10)

27) Annual report on implementation of the Resident Inspectors Program at commercial hazardous waste facilities (G.S. 130A-295.02(m))

28) Report of Superfund cost share fund expenditures for cleanup of sites on the National Priorities List (S.L. 1999-237(15.6)(b))

29) Annual report on the North Carolina Hazardous Waste Management Plan (G.S. 130A-294(i))

30) Annual report on the Effectiveness of the Brownfields Property Reuse Act (G.S. 130A-310.40)

Parks and Recreation / Land Conservation:

31) Parks and Recreation Trust Fund Annual Report, Fiscal Year 2003-2004 (G.S. 113-44.15(c))

32) North Carolina Natural Heritage Trust Fund Award Report, Fiscal Year 2003-2004 (G.S. 113-77.9(e))

33) Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands (G.S. 113A-241(c))

34) Annual report on implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR (G.S. 113A-235(c))

Water Quality:

35) Annual report on permitting and inspecting animal waste management systems/Animal Waste Compliance Report (G.S. 143-215.10M)

36) Annual report on the compliance/ enforcement of water quality laws for facilities that discharge into surface waters (G.S. 143-215.9A)

37) Annual report on the Wastewater Discharge Elimination Program (S.L. 2001-452, Sec. 2.9)

38) Semiannual report on the effectiveness of the pilot program to inspect animal waste management systems by the Division of Soil and Water Conservation (S.L. 2002-176, Sec. 1.2)

39) Annual report on Basinwide Water Quality Management Plans (G.S. 143-215.8B)

40) Final report on the Neuse River Monitoring and Modeling Project (G.S. 143-215.8C)

41) Annual report on the Dry-Cleaning Solvent Cleanup Program (G.S. 143-215.104U)

42) Annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund (G.S. 143-215.94M)

Water Quantity:

43) Annual report on the progress of water supply planning (G.S. 143-355(n))

PLANNING MEETING:

To facilitate development of the agenda for the 21 October meeting of the ERC, to begin planning for subsequent meetings of the ERC, and to receive input from interested persons regarding the work of the ERC, the Commission Counsel will hold an informal planning meeting at **10:00 a.m. on Tuesday 12 October 2004 in Room 605 of the Legislative Office Building**. Persons who wish to participate in the development of the agenda for meetings of the ERC, or who are interested in any matter before the ERC, are invited to attend.

RESCHEDULING OF JOINT MEETING (ERC AND JLCSA) AND WRITTEN COMMENTS:

At this time, no specific dates have been selected for rescheduling the joint meeting of the ERC and the Joint Legislative Commission on Seafood and Aquaculture (JLCSA) that was cancelled due to Hurricane Jeanne. Once we have received input from the Co-Chairs and members of the ERC and JLCSA, we will distribute a meeting notice announcing the date and location of the rescheduled joint meeting. Due to scheduling constraints over the next month, however, this meeting will not occur until November or later.

The ERC and JLCSA are interested in receiving comment on issues related to the implementation of the coastal recreational fishing license and how those issues should be addressed. Persons who wish to submit written comment may do so at any time (preferably prior to 1 November 2004) by mailing written matter to ERC or JLCSA staff. Written statements should be on standard size paper (8 1/2" x 11") paper with sufficient margins to allow for binding. Please mail your comments to:

Cindy Davis, Commission Clerk
Joint Legislative Commission on Seafood and Aquaculture
525 Legislative Office Building
300 North Salisbury Street
Raleigh, North Carolina 27603

SCHEDULE OF FUTURE MEETINGS:

Below is a schedule of meetings of the Environmental Review Commission for October 2004 through January 2005. This schedule is tentative and subject to adjustment. For planning purposes, however, please reserve these dates.

Commission Meeting	Staff Planning Meeting
Thursday 21 October 2004	Tuesday 12 October 2004
Friday 19 November 2004	Tuesday 9 November 2004
Monday 22 November & Tuesday 23 November 2004	Tuesday 9 November 2004
Tuesday 30 November 2004	Tuesday 9 November 2004
Tuesday 7 December 2004	Wednesday 1 December 2004
Wednesday 12 January 2005	Wednesday 5 January 2005
Thursday 13 January 2005	Wednesday 5 January 2005
Thursday 20 January 2005	Wednesday 5 January 2005
Tuesday 25 January 2005	Wednesday 5 January 2005

MEETINGS OF INTERESTED PARTIES (605 WORKING GROUPS):

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Limit Liability for Environmental Cleanups Working Group (HB 1603/SB 1222)
2:00 p.m. Wednesday 27 October 2004 – 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel or other Commission staff at (919) 733-2578.

October 21, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 10.21.04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Tom Beam	NC Environmental Defense
Boyd Dolan	NC DWQ
Alan Clark	NCDWQ
Alex Marks	NCDWR
Gordon Allen	NC Conservation Network
Coleen H. Sullins	NC DWQ
Alan Klimek	DWQ
Paul Meyer	NCACC
Laurie Smith	NC DOT
John McHugh	Gov Office
Sharon Strand	State Energy Office

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — October 21, 2004

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Johanna Reese	DENR
Doug Lassiter	NCSTA
TRACY DAVIS	DENR - Land Resources
Linda Culpepper	DENR - Div. Water Mgt.
Tommy Stevens	NCPC
Sharon Miller	CUCA
NANCY REED	SELC
Mary Thompson	MICIC
Fred Allen	NC Aggregates Assn.
Anita Watkins	NCLM
Lucius Pullen	Counsel N.C. Mining Associations

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 10-21-04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
ZEB ALLEY	ALLEY ASSOCIATES
Kathy Hawkins	Progress Energy
Michael Nelson	CCNC

October 21, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
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Raleigh, North Carolina

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AGENDA
9:30 a.m. Thursday 21 October 2004
Room 643 Legislative Office Building

1. Call to order
   Representative Pryor A. Gibson, Presiding

2. Introductory remarks by Cochairs
   Representative Pryor A. Gibson
   Representative Daniel F. McComas
   Senator Charles W. Albertson
   Senator Daniel G. Clodfelter

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Quarterly reports by the Environmental Management Commission (EMC) as to its operations, activities, programs, and progress during 2004 (G.S. 143B-282(b))
   Dr. David H. Moreau, Chairman
   Environmental Management Commission

5. Report on the programs, activities, and priorities of the Division of Water Quality
   Alan W. Klimek, Director
   Division of Water Quality, Department of Environment and Natural Resources (DENR)

6. Annual report on the status of leaking petroleum underground storage tanks, the State cleanup funds, and the Groundwater Protection Loan Fund (G.S. 143-215.94M)
   Grover Nicholson, Chief
   Underground Storage Tank Section, Division of Waste Management, DENR

7. Report on the programs, activities, and priorities of the Division of Waste Management
   Dexter R. Matthews, Director
   Division of Waste Management, DENR

8. Commission discussion and announcements

9. Adjourn

NEXT MEETINGS:

11:00 a.m. Thursday 18 November 2004
Location: 643 Legislative Office Building

Note: The Joint Legislative Commission on Seafood and Aquaculture will meet at 9:30 a.m. on Thursday 18 November 2004. The Environmental Review Commission and the Joint Legislative Commission on Seafood and Aquaculture will meet jointly beginning at 11:00 a.m. on that day.

9:30 a.m. Friday 19 November 2004
Location: 643 Legislative Office Building

Staff Planning Meeting: 10:00 a.m. Tuesday 9 November 2004 – 605 Legislative Office Building

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Limit Liability for Environmental Cleanups Working Group (HB 1603/SB 1222)
2:00 p.m. Wednesday 27 October 2004 – 605 Legislative Office Building

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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21 October 2004

MEMORANDUM

To: Members of the Environmental Review Commission
From: Tim Dodge, Research Assistant for Environmental Issues
Re: Reports to the Commission

This memorandum lists reports that have been submitted to the Environmental Review Commission by State agencies, as required by law, since the last reports distribution in May 2004.

A. REPORTS RELATED TO TODAY'S AGENDA

The following reports are attached to this memorandum. These reports may be referenced during the course of the 21 October 2004 Commission meeting.

Environmental Management Commission (Agenda Item 4):

1) *Quarterly report by the Environmental Management Commission (EMC) as to its operations, activities, programs, and progress during 2004 (G.S. 143B-282(b)).* EMC. 1 July 2004. Statutory Authority: G.S. 143B-282(b).

2) *Quarterly report by the Environmental Management Commission (EMC) as to its operations, activities, programs, and progress during 2004 (G.S. 143B-282(b)).* EMC. 1 October 2004. Statutory Authority: G.S. 143B-282(b).

Water Quality (Agenda Item 5):

3) *Annual report on progress in developing and implementing basinwide water quality management plans.* Division of Water Quality, DENR. 20 October 2004. Statutory Authority: G.S. 143-215.8B(d). .

4) *Annual report on permitting and inspecting animal waste management systems/Animal Waste Compliance Report.* Division of Water Quality, DENR. 18 October 2004. Statutory Authority: G.S. 143-215.10M.

Hazardous Waste Management (Agenda Item 7):

5) *Annual report on the implementation of the North Carolina Hazardous Waste Management Plan.* Division of Waste Management, DENR. 1 October 2004. Statutory Authority: G.S. 130A-294(i).

6) *Annual report on implementation of the resident inspectors program at commercial hazardous waste facilities.* Division of Waste Management, DENR. 1 September 2004. Statutory Authority: G.S. 130A-295.02(m).

7) *Annual report on the Inactive Hazardous Sites Program.* Division of Waste Management, DENR. 20 October 2004. Statutory Authority: 130A-310.10.

8) *Annual report on the effectiveness of the Brownfields Property Reuse Act.* Division of Waste Management, DENR. 21 October 2004. Statutory Authority: 130A-310.40.

9) *Annual report on the Dry-Cleaning Solvent Cleanup Program.* Division of Waste Management, DENR. 16 September 2004. Statutory Authority: 143-215.104U.

10) *Report on Superfund cost share fund expenditures for cleanup of sites on the National Priorities List.* Division of Waste Management, DENR. 20 September 2004. Statutory Authority: S.L. 1999-237(15.6)(b).

B. READ-ONLY REPORTS

The following reports are attached to this memorandum. These reports are not scheduled for oral presentation.

General:

11) *One-Stop Permit Assistance and Coordination Program status report.* DENR. 12 October 2004. Statutory Authority: S.L. 2004-124, Sec. 12.12.

Land Resources:

12) *Annual report on the cost of implementing the Mining Act of 1971.* Division of Land Resources, DENR. 1 September 2004. Statutory Authority: G.S. 74-54.1(c).

C. REPORTS HELD FOR FUTURE PRESENTATIONS

The following reports are being held for distribution in conjunction with a potential agenda item a future meeting of the Commission.

Air Quality:

13) *Annual report on implementation of S.L. 2002-4 (Clean Smokestacks Act).* DENR and the North Carolina Utilities Commission. 1 June 2004. Statutory Authority: S.L. 2002-4, Sec. 14.

14) *Annual report on issues related to the development and implementation of standards and plans to implement programs to control emissions of mercury and carbon dioxide from coal-fired*

generating units and other stationary sources of air pollution. Division of Air Quality, DENR. 1 September 2004. Statutory Authority: S.L. 2002-4, Sec. 12-13.

Parks and Recreation / Land Conservation:

15) Parks and Recreation Trust Fund Annual Report, Fiscal Year 2002-2003. Division of Parks and Recreation, DENR. 1 October 2004. Statutory Authority: G.S. 113-44.15(c).

16) North Carolina Natural Heritage Trust Fund Award Report, Fiscal Year 2002-2003. Division of Parks and Recreation, DENR. 1 October 2004. Statutory Authority: G.S. 113-77.9(e).

17) Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands. DENR. 1 October 2004. Statutory Authority: G.S. 113A-241(c).

D. OTHER REPORTS

The following report has been distributed directly to members of the Environmental Review Commission by the reporting authority.

General:

18) Semiannual report on agency litter enforcement, litter prevention, and litter removal efforts. Office of the Governor. 1 September 2004. Statutory Authority: G.S. 147-12(b).

Please contact George Givens, Jeff Hudson, Jennifer McGinnis, or Tim Dodge at (919) 733-2578 if you have any questions or comments.

October 21, 2004 ERC Meeting
EXHIBIT D

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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21 October 2004

MEMORANDUM

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This memorandum lists reports that have been submitted to the Environmental Review Commission by State agencies, as required by law, since the last reports distribution in May 2004.

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Please contact George Givens, Jeff Hudson, Jennifer McGinnis, or Tim Dodge at (919) 733-2578 if you have any questions or comments.

QUARTERLY REPORT

TO THE

ENVIRONMENTAL REVIEW COMMISSION

ON

ENVIRONMENTAL MANAGEMENT COMMISSION ACTIVITIES

July 2004

YEAR 2003 – 2004 FOURTH QUARTER REPORT TO ERC

I. Quarterly Report On **Air Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

II. Quarterly Report On **Ground Water Quality** Activities

A. Future EMC And Committee Agenda Items

III. Quarterly Report On **Surface Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

I. AIR QUALITY ACTIVITIES

Agenda Item : Response to an Objection by the Rules Review Commission on the Ethylene Oxide Emissions Rule

Explanation:

On February 12, 2004, the Environmental Management Commission adopted amendments to the control of ethylene oxide emission rule (15A NCAC 2D .0538). One amendment provides an alternative emission limit for ethylene oxide emission from all sterilizer unload and backdraft valve exhausts and degassing rooms. Another amendment allows a facility to model all plant ethylene oxide emissions to demonstrate compliance with the acceptable ambient level for ethylene oxide in lieu of complying with the emission standards in the rule.

At its meeting on March 18, 2004, the Rules Review Commission objected to this rule on the grounds of ambiguity. The rule contained a prepositional phrase that did not appear to modify anything. The language in question was previously adopted language and appears in Paragraph (b). The Rules Review Commission staff's recommendation for the objection, which the Rules Review Commission adopted is attached.

In response to the objection, the phrase "from the processes described in Paragraph (d) of this rule" is proposed to be removed. This phrase is redundant, and the rule does not loose any of its meaning without it. The revised rule is attached.

Recommendation:

The Director recommends that the Commission adopt the revised rule in response to the Rules Review Commission's objection.

EMC Action: EMC adopted amendments to ethylene oxide emission rule in response to RRC's objection.

Agenda Item:	Request to Proceed to Public Hearing on an Amendment to the Permit Exemption Rule
Explanation:	The Environmental Management Commission (EMC) is requested to approve one or more public hearings to consider the adoption of amendments to Rule 15A NCAC 2Q .0102, Activities Exempted From Permit Requirements. The proposed amendment clarifies the facility permit exemption. It adds a qualification such that the exemption would not apply if the facility had a source that could likely violate an applicable standard if not properly controlled and operated. This disqualification of sources that could violate an emission standard prevents owners or operators from using this exemption to avoid permitting. The amendment is a clarification and maintains the status quo.
Recommendation:	The Director recommends that the Commission authorize a public hearing(s) on these Rules and that the Chairman appoint a member(s) of the Commission to serve as hearing officer(s).

EMC Action: EMC approved taking proposed amendments to public hearing.

Two rules are proposed for amendment (2Q .0701 and .0709) to clarify when conditions in a permit should be changed when an acceptable ambient level of a toxic air pollutant changes.

An amendment is proposed to the rule that defines emission rates that require a permit (2Q .0711) to correct the calculation of 10 irritant toxic air pollutant emissions.

A new rule is proposed to exempt portable rock crushers.

RECOMMENDATION: The Director recommends that the Commission authorize a public hearing(s) on these items and that the Chairman appoint a member(s) of the Commission to serve as hearing officer(s).

EMC Action: EMC approved taking the proposed amendments and repeal to public hearing.

Agenda Item:	Request to Proceed to Public Hearing on Amendment to the Visible Emission Rule
Explanation:	The Environmental Management Commission (EMC) is requested to approve one or more public hearings to consider the adoption of an amendment to Rule 15A NCAC 2D .0521, Visible Emissions. The amendment defines, for facilities operating continuous opacity monitoring systems (COMS), the maximum number of times that the opacity standard may be exceeded daily before a violation occurs. It establishes a new compliance requirement for COM sources, changing "10" to "four" in the Rule phrase "No more than 10 six-minute periods shall exceed the opacity standard in any one day." The change follows the EPA recommendation to comply with Section 110 of the Clean Air Act (CAA). When amended, the Rule will become a part of the North Carolina State Implementation Plan (SIP).
Recommendation:	The Director recommends that the Commission authorize a public hearing(s) on this Rule and that the Chairman appoint a member(s) of the Commission to serve as hearing officer(s).

EMC Action: EMC approved taking proposed amendments to public hearing.

Agenda Item: Request to Proceed to Public Hearing on Amendments to the Prevention of Significant Deterioration Rule and Major New Source Review Rule for Nonattainment Areas

Explanation: The Environmental Management Commission (EMC) is requested to approve one or more public hearings to consider the adoption of amendments to Rule 15A NCAC 2D .0530, Prevention of Significant Deterioration and .0531, New Source Review.

Rules 15A NCAC 2D .0530 and .0531 are being amended to bring them in line with the federal rules by incorporating recent amendments to 40 CFR 51.165, Nonattainment New Source Review and 40 CFR 51.166, Prevention Of Significant Deterioration Of Air Quality. Along with incorporating the EPA revisions, several of the EPA definitions (*baseline actual emissions*, *pollution control projects*, and *projected actual emissions*) are proposed for modification and additional changes are being made to strengthen the requirements.

The proposed rules contain more stringent recordkeeping requirements and a requirement that projected actual emissions become a permit condition. Actual emissions may be increased by permit amendment after demonstrating that *all* additional emission increases are the direct result of product demand growth, and that the capacity to increase production was available *prior* to the modification.

Recommendation: The Director recommends that the Commission authorize a public hearing(s) on these Rules and that the Chairman appoint a member(s) of the Commission to serve as hearing officer(s).

EMC Action: EMC approved taking proposed amendments to public hearing.

AGENDA ITEM: Request to Proceed to Public Hearing on the Adoption of and Amendments to Various Rules.

EXPLANATION:

The Environmental Management Commission (EMC) is requested to approve one or more public hearings to consider the adoption of and amendments to various air quality rules.

The rule requiring control of nitrogen dioxides and nitrogen oxides (2D .0519) is proposed for amendment to correct a cross-reference.

Two rules that require source emission monitoring (2D .0606 and .0608) are proposed for amendment to allow alternative monitoring procedures for continuous emission monitors under certain circumstances.

Three rules are proposed for amendment (2D .0801 and 2Q .0603 and .0605) to clarify that transportation facility rules apply only to carbon monoxide. The highway project rule (2D .0803) is proposed to be repealed; it has been superceded by more recent rules.

The rule that regulates commercial and industrial solid waste incinerator units (2D .1210) is proposed to be amended to change performance test date and make a cross-reference correction. A cross-reference correction is being made to the rule covering other incinerators (2D .1208).

The rule describing recordkeeping and reporting of nitrogen oxide emissions (2D .1404) is proposed to be amended to allow an alternative procedure for satisfying missing monitoring data requirements.

The Rule that identifies activities exempted from permit requirements (2Q .0102) is proposed for amendment to add an exemption small combustion sources, to allow petroleum dry cleaners subject to new source performance standards to be exempted from permitting, and to modify the exemption for emergency generators.

AGENDA ITEM : Hearing Officers' Report on Amendments to the Air Toxic Rules on Hydrogen Sulfide, Permit Exemptions, and Modifications.

EXPLANATION:

On October 30, 2003 and November 5, 2003, Dr. Shaw, Dr. Blanks and Mr. Jenkins held public hearings on amendments to the air toxics rules on hydrogen sulfide, permit exemptions, and modifications.

The toxic air pollutant guideline (15A NCAC 2D .1104) for hydrogen sulfide is proposed to be revised. Five acceptable ambient level options have been proposed for comment. The rule for emission rates requiring a permit (15A NCAC 2Q .0711) is also proposed to be amended to revise the rate.for hydrogen sulfide to correspond to the revised guideline. The air toxic permit exemption rule (15A NCAC 2Q .0702) is also proposed to be amended to exempt wastewater treatment systems at pulp and paper mills. Two options, one of which exempts wastewater treatment systems at pulp and paper mills until February 1, 2007, at which time the exemption would expire and the other which permanently exempts such wastewater treatment systems, were proposed for comment. A new rule (15A NCAC 2Q .0714) is proposed to require testing of emissions from wastewater treatment systems at pulp and paper mills and evaluation of activated sludge systems for wastewater treatment. Two options regarding the nature and scope of the study were proposed for comment.

Over 1300 comments were received from a variety of individuals and organizations both within and outside North Carolina including members of the general public, residents near affected facilities, environmental organizations, public health officials, health professionals, county and local government officials, members of the General Assembly, industrial organizations and trade associations, affected facilities, employees of affected facilities, and commerce and economic development groups. Many commenters expressed concern regarding the health effects from continued exposure to hydrogen sulfide emissions. Many commenters expressed

concern regarding the ability of affected facilities to comply with a stringent standard and remain economically viable and the impact affected facility closures would have on the local, regional, and state economy and communities should they occur. Several commenters expressed concern about the potential for competitive disadvantage with other states and countries if North Carolina adopts a much stricter standard. Several commenters requested the Commission find balance between the health and environmental impacts and the economic impacts in making its decisions regarding the standard and establishing any exemptions. Several commenters expressed concern that many sources of hydrogen sulfide emissions are not included in the emissions inventory and would not be covered by the rule. Several commenters raised concerns about conservatism incorporated to account for uncertainty in the various phases of the program such as setting the AAL, estimating emissions, modeling, using meteorological data, and not allowing for exceedances. Some commenters said that there is a lack of evidence that adverse health effects are occurring around affected facilities. Some commenters expressed concern about the uncertainty surrounding quantification of emissions from wastewater treatment systems. Some commenters expressed concern about the ability of activated sludge systems to control hydrogen sulfide emissions to the required levels. Some commenters questioned appropriateness of use of the studies upon which some of the AAL recommendations were based.

Approximately half of the commenters supported the lowest AAL combination of 0.056 mg/m3 for a 1-hour average and 0.033 mg/m3 for a 24-hour average, Option 2, in combination with no exemption for wastewater treatment systems at pulp and paper mills. Approximately half of the commenters supported the highest value of 0.12 mg/m3 for the AAL, Option 4, in combination with a permanent exemption for pulp and paper mill wastewater treatment system emissions, Option B. A few commenters supported a temporary exemption for further study of pulp and paper mill

wastewater treatment emissions and control technology options.

The hearing record was sent to you earlier.

RECOMMENDATION: The hearing officers recommend that the Commission adopt the proposed amendments to the air quality regulations contained in Chapter II of the hearing record.

EMC Action: EMC adopted amendments to the air toxic rules and new rule requiring studying emissions from wastewater treatment systems at pulp and paper mills.

Agenda Item: Hearing Officers' Report on Amendments to and Adoption of Air Quality Rules on Open Burning

Explanation: On October 30 and November 5, 2003, Dr. Delilah Blanks, Dr. Frank S. Shaw, and Mr. Thomas K. Jenkins held public hearings on the adoption of and amendments to various air quality rules. Only four of the 18 proposed amended and new rules included in this hear record generated comments.

Several clarifications and other changes are proposed to be made to the open burning rule (Section 15A NCAC 2D .1900). Purpose, Scope, And Permissible Open Burning (15A NCAC 2D .1901) has been expanded. Several new definitions are proposed (15A NCAC 2D .1902). A prohibition of most types of open burning on days forecast to be code orange or above is also proposed (15A NCAC 2D .1903 and .1904). The new source performance standards for air curtain burners covered under these standards are added to the air curtain burner rule (15A NCAC 2D .1904). These requirements have already been adopted under the new source performance standard rule (they are added here for clarity). The need for temporary air curtain burners to have a certified visible emissions reader onsite is proposed to be removed. Delegation to county governments rule (15A NCAC 2D .1906) has been modified to preclude municipal governments from issuing permits to permanent sited air curtain burners.

One of the proposed changes to the permissible open burning rule (15A NCAC 2D .1903) changes as allowable opening burning, burning "acceptable to" the Department of Agriculture, Division of Forest Resources, or Wildlife Management Commission to burning "recommended by" the respective agency. Twenty people commented in opposition to this change. The commenters indicated that the amended Rule will require specific permission from State agencies to conduct agriculture or forest management open burning, that State agency anticipated visits to each site will cause unwarranted delays and lost time, and that

open burning may require an air quality permit. In addition, many commenters believe they will face an additional liability if they conduct open burning without first verifying that the open burning process is a recommended practice for their particular application.

In response to these comments, the rule has been changed. "Recommended by" has been replaced by "acceptable to," which is the original (current) language in the Rule.

A record of Hearing Three was sent to you earlier. The revised rules proposed for adoption is attached.

Recommendation: The Hearing Officers recommend that the proposed amendments to the Open Burning Section as presented in this agenda item be adopted by the Environmental Management Commission.

EMC Action: EMC adopted amendments to open burning rules.

Future EMC and Air Quality Committee Agenda Items

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
July 04	-Open Burning (419) -Update to Title V Permit Content Rule (420)	-Assuring Compliance with Heavy Duty Diesel Engine Standard for Model Year 2007 (418)	Hearing Request -Assuring Compliance with Heavy Duty Diesel Engine Standard for Model Year 2007 (418)
Oct 04		-Amend Definition of AApplicable Requirement@ to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367)	Adoption -Change Daily Opacity Exceedances for COM from 10 to 4 in 2D .0521 (417) -Correct Testing Date for CISWI (413) -Correct Cross-Reference in 2D .1208 (389) -Clarification of Facility Permit Exemption in 2Q .0102 (402) -Correct Cross-Reference in 2D .0519 (391) -Portable Crushers (385) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level Should Be Changed in a Permit (396) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -To Revise PSD Rule (393) -Assuring Compliance with Heavy Duty Diesel Engine Standard for Model Year 2007 (418)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		-Update Address in 2D .0103 (392)	
Oct 04 cont.		-Correction of Definition of Actual Emissions in 2Q .0202 (401) -Revision of Ranking of Incinerators in 2D .1201 (403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405) -Correct Washington Regional Office Address in 2D .1905 (410) -Make Emission Inventory Part of Permit Application (411) -Leaks at Gasoline Terminal Clarification (412) -Implementation of New Authority: Banking and Trading and Credit for Early Reductions (323c) -Open Burning (419) -Update to Title V Permit Content Rule	
Dec 04			Hearing Request -Amend Definition of AApplicable Requirement@ to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409)
Dec 04 cont.			-Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Revision of Ranking of Incinerators in 2D .1201 (403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405) -Correct Washington Regional Office Address in 2D .1905 (410) -Make Emission Inventory Part of Permit Application (411) -Leaks at Gasoline Terminal Clarification (412) -Implementation of New Authority: Banking and Trading and Credit for Early Reductions (323c) -Open Burning (419) -Update to Title V Permit Content Rule (420)
Mar 05			Adoption -Amend Definition of AApplicable Requirement@ to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			-Permit Exemption for County Grain Elevators and Mills (325) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297)
Mar 05 cont			-Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Revision of Ranking of Incinerators in 2D .1201 (403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405) -Correct Washington Regional Office Address in 2D .1905 (410) -Make Emission Inventory Part of Permit Application (411) -Leaks at Gasoline Terminal Clarification (412) -Implementation of New Authority: Banking and

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			Trading and Credit for Early Reductions (323c) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405) -Open Burning (419) -Update to Title V Permit Content Rule (420)
Apr 05		-Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)	
May 05			<u>Hearing Request</u> -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)
July 05			<u>Adoption</u> -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Sept 05		-Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility@ and ASynthetic Minor Facility@ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)	
Oct 05			Hearing Request -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility@ and ASynthetic Minor Facility@ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
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II. GROUNDWATER ACTIVITIES

GROUNDWATER GWC / EMC FUTURE AGENDAS*

	Committee Agenda	EMC Agenda
July 2004	• Meeting cancelled.	• No items scheduled at this time.
Aug 2004	• No meeting scheduled.	• No meeting scheduled.
Sept 2004	>DWM-UST SECTION ITEMS< 1. **Request to Proceed to Public Notice and Hearing on Proposed Rules to Modify the Testing Requirements Under Title 15A NCAC 2L .0115 (*Waive 30 Day Rule)*** 2. **Information on Legislation for Secondary Containment for Non-Tank Components of a UST System with a Request to Proceed with Public Notice and Hearing.** >DWQ-GWS ITEMS<< 1. **Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** 2. Underground Injection Control Presentation on Aquifer Storage and Retrieval (ASR) with a Discussion of ASR in other States. >DWM – SUPERFUND SECTION ITEM<< 1. **Request to Proceed to Public Notice and Hearing for Implementation of New Rules from the Dry-Cleaning Solvent Cleanup Fund.**	>DWM-UST SECTION ITEM<< 1. **Request to Proceed to Public Notice and hearing on Proposed Rules to Modify the Testing Requirements Under Title 15A NCAC 2L .0115. *(Waive 30 Day Rule)***

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

	Committee Agenda	EMC Agenda
Oct 2004	>DWQ-GWS ITEMS< 1. **Request to Proceed to Public Notice and Hearing on Revisions to the Carbon Fraction Classes in 15A NCAC 2L .0202.** 2. Update on the Division of Water Quality Reorganization and the Status of Implementation.	>DWM-UST SECTION ITEMS< 1. **Information on Legislation for Secondary Containment for Non-Tank Components of a UST System with a Request to Proceed with Public Notice and Hearing.** >DWQ-GWS ITEMS< 1. **Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.** >DWM – SUPERFUND SECTION ITEM< 1. **Request to Proceed to Public Notice and Hearing for Implementation of New Rules from the Dry-Cleaning Solvent Cleanup Fund.**
Nov 2004	• No meeting scheduled.	• No meeting scheduled.

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

SURFACE WATER QUALITY ACTIVITIES

Agenda Item:

Presentation of the WQC's Recommendation on a Petition for Rulemaking to Reclassify the Catawba River's Bridgewater Dam Tailwater to Trout (Tr)

Explanation:

In April 2004 the Division received a Petition for Rulemaking package from the Southern Environmental Law Center (SELC). This package, which was submitted in accordance with 15A NCAC 2I. 0500, petitioned the EMC to initiate rulemakings proceedings to add the Trout (Tr) supplemental classification to a portion of the Catawba River from the Bridgewater (Linville) Dam to the City of Morganton water intake. In accordance with the requirements of 2I .0500 this petition for rulemaking was reviewed by the Water Quality Committee on July 7, 2004 and a recommendation regarding the disposition of the petition request was developed by the Committee. As mandated in 2I .0503, the WQC Chairman will now present the WQC's recommendation to the full Commission for its consideration.

Recommendation:

That the Commission approve the WQC's recommendation regarding the SELC's Petition for Rulemaking.

EMC ACTION:

The EMC concurred with the Water Quality Committee's recommendation for the resolution of this petition request. The EMC denied the petition to initiate rulemaking to add the supplemental Trout (Tr) classification to the subject waters. This denial was based on the fact that the waters that are the subject of the petition request are currently involved in the Federal Energy Regulatory Commission (FERC) relincensing process. However, the EMC did direct DWQ Staff to return to the WQC in May 2005 and the Fall of 2006 so that the WQC and EMC may revisit this issue as the relincensing process unfolds.

SURFACE WATER QUALITY WQC/EMC FUTURE AGENDAS

	WQC Agenda	EMC Agenda
July 2004	• Request to Approve Rulemaking for a Coastal Enterococci-Based Bacteriological Water Quality Standard • Request for Approval of the Coastal Habitat Protection Plan's Annual Report • Update on Benthic Criteria for Swamp Streams • Update on Development of Nutrient Allocation Scenarios for Phosphorous and Nitrogen Reduction to Jordan Lake	• Request to Proceed to Public Hearings with Rulemaking for a Coastal Enterococci-Based Bacteriological Water Quality Standard • Request for Approval of the Proposed Reclassification of a Section of Richland Creek to Class Trout (Tr) • Approval of a Local Permit Program for the City of Monroe in Accordance with NCGS 143-215.1(f)
Aug 2004	• No meeting scheduled.	• No meeting scheduled.
Sep 2004	• Request for Consideration of Delegation of the Neuse and Tar-Pamlico Rivers Riparian Area Protection Rules to Pitt County, NC • Request for Approval to take the Draft French Broad River Basin Plan to Public Meetings • Request for Approval of the Final Catawba River Basin Plan • Request for Approval of 11 Local Programs Implementing the Tar-Pamlico Stormwater Rule	• Request for Consideration of Delegation of the Neuse and Tar-Pamlico Rivers Riparian Area Protection Rules to Pitt County, NC • Request for Approval of the Final Catawba River Basin Plan • Request for Approval of the Proposed Reclassification of a Critical Area on the Rocky River for the New Siler City Dam.
Oct 2004	• Request for Approval of a Nutrient Management Strategy and Compliance Schedule for Jordan Lake	• Request for Approval of a Nutrient Management Strategy and Compliance Schedule for Jordan Lake
Nov 2004	• No meeting scheduled.	• No meeting scheduled.

NORTH CAROLINA GENERAL ASSEMBLY
LEGISLATIVE SERVICES OFFICE
2129 STATE LEGISLATIVE BUILDING
RALEIGH 27603-5925

GEORGE R. HALL, JR.
LEGISLATIVE SERVICES OFFICER

LEGISLATIVE SERVICES OFFICE
TELEPHONE: (919) 733-7044
FAX: (919) 715-2739

September 15, 2004

MEMORANDUM

TO: NC General Assembly Members
Legislative Staff

FROM: George Hall

SUBJECT: Flu Shots

Flu shots will be offered at no charge to Legislative Members and Staff on Friday, October 1, 2004, from 11:30 am to 12:45 pm in Room 1228 State Legislative Building.

October 1 is the only date the shots will be given. Because they are being offered at no charge, the shots are for legislators and current staff only - no family members please. Please e-mail Beverly Adams if you plan to receive a flu shot so that adequate medical staff and vaccines will be available.

Attached is a form provided by MEDFIRST that should be completed and brought with you to Room 1228 to receive your vaccination. It will be helpful if you wear something that will allow easy access to the shoulder site for injection. The cut off time of 12:45 pm will be strictly adhered to because MEDFIRST staff have other State Government vaccine sites on the same date.

Supervisors, please make sure all current staff are aware of the shots. Thank you.

PATIENT INFORMED CONSENT FOR ONSITE FLU SHOTS

INFLUENZA - "The Flu": Influenza is a contagious viral infection that may cause fever, chills, headache, muscle aches, cough and sore throat. This disease usually lasts for several days to a week or more with complete recovery in usual cases. However, complications may lead to pneumonia or death in some people.

It is not possible to estimate the risk of an individual getting the flu this year. The elderly, people with diabetes, heart, lung or kidney disease can have serious complications from the flu.

THE VACCINE: An injection of the flu vaccine will NOT give you the flu because the vaccine is made from killed viruses. The vaccine is made from viruses selected by the US Public Health Service for Disease Control. In most cases the vaccine provides protection for a period of about nine months.

RISKS AND POSSIBLE SIDE EFFECTS: Side effects from the influenza vaccine are generally mild in adults and occur at low frequency. These reactions consist of tenderness at the injection site, fever, chills, headache, or muscle aches. These symptoms may last for about forty-eight hours, and can be treated with aspirin-free products such as acetaminophen ("Tylenol"). If concerning symptoms develop after receiving the vaccine, contact your physician.

SPECIAL PRECAUTIONS: Children under three years of age and pregnant women should consult with their personal physician before receiving the vaccine.

Persons who are allergic to eggs, chickens, chicken feathers, or chicken dander should not receive this vaccine until they have consulted their personal physician. Persons with a history of Guillian-Barre Syndrome (a neurologic disorder) should not receive the vaccine.

Persons with fever should not receive this vaccine until fever is resolved and they have been cleared by their personal physician. Persons who have received another type of vaccine within the past fourteen days should see their personal physician before receiving this vaccine.

If you have a reaction, contact your personal physician immediately. Lot # U1379AA

If you have any questions, please ask prior to receiving the vaccine. Exp. Date 6/30/05

.....

I have read the above information and have had an opportunity to ask questions. I understand the benefits and risks associated with the vaccine. I request to receive the vaccine and release from any liability MEDFIRST, INC. any associated staff member or employee of MEDFIRST and the company that may be providing for the vaccine, including but not limited to any illness, loss of time or other side effects which may result from administration of the vaccine.

Fill out and sign below for ONSITE VACCINATION

_____ _____

Name (Please print) Date

_____

Company or Organization Name

_____

Telephone Number

Signature_____

NORTH CAROLINA GENERAL ASSEMBLY
LEGISLATIVE SERVICES OFFICE
2129 STATE LEGISLATIVE BUILDING
RALEIGH 27603-5925

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Fill out and sign below for ONSITE VACCINATION

_____ _____

Name (Please print) Date

_____

Company or Organization Name

_____

Telephone Number

Signature_____

Annual Report from the Basinwide Planning Program

For the Period of October 1, 2003 through September 30, 2004

I. Progress in Developing and Implementing Basinwide Water Quality Plans

A. Public Outreach/Involvement

The Basinwide Planning Program finalized the first cycle of basin plans in May 1998. The second cycle of plans was completed in March 2003. The third cycle of basinwide water quality plans has begun, with the finalization and Environmental Management Commission approval of the *Neuse (July 2002), Lumber (December 2003) and Tar-Pamlico (March 2004) River Basinwide Water Quality Plans*. Completion of the remaining third cycle of plans is well underway for the Catawba, French Broad, and Cape Fear river basins. Activities related to gathering formal public input on the basinwide plans during October 2003 through September 2004 are presented below.

River Basin	Plans Approved by Environmental Management Commission	Public Workshops	Public Meetings
Tar-Pamlico	March 2004		December 2003 (4)
Lumber	December 2003		
Catawba	September 2004	October 2003 (3)	July 2004 (3)
French Broad		November 2003 (4)	
New		April 2004 (1)	
Cape Fear		May 2004 (5)	
TOTAL	**3**	**13**	**7**

B. Coordination and Collaboration Activities Related to Basinwide Planning Implementation

Many additional activities have occurred over the past year that are not tied to a specific basin, but rather can be applied to the program as a whole. Some of the more significant activities are as follows.

- In an effort to ensure Basinwide Plan implementation and to increase coordination among Division of Water Quality staff and other agencies, meetings to discuss implementation needs are held every six months for each river basin. At least one meeting has been held with each regional office staff during this reporting period to discuss the Implementation Packet for each river basin covered by the regional office. Central office staff from various units either attend these meetings with Basinwide staff, or further coordination is conducted with central office staff as follow-up to the meetings. Additional meetings are conducted with other agency personnel and local watershed organizations as needed to discuss specific management strategies and to assess progress being made to implement these strategies. These meetings are also used as an opportunity to share more information and jointly develop appropriate management strategies to address specific problems.

- Basinwide staff coordinate with the Ecosystem Enhancement Program staff on prioritization of targeted watersheds, getting input from local resource professionals, and using information within the Phase I watershed scoping documents.
- Staff coordinate with state, federal and local agencies to obtain information pertinent to the basinwide plans, increasing the level of coordination and communication with these agencies and their participation in the development of basinwide plans. Discussions between the Basinwide Planning Program and the NC divisions of Soil and Water Conservation, Environmental Health, Coastal Management, Water Resources, and Marine Fisheries, as well as the Wildlife Resources Commission and US Fish and Wildlife have occurred as a means of improving communication, sharing information and ensuring appropriate information is presented in the basin plans.
- Basinwide information was provided to applicants for Clean Water Management Trust Fund and Section 319 and 205(j) grants. Basin planners also provide technical reviews of applications.
- Basinwide plans, notices of public input opportunities, a river quiz and other relevant information to the basinwide planning program are updated on the Web site to provide interested parties with more access to information (see http://h2o.enr.state.nc.us/basinwide/).
- Over 778 people have attended the twenty-three public workshops for the third cycle (includes the seven basins where third cycle planning has begun) and over 305 people attended the third cycle of public meetings (includes four basins where third cycle plans have been developed).
- Basinwide staff continues to coordinate with the Classifications & Standards Unit and other federal and state agencies to develop management strategies for threatened and endangered species per DWQ rule.
- Basinwide staff continues to work with US Geologic Survey, NC Department of Transportation (NCDOT) and the Center for Geographic Information and Analysis in development of 1:24,000 National Hydrography Data (NHD) for North Carolina. Methods continue to be developed and tested to incorporate water quality and NCDOT data onto the NHD. The NHD will be a necessary data layer for submittal of future 303(d) impaired waters lists to the Environmental Protection Agency.
- Basinwide staff continues to develop information and improve skills related to Geographic Information System procedures. The result of these efforts will increase proficiency in use support mapping and analysis.
- Basinwide staff continues to enhance procedures, methods and database implementation pertaining to use support decisions on water quality status.
- Solicitation for water quality information from outside sources for the Roanoke, White Oak, Savannah, Watauga, Hiwassee and Little Tennessee river basins was conducted in 2003. This activity entails mailing a flyer to all persons on the mailing list database for these basins, including NPDES dischargers.
- Staff conducted public input phase for developing draft basinwide water quality plans for the Tar-Pamlico, Catawba, French Broad, New and Cape Fear River basins. Over 614 people attended. This activity entails many presentations and meetings with other state and federal agency staff, local watershed groups, NPDES discharger coalitions, local governments, etc.
- Staff prepared draft plans for public review for the Tar-Pamlico and Catawba River basins. This activity entails conducting data analysis and making use support decisions based on all available information, obtaining public input as noted in above, preparing text and maps by subbasin identifying watershed level water quality problems and potential solutions.
- Staff conducted public review and comment phase on the Tar-Pamlico and Catawba River basins. Over 312 people attended. This activity entails mailing notices of the availability of the draft plan on-line or by hard copy, meeting with various interested parties as noted above,

editing the plan to reflect the comments as needed, and conducting final preparation of the plan for approval by the Environmental Management Commission.

- Staff continues to coordinate with river basin coalitions and watershed groups to identify high priority waters and issues of relevance to that group, and identify potential means to address the issues. This activity entails providing technical assistance and guidance on water quality initiatives developed and implemented at the local level.
- Staff continues to participate in FERC hydropower relicensing negotiation efforts for the Catawba and Yadkin-Pee Dee River basins. This activity entails ensuring that water quality conditions in the basin are maintained or improved as a result of relicensing activities.
- Staff have begun to review and provide comments to the Division of Coastal Management staff on land-use plans.

C. Some Plan Development and Implementation Activities Related to Specific River Basins

The following bullets, by basin, present some of the more significant activities and accomplishments over the past year to achieve the goals of the Basinwide Planning Program. The program had one of four basin planner positions vacant for much of this reporting period due to inability to fill the position.

Cape Fear River –

- Continued to work with the Basin Discharger Coalitions in development of projects and coordination with basinwide planning efforts.
- Participate in modeling and Total Maximum Daily Load (TMDL) meetings with stakeholders in lower Cape Fear, Haw River/Jordan Reservoir and Durham.
- Participated in Conservation Resource Enhancement Program meeting to discuss nutrient impacted waters.
- Conducted two sets of Implementation meetings with DWQ staff.
- Participated in Cape Fear River Assembly and Division of Water Resources hydrologic model update.

Catawba River –

- Participate in quarterly meetings of the Catawba River Bi-State Task Force, often providing a presentation on status of Catawba River Basinwide issues.
- Provide input to the Catawba River Bi-State Task Force by serving on the Executive Committee.
- Participating in monthly meetings with DENR agency staff and other stakeholders and Duke Power representatives to explore the potential for, and develop a process for, a Federal Energy Regulatory Commission (FERC) relicensing settlement agreement. Program supervisor, basin planner and regional office staff person participate in the State Relicensing Team or Local Advisory Group. Staff works with the agencies and Duke Power to develop study plans to assess the impacts of hydropower operations on water quality, wetlands and aquatic habitat. Studies are underway and expected to be completed in the coming year. Additional studies may be identified as needed next year. A 401 Certificate is required by DWQ and the FERC for renewing the expiring hydropower license. The new license will be a 30 or 40-year license.
- Completed and received EMC approval on the third cycle basinwide plan in September 2004.
- Began process to develop strategy to reverse impairment to Lake Rhodhiss. Parties involved include Western Piedmont COG, Carolina Land and Lakes RC&D, SWCD, DENR, etc.

Chowan and Pasquotank Rivers –

- Held one set of Implementation meetings with DWQ staff.
- Participated in Submerged Aquatic Vegetation (SAV) meetings with several state and federal agencies to develop a SAV monitoring plan. These efforts also include development of a Memorandum of Understanding for cooperative monitoring, restoration, and research concerning SAV habitat in coastal North Carolina.
- Reviewed and commented on county and municipal Coastal Area Management Act land use plans.
- Presented basin information to the Dare County Water Quality program staff.

Little Tennessee River –

- Coordinating Nonpoint Source Team of local, state and federal agencies and local watershed organizations to conduct education and demonstration projects in the basin.
- Worked with several professors at Western Carolina University to disseminate information and give presentations to students about water quality and state government jobs.
- Serving on the technical advisory board for the Little Tennessee Watershed Association.
- Working with the Wildlife Resources Commission and US Fish & Wildlife Service on strategies to improve and sustain water quality to protect federally-listed mussel and fish species in the basin.
- Work with Watershed Association of the Tuckasegee River to develop a community based restoration effort on Greens and Savannah creeks.
- Serve as a technical advisor to the newly formed Graham County Revitalization Economic Action Team.
- Assisting three volunteer watershed associations to develop local action plans.
- Conducted two sets of Implementation meetings with DWQ staff.

Hiwassee –

- Jointly produced two sediment and erosion control/permitting for developers workshops with Hiwassee River Watershed Coalition (HRWC) and Soil and Water Conservation District.
- Serve on technical advisory board for HRWC.
- Active member on the Hiwassee Interagency Team. The team is working to enhance communication and coordination between states, hydropower operations, and watershed associations.
- Conducted two sets of Implementation meetings with DWQ staff.

Lumber River –

- Finalized the third cycle basinwide plan in December 2003 and received EMC approval.
- Conducted two sets of Implementation meetings with DWQ staff.
- Coordinated with National Resource Conservation Service, Soil and Water Conservation District offices and the Conservation Resource Enhancement Program coordinator regarding priority areas in the basin.
- Coordinated with the Lumber River Council of Governments regarding raising public awareness and identifying appropriate groups and agencies to aid in this effort.

Neuse River –

- Participated in Upper Neuse River Basin Association technical advisory committee for stream mapping protocols and Watershed Evaluation Tool to be used by local governments.
- Conducted two sets of Implementation meetings with DWQ staff.

Roanoke River –

- Participating heavily in Army Corps of Engineers (ACE) Section 216 study for the John H. Kerr Reservoir. Responsibilities include representation on several technical task groups including team leadership at meetings with multiple state and federal agencies and interest groups. Tasks have also included development of a Scope of Work for the Water Quality Task Group for monitoring and modeling efforts. The Section 216 is a collaborative study with the states of North Carolina and Virginia and the ACE to conduct a comprehensive evaluation on impacts to the Roanoke River downstream from the Roanoke Rapids Dam. The study is composed of three phases. Phase One, the feasibility phase, is composed of several tasks such as gathering and evaluating existing relevant data, identifying gaps in the existing relevant data, and identifying and evaluating existing methods and tools for study of the subject. Phase One, scheduled for twelve months, is near completion. Phase Two, the design phase, will begin after the feasibility phase and is scheduled for 24-36 months. Phase Three, the construction phase, will begin after the design phase and is scheduled for 24 months.
- Representation on weekly communications with the ACE and relevant agencies regarding flood control releases and subsequent flow reductions from J.H. Kerr Reservoir as they pertain to dissolved oxygen levels on the Roanoke River.
- Conducted two sets of Implementation meetings with DWQ staff.

Tar-Pamlico River–

- Conducted two Implementation meetings with DWQ staff.
- Participated in Upper Tar River collaboration effort with the Division of Soil and Water Conservation, National Resources Conservation Service, Conservation REP, Division of Forest Resources, Wildlife Resources Commission and Tar River Land Conservancy to identify and coordinate water quality target project areas and resources.
- Advised Wildlife Resources Commission, Natural Heritage Program, and US Fish and Wildlife Service staff in development of endangered species management plans for watersheds in the upper portion of the basin and the lower Swift Creek Watershed.

White Oak River –

- Presented DWQ use support assessment methods for shellfish waters to NC Coastal Federation shellfish conference.
- Presented and participated in water quality restoration strategies with the New River Round Table, including the City of Jacksonville, Marine Corps Base Camp Lejeune, Division of Soil and Water Conservation, Natural Resource Conservation Service, Cooperative Extension Service, and UNC-Wilmington.
- Conducted two Implementation meetings with DWQ staff.

Yadkin-Pee Dee River –

- Participating in monthly meetings with DENR agency staff and other stakeholders, along with Progress Energy and Yadkin, Inc. (APGI) representatives to explore the potential for, and developing a process for, Federal Energy Regulatory Commission (FERC)) relicensing settlement agreements for both hydropower facilities.

QUARTERLY REPORT

TO THE

ENVIRONMENTAL REVIEW COMMISSION

ON

ENVIRONMENTAL MANAGEMENT COMMISSION ACTIVITIES

October 2004

YEAR 2004 – 2005 FIRST QUARTER REPORT TO ERC

I. Quarterly Report On **Air Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

II. Quarterly Report On **Ground Water Quality** Activities

A. Future EMC And Committee Agenda Items

III. Quarterly Report On **Surface Water Quality** Activities

A. Major EMC Agenda Items During Quarter

B. Future EMC And Committee Agenda Items

I. AIR QUALITY ACTIVITIES

Agenda Item: Response to Objections by the Rules Review Commission on Several Air Quality Rules

Explanation: At its May meeting, the Rules Review Commission (RRC) objected to four rules: 15A NCAC 2D .0902 and .1904 and 2Q .0706 and .0714.

On March 11, 2004, the Environmental Management Commission (EMC) adopted an amendment to the volatile organic compound applicability rule (15A NCAC 2D .0902). The amendment changed the laboratory exemption to make it consistent with the permit exemption for laboratories. The RRC objected to this rule on the grounds of ambiguity. The applicability statements in this rule appear to conflict with each other and with applicability statements in various rules in this section.

In response to the objection, a new paragraph is being added that states volatile organic compound rules apply only according to the provisions specifically set out in the applicability rule. A redundant paragraph, which seems to add more confusion than clarity, is being removed. Also, the exemptions are being moved from the last paragraph to the second paragraph.

On April 8, 2004, the EMC adopted amendments to the air curtain burner rule (15A NCAC 2D .1904). The amendments require operation of air curtain burners to cease when an ozone action day code orange status or above is forecast. The language requiring a prevention of significant deterioration review is modified. The necessity for temporary air curtain burners to have a certified visible emission reader on-site during operation is removed. The opacity limit is changed from 5 percent to 10 percent. Other clarifications and changes have also been made. The RRC objected to this rule on the grounds of ambiguity and legal authority. It is not clear who is to certify onsite visible emissions readers, and no authority is cited to set occupational requirements for such readers.

In response to this objection, the procedures in 40 CFR Part 60, Method 9 for certifying visible emissions readers are incorporated by reference. Also, the federal rule that requires certified visible emissions readers to be used to read visible emissions from air curtain burners is added to the statutory authority part of the history note.

On April 8, 2004, the EMC adopted amendments to the air toxics permit modifications rule (15A NCAC 2Q .0706) to treat insignificant activities the same way activities exempted from permitting are treated. The RRC objected to this rule on the basis of ambiguity. It is not clear what toxic air pollutants have been identified by the Director as significantly increasing the risk to

human health, or conversely, what standards are to be used by the Director to identify the pollutants.

In response to this objection, the phrase "significantly increase the risk to human health" is replaced by "cause an acceptable ambient level in 15A NCAC 2D .1104 to be exceeded." The phrase "increase of risk to human health" is replaced with "impacts on ambient levels for air toxics." The replacement language is similar to that used in 15A NCAC 2Q .0712, Calls by the Director. (This rule authorizes the Director to require an air toxic evaluation and permit for any source of air toxics regardless of any exemption or other provision of the air toxic rules if he finds unacceptable risk to human health based on the acceptable ambient levels.)

On April 8, 2004, the EMC adopted rule 15A NCAC 2Q .0714, Wastewater Treatment Systems at Pulp and Paper Mills. This rule requires pulp and paper mills to measure emissions and their ambient impacts for their wastewater treatment systems. The RRC objected to this rule on the basis of ambiguity. No standards are given for the Director to use in approving estimation methods or factors.

In response to this objection, criteria have been added for the Director to use in approving estimation methods or factors.

The Rules Review Commission staff's recommendations for the objections to these rules, which the Rules Review Commission adopted, are attached. Also, attached are revised rules responding to the objections.

Recommendation: The Director recommends that the Commission adopt the revised rules in response to the Rules Review Commission's objection.

EMC ACTION: EMC adopted revised rules.

Agenda Item: Request to Proceed to Public Hearing on the Adoption of Heavy-Duty Diesel Vehicle Requirements for Model Year 2008 and Beyond.

Explanation: One or more public hearings will be set to consider the adoption of heavy-duty diesel vehicle requirements for model year 2008 and beyond.

15A NCAC 2D .1009, Model Year 2008 and Subsequent Model Year Heavy-Duty and Medium-Duty Diesel Vehicle Requirements, is proposed to be adopted to ensure that benefits from the federal standards for 2007 and later model year heavy-duty diesel engines and vehicles will be realized. In 2001 the U.S. EPA promulgated a final rule to reduce emission standards for 2007 and subsequent model year heavy-duty engines and vehicles. The emission standards represent a 90% reduction of nitrogen oxides (NOx) emissions, 72% reduction of non-methane hydrocarbon (NMHC) emissions, and 90% reduction of particulate matter (PM) emissions compared to the federal 2004 emission standards. The effect of the regulation is comparable to that of the regulations that first required the use of catalytic converters on gasoline-fueled automobiles and light-duty trucks in the mid 1970's.

As a result of various lobbying pressures, there is concern that EPA may delay or weaken its 2007 model year standards and that without adopting these standards, maintenance of the ambient air standards will be problematic. In 2007 mobile sources contribute approximately 55% of the overall NOx emissions inventory on an average summer weekday and 57% of those NOx emissions result from heavy-duty diesel vehicles. Continuation of lower emission standards for these vehicles is an essential part of the State's strategy to maintain compliance with the ozone NAAQS in future years.

Under the Clean Air Act, California is the only state that may develop its own vehicle standards. However, through Section 177 of the Clean Air Act, other states may adopt California's vehicle standards. California adopted amendments to its.standards harmonizing its rule with the federal 2007 rule for heavy-duty vehicles. The requirements became effective in November of 2002.
Several states are pursuing adopting the California heavy-duty engine and vehicle standards for 2007 and later model years as a contingency in the event that EPA delays or weakens its 2007 model year standards. The rule is proposed for adoption at this time because under

the requirements of the CAA, manufacturers must be provided two years lead time in advance of the model year. EPA defines model year such that a model year 2007 vehicle or engine could be produced as early as January 2, 2006. In order to provide two years lead time as required by the Act, emission standards for model year 2007 vehicles would have to have been effective before January 2, 2004. Thus, to meet the two year lead time requirement, the earliest model year to which the North Carolina rule could apply at this time is model year 2008.

The proposed rule requires that model year 2008 and later model year heavy-duty diesel vehicles and medium-duty diesel vehicles or engines be certified by the California Air Resources Board (CARB) as meeting its model year 2007 and subsequent model year heavy-duty diesel emissions standards in order to be sold, leased, or registered in North Carolina. Because the model year 2007 standards for heavy-duty diesels are a crucial part of the State's plan to attain and maintain the ozone standard, their adoption via the California rule as a contingency is needed to ensure that their benefits remain in place.

Recommendation:

The Director recommends that the Commission authorize a public hearing(s) on these items and that the Chairman appoint a member(s) of the Commission to serve as hearing officer(s).

EMC ACTION: EMC approved proceeding to public hearing.

Future EMC and Air Quality Committee Agenda Items

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Oct 04	-Revision of Portable Generator Permit Exemption (420) -Elimination of an Unnecessary Reporting Requirement (421) -Clarification of Storage Tank Permit Exemption for Ethanol-Based Fuels (422) -Clarification of Transportation Conformity Rules (423)		Adoption -Assuring Compliance with Heavy Duty Diesel Engine Standard for Model Year 2007 (418)
Dec 04		-Amend Definition of AApplicable Requirement@ to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify When a Modification Must Be in Compliance	Adoption -Change Daily Opacity Exceedances for COM from 10 to 4 in 2D .0521 (417) -Correct Testing Date for CISWI (413) -Correct Cross-Reference in 2D .0519 (391) -Portable Crushers (385) -Correct Cross-Reference in 2D .1208 (389) -Clarification of Facility Permit Exemption in 2Q .0102 (402) -Incorporate Alternative Monitoring Procedures in 2D .0600 and .0608 (398) -Clarify That Transportation Facility Rules Apply Only to Carbon Monoxide (394) -Repeal of 2D .0803 (395) -Clarify When an Acceptable Ambient Level Should Be Changed in a Permit (396) -Change Emergency Generator Exemption in 2Q .0102 (388) -Small Wood Fire Boiler Permit Exemption (285) -Exempt NSPS Dry Cleaners from Permitting (366) -Correction and Clarification in 2Q .0102 (375) -Exempting Space Heaters From Permitting (379) -Correction for Calculating Emissions for 10 Irritant Toxic Air Pollutants to Determine if a Permit Is Needed (386) -To Revise PSD Rule (393)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
		with the Air Toxic Rules (397) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Update Address in 2D .0103 (392)	
Dec 04 cont.		-Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405) -Correct Washington Regional Office Address in 2D .1905 (410) -Make Emission Inventory Part of Permit Application (411) -Leaks at Gasoline Terminal Clarification (412) -Implementation of New Authority: Banking and Trading and Credit for Early Reductions (323c) -Open Burning (419) -Revision of Portable Generator Permit Exemption (420) -Elimination of an Unnecessary Reporting Requirement (421) -Clarification of Storage Tank Permit Exemption for Ethanol-Based Fuels (422) -Clarification of Transportation Conformity Rules (423) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Revision of Ranking of Incinerators in 2D .1201 (403)	
Feb 05			-Amend Definition of AApplicable Requirement@ to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			Mills (325) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408)
Feb 05 cont.			-Intent to Construct (409) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397) -Provide Option for Missing Data Requirements in 2D .1404 (399) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Revision of Ranking of Incinerators in 2D .1201 (403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405) -Correct Washington Regional Office Address in 2D .1905 (410) -Make Emission Inventory Part of Permit Application (411) -Leaks at Gasoline Terminal Clarification (412) -Implementation of New Authority: Banking and Trading and Credit for Early Reductions (323c)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
			-Open Burning (419) -Revision of Portable Generator Permit Exemption (420) -Elimination of an Unnecessary Reporting Requirement (421) -Clarification of Storage Tank Permit Exemption for Ethanol-Based Fuels (422) -Clarification of Transportation Conformity Rules (423)
Apr 05 Apr 05 cont.		-Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)	Adoption -Amend Definition of AApplicable Requirement@ to add reference to 2D .900,.1400, and .1200 (334) -Implementation of New Authority I/M Codes (323a1) -Implementation of New Authority sales and service of analyzers (323d) -Reporting Requirements Conform with General Statutes (361) -Permit Exemption for County Grain Elevators and Mills (325) -Replace 08/17/71 Method 5 with Method 202 in Rule .0501(c)(3) and Stack Testing (100, 297) -Stack Testing (148a) -Particulate Emissions from Spray/Finish Booths and Woodworking (21, 68) -Glass Melting Furnaces (328) -General Fugitive Dust Control (276) -Definition of Administrator (406) -Permit Exemption for Asphalt Cement Storage Tanks (407) -Compliance Certification for Title V Permits (408) -Intent to Construct (409) -Exclusionary Rule for Air Curtain Burners (387) -Clarify Crusher Requirements to Use Wet Suppression at All Times (313) -Revision of Small Definitional Level for Peak Shaving Generators (371) -Clarify When a Modification Must Be in Compliance with the Air Toxic Rules (397)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Apr 05 cont.			-Provide Option for Missing Data Requirements in 2D .1404 (399) -Clarification of Perchloroethylene Dry Cleaners Exemption in 2Q .0702 (367) -Update Address in 2D .0103 (392) -Correction of Definition of Actual Emissions in 2Q .0202 (401) -Revision of Ranking of Incinerators in 2D .1201 (403) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405) -Correct Washington Regional Office Address in 2D .1905 (410) -Make Emission Inventory Part of Permit Application (411) -Leaks at Gasoline Terminal Clarification (412)-Implementation of New Authority: Banking and Trading and Credit for Early Reductions (323c) -Excluding Trades Under the Nitrogen Oxide Budget Trading Program from 2Q .0523 (405) -Open Burning (419) -Revision of Portable Generator Permit Exemption (420) -Elimination of an Unnecessary Reporting Requirement (421) -Clarification of Storage Tank Permit Exemption for Ethanol-Based Fuels (422) -Clarification of Transportation Conformity Rules (423)
May 05			Hearing Request -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
July 05			Adoption -Revision of AAL for Carbon Tetrachloride (376) -Distributed Power Generation Using Diesel and Other Fuels (347) -Revise AAL for 1,3-Butadiene and Carbon Tetrachloride (299) -AAL for MDI, DI, Acrylamide, Chromium VI (124) -Boilers and Industrial Furnaces Burning Hazardous Waste (330)
Sept 05		-Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility@ and ASynthetic Minor Facility@ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)	
Oct 05			Hearing Request -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility@ and ASynthetic Minor Facility@ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356)

MONTH	AQC CONCEPTS	AQC DRAFT RULES	EMC ACTION
Dec 05			-Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404) <u>Adoption</u> -Replacement of SIC with NAICS in the Air Toxic Rules (369) -Change Definition of ASmall Facility@ and ASynthetic Minor Facility@ -Commence Construction and Operation -Elimination of 40% Opacity (349) -Good O&M Maintenance (302) -Mercury Emissions from Combustion Sources (356) -Exempt Air Curtain Burners from Air Toxic Rules (364) -Removal of Permit Exemption for Incinerators (315) -Higher Allowable Particulate Emission Rate for Small Wood Fired Indirect Heat Exchangers (286) -Deletion of Facility-Wide Language in VOC Permit Exemption (370) -Revision of Wording of Monitoring Requirements in Several Incinerator Rules (382) -Allowing Ambient Monitoring for Air Toxic Compliance Determination (404)

II. GROUNDWATER ACTIVITIES

GROUNDWATER GWC / EMC FUTURE AGENDAS*

	Committee Agenda	EMC Agenda
Oct 2004	> DWQ-GROUNDWATER ITEM< 1. Status of Hearing Officers Report for the Proposed Rulemaking to Amend 33 Groundwater Quality Standards in 15A NCAC 2L .0202. 2. Presentation of the Process to Revise and Establish Groundwater Quality Standards under Title 15A NCAC 2L .0202 > DWM- SUPERFUND SECTION ITEM< 1. Initiation of Rulemaking for the Dry-Cleaning Solvent Cleanup Act Program to Establish a Risk-Based Approach to Addressing Contaminated Sites	No items scheduled for this meeting
Dec 2004	> DWM-UST SECTION ITEMS< 1. Information on Legislation for Secondary Containment for Non-Tank Components of a UST System with a Request to Proceed with Public Notice and Hearing. 2. Approval to Proceed to Public Notice and Hearing on Proposed Rules to Modify the Testing Requirements Under Title 15A NCAC 2L .0115. > DWQ-GROUNDWATER ITEMS< 1. Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.	No items scheduled at this time

	2. Underground Injection Control Presentation on Aquifer Storage and Retrieval (ASR) with a Discussion of ASR in other States.	
Feb 2005	<u>> DWQ-GWS ITEMS <</u> 1. Request to Proceed to Public Notice and Hearing on Revisions to the Carbon Fraction Classes and Ten Substances in 15A NCAC 2L .0202. 2. Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202. 3. Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards. <u>> DWM- SUPERFUND SECTION ITEM<</u> 1. Request to Proceed to Public Notice and Hearing for Implementation of New Rules from the Dry-Cleaning Solvent Cleanup Fund Program.	<u>> DWM-UST SECTION ITEMS<</u> 1. Information on Legislation for Secondary Containment for Non-Tank Components of a UST System with a Request to Proceed with Public Notice and Hearing. 2. Approval to Proceed to Public Notice and Hearing on Proposed Rules to Modify the Testing Requirements Under Title 15A NCAC 2L .0115. <u>> DWQ-GROUNDWATER ITEM<</u> 1. Request to APPROVE Changes to 33 Groundwater Quality Standards in 15A NCAC 2L .0202.

*Dates shown are projections. Actual schedules could vary 1-3 months either direction.

	Committee Agenda	EMC Agenda
Mar 2005	No items scheduled at this time	<u>> DWQ-GWS ITEMS <</u> 1. Request to Proceed to Public Notice and Hearing on Revisions to the Carbon Fraction Classes and Ten Substances in 15A NCAC 2L .0202. 2. Request to APPROVE a Change to the MTBE Groundwater Quality Standard in 15A NCAC 2L .0202. 3. Request to APPROVE Changes to Arsenic and Chromium Groundwater Quality Standards. <u>> DWM- SUPERFUND SECTION ITEM<</u> 1. Request to Proceed to Public Notice and Hearing for Implementation of New Rules from the Dry-Cleaning Solvent Cleanup Fund Program.
Apr 2005	<u>> DWQ-GWS ITEMS <</u> 1. Request to APPROVE Nine New Groundwater Quality Standards. 2. Request to APPROVE Changes to Eleven Groundwater Quality Standards.	No items scheduled at this time
May 2005	<u>> DWM-UST SECTION ITEMS<</u> 1. Request to APPROVE Amendments to the Secondary Containment Requirements for Non-Tank Components of a UST System.	<u>> DWQ-GWS ITEMS <</u> 1. Request to APPROVE Nine New Groundwater Quality Standards.

	2. Request to APPROVE Proposed Rules to Modify the Testing Requirements Under Title 15A NCAC 2L .0115.	2. Request to APPROVE Changes to Eleven Groundwater Quality Standards.
July 2005	<u>> DWM- SUPERFUND SECTION ITEM<</u> 1. Request APPROVE New Rules from the Dry-Cleaning Solvent Cleanup Fund Program. <u>> DWQ-GWS ITEM <</u> 1. Request APPROVAL for Revisions to the Carbon Fraction Classes and Ten Substances in 15A NCAC 2L .0202.	<u>> DWM-UST SECTION ITEMS<</u> 1. Request to APPROVE Amendments to the Secondary Containment Requirements for Non-Tank Components of a UST System. 2. Request to APPROVE Proposed Rules to Modify the Testing Requirements Under Title 15A NCAC 2L .0115.

*Dates shown are projections. Actual schedules could vary 1-3 months either direction. Text shown in ***bold and italic type*** are ACTION ITEMS. Note that other items may be added as the year progresses.

Agenda Item: Presentation of the WQC's Recommendation on a Petition for Rulemaking to Reclassify the Catawba River's Bridgewater Dam Tailwater to Trout (Tr)

Explanation: In April 2004 the Division received a Petition for Rulemaking package from the Southern Environmental Law Center (SELC). This package, which was submitted in accordance with 15A NCAC 2I. 0500, petitioned the EMC to initiate rulemakings proceedings to add the Trout (Tr) supplemental classification to a portion of the Catawba River from the Bridgewater (Linville) Dam to the City of Morganton water intake. In accordance with the requirements of 2I .0500 this petition for rulemaking was reviewed by the Water Quality Committee on July 7, 2004 and a recommendation regarding the disposition of the petition request was developed by the Committee. As mandated in 2I .0503, the WQC Chairman will now present the WQC's recommendation to the full Commission for its consideration.

Recommendation: That the Commission approve the WQC's recommendation regarding the SELC's Petition for Rulemaking.

EMC ACTION: **The EMC denied the petition to initiate rulemaking to add the supplemental Trout (Tr) classification to the subject waters. This denial was based on the fact that the waters are included in a larger watershed that is currently involved in the Federal Energy Regulatory Commission (FERC) relicensing process. However, the EMC did direct DWQ Staff to return to the WQC in May 2005 and the Fall of 2006 so that the WQC and EMC may revisit this issue as the relicensing process unfolds.**

Agenda Item: Request for Permission to Proceed to Public Hearing(s) with Proposed Water Quality Standards for Enterococcus for Coastal Waters as Required by the BEACH Act

Explanation: Revision to the State's water quality standard for bacteria in coastal waters is mandated by the federal Beaches Environmental Assessment and Coastal Health Act (BEACH Act). The BEACH Act requires North Carolina to implement a bacteriological water quality standard with enterococci as the indicator organism for its coastal recreational waters. North Carolina's existing bacteriological standard for coastal waters utilizes a fecal coliform indicator. The BEACH Act deadline for the implementation of a coastal enterococci standard was in April of this year. North Carolina, along with all the other Region 4 coastal states, did not meet this deadline primarily due to a lack of final implementation guidance from the EPA. Accordingly, EPA is commencing promulgation proceedings regarding the implementation of a coastal enterococci standard for all BEACH Act states, including North Carolina, that have not yet adopted this standard. If the standard proposed by Staff today becomes effective prior to the conclusion of the EPA promulgation procedures, EPA will cease its promulgation action. DWQ Staff is proposing the following bacteriological water quality standards for North Carolina's marine waters:

- For SB Waters: A geomean of 35 per 100 ml and a Single Sample Maximum of 104 per 100 ml (Apr 1 to Oct 31) and 500 per 100 ml (Nov 1 to Mar 31)
- For SC Waters: A geomean of 35 per 100 ml and a Single Sample Maximum of 500 per 100 ml year round.

The Division is proposing the use of enterococci for recreational use support in all of its SB and SC waters. The Division must retain the use of a fecal coliform indicator for Class SA waters due to applicable Food and Drug Administration criteria.

Recommendation: That the EMC approve the request to proceed to public hearing(s) with the proposed enterococcus water quality standard for water bodies classified SB and SC.

EMC ACTION: EMC voted to approve going to notice and public hearing to amend the standard according to the Federal requirements.

Agenda Item: Request for Approval of the Proposed Reclassification of a Section of Richland Creek (Haywood County, Little Tennessee River Basin) to Class Trout (Tr)

Explanation: The North Carolina Wildlife Resources Commission submitted a request to reclassify a portion of Richland Creek to Class Tr. The reason for the request was to protect the existing waters' trout populations. Subsequent water quality studies indicated that the proposed waters are eligible for reclassification to Tr.

In July and September 2002, the Water Quality Committee and the Commission, respectively, approved the request to proceed with rule-making for the proposed reclassification. A public hearing was held in April 2004 in Clyde, NC. Two verbal comments and two written comments were received that were in favor of the reclassification. The Hearing Officer's Report of Proceedings sent to the EMC includes further details.

Recommendation: The Hearing Officer recommends that the proposed reclassification be approved by the Commission. If reclassified as proposed, the effective date is estimated to be September 1, 2004.

EMC ACTION: The EMC voted to approve the reclassification of these surface waters to Class Trout (Tr).

Agenda Item: Approval of Local Permit Program for the City of Monroe in Accordance with NCGS 143-215.1(f) and NCAC 15A 2H .0218.

Explanation: The City of Monroe has requested approval to become a delegated authority to establish and administer a local permit program for the issuance of public gravity sewer extensions within their utility service area in lieu of these permits being issued by this Division. This will enable them to issue permits for the construction and operation of new gravity sewer lines, and modifications to proposed or existing gravity sewer lines within their service area that will be either developer donated to the City for ownership or constructed by the City themselves. The City has demonstrated that engineering, inspections staff and funding is available for the administration of this program. They have submitted their program documents that demonstrate compatibility with Division requirements. The ordinance has been approved by the Attorney General office staff as being in compliance with the statute. Quarterly reports will be submitted to the Division for review according to current policy.

All items submitted by the City of Monroe have met the requirements outlined for program delegation in NCGS 143-215.1(f) and NCAC 15A 2H .0218 and are in accordance with our most current policies for delegated programs.

Recommendation: It is the recommendation of the Division that the Commission approve the request from the City of Monroe for delegation of public gravity sewer extension permitting authority.

EMC ACTION: The EMC approved the request from the City of Monroe.

Agenda Item:

Request for Approval of the Proposed Reclassification of a Rocky River (Chatham County, Cape Fear River Basin) to Class Water Supply III (WS-III) Critical Area (CA)

Explanation:

The Town of Siler City submitted a request to reclassify a section of the Rocky River to WS-III CA. The reason for the reclassification is to allow a new dam structure to be placed below the existing dam. The new dam will significantly enlarge the existing small impoundment to an approximately 160-acre reservoir. The Town wishes to have the new dam constructed and the resulting reservoir created in order to meet water demands through 2030.

In May 2003, the Water Quality Committee and the Commission approved the request to proceed with rule-making for the proposed reclassification. Because a State 401 Water Quality Certification would be needed before the Town could be given a Federal 404 (Dredge and Fill) permit to build the new dam, a "duel purpose" hearing was held in November 2003 in Siler City. The hearing received comments on the water supply reclassification and on the 401 Certification. The report on the 401 Certification issue is being prepared by the Division of Water Quality staff and the Division Director will determine if a 401 Certification will be issued (anticipated by 9/9/04). That information will be passed on to the U.S. Army Corps of Engineers to use in their decision on whether to issue a 404 (Dredge and Fill) permit.

Of the 32 individuals who spoke, seven spoke in favor of the proposed reclassification, two spoke neither for nor against the reclassification, and 23 voiced sentiments against the proposed reclassification. Four hundred and twenty six letters were received during the comment period; nine letters were received in favor of the proposal and 417 letters were submitted against the proposal. Three hundred and sixty one of the 417 letters were signed copies of one of two templates. The template letters cited several reasons opposing the proposal, which DWQ staff subsequently thoroughly

investigated.

Recommendation: The Hearing Officers recommend that the proposed reclassification be approved by the Commission. This recommendation is contingent upon the Town of Siler City taking mitigative measures as well as the measures specified in the Commission's water supply watershed protection rules.

EMC ACTION: The EMC approved the Hearing Officers' recommendations for approval of the reclassification.

Agenda Item: Request for Approval of the Final Catawba River Basinwide Water Quality Plan

Explanation: The *Catawba River Basinwide Water Quality Plan* is in the third cycle of basinwide plans that the Division is preparing for all 17 of the state's major river basins.

The Water Quality Committee approved the draft Catawba River Basinwide Water Quality Plan in May 2004 to be taken to public meetings. Three public meetings were held throughout the basin in Dallas, Newton, and Marion in July/August 2004 with approximately 192 people in attendance. Revisions were made and some information was added to the draft plan based on comments. Copies of the revised plans were sent to EMC members in the EMC package.

This Basinwide Water Quality Plan is a planning document that will guide both the public's and the Division's management actions in this river basin over the next five years and beyond. The management actions are based on existing rules and policy. Therefore, approval and endorsement of this plan by the Commission would affirm that the management actions set forth in this plan are consistent with the rules adopted by the Commission and with the decision-making policies under which the Division has acted in the past.

Recommendation: It is recommended that the *Catawba River Basinwide Water Quality Plan* be approved and endorsed by the Commission as a guide to water quality program management and implementation by the Division of Water Quality as it carries out its Water Quality Program duties and responsibilities in this river basin.

EMC ACTION: The EMC approved the Catawba River Basinwide Water Quality Plan.

SURFACE WATER QUALITY WQC/EMC FUTURE AGENDAS*

	WQC Agenda	EMC Agenda
Oct 2004	• Request for Major Variance from Neuse Riparian Area for Novo Nordisk • Presentation of "In-Lieu" Fees Programs and Recommendations for Updates • Annual Agricultural Reports in Tar-Pamlico and Neuse River Basins • Update on Coastal Habitat Protection Plan	• Submittal of Annual Progress Reports on the Neuse and Tar-Pamlico Agricultural Rules
Nov 2004	• No meeting scheduled.	• No meeting scheduled.
Dec 2004	• Update on Rule Amendments to "Waste Not Discharged to Surface Waters" Rules (15A NCAC 2H .0200) • Request to Proceed to Public Hearing with Reclassifications: Dan River to a Water Supply; Deep Creek to Water Supply Critical Area; and, Uwharrie River to Class B • Request to Delegate the Riparian Buffer Program to Pitt County • Request for Approval to Send the Draft French Broad River Basin Plan to Public Meetings •	• Request to Delegate the Neuse and Tar-Pamlico Rivers Riparian Area Protection Rules to Pitt County, NC • Request for Approval and Adoption of the Coastal Habitat Protection Plan in conjunction with the Marine Fisheries Commission and the Coastal Resources Commission.
Jan 2005	• No meeting scheduled	• No meeting scheduled
Feb 2005	• Request for Approval to Send the Draft Cape Fear River Basin Plan to Public Meetings • Consideration of a Nutrient Management Strategy/Compliance Schedule for Jordan Lake.	• Consideration of a Nutrient Management Strategy/Compliance Schedule for Jordan Lake.

*Dates shown are projections. Actual schedules could vary 1-3 months either direction.

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

October 4, 2004

TO: Environmental Review Commission Members

FROM: William G. Ross Jr., Secretary

RE: Animal Waste Management Annual Report

G.S. 143-215.10M requires the Department of Environment and Natural Resources to report to the Environmental Review Commission each year on permitting, inspection, and compliance activity of animal waste operations across the state. Attached is this year's report. If you have any questions please contact Keith Larick at (919) 715-6185.

Attachment

cc: Alan W. Klimek, P.E.

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STATUS OF PERMITTING AND INSPECTING ANIMAL WASTE MANAGEMENT SYSTEMS

ANIMAL WASTE COMPLIANCE REPORT

JULY 1, 2003 – JUNE 30, 2004

REFERENCE:
G.S. 143-215.10M

Status of permitting and inspecting animal waste management systems/Animal Waste Compliance Report for Period Beginning July 1, 2003 and Ending June 30, 2004

SUMMARY

Pursuant to G.S. 143-215.10M, the Department of Environment and Natural Resources submits the subject annual report.

This report details the inspections and operational reviews completed in North Carolina during the fiscal year 2003 for both the Division of Water Quality and the Division of Soil and Water Conservation. The tables show the type of inspection and the number of inspections completed. The Pilot Project conducted by the Division of Soil and Water Conservation is still in effect for 2003.

The tables show the number of permits issued by region and statewide for the fiscal year 2003. The tables also show permits issued by type of operation: swine, cattle, and poultry.

The report details the number and type of violations identified during inspections. The tables show the number of facilities receiving a notice of deficiency or violation, and the number of enforcement actions initiated during fiscal year 2003. The violation data is broken down by region and by type of operation.

The enclosed tables list totals for each of the Department's Regional Offices as well as state totals. The Regional Offices are noted as follows: ARO – Asheville Regional Office, FRO – Fayetteville Regional Office, MRO – Mooresville Regional Office, RRO – Raleigh Regional Office, WARO – Washington Regional Office, WIRO – Wilmington Regional Office, and WSRO – Winston-Salem Regional Office.

If there is a need for any additional information or clarification, please do not hesitate to contact us.

For Period Beginning July 1, 2003 and Ending June 30, 2004*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total number of Animal Operations Requiring Inspections and Operation Reviews	26	753	94	250	541	675	100	2439
DWQ Total number of inspections completed**	29	932	110	346	500	488	145	2550
Routine DWQ annual compliance inspections	25	847	107	293	456	275	129	2205
Inspections conducted due to complaints	1	22	1	8	5	13	11	61
Follow-up of previous review or inspection	2	45	0	7	5	17	3	79
Emergency notification	0	5	0	4	4	13	0	26
Lagoon Evaluation	0	4	0	30	25	32	1	92
Other inspections	1	9	2	4	5	65	1	87
DSWC Total number of compliance inspections completed** (Brunswick, Columbus, and Jones County Only)	-	-	-	-	63	106	-	169
Routine DSWC annual compliance inspections	-	-	-	-	41	61	-	102
Inspections conducted due to complaints	-	-	-	-	1	4	-	5
Follow-up of previous review or inspection	-	-	-	-	0	6	-	6
Emergency Notification	-	-	-	-	0	1	-	1
Other inspections	-	-	-	-	21	34	-	55
DSWC Total number of operation reviews completed***	26	918	91	167	596	646	110	2554
Routine operation reviews	26	888	91	165	553	630	94	2447
Inspections conducted due to complaints	0	0	0	0	0	1	0	1
Follow-up of previous review or inspection	0	21	0	1	1	9	2	34
Emergency Notification	0	0	0	0	36	0	0	36
Other inspections	0	11	0	1	7	6	0	25
Other Agency Total number of operation reviews completed****	10	1	1	70	14	80	8	184
Routine operation reviews	10	1	1	70	14	79	8	183
Follow-up of previous review	0	0	0	0	0	1	0	

*Year to date numbers are reported as of 6/30/04 and may vary from actual due to delays in data entry and continued refinements to database.

**Pilot Project. Compliance Inspections will normally only be conducted in Brunswick, Columbus, and Jones County by DSWC. Operation reviews are normally conducted in the Pilot Counties in the spring and compliance inspections in the fall. As of July 1, 1999, Brunswick County became part of the Pilot Project.

***Inspections and operation reviews may include facilities that are no longer in operation and/or multiple inspections or operation reviews at one facility.

****Other Agencies include Soil and Water Conservation Districts and NRCS.

For Period Beginning July 1, 2003 and Ending June 30, 2004*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Number of Permits Issued to Animal Operations	4	19	6	12	18	24	4	87
Swine	0	19	0	9	18	24	0	70
Cattle	4	0	5	2	0	0	4	15
Poultry	0	0	1	1	0	0	0	2

For Period Beginning July 1, 2003 and Ending June 30, 2004*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Deficiencies and Violations[1] found during DSWC operation reviews and DWQ inspections*	9	262	10	45	126	216	29	697
Number of facilities receiving a deficiency or violation from inspections	1	143	9	42	101	118	27	484
Enforcement actions initiated from July 1, 2003 to June 30, 2004**	0	8	0	10	7	14	9	48

*Violation totals include violations noted during both operation reviews and compliance inspections and may include multiple violations at a single facility.

**Enforcement actions being developed by the regional staff are normally not shown as actions initiated during that quarter. These actions will be included in the next year to date totals.

Deficiencies and Violations Identified[1]	Total number of inspections with identified problem	Percent of total problems identified	Percent of total inspections completed (5,457)
Discharges from Animal Waste Management System	77	11.0	1.4
Of the total discharges identified, the number of discharges that reached surface waters of the state	(35)***	(5.0)	(0.6)
Inadequate Freeboard	391	56.1	7.2
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(45)	(6.5)	(0.8)
No Certified Operator in Charge	10	1.4	0.2
Evidence of over application	137	19.7	2.5
Does not meet setbacks	0	0.0	0.0
Inadequate land	3	0.4	0.1
Crop differs from that stated in Certified Animal Waste Management Plan	79	11.3	1.4
Totals	697****	100	

***Of the discharges to surface waters, 3 were from cattle operations, 31 were from swine operations and 1 were from poultry operations.

****5,457 inspections and reviews were conducted. There were 7 potential problems evaluated on each report. Therefore the total possible deficiencies and violations that could have been noted was 38,199. The 697 problems identified represents 1.8% of the total potential number.

For Period Beginning July 1, 2003 and Ending June 30, 2004*

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM								
Deficiencies and Violations[1] Identified	**ARO**	**FRO**	**MRO**	**RRO**	**WARO**	**WIRO**	**WSRO**	**State Totals**
Discharges from Animal Waste Management Systems	1	25	4	17	12	14	4	77
Of the total discharges identified, the number of discharges that reached surface waters of the state	(0)	(10)	(0)	(6)	(5)	(11)	(3)	(35)
Inadequate Freeboard	3	152	5	12	60	154	5	391
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(0)	(12)	(1)	(9)	(5)	(17)	(1)	(45)
No Certified Operator in Charge	1	0	0	3	0	2	4	10
Evidence of over application	0	57	0	7	32	32	9	137
Does not meet setbacks	0	0	0	0	0	0	0	0
Inadequate land	2	0	0	1	0	0	0	3
Crop differs from that stated in Certified Animal Waste Management Plan	2	28	1	5	22	14	7	79
Totals	9	262	10	45	126	216	29	697

*Year to date numbers are reported as of 6/30/04 and may vary from actual due to delays in data entry and continued refinements to database.

For Period Beginning July 1, 2003 and Ending June 30, 2004*

TOTAL NUMBER OF INSPECTIONS WITH IDENTIFIED PROBLEM					
Deficiencies and Violations Identified[1]	**Swine**	**Cattle**	**Poultry**	**Horses**	**State Totals**
Discharges from Animal Waste Management System	61	8	8	0	77
Of the total discharges identified, the number of discharges that reached surface waters of the state	(31)	(3)	(1)	(0)	(35)
Inadequate Freeboard	370	10	11	0	391
Of the total inspections identified with inadequate freeboard, the number of inspections with freeboard noted at less than 1 foot	(34)	(2)	(9)	(0)	(45)
No Certified Operator in Charge	5	3	2	0	10
Evidence of over application	130	6	1	0	137
Does not meet setbacks	0	0	0	0	0
Inadequate land	0	2	1	0	3
Crop differs from that stated in Certified Animal Waste Management Plan	70	9	0	0	79
Totals	636	38	23	0	697

*Year to date numbers are reported as of 6/30/04 and may vary from actual due to delays in data entry and continued refinements to database.

[1] From the period of 7/1/03 through 6/30/04, DWQ has issued roughly 309 Notice of Deficiencies, and approximately 132 Notice of Violations. This number can only be estimated due to the slight time delay between the issuance of a NOD or NOV from the DWQ regional staff, and the receiving of the copy of the letter by the DWQ Central Office.

North Carolina
Hazardous Waste Management Plan
2004

N.C. Department of Environment and Natural Resources
Division of Waste Management
Hazardous Waste Section
http://wastenotnc.org

State of North Carolina
Michael F. Easley, Governor

Department of Environment and Natural Resources
William G. Ross Jr., Secretary

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Executive Summary

The State of North Carolina's Solid Waste Management law requires the Department of Environment and Natural Resources (DENR) to develop a hazardous waste management plan for the state and revise it on or before July 1 of even-numbered years. (N.C.G.S. 130A 294(i)). The first plan was published in July 1990 and has been revised at two-year intervals. The 2004 plan summarizes the activities of the North Carolina Hazardous Waste Section to ensure safe management of hazardous waste and to encourage waste minimization, reuse and recycling. Major activities include implementing and enforcing the hazardous waste regulatory program, conducting workshops and providing technical assistance in waste reduction and recycling, soliciting participants in the Environmental Protection Agency's National Waste Minimization Partnership Program, and continuing efforts to improve compliance and foster waste reduction by small businesses.

1.0 INTRODUCTION

The State of North Carolina's Solid Waste Management law requires the Department of Environment and Natural Resources (DENR) to develop a hazardous waste management plan for the state. The plan is revised on or before July 1 of even-numbered years. (N.C.G.S. 130A 294(i)). The first plan was published in July 1990. This 2004 plan summarizes the North Carolina Hazardous Waste Section's activities to ensure the safe management of hazardous waste and to encourage waste minimization, reuse and recycling.

2.0 NORTH CAROLINA HAZARDOUS WASTE SECTION

The Hazardous Waste Section (HWS) was authorized by the U.S. Environmental Protection Agency (EPA) in 1980 to implement the federal hazardous waste regulatory program under the Resource Conservation and Recovery Act. The HWS has a staff of 50 people working in three branches: Facility Management, Compliance and Programs. Collectively, the three branches undertake the following activities:

- Regulate the management of hazardous waste by generators, transporters, treaters, storers, recyclers and disposers;
- Educate the hazardous waste community by providing technical assistance through individual consultations and seminars that encourage waste reduction, sound recycling, safe management practices and proper disposal as a last resort;
- Issue permits specifying requirements that each hazardous waste treatment, storage, recycling or disposal facility must meet;
- Provide a continuing compliance presence at commercial hazardous waste management facilities through the HWS Resident Inspector Program;
- Conduct compliance inspections and, in coordination with the North Carolina Office of the Attorney General, take enforcement actions against violators;
- Require groundwater assessments, facility investigations and corrective measures at facilities where hazardous wastes have been released into the environment and
- Ensure section staff receive necessary training and professional development opportunities to continually improve their job performance.

Information on most of the activities above is captured in the national hazardous waste database, RCRAInfo. The database is managed by the EPA, but most of the data is entered by authorized state programs. RCRAInfo contains comprehensive information on all facilities that generate or manage hazardous waste within the state, as well as all HWS activities affecting those facilities. In 2004 and 2005 the HWS will continue to develop and implement the conversion of RCRAInfo to the Department's Internet-Based Enterprise Application Management (IBEAM) framework. IBEAM will increase efficiency and accuracy by eliminating the need for centralized, direct data entry into the RCRAInfo system. The IBEAM system will also upload information seamlessly into the Department's Facility Identification Template for States database (FITS) and the Departmental Decision Support System. All systems are currently under development.

To view RCRAInfo and regulatory information for specific hazardous waste sites, visit http://www.epa.gov/enviro/. For details about the Hazardous Waste Section and the Division of Waste Management visit http://www.wastenotnc.org/.

3.0 HAZARDOUS WASTE GENERATION AND MANAGEMENT

Hazardous waste is categorized as either "characteristic," "listed," or both. Both waste categories and their attendant subcategories are specifically described in the federal regulations at 40 CFR 261, incorporated by reference in 15A NCAC 13A .0106.

Characteristic waste refers to any solid waste that exhibits a characteristic of ignitability, corrosivity, reactivity and/or toxicity. (Wastes are considered to have the characteristic of toxicity if they contain any of 40 specified hazardous constituents in excess of federal standards.) The term "listed waste" refers to specific wastestreams the EPA identified as hazardous based on its investigations of particular industries as well as certain listed commercial chemical products that are disposed.

The tables below show summary information about North Carolina's top 10 hazardous waste generators and its top 10 treatment, storage and disposal facilities (TSDFs) in 2001. The source for this data is EPA's 2001 "Biennial Report of Hazardous Waste Generation." This is the most recent information available. The 2001 Biennial Report (BR), published on October 1, 2003, can be found at http://www.epa.gov/epaoswer/hazwaste/data/brs01/index.htm.

It is important to note that EPA revised its waste management reporting requirements in 1999 to exclude hazardous wastewaters managed in treatment systems regulated under the Clean Water Act. Wastewaters historically account for a significant proportion of reported hazardous waste tonnages. Misinterpretations of the wastewater reporting exclusion on the part of North Carolina facilities led to significant errors in the state's Biennial Report data for 1999. That data is not included in this document because any comparisons drawn between the two reporting periods would likely be inaccurate. Future reports will use 2001 data as a baseline to track North Carolina's waste generation and management trends.

In 2001, 501 North Carolina large quantity generators (LQGs) [1] reported generating 94,534 tons of hazardous waste. Of the 501 LQGs, the top 10 facilities generated 32,515 tons, or 34 percent, of the total quantity of hazardous waste generated by North Carolina's large quantity generators.

[1] Large Quantity Generators are defined as facilities that generate 1,000 kg (2,200 lbs.) or more of hazardous waste in a calendar month.

Table 3.1 - Ten largest hazardous waste generators and quantity generated

	Site Name	EPA ID No.	City	Tons
1	DSM Pharmaceuticals, Inc.	NCD047373766	Greenville	5,663
2	Ecoflo, Inc.	NCD980842132	Greensboro	5,170
3	Ameristeel Corporation	NCD093340487	Charlotte	4,758
4	Cogins Corporation	NCD062567623	Charlotte	3,430
5	Heritage Environmental Services	NCD121700777	Charlotte	3,109
6	DuPont	NCD047368642	Fayetteville	2,708
7	R. J. Reynolds Tobacco Co.	NCD067441394	Winston-Salem	2,499
8	General Electric Co.	NCD050409150	Wilmington	2,468
9	Onyx Environmental	NCD986166338	Creedmoor	1,360
10	BASF Corporation	NCD049997786	Morganton	1,350
	Total			**32,515**

In 2001, 66 North Carolina treatment, storage or disposal facilities (TSDFs) reported managing 39,274 tons of hazardous waste through treatment, storage or disposal. Of the 66 TSDFs, the top 10 facilities managed 27,441 tons, or 70 percent, of the total. Common hazardous waste management methods include solvent recovery, incineration, fuel blending, energy recovery, sludge treatment, stabilization and metals recovery.

Table 3.2 - Ten largest hazardous waste managers or TSDFs

	Site Name	EPA ID No.	City	Tons
1	DSM Pharmaceuticals, Inc.	NCD047373766	Greenville	5,590
2	Clean Harbors	NCD000648451	Reidsville	5,065
3	Ecoflo, Inc.	NCD 980842132	Greensboro	3,406
4	Ashland Distribution	NCD061263315	Charlotte	3,193
5	Mallinckrodt, Inc.	NCD042091975	Raleigh	2,079
6	Heritage Environmental Services	NCD121700777	Charlotte	1,973
7	Detrex Corporation	NCD049773245	Charlotte	1,956
8	General Electric Co.	NCD050409150	Wilmington	1,536
9	DuPont	NCD047368642	Fayetteville	1,515
10	Durable Wood Preservers Inc.	NCD003173358	Research Triangle	1,128
	Total			**27,441**

Although only LQGs and TSDFs are required to report their hazardous waste generation and management amounts, it is important to note that North Carolina also has 2,028 small

quantity generators and 3,991 conditionally exempt small quantity generators.[2] These facilities are not required to report the amounts of hazardous waste they generate because they are typically small businesses for whom periodic reporting could be overly burdensome. However, these facilities collectively generate a significant amount of hazardous waste that needs to be managed properly and in compliance with all applicable rules.

4.0 HAZARDOUS WASTE REDUCTION INITIATIVES

A. Commitment to Hazardous Waste Minimization

The HWS has recently joined forces with EPA's Region IV to solicit participants in the National Waste Minimization Partnership Program. This voluntary program fosters partnerships between EPA and industry to reduce hazardous waste -- especially waste containing 30 highly toxic chemicals. Partners who make significant progress in waste reduction receive national recognition for their achievements.

The North Carolina Hazardous Waste Section has also committed to the following steps:

- Incorporate pollution prevention training that is based on targeted priority chemical waste streams, into annual generator workshops, industry meetings and enforcement settlement negotiations;
- Review facility requests for alternative management practices for hazardous waste (use/reuse, substitution, reclassification and delisting), and
- Support intervention projects to reduce/eliminate priority chemicals via partnerships with other agencies.

B. Environmental Stewardship Initiative Award

DENR's Environmental Stewardship Initiative promotes and encourages superior environmental performance by North Carolina's regulated community. This voluntary program stimulates the development and implementation of programs that use pollution prevention and innovative approaches to meet and exceed regulatory requirements. There are three levels of participation. "Environmental Partners" is for organizations interested in developing a systematic approach to improving their environmental performance. The "Rising Steward" level was added this year and is designed for those organizations that have a mature environmental management program. The "Environmental Steward" level is for organizations that already display a commitment to exemplary environmental performance beyond what is required by law. All participants must set environmental performance goals that include pollution prevention and are required to report annually on progress towards these goals and net pollution reductions.

[2] Small Quantity Generators are defined as facilities that generate between 100 kg and 1,000 kg (220 lbs. to 2,200 lbs.) per calendar month. Conditional Exempt Small Quantity Generators generate less than 100 kg (220 lbs.) per calendar month.

This important program not only recognizes outstanding environmental performance at the "Steward" level, but provides encouragement and assistance to foster improved environmental performance by North Carolina organizations. Coaches (technical staff) are assigned to each participant to provide technical assistance on pollution prevention and develop an environmental management system. Networking opportunities allow participants to learn from each other and share success stories. This program seeks to reduce the impact on the environment beyond measures required by any permit or rule, producing a better environment, conserving natural resources and resulting in long-term economic benefits.

For more information about the program, visit http://www.p2pays.org/esi/.

C. Other Activities

The HWS will continue to support safe hazardous waste management in North Carolina by:

- Supporting annual generator workshops that help educate the largest generators on hazardous waste regulations and the expectations of hazardous waste inspectors as well as supporting opportunities for waste minimization and recycling;
- Continuing the HWS initiative to improve compliance in the vast SQG universe through a SQG self-certification survey;
- Seeking to establish a hazardous waste generator security deposit to fund the cleanup of abandoned generator sites that do not meet acceptable environmental standards;
- Continuing to seek EPA authorization to maintain HWS' authority to implement newly promulgated regulations and standards;
- Improving the quality of hazardous waste data for hazardous waste trend analysis and sound decision-making; and
- Participating in EPA rulemakings that affect regulatory status and management standards for recycling used industrial rags and wipes, spent materials that are reclaimed for reuse, and other regulatory proposals.

RESIDENT INSPECTOR PROGRAM

2004 ANNUAL REPORT

Presented to

The Environmental Review Commission

September 2, 2004

NCDENR

North Carolina Department of Environment and Natural Resources

HAZARDOUS WASTE SECTION

State of North Carolina
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Governor

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RESIDENT INSPECTOR PROGRAM
2004 ANNUAL REPORT

This annual report is presented to the Environmental Review Commission pursuant to Article 9, G.S.-130A 295.02(m). The report covers the activities of the Resident Inspector Program from July 1, 2003 through June 30, 2004.

I. OVERVIEW

The Resident Inspector Program has been operating for more than 13 years in the Division of Waste Management. This program monitors all aspects of the commercial hazardous waste facilities in North Carolina and ensures compliance with all laws and rules administered by the Department of Environment and Natural Resources. It may also enforce laws or rules administered by any other state agency through a memorandum of agreement.

The Resident Inspector Program was established "... to enhance the ability of the Department to protect the public health and the environment by providing the Department with the authority and resources necessary to maintain a rigorous inspection and enforcement program at commercial hazardous waste facilities" [G.S. 130A-295.02(f)].

II. PROGRAM STAFFING

For this fiscal year, the program was comprised of two resident inspectors assigned to regional duty stations, one administrative assistant and a program supervisor (See Attachment 1 for the Organization Chart). The Resident Inspector Program resides within the Hazardous Waste Section's Compliance Branch.

III. THE RESIDENT INSPECTOR

Most state agencies perform their compliance monitoring inspections as required from their specific respective regulations. The Resident Inspector Program, however, is unique in that its inspections utilize a multi-media approach. This approach covers all regulatory responsibilities for which DENR is authorized, such as hazardous waste management and treatment requirements, workplace safety, air emissions requirements, wastewater treatment and discharge requirements, etc.

There are inherent overlaps of DENR's regulatory requirements with regulations administered by other departments. Two examples include the Department of Labor's Occupational Safety & Health Act and the Department of Transportation's hazardous materials transportation regulations. Deviations from these various departments' regulations could adversely affect public health and the environment, as well as a facility's compliance with air, water or hazardous waste management regulations. As part of the Resident Inspector Program's comprehensive approach to monitoring commercial hazardous waste facilities, resident inspectors also evaluate these sites for potential violations in these other regulatory areas. When necessary, they make recommendations to the facilities and/or make referrals to the authorized agency or agencies. The mandated frequency of inspection at each facility gives resident inspectors the time needed to achieve this high degree of oversight.

To prepare resident inspectors for their multimedia approach to inspections, initial training typically consists of Hazardous Waste Operations and Emergency Response (24 or 40 hours), Environmental Surveillance, RCRA Hazardous Waste Training, Hazardous Materials Transportation and the care and use of Level B / Personal Protective Equipment.

Annual training for resident inspectors includes an 8-hour Health & Safety Basic Refresher, Level B Update and Environmental Surveillance Update. Depending upon the inspector's area of expertise and responsibility, other miscellaneous training may be received, including Hazardous Waste Incineration, Ambient Air Monitoring, Air Pollution Control Devices, Chemical Safety Audit, OSHA Inspector's Course, Hazardous Materials Management and various EPA regulatory workshops.

IV. SUBJECT FACILITIES

To be subject to oversight by the Resident Inspector Program, the facility must be a commercial hazardous waste facility. The term "commercial," as it relates to a hazardous waste facility, is defined as a "facility ... that accepts hazardous waste from the general public or another person for a fee" [G.S. 130A-290(a)(3)]. Currently, there are 12 permitted commercial hazardous waste treatment, storage, and disposal facilities in North Carolina under the jurisdiction of the Resident Inspector Program. The Giant Resource Recovery facility continues with its previously announced intention to close all hazardous waste operations at the Stanly County, North Carolina location. The Carolina Solite facility (owned by the Giant Resource Recovery) continues to operate the light weight aggregate kilns utilizing "used oil" as a fuel and continues to be monitored by the Division of Air Quality and periodically by the Resident Inspector Program. Heritage Environmental Services, (one of four commercial permitted treatment, storage and disposal facilities located in Mecklenburg County), has suspended normal operations during a corporate economic evaluation. Although not currently treating, storing or disposing of hazardous waste at the Charlotte facility, Heritage Environmental Services continues to provide disposal services for their North Carolina customers, utilizing this Charlotte facility as a transfer station. This facility continues to be monitored by the Resident Inspector Program.

V. FACILITY CATEGORY RANKINGS

Each commercial hazardous waste treatment, storage and disposal facility is ranked to determine its required inspection fees and minimum inspection frequency as required under 15A NCAC 13A .0116. The frequency of the inspections at each facility is dependent upon its qualification as a "special purpose" commercial hazardous waste facility and the category ranking assigned to it.
Currently, all existing commercial hazardous waste treatment, storage and disposal facilities in North Carolina qualify as "special purpose" facilities. (See Attachment 2 for current category rankings and primary waste treatment activities for these facilities.) The designated categories of 1, 2 or 3 correspond to a minimum inspection frequency of two, four or six times per month, respectively.

VI. FUNDING & EXPENSES

The Resident Inspector Program is funded by fees collected from the commercial hazardous waste facilities. These fees are based upon each facility's category ranking and volume (tons) of hazardous waste handled. The category ranking system is designed to be an indirect measure of the costs associated with the oversight at each commercial hazardous waste facility. The commercial hazardous waste facilities' tonnage throughput has increased marginally; consequently, the fees received from these facilities have increased slightly.

For FY 2003-2004, the budget was developed using anticipated revenues from Resident Inspector Program fees of approximately $275,000. The actual hazardous waste tonnage received by many of the commercial facilities increased slightly over the previous year due to general improvement in economic stability of industry. (A detailed list of the individual tonnages received by each of the commercial hazardous waste facilities in FY 2003-2004 can be found in Attachment 3.) The actual program receipts in FY 2003-2004 totaled $276,605, while Program expenses for the year were held to $242,123. Currently, it remains necessary for the Resident Inspector Program Supervisor to conduct a portion of the required inspections in order to meet all aspects of the Program's mandates.

VII. INSPECTION GOALS & ACHIEVEMENTS

During this past fiscal year, the program staff conducted a total of 557 inspections. Additional inspections, over the required minimum of 504 inspections, were performed to monitor closure activities at one facility, the temporary suspension of normal operation at another facility, and to assist in improving compliance performance by other facilities. (A detailed list of the inspections performed by program staff at the commercial hazardous waste facilities in FY 2003-2004 can be found in Attachment 4.)

VIII. ENFORCEMENT & COMPLIANCE

Enforcement Activities

In general, the commercial hazardous waste facilities continue to be cooperative and have rapidly responded with corrective action in most cases when deficiencies or violations were cited or recommendations made. When either of these actions do not result in timely and consistent compliance, a more severe enforcement action is taken, such as, a compliance order with administrative penalty.

During the past fiscal year, resident inspectors issued five notices of violation to commercial facilities (see Attachment 5 for current and historic enforcement tracking). These notices of violation, when compared to the actual number of inspections, translate to an overall compliance rate of 99.1 percent.

Compliance Assistance Activities

Compliance assistance activities offered under this program are conducted routinely during the inspectors' site visits. Since the inspectors visit these facilities at least semi-monthly, they have the opportunity to become very familiar with the operations of each facility and may offer compliance assistance in several ways. Inspectors identify past trouble areas and work with the facility toward a permanent solution. They also increase scrutiny of these areas during each visit to keep the facility's compliance awareness high. Inspectors communicate frequently with facility management and front-line workers to clarify the permit, current regulatory requirements, the reasons for the requirements, and the potential risks incurred for noncompliance. Inspectors continue to develop and schedule roundtable training workshops customized for each specific facility. These workshops cover the most frequent violations observed overall at commercial facilities, the most frequent violations observed at their particular facility, any potential areas of concern and positive facility operations.

If a facility repeats a violation, the primary inspector and program supervisor will set up an informal enforcement conference with the facility compliance manager, the plant manager, and, if applicable, the corporate compliance officers. They discuss the facility's current compliance issues and work with the facility to find a permanent solution, which may include formal enforcement.

IX. PUBLIC MEETINGS / HEARINGS & PERMIT RENEWALS

Resident Inspector Program staff continue to observe and assist/support public meetings/hearings that involve the operation of and proposed modifications to the commercial hazardous waste facilities in the state. A continuing program goal is for the staff to be fully aware of public concerns and to be conscious of these concerns during oversight efforts at these facilities. Program staff have provided assistance in facility compliance audits by off-site generators, consultants, other agencies and the public. Program staff work with area schools to provide information in the classroom about environmental responsibility and how the facilities help with that responsibility.

The Resident Inspector Program staff continue to work with the Facility Management Branch (the permitting arm of the Hazardous Waste Section) and each commercial hazardous waste facility during the permit renewal/application process and other compliance reviews, such as, closure of a permitted storage units. The purpose of this joint effort is to provide clarification, address areas of concern, and assist in ensuring the permit application accurately reflects the facility as it is operated. This also provides the facility with a unified, consistent means of communication with the section.

X. SUMMARY

At the conclusion of the program's 13th year, Resident Inspector staff continue to provide rigorous oversight of the commercial hazardous waste facilities in this state. This is reflected in the facilities' overall compliance rate of 99.1 percent. Staff constantly seek new approaches and initiatives to improve the department's ability to protect public health and the environment. Staff also work to ensure that new regulatory requirements are fully understood by the facilities so they can be implemented rapidly and correctly. Proactive approaches, such as workshops, program oversight and compliance assistance efforts, have clearly demonstrated a heightened level of awareness and continued compliance at the commercial hazardous waste facilities in North Carolina.

ATTACHMENTS

ATTACHMENT 1
RESIDENT INSPECTOR PROGRAM

ORGANIZATIONAL CHART

Hazardous Waste Section Chief

Compliance Branch Head

Resident Inspector Supervisor

Administrative Assistant

Resident Inspector

EQ – North Carolina
Onyx Environmental Services
Safety Kleen – Raleigh
Safety Kleen – St. Paul

Resident Inspector

Clean Harbors
Ecoflo Environmental Services
Safety Kleen – Archdale
Safety Kleen – Charlotte

Ashland Distribution
Parts Cleaning Technology / Detrex Chemical
Giant Resource Recovery
Heritage Environmental Services

ATTACHMENT 2
RESIDENT INSPECTOR PROGRAM

Commercial Hazardous Waste Facilities

CATEGORY RANKINGS & PRIMARY TREATMENT

(FY 2003-2004)

FACILITY	CURRENT CATEGORY RANKING	Primary Waste Treatment
Ashland Distribution Co.	1	Container Storage
Clean Harbors	3	Hazardous Waste Consolidation, Fuels Blending, Container Storage
Detrex Chemical / Parts Cleaning Technologies	2	Chlorinated Solvent Reclamation
ECOFLO, Inc.	3	Hazardous Waste Consolidation, Fuels Blending, Container Storage
EQ – North Carolina	2	Container Storage
Giant Resource Recovery *	1	Previously - Fuels Blending
Heritage Environmental Services	3	Aqueous Treatment, Fuels Blending, Container Storage, Hazardous Waste Consolidation
ONYX Environmental Services	2	Container Storage
Safety-Kleen / Archdale	1	Mineral Spirits Reclamation
Safety-Kleen / Charlotte	1	Mineral Spirits Reclamation
Safety-Kleen / Raleigh	1	Mineral Spirits Reclamation
Safety-Kleen / St. Pauls	1	Mineral Spirits Reclamation

* Giant Resource Recovery is currently in the process of final closure as a permitted TSDF

ATTACHMENT 3
RESIDENT INSPECTOR PROGRAM

Commercial Hazardous Waste Facilities

ANNUAL HAZARDOUS WASTE TONNAGE RECEIVED REPORT

(FY 2003/2004)

COMMERCIAL FACILITY	Tons Received 2003/2004	Tons Received 2002/2003	Tons Received 2001/2002	Tons Received 2000/2001	Tons Received 1999/2000
ASHLAND	3,164.72	3,363.58	3,108.87	3,711.66	3,978.10
CLEAN HARBORS	4,039.98	4,199.94	5,333.92	4,788.78	5,207.73
DETREX	674.57	1,017.31	1,643.76	2,364.60	2,582.80
ECOFLO	6,126.56	4,916.60	4,131.37	6,221.00	6,092.37
EQ–North Carolina	3,221.14	152.52	0	176.39	873.74
GIANT/SOLITE	0	0	0	0	2,433.00
HERITAGE	431.28	920.54	2,501.15	4,850.90	5,519.38
ONYX	1,297.00	1,245.00	1,325.55	1,434.29	1,381.18
SK-ARCHDALE	498.00	564.50	728.90	854.30	858.70
SK-CHARLOTTE	472.00	493.20	653.30	865.20	952.00
SK-RALEIGH	449.90	512.00	676.50	829.80	863.54
SK-ST PAUL	319.73	339.90	396.00	482.90	534.22
TOTAL	20,694.88	17,726.09	20,499.32	26,579.82	31,276.76

ATTACHMENT 4
RESIDENT INSPECTOR PROGRAM

Commercial Hazardous Waste Facilities

INSPECTION TOTALS

(FY 2003/2004)

FACILITY	REQUIRED INSPECTIONS	ACTUAL INSPECTIONS
Ashland Distribution Co.	24	33
Clean Harbors	72	73
Detrex Chemical / Parts Cleaning Tech.	48	55
ECOFLO, Inc.	72	74
EQ - North Carolina	48	56
Giant Resource Recovery	24	33
Heritage Environmental Services	72	77
ONYX Environmental Services	48	50
Safety-Kleen / Archdale	24	26
Safety-Kleen / Charlotte	24	27
Safety-Kleen / Raleigh	24	27
Safety-Kleen / St. Pauls	24	26
TOTAL	504	557

ATTACHMENT 5
RESIDENT INSPECTOR PROGRAM

ENFORCEMENT OVERVIEW at COMMERCIAL HAZARDOUS WASTE FACILITIES (7/1/91 through 6/30/04)

FACILITY	NOVs FY 03-04	NOVs To Date	Compliance Orders FY 03-04	Compliance Orders To Date
ASHLAND	2	12	0	0
CLEAN HARBORS [1]	0	15	0	0
DETREX	1	12	0	1
ECOFLO	0	9	0	0
ENVIROCHEM [2]	0	8	0	1
EQ–North Carolina[2]	0	0	0	0
GIANT [3]	0	12	0	0
HERITAGE	1	30	0	3
ONYX	1	11	0	1
SK-ARCHDALE [4]	0	14	0	0
SK-CHARLOTTE [4]	1	16	0	0
SK-RALEIGH [4]	0	11	0	0
SK-ST PAUL [4]	0	15	0	0
SOLITE [5]	0	8	0	1
TOTALS	5	173	0	7

1 Clean Harbors (formerly owned by Safety-Kleen Technical Services; formerly owned by Laidlaw)

2 EQ-North Carolina (formerly owned by EnviroChem Environmental Services, Inc.)

3 Giant Resource Recovery (formerly owned by Oldover Corp.) - Currently in closure

4 SK = Safety-Kleen Corporation

5 Solite Corporation has ceased operation as a hazardous waste burner - CLOSED January 2003

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

MEMORANDUM

TO: Environmental Review Commission

FROM: William G. Ross, Jr.

RE: Inactive Hazardous Sites Annual Report to the Legislature

In 1987 the North Carolina General Assembly enacted the Inactive Hazardous Sites Response Act (N.C.G.S. 130A-310) to address sites with non-permitted releases of hazardous substances. This legislation requires annual reporting to the Environmental Review Commission. The 2004 annual status report is enclosed.

Should you have any questions, please call Jack Butler, Chief, Superfund Section, Division of Waste Management at 733-2801, ext. 293.

WGR/CVJ/slb

Attachment

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR/

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Report to the North Carolina General Assembly on the Inactive Hazardous Sites Program

October 2004

Superfund Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources

http://www.wastenotnc.org

EXECUTIVE SUMMARY

The Inactive Hazardous Sites Program was created by the North Carolina General Assembly to identify, control and correct properties contaminated with hazardous substances.

To date, 1,855 chemical spill or disposal sites and old, unlined dumps or landfills have been catalogued. Of this number, 1,434 still require work to address their hazards. The old, unlined landfills make up about one half of the sites still requiring action. In most cases, the locations of the landfills are still being determined. The Inactive Hazardous Sites Branch has received federal funding this year for one full-time equivalent position to locate these landfills, collect information on property use, determine the potential for exposure and work with owners for safe final solutions. The Branch previously had a contractor conducting some of this work. The contract funds were expended in 2003. Under this contract, location and use determinations were completed at about one-third of the cataloged sites. Of those inspected thus far, 72 percent have a residence, school, church, day care or drinking water source on or within 1,000 feet of the landfill. Based on observations at sites investigated by the USEPA and the North Carolina Division of Waste Management, most of North Carolina's unlined landfills can be expected to have groundwater contamination.

To increase the program's effectiveness, the General Assembly authorized the use of private environmental consulting firms to oversee voluntary cleanup actions. Registered Environmental Consultants (RECs) are providing supervision for cleanup work on 30 sites. State staff audit a portion of the REC's work activities. At present, 70 firms have received REC status. In addition, oversight of remedial actions at two sites is being provided by federally-funded staff and oversight of work at 35 former manufactured gas plant sites is being provided through an agreement with a consortium of utilities and municipalities that funds two staff members.

The following summarizes site cleanup activities over this past reporting year.

Sites Identified	
Chemical spill or disposal sites	1,100
Old unlined dumps and landfills	755
Total	**1,855**
Sites With All Work Complete	
Since last status report in 10/03	8
Total Site Completions	**421**

Ongoing Cleanup Actions

Ongoing REC-Supervised Site Cleanup Actions	30
Ongoing Priority Cleanup Actions Supervised by State Staff	69
Total	**99**

The Inactive Hazardous Sites Response Act requires annual reporting to the General Assembly. All of the reporting requirements specified under N.C.G.S. 130A-310.10 are met in this report. The status report on the Brownfields program, as required by N.C.G.S. 130A-310.40, is provided separately.

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I. THE INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST

The Inactive Hazardous Sites Branch is within the North Carolina Department of Environment and Natural Resources' Division of Waste Management. It implements the Inactive Hazardous Sites Response Act of 1987. This act requires DENR to maintain a catalog of inactive hazardous substance or waste disposal sites. Table 1, on the following page, provides a list of sites added to that inventory since the last program report in October 2003. Table 2, on page 3, provides a list of sites assigned "No Further Action" status. The entire inventory can be found in Appendix II. Figure 1, on page 4, shows how the inventory is distributed by category. Appendix I provides a description of each inventory category.

N.C.G.S. 130A-310.2 requires that sites catalogued in the Inactive Hazardous Sites Inventory be prioritized based on their threat to public health and the environment. After discovery, sites are first cataloged in the "Evaluations Pending" category of the Inactive Hazardous Sites Inventory until their rank is determined. Site rankings are determined using the rules found in 15A NCAC 13C .0200. Once ranked, sites are transferred to the Inactive Hazardous Waste Sites Priority List. This list is provided in Table 3, found on page 5.

TABLE 1. INACTIVE HAZARDOUS SITES INVENTORY
LIST OF NEW SITES ADDED
OCTOBER 2003 - OCTOBER 2004

ID Number	*Site Name*	*City*	*County*
NCN000407686	CARALEIGH PHOSPHATE AND FERTILIZER	RALEIGH	WAKE
NONCD0001104	CATO FARMS	CHARLOTTE	MECKLENBURG
NONCD0001107	CONE MILLS - FLORENCE PLANT	FOREST CITY	RUTHERFORD
NONCD0001102	ENQUIRER JOURNAL	MONROE	UNION
NCD003200656	FEATHER PROCESSORS, INC	ROSE HILL	DUPLIN
NONCD0001109	FRIENDLY CLEANERS	WILSON	WILSON
NCD981922362	GREIF, INC	BLADENBORO	BLADEN
NONCD0001111	IDEAL CLEANERS	RALEIGH	WAKE
NCD986232163	JSC GRAPHIC ARTS	WINSTON-SALEM	FORSYTH
NONCD0001106	MICROTON ABRASIVES, INC	PINEVILLE	MECKLENBURG
NCN000407364	QUARTER MASTER AUTO DETAIL	KERNERSVILLE	FORSYTH
NONCD0001108	RENTAL UNIFORM SERVICE	ASHEVILLE	BUNCOMBE
NCN000407775	ROYSTER FERTILIZER	LELAND	BRUNSWICK
NCN000407700	SPRINGS ROAD GO CART TRACK	CONOVER	CATAWBA
NONCD0001105	WETSIG YACHTS	WILMINGTON	NEW HANOVER
NONCD0001110	WOODSON-TENET LABORATORIES	GOLDSTON	CHATHAM

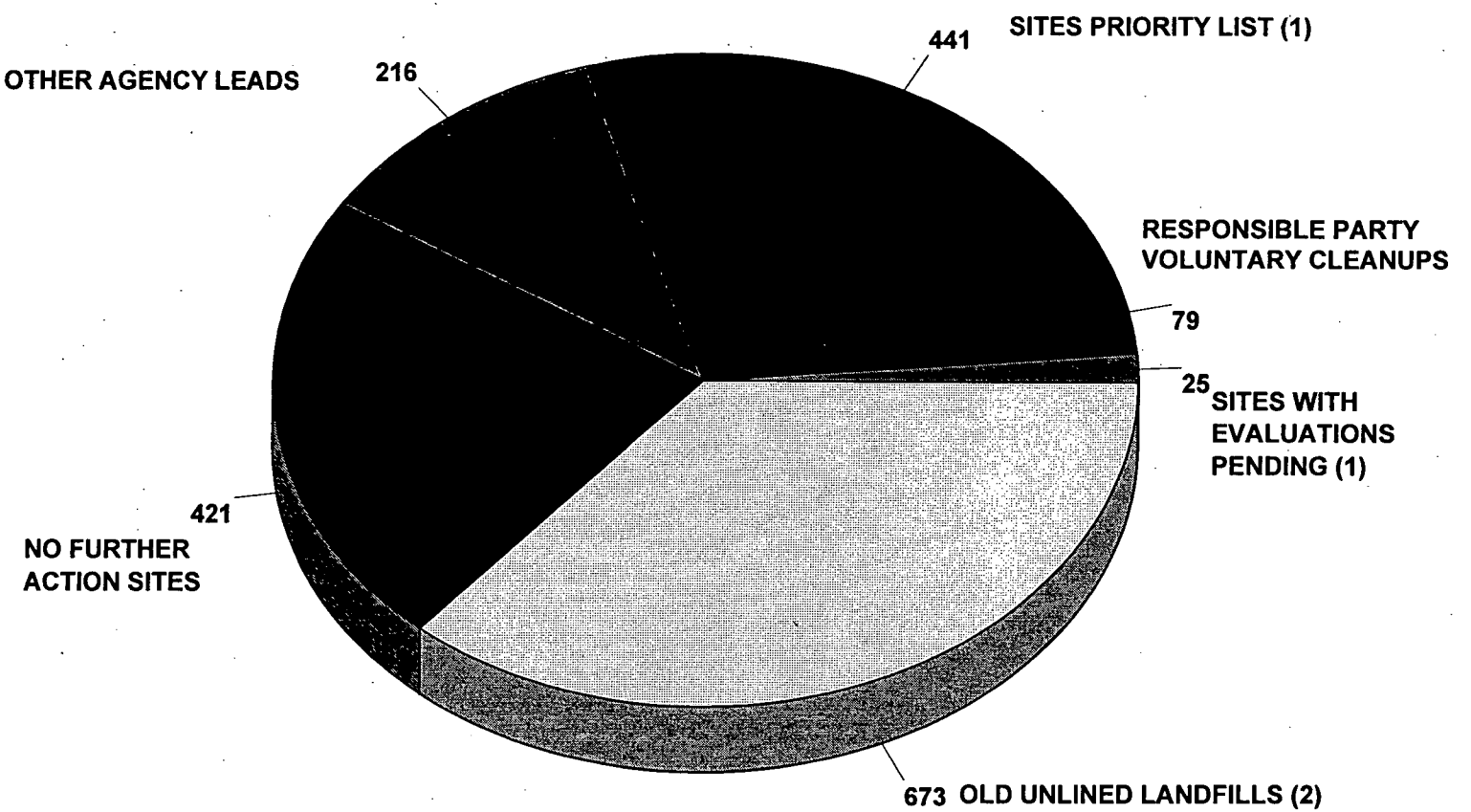
Reopened Cases

NCD101750305	INDUSTRIAL PLASITCS, INC.	GREENSBORO	GUILFORD

TABLE 2. INACTIVE HAZARDOUS SITES INVENTORY
SITES RECEIVING NO FURTHER ACTION STATUS
OCTOBER 2003 - OCTOBER 2004

ID Number	*Site Name*	*City*	*County*
NCSFN0407144	CARTRETTE FIELD	CHADBOURN	COLUMBUS
NCD075563932	ESB INC/EXIDE CORPORATION	RALEIGH	WAKE
NCD093340487	FLORIDA STEEL CORPORATION	CHARLOTTE	MECKLENBURG
NCD060291051	HOW ENTERPRISES	ABERDEEN	MOORE
NONCD0000056	JAMES LANDFILL	LAURINBURG	SCOTLAND
NONCD0000077	OLD STATE LAB	CARY	WAKE
NCD986215499	PARKER INDUSTRIES	CONNELLY SPRINGS	BURKE
NCD003228087	S&W CHEMICALS, INC.	HICKORY	CATAWBA

FIGURE 1. INACTIVE HAZARDOUS SITES
OCTOBER 2004 INVENTORY CATEGORICAL DISTRIBUTION
(1,855 Sites)



(1) Thirty eight sites in either the "evaluations pending" or "sites priority list" categories are also undergoing assessment and/or cleanup with program supervision (but not under an agreement).

(2) Inventory has 755 landfills. Of that number, 82 were already included in the inventory before the addition of the larger catalog of old, unlined landfills. As a result, they fall into other categories.

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NONCD0000022	WATTS REGULATOR-DAVIS PROPERTY	OLD BALL PARK ROAD	SPINDALE	RUTHERFORD	59.73		
						groundwater	metals
						soil	organics
						soil	metals
NCD003184710	CAROLINA CREOSOTING CORPORATION	EASTBROOK ROAD	LELAND	BRUNSWICK	57.17		
						groundwater	organics
						soil	organics
NONCD0001100	SIMPSON WELL CONTAMINATION	8 EASTWOOD DRIVE	BELMONT	GASTON	56.35		
						groundwater	organics
NCD981864614	ULAH BATTERY/BATTERY PILES	SR 1219	ASHEBORO	RANDOLPH	55.64		
						soil	metals
						soil	acids
NONCD0001056	LITTLE MOUNTAIN LANDFILL	(SR 1522) LITTLE MNT RD	TRYON	POLK	53.17		
						groundwater	organics
						groundwater	metals
NCD003229358	SCM PROCTOR-SILEX/WEAREVER	HAY ST	MOUNT AIRY	SURRY	53.02		
						groundwater	metals
						surface water	metals
						sediment	organics
						soil	metals
						sediment	metals
NCN000407584	SOUTHERN METALS RECYCLING, INC	1002 SOUTH FRONT STREET	WILMINGTON	NEW HANOVER	52.56		
						soil	metals
						groundwater	metals
NCD980729677	KNOB CREEK FLYASH DISPOSAL	SR 1540	BREVARD	TRANSYLVANIA	52.53		
						soil	metals
NCD986166692	HARWELL ROAD SEPTIC PIT	HARWELL ROAD	GASTONIA	GASTON	52.37		
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD003167780	SPRAGUE ELECTRIC COMPANY	HWY 194	LANSING	ASHE	52.33		
						groundwater	metals
						groundwater	organics
						soil	metals
NCD088563242	MONSANTO COMPANY/ROHM & HAAS	CEDAR CREEK RD	FAYETTEVILLE	CUMBERLAND	51.78		
						groundwater	organics
						sediment	metals
NCN000407333	TRIAD USED AUTO SALES	1520 ALAMANCE CHURCH RD	GREENSBORO	GUILFORD	51.53		
						groundwater	metals
						soil	metals
						soil	organics
						groundwater	organics
NCD980558035	HOMINY CREEK LANDFILL	RHODODENDRON PK	ASHEVILLE	BUNCOMBE	51.23		
						known/suspected	
NONCD0001025	TOOMEY PROPERTY	1020 HICKORY GROVE ROAD	SPRINGWOOD	GASTON	51.23		
						groundwater	organics
						soil	organics
NCD982117590	CUSTOM PROCESSING AND	1110 SURRETT DRIVE	HIGH POINT	GUILFORD	51.04		
						groundwater	organics
						groundwater	metals
						soil	organics
NONCD0000016	CMC LANDFILL	EAST MAIN STREET	ELKIN	SURRY	51.02		
						groundwater	organics
						soil	organics
NCD986178226	TEXFI INDUSTRIES, INC	601 HOFFER DRIVE	FAYETTEVILLE	CUMBERLAND	50.55		
						soil	organics
						groundwater	organics
NCD093338119	SCM CORP. GLIDDEN COATINGS	3926 GLENWOOD DRIVE	CHARLOTTE	MECKLENBURG	50.29		
						groundwater	organics
NCD986172518	OLD MOUNT HOLLY ROAD PCE SITE	OLD MT HOLLY RD & FREEDOM DR	CHARLOTTE	MECKLENBURG	50.26		
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD980839716	RIVERDALE HOMES/EARL GETTS	404 RIVERDALE DRIVE	DURHAM	DURHAM	50.10	groundwater	pesticides
NCN000407480	HORTON IRON & METAL	2216 US HWY 421 N	WILMINGTON	NEW HANOVER	49.83	surface water	metals
						sediment	pesticides
						surface water	pesticides
						groundwater	pesticides
						groundwater	metals
						soil	metals
						sediment	metals
NCD981750425	BUXTON DUMP	.5 MILES WEST OF BACK RD	BUXTON	DARE	49.81	groundwater	organics
						soil	organics
NCD980558027	POND ROAD LANDFILL 2	POND ROAD	ASHEVILLE	BUNCOMBE	49.79	known/suspected	
NCD003231545	SHERWOOD TREATING CO., INC.	1660 SILAS CREEK PKWAY	WINSTON-SALEM	FORSYTH	49.78	soil	metals
						groundwater	metals
NCD003220969	WHITE FURNITURE CO.	201 EAST CORNER ST	MEBANE	ALAMANCE	49.76	groundwater	metals
						soil	metals
						soil	organics
NONCD0000679	STURGEON CITY PROPERTY	4 COURT STREET	JACKSONVILLE	ONSLOW	49.67	sediment	metals
						groundwater	organics
NCD980558761	GS LABORATORY EQUIPMENT	275 AIKEN RD	ASHEVILLE	BUNCOMBE	49.57	sediment	organics
						soil	metals
						groundwater	organics
						surface water	organics
						sediment	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD000813592	GA-PACIFIC CORP/HDWD SAW	PLYWOOD DR	PLYMOUTH	WASHINGTON	49.53		
						soil	metals
						groundwater	metals
						soil	pesticides
						groundwater	organics
						sediment	organics
						soil	organics
						sediment	metals
						groundwater	pesticides
NCD003221462	GARDNER MIRROR CORPORATION	HWY 268 E	N WILKESBORO	WILKES	49.45		
						known/suspected	
NCD980502991	JACKSONVILLE LANDFILLS	(SEVERAL LOCATIONS)	JACKSONVILLE	ONSLOW	49.36		
						groundwater	metals
						groundwater	organics
NC0001279710	WOODY WILSON BATTERY/ASHLEY HTS	HWY 211	ASHLEY HEIGHTS	HOKE	49.02		
						soil	organics
						soil	metals
NCD986171379	NEW HAVEN DRIVE TCE	NEW HAVEN DRIVE	GASTONIA	GASTON	48.98		
						groundwater	organics
NCD980557987	SWANNANOA LANDFILL	HWY 70 E	SWANNANOA	BUNCOMBE	48.93		
						soil	organics
						groundwater	organics
NCD000770487	JOHNSON CONTROLS GLOBE BATTERY	OLD GREENSBORO ROAD	WINSTON-SALEM	FORSYTH	48.85		
						surface water	metals
						soil	organics
						sediment	metals
NCSFN0407074	NC MARITIME MUSEUM	310 FRONT ST	BEAUFORT	CARTERET	48.84		
						sediment	pesticides
						sediment	metals
						sediment	organics
NCD986175636	ASHE PATTERN SHOP (FORMER)	4411 BEATY ROAD	GASTONIA	GASTON	48.82		
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD980729412	CAROLINA TANK CLEANING COMPANY	HWY 68-4 MI N OF I-40	GREENSBORO	GUILFORD	48.53		
						soil	organics
						soil	metals
NONCD0000085	JONES & PRESNELL STUDIO	433 LAWTON ROAD	CHARLOTTE	MECKLENBURG	48.48		
						groundwater	organics
NCD986175628	LEE'S MOTOR WORKS	BEATY ROAD	GASTONIA	GASTON	48.48		
						surface water	organics
						soil	organics
						groundwater	organics
NCD000623223	MARTIN MANUFACTURING PROPERTIES	E MAIN ST US 17	WILLIAMSTON	MARTIN	48.40		
						groundwater	metals
						groundwater	organics
NCD986186518	OLD ATC REFINERY	801 SURRY STREET	WILMINGTON	NEW HANOVER	48.40		
						sediment	metals
						soil	organics
						groundwater	metals
						soil	metals
NCD042269134	SOUTHERN SCREW/FARLEY METALS	1225 BARKLEY RD	STATESVILLE	IREDELL	48.40		
						groundwater	organics
						groundwater	metals
						soil	bases
						soil	metals
						groundwater	cyanide
NCD981474158	SWEETEN CREEK DRUM SITE	115 SWEETEN CREEK ROAD	ASHEVILLE	BUNCOMBE	48.40		
						soil	metals
NCD041230418	AMP INCORPORATED	3900 REIDSVILLE ROAD	WINSTON-SALEM	FORSYTH	48.35		
						sediment	metals
						surface water	metals
						soil	metals
						sediment	cyanide
						soil	organics
						soil	cyanide

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD003216959	UNION CAMP CORPORATION	RAGSDALE RD	JAMESTOWN	GUILFORD	48.27	sediment	metals
						groundwater	organics
						surface water	organics
NCD986188027	CHAMPION LANDFILL #3	SR 1550 I40	CANTON	HAYWOOD	48.25	soil	metals
NCD980600449	SED, INC. RADAR ROAD	500 RADAR ROAD	GREENSBORO	GUILFORD	48.18	soil	organics
NCD003163888	HENREDON FURNITURE	HENREDON RD	MORGANTON	BURKE	48.17	groundwater	organics
						soil	organics
NCD041414780	FIELDCREST MILLS INC./NC FINISHING	US 29/70 N	SPENCER	ROWAN	48.07	soil	organics
						groundwater	organics
						soil	metals
						groundwater	metals
NCD980558019	ELK MOUNTAIN LANDFILL	ELK MOUNTAIN ROAD	ASHEVILLE	BUNCOMBE	47.96	soil	organics
						soil	metals
						soil	pesticides
NCD024477556	WINSTON CONTAINER COMPANY	4732 MORRIS FIELD RD	CHARLOTTE	MECKLENBURG	47.89	soil	organics
NONCD0001094	ALLISON MANUFACTURING CO	930 OLD CHARLOTTE ROAD	ALBEMARLE	STANLY	47.87	groundwater	organics
						soil	organics
NCD008839276	MONEY-WORTH, INC	US 70 E	SWANNANOA	BUNCOMBE	47.87	known/suspected	
NONCD0000023	CAROLINA P&L CO. FAYETTEVILLE	CUMBERLAND RD & OWEN DR	FAYETTEVILLE	CUMBERLAND	47.78	surface water	organics
						soil	organics
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0001081	ALCOA-NARROWS POWERHOUSE	PINE STREET	BADIN	MONTGOMERY	47.77	soil soil	organics metals
NCD980848840	SCOTT'S CREEK BATTERY SITE	402 HOWELL ROAD	NEW BERN	CRAVEN	47.75	soil	metals
NCD980557870	CALDWELL COUNTY ABANDONED WASTE	NC HWY 90	LENOIR	CALDWELL	47.69	groundwater groundwater	metals organics
NCD990883001	MONARCH FURNITURE CORPORATION	300 SCIENTIFIC ST	JAMESTOWN	GUILFORD	47.40	groundwater soil	metals metals
NCD986180917	SPANN PROPERTY	US HIGHWAY 25	HENDERSONVILLE	HENDERSON	47.26	known/suspected	
NONCD0001029	R & D LAMINATORS INC	HOLLOMAN ROAD (SR 1187)	AHOSKIE	HERTFORD	47.21	groundwater	organics
NCD024895864	STEWART-WARNER CORP/BASSICK-SACK	2941 INDIANA AVE	WINSTON-SALEM	FORSYTH	47.19	soil	organics
NCD980557557	ASHEBORO LANDFILL	OFF OF OLD US 64	ASHEBORO	RANDOLPH	47.10	soil	metals
NCD986176030	RHODERIA DRIVE WELLS	LAKEWOOD & RHODERA DRIVE	STALLINGS	UNION	46.98	soil groundwater	metals organics
NCD044444735	CROMPTON & KNOWLES CORP.	SPENCER MT RD	LOWELL	GASTON	46.97	soil soil	organics metals
NCD986231967	TOM SADLER ROAD WELLS	TOM SADLER RD	CHARLOTTE	MECKLENBURG	46.92	groundwater groundwater soil	metals organics metals
NCD003183571	WINTERVILLE MACHINE WORKS, INC.	209 S MILL ST	WINTERVILLE	PITT	46.90	soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCN000407188	US 1-15/501 ABERDEEN	US 1 - US 15/501	ABERDEEN	MOORE	46.88		
						soil	metals
						groundwater	organics
NONCD0000081	TRITON, INC	1610 SOUTH WARD BLVD	WILSON	WILSON	46.84		
						groundwater	organics
						groundwater	metals
NCD000830653	CAROLINA P&L CO. ROXBORO STEAM	SR 1377	ROXBORO	PERSON	46.79		
						known/suspected	
NONCD0001001	CLOSED CITY OF HENDERSON LDFL	NC 39 & ST. ANDREWS CHURCH RD		HENDERSON	VANCE	46.74	
						groundwater	organics
						groundwater	metals
NCD003233673	HOOVER REPAIR SHOP	461 N SOUTH STREET SR1669	MT AIRY	SURRY	46.69		
						groundwater	cyanide
						soil	cyanide
						groundwater	metals
						soil	metals
NCD980518211	IRT/IBM CORPORATION	4101 S I-85	CHARLOTTE	MECKLENBURG	46.67		
						groundwater	metals
NCD072012354	SINGER CO/FURNITURE DIV WASHINGTON	STATE ROAD 1175	CHOCOWINITY	BEAUFORT	46.57		
						sediment	organics
						groundwater	organics
						groundwater	metals
						groundwater	pesticides
						soil	organics
NCD041519364	TEXASGULF CHEMICALS COMPANY	HWY 306 NORTH	AURORA	BEAUFORT	46.56		
						soil	organics
						surface water	metals
						groundwater	pesticides
						soil	pesticides
						sediment	organics
						groundwater	organics
						sediment	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD003184249	UNION CARBIDE CORP/EVEREADY	264 BYPASS-EVANS ST EXTN	GREENVILLE	PITT	46.52	groundwater	organics
						groundwater	metals
NC5210022906	USA RESERVE XVIII AIRBORNE CORPS	405 FISHER ST	MOREHEAD CITY	CARTERET	46.51	known/suspected	
NONCD0001049	LEXINGTON FURNITURE IND. PLNT #7	178 LFI COMPLEX LANE	LEXINGTON	DAVIDSON	46.43	groundwater	metals
						groundwater	organics
NCD980844336	UNION CARBIDE BATTERY	5400 HOVIS ROAD	CHARLOTTE	MECKLENBURG	46.30	surface water	organics
						soil	metals
NCSFN0406906	OLD STAKE ROAD	OLD STAKE ROAD	CHADBOURNE	COLUMBUS	46.17	soil	metals
						groundwater	metals
NCD003149663	RADIATOR SPECIALTY COMPANY	1900 WILKINSON BLVD	CHARLOTTE	MECKLENBURG	46.16	soil	metals
						sediment	metals
						soil	organics
						sediment	organics
						groundwater	organics
NCD049772023	H & S PROCESSORS, INC.	NC HIGHWAY 150 WEST	LINCOLNTON	LINCOLN	46.11	groundwater	organics
NCD003216462	UNION CARBIDE CORP/EVEREADY	800 ALBEMARLE RD	ASHEBORO	RANDOLPH	45.97	groundwater	organics
						soil	organics
NCD003467099	CONE MILLS CORP/GRANITE FINISHING	OLD HWY 70	HAW RIVER	ALAMANCE	45.72	groundwater	organics
						soil	metals
NCD003213030	DOUGLAS BATTERY MANUFACTURING	500 BATTERY DR	WINSTON-SALEM	FORSYTH	45.69	groundwater	metals
NCD144192606	PARKER-ZENITH	TAYLOR STREET	ABERDEEN	MOORE	45.67	groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0001074	OLD FORD BLDG	FIFTH ST	TABOR CITY	COLUMBUS	45.62		
						groundwater	metals
						soil	metals
						soil	organics
NCD981015746	CAROLINA ALUMINUM/HERBERT TAYLOR	SR 1125	ROPER	WASHINGTON	45.33		
						soil	organics
NCD003167988	MARANTZ PIANO CO INC/ANEVKA, INC	HWY 64/70 E	MORGANTON	BURKE	45.30		
						groundwater	metals
						soil	metals
						groundwater	organics
						soil	organics
NCD024600579	SUPERIOR PRODUCTS COMPANY	HWY 70A	GREENSBORO	GUILFORD	45.25		
						soil	metals
NCD981473150	CHERRY MT STREET DRUM	602 CHERRY MOUNTAIN	FOREST CITY	RUTHERFORD	45.07		
						soil	metals
NONCD0001022	GIBBS ELECTROPLATING - OLD LOCATION	2229 N DAVIDSON	CHARLOTTE	MECKLENBURG	45.07		
						groundwater	organics
						soil	metals
						groundwater	metals
						soil	organics
NCD980728745	OSHIELDS FLY ASH	SR 1510	BREVARD	TRANSYLVANIA	44.80		
						known/suspected	
NCD000813600	GA-PACIFIC CORP CHIP-N-SAW	HIGHWAY 74 WEST	WHITEVILLE	COLUMBUS	44.79		
						known/suspected	
NCD066327313	FINETEX, INC.	I85 HACKETT ST EXIT	SPENCER	ROWAN	44.77		
						groundwater	organics
						soil	organics
NONCD0001011	JUNG CORPORATION	718 INDUSTRIAL PARK AVE	ASHEBORO	RANDOLPH	44.77		
						groundwater	organics
NCD986228054	KANNAPOLIS PCE SPILL	ENOCHVILLE ROAD	KANNAPOLIS	CABARRUS	44.71		
						groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD980502983	HOPE MILLS LANDFILL	SR 1003/WIRE ROAD	HOPE MILLS	CUMBERLAND	44.50	groundwater	metals
NCD981468622	FORK SWAMP/GRADY WHITE BOAT	SR 1725	AYDEN	PITT	44.49	soil	organics
NCD093334969	S & S METALS RECYCLING COMPANY	SHORTCUT ROAD/SR 2455	GOLD HILL	CABARRUS	44.49	surface water soil	metals metals
NONCD0000060	WATTS REGULATOR-GENERAL AIDES	WITHROW ROAD	FOREST CITY	RUTHERFORD	44.49	soil	metals
NONCD0001079	LES MYERS PARK	LAWNDALE AVENUE EXT.	CONCORD	CABARRUS	44.42	soil	metals
NCD981928088	TEXFI INDUSTRIES, INC/NEW BERN	SR 1317/BOSCH STREET	NEW BERN	CRAVEN	44.30	groundwater	organics
NC0000195743	JIMMY GREEN METALS	BARN HILL CHURCH ROAD	NASHVILLE	NASH	44.29	soil	metals
NCD042891663	MITCHELL ENGR CO/CECO BLDG. DIV.	BYPASS 301	ROCKY MOUNT	NASH	44.27	groundwater soil	organics metals
NCD084167444	STANADYNE, INC/DIESEL SYSTEMS	405 WHITE ST	JACKSONVILLE	ONSLOW	44.22	soil soil	organics metals
NONCD0001034	GEORGE STREET PESTICIDE	SOUTH GEORGE STREET	GOLDSBORO	WAYNE	44.16	soil groundwater	pesticides pesticides
NONCD0000038	AYCOCK PROPERTY	SR 1162 & 1103	WILSON	WILSON	43.92	groundwater	organics
NCN000407206	SHULIMSON BROTHERS SCRAP YARD	MEADOW ROAD	ASHEVILLE	BUNCOMBE	43.79	soil groundwater groundwater	metals organics metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD003164464	UNIROYAL INC/UNIROYAL CHEMICAL	214 W RUBY AVE	GASTONIA	GASTON	43.79	soil	organics
NCD003149556	CTS OF ASHEVILLE, INC.	MILLS GAP RD	SKYLAND	BUNCOMBE	43.44	soil soil surface water surface water	metals organics metals organics
NCN000407447	ABERDEEN CONTAMINATED GRNDWTR	SR 211	ABERDEEN	MOORE	43.39	groundwater	organics
NCD053487765	STRATFORD METAL FINISHINGS, INC.	807 S MARSHALL ST	WINSTON-SALEM	FORSYTH	43.38	soil	metals
NONCD0000043	GREAT LAKES CARBON CORPORATION	307 JAMESTOWN ROAD	MORGANTON	BURKE	43.36	groundwater groundwater	organics metals
NCD082363102	HELENA CHEMICAL COMPANY	HARRY MALLEY RD	LAURINBURG	SCOTLAND	43.32	groundwater soil	pesticides metals
NCD060306727	RICHARDS WC COMPANY, INC.	101 EAST MAPLE STREET	ABERDEEN	MOORE	43.31	soil soil	organics metals
NCD986211274	STONEY FORK CREEK DRUM DUMP SITE	MT. ZION ROAD	DEEP GAP	WILKES	43.31	known/suspected	
NCD980557946	FAIRVIEW LANDFILL	FAIRVIEW ROAD	FAIRVIEW	BUNCOMBE	43.19	known/suspected	
NONCD0001095	MOSES CONE MEMORIAL PARK	BLUE RIDGE PKWY	BLOWING ROCK	WATAUGA	43.19	soil	metals
NCD981022072	BETTIS PROPERTY	1/2 MI. E OF BETTIS RD &	EARL	CLEVELAND	43.16	known/suspected	
NCD980557805	KERR MCGEE CORPORATION	NAVASSA RD	NAVASSA	BRUNSWICK	43.11	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD986197374	OLD RANDLEMAN TOWN DUMP	WALKER MILL ROAD /SR 1961	RANDLEMAN	RANDOLPH	43.05	soil	organics
						groundwater	metals
NCSFN0406953	G&B/FARMER PROPERTY	DOUG HILL FARM RD (SR 1100)	SCOTLAND NECK	HALIFAX	43.04	soil	metals
						soil	organics
NONCD0000027	MEADOWVIEW ROAD	MEADOWVIEW ROAD	GREENSBORO	GUILFORD	43.04	groundwater	organics
NCD986172617	FORBES ROAD WELLS	501 FORBES ROAD	GASTONIA	GASTON	43.02	surface water	organics
						groundwater	organics
NCD048401087	HOOKER FURNITURE	1212 THROWER ROAD	PLEASANT GARDEN	GUILFORD	43.00	groundwater	organics
						soil	organics
						groundwater	metals
NONCD0001102	ENQUIRER JOURNAL	500 W JEFFERSON ST	MONROE	UNION	42.99	groundwater	organics
NCD003230836	DUKE REFINING CORPORATION	2020 JARRELL STREET	HIGH POINT	GUILFORD	42.87	groundwater	organics
						sediment	organics
						soil	organics
NONCD0000025	RANGE ROAD BURN SITE	RANGE ROAD	BUTNER	GRANVILLE	42.80	soil	metals
						soil	organics
NONCD0001090	OLD MILL BLDG	301 FOURTH AVE EAST	HENDERSONVILLE	HENDERSON	42.75	groundwater	organics
NCN000407197	LEARY BROTHERS STORAGE (FORMER)	VIRGINIA & BROAD STREET	EDENTON	CHOWAN	42.74	soil	metals
						soil	organics
						groundwater	organics
						groundwater	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0001016	ROYSTER-CLARK FERTILIZER PLANT	SR 1321	OAK CITY	MARTIN	42.74	groundwater	inorganics
						groundwater	pesticides
						soil	organics
NCD000615872	AMP INCORPORATED	1260 SHANNON-BRADLEY RD	GASTONIA	GASTON	42.72	soil	metals
						soil	organics
						groundwater	metals
NONCD0001105	WETSIG YACHTS	4022 MARKET STREET	WILMINGTON	NEW HANOVER	42.60	groundwater	metals
						soil	metals
NCD130708126	CONSOLIDATED WAREHOUSE	8300 MOORES CHAPEL RD	CHARLOTTE	MECKLENBURG	42.58	soil	organics
						groundwater	organics
						surface water	organics
NCD003198967	GENERAL ELECTRIC CO/CAROLINA	900 N GEORGE ST	GOLDSBORO	WAYNE	42.53	groundwater	metals
NCD045924339	ACME UNITED CORPORATION	HWY 117	FREMONT	WAYNE	42.36	groundwater	metals
NCSFN0407140	CARDINAL CONTAINER SERVICES	138 WALSER ROAD	LEXINGTON	DAVIDSON	42.30	groundwater	metals
						groundwater	organics
NCD000830612	CAROLINA P&L CO. MAYO STEAM	HWY 501	ROXBORO	PERSON	42.13	soil	metals
NC0002374445	GASTONIA INDUSTRIAL TRUCK	HEMPHILL ROAD	GASTONIA	GASTON	42.08	groundwater	organics
NCD043711977	CHEMICAL LEAMAN TANK LINES, INC.	6600 WEST MARKET STREET	GREENSBORO	GUILFORD	42.05	groundwater	organics
NONCD0001072	J & C DYEING	1000 WEST GROVER STREET	SHELBY	CLEVELAND	41.98	groundwater	metals
						groundwater	organics
						soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD002571438	ABC ENGRAVERS	724 NORTH I-85	CHARLOTTE	MECKLENBURG	41.91	groundwater soil groundwater	organics metals metals
NCD980557698	GREENVILLE CITY LANDFILL	FIFTH STREET & CEMETERY RD	GREENVILLE	PITT	41.86	soil	metals
NCD981932023	TARBORO-EDGECOMBE AIRPORT	HWY 44	TARBORO	EDGECOMBE	41.81	soil	organics
NCD003155587	SCOTT AVIATION OF MONROE/TOOL SERV	309 W. CROWELL ST	MONROE	UNION	41.73	soil groundwater	metals organics
NCD981031578	RAINBOW DRIVE BATTERY	SR 1646	KANNAPOLIS	CABARRUS	41.66	soil	metals
NCD991278730	SQUIBB E R & SONS	FLOWERS RD	KENLY	JOHNSTON	41.61	groundwater	organics
NCD986166734	OLD BEAUFORT CO. LANDFILL	FLANDERS FILTERS ROAD	WASHINGTON	BEAUFORT	41.57	groundwater	metals
NCD000830620	CAROLINA P&L CO. WEATHERSPOON	74 EAST	LUMBERTON	ROBESON	41.55	known/suspected	
NONCD0000073	H. M. WADE FURNITURE	SOUTH GRAHAM STREET	CHARLOTTE	MECKLENBURG	41.50	groundwater	organics
NCD002972966	REA MAGNET WIRE COMPANY	OLD LAUREL HILL CHURCH RD	LAURINBURG	SCOTLAND	41.49	surface water soil	organics organics
NCD982124646	GREGSON FUNITURE INDUSTRIES	206 E FRAIZER AVENUE	LIBERTY	RANDOLPH	41.48	soil surface water soil groundwater	metals metals organics metals
NCD003195161	CORNING GLASS WORKS	3900 ELECTRONICS DRIVE	RALEIGH	WAKE	41.47	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NC0002178580	VC CHEMICAL-ALMONT WORKS	US 421 NORTH	WILMINGTON	NEW HANOVER	41.47	soil	metals
NCD980557854	FMC/NIAGARA PESTICIDES	OLD ST HWY 11 NORTH	AYDEN	PITT	41.44	soil	pesticides
						soil	organics
NCD055165609	PANTASOTE INC. FILM/COMPOUND DIV.	1508 S CENTER ST	HICKORY	CATAWBA	41.38	groundwater	organics
						soil	metals
						groundwater	metals
NCD980557771	CHARLOTTE CITY DUMP	HWY 49 - YORK ROAD	CHARLOTTE	MECKLENBURG	41.34	groundwater	metals
NCD991278755	MARTIN'S BATTERY SALVAGE, INC.	ASHLAND RD	KANNAPOLIS	CABARRUS	41.22	soil	metals
NONCD0000047	MEADS AIRFIELD PESTICIDES	SR 1100	WEEKSVILLE	PASQUOTANK	41.22	soil	pesticides
NCN000407241	CHADBOURN BATTERY	US 76/74 & NC 410	CHADBOURN	COLUMBUS	41.21	soil	metals
NCD986171445	BENFIELD CHEMICALS	OLD CANTON CLYDE HWY	CANTON	HAYWOOD	41.20	soil	metals
						soil	organics
						soil	pesticides
NONCD0001099	C & L SURPLUS	1868 HWY 64 W	HAYESVILLE	CLAY	41.20	sediment	metals
NCD980848782	MADISON COUNTY CYANIDE SITE	RT 2/HWY 63	LEICESTER	MADISON	41.20	known/suspected	
NCD062664883	REINCO CHEMICAL COMPANY	EAST 11 ST	ROANOKE RAPIDS	HALIFAX	41.20	soil	organics
						groundwater	organics
NCD024817827	HENREDON FURNITURE	ALTAPASS ROAD	SPRUCE PINE	MITCHELL	41.19	soil	organics
						soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD981016280	DURHAM ANIMAL CLINIC	4306 ROXBORO ROAD	DURHAM	DURHAM	41.13	groundwater	organics
NCD054283189	HOOVER MACHINE SHOP	RATCHFORD ROAD	GASTONIA	GASTON	41.09	groundwater	organics
NCD001704980	WILMINGTON BRANCH/BORDEN/SMITH	NAVASSA ROAD	NAVASSA	BRUNSWICK	40.81	soil groundwater	organics organics
NCD062566047	FASCO CONTROLS CORPORATION	SR 1926	SHELBY	CLEVELAND	40.78	soil soil	organics metals
NONCD0001077	CATAWISSA LUMBER CO	301 LOCUST ST	WEST JEFFERSON	ASHE	40.72	groundwater	organics
NONCD0001040	DOMESTIC LAUNDRY/WASHBURN	801 S MCDOWELL STREET	CHARLOTTE	MECKLENBURG	40.71	groundwater	organics
NCD075570820	PLYMOUTH WOOD TREATING COMPANY	N HWY 45	PLYMOUTH	WASHINGTON	40.68	groundwater	metals
NCD000605097	STATESVILLE ROAD LANDFILL	HWY 21 STATESVILLE ROAD	CHARLOTTE	MECKLENBURG	40.61	soil	metals
NCD982119463	DAYCO LANDFILL CRYME COVE ROAD	SR 1134	WAYNESVILLE	HAYWOOD	40.52	soil	organics
NCD981927908	KIDD LANE BATTERY DISPOSAL	3607 KIDD LANE	CHARLOTTE	MECKLENBURG	40.49	soil	metals
NCD024462327	ACADEMY STEEL DRUM	3213 RIDGE RD	MATTHEWS	MECKLENBURG	40.48	soil surface water surface water soil	organics organics metals metals
NC0000998344	HICKORY GROVE ROAD TCE	HICKORY GROVE ROAD	MCADENVILLE	GASTON	40.46	groundwater	organics
NCD003235066	NEW AGE FURNITURE CO/MILLER TOOL	PROSPECT STREET	LEXINGTON	DAVIDSON	40.42	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD082362989	TUNGSTEN QUEEN MINE/ATLAS MINE	SR 1348	TOWNSVILLE	VANCE	40.34	soil	metals
NONCD0000031	INDEPENDENCE MALL OUTPARCEL	OLEANDER & FORDHAM RDS	WILMINGTON	NEW HANOVER	40.19	groundwater	organics
NONCD0001068	GENCORP PRINTWORLD INC	2011 ROCKY RIVER ROAD	MONROE	UNION	40.18	groundwater soil groundwater	organics metals metals
NCD980838379	ROWE CORP PROPERTY/BOULIGNY SITE	433 W MOREHEAD ST	CHARLOTTE	MECKLENBURG	40.18	soil groundwater	metals metals
NCD986172492	CRESTLINE CONTAMINATED WELLS	ROUTE 211	ABERDEEN	MOORE	40.12	groundwater groundwater	metals organics
NC0000183103	CHEMICAL CARTAGE COMPANY	141 OLD FAYETTEVILLE RD.	LELAND	BRUNSWICK	40.11	soil	organics
NCD093334894	BURLINGTON INDUSTRIES, INC.	PHOENIX STREET	STATESVILLE	IREDELL	40.03	soil groundwater	metals organics
NCD003158094	GLEN RAVEN MILLS	EAST MAIN STREET	BURNSVILLE	YANCEY	40.02	soil	metals
NCD986166379	PILOT MOUNTAIN TIRE FIRE	DAVENPORT ROAD	PILOT MOUNTAIN	SURRY	39.94	known/suspected	
NCSFN0406911	CAROLINA ASSOCIATED MILL	766 HWY 10 W	NEWTON	CATAWBA	39.88	soil	metals
NCN000407700	SPRINGS ROAD GO CART TRACK	4254 SPRINGS RD	CONOVER	CATAWBA	39.86	surface water sediment	organics organics
NONCD0000012	WHITE'S GRAVEL PIT	1515 HWY 49 SOUTH	CONCORD	CABARRUS	39.83	soil	metals

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD986223170	MCBESS INDUSTRIES	OLD HWY 321	HIGH SHOALS	GASTON	39.75	soil sediment	organics metals
NCD980839757	INDIAN GRAVE GAP DRUM DISPOSAL	APPROX 2 MLS N OF SR 1513	LENOIR	CALDWELL	39.69	surface water	metals
NCD986172500	MCLEAN BROTHERS FARM	SR 1415	WAGRAM	SCOTLAND	39.67	soil soil	organics pesticides
NCD048958615	KELLY-SPRINGFIELD TIRE CO/GOODYEAR	NAVASSA RD	FAYETTEVILLE	CUMBERLAND	39.64	soil	organics
NCD986170694	POULOS GROUNDWATER CONT.	SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	39.63	groundwater	organics
NCD986188498	DURA-BUILT ENGINES CO	OFF HWY 55	COATS	HARNETT	39.57	sediment sediment	metals organics
NONCD0001041	MITCHELL & BECKER	1928 SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	39.56	groundwater groundwater soil	organics metals metals
NCD003466919	AXTON-CROSS COMPANY/VAN WATER	3001 HOLTS CHAPEL RD	GREENSBORO	GUILFORD	39.55	groundwater soil	organics organics
NC0001402213	ELLIS JUNK YARD	NEEDMORE DRIVE	HAYESVILLE	CLAY	39.52	soil soil	organics metals
NCD980502827	BROWN #1	SR 1504 VANDERBILT RD	PISGAH FOREST	TRANSYLVANIA	39.30	soil	metals
NCD079066833	LENOIR REFINING COMPANY	263 PENNTON AVE NW	LENOIR	CALDWELL	39.26	soil	organics
NCD003216397	HIGHLAND INDUSTRIES/BURLINGTON IND.	215 DRUMMOND ST/SR 2089	KERNERSVILLE	FORSYTH	39.25	soil groundwater	organics organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD003154960	FLEMING LABORATORIES	2205 THRIFT ROAD	CHARLOTTE	MECKLENBURG	39.24		
						soil	organics
						groundwater	organics
NCD119168813	ANILOX ROLL COMPANY	4840 WALLACE NEAL RD	CHARLOTTE	MECKLENBURG	39.13		
						soil	metals
NCD980557649	GOLDSBORO MUNICIPAL LANDFILL	117 BYPASS	GOLDSBORO	WAYNE	39.01		
						known/suspected	
NCD033978396	ATEC INDUSTRIES	PERKINS DRIVE	ROXBORO	PERSON	38.92		
						groundwater	metals
						soil	organics
						soil	metals
						groundwater	organics
NCD980557607	GLASS, EH COUNTY LANDFILL	1103 NEALTOWN ROAD	GREENSBORO	GUILFORD	38.91		
						known/suspected	
NCN000407686	CARALEIGH PHOSPHATE AND FERTILIZER	1601 LAKE WHEELER ROAD	RALEIGH	WAKE	38.87		
						soil	metals
NCD089914311	MILLER BREWING CO/CONT DIV	1900 BARNES ST	REIDSVILLE	ROCKINGHAM	38.85		
						groundwater	pesticides
						soil	pesticides
NONCD0000079	OLD PINEHURST HOTEL CLEANERS	MCCASKILL ROAD	PINEHURST	MOORE	38.79		
						groundwater	organics
NONCD0000001	STANLY NEWS & PRESS	237 W NORTH STREET	ALBEMARLE	STANLY	38.78		
						soil	metals
NCD003520301	OVERCASH MACHINE SHOP, INC.	865 CONNOR STREET	STATESVILLE	IREDELL	38.69		
						known/suspected	
NCD083678631	SINCLAIR AND VALENTINE CO.	515 S TURNER AVE	CHARLOTTE	MECKLENBURG	38.69		
						soil	organics
						soil	metals
NONCD0000083	CHEESMAN PROPERTY	3251 GREGORY ROAD	ROCKWELL	CABARRUS	38.68		
						known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD105797922	TECHNIBILT/DIV OF WHITTAKER	EAST PEACE ST	NEWTON	CATAWBA	38.61	soil	metals
						soil	organics
NONCD0001018	HWY 49 BATTERY DUMP	NC HIGHWAY 49	CHARLOTTE	MECKLENBURG	38.47	soil	metals
						groundwater	metals
NCD980557623	UNIVERSITY OF NC/ARPT WASTE DISP	AIRPORT RD	CHAPEL HILL	ORANGE	38.47	soil	organics
						groundwater	organics
NONCD0000015	CENTRAL TRANSPORT COMPANY	215 SAMPSON ST	WILMINGTON	NEW HANOVER	38.45	surface water	metals
NONCD0000044	CHEMICAL AND SOLVENTS, INC.	2804 PATTERSON STREET	GREENSBORO	GUILFORD	38.45	soil	organics
NCD986190239	CHEROKEE OIL	925 SOUTH SUMMIT AVE	CHARLOTTE	MECKLENBURG	38.45	soil	metals
NCD081428104	SUN CHEM CORPORATION/GPI DIV	2400 0LD LEXINGTON ROAD	WINSTON-SALEM	FORSYTH	38.41	soil	organics
						soil	metals
NCD052553641	WEYERHAEUSER CO/LEWISTON	HWY 308 W	LEWISTON	BERTIE	38.38	soil	metals
NCD980557615	UNIVERSITY OF NC/OLD SANITARY LDFL	AIRPORT ROAD	CHAPEL HILL	ORANGE	38.25	groundwater	organics
NCD004520136	EATON CORPORATION	ROUTE 501 SOUTH	ROXBORO	PERSON	38.14	groundwater	organics
NCD001871854	FRUEHAUF TRAILER CORPORATION	310 DALTON	CHARLOTTE	MECKLENBURG	38.12	groundwater	organics
NONCD0000055	GLISSON ENTERPRISES	HWY 903	GREENVILLE	PITT	38.12	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NONCD0001076	SOUTHSIDE INVESTMENTS LLC	2222 SOUTH BLVD	CHARLOTTE	MECKLENBURG	38.05	soil	metals
						groundwater	organics
						soil	organics
						groundwater	metals
NONCD0000003	VAN WATERS & ROGERS	ATANDO INDUSTRIAL PARK	CHARLOTTE	MECKLENBURG	38.05	groundwater	organics
						soil	organics
NONCD0000030	COLLINS AND AIKMAN	327 EAST ELM ST.	GRAHAM	ALAMANCE	38.04	groundwater	organics
NCD980844732	CLAYTON BALL FIELD	SR 1709	CLAYTON	JOHNSTON	37.98	soil	pesticides
NCD980557953	FISHBURNE LANDFILL	AIRPORT ROAD	FLETCHER	BUNCOMBE	37.98	groundwater	organics
NCD980503148	SOUTHCHEM LANDFILL	750 EAST MARKHAM AVE	DURHAM	DURHAM	37.98	surface water	organics
						surface water	pesticides
						soil	pesticides
						sediment	pesticides
NONCD0001064	GUILFORD MILLS PLANT	200 DICKENS ROAD	FUQUAY-VARINA	WAKE	37.89	groundwater	organics
NCD980559983	PPG IND., INC./WKS 52	WASHBURN SWITCH ROAD	SHELBY	CLEVELAND	37.89	known/suspected	
NCD003148889	CHAMPION INTERNATIONAL/CANTON MILL	NEWFOUND STREET	CANTON	HAYWOOD	37.79	groundwater	organics
NCD053010724	ICI - AMERICAS, INC.	2130 N TRYON	CHARLOTTE	MECKLENBURG	37.67	known/suspected	
NCD052813250	AMERICAN ENKA COMPANY/BASF	US 19 & 23 WEST	ENKA	BUNCOMBE	37.65	soil	organics
						soil	metals
NONCD0001091	WEST MOREHEAD ST PESTICIDE	147 W MOREHEAD ST	CHARLOTTE	MECKLENBURG	37.62	groundwater	pesticides

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD986171270	HESTA CARILLON PROJECT	WEST TRADE STREET	CHARLOTTE	MECKLENBURG	37.61	groundwater	organics
NONCD0000074	TEXTILE CHEMICAL FACILITY	GRAHAM STREET	CHARLOTTE	MECKLENBURG	37.60	groundwater	organics
NCN000407564	WATHA FIRING RANGE	3311 SHILOH RD	WATHA	PENDER	37.54	groundwater	metals
NONCD0000024	GAITHER TRANSOU PROPERTY	1202 GUILFORD COLLEGE RD	GREENSBORO	GUILFORD	37.52	soil soil	organics metals
NCD062548995	QUORUM KNITTING	REEMS CREEK RD	WEAVERVILLE	BUNCOMBE	37.35	soil	organics
NCD981928021	HOLLINGSWORTH PROPERTY	BROADFOOT AVE & CLARK ST	FAYETTEVILLE	CUMBERLAND	37.34	soil	pesticides
NCD986171338	PEELE CO. PESTICIDE DISPOSAL	NC 42 EAST	CLAYTON	JOHNSTON	37.13	soil soil	pesticides metals
NONCD0000057	WATTS, LEVI PROPERTY	103 FAIRBLUFF ROAD	TABOR CITY	COLUMBUS	37.09	known/suspected	
NCD101750305	INDUSTRIAL PLASTICS, INC.	CLOVER & MCONNELL ROAD	GREENSBORO	GUILFORD	36.97	groundwater	metals
NCD980503098	PFIZER INC/SKATE STADIUM	4500 BLOCK OF HIGH POINT	GREENSBORO	GUILFORD	36.93	known/suspected	
NCD986166759	WILSON SEPTIC PITS	SR 1131	HICKORY	CATAWBA	36.90	soil soil	organics metals
NCD067428821	SIEMENS-ALLIS, INC/SWITCHGEAR DIV	5000 WOMACK ROAD	SANFORD	LEE	36.86	sediment groundwater	organics metals
NCD981022288	C&T REFINERY	4800 SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	36.80	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD980557789	RICHMOND COUNTY LANDFILL	MIZDAH ROAD SR 1992	ROCKINGHAM	RICHMOND	36.64	known/suspected	
NCD003196847	NATIONAL SPINNING COMPANY	WEST 3RD STREET	WASHINGTON	BEAUFORT	36.61	groundwater	organics
NCD981929813	CARBONTON ROAD DRUM SITE	2816 CARBONTON ROAD	SANFORD	LEE	36.60	soil	metals
NCD044447639	CROWN CENTRAL PETROLEUM CORP.	7720 MOUNT HOLLY ROAD	PAW CREEK	MECKLENBURG	36.59	soil groundwater	organics organics
NCD024577421	NORTH CAROLINA SALVAGE CO.	HWY 117 SOUTH	GOLDSBORO	WAYNE	36.38	soil	metals
NCD986188001	CHAMPION INTERNATIONAL LANDFILL #1	SR 1571 & 1573	CANTON	HAYWOOD	36.35	soil	organics
NCD000830919	CAROLINA P&L CO. CAPE FEAR STM	SR 1916	MONCURE	CHATHAM	36.33	groundwater	metals
NCD980712038	SED, INC. SWING COURT	SWING COURT	GREENSBORO	GUILFORD	36.30	known/suspected	
NCD991279118	MEREDITH/BURDA, INC.	ST JAMES CHURCH RD	NEWTON	CATAWBA	36.12	soil	metals
NONCD0001009	SINGER PLANT #2	VIRGINIA STREET	LENOIR	CALDWELL	36.09	soil	organics
NCD986188019	CHAMPION LANDFILL #2	SR 1539	CANTON	HAYWOOD	36.04	soil	organics
NCD981015886	CAROLINA PRODUCTION FINISHING	105 FAIRVIEW RD	ASHEVILLE	BUNCOMBE	35.86	groundwater	organics
NCD981021702	CAMP, LEONARD PROPERTY	SR 2226	EARL	CLEVELAND	35.79	sediment	organics
NCD980557912	GROVE STONE LANDFILL	GROVE STONE ROAD	BLACK MOUNTAIN	BUNCOMBE	35.55	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD070619911	TELEDYNE ALLVAC MONROE PLANT	ASHECRAFT AVE	MONROE	UNION	35.37	soil	metals
NONCD0001028	GURLEY DRIVE LANDFILL	292 GURLEY DRIVE	CONCORD	CABARRUS	35.30	known/suspected	
NCD067437400	GULF OIL CORPORATION	SR 2813	MCLEANSVILLE	GUILFORD	35.22	surface water	metals
NCD003216413	RALEIGH ROAD FURNITURE CORP.	802 WEST CENTER ROAD	LEXINGTON	DAVIDSON	35.22	known/suspected	
NCD044515211	HAYES-ALBION CORP/BRIGGS-SHAFFNER	3760 KIMWELL DR	WINSTON-SALEM	FORSYTH	35.17	soil	metals
NONCD0000006	LITTLEFIELD LANDFILL	NC 11 SOUTH	AYDEN	PITT	35.16	known/suspected	
NCD072028251	TORPEDO WIRE & STRIP, INC.	INSTRUMENT DR	ROCKY MOUNT	NASH	35.10	soil	metals
NCN000407364	QUARTER MASTER AUTO DETAIL	1239 OLD SALEM RD	KERNERSVILLE	FORSYTH	35.09	soil	metals
NCD980559389	TARBORO LANDFILL	BAKER STREET EXTN-SR 1518	TARBORO	EDGECOMBE	35.04	known/suspected	
NCD108702606	HARTSOE BATTERY	2513 LINA AVE	KANNAPOLIS	ROWAN	35.01	soil	metals
NCD003183480	UNION CAMP CORPORATION	524 BROGDEN RD	SMITHFIELD	JOHNSTON	35.01	known/suspected	
NCD024459471	GUYTON BATTERY SERVICE	HWY 401 S	CHADBOURN	COLUMBUS	34.92	soil	metals
NCN000407205	TRI-COUNTY AIRPORT	NC 561	AULANDER	HERTFORD	34.92	soil	pesticides
NCD061795696	UNITEX CHEMICALS	520 BROOME RD	GREENSBORO	GUILFORD	34.91	groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD084171545	HALIFAX COUNTY LANDFILL	SR 1103		HALIFAX	34.81	known/suspected	
NCD981023732	NEUVILLE SOCK PROPERTY	US 64/70 I-40 ACCESS ROAD	HILDEBRAN	BURKE	34.80	soil	metals
NCD986227965	STOLLER CHEMICAL - SEVERN	HIGHWAY 35	SEVERN	NORTHAMPTON	34.73	soil soil	organics pesticides
NONCD0000028	CAROLINA P&L CO. SPRUCE PINE	MOUNTAIN LAUREL DR	SPRUCE PINE	MITCHELL	34.62	known/suspected	
NONCD0001038	BRYANT FARM DRUM DUMP	W OF NC 86 400 FT S OF VA LINE	GATEWOOD	CASWELL	34.61	known/suspected	
NCD000616219	GA-PACIFIC CORP	HWY 1775	HAMLET	RICHMOND	34.61	known/suspected	
NONCD0001048	LEXINGTON FURNITURE IND. PLNT #2	3979 OLD LINWOOD ROAD	LEXINGTON	DAVIDSON	34.53	groundwater soil	organics organics
NONCD0000075	FOAMEX/REEVES BROTHERS	HWY 115	CORNELIUS	MECKLENBURG	34.50	soil	organics
NCD980557672	PITT COUNTY UTILITY LANDFILL	PORT TERMINAL RD	GREENVILLE	PITT	34.38	known/suspected	
NC0001206473	GLEN RAVEN MILLS	TUCKER STREET C	BURLINGTON	ALAMANCE	34.27	groundwater	organics
NCD040042426	AEROQUIP/FAWN PLASTICS	HIGHWAY 264 ALT.	MIDDLESEX	NASH	34.22	groundwater	organics
NCD093132207	VOICE OF AMERICA RELAY STATION	COUNTY ROAD 1212	GREENVILLE	PITT	34.21	known/suspected	
NCD098765506	SINGER CO/FURNITURE DIV BRYSON	GIBBONS AVE	BRYSON CITY	SWAIN	34.16	groundwater	organics
NONCD0001109	FRIENDLY CLEANERS	605 S. PENDER ST	WILSON	WILSON	34.14	soil	organics

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ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD083673616	REEVES BROTHERS	RAILROAD AVE	RUTHERFORDTON	RUTHERFORD	34.10	soil	organics
NONCD0000042	SOUTHMET, INC.	NORTH GREENE STREET	GREENVILLE	PITT	34.04	known/suspected	
NCD000006361	SUPERIOR ELECTRO FINISHES	115 EAST POLO ROAD	WINSTON SALEM	FORSYTH	34.04	soil	metals
NONCD0000041	CIBA-GEIGY	WESTINGHOUSE BLVD	CHARLOTTE	MECKLENBURG	34.01	groundwater soil	organics organics
NCD986209575	CARDINAL CHEMICAL WAREHOUSE FIRE	NC 211 & NC 72	LUMBERTON	ROBESON	33.96	soil	pesticides
NONCD0000078	CAROLINA METAL AND ALLOYS	1016 E. SPRINGFIELD AVENUE	HIGH POINT	GUILFORD	33.72	soil	metals
NCD097361018	KIN PROPERTIES ABANDONED DRUMS	920 EASTWAY DRIVE	CHARLOTTE	MECKLENBURG	33.72	soil	organics
NCD990715658	SOUTHERN MANUFACTURING, INC.	1000 SEABOARD ST	CHARLOTTE	MECKLENBURG	33.72	soil	inorganics
NCD003196193	PIFER INDUSTRIES, INC.	2210 E PETTIGREW ST	DURHAM	DURHAM	33.67	known/suspected	
NONCD0001071	DOE-SPUN	ROUTE 1002	HOLLISTER	HALIFAX	33.63	groundwater	metals
NCD003162500	CONSOLIDATED ENGRAVERS CORP.	311 E 12TH ST	CHARLOTTE	MECKLENBURG	33.51	surface water sediment groundwater groundwater soil surface water soil sediment	metals metals organics metals metals organics organics organics
NCD065295495	TEXFI IMPRESSIONS	PALETOWN RD	GOLDSBORO	WAYNE	33.41	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NONCD0000054	MOORES COMPANY	US 1 BUSINESS & SR 1001	HENDERSON	VANCE	33.35	soil	organics
NCD055550560	GULF ADHESIVES & RESINS/PERKINS	1717 WARD STREET	HIGH POINT	GUILFORD	33.33	groundwater soil	organics organics
NCD000281832	SANFORD PLATING COMPANY	SR 1466	SANFORD	LEE	33.32	soil soil	organics metals
NONCD0000097	MORRIS, NORMAN	HIGHWAY 87 NORTH	ELON COLLEGE	ALAMANCE	33.23	soil	metals
NCD054417308	COASTAL CHEMICAL CORP.	NC 42	CLAYTON	JOHNSTON	33.11	soil	pesticides
NONCD0000096	MASON DRUM STORAGE	42 FIBERVILLE STREET	CANTON	HAYWOOD	32.99	known/suspected	
NCD981928385	JOHN DEERE TRACTOR	HWY 601 AND SR 1413	MOCKSVILLE	DAVIE	32.95	known/suspected	
NCD072018252	GENERAL ELECTRIC CO/MED STEAM	OLD RALEIGH RD	DURHAM	DURHAM	32.88	groundwater	organics
NCD093783876	VANIER GRAPHICS CORPORATION	655 MEADOW RD	EDEN	ROCKINGHAM	32.86	groundwater soil	organics organics
NCD980729479	CAROLAWN COMPANY	1426 W MOUNTAIN ST	KERNERSVILLE	FORSYTH	32.81	soil	organics
NCD000623199	TEXACO INC/FAYETTEVILLE	992 SHAW MILL RD	FAYETTEVILLE	CUMBERLAND	32.56	groundwater	organics
NCD002388965	LACKAWANNA LEATHER CO., INC.	HWY 70A WEST	CONOVER	CATAWBA	32.48	groundwater	metals
NCD981472624	US 70 DRUM DUMP	US 70	MORGANTON	BURKE	32.41	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NONCD0001036	JOYCETON WATER WORKS WELL #2	300 FT N OF SWANSON RD	LENOIR	CALDWELL	32.38	groundwater	organics
NONCD0001037	JOYCETON WATER WORKS WELL #9	600 FT N OF SWANSON RD	LENOIR	CALDWELL	32.38	groundwater	organics
NCD980502892	CREEK BRIDGE/BORDEN CHEMICAL	US HWY 24-87 (GROVE ST)	FAYETTEVILLE	CUMBERLAND	32.35	known/suspected	
NCD095470332	THONIT A SIMMONS COMPANY	11900 STEELE CREEK ROAD	CHARLOTTE	MECKLENBURG	32.33	soil soil	metals organics
NCD080885551	DAUGHERTY CHEMICAL COMPANY	307 WALKER STREET	DURHAM	DURHAM	32.27	soil	metals
NCD980848766	GIBBS ELECTROPLATING	5210 HOVIS ROAD	CHARLOTTE	MECKLENBURG	32.27	soil	metals
NCD980847123	HURT RESIDENCE	HWY 64	MORGANTON	BURKE	32.27	soil	organics
NCD980502793	APEX SANITARY LANDFILL	HIGHWAY 55	APEX	WAKE	32.16	known/suspected	
NONCD0001006	WESTINGHOUSE TURBINE	WESTINGHOUSE ROAD	CHARLOTTE	MECKLENBURG	31.94	soil	organics
NCD003221868	CENTURY FURNITURE COMPANY	401 11TH ST NW	HICKORY	CATAWBA	31.90	soil	metals
NONCD0000084	THERMO PRODUCTS, INC.	800 JONES STREET	DENTON	DAVIDSON	31.77	soil soil	metals organics
NCD980799019	CHEROKEE OIL	1201 BERRYHILL ROAD	CHARLOTTE	MECKLENBURG	31.76	surface water soil soil	metals metals organics
NCD980559330	NASH COUNTY LANDFILL/SR 1524	SR 1524	RED OAK	NASH	31.76	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD083669952	STORY BURIAL AREAS/UNION CHEMICAL	6101 ORR ROAD	CHARLOTTE	MECKLENBURG	31.76	groundwater	organics
NONCD0000059	DAYCO COCHRAN LANDFILL	RT 1 HYATT CREEK ROAD	WAYNESVILLE	HAYWOOD	31.71	soil	organics
NCSFN0407143	AMERICAN ELEMENTS	500 WALLACE ST	FARMVILLE	PITT	31.68	soil	metals
NCD986180883	CCFC PESTICIDE DISPOSAL	607 HILLSBOROUGH STREET	OXFORD	GRANVILLE	31.67	known/suspected	
NCD980557847	KAISER ACME FARMARKET	SR 1870	RIEGELWOOD	COLUMBUS	31.60	soil groundwater	pesticides organics
NCD980845119	BUCKHORN PESTICIDES	NC 581 & NC 42	WILSON	WILSON	31.36	soil soil	pesticides organics
NCD003229762	STRUCTURAL WOODS PRESERVING CO.	HWY 22	COLERIDGE	RANDOLPH	31.34	soil groundwater	metals metals
NCSFN0406924	VC CHEMICAL	STAMBACK FERRY RD	WADESBORO	ANSON	31.34	soil	metals
NCD000828566	TARTAN MARINE PROPERTY	NC HIGHWAY 77 & SR 2032	HAMLET	RICHMOND	31.33	soil	metals
NCD981863814	LANCASTER PLATING	802 EDWARDS ROAD	LILLINGTON	HARNETT	31.32	soil	metals
NONCD0001015	MARY CIRCLE BATTERY	ZION CHURCH & MARY CRL	CONCORD	CABARRUS	31.18	soil	metals
NCD045451473	ACE CHEMICAL CORPORATION	9801 YORK ROAD	CHARLOTTE	MECKLENBURG	31.05	soil groundwater	organics organics
NCD049845266	STANLEY CASE GOODS (FORMER)	HWY 211	WEST END	MOORE	31.01	groundwater	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NONCD0000019	SIR WALTER GUN CLUB	US 64	RALEIGH	WAKE	30.96	soil	metals
NONCD0000070	BENFIELD SANITATION SERVICE	1809 W FRONT ST	STATESVILLE	IREDELL	30.87	known/suspected	
NCD980843460	GRANT CREEK WWTP	CRUSE ROAD	SALISBURY	ROWAN	30.66	soil	organics
NCD003195963	WESTINGHOUSE ELEC METER & LIGHT	US 1 N	RALEIGH	WAKE	30.57	soil soil	metals organics
NCD024740433	EC MANUFACTURING	413 N. POLK STREET	PINEVILLE	MECKLENBURG	30.45	soil	metals
NONCD0001033	AMERICAN CONTRACT COATINGS	HWY 55	APEX	WAKE	30.43	known/suspected	
NONCD0001067	CC DICKSON	1524 SOUTH BOULEVARD	CHARLOTTE	MECKLENBURG	30.43	groundwater soil	organics organics
NCD003938586	CORNING GLASS WORKS	310 NORTH COLLEGE ROAD	WILMINGTON	NEW HANOVER	30.37	known/suspected	
NCD981031693	KEENER LANDFILL	SR 1820	CLINTON	SAMPSON	30.30	soil	organics
NCSFN0406962	VINEGAR HILL LEAD SITE	HWY 701 N	TABOR CITY	COLUMBUS	30.30	soil	metals
NONCD0001065	OLD CHARLOTTE LDFL/VANGUARD	SEVENTY SEVEN CENTER DRIVE	CHARLOTTE	MECKLENBURG	30.26	groundwater	organics
NC0000998336	CP PROPERTIES	2350 BROWN ROAD	SANFORD	LEE	30.23	sediment soil soil	metals metals organics
NCD000616516	SCOVILL INC/SECURITY PRODUCTS	HWY 74 E	MONROE	UNION	30.21	soil soil	metals organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD003186004	INTERNATIONAL PAPER RICHMOND	2215 S. WILMINGTON STREET	RALEIGH	WAKE	30.10	soil groundwater	organics organics
NCD024762668	BUSH BROTHERS PLATING INC/GREER	107 NE MARKET ST	REIDSVILLE	ROCKINGHAM	30.05	known/suspected	
NONCD0000035	CHAPEL STREET BATTERY DUMP	CHAPEL STREET	KANNAPOLIS	ROWAN	30.00	known/suspected	
NCD980557722	HARRISBURG BATTERY	HIGHWAY 49	HARRISBURG	CABARRUS	30.00	soil	metals
NCD067392175	TRAMCO, INC.	SR 1611	CONNELLY SPRINGS	BURKE	29.87	soil	organics
NCD057248759	PATCH RUBBER POND	GRACE BOULEVARD	ROANOKE RAPIDS	HALIFAX	29.82	soil	organics
NCD003213568	LIBERTY FURNITURE CORP/CHROMCRAFT	HWY 421	LIBERTY	RANDOLPH	29.60	soil	organics
NCD986170678	WOOD ROAD DRUM BURIAL	WOOD ROAD/CR 2641	GASTONIA	GASTON	29.44	known/suspected	
NCD049845548	REICHHOLD CHEMICAL, INC.	SR 1916	MONCURE	CHATHAM	29.33	soil	organics
NCD003218161	CORNELL-DUBILIER ELECTRONICS	2652 DALYRUMPLE STREET	SANFORD	LEE	29.02	groundwater soil	organics organics
NONCD0001106	MICROTON ABRASIVES, INC	10242 RODNEY BLVD	PINEVILLE	MECKLENBURG	28.94	groundwater soil	organics organics
NCD991278714	CAROCHEM, INC.	540 GULF ST	DURHAM	DURHAM	28.72	soil	organics
NONCD0001050	LEXINGTON FURNITURE IND. PLNT #12	3301 COTTON GROVE LANE	LEXINGTON	DAVIDSON	28.59	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD980843528	TOWN CREEK REGIONAL WWTP	HEILIGTOWN ROAD	SALISBURY	ROWAN	28.50	known/suspected	
NCD048184451	BURLINGTON HOME CHAIR	HIGHWAY 268	RONDA	WILKES	28.49	known/suspected	
NCD000828616	USS AGRI-CHEMICALS FARM SERVICE	HWY 701	WHITEVILLE	COLUMBUS	28.45	known/suspected	
NCD003186178	COASTAL CHEMICAL CORP.	EVANS ST EXT	GREENVILLE	PITT	28.33	soil	pesticides
NCD991278581	BURLINGTON FURNITURE/LUMBER PL	US 64 EAST	LEXINGTON	DAVIDSON	28.12	known/suspected	
NCD980483275	HELENA CHEMICAL COMPANY	DENNIS STREET EXTENSION	ENFIELD	HALIFAX	28.04	soil soil soil	organics pesticides metals
NCD003151651	WILLARD SMELTING CO.	101 NEWBERN ST	CHARLOTTE	MECKLENBURG	27.86	soil	metals
NCD991278839	NORTH STATE CHEMICALS	3301 SPRING GARDEN ST	GREENSBORO	GUILFORD	27.60	soil soil	organics metals
NCD990867855	FAWN PLASTICS CO., INC.	317 JEFFREYS ROAD	ROCKY MOUNT	NASH	27.52	known/suspected	
NONCD0001030	BLR	2911 LEE AVENUE	SANFORD	LEE	27.50	groundwater soil	organics organics
NONCD0000013	CAROLINA HARDWOODS	158 FACTORY STREET	WILLIAMSTON	MARTIN	27.49	surface water	metals
NCD024770125	BURLINGTON FURNITURE	ATOAH STREET	ROBBINSVILLE	GRAHAM	27.10	soil	organics
NONCD0000091	DUKE POWER/WALNUT COVE	POWER HOUSE ROAD	WALNUT COVE	STOKES	26.95	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD980557664	BURLINGTON INDUSTRIES, INC.	US 1 NORTH	RALEIGH	WAKE	26.86	soil	organics
NCD024468597	CHARLOTTE STEEL DRUM	2900 WEST TRADE STREET	CHARLOTTE	MECKLENBURG	26.67	known/suspected	
NCD003213881	BENDIX CORPORATION	I-85 INNES ST EXIT	SALISBURY	ROWAN	26.36	soil	metals
NCD986166288	WOODY'S TIRE FIRE	HIGHWAY 321	GASTONIA	GASTON	26.35	known/suspected	
NCD990868168	INMONT CORP/BASF CORPORATION	1701 W WESTINGHOUSE BLVD	CHARLOTTE	MECKLENBURG	26.22	soil groundwater	organics organics
NCD003218492	CAROLINA RUBBER HOSE COMPANY	1801 SOUTH RAILROAD	SALISBURY	ROWAN	26.04	soil soil	organics metals
NCD003464765	VAUGHAN-BASSETT FURNITURE CO.	ROUTE 268 EAST	ELKIN	SURRY	25.93	soil	organics
NONCD0001039	OVERCASH GRAVEL & GRADING CO. INC.	1150 SHELTON ROAD	CONCORD	CABARRUS	25.71	known/suspected	
NCD980602791	SALVAGE OIL OF AMERICA	1227 MCLEOD STREET	ROCKINGHAN	RICHMOND	25.68	soil	organics
NCD000822130	HARRELSON RUBBER COMPANY	HWY 220 SOUTH	ASHEBORO	RANDOLPH	25.45	known/suspected	
NCD990715070	NEW HANOVER CY & CAROLINA LDFL	SR 1534/DOW RD	CAROLINA BEACH	NEW HANOVER	25.42	known/suspected	
NCD003200656	FEATHER PROCESSORS, INC	HWY 117 NORTH	ROSE HILL	DUPLIN	25.30	soil	metals
NCD980503031	MILAN YARD LANDFILL	NORTH ST. EXT. MILAN ROAD	FAYETTEVILLE	CUMBERLAND	25.25	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD000609974	UNION OIL CO. SE TERM	6801 W MARKET ST	GREENSBORO	GUILFORD	24.94	groundwater soil	organics organics
NCSFN0406894	STALLINGS SALVAGE	SECREST AVE	MONROE	UNION	24.89	known/suspected	
NCD981003957	HENSON LANDFILL	US HIGHWAY 221 SOUTH	FOREST CITY	RUTHERFORD	24.35	soil	organics
NCD980559355	NASH COUNTY LANDFILL/SR 1145	STATE RD 1145	SPRING HOPE	NASH	24.18	known/suspected	
NONCD0000048	WALKER DRUM DISPOSAL	WYATTS CHURCH GROVE ROAD	GOLD HILL	ROWAN	23.80	soil soil	metals organics
NCD077821296	SOUTHERN RESIN/US INDUSTRIES INC	1510 DENTON ROAD	THOMASVILLE	DAVIDSON	23.62	groundwater	organics
NCD003189024	BORDEN CHEMICAL FAYETTEVILLE PLANT	1411 INDUSTRIAL DR	FAYETTEVILLE	CUMBERLAND	23.51	groundwater groundwater	organics metals
NCD982174492	NATIONAL PIN	SR 1572	SARATOGA	WILSON	23.37	known/suspected	
NCD077838589	THOMASVILLE FOREST PRODUCTS	CLARKSBURY CHRUCH ROAD	THOMASVILLE	DAVIDSON	23.10	soil	metals
NCD980838551	MCDOWELL FIREMAN ASSOCIATION SITE	SR 1214 GREENLEE ROAD	MARION	MCDOWELL	23.09	known/suspected	
NONCD0000087	HARPER CRAWFORD BAG CO.	401 PARKWOOD AVE	CHARLOTTE	MECKLENBURG	22.93	soil soil soil	metals pesticides organics
NCD096158696	BURLINGTON INDUSTRIES, INC.	6008 HIGH POINT RD	GREENSBORO	GUILFORD	22.43	soil groundwater groundwater soil	organics metals organics bases

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	Site Name	Site Address	City	County	Score	Medium	Contaminants
NCD980557888	LENOIR CITY LANDFILL	904 VIRGINIA STREET	LENOIR	CALDWELL	22.42	soil	organics
NCD024583288	AIR PRODUCTS AND CHEMICALS, INC.	115 SOUTHERN OXYGEN RD	GREENSBORO	GUILFORD	22.39	soil	organics
NCD980502934	FAYETTEVILLE LANDFILL	GRAY STREET	FAYETTEVILLE	CUMBERLAND	21.97	known/suspected	
NCD071579528	FORBUSH METAL	SPEER BRIDGE ROAD	YADKINVILLE	YADKIN	21.90	soil soil soil	organics metals cyanide
NCD980503106	SANITATION SERV LAND	SR 1743	SAINT PAULS	ROBESON	21.66	known/suspected	
NONCD0001027	CROWDERS MOUNTAIN STATE PARK	CROWDERS MOUNTAIN STATE PK	GASTONIA	GASTON	21.57	known/suspected	
NCD003236841	WARLICK PAINT COMPANY	945 MONROE ST	STATESVILLE	IREDELL	21.47	known/suspected	
NCD986232213	SUMMIT RESOURCE MANAGEMENT	3501 GRIBBLE ROAD	STALLINGS	UNION	21.45	surface water soil soil	organics inorganics organics
NCD000776732	SAFETY-KLEEN CORP 3-031-02	HWY 41W	WALLACE	DUPLIN	21.26	known/suspected	
NCD003223799	CLAYTON-MARCUS CO., INC.	HWY 127 N	BETHLEHEM	ALEXANDER	21.11	soil soil soil	organics metals cyanide
NCD054284518	STANDARD PACKAGING CORPORATION	HWY 73 W	MT GILEAD	MONTGOMERY	21.07	known/suspected	
NCD003214574	SPRUANCE SOUTHERN, INC.	HWY 8	WINSTON-SALEM	FORSYTH	20.81	known/suspected	

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NCD046149019	HISTRAND CHEMICAL, INC.	HWY 9	LENOIR	CALDWELL	20.72	known/suspected	
NONCD0001062	SWAIM'S TRUCK PARTS & SERVICE	WELCOME AVENUE	HENDERSON	VANCE	20.15	soil soil	metals organics
NCD980559637	BEAUNIT CORP./DYING & FINISHING	LINEBERGER STREET	LOWELL	GASTON	19.99	known/suspected	
NCD980502850	CABARRUS DISPOSAL COMPANY, INC.	SR 1152	CONCORD	CABARRUS	19.86	known/suspected	
NONCD0001005	TRANSEASTERN CORP.	509 S LODGE ST	WILSON	WILSON	19.56	known/suspected	
NCD048462881	ARMOLOY CO OF NC/HI-TECH	1603 SALISBURY ROAD	STATESVILLE	IREDELL	19.37	known/suspected	
NCD003152659	REICHHOLD CHEMICAL, INC.	161 BUFFALO RD	CONCORD	CABARRUS	19.32	known/suspected	
NCD003162666	CANNON MILLS COMPANY/FIELDCREST	HWY 29 & 601	KANNAPOLIS	CABARRUS	19.31	known/suspected	
NCD053528170	LAURENS GLASS/BALL-INCON GLASS PK	US 1 SOUTH	HENDERSON	VANCE	19.23	groundwater	organics
NCD981921083	SWIFT ADHESIVES	9724 INDUSTRIAL DRIVE	PINEVILLE	MECKLENBURG	19.19	known/suspected	
NCD003225620	HIGH POINT FURNITURE INDUSTRIES	CORPORATION DRIVE	HIGH POINT	GUILFORD	19.14	soil	organics
NONCD0000014	BOISE CASCADE	SR 1916	MONCURE	CHATHAM	18.86	known/suspected	
NONCD0000092	FUNDER AMERICA	200 FUNDER RD	MOCKSVILLE	DAVIE	18.33	known/suspected	
NCD067178707	FAWN PLASTICS CO., INC.	RT 264 BUSINESS	MIDDLESEX	NASH	17.34	soil	organics

TABLE 3. INACTIVE HAZARDOUS WASTE SITES PRIORITY LIST (In Order By Score)

ID Number	*Site Name*	*Site Address*	*City*	*County*	*Score*	*Medium*	*Contaminants*
NONCD0000034	ASHEVILLE INDUSTRIES	20 GLEN BRIDGE RD(SR3495)	ARDEN	BUNCOMBE	16.30	soil	organics
NCD071567259	WEYERHAEUSER CO/MONCURE	STATE ROAD 1916	MONCURE	CHATHAM	16.04	known/suspected	
NONCD0000053	CAROLINA MARBLE CO.	INDIAN MOUND ROAD	ALBEMARLE	STANLY	15.28	surface water	
NONCD0000099	PARTON'S MOTOR COMPANY	2800 SOUTH YORK ROAD	GASTONIA	GASTON	15.22	known/suspected	
NCD085082311	AMERICAN COLORS INCORPORATED	831 MORETZ AVE	CHARLOTTE	MECKLENBURG	14.85	known/suspected	
NONCD0000082	CAPE FEAR CHEMICALS/HL BRICE	HWY 701 S	ELIZABETHTOWN	BLADEN	11.48	soil	pesticides
NCD081333858	HOLSTON ENERGY INC/HOLSTON FUEL	HWY 19A/235 BYPASS	WAYNESVILLE	HAYWOOD	7.70	soil	organics

II. SITES THAT MAY OR ARE KNOWN TO REQUIRE USE OF THE INACTIVE HAZARDOUS SITES CLEANUP FUND

Purpose of the Fund

The Inactive Hazardous Sites Cleanup Fund is used to: (1) address imminent hazard sites; (2) pay for assessment and cleanup when responsible parties do not comply with orders to clean up sites; (3) pay for assessment and cleanup of sites that do not have financially-viable responsible parties (orphan sites); and (4) pay for state-contracted survey and legal assistance necessary to prepare notices of Inactive Hazardous Substance or Waste Disposal Sites where owners do not comply with orders to conduct such work. The state must attempt to recover its expenditures from responsible parties in the first, second and fourth cases.

The Inactive Hazardous Waste Sites Priority List helps determine priorities for cleanup. Responsible parties for top priority sites are encouraged to voluntarily clean up their sites. When a responsible party does not comply with a request and subsequent order to clean up a site, the State must perform the cleanup using the Inactive Hazardous Sites Cleanup Fund. The demand for state funds to conduct site cleanups depends on two factors: 1. how often responsible parties refuse to comply with orders to conduct cleanup; 2. the number of sites that lack financially-viable responsible parties. To date, the program has been successful in obtaining cleanup by responsible parties. Funds are mainly needed for orphan sites where the responsible party either cannot be located or has no financial resources.

The statute requires that the program report the list of sites known to require funds and the list of sites suspected to require funds for cleanup. Determining if responsible parties exist (and thus, if funds are needed) is often a complex and lengthy process. This information can become dated as owners and operators of the facilities change over time. To avoid the need to update the information several times, responsible party research is not done until a site is next in priority for action. For this reason, the total number of orphan sites on the SPL requiring state funds is not presently known.

Orphan Chemical Sites

The October 2003 report identified 39 orphaned chemical waste sites. Of these, 33 were noted to have attributes that made them a high priority. Since that report, two sites (Bone Farm Pesticide Site in Nashville and Cartrette Field in Chadbourn) have been cleaned up using the Inactive Hazardous Sites Fund. The Fund will pay to remove most of the waste from a third (Mary Circle Battery in Concord). An additional 11 sites are now in bankruptcy and thus orphaned. DENR hopes to obtain some funds for addressing these sites through bankruptcy claims, but the funds most likely will be insufficient to address all of the contamination. Thus a total of 48 orphaned sites will require funds for cleanup. The remaining money now in the Inactive Hazardous Sites Fund, not committed to addressing the Texfi, Inc. site described below, will be expended by the end of 2004 to conduct groundwater sampling in an area of threatened drinking water wells at the Gaither Transou site in Greensboro.

In addition to these orphan sites, the branch has been expending cleanup funds to address the serious threat to public health and the environment posed by the Texfi, Inc. site in Fayetteville, Cumberland County. Groundwater contaminated with hazardous substances has migrated from

Texfi to the adjoining City of Fayetteville's Hoffer Water Plant property. The contaminated groundwater is in contact with the city's primary finished drinking water holding tank. This tank sits, in part, below the groundwater table. The tank's construction and the nature of its water flow make it possible for contaminated groundwater to enter the tank. In addition, the city's drinking water intakes on the Cape Fear River, 450 feet downstream from the Texfi property, and a city park adjoining the Texfi property, are also concerns. Thus far, analyses indicate the drinking water has not been affected.

DENR used cleanup funds to construct a barrier wall in 2001 to prevent additional flow of contaminated water toward the tank. Extraction wells were installed to remove some of the contaminated water that had already passed on to the water plant property and around the tank. Groundwater contaminant concentrations in the area between the wall and the tank have declined since initiating this action. The construction of the barrier wall, the removal of contaminated groundwater from between the wall and the tank and monitoring of the city's drinking water are being conducted as immediate protective measures. These activities will not clean up the larger groundwater contaminant plume or its sources at the Texfi site. With $50,000 in additional funding from the legislature in the 04-05 budget year and reducing the frequency of sampling we are able to extend the monitoring of the clear well and the groundwater in that area to about September of 2006.

There is a risk that the barrier wall will fail overtime. Thus it is important to remove the source of the groundwater contamination on the Texfi property. The sources are solvents in the subsurface and contaminated soils.

Settlement of North Carolina's bankruptcy claim against the Texfi estate mandated that a portion of the proceeds from the estate's law suits and property sales are to be placed in a trust fund to conduct the removal of contaminant sources. We do not know how long it may take to generate sufficient funds or how much money will result. To date we have received $225,000. This is in no way sufficient to initiate source removal action effectively. As soon as sufficient monies accrue, work will promptly begin. After removing the sources contributing to groundwater contamination, it could take many years before significant reductions in groundwater contaminant concentrations occur.

Unlined Landfills

Hundreds of old unlined landfills have been cataloged in the state. Based on information from landfills across the country, most will likely have groundwater contaminated with hazardous substances. The branch had previously received funds to determine the location and current use of these sites. This work was completed in a total of 38 of the 100 counties. We continue to conduct location work in the other counties with some limited federal funding. To date, we have completed field surveys of 282 old landfills. Of the landfills inspected, 204 are considered priorities. This is due to a drinking water source, a residence, a school, a church, or a daycare on the property or within 1,000 feet of the landfill.

We can estimate the number of old, unlined landfills that pose the greatest hazard by using the following equation:

Number of landfills with exposure concerns (204) ÷ number of landfills surveyed thus far (282) X total number of landfills in inventory (750) = estimated 543 landfills with potential exposure concerns.

Almost without exception, these landfills were operated either by private individuals with limited financial resources or by counties and municipalities that operated in the public interest and did not make a profit. Thus, these sites may be considered to have no responsible parties available to pay for any corrective measures required.

Cleanup Funds Needed

There are a total of 798 orphan chemical sites and old unlined landfills that remain to be addressed. Of these, 235 are considered high priorities due to exposure concerns (the 31 remaining known priority chemical sites not cleaned up and the 204 old landfills that have been inspected and found to have exposure concerns). Based on the average cost expended per site for the recent orphan cleanups conducted, another $177,913 per site or $5,515,303 for 31 sites or $41,809,555 for 235 sites will be needed.

The Texfi, Inc. site has no other responsible parties. The federal government has already indicated the site is not a candidate for a cleanup under Superfund. Drinking water for the entire population of the City of Fayetteville is threatened. The legislature has provided $50,000 in the 04-05 budget to continue operation of the interim protective remedy (the operation of the groundwater extraction well system and sampling) while bankruptcy funds accrue to a level that can support a source area removal. It may be years before groundwater contaminant concentrations drop as a result of any removal. Funds are currently available to continue the operation of the interim remedy and sampling through September 2006.

As of July 1, 2004, the balance of the Inactive Hazardous Sites Cleanup Fund totaled $140,097.10. Of this, $100,321 is committed to continue the operation of the Texfi interim remedy through September of 2006. The remaining $39,776.10 will be expended by the end of calendar year 2004 to cleanup as much waste at possible at the third ongoing orphan cleanup (Mary Circle Battery in Concord) being conducted with fund monies and to conduct some groundwater sampling around threatened wells at the Gaither Transou site in Greensboro.

III. NATIONAL PRIORITIES LIST SITES REQUIRING A STATE COST SHARE

National Priorities List sites are those hazardous substance or waste disposal sites that are priorities for cleanup under the federal Comprehensive Environmental Response, Compensation and Liability Act, more commonly known as Superfund. North Carolina has 28 NPL sites.

The NPL includes both sites with financially-viable responsible parties and orphan sites. Cleanup costs are financed either by responsible parties or by a federal trust fund with a state cost share. When the federal trust fund is used, CERCLA requires North Carolina to pay 10 percent of the cleanup cost plus 100 percent of the cost to operate and maintain the remediation system.

Table 4, found on page 47, provides a list of the North Carolina NPL sites, their locations, investigation/cleanup status, estimated costs, and projected start dates for cleanup. Part I, found on page 47, includes those sites where the Federal Trust Fund/North Carolina cost share is required. A summary of North Carolina's cost share obligations is provided at the end of this part. Part II, found on page 49 includes the status of responsible party funded cleanups.

TABLE 4. NORTH CAROLINA NATIONAL PRIORITIES LIST SITES
PART I - SITES WHERE FEDERAL TRUST FUND/NORTH CAROLINA COST SHARE IS REQUIRED

NPL Site	*City/County*	*Operable Unit*	*Cleanup Status*	*Estimated Cost*	*Cleanup Start Date***
ABC One Hour Cleaners	Jacksonville, Onslow	OU1-Groundwater	RA	$3,760,000	In Progress
		OU2-Soil	RA	$750,000	In Progress
Barber Orchard	Waynesville, Haywood	Entire Site	RI	Not Determined	2005
Benfield Industries	Waynesville, Haywood	Entire Site		$6,729,200	
		Soil	RA		Complete
		Groundwater	RA		In Progress
Cape Fear Wood Preserving	Fayetteville, Cumberland	Entire Site		$24,407,574	
		Soil	Complete		Complete
		Groundwater	RA		In Progress
Carolina Transformer	Fayetteville, Cumberland	Entire Site		$22,000,000	
		Soil/Sediment	RA		In Progress
		Groundwater	RD		2005
Davis Park Road TCE	Gastonia, Gaston	Groundwater	RA	$3,873,299	In Progress
FCX, Inc.-Statesville	Statesville, Iredell	OU1-Groundwater	RA	$4,161,525	In Progress
		OU2-Soil	Complete	$6,000,000	Complete
FCX, Inc.-Washington	Washington, Beaufort	OU1-Groundwater	RI	Not Determined	2005
		OU2-Soil/ Surface Water/ Sediment	Complete	No Cost Share	Complete
North Belmont PCE	Belmont, Gaston	Groundwater	RA	$7,535,000	In Progress
Potter's Septic Tank Service	Maco, Brunswick	Soil	Complete	$8,350,000	Complete
		Groundwater	RA		In Progress
Ram Leather	Mint Hill, Mecklenburg	Soil	RD	$926,000	2004
		Groundwater	RD	Not Determined	Not Determined

TABLE 4. NORTH CAROLINA NATIONAL PRIORITIES LIST SITES
PART I - SITES WHERE FEDERAL TRUST FUND/NORTH CAROLINA COST SHARE IS REQUIRED

Reasor Chemical	Castle Hayne,	New Hanover	Entire Site	RD/RA	$2,000,000	2005
Ward Transformer	Raleigh, Wake		Entire Site	FS	Not Determined	Not Determined

SUMMARY OF NORTH CAROLINA COST SHARE REQUIREMENTS
As of July 1, 2004

Estimated total cost of pending/ongoing federal trust fund/N.C. cost share cleanups:	$90,492,598*
N.C.'s 10 percent cost share for pending/ongoing cleanups:	$9,049,260*
Fund disbursements for cost share payments:	$5,423,173
Current fund balance:	$5,125,107
Encumbered amount of the fund balance for cost share payments:	$3,333,485

* This number will increase due to remedial action cost estimates not being available for all sites. Also, other sites may be added to the National Priorities List which will require a state cost share.

** Date applies to either entire site or operable unit.

OU – Operable Unit
RA – Remedial Action
RD – Remedial Design
RI – Remedial Investigation

TABLE 4. NORTH CAROLINA NATIONAL PRIORITIES LIST SITES
PART II - RESPONSIBLE PARTY FUNDED CLEANUPS

NPL Site	*City/County*	*Operable Unit*	*Cleanup Status*
Aberdeen Pesticides	Aberdeen, Moore	OU1 & OU4 - Soils-All Sites	Complete
		OU3-Groundwater for FC, TS, F6	RA In Progress
		OU5-Groundwater for Rt 211 & McIver	RA In Progress
Bypass 601/Martin Scrap	Concord, Cabarrus	OU1-Soil/Sediment at Martin Scrap	O & M
		OU2-Off-Site Soil/Sediment	Complete
		OU3-Groundwater	O & M
Charles Macon Lagoon and Drum	Cordova, Richmond	Soil	Complete
		Groundwater	O & M
Celanese Corporation	Shelby, Cleveland	OU1-Groundwater	O & M
		OU2-Soil	Complete
		Surface Water	Complete
Chemtronics, Inc.	Swannanoa, Buncombe	Soil	O & M
		Groundwater	O & M
FCX, Inc.	Statesville, Iredell	OU3-Burlington Industries Site	RA In Progress
Geigy Chemical	Aberdeen, Moore	Soil	Complete
		Groundwater	RA In Progress
General Electric/ Shepard Farm	East Flat Rock, Henderson	Soil	O & M
		Groundwater	O & M
		Surface Water/Sediment	Complete
Jadco-Hughes	Belmont, Gaston	Soil/Sediment	RA In Progress
		Groundwater	RA In Progress
JFD Electronics/ Channel Master	Oxford, Granville	Soil	Complete
		Groundwater	O & M

TABLE 4. NORTH CAROLINA NATIONAL PRIORITIES LIST SITES
PART II - RESPONSIBLE PARTY FUNDED CLEANUPS

NPL Site	*City/County*	*Operable Unit*	*Cleanup Status*
Koppers Company, Inc.	Morrisville, Wake	Soil	Complete
		Groundwater	O & M
		Surface Water	Complete
Martin Marietta/Sodyeco	Charlotte, Mecklenburg	Soil	RA In Progress
		Groundwater	RA In Progress
National Starch & Chemical	Salisbury, Rowan	OU1-Groundwater in Western Part of Site	O & M
		OU2-Trench Area Soil/Surface Water	O & M
		OU3-Area 2 Groundwater/Wastewater Treatment Area/Surface Water/ Sediments in NE Tributary	O & M
		OU4-Area 2 Soil/Wastewater Treatment Lagoon Area	O & M
New Hanover County Airport	Wilmington, New Hanover	Groundwater	RA In Progress
NCSU	Raleigh, Wake	Soil	Complete
		Groundwater	Start 2004
USMC Camp LeJeune	Jacksonville, Onslow	Multiple Units	Various Stages
Cherry Point	Cherry Point, Craven	Multiple Units	Various Stages

RA – Remedial Action
O & M - Operation and Maintenance
OU – Operable Unit

IV. RESPONSIBLE PARTY VOLUNTARY SITE REMEDIAL ACTION

When the Inactive Hazardous Sites Branch solicits the cooperation of responsible parties in taking action at a priority site, most parties agree to voluntarily conduct a cleanup with branch approval. In addition to these voluntary actions, responsible parties and owners often come forward on their own to initiate an approved assessment and/or remedial action. Due to the number of volunteers and very limited staff resources, the branch was authorized by the General Assembly to privatize its oversight role at lower priority, voluntary site remedial actions. Sites with more severe public health threats or concerns are still reviewed by state staff.

The privatized portion of the voluntary cleanup program is called the Registered Environmental Consultant, or REC Program. Under this program, a responsible party hires an REC to both conduct, and to certify the regulatory compliance of, a site's assessment and clean up. In order for a firm to qualify as an REC, it must demonstrate it meets certain regulatory qualifications criteria. The REC certification replaces state oversight. The state audits a portion of the REC projects to ensure the integrity of the program. The state sanctions RECs where necessary. A state staff auditor is funded through fees collected from the voluntary participants.

A current list of sites which have parties conducting assessments and cleanups in accordance with consent agreements with the state is provided in Table 5, on the following page. Table 6, found on page 54, is a list of additional, ongoing, Branch-directed priority actions not under consent agreements.

TABLE 5. SITES UNDERGOING VOLUNTARY REMEDIAL ACTION BY RESPONSIBLE PARTIES

ID Number	*Site Name*	*City*	*County*
NONCD0000040	ABBOTT LABORATORIES	LAURINBURG	SCOTLAND
NONCD0000039	ABITIBI-PRICE CORPORATION	ROARING RIVER	WILKES
NCD047257472	APPLIED RESEARCH GROUP, INC.	CHARLOTTE	MECKLENBURG
NCD074511361	AQUAIR CORPORATION	CHARLOTTE	MECKLENBURG
NCD986188787	ASHEVILLE COAL GAS PLANT #1	ASHEVILLE	BUNCOMBE
NONCD0000032	ASHEVILLE COAL GAS PLANT #2	ASHEVILLE	BUNCOMBE
NCD072003635	ATHOL MANUFACTURING COMPANY	BUTNER	GRANVILLE
NCD003193588	BARBOUR BOAT WORKS, INC.	NEW BERN	CRAVEN
NONCD0000002	BURLINGTON COAL GAS PLANT	BURLINGTON	ALAMANCE
NCD986171965	CARO-KNIT	WILMINGTON	NEW HANOVER
NCD000830646	CAROLINA P&L CO. SUTTON STEAM	WILMINGTON	NEW HANOVER
NCD000608117	CELANESE CORPORATION/FIBERS TECH	CHARLOTTE	MECKLENBURG
NCD986188803	CHARLOTTE COAL GAS PLANT NO. 2	CHARLOTTE	MECKLENBURG
NONCD0001082	CMI FLYASH DISPOSAL (PARCEL 2)	ELKIN	SURRY
NONCD0001092	CMI WWTP (PARCEL1)	ELKIN	SURRY
NCD986197333	CONCORD COAL GAS PLANT	CONCORD	CABARRUS
NONCD0001097	COPES-VULCAN, INC	CHARLOTTE	MECKLENBURG
NONCD0001061	CP&L NORTHERN DIVISION COMPLEX	GARNER	WAKE
NC0001606250	CRISTEX DRUM	OXFORD	GRANVILLE
NCD062567623	DIAMOND SHAMROCK CORP/HENKEL PROCES	CHARLOTTE	MECKLENBURG
NONCD0001035	DUKE ENERGY-WINSTON-SALEM POWER	WINSTON-SALEM	FORSYTH
NCD981861743	DUKE POWER/GREENSBORO GAS PLANT	GREENSBORO	GUILFORD
NCD000813519	DUKE UNIVERSITY	DURHAM	DURHAM
NCD986173938	DURHAM GAS PLANT	DURHAM	DURHAM
NONCD0001058	ELECTRONICS COMPONENT CORPORATION	BURGAW	PENDER
NCD986197267	ELIZABETH CITY COAL GAS	ELIZABETH CITY	PASQUOTANK
NCD986197341	FAYETTEVILLE COAL GAS/RAY AVE	FAYETTEVILLE	CUMBERLAND
NONCD0000017	FLAKT PRODUCTS	WINSTON-SALEM	FORSYTH
NONCD0000029	FLEET AEROSPACE CORP./AERONCA	CHARLOTTE	MECKLENBURG
NCD986188829	GASTONIA COAL GAS PLANT	GASTONIA	GASTON
NCD051322980	GENERAL ELECTRIC CO.	CHARLOTTE	MECKLENBURG
NCD003163730	GENERAL INSTRUMENT CORP.	FAIRVIEW	BUNCOMBE
NONCD0001069	GENERAL MARBLE COMPANY	LINCOLNTON	LINCOLN
NCD986197309	GOLDSBORO COAL GAS PLANT #1	GOLDSBORO	WAYNE
NONCD0001083	GOLDSBORO COAL GAS PLANT #2	GOLDSBORO	WAYNE
NONCD0001089	GREENSBORO COAL GAS PLANT #1	GREENSBORO	GUILFORD
NCD986188886	GREENVILLE COAL GAS PLANT	GREENVILLE	PITT
NCD986232379	GRESHAMS LAKE INDUSTRIAL PARK	RALEIGH	WAKE
NCD051739209	HARRELSON RUBBER COMPANY	ASHEBORO	RANDOLPH
NONCD0001084	HENDERSON COAL GAS PLANT	HENDERSON	VANCE

TABLE 5. SITES UNDERGOING VOLUNTARY REMEDIAL ACTION BY RESPONSIBLE PARTIES

ID Number	*Site Name*	*City*	*County*
NCD990734055	HERCOFINA/CAPE INDUSTRIES	WILMINGTON	NEW HANOVER
NCD039102959	HEVI-DUTY ELECTRIC/GENERAL SIG	GOLDSBORO	WAYNE
NONCD0001085	HICKORY COAL GAS PLANT	HICKORY	CATAWBA
NCD986188837	HIGH POINT COAL GAS PLANT	HIGH POINT	GUILFORD
NCD051745685	HOLDING POND FOR WASTE/USS	GREENSBORO	GUILFORD
NCD003215696	HUNT MANUFACTURING	STATESVILLE	IREDELL
NONCD0000050	HWY 268 MIRROR WASTE DUMP	NORTH WILKESBORO	WILKES
NONCD0000056	JAMES LANDFILL	LAURINBURG	SCOTLAND
NCD986197366	KINSTON COAL GAS PLANT	KINSTON	LENOIR
NCD986197358	LEXINGTON COAL GAS PLANT	LEXINGTON	DAVIDSON
NCD003183167	LONG MANUFACTURING	TARBORO	EDGECOMBE
NCD055359079	MASONITE CORP. FIBERBOARD DIV.	SPRING HOPE	NASH
NONCD0001086	MT AIRY COAL GAS PLANT	MT AIRY	SURRY
NCD986197259	NEW BERN COAL GAS PLANT	NEW BERN	CRAVEN
NCD055162069	PELTON & CRANE PLANT (FORMER)	CHARLOTTE	MECKLENBURG
NONCD0001020	PRECISION FABRICS GROUP, INC	GREENSBORO	GUILFORD
NCD986188894	RALEIGH COAL GAS PLANT NO. 1	RALEIGH	WAKE
NCD986188902	RALEIGH COAL GAS PLANT NO. 2	RALEIGH	WAKE
NONCD0001087	REIDSVILLE COAL GAS PLANT	REIDSVILLE	ROCKINGHAM
NCD053009510	RELIANCE UNIVERSAL OF KENTUCKY	LENOIR	CALDWELL
NCD986197325	ROCKY MOUNT COAL GAS PLANT NO. 1	ROCKY MOUNT	NASH
NCD986197317	ROCKY MOUNT COAL GAS PLANT NO. 2	ROCKY MOUNT	NASH
NCD981933096	ROCKY MOUNT, OLD AIRPORT	ROCKY MOUNT	NASH
NCD986197283	SALISBURY COAL GAS PLANT #1	SALISBURY	ROWAN
NONCD0001088	SALISBURY COAL GAS PLANT #2	SALISBURY	ROWAN
NCD062552153	SAYLES-BILTMORE BLEACHERIES	ASHEVILLE	BUNCOMBE
NCD003234549	SCM PROCTOR SILEX/WEAREVER	SOUTHERN PINES	MOORE
NCD053488557	SOUTHERN WOOD PIEDMONT COMPANY	GULF	CHATHAM
NCD058517467	SOUTHERN WOOD PIEDMONT COMPANY	WILMINGTON	NEW HANOVER
NCD986197291	STATESVILLE COAL GAS PLANT	STATESVILLE	IREDELL
NCD986176444	STROH/CHITTY FARM	WINSTON-SALEM	FORSYTH
NONCD0001101	STRONGHAVEN WAREHOUSE	MATTHEWS	MECKLENBURG
NCD986166700	TOISNOT SWAMP	WILSON	WILSON
NCD053485991	VARCO-PRUDEN BUILDINGS	KERNERSVILLE	FORSYTH
NCD986197275	WASHINGTON COAL GAS PLANT	WASHINGTON	BEAUFORT
NCD986188910	WILMINGTON COAL GAS PLANT	WILMINGTON	NEW HANOVER
NCN000407302	WILMINGTON GUN CLUB (FORMER)	WILMINGTON	NEW HANOVER
NCD986188845	WINSTON-SALEM COAL GAS PLANT NO. 1	WINSTON-SALEM	FORSYTH
NCD986188852	WINSTON-SALEM COAL GAS PLANT NO. 2	WINSTON-SALEM	FORSYTH

TABLE 6. ADDITIONAL, ONGOING, STATE-DIRECTED PRIORITY ACTIONS NOT UNDER VOLUNTARY CONSENT AGREEMENTS

ID Number	*Site Name*	*City*	*County*
NCD024462327	ACADEMY STEEL DRUM	MATTHEWS	MECKLENBURG
NCD003193588	BARBOUR BOAT WORKS	NEW BERN	CRAVEN
NCD000773515	GA-PACIFIC	BOWDENS	DUPLIN
NCD000773507	GA-PACIFIC	ENFIELD	HALIFAX
NCD000813600	GA-PACIFIC	WHITEVILLE	COLUMBUS
NCD003221462	GARDNER MIRROR	N WILKESBORO	WILKES
NONCD0001064	GUILFORD MILLS	FUQUAY-VARINA	WAKE
NCD980729677	KNOB CREEK FLYASH	BREVARD	TRANSYLVANIA
NONCD0001056	LITTLE MOUNTAIN LANDFILL	TRYON	POLK
NONCD0001015	MARY CIRCLE BATTERY	CONCORD	CABARRUS
NCSFN0407074	NC MARITIME MUSEUM	BEAUFORT	CARTERET
NONCD0001112	OLD JOHNS RIVER RD DUMP	BLUE RIDGE PKWY	WATAGUA
NCD986215499	PARKER INDUSTRIES	FAYETTEVILLE	CUMBERLAND
NCD144192606	PARKER-ZENITH	ABERDEEN	MOORE
NCD980839716	RIVERDALE HOMES	DURHAM	DURHAM
NCD990715658	SOUTHERN MANUFACTURING	CHARLOTTE	MECKLENBURG
NONCD0001062	SWAIM'S TRUCK PARTS	HENDERSON	VANCE
NONCD0001075	TEXFI INDUSTRIES	FAYETTEVILLE	CUMBERLAND
NCD082362989	TUNGSTEN QUEEN MINE	TUNGSTEN	VANCE
NONCD0001110	WOODSON-TENET LAB	GOLDSTON	CHATHAM

Note: There are 22 additional sites with active ongoing bankruptcy claims, new site screenings, "no further action" reviews or monitoring of perpetual land use restrictions.

V. IMMINENT HAZARD SITES

The N.C. Department of Environment and Natural Resources and the USEPA are committed to addressing imminent hazard sites when identified. Table 7 provides a list of sites where imminent hazards have been discovered, or where abatement activities have continued, in fiscal year 03-04. Their location, a site description, status and funding source are also provided.

TABLE 7. SUMMARY OF IMMINENT HAZARD SITES

Site	*City/ County*	*Site Description*	*Status*	*Funding Source*
Holtra Chem/Honeywell	Riegelwood/ Columbus	Tanks, lagoons, ponds, soils, materials and a building contaminated with mercury.	Work began in 2003. USEPA continuing to oversee work being conducted by owner.	Owner
Rhodera Drive Wells	Stallings/ Union	Buried drums in a residential area.	USEPA conducting drum and soil cleanup.	USEPA
Swiggett Road DOT Abandoned Drums	Greensboro/ Guilford	Abandoned drums containing various hazardous substances.	USEPA removed drums in 2003-2004.	USEPA
Texfi Industries	Fayetteville/ Cumberland	Chlorinated solvent groundwater contaminant plume has migrated from a former textile mill to the City of Fayetteville's water plant property. The city's finished drinking water holding tank sits in contact with contaminated groundwater. The city's drinking water intakes on the Cape Fear River are 450 feet downstream from the Texfi property line.	The State constructed a barrier wall to prevent further contaminant migration to the holding tank area and installed extraction wells to remove contamination presently near the tank. The State has funds to operate the extraction wells and monitor the groundwater until September 2006 when funds will be depleted. The State is waiting for funds through a bankruptcy settlement to conduct a source removal.	State

VI. SUMMARY OF THE INACTIVE HAZARDOUS SITES CLEANUP FUND AND NATIONAL PRIORITIES LIST COST SHARE FUND

Inactive Hazardous Sites Cleanup Fund
As of July 1, 2004

Deposits (03-04)		
Interest		$6,730
No further action review fees		$1,000
Transfer from NPL Cost Share Account for Texfi Monitoring/Assessment		$50,000
Total Deposits		**$57,730**
Withdrawals (03-04)		
Texfi Industries-Fayetteville emergency abatement contract	$91,462	
Orphan priority site sampling/removal contract	$537,035	
Total Withdrawals		**$628,497**
Current Balance		**$140,097**
Obligations		
Texfi emergency abatement contract		$100,321
Orphan priority site sampling/removal contract	$39,776	
Total Current Obligations	**$140,097**	
Effective Balance		**$0**
Orphan Cleanup Cost Requirements (see Chapter II for more details)		
Funds needed for 31 additional priority orphan sites	$5,515,303	
Funds needed to address 204 old landfills with exposure concerns	$36,294,252	
Priority Orphan Site Cleanup Costs		**$41,809,555**

National Priorities List Cost Share Fund
As of July 1, 2004

Estimated cost of federal trust fund/N.C. cost share cleanups	$90,492,598
N.C.'s 10 percent cost share for pending/ongoing cleanups	$9,049,260*
Fund disbursements for cost share payments	$5,423,173
Current balance	$5,125,107
Encumbered amount of the fund balance for cost share payments	$3,333,485
Effective Balance	**$1,791,622***

* Cleanup cost estimates are not yet available for all sites. The cost share figure will increase as cost estimates become available. Also, other sites may be added to the National Priorities List that will require a state cost share. This account will also be required to pay for the state's operation and maintenance obligations which, will begin in the next few years at some sites. Aside from interest, the fund has no continuing source of income.

APPENDIX I

INACTIVE HAZARDOUS SITES INVENTORY
Description of Categories

The Department of Environment and Natural Resources is required by North Carolina General Statute 130A-310.1(a) to maintain an inventory of inactive hazardous substance or waste disposal sites. The Inactive Hazardous Sites Inventory accounts for all of the sites in the EPA's Comprehensive Environmental Response, Compensation and Liability Act inventory of potential contaminated sites called CERCLIS. The intent is to address those sites determined not to be federal priorities. Many sites in the CERCLIS inventory, and therefore also the Inactive Hazardous Sites Inventory, are regulated by other state and federal laws. Thus, they are not priorities for the Inactive Hazardous Sites Branch. The Inactive Hazardous Sites Inventory (Appendix II) is organized in the categories described below. To avoid duplication of work, sites being addressed by other agencies are tracked in separate categories. Ten of the inventory sites appear in multiple other agency lead categories (4 through 10).

1. **Sites Priority List (pgs 60-70)**
   The SPL includes sites with confirmed contamination or known disposal of hazardous substances that have been ranked using the Prioritization System rules (15A NCAC Subchapter 13C .0200).

2. **Responsible Party Voluntary Remedial Action Sites (pgs 71-72)**
   In accordance with North Carolina General Statute 130A-310.9(b), voluntary cleanups or "remedial actions" conducted by responsible parties under agreements with the state must be listed in a separate category.

3. **Sites with Evaluations Pending (pg 73)**
   This category includes those sites that require evaluation before site priority can be determined. Each site with evidence of contamination will be ranked and transferred to the SPL. Those sites where no further action is required will also be transferred to that category.

4. **National Priorities List (pg 74)**
   The NPL consists of sites the federal government has determined to be the most serious, uncontrolled hazardous waste disposal sites in the nation. Either federal and state dollars or responsible parties will fund these cleanups. This list only includes North Carolina NPL sites.

5. **Non-NPL Federal Superfund Cleanups (pg 75)**
   NPL-caliber sites where the USEPA has entered into agreements with responsible parties to conduct remedial action are supervised by the USEPA. This list includes only the USEPA non-NPL remedial action sites located in North Carolina.

6. **RCRA Permitted or Interim Status Facilities* (pgs 76-77)**
Facilities that are permitted or have interim status under the Resource Conservation and Recovery Act are tracked in this category. These sites are exempt pursuant to G.S. 130A-310(3) and come under the jurisdiction of the North Carolina Hazardous Waste Section.

7. **RCRA Non-Permitted Corrective Action Sites* (pg 78)**
The inventory includes some non-permitted sites that are currently undergoing Resource Conservation and Recovery Act corrective action under the direction of the North Carolina Hazardous Waste Section.

8. **Sites Under the Jurisdiction of the Solid Waste Section* (pg 79)**
Permitted solid waste landfills being monitored and controlled by the North Carolina Solid Waste Section, including those subject to post-closure care requirements, are tracked in this category.

9. **Sites Under the Jurisdiction of the Division of Water Quality * (pgs 80-81)**
Sites in this category include those where the North Carolina Division of Water Quality has been specified as the lead agency to oversee assessment and/or cleanup.

10. **Sites Under the Jurisdiction of the Division of Environmental Health's Radiation Protection Section* (pg 82)**
Sites conducting assessment and cleanup under the direction of the North Carolina North Carolina Radiation Protection Section are tracked in this category.

11. **Old Unlined Landfills (pgs 83-99)**
This is a list of all the old unlined landfills catalogued by the branch. Some of the landfills were already included in the inventory before the addition of the larger catalog of old landfills. As a result, they also appear in other categories.

* **Additional sites, not included in the Inactive Hazardous Sites Inventory, may be managed by these regulatory agencies. A few sites have multiple agency jurisdiction.**

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
OCTOBER 2004

1. SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD002571438	ABC ENGRAVERS	CHARLOTTE	MECKLENBURG
NCN000407447	ABERDEEN CONTAMINATED GROUNDWATER	ABERDEEN	MOORE
NCD024462327	ACADEMY STEEL DRUM	MATTHEWS	MECKLENBURG
NCD045451473	ACE CHEMICAL CORPORATION	CHARLOTTE	MECKLENBURG
NCD045924339	ACME UNITED CORPORATION	FREMONT	WAYNE
NCD040042426	AEROQUIP/FAWN PLASTICS	MIDDLESEX	NASH
NCD024583288	AIR PRODUCTS AND CHEMICALS, INC.	GREENSBORO	GUILFORD
NONCD0001081	ALCOA-NARROWS POWERHOUSE	BADIN	MONTGOMERY
NONCD0001094	ALLISON MANUFACTURING CO	ALBEMARLE	STANLY
NCD085082311	AMERICAN COLORS INCORPORATED	CHARLOTTE	MECKLENBURG
NONCD0001033	AMERICAN CONTRACT COATINGS	APEX	WAKE
NCSFN0407143	AMERICAN ELEMENTS	FARMVILLE	PITT
NCD052813250	AMERICAN ENKA COMPANY/BASF	ENKA	BUNCOMBE
NCD000615872	AMP INCORPORATED	GASTONIA	GASTON
NCD041230418	AMP INCORPORATED	WINSTON-SALEM	FORSYTH
NCD119168813	ANILOX ROLL COMPANY	CHARLOTTE	MECKLENBURG
NCD980502793	APEX SANITARY LANDFILL	APEX	WAKE
NCD048462881	ARMOLOY CO OF NC/HI-TECH	STATESVILLE	IREDELL
NCD986175636	ASHE PATTERN SHOP (FORMER)	GASTONIA	GASTON
NCD980557557	ASHEBORO LANDFILL	ASHEBORO	RANDOLPH
NONCD0000034	ASHEVILLE INDUSTRIES	ARDEN	BUNCOMBE
NCD033978396	ATEC INDUSTRIES	ROXBORO	PERSON
NCD003466919	AXTON-CROSS COMPANY/VAN WATER	GREENSBORO	GUILFORD
NONCD0000038	AYCOCK PROPERTY	WILSON	WILSON
NCD980559637	BEAUNIT CORP./DYING & FINISHING	LOWELL	GASTON
NCD003213881	BENDIX CORPORATION	SALISBURY	ROWAN
NCD986171445	BENFIELD CHEMICALS	CANTON	HAYWOOD
NONCD0000070	BENFIELD SANITATION SERVICE	STATESVILLE	IREDELL
NCD981022072	BETTIS PROPERTY	EARL	CLEVELAND
NONCD0001030	BLR	SANFORD	LEE
NONCD0000014	BOISE CASCADE	MONCURE	CHATHAM
NCD003189024	BORDEN CHEMICAL FAYETTEVILLE PLANT	FAYETTEVILLE	CUMBERLAND
NCD980502827	BROWN #1	PISGAH FOREST	TRANSYLVANIA
NONCD0001038	BRYANT FARM DRUM DUMP	GATEWOOD	CASWELL
NCD980845119	BUCKHORN PESTICIDES	WILSON	WILSON
NCD024770125	BURLINGTON FURNITURE	ROBBINSVILLE	GRAHAM
NCD991278581	BURLINGTON FURNITURE/LUMBER PL	LEXINGTON	DAVIDSON
NCD048184451	BURLINGTON HOME CHAIR	RONDA	WILKES
NCD096158696	BURLINGTON INDUSTRIES, INC.	GREENSBORO	GUILFORD
NCD980557664	BURLINGTON INDUSTRIES, INC.	RALEIGH	WAKE

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
OCTOBER 2004

1. SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD093334894	BURLINGTON INDUSTRIES, INC.	STATESVILLE	IREDELL
NCD024762668	BUSH BROTHERS PLATING INC/GREER	REIDSVILLE	ROCKINGHAM
NCD981750425	BUXTON DUMP	BUXTON	DARE
NONCD0001099	C & L SURPLUS	HAYESVILLE	CLAY
NCD981022288	C&T REFINERY	CHARLOTTE	MECKLENBURG
NCD980502850	CABARRUS DISPOSAL COMPANY, INC.	CONCORD	CABARRUS
NCD980557870	CALDWELL COUNTY ABANDONED WASTE	LENOIR	CALDWELL
NCD981021702	CAMP, LEONARD PROPERTY	EARL	CLEVELAND
NCD003162666	CANNON MILLS COMPANY/FIELDCREST	KANNAPOLIS	CABARRUS
NONCD0000082	CAPE FEAR CHEMICALS/HL BRICE	ELIZABETHTOWN	BLADEN
NCN000407686	CARALEIGH PHOSPHATE AND FERTILIZER	RALEIGH	WAKE
NCD981929813	CARBONTON ROAD DRUM SITE	SANFORD	LEE
NCD986209575	CARDINAL CHEMICAL WAREHOUSE FIRE	LUMBERTON	ROBESON
NCSFN0407140	CARDINAL CONTAINER SERVICES	LEXINGTON	DAVIDSON
NCD991278714	CAROCHEM, INC.	DURHAM	DURHAM
NCD980729479	CAROLAWN COMPANY	KERNERSVILLE	FORSYTH
NCD981015746	CAROLINA ALUMINUM/HERBERT TAYLOR	ROPER	WASHINGTON
NCSFN0406911	CAROLINA ASSOCIATED MILL	NEWTON	CATAWBA
NCD003184710	CAROLINA CREOSOTING CORPORATION	LELAND	BRUNSWICK
NONCD0000013	CAROLINA HARDWOODS	WILLIAMSTON	MARTIN
NONCD0000053	CAROLINA MARBLE CO.	ALBEMARLE	STANLY
NONCD0000078	CAROLINA METAL AND ALLOYS	HIGH POINT	GUILFORD
NCD000830919	CAROLINA P&L CO. CAPE FEAR STM	MONCURE	CHATHAM
NONCD0000023	CAROLINA P&L CO. FAYETTEVILLE	FAYETTEVILLE	CUMBERLAND
NCD000830612	CAROLINA P&L CO. MAYO STEAM	ROXBORO	PERSON
NCD000830653	CAROLINA P&L CO. ROXBORO STEAM	ROXBORO	PERSON
NONCD0000028	CAROLINA P&L CO. SPRUCE PINE	SPRUCE PINE	MITCHELL
NCD000830620	CAROLINA P&L CO. WEATHERSPOON STEAM	LUMBERTON	ROBESON
NCD981015886	CAROLINA PRODUCTION FINISHING	ASHEVILLE	BUNCOMBE
NCD003218492	CAROLINA RUBBER HOSE COMPANY	SALISBURY	ROWAN
NCD980729412	CAROLINA TANK CLEANING COMPANY	GREENSBORO	GUILFORD
NONCD0001077	CATAWISSA LUMBER CO	WEST JEFFERSON	ASHE
NONCD0001067	CC DICKSON	CHARLOTTE	MECKLENBURG
NCD986180883	CCFC PESTICIDE DISPOSAL	OXFORD	GRANVILLE
NONCD0000015	CENTRAL TRANSPORT COMPANY	WILMINGTON	NEW HANOVER
NCD003221868	CENTURY FURNITURE COMPANY	HICKORY	CATAWBA
NCN000407241	CHADBOURN BATTERY	CHADBOURN	COLUMBUS
NCD986188001	CHAMPION INTERNATIONAL LANDFILL #1	CANTON	HAYWOOD
NCD003148889	CHAMPION INTERNATIONAL/CANTON MILL	CANTON	HAYWOOD
NCD986188019	CHAMPION LANDFILL #2	CANTON	HAYWOOD
NCD986188027	CHAMPION LANDFILL #3	CANTON	HAYWOOD
NONCD0000035	CHAPEL STREET BATTERY DUMP	KANNAPOLIS	ROWAN

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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1. SITES PRIORITY LIST

ID Number	*Site Name*	*City*	*County*
NCD980557771	CHARLOTTE CITY DUMP	CHARLOTTE	MECKLENBURG
NCD024468597	CHARLOTTE STEEL DRUM	CHARLOTTE	MECKLENBURG
NONCD0000083	CHEESMAN PROPERTY	ROCKWELL	CABARRUS
NONCD0000044	CHEMICAL AND SOLVENTS, INC.	GREENSBORO	GUILFORD
NC0000183103	CHEMICAL CARTAGE COMPANY	LELAND	BRUNSWICK
NCD043711977	CHEMICAL LEAMAN TANK LINES, INC.	GREENSBORO	GUILFORD
NCD986190239	CHEROKEE OIL	CHARLOTTE	MECKLENBURG
NCD980799019	CHEROKEE OIL	CHARLOTTE	MECKLENBURG
NCD981473150	CHERRY MT STREET DRUM	FOREST CITY	RUTHERFORD
NONCD0000041	CIBA-GEIGY	CHARLOTTE	MECKLENBURG
NCD980844732	CLAYTON BALL FIELD	CLAYTON	JOHNSTON
NCD003223799	CLAYTON-MARCUS CO., INC.	BETHLEHEM	ALEXANDER
NONCD0001001	CLOSED CITY OF HENDERSON LDFL	HENDERSON	VANCE
NONCD0000016	CMC LANDFILL	ELKIN	SURRY
NCD054417308	COASTAL CHEMICAL CORP.	CLAYTON	JOHNSTON
NCD003186178	COASTAL CHEMICAL CORP.	GREENVILLE	PITT
NONCD0000030	COLLINS AND AIKMAN	GRAHAM	ALAMANCE
NCD003467099	CONE MILLS CORP/GRANITE FINISHING	HAW RIVER	ALAMANCE
NCD003162500	CONSOLIDATED ENGRAVERS CORP.	CHARLOTTE	MECKLENBURG
NCD130708126	CONSOLIDATED WAREHOUSE	CHARLOTTE	MECKLENBURG
NCD003218161	CORNELL-DUBILIER ELECTRONICS	SANFORD	LEE
NCD003195161	CORNING GLASS WORKS	RALEIGH	WAKE
NCD003938586	CORNING GLASS WORKS	WILMINGTON	NEW HANOVER
NC0000998336	CP PROPERTIES	SANFORD	LEE
NCD980502892	CREEK BRIDGE/BORDEN CHEMICAL	FAYETTEVILLE	CUMBERLAND
NCD986172492	CRESTLINE CONTAMINATED WELLS	ABERDEEN	MOORE
NCD044444735	CROMPTON & KNOWLES CORP.	LOWELL	GASTON
NONCD0001027	CROWDERS MOUNTAIN STATE PARK	GASTONIA	GASTON
NCD044447639	CROWN CENTRAL PETROLEUM CORP.	PAW CREEK	MECKLENBURG
NCD003149556	CTS OF ASHEVILLE, INC.	SKYLAND	BUNCOMBE
NCD982117590	CUSTOM PROCESSING AND MANUFACTURING	HIGH POINT	GUILFORD
NCD080885551	DAUGHERTY CHEMICAL COMPANY	DURHAM	DURHAM
NONCD0000059	DAYCO COCHRAN LANDFILL	WAYNESVILLE	HAYWOOD
NCD982119463	DAYCO LANDFILL CRYME COVE ROAD	WAYNESVILLE	HAYWOOD
NONCD0001071	DOE-SPUN	HOLLISTER	HALIFAX
NONCD0001040	DOMESTIC LAUNDRY/WASHBURN GRAPHICS	CHARLOTTE	MECKLENBURG
NCD003213030	DOUGLAS BATTERY MANUFACTURING CO.	WINSTON-SALEM	FORSYTH
NONCD0000091	DUKE POWER/WALNUT COVE	WALNUT COVE	STOKES
NCD003230836	DUKE REFINING CORPORATION	HIGH POINT	GUILFORD
NCD986188498	DURA-BUILT ENGINES CO	COATS	HARNETT
NCD981016280	DURHAM ANIMAL CLINIC	DURHAM	DURHAM
NCD004520136	EATON CORPORATION	ROXBORO	PERSON

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1. SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD024740433	EC MANUFACTURING	PINEVILLE	MECKLENBURG
NCD980558019	ELK MOUNTAIN LANDFILL	ASHEVILLE	BUNCOMBE
NC0001402213	ELLIS JUNK YARD	HAYESVILLE	CLAY
NONCD0001102	ENQUIRER JOURNAL	MONROE	UNION
NCD980557946	FAIRVIEW LANDFILL	FAIRVIEW	BUNCOMBE
NCD062566047	FASCO CONTROLS CORPORATION	SHELBY	CLEVELAND
NCD067178707	FAWN PLASTICS CO., INC.	MIDDLESEX	NASH
NCD990867855	FAWN PLASTICS CO., INC.	ROCKY MOUNT	NASH
NCD980502934	FAYETTEVILLE LANDFILL	FAYETTEVILLE	CUMBERLAND
NCD003200656	FEATHER PROCESSORS, INC	ROSE HILL	DUPLIN
NCD041414780	FIELDCREST MILLS INC./NC FINISHING	SPENCER	ROWAN
NCD066327313	FINETEX, INC.	SPENCER	ROWAN
NCD980557953	FISHBURNE LANDFILL	FLETCHER	BUNCOMBE
NCD003154960	FLEMING LABORATORIES	CHARLOTTE	MECKLENBURG
NCD980557854	FMC/NIAGARA PESTICIDES	AYDEN	PITT
NONCD0000075	FOAMEX/REEVES BROTHERS	CORNELIUS	MECKLENBURG
NCD986172617	FORBES ROAD WELLS	GASTONIA	GASTON
NCD071579528	FORBUSH METAL	YADKINVILLE	YADKIN
NCD981468622	FORK SWAMP/GRADY WHITE BOAT	AYDEN	PITT
NONCD0001109	FRIENDLY CLEANERS	WILSON	WILSON
NCD001871854	FRUEHAUF TRAILER CORPORATION	CHARLOTTE	MECKLENBURG
NONCD0000092	FUNDER AMERICA	MOCKSVILLE	DAVIE
NCSFN0406953	G&B/FARMER PROPERTY	SCOTLAND NECK	HALIFAX
NCD000616219	GA-PACIFIC CORP	HAMLET	RICHMOND
NCD000813600	GA-PACIFIC CORP CHIP-N-SAW	WHITEVILLE	COLUMBUS
NCD000813592	GA-PACIFIC CORP/HDWD SAW	PLYMOUTH	WASHINGTON
NONCD0000024	GAITHER TRANSOU PROPERTY	GREENSBORO	GUILFORD
NCD003221462	GARDNER MIRROR CORPORATION	NORTH WILKESBORO	WILKES
NC0002374445	GASTONIA INDUSTRIAL TRUCK	GASTONIA	GASTON
NONCD0001068	GENCORP PRINTWORLD INC	MONROE	UNION
NCD003198967	GENERAL ELECTRIC CO/CAROLINA	GOLDSBORO	WAYNE
NCD072018252	GENERAL ELECTRIC CO/MED STEAM TURBIN	DURHAM	DURHAM
NONCD0001034	GEORGE STREET PESTICIDE	GOLDSBORO	WAYNE
NCD980848766	GIBBS ELECTROPLATING	CHARLOTTE	MECKLENBURG
NONCD0001022	GIBBS ELECTROPLATING - OLD LOCATION	CHARLOTTE	MECKLENBURG
NCD980557607	GLASS, EH COUNTY LANDFILL	GREENSBORO	GUILFORD
NC0001206473	GLEN RAVEN MILLS	BURLINGTON	ALAMANCE
NCD003158094	GLEN RAVEN MILLS	BURNSVILLE	YANCEY
NONCD0000055	GLISSON ENTERPRISES	GREENVILLE	PITT
NCD980557649	GOLDSBORO MUNICIPAL LANDFILL	GOLDSBORO	WAYNE
NCD980843460	GRANT CREEK WWTP	SALISBURY	ROWAN
NONCD0000043	GREAT LAKES CARBON CORPORATION	MORGANTON	BURKE

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1. SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD980557698	GREENVILLE CITY LANDFILL	GREENVILLE	PITT
NCD982124646	GREGSON FUNITURE INDUSTRIES	LIBERTY	RANDOLPH
NCD980557912	GROVE STONE LANDFILL	BLACK MOUNTAIN	BUNCOMBE
NCD980558761	GS LABORATORY EQUIPMENT	ASHEVILLE	BUNCOMBE
NONCD0001064	GUILFORD MILLS PLANT	FUQUAY-VARINA	WAKE
NCD055550560	GULF ADHESIVES & RESINS/PERKINS	HIGH POINT	GUILFORD
NCD067437400	GULF OIL CORPORATION	MCLEANSVILLE	GUILFORD
NONCD0001028	GURLEY DRIVE LANDFILL	CONCORD	CABARRUS
NCD024459471	GUYTON BATTERY SERVICE	CHADBOURN	COLUMBUS
NCD049772023	H & S PROCESSORS, INC.	LINCOLNTON	LINCOLN
NONCD0000073	H. M. WADE FURNITURE	CHARLOTTE	MECKLENBURG
NCD084171545	HALIFAX COUNTY LANDFILL		HALIFAX
NONCD0000087	HARPER CRAWFORD BAG CO.	CHARLOTTE	MECKLENBURG
NCD000822130	HARRELSON RUBBER COMPANY	ASHEBORO	RANDOLPH
NCD980557722	HARRISBURG BATTERY	HARRISBURG	CABARRUS
NCD108702606	HARTSOE BATTERY	KANNAPOLIS	ROWAN
NCD986166692	HARWELL ROAD SEPTIC PIT	GASTONIA	GASTON
NCD044515211	HAYES-ALBION CORP/BRIGGS-SHAFFNER	WINSTON-SALEM	FORSYTH
NCD980483275	HELENA CHEMICAL COMPANY	ENFIELD	HALIFAX
NCD082363102	HELENA CHEMICAL COMPANY	LAURINBURG	SCOTLAND
NCD003163888	HENREDON FURNITURE	MORGANTON	BURKE
NCD024817827	HENREDON FURNITURE	SPRUCE PINE	MITCHELL
NCD981003957	HENSON LANDFILL	FOREST CITY	RUTHERFORD
NCD986171270	HESTA CARILLON PROJECT	CHARLOTTE	MECKLENBURG
NC0000998344	HICKORY GROVE ROAD TCE	MCADENVILLE	GASTON
NCD003225620	HIGH POINT FURNITURE INDUSTRIES	HIGH POINT	GUILFORD
NCD003216397	HIGHLAND INDUSTRIES/BURLINGTON IND.	KERNERSVILLE	FORSYTH
NCD046149019	HISTRAND CHEMICAL, INC.	LENOIR	CALDWELL
NCD981928021	HOLLINGSWORTH PROPERTY	FAYETTEVILLE	CUMBERLAND
NCD081333858	HOLSTON ENERGY INC/HOLSTON FUEL	WAYNESVILLE	HAYWOOD
NCD980558035	HOMINY CREEK LANDFILL	ASHEVILLE	BUNCOMBE
NCD048401087	HOOKER FURNITURE	PLEASANT GARDEN	GUILFORD
NCD054283189	HOOVER MACHINE SHOP	GASTONIA	GASTON
NCD003233673	HOOVER REPAIR SHOP	MT AIRY	SURRY
NCD980502983	HOPE MILLS LANDFILL	HOPE MILLS	CUMBERLAND
NCN000407480	HORTON IRON & METAL	WILMINGTON	NEW HANOVER
NCD980847123	HURT RESIDENCE	MORGANTON	BURKE
NONCD0001018	HWY 49 BATTERY DUMP	CHARLOTTE	MECKLENBURG
NCD053010724	ICI - AMERICAS, INC.	CHARLOTTE	MECKLENBURG
NONCD0000031	INDEPENDENCE MALL OUTPARCEL	WILMINGTON	NEW HANOVER
NCD980839757	INDIAN GRAVE GAP DRUM DISPOSAL	LENOIR	CALDWELL
NCD101750305	INDUSTRIAL PLASTICS, INC.	GREENSBORO	GUILFORD

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1. SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD990868168	INMONT CORP/BASF CORPORATION	CHARLOTTE	MECKLENBURG
NCD003186004	INTERNATIONAL PAPER RICHMOND GRAVURE	RALEIGH	WAKE
NCD980518211	IRT/IBM CORPORATION	CHARLOTTE	MECKLENBURG
NONCD0001072	J & C DYEING	SHELBY	CLEVELAND
NCD980502991	JACKSONVILLE LANDFILLS	JACKSONVILLE	ONSLOW
NC0000195743	JIMMY GREEN METALS	NASHVILLE	NASH
NCD981928385	JOHN DEERE TRACTOR	MOCKSVILLE	DAVIE
NCD000770487	JOHNSON CONTROLS GLOBE BATTERY	WINSTON-SALEM	FORSYTH
NONCD0000085	JONES & PRESNELL STUDIO	CHARLOTTE	MECKLENBURG
NONCD0001036	JOYCETON WATER WORKS WELL #2	LENOIR	CALDWELL
NONCD0001037	JOYCETON WATER WORKS WELL #9	LENOIR	CALDWELL
NONCD0001011	JUNG CORPORATION	ASHEBORO	RANDOLPH
NCD980557847	KAISER ACME FARMARKET	RIEGELWOOD	COLUMBUS
NCD986228054	KANNAPOLIS PCE SPILL	KANNAPOLIS	CABARRUS
NCD981031693	KEENER LANDFILL	CLINTON	SAMPSON
NCD048958615	KELLY-SPRINGFIELD TIRE CO/GOODYEAR	FAYETTEVILLE	CUMBERLAND
NCD980557805	KERR MCGEE CORPORATION	NAVASSA	BRUNSWICK
NCD981927908	KIDD LANE BATTERY DISPOSAL	CHARLOTTE	MECKLENBURG
NCD097361018	KIN PROPERTIES ABANDONED DRUMS	CHARLOTTE	MECKLENBURG
NCD980729677	KNOB CREEK FLYASH DISPOSAL	BREVARD	TRANSYLVANIA
NCD002388965	LACKAWANNA LEATHER CO., INC.	CONOVER	CATAWBA
NCD981863814	LANCASTER PLATING	LILLINGTON	HARNETT
NCD053528170	LAURENS GLASS/BALL-INCON GLASS PACK	HENDERSON	VANCE
NCN000407197	LEARY BROTHERS STORAGE (FORMER)	EDENTON	CHOWAN
NCD986175628	LEE'S MOTOR WORKS	GASTONIA	GASTON
NCD980557888	LENOIR CITY LANDFILL	LENOIR	CALDWELL
NCD079066833	LENOIR REFINING COMPANY	LENOIR	CALDWELL
NONCD0001079	LES MYERS PARK	CONCORD	CABARRUS
NONCD0001050	LEXINGTON FURNITURE IND. PLNT #12	LEXINGTON	DAVIDSON
NONCD0001048	LEXINGTON FURNITURE IND. PLNT #2	LEXINGTON	DAVIDSON
NONCD0001049	LEXINGTON FURNITURE IND. PLNT #7	LEXINGTON	DAVIDSON
NCD003213568	LIBERTY FURNITURE CORP/CHROMCRAFT	LIBERTY	RANDOLPH
NONCD0001056	LITTLE MOUNTAIN LANDFILL	TRYON	POLK
NONCD0000006	LITTLEFIELD LANDFILL	AYDEN	PITT
NCD980848782	MADISON COUNTY CYANIDE SITE	LEICESTER	MADISON
NCD003167988	MARANTZ PIANO CO INC/ANEVKA, INC	MORGANTON	BURKE
NCD000623223	MARTIN MANUFACTURING PROPERTIES	WILLIAMSTON	MARTIN
NCD991278755	MARTIN'S BATTERY SALVAGE, INC.	KANNAPOLIS	CABARRUS
NONCD0001015	MARY CIRCLE BATTERY	CONCORD	CABARRUS
NONCD0000096	MASON DRUM STORAGE	CANTON	HAYWOOD
NCD986223170	MCBESS INDUSTRIES	HIGH SHOALS	GASTON
NCD980838551	MCDOWELL FIREMAN ASSOCIATION SITE	MARION	MCDOWELL

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ID Number	Site Name	City	County
NCD986172500	MCLEAN BROTHERS FARM	WAGRAM	SCOTLAND
NONCD0000027	MEADOWVIEW ROAD	GREENSBORO	GUILFORD
NONCD0000047	MEADS AIRFIELD PESTICIDES	WEEKSVILLE	PASQUOTANK
NCD991279118	MEREDITH/BURDA, INC.	NEWTON	CATAWBA
NONCD0001106	MICROTON ABRASIVES, INC	PINEVILLE	MECKLENBURG
NCD980503031	MILAN YARD LANDFILL	FAYETTEVILLE	CUMBERLAND
NCD089914311	MILLER BREWING CO/CONT DIV	REIDSVILLE	ROCKINGHAM
NONCD0001041	MITCHELL & BECKER	CHARLOTTE	MECKLENBURG
NCD042891663	MITCHELL ENGR CO/CECO BLDG. DIV.	ROCKY MOUNT	NASH
NCD990883001	MONARCH FURNITURE CORPORATION	JAMESTOWN	GUILFORD
NCD008839276	MONEY-WORTH, INC	SWANNANOA	BUNCOMBE
NCD088563242	MONSANTO COMPANY/ROHM & HAAS	FAYETTEVILLE	CUMBERLAND
NONCD0000054	MOORES COMPANY	HENDERSON	VANCE
NONCD0000097	MORRIS, NORMAN	ELON COLLEGE	ALAMANCE
NONCD0001095	MOSES CONE MEMORIAL PARK	BLOWING ROCK	WATAUGA
NCD980559355	NASH COUNTY LANDFILL/SR 1145	SPRING HOPE	NASH
NCD980559330	NASH COUNTY LANDFILL/SR 1524	RED OAK	NASH
NCD982174492	NATIONAL PIN	SARATOGA	WILSON
NCD003196847	NATIONAL SPINNING COMPANY	WASHINGTON	BEAUFORT
NCSFN0407074	NC MARITIME MUSEUM	BEAUFORT	CARTERET
NCD981023732	NEUVILLE SOCK PROPERTY	HILDEBRAN	BURKE
NCD003235066	NEW AGE FURNITURE CO/MILLER TOOL	LEXINGTON	DAVIDSON
NCD990715070	NEW HANOVER CY & CAROLINA LDFL	CAROLINA BEACH	NEW HANOVER
NCD986171379	NEW HAVEN DRIVE TCE	GASTONIA	GASTON
NCD024577421	NORTH CAROLINA SALVAGE CO.	GOLDSBORO	WAYNE
NCD991278839	NORTH STATE CHEMICALS	GREENSBORO	GUILFORD
NCD986186518	OLD ATC REFINERY	WILMINGTON	NEW HANOVER
NCD986166734	OLD BEAUFORT CO. LANDFILL	WASHINGTON	BEAUFORT
NONCD0001065	OLD CHARLOTTE LDFL/VANGUARD CENTRE	CHARLOTTE	MECKLENBURG
NONCD0001074	OLD FORD BLDG	TABOR CITY	COLUMBUS
NONCD0001090	OLD MILL BLDG	HENDERSONVILLE	HENDERSON
NCD986172518	OLD MOUNT HOLLY ROAD PCE SITE	CHARLOTTE	MECKLENBURG
NONCD0000079	OLD PINEHURST HOTEL CLEANERS	PINEHURST	MOORE
NCD986197374	OLD RANDLEMAN TOWN DUMP	RANDLEMAN	RANDOLPH
NCSFN0406906	OLD STAKE ROAD	CHADBOURNE	COLUMBUS
NCD980728745	OSHIELDS FLY ASH	BREVARD	TRANSYLVANIA
NONCD0001039	OVERCASH GRAVEL & GRADING CO. INC.	CONCORD	CABARRUS
NCD003520301	OVERCASH MACHINE SHOP, INC.	STATESVILLE	IREDELL
NCD055165609	PANTASOTE INC. FILM/COMPOUND DIV.	HICKORY	CATAWBA
NCD144192606	PARKER-ZENITH	ABERDEEN	MOORE
NONCD0000099	PARTON'S MOTOR COMPANY	GASTONIA	GASTON
NCD057248759	PATCH RUBBER POND	ROANOKE RAPIDS	HALIFAX

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1. SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD986171338	PEELE CO. PESTICIDE DISPOSAL	CLAYTON	JOHNSTON
NCD980503098	PFIZER INC/SKATE STADIUM	GREENSBORO	GUILFORD
NCD003196193	PIFER INDUSTRIES, INC.	DURHAM	DURHAM
NCD986166379	PILOT MOUNTAIN TIRE FIRE	PILOT MOUNTAIN	SURRY
NCD980557672	PITT COUNTY UTILITY LANDFILL	GREENVILLE	PITT
NCD075570820	PLYMOUTH WOOD TREATING COMPANY	PLYMOUTH	WASHINGTON
NCD980558027	POND ROAD LANDFILL 2	ASHEVILLE	BUNCOMBE
NCD986170694	POULOS GROUNDWATER CONTAMINATION	CHARLOTTE	MECKLENBURG
NCD980559983	PPG IND., INC./WKS 52	SHELBY	CLEVELAND
NCN000407364	QUARTER MASTER AUTO DETAIL	KERNERSVILLE	FORSYTH
NCD062548995	QUORUM KNITTING	WEAVERVILLE	BUNCOMBE
NONCD0001029	R & D LAMINATORS INC	AHOSKIE	HERTFORD
NCD003149663	RADIATOR SPECIALTY COMPANY	CHARLOTTE	MECKLENBURG
NCD981031578	RAINBOW DRIVE BATTERY	KANNAPOLIS	CABARRUS
NCD003216413	RALEIGH ROAD FURNITURE CORP. STANLEY	LEXINGTON	DAVIDSON
NONCD0000025	RANGE ROAD BURN SITE	BUTNER	GRANVILLE
NCD002972966	REA MAGNET WIRE COMPANY	LAURINBURG	SCOTLAND
NCD083673616	REEVES BROTHERS	RUTHERFORDTON	RUTHERFORD
NCD003152659	REICHHOLD CHEMICAL, INC.	CONCORD	CABARRUS
NCD049845548	REICHHOLD CHEMICAL, INC.	MONCURE	CHATHAM
NCD062664883	REINCO CHEMICAL COMPANY	ROANOKE RAPIDS	HALIFAX
NCD986176030	RHODERIA DRIVE WELLS	STALLINGS	UNION
NCD060306727	RICHARDS WC COMPANY, INC.	ABERDEEN	MOORE
NCD980557789	RICHMOND COUNTY LANDFILL	ROCKINGHAM	RICHMOND
NCD980839716	RIVERDALE HOMES/EARL GETTS	DURHAM	DURHAM
NCD980838379	ROWE CORP PROPERTY/BOULIGNY SITE	CHARLOTTE	MECKLENBURG
NONCD0001016	ROYSTER-CLARK FERTILIZER PLANT	OAK CITY	MARTIN
NCD093334969	S & S METALS RECYCLING COMPANY	GOLD HILL	CABARRUS
NCD000776732	SAFETY-KLEEN CORP 3-031-02	WALLACE	DUPLIN
NCD980602791	SALVAGE OIL OF AMERICA	ROCKINGHAN	RICHMOND
NCD000281832	SANFORD PLATING COMPANY	SANFORD	LEE
NCD980503106	SANITATION SERV LAND	SAINT PAULS	ROBESON
NCD093338119	SCM CORP. GLIDDEN COATINGS & RESINS	CHARLOTTE	MECKLENBURG
NCD003229358	SCM PROCTOR-SILEX/WEAREVER	MOUNT AIRY	SURRY
NCD003155587	SCOTT AVIATION OF MONROE/TOOL SERV	MONROE	UNION
NCD980848840	SCOTT'S CREEK BATTERY SITE	NEW BERN	CRAVEN
NCD000616516	SCOVILL INC/SECURITY PRODUCTS	MONROE	UNION
NCD980600449	SED, INC. RADAR ROAD	GREENSBORO	GUILFORD
NCD980712038	SED, INC. SWING COURT	GREENSBORO	GUILFORD
NCD003231545	SHERWOOD TREATING CO., INC.	WINSTON-SALEM	FORSYTH
NCN000407206	SHULIMSON BROTHERS SCRAP YARD	ASHEVILLE	BUNCOMBE
NCD067428821	SIEMENS-ALLIS, INC/SWITCHGEAR DIV	SANFORD	LEE

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1. SITES PRIORITY LIST

ID Number	Site Name	City	County
NONCD0001100	SIMPSON WELL CONTAMINATION	BELMONT	GASTON
NCD083678631	SINCLAIR AND VALENTINE CO.	CHARLOTTE	MECKLENBURG
NCD098765506	SINGER CO/FURNITURE DIV BRYSON	BRYSON CITY	SWAIN
NCD072012354	SINGER CO/FURNITURE DIV WASHINGTON	CHOCOWINITY	BEAUFORT
NONCD0001009	SINGER PLANT #2	LENOIR	CALDWELL
NONCD0000019	SIR WALTER GUN CLUB	RALEIGH	WAKE
NCD980503148	SOUTHCHEM LANDFILL	DURHAM	DURHAM
NCD990715658	SOUTHERN MANUFACTURING, INC.	CHARLOTTE	MECKLENBURG
NCN000407584	SOUTHERN METALS RECYCLING, INC	WILMINGTON	NEW HANOVER
NCD077821296	SOUTHERN RESIN/US INDUSTRIES INC	THOMASVILLE	DAVIDSON
NCD042269134	SOUTHERN SCREW/FARLEY METALS	STATESVILLE	IREDELL
NONCD0000042	SOUTHMET, INC.	GREENVILLE	PITT
NONCD0001076	SOUTHSIDE INVESTMENTS LLC	CHARLOTTE	MECKLENBURG
NCD986180917	SPANN PROPERTY	HENDERSONVILLE	HENDERSON
NCD003167780	SPRAGUE ELECTRIC COMPANY	LANSING	ASHE
NCN000407700	SPRINGS ROAD GO CART TRACK	CONOVER	CATAWBA
NCD003214574	SPRUANCE SOUTHERN, INC.	WINSTON-SALEM	FORSYTH
NCD991278730	SQUIBB E R & SONS	KENLY	JOHNSTON
NCSFN0406894	STALLINGS SALVAGE	MONROE	UNION
NCD084167444	STANADYNE, INC/DIESEL SYSTEMS	JACKSONVILLE	ONSLOW
NCD054284518	STANDARD PACKAGING CORPORATION	MT GILEAD	MONTGOMERY
NCD049845266	STANLEY CASE GOODS (FORMER)	WEST END	MOORE
NONCD0000001	STANLY NEWS & PRESS	ALBEMARLE	STANLY
NCD000605097	STATESVILLE ROAD LANDFILL	CHARLOTTE	MECKLENBURG
NCD024895864	STEWART-WARNER CORP/BASSICK-SACK	WINSTON-SALEM	FORSYTH
NCD986227965	STOLLER CHEMICAL - SEVERN	SEVERN	NORTHAMPTON
NCD986211274	STONEY FORK CREEK DRUM DUMP SITE	DEEP GAP	WILKES
NCD083669952	STORY BURIAL AREAS/UNION CHEMICAL	CHARLOTTE	MECKLENBURG
NCD053487765	STRATFORD METAL FINISHINGS, INC.	WINSTON-SALEM	FORSYTH
NCD003229762	STRUCTURAL WOODS PRESERVING CO.	COLERIDGE	RANDOLPH
NONCD0000679	STURGEON CITY PROPERTY	JACKSONVILLE	ONSLOW
NCD986232213	SUMMIT RESOURCE MANAGEMENT	STALLINGS	UNION
NCD081428104	SUN CHEM CORPORATION/GPI DIV	WINSTON-SALEM	FORSYTH
NCD000006361	SUPERIOR ELECTRO FINISHES	WINSTON SALEM	FORSYTH
NCD024600579	SUPERIOR PRODUCTS COMPANY	GREENSBORO	GUILFORD
NONCD0001062	SWAIM'S TRUCK PARTS & SERVICE	HENDERSON	VANCE
NCD980557987	SWANNANOA LANDFILL	SWANNANOA	BUNCOMBE
NCD981474158	SWEETEN CREEK DRUM SITE	ASHEVILLE	BUNCOMBE
NCD981921083	SWIFT ADHESIVES	PINEVILLE	MECKLENBURG
NCD980559389	TARBORO LANDFILL	TARBORO	EDGECOMBE
NCD981932023	TARBORO-EDGECOMBE AIRPORT	TARBORO	EDGECOMBE
NCD000828566	TARTAN MARINE PROPERTY	HAMLET	RICHMOND

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1. SITES PRIORITY LIST

ID Number	Site Name	City	County
NCD105797922	TECHNIBILT/DIV OF WHITTAKER	NEWTON	CATAWBA
NCD070619911	TELEDYNE ALLVAC MONROE PLANT	MONROE	UNION
NCD000623199	TEXACO INC/FAYETTEVILLE	FAYETTEVILLE	CUMBERLAND
NCD041519364	TEXASGULF CHEMICALS COMPANY	AURORA	BEAUFORT
NCD065295495	TEXFI IMPRESSIONS	GOLDSBORO	WAYNE
NCD986178226	TEXFI INDUSTRIES, INC	FAYETTEVILLE	CUMBERLAND
NCD981928088	TEXFI INDUSTRIES, INC/NEW BERN	NEW BERN	CRAVEN
NONCD0000074	TEXTILE CHEMICAL FACILITY	CHARLOTTE	MECKLENBURG
NONCD0000084	THERMO PRODUCTS, INC.	DENTON	DAVIDSON
NCD077838589	THOMASVILLE FOREST PRODUCTS	THOMASVILLE	DAVIDSON
NCD095470332	THONIT A SIMMONS COMPANY	CHARLOTTE	MECKLENBURG
NCD986231967	TOM SADLER ROAD WELLS	CHARLOTTE	MECKLENBURG
NONCD0001025	TOOMEY PROPERTY	SPRINGWOOD	GASTON
NCD072028251	TORPEDO WIRE & STRIP, INC.	ROCKY MOUNT	NASH
NCD980843528	TOWN CREEK REGIONAL WWTP	SALISBURY	ROWAN
NCD067392175	TRAMCO, INC.	CONNELLY SPRINGS	BURKE
NONCD0001005	TRANSEASTERN CORP.	WILSON	WILSON
NCN000407205	TRI-COUNTY AIRPORT	AULANDER	HERTFORD
NCN000407333	TRIAD USED AUTO SALES	GREENSBORO	GUILFORD
NONCD0000081	TRITON, INC	WILSON	WILSON
NCD082362989	TUNGSTEN QUEEN MINE/ATLAS MINE	TOWNSVILLE	VANCE
NCD981864614	ULAH BATTERY/BATTERY PILES	ASHEBORO	RANDOLPH
NCD003216959	UNION CAMP CORPORATION	JAMESTOWN	GUILFORD
NCD003183480	UNION CAMP CORPORATION	SMITHFIELD	JOHNSTON
NCD980844336	UNION CARBIDE BATTERY	CHARLOTTE	MECKLENBURG
NCD003216462	UNION CARBIDE CORP/EVEREADY BATTERY	ASHEBORO	RANDOLPH
NCD003184249	UNION CARBIDE CORP/EVEREADY BATTERY	GREENVILLE	PITT
NCD000609974	UNION OIL CO. SE TERM	GREENSBORO	GUILFORD
NCD003164464	UNIROYAL INC/UNIROYAL CHEMICAL	GASTONIA	GASTON
NCD061795696	UNITEX CHEMICALS	GREENSBORO	GUILFORD
NCD980557623	UNIVERSITY OF NC/ARPT WASTE DISP	CHAPEL HILL	ORANGE
NCD980557615	UNIVERSITY OF NC/OLD SANITARY LDFL	CHAPEL HILL	ORANGE
NCN000407188	US 1-15/501 ABERDEEN	ABERDEEN	MOORE
NCD981472624	US 70 DRUM DUMP	MORGANTON	BURKE
NC5210022906	USA RESERVE XVIII AIRBORNE CORPS	MOREHEAD CITY	CARTERET
NCD000828616	USS AGRI-CHEMICALS FARM SERVICE	WHITEVILLE	COLUMBUS
NONCD0000003	VAN WATERS & ROGERS	CHARLOTTE	MECKLENBURG
NCD093783876	VANIER GRAPHICS CORPORATION	EDEN	ROCKINGHAM
NCD003464765	VAUGHAN-BASSETT FURNITURE CO.	ELKIN	SURRY
NCSFN0406924	VC CHEMICAL	WADESBORO	ANSON
NC0002178580	VC CHEMICAL-ALMONT WORKS	WILMINGTON	NEW HANOVER
NCSFN0406962	VINEGAR HILL LEAD SITE	TABOR CITY	COLUMBUS

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1. SITES PRIORITY LIST

ID Number	*Site Name*	*City*	*County*
NCD093132207	VOICE OF AMERICA RELAY STATION	GREENVILLE	PITT
NONCD0000048	WALKER DRUM DISPOSAL	GOLD HILL	ROWAN
NCD003236841	WARLICK PAINT COMPANY	STATESVILLE	IREDELL
NCN000407564	WATHA FIRING RANGE	WATHA	PENDER
NONCD0000022	WATTS REGULATOR-DAVIS PROPERTY SITE	SPINDALE	RUTHERFORD
NONCD0000060	WATTS REGULATOR-GENERAL AIDES SITE	FOREST CITY	RUTHERFORD
NONCD0000057	WATTS, LEVI PROPERTY	TABOR CITY	COLUMBUS
NONCD0001091	WEST MOREHEAD ST PESTICIDE	CHARLOTTE	MECKLENBURG
NCD003195963	WESTINGHOUSE ELEC METER & LIGHT	RALEIGH	WAKE
NONCD0001006	WESTINGHOUSE TURBINE	CHARLOTTE	MECKLENBURG
NONCD0001105	WETSIG YACHTS	WILMINGTON	NEW HANOVER
NCD052553641	WEYERHAEUSER CO/LEWISTON	LEWISTON	BERTIE
NCD071567259	WEYERHAEUSER CO/MONCURE	MONCURE	CHATHAM
NCD003220969	WHITE FURNITURE CO.	MEBANE	ALAMANCE
NONCD0000012	WHITE'S GRAVEL PIT	CONCORD	CABARRUS
NCD003151651	WILLARD SMELTING CO.	CHARLOTTE	MECKLENBURG
NCD001704980	WILMINGTON BRANCH/BORDEN/SMITH DOUGL	NAVASSA	BRUNSWICK
NCD986166759	WILSON SEPTIC PITS	HICKORY	CATAWBA
NCD024477556	WINSTON CONTAINER COMPANY	CHARLOTTE	MECKLENBURG
NCD003183571	WINTERVILLE MACHINE WORKS, INC.	WINTERVILLE	PITT
NCD986170678	WOOD ROAD DRUM BURIAL	GASTONIA	GASTON
NC0001279710	WOODY WILSON BATTERY/ASHLEY HEIGHTS	ASHLEY HEIGHTS	HOKE
NCD986166288	WOODY'S TIRE FIRE	GASTONIA	GASTON

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2. RESPONSIBLE PARTY VOLUNTARY REMEDIAL ACTION SITES

ID Number	Site Name	City	County
NONCD0000040	ABBOTT LABORATORIES	LAURINBURG	SCOTLAND
NONCD0000039	ABITIBI-PRICE CORPORATION	ROARING RIVER	WILKES
NCD047257472	APPLIED RESEARCH GROUP, INC.	CHARLOTTE	MECKLENBURG
NCD074511361	AQUAIR CORPORATION	CHARLOTTE	MECKLENBURG
NCD986188787	ASHEVILLE COAL GAS PLANT #1	ASHEVILLE	BUNCOMBE
NONCD0000032	ASHEVILLE COAL GAS PLANT #2	ASHEVILLE	BUNCOMBE
NCD072003635	ATHOL MANUFACTURING COMPANY	BUTNER	GRANVILLE
NCD003193588	BARBOUR BOAT WORKS, INC.	NEW BERN	CRAVEN
NONCD0000002	BURLINGTON COAL GAS PLANT	BURLINGTON	ALAMANCE
NCD986171965	CARO-KNIT	WILMINGTON	NEW HANOVER
NCD000830646	CAROLINA P&L CO. SUTTON STEAM	WILMINGTON	NEW HANOVER
NCD000608117	CELANESE CORPORATION/FIBERS TECH	CHARLOTTE	MECKLENBURG
NCD986188803	CHARLOTTE COAL GAS PLANT NO. 2	CHARLOTTE	MECKLENBURG
NONCD0001082	CMI FLYASH DISPOSAL (PARCEL 2)	ELKIN	SURRY
NONCD0001092	CMI WWTP (PARCEL1)	ELKIN	SURRY
NCD986197333	CONCORD COAL GAS PLANT	CONCORD	CABARRUS
NONCD0001097	COPES-VULCAN, INC	CHARLOTTE	MECKLENBURG
NONCD0001061	CP&L NORTHERN DIVISION COMPLEX	GARNER	WAKE
NC0001606250	CRISTEX DRUM	OXFORD	GRANVILLE
NCD062567623	DIAMOND SHAMROCK CORP/HENKEL PROCES	CHARLOTTE	MECKLENBURG
NONCD0001035	DUKE ENERGY-WINSTON-SALEM POWER	WINSTON-SALEM	FORSYTH
NCD981861743	DUKE POWER/GREENSBORO GAS PLANT	GREENSBORO	GUILFORD
NCD000813519	DUKE UNIVERSITY	DURHAM	DURHAM
NCD986173938	DURHAM GAS PLANT	DURHAM	DURHAM
NONCD0001058	ELECTRONICS COMPONENT CORPORATION	BURGAW	PENDER
NCD986197267	ELIZABETH CITY COAL GAS	ELIZABETH CITY	PASQUOTANK
NCD986197341	FAYETTEVILLE COAL GAS/RAY AVE	FAYETTEVILLE	CUMBERLAND
NONCD0000017	FLAKT PRODUCTS	WINSTON-SALEM	FORSYTH
NONCD0000029	FLEET AEROSPACE CORP./AERONCA	CHARLOTTE	MECKLENBURG
NCD986188829	GASTONIA COAL GAS PLANT	GASTONIA	GASTON
NCD051322980	GENERAL ELECTRIC CO.	CHARLOTTE	MECKLENBURG
NCD003163730	GENERAL INSTRUMENT CORP.	FAIRVIEW	BUNCOMBE
NONCD0001069	GENERAL MARBLE COMPANY	LINCOLNTON	LINCOLN
NCD986197309	GOLDSBORO COAL GAS PLANT #1	GOLDSBORO	WAYNE
NONCD0001083	GOLDSBORO COAL GAS PLANT #2	GOLDSBORO	WAYNE
NONCD0001089	GREENSBORO COAL GAS PLANT #1	GREENSBORO	GUILFORD
NCD986188886	GREENVILLE COAL GAS PLANT	GREENVILLE	PITT
NCD986232379	GRESHAMS LAKE INDUSTRIAL PARK	RALEIGH	WAKE
NCD051739209	HARRELSON RUBBER COMPANY	ASHEBORO	RANDOLPH
NONCD0001084	HENDERSON COAL GAS PLANT	HENDERSON	VANCE

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2. RESPONSIBLE PARTY VOLUNTARY REMEDIAL ACTION SITES

ID Number	*Site Name*	*City*	*County*
NCD990734055	HERCOFINA/CAPE INDUSTRIES	WILMINGTON	NEW HANOVER
NCD039102959	HEVI-DUTY ELECTRIC/GENERAL SIG	GOLDSBORO	WAYNE
NONCD0001085	HICKORY COAL GAS PLANT	HICKORY	CATAWBA
NCD986188837	HIGH POINT COAL GAS PLANT	HIGH POINT	GUILFORD
NCD051745685	HOLDING POND FOR WASTE/USS	GREENSBORO	GUILFORD
NCD003215696	HUNT MANUFACTURING	STATESVILLE	IREDELL
NONCD0000050	HWY 268 MIRROR WASTE DUMP	NORTH WILKESBORO	WILKES
NONCD0000056	JAMES LANDFILL	LAURINBURG	SCOTLAND
NCD986197366	KINSTON COAL GAS PLANT	KINSTON	LENOIR
NCD986197358	LEXINGTON COAL GAS PLANT	LEXINGTON	DAVIDSON
NCD003183167	LONG MANUFACTURING	TARBORO	EDGECOMBE
NCD055359079	MASONITE CORP. FIBERBOARD DIV.	SPRING HOPE	NASH
NONCD0001086	MT AIRY COAL GAS PLANT	MT AIRY	SURRY
NCD986197259	NEW BERN COAL GAS PLANT	NEW BERN	CRAVEN
NCD055162069	PELTON & CRANE PLANT (FORMER)	CHARLOTTE	MECKLENBURG
NONCD0001020	PRECISION FABRICS GROUP, INC	GREENSBORO	GUILFORD
NCD986188894	RALEIGH COAL GAS PLANT NO. 1	RALEIGH	WAKE
NCD986188902	RALEIGH COAL GAS PLANT NO. 2	RALEIGH	WAKE
NONCD0001087	REIDSVILLE COAL GAS PLANT	REIDSVILLE	ROCKINGHAM
NCD053009510	RELIANCE UNIVERSAL OF KENTUCKY	LENOIR	CALDWELL
NCD986197325	ROCKY MOUNT COAL GAS PLANT NO. 1	ROCKY MOUNT	NASH
NCD986197317	ROCKY MOUNT COAL GAS PLANT NO. 2	ROCKY MOUNT	NASH
NCD981933096	ROCKY MOUNT, OLD AIRPORT	ROCKY MOUNT	NASH
NCD986197283	SALISBURY COAL GAS PLANT #1	SALISBURY	ROWAN
NONCD0001088	SALISBURY COAL GAS PLANT #2	SALISBURY	ROWAN
NCD062552153	SAYLES-BILTMORE BLEACHERIES	ASHEVILLE	BUNCOMBE
NCD003234549	SCM PROCTOR SILEX/WEAREVER	SOUTHERN PINES	MOORE
NCD053488557	SOUTHERN WOOD PIEDMONT COMPANY	GULF	CHATHAM
NCD058517467	SOUTHERN WOOD PIEDMONT COMPANY	WILMINGTON	NEW HANOVER
NCD986197291	STATESVILLE COAL GAS PLANT	STATESVILLE	IREDELL
NCD986176444	STROH/CHITTY FARM	WINSTON-SALEM	FORSYTH
NONCD0001101	STRONGHAVEN WAREHOUSE	MATTHEWS	MECKLENBURG
NCD986166700	TOISNOT SWAMP	WILSON	WILSON
NCD053485991	VARCO-PRUDEN BUILDINGS	KERNERSVILLE	FORSYTH
NCD986197275	WASHINGTON COAL GAS PLANT	WASHINGTON	BEAUFORT
NCD986188910	WILMINGTON COAL GAS PLANT	WILMINGTON	NEW HANOVER
NCN000407302	WILMINGTON GUN CLUB (FORMER)	WILMINGTON	NEW HANOVER
NCD986188845	WINSTON-SALEM COAL GAS PLANT NO. 1	WINSTON-SALEM	FORSYTH
NCD986188852	WINSTON-SALEM COAL GAS PLANT NO. 2	WINSTON-SALEM	FORSYTH

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3. SITES WITH EVALUATIONS PENDING

ID Number	*Site Name*	*City*	*County*
NONCD0001107	CONE MILLS - FLORENCE PLANT	FOREST CITY	RUTHERFORD
NCD981014517	DYNATECH	CHARLOTTE	MECKLENBURG
NONCD0001070	EMPORIUM CLEANERS	RALEIGH	WAKE
NCD980503056	FLEMINGTON LANDFILL	WILMINGTON	NEW HANOVER
NCD000773515	GA-PACIFIC CORP/HDWD SAW	BOWDENS	DUPLIN
NCD000773507	GA-PACIFIC CORP/HDWD SAW	ENFIELD	HALIFAX
NCD981922362	GREIF, INC	BLADENBORO	BLADEN
NONCD0001111	IDEAL CLEANERS	RALEIGH	WAKE
NCD986232163	JSC GRAPHIC ARTS	WINSTON-SALEM	FORSYTH
NCD981863327	KSP DRY CLEANERS	CHAPEL HILL	ORANGE
NCN000407301	LOFLIN GOLD MINE	TRINITY	RANDOLPH
NONCD0001098	NATIONAL TEXTILES, LLP	MORGANTON	BURKE
NCD980848667	ONE HOUR KORETIZING	DURHAM	DURHAM
NONCD0001024	PARK PLAZA	SPENCER	ROWAN
NONCD0001108	RENTAL UNIFORM SERVICE	ASHEVILLE	BUNCOMBE
NCN000407196	ROWAN ROAD LANDFILL	CLINTON	SAMPSON
NCN000407775	ROYSTER FERTILIZER	LELAND	BRUNSWICK
NONCD0001096	SALISBURY TOWNSHIP SHOPPING CENTER	SALISBURY	ROWAN
NCD083673681	SINGER CO/KERAFOTT DIV	BLACK MOUNTAIN	BUNCOMBE
NC0210020541	US DOD MILITARY OCEAN TERMINAL	SOUTHPORT	BRUNSWICK
NC7210020544	USA TARHEEL ARMY MISSILE PLANT	BURLINGTON	ALAMANCE
NC6570027460	USAF DARE COUNTY RANGE SEYMOUR	ENGLEHART	HYDE
NC7170090008	USMC/CRASH CREW BURN PIT	MOREHEAD CITY	CARTERET
NONCD0001110	WOODSON-TENET LABORATORIES	GOLDSTON	CHATHAM
NCN000407243	WOODY'S SALVAGE YARD	VANDER	CUMBERLAND

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4. NATIONAL PRIORITIES LIST

ID Number	*Site Name*	*City*	*County*
NCD024644494	ABC ONE HOUR CLEANERS	JACKSONVILLE	ONSLOW
NCD980843346	ABERDEEN PESTICIDE DUMPS	ABERDEEN	MOORE
NCSFN0406989	BARBER ORCHARD	WAYNESVILLE	HAYWOOD
NCD981026479	BENFIELD INDUSTRIES, INC.	HAZELWOOD	HAYWOOD
NCD044440303	BYPASS 601	CONCORD	CABARRUS
NC6170022580	CAMP LEJEUNE MILITARY RESERVATION	CAMP LEJEUNE	ONSLOW
NCD003188828	CAPE FEAR WOOD PRESERVING	FAYETTEVILLE	CUMBERLAND
NCD003188844	CAROLINA TRANSFORMER	FAYETTEVILLE	CUMBERLAND
NCD003446721	CELANESE CORPORATION/SHELBY FIBER	SHELBY	CLEVELAND
NCD980840409	CHARLES MACON LAGOON & DRUM	CORDOVA	RICHMOND
NCD095459392	CHEMTRONICS, INC/JET RESEARCH	SWANNANOA	BUNCOMBE
NC1170027261	CHERRY POINT MARINE CORPS AIR STN	CHERRY POINT	CRAVEN
NCD986175644	DAVIS PARK ROAD TCE SITE	GASTONIA	GASTON
NCD095458527	FCX, INC. STATESVILLE	STATESVILLE	IREDELL
NCD981475932	FCX, INC. WASHINGTON PLANT	WASHINGTON	BEAUFORT
NCD981927502	GEIGY CHEMICAL CORPORATION	ABERDEEN	MOORE
NCD079044426	GENERAL ELECTRIC CO/SHEPHERD FARM	EAST FLAT ROCK	HENDERSON
NCD980729602	JADCO-HUGHES	BELMONT	GASTON
NCD122263825	JFD/CHANNEL MASTER	OXFORD	GRANVILLE
NCD003200383	KOPPERS COMPANY, INC.	MORRISVILLE	WAKE
NCD001810365	MARTIN MARIETTA-SODYECO DIV/SANDOZ	CHARLOTTE	MECKLENBURG
NCD991278953	NATIONAL STARCH CORPORATION	SALISBURY	ROWAN
NCD980557656	NC STATE UNIV. (LOT 86 FARM UNIT)	RALEIGH	WAKE
NCD981021157	NEW HANOVER COUNTY AIRPORT BURN	WILMINGTON	NEW HANOVER
NCD986187128	NORTH BELMONT PCE SITE	NORTH BELMONT	GASTON
NCD981023260	POTTER'S SEPTIC TANK SVS PITS	MACO	BRUNSWICK
NCD982096653	RAM LEATHER CARE	CHARLOTTE	MECKLENBURG
NCD986187094	REASOR CHEMICAL	CASTLE HAYNE	NEW HANOVER
NCD003202603	WARD TRANSFORMER	RALEIGH	WAKE

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5. NON-NPL FEDERAL SUPERFUND CLEANUPS

ID Number	*Site Name*	*City*	*County*
NCD000648402	BATTERY TECH (DURACELL)	LEXINGTON	DAVIDSON
NCD044447589	BLUE RIDGE PLATING COMPANY	ARDEN	BUNCOMBE
NCD051827905	ESTECH GENERAL CHEMICALS CORP.	NAVASSA	BRUNSWICK
NCD045922986	FLANDERS FILTERS, INC.	WASHINGTON	BEAUFORT
NCD986172526	GURLEY PESTICIDE BURIAL	SELMA	JOHNSTON
NCD981027915	J STREET FLYASH DISPOSAL SITE	ERWIN	HARNETT
NCD053530234	NORTHEAST CHEMICAL COMPANY	CAPE FEAR	NEW HANOVER
NC6570024475	POPE AFB	POPE AIR FORCE BASE	CUMBERLAND
NCD062555792	SIGMON'S SEPTIC TANK	STATESVILLE	IREDELL
NCD087336335	TRIANGLE PACIFIC CORP/IXL DIV.	ELIZABETH CITY	PASQUOTANK
NC7570024474	USAF SEYMOUR JOHNSON AFB	GOLDSBORO	WAYNE
NCD991278540	WEYERHAEUSER COMPANY	PLYMOUTH	MARTIN

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6. RCRA PERMITTED OR INTERIM STATUS FACILITIES

ID Number	Site Name	City	County
NCD986171320	ALCOA BADIN LANDFILL	BADIN	STANLY
NCD003162542	ALCOA BADIN WORKS	BADIN	STANLY
NCD053488409	ALLIED CHEMICAL CORPORATION	MONCURE	CHATHAM
NCD085074821	AMERICAN HOECHST SOU-TEX /HOECHST	MT. HOLLY	GASTON
NCD070619663	ASHEVILLE DYEING AND FINISHING	SWANNANOA	BUNCOMBE
NCD024599011	ASHLAND CHEMICAL CO	GREENSBORO	GUILFORD
NCD061263315	ASHLAND CHEMICAL COMPANY	CHARLOTTE	MECKLENBURG
NCD088560032	ASHLAND CHEMICAL COMPANY	RALEIGH	WAKE
NCD001725464	BORDEN CHEMICAL SMITH-DOUGLAS	KINSTON	LENOIR
NCD060295417	BURLINGTON FURNITURE/CENT MAIN	LEXINGTON	DAVIDSON
NCD047373766	BURROUGHS WELLCOME COMPANY	GREENVILLE	PITT
NCD052547635	BURROUGHS WELLCOME COMPANY	RTP	DURHAM
NCD086871282	CALDWELL SYSTEMS INCORPORATED	LENOIR	CALDWELL
NC6170022580	CAMP LEJEUNE MILITARY RESERVATION	CAMP LEJEUNE	ONSLOW
NCD003154010	CARTER, A B INCORPORATED	GASTONIA	GASTON
NCD991278623	CHARLOTTE FIRE DEPT TRNG/CITY OF	CHARLOTTE	MECKLENBURG
NC1170027261	CHERRY POINT MARINE CORPS AIR STN	CHERRY POINT	CRAVEN
NCD061801361	CIBA-GEIGY CORPORATION	GREENSBORO	GUILFORD
NCD042892067	COOPER INDUSTRIES, INC. LUFKIN DIV	APEX	WAKE
NCD049773245	DETREX CHEMICAL INDUSTRIES, INC.	CHARLOTTE	MECKLENBURG
NCD047368642	DUPONT EI DE NEMOURS & CO.	FAYETTEVILLE	CUMBERLAND
NCD003190386	DUPONT EI DE NEMOURS & CO.	KINSTON	LENOIR
NCD047369046	DUPONT EI DE NEMOURS & CO.	LELAND	BRUNSWICK
NCD003173358	DURABLE WOOD PRESERVERS, INC.	CHARLOTTE	MECKLENBURG
NCD986194439	DYNATECH - HAWKINS ST	CHARLOTTE	MECKLENBURG
NCD003237948	GENERAL ELECTRIC CO/HICKORY	HICKORY	CATAWBA
NCD093137636	GENERAL WOOD PRESERVING CO., INC.	LELAND	BRUNSWICK
NCD024900987	HOLCOMB CREOSOTE COMPANY	YADKINVILLE	YADKIN
NCD991278631	HOLTRA CHEM/HONEYWELL, INC.	REIGELWOOD	COLUMBUS
NCD041463761	IBM CORPORATION	RTP	DURHAM
NCD981476955	JOHNSTON COUNTY SCHOOL BOARD	SMITHFIELD	JOHNSTON
NCD000771964	LITHIUM CORP. OF AMERICA /FMC	BESSEMER CITY	GASTON
NCD044438406	LITTON INDUSTRIES/CLIFTON PRECISION	CHEROKEE	CHEROKEE
NCD048467427	MINERAL RESEARCH & DEV. CORP.	ROCKY RIVER	CABARRUS
NC1750890005	NATIONAL INST. ENVMTL. HLTH. SCI.	RTP	DURHAM
NCD991278953	NATIONAL STARCH CORPORATION	SALISBURY	ROWAN
NCD000773655	OLDOVER CORP/CAROLINA SOLITE	NORWOOD	STANLY
NCD053010732	PARKS-CRAMER COMPANY	CHARLOTTE	MECKLENBURG
NCD091245969	RADIATOR SPECIALTY CO.	INDIAN TRAIL	UNION
NCD042091975	RJR/MALLINKRODT	RALEIGH	WAKE

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6. RCRA PERMITTED OR INTERIM STATUS FACILITIES

ID Number	*Site Name*	*City*	*County*
NCD046362117	ROADWAY EXPRESS TERMINAL	KERNERSVILLE	FORSYTH
NCD079060059	SAFETY KLEEN CORP.	CHARLOTTE	MECKLENBURG
NCD077840148	SAFETY-KLEEN CORP 3-064-01	HIGH POINT	GUILFORD
NCD000776740	SAFETY-KLEEN CORP 3-171-01	RALEIGH	WAKE
NCD980846935	SAFETY-KLEEN CORP. 3-031	ST PAULS	ROBESON
NCD065300519	SCHLAGE LOCK COMPANY	ROCKY MOUNT	EDGECOMBE
NCD002591014	SCOVILL, SHRADER-BELLOWS DIVISION	WAKE FOREST	WAKE
NCD071574164	SEABOARD CHEMICAL CORPORATION	JAMESTOWN	GUILFORD
NCD057451270	SINGER CO/AAF-MCQUAY	WILMINGTON	NEW HANOVER
NCD000604322	SINGER CO/FURNITURE DIV PLTS 3	LENOIR	CALDWELL
NCD067203752	SQUARE D COMPANY	KNIGHTDALE	WAKE
NCD091249417	TEXTRON INC/HOMELITE DIV.	GASTONIA	GASTON
NCD982093783	UNC-CHAPEL HILL	CHAPEL HILL	ORANGE
NCD045646924	UNICAN SECURITY SYSTEMS/ILCO UNI	ROCKY MOUNT	NASH
NC8210020121	USA FORT BRAGG	FORT BRAGG	CUMBERLAND
NC2690308232	USCG SUPPORT CENTER	ELIZABETH CITY	PASQUOTANK
NCD041466251	VEEDER-ROOT COMPANY	ELIZABETHTOWN	BLADEN
NCD060299880	WEBER USA SANFORD PLANT	SANFORD	LEE
NCD003213907	WESTERN ELECTRIC CO/AT&T	WINSTON-SALEM	FORSYTH
NCD003471158	WORTH CHEMICAL	GREENSBORO	GUILFORD

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7. RCRA NON-PERMITTED CORRECTIVE ACTION SITES

ID Number	*Site Name*	*City*	*County*
NCD003168168	AMERICAN CYANAMID/FREEDOM TEXTILES	CHARLOTTE	MECKLENBURG
NCD044447589	BLUE RIDGE PLATING COMPANY	ARDEN	BUNCOMBE
NCD044440303	BYPASS 601	CONCORD	CABARRUS
NCD048181218	CAROLINA GALVANIZING CORP.	ABERDEEN	MOORE
NCD003200854	CAROLINA WOOD PRESERVING COMPANY	SCOTLAND NECK	HALIFAX
NCD095459392	CHEMTRONICS, INC/JET RESEARCH	SWANNANOA	BUNCOMBE
NCD107868812	CONBRACO INDUSTRIES, INC.	MATTHEWS	MECKLENBURG
NCD001864123	GA-PACIFIC CORP ATP	MURFREESBORO	HERTFORD
NCD003185238	ITT TELECOMS CORP/ALCATEL	RALEIGH	WAKE
NCD003151990	KIMBERLY-CLARK CORP/LANDFILL	BALFOUR	HENDERSON
NCD001810365	MARTIN MARIETTA-SODYECO DIV/SANDOZ	CHARLOTTE	MECKLENBURG
NCD991277724	MITCHELL SYSTEMS, INC.	SPRUCE PINE	MITCHELL
NCD041466806	PHILLIPS PLATING	BRIDGETON	CRAVEN
NCD000648451	TRIANGLE RESOURCE IND/LAIDLAW	REIDSVILLE	ROCKINGHAM
NC7570024474	USAF SEYMOUR JOHNSON AFB	GOLDSBORO	WAYNE

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8. SITES UNDER THE JURISDICTION OF THE SOLID WASTE SECTION

ID Number	Site Name	City	County
NCD980557714	BEAUFORT COUNTY LANDFILL	BATH	BEAUFORT
NCD980502801	BIGGERSTAFF LANDFILL	GASTONIA	GASTON
NCD980502819	BLADEN COUNTY LANDFILL	ELIZABETHTOWN	BLADEN
NCD980502835	BRUNSWICK COUNTY LANDFILL	LELAND	BRUNSWICK
NCD980558001	BUNCOMBE COUNTY LANDFILL	ASHEVILLE	BUNCOMBE
NCD980502843	CABARRUS COUNTY LANDFILL	CONCORD	CABARRUS
NCD982118960	CALDWELL LANDFILL	LENOIR	CALDWELL
NCD980502868	CHATHAM COUNTY LANDFILL	PITTSBORO	CHATHAM
NCD980502900	CUMBERLAND COUNTY LANDFILL	FAYETTEVILLE	CUMBERLAND
NCD003152329	DUPONT EI DE NEMOURS & CO.	CEDAR MOUNTAIN	TRANSYLVANIA
NCD047369046	DUPONT EI DE NEMOURS & CO.	LELAND	BRUNSWICK
NCD003166675	ECUSTA MILL	PISGAH FOREST	TRANSYLVANIA
NCD980502926	EDGECOMBE COUNTY LANDFILL	TARBORO	EDGECOMBE
NCD000605303	FEDERAL PAPER BOARD CO., INC.	RIEGELWOOD	COLUMBUS
NCD044388015	GA-PACIFIC CORP HDBD	CONWAY	NORTHAMPTON
NC4120000001	GRAHAM COUNTY MUNICIPAL LANDFILL	ROBBINSVILLE	GRAHAM
NCD991279027	GREENSBORO CITY LANDFILL	GREENSBORO	GUILFORD
NCD980502959	HARRISBURG PARK LANDFILL	CHARLOTTE	MECKLENBURG
NCD981474190	HAYWOOD COUNTY LANDFILL	WAYNESVILLE	HAYWOOD
NCD980557961	HENDERSON COUNTY SAN LANDFILL	HENDERSONVILLE	HENDERSON
NCD980557565	HIGH POINT CITY LANDFILL	HIGH POINT	GUILFORD
NCD003151990	KIMBERLY-CLARK CORP/LANDFILL	BALFOUR	HENDERSON
NCD075588913	KINSTON DEMOLITION LANDFILL	KINSTON	LENOIR
NCD980503015	LEE COUNTY LANDFILL	SANFORD	LEE
NCD980557581	LEXINGTON MUNICIPAL LANDFILL	LEXINGTON	DAVIDSON
NCD070626825	MACON COUNTY LANDFILL	FRANKLIN	MACON
NCD981928013	MOORE COUNTY LANDFILL	ABERDEEN	MOORE
NCD980559348	NASH COUNTY LANDFILL	NASHVILLE	NASH
NCD986171106	ORANGE CO. REGIONAL LANDFILL	CHAPEL HILL	ORANGE
NCD980557680	PITT COUNTY LANDFILL	GREENVILLE	PITT
NCD043712298	PPG IND., INC.	LEXINGTON	DAVIDSON
NCD980557748	ROWAN COUNTY LANDFILL	SALISBURY	ROWAN
NCD980503122	SORRELL LANDFILL	APEX	WAKE
NC3120000002	SWAIN COUNTY LANDFILL	BRYSON CITY	SWAIN
NCD980503163	UNION COUNTY LANDFILL	MONROE	UNION
NCD980503171	WAKE COUNTY/FELTONVILLE LANDFILL	APEX	WAKE
NCD980557896	WILKES COUNTY MUNICIPAL LANDFILL	RONDA	WILKES

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9. SITES UNDER THE JURISDICTION OF THE DIVISION OF WATER QUALITY

ID Number	*Site Name*	*City*	*County*
NCD002464691	ALLIANCE CAROLINA TOOL AND MOLD	ARDEN	BUNCOMBE
NCD040049173	AMOCO OIL COMPANY	WILMINGTON	NEW HANOVER
NCD075582197	AMORE/WORTH CHEMICAL	DURHAM	DURHAM
NCD980844518	AMP INCORPORATED	CLEMMONS	FORSYTH
NCD003467974	AMP INCORPORATED	GREENSBORO	GUILFORD
NCD051853547	AUSTIN FOODS	CARY	WAKE
NCD054412283	BLACK & DECKER PLANT (FORMER)	TARBORO	EDGECOMBE
NCD047373766	BURROUGHS WELLCOME COMPANY	GREENVILLE	PITT
NCD045456134	BUSS AUTOMATION INCORPORATED	LENOIR	CALDWELL
NONCD0001104	CATO FARMS	CHARLOTTE	MECKLENBURG
NCD046148540	CENTRAL TRANSPORT COMPANY	CHARLOTTE	MECKLENBURG
NCD065288847	CF NITROGEN, INCORPORATED	WINTON	HERTFORD
NCD991278623	CHARLOTTE FIRE DEPT TRNG/CITY OF	CHARLOTTE	MECKLENBURG
NCD986176451	CITY OF SHELBY LANDFILL	SHELBY	CLEVELAND
NONCD0000065	CMI INDUSTRIES	ELKIN	SURRY
NONCD0001032	COCA COLA BOTTLING WORKS INC	NEW BERN	CRAVEN
NCD107868812	CONBRACO INDUSTRIES, INC.	MATTHEWS	MECKLENBURG
NCD042890525	DIAMOND SHAMROCK CORP/MARIETTA	CASTLE HAYNE	NEW HANOVER
NCD057454670	DIAMOND SHAMROCK CORP/OCCIDENTAL	CASTLE HAYNE	NEW HANOVER
NONCD0001066	DIMETRICS INC	DAVIDSON	MECKLENBURG
NCD000827832	ELECTRICAL UTILITIES/CO BB&T	FARMVILLE	PITT
NCD089989917	EMERSON ELECTRIC COMPANY	MURPHY	CHEROKEE
NCD003201837	ENCEE CHEMICAL SALES, INC.	BRIDGETON	CRAVEN
NCD000605303	FEDERAL PAPER BOARD CO., INC.	RIEGELWOOD	COLUMBUS
NCD041043811	FIBER INDUSTRIES INC/HOECHST-CELANES	SALISBURY	ROWAN
NCD067191262	FIRESTONE TIRE AND RUBBER COMPANY	WILSON	WILSON
NCD062553490	FLEET TRANSPORT CO., INC.	CHARLOTTE	MECKLENBURG
NCD980559975	GA-PACIFIC CORP/RESIN DIV	CONWAY	NORTHAMPTON
NCD003448610	GALVAN INDUSTRIES, INC.	HARRISBURG	CABARRUS
NCD003149291	GASTON COUNTY DYEING MACHINE CO.	MOUNT HOLLY	GASTON
NCD991277922	GASTON COUNTY DYEING MACHINE CO.	STANLEY	GASTON
NCD050409150	GENERAL ELECTRIC CO/WILMINGTON	WILMINGTON	NEW HANOVER
NCD043679349	GENERAL TIRE & RUBBER CO	CHARLOTTE	MECKLENBURG
NONCD0001023	HEAVY EQUIPMENT SCHOOL	CHARLOTTE	MECKLENBURG
NONCD0001078	HIGHLAND MILLS	CHARLOTTE	MECKLENBURG
NCD062571658	HONEYWELL MICRO SWITCH DIV.	MARS HILL	MADISON
NCD003198520	HONEYWELL, INC	DURHAM	DURHAM
NCD083674713	HULL SERVICE STATION/PHILLIPS 66	VALE	LINCOLN
NONCD0000089	JOHN MORRELL & CO	WILSON	WILSON

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9. SITES UNDER THE JURISDICTION OF THE DIVISION OF WATER QUALITY

ID Number	Site Name	City	County
NCD000653576	KERN RUBBER CO. URETHANE PLANT	SALISBURY	ROWAN
NCD062552989	MALLARD CREEK RD/UNION OIL CO OF CA	CHARLOTTE	MECKLENBURG
NCD000772046	MOBIL OIL CORP/KOCH REFINING	WILMINGTON	NEW HANOVER
NCD981030893	MUSIC CLUB PESTICIDE SITE	WILLIAMSTON	MARTIN
NCD091572073	NATIONAL STARCH & CHEMICAL COMPANY	LELAND	BRUNSWICK
NCD986185411	OLD WESTERN NC FAIRGROUNDS	EAST FLAT ROCK	HENDERSON
NONCD0001053	PARAMOUNT CHEVROLET	GOLDSBORO	WAYNE
NCD057037178	PFIZER INC/COTY DIVISION	SANFORD	LEE
NCD040047425	PRILLAMAN CHEMICALS	FAYETTEVILLE	CUMBERLAND
NCD067441394	RJR ARCHER, INC.	WINSTON-SALEM	FORSYTH
NCD044514602	RJR ARCHER, INC.	WINSTON-SALEM	FORSYTH
NCD042091215	RJR TECH COMPANY	MERRY HILL	BERTIE
NCD041466525	ROCKY MOUNT FIBER DUMP	ROCKY MOUNT	EDGECOMBE
NCD003197704	SALT WOOD PRODUCTS, INC.	COVE CITY	CRAVEN
NCD981863228	SCHERER, R.P.	MONROE	UNION
NCD095458709	SCHRADER AUTOMOTIVE PRODUCTS DIV.	MONROE	UNION
NCD986180909	SHELBY DYEING & FINISHING	SHELBY	CLEVELAND
NONCD0000033	SPRINGS IND/UNIGLASS IND.	STATESVILLE	IREDELL
NCD003951878	SQUARE D COMPANY	ASHEVILLE	BUNCOMBE
NCD986191484	STOUT INTERNATIONAL OF NC, INC	MONROE	UNION
NONCD0000011	TERRELL MACHINE SHOP	CHARLOTTE	MECKLENBURG
NCD086326741	TEXACO INC/APEX	APEX	WAKE
NCD096165121	TEXACO INC/GREENSBORO	GREENSBORO	GUILFORD
NCD046148318	TEXACO INC/PAW CREEK	PAW CREEK	MECKLENBURG
NCD000770016	TEXAS CITY REFINING COMPANY	PAW CREEK	MECKLENBURG
NCD002560159	THIELE-ENGDAHL, INCORPORATED	WINSTON-SALEM	FORSYTH
NCD037160439	TOASTMASTER, INCORPORATED	LAURINBURG	SCOTLAND
NONCD0001017	TOWNE NORTH SHOPPING CENTER	RALEIGH	WAKE
NONCD0000088	TRANS TECHNOLOGY	CHARLOTTE	MECKLENBURG
NCD038551263	TRI-COUNTY COMMUNITY COLLEGE	MURPHY	CHEROKEE
NCD000609982	UNION OIL CO. SE TERM/PAW CREEK	PAW CREEK	MECKLENBURG
NONCD0000010	UNITED MERCHANTS/OLD FORT PLANT	OLD FORT	MCDOWELL
NCD980515308	UNIVERSITY OF NC AT CHAPEL HILL	CHAPEL HILL	ORANGE
NC6680090002	US EPA TECH CENTER	RTP	DURHAM
NCD001493931	WECK, EDWARD INC.	RTP	DURHAM
NCD045924032	WEST POINT PEPPERELL LUMBERTON	LUMBERTON	ROBESON
NCD024766719	WRIGHT CHEMICAL CORP.	RIEGELWOOD	COLUMBUS

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10. SITES UNDER THE JURISDICTION OF THE DIVISION OF ENVIRONMENTAL HEALTH'S RADIATION PROTECTION SECTION

ID Number	*Site Name*	*City*	*County*
NCD980559397	RADIATION PHYSICS CONSULTANTS	PURLEAR	WILKES

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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000401	ABATTOIR LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000443	ABERDEEN DUMP	ABERDEEN	MOORE	No
NONCD0000361	AHOSKIE DUMP	AHOSKIE	HERTFORD	No
NONCD0000307	AIRPORT LANDFILL		FORSYTH	No
NONCD0000728	ALAMANCE CO LDFL	GRAHAM	ALAMANCE	No
NONCD0000102	ALAMANCE GARBAGE SERVICE	BURLINGTON	ALAMANCE	No
NONCD0000571	ALBEMARLE DUMP	ALBERMARLE	STANLY	No
NONCD0000551	ALEXANDER MILLS DUMP	ALEXANDER MILLS	RUTHERFORD	No
NONCD0000192	ANDERSON REFUSE DUMP		CALDWELL	No
NONCD0000231	ANDREWS DUMP	ANDREWS	CHEROKEE	No
NONCD0000349	ANGIER REFUSE DUMP	ANGIER	HARNETT	No
NONCD0000731	ANSON CO LDFL		ANSON	No
NONCD0000568	AQUADALE DUMP	AQUADALE	STANLY	No
NONCD0000717	ARAPAHOE LDFL	ARAPAHOE	PAMLICO	No
NONCD0000165	ARDEN DISPOSAL	ARDEN	BUNCOMBE	No
NONCD0000644	ARLINGTON DUMP	ARLINGTON	YADKIN	No
NONCD0000732	ASHE CO LDFL		ASHE	No
NONCD0000120	ASHE COUNTY LANDFILL	JEFFERSON	ASHE	No
NONCD0000509	ASHEBORO DUMP	ASHEBORO	RANDOLPH	No
NONCD0000167	ASHEVILLE LANDFILL	ASHEVILLE	BUNCOMBE	No
NONCD0000489	ATKINSON DUMP	ATKINSON	PENDER	No
NONCD0000199	ATLANTIC REFUSE DUMP	ATLANTIC	CARTERET	No
NONCD0000138	AULANDER REFUSE DISPOSAL	AULANDER	HERTFORD	No
NONCD0000126	AURORA DUMP		BEAUFORT	No
NONCD0000659	AUTEN ROAD LANDFILL		GASTON	No
NONCD0000560	AUTRYVILLE LDFL	AUTRYVILLE	SAMPSON	No
NONCD0000502	AYDEN REFUSE DUMP	AYDEN	PITT	No
NONCD0000773	AZALEA ROAD LANDFILL	OTEEN	BUNCOMBE	No
NONCD0000556	B & G DUMP	CLIFFSIDE	RUTHERFORD	No
NONCD0000454	BAILEY DUMP	BAILEY	NASH	No
NONCD0000431	BAKERVILLE REFUSE DISPOSAL	BAKERVILLE	MITCHELL	No
NONCD0000768	BALFOUR ROAD LANDFILL	GRANITE QUARRY	ROWAN	No
NONCD0000594	BALSAM GROVE DUMP		TRANSYLVANIA	No
NONCD0000457	BARFIELD'S DUMP	WRIGHTSVILLE BEACH	NEW HANOVER	No
NONCD0000128	BATH DUMP	BATH	BEAUFORT	No
NONCD0000451	BATTLEBORO DUMP	BATTLEBORO	NASH	No
NONCD0000485	BAYBORO DUMP	BAYBORO	PAMLICO	No
NONCD0000200	BEAUFORT REFUSE DUMP	BEAUFORT	CARTERET	No
NONCD0000579	BEAULAH COMM. DUMP		SURRY	No

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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000302	BECKEL ROAD DUMP	WINSTON-SALEM	FORSYTH	No
NONCD0000131	BELHAVEN DUMP	BELHAVEN	BEAUFORT	No
NONCD0000780	BELLTOWN ROAD DUMP	HAVELOCK	CRAVEN	No
NONCD0000384	BENSON REFUSE DUMP	BENSON	JOHNSTON	No
NONCD0000669	BENTLEY WOODS SITE	RALEIGH	WAKE	No
NONCD0000325	BESSEMER CITY DUMP	BESSEMER CITY	GASTON	No
NONCD0000501	BETHEL REFUSE DUMP	BETHEL	PITT	No
NONCD0000108	BETHLEHEM COMMUNITY DUMP	BETHLEHEM	ALEXANDER	No
NONCD0000283	BEULAVILLE DUMP	BEULAVILLE	DUPLIN	No
NONCD0000672	BISCOE OLD TOWN DUMP	BISCOE	MONTGOMERY	No
NONCD0000636	BLACK CREEK DUMP	BLACK CREEK	WILSON	No
NONCD0000166	BLACK MOUNTAIN	BLACK MOUNTAIN	BUNCOMBE	No
NONCD0000148	BLADENBORO REFUSE DISPOSAL	BLADENBORO	BLADEN	No
NONCD0000622	BLOWING ROCK LANDFILL	BLOWING ROCK	WATAUGA	No
NONCD0000194	BLOWING ROCK LF	BLOWING ROCK	CALDWELL	No
NONCD0000465	BLUE CLAY RD. LF		NEW HANOVER	No
NONCD0000241	BOILING SPRINGS DUMP	BOILING SPRINGS	CLEVELAND	No
NONCD0000160	BOILING SPRINGS LAKES DUMP	BOILING SPRINGS	BRUNSWICK	No
NONCD0000149	BOLIVIA REFUSE DISPOSAL	BOLIVIA	BRUNSWICK	No
NONCD0000252	BOLTON DUMP	BOLTON	COLUMBUS	No
NONCD0000226	BONLEE DUMP	BONELEE	CHATHAM	No
NONCD0000623	BOONE REFUSE DISPOSAL	BOONE	WATAUGA	No
NONCD0000645	BOONEVILLE DUMP	BOONEVILLE	YADKIN	No
NONCD0000546	BOSTIC REFUSE DISPOSAL	BOSTIC	RUTHERFORD	No
NONCD0000168	BRISTOL CREEK COMM. DUMP		BURKE	No
NONCD0000389	BROADWAY DUMP	BROADWAY	LEE	No
NONCD0000119	BRONSON SAND & GRAVEL LDFL	LILESVILLE	ANSON	No
NONCD0000320	BRUCES COUNTY LANDFILL		GASTON	No
NONCD0000673	BUD HOLDING COMPANY	GREENSBORO	GUILFORD	No
NONCD0000306	BUDDY ROBINS LANDFILL		FORSYTH	No
NONCD0000348	BUIES CREEK DUMP	BUIES CREEK	HARNETT	No
NONCD0000354	BUIES CREEK LANDFILL	BUIES CREEK	HARNETT	No
NONCD0000300	BUILDING RUBBLE LF		FORSYTH	No
NONCD0000682	BUNCOMBE CO LF/E CANTON LF/OLD		BUNCOMBE	No
NONCD0000312	BUNN DUMP	BUNN	FRANKLIN	No
NONCD0000490	BURGAW DUMP	BURGAW	PENDER	No
NONCD0000649	BURNSVILLE DUMP	BURNSVILLE	YANCEY	No
NONCD0000695	BURNT MILL CREEK LANDFILL	WILMINGTON	NEW HANOVER	No
NONCD0000765	BUXTON DUMP TWO	BUXTON	DARE	No
NONCD0000224	BYNUM DUMP	BYNUM	CHATHAM	No

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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000510	C.A. BOWERS DUMP	TRINITY	RANDOLPH	No
NONCD0000284	CALYPSO DUMP	CALYPSO	DUPLIN	No
NONCD0000654	CAMDEN CO LF-CAMDEN	CAMDEN	CAMDEN	No
NONCD0000197	CAMDEN COUNTY LF-OLD TRAP	CAMDEN	CAMDEN	No
NONCD0000442	CAMERON DUMP	CAMERON	MOORE	No
NONCD0000683	CAMP DAVIS LANDFILL	HOLLY RIDGE	ONSLOW	No
NONCD0000162	CANDLER REFUSE DISPOSAL AREA	CANDLER	BUNCOMBE	No
NONCD0000433	CANDOR DUMP	CANDOR	MONTGOMERY	No
NONCD0000755	CANNON MILLS LANDFILL		ROWAN	No
NONCD0000358	CANTON DUMP	CANTON	HAYWOOD	No
NONCD0000213	CAPE CARTERET DUMP	CAPE CARTERET	CARTERET	No
NONCD0000458	CAROLINA BEACH REFUSE DISP	CAROLINA BEACH	NEW HANOVER	No
NONCD0000764	CAROVA BEACH LANDFILL	CAROVA BEACH	CURRITUCK	No
NONCD0000395	CARTER'S REFUSE DISPOSAL	KINSTON	LENOIR	No
NONCD0000214	CARTERET COUNTY LF	NEWPORT	CARTERET	No
NONCD0000209	CARTERET COUNTY LF - MOUNT	NEWPORT	CARTERET	No
NONCD0000446	CARTHAGE DUMP	CARTHAGE	MOORE	No
NONCD0000602	CARY DUMP	CARY	WAKE	No
NONCD0000377	CASHIER'S REFUSE DISPOSAL	CASHIERS	JACKSON	No
NONCD0000448	CASTALIA REFUSE DUMP	CASTALIA	NASH	No
NONCD0000459	CASTLE HAYNE SERVICE DUMP	CASTLE HAYNE	NEW HANOVER	No
NONCD0000460	CASTLE HAYNE TRASH SERVICE	CASTLE HAYNE	NEW HANOVER	No
NONCD0000216	CASWELL LF	YANCEYVILLE	CASWELL	No
NONCD0000392	CASWELL SCHOOL DUMP	KINSTON	LENOIR	No
NONCD0000222	CATAWBA COUNTY LF	HICKORY	CATAWBA	No
NONCD0000217	CATAWBA DUMP		CATAWBA	No
NONCD0000782	CENTRAL PARK LDFL	WINSTON-SALEM	FORSYTH	No
NONCD0000254	CHADBOURN DUMP	CHADBOURN	COLUMBUS	No
NONCD0000642	CHAMBERLAND-HODGE DUMP	YADKINVILLE	YADKIN	No
NONCD0000484	CHAPEL HILL LANDFILL	CHAPEL HILL	ORANGE	No
NONCD0000716	CHARLIE LITTLE RD LDFL	DUDLEY SHOALS	CALDWELL	No
NONCD0000182	CHARLOTTE MOTOR SPEEDWAY LF#1		CABARRUS	No
NONCD0000183	CHARLOTTE MOTOR SPEEDWAY LF#2		CABARRUS	No
NONCD0000185	CHARLOTTE MOTOR SPEEDWAY LF#3		CABARRUS	No
NONCD0000582	CHATHAM REFUSE DISPOSAL	ELKIN	SURRY	No
NONCD0000587	CHEROKEE INDIAN DUMP	CHEROKEE	SWAIN	No
NONCD0000627	CHERRY HOSPITAL DUMP	GOLDSBORO	WAYNE	No
NONCD0000779	CHERRY POINT LANDFILL	CHERRY POINT	CRAVEN	No
NONCD0000778	CHERRY POINT MCAS LANDFILL	CHERRY POINT	CRAVEN	No
NONCD0000250	CHERRYVILLE DUMP	CHERRYVILLE	CLEVELAND	No

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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000187	CHESTER REFUSE DISPOSAL		CALDWELL	No
NONCD0000540	CHINA GROVE DUMP	CHINA GROVE	ROWAN	No
NONCD0000127	CHOCOWINITY DUMP	CHOCOWINITY	BEAUFORT	No
NONCD0000751	CITY OF ALBERMARLE DUMP	ALBERMARLE	STANLY	No
NONCD0000294	CITY OF DURHAM LF	DURHAM	DURHAM	No
NONCD0000740	CITY OF FAYETTEVILLE LDFL	FAYETTEVILLE	CUMBERLAND	No
NONCD0000739	CITY OF FAYETTEVILLE LDFL	FAYETTEVILLE	CUMBERLAND	No
NONCD0000244	CITY OF KINGS MTN.	KINGS MOUNTAIN	CLEVELAND	No
NONCD0000712	CITY OF LUMBERTON LDFL	LUMBERTON	ROBESON	No
NONCD0000332	CITY OF OXFORD LF	OXFORD	GRANVILLE	No
NONCD0000612	CITY OF RALEIGH - WILDERS GROVE	RALEIGH	WAKE	No
NONCD0000699	CITY OF SHELBY LDFL (STUBBS)	STUBBS	CLEVELAND	No
NONCD0000674	CITY OF WILSON LANDFILL	WILSON	WILSON	No
NONCD0000743	CITY OF WINSTON-SALEM	WINSTON-SALEM	FORSYTH	No
NONCD0000744	CITY OF WINSTON-SALEM	WINSTON-SALEM	FORSYTH	No
NONCD0000308	CITY OF WINSTON-SALEM LF	WINSTON-SALEM	FORSYTH	No
NONCD0000726	CIVIC CENTER AREA	GRAHAM	ALAMANCE	No
NONCD0000147	CLARKTON REFUSE DISPOSAL	CLARKTON	BLADEN	No
NONCD0000280	CLEMENT REFUSE DUMP	MOCKSVILLE	DAVIE	No
NONCD0000157	CLEMMONS LF	BOLIVIA	BRUNSWICK	No
NONCD0000544	CLIFFSIDE MILL DUMP	CLIFFSIDE	RUTHERFORD	No
NONCD0000558	CLINTON DUMP	CLINTON	SAMPSON	No
NONCD0000363	CLYDE LEACH DUMP	ARABIA	HOKE	No
NONCD0000745	COATS MODIFIED LDFL	COATS	HARNETT	No
NONCD0000353	COATS REFUSE DISPOSAL	COATS	HARNETT	No
NONCD0000142	COLERAIN REFUSE DISPOSAL	COLERAIN	BERTIE	No
NONCD0000314	COLLEGE ST DUMP	YOUNGSVILLE	FRANKLIN	No
NONCD0000426	COLLINS & AIKMAN LF	OLD FORT	MCDOWELL	No
NONCD0000595	COLUMBIA DUMP	COLUMBIA	TYRRELL	No
NONCD0000503	COLUMBUS REFUSE DISPOSAL	COLUMBUS	POLK	No
NONCD0000180	CONCORD LANDFILL	CONCORD	CABARRUS	No
NONCD0000295	CONETOE REFUSE DISPOSAL AREA	CONETOE	EDGECOMBE	No
NONCD0000218	CONOVER DUMP	CONOVER	CATAWBA	No
NONCD0000470	CONWAY REFUSE DISPOSAL	CONWAY	NORTHAMPTON	No
NONCD0001093	CORBETT PACKAGING CO LDFL	WILMINGTON	NEW HANOVER	No
NONCD0000372	COUNTY GARBAGE LANDFILL	STATESVILLE	IREDELL	No
NONCD0000301	COUNTY GARBAGE LANDFILL	WINSTON-SALEM	FORSYTH	No
NONCD0000322	CRAMERTON LF	CRAMERTON	GASTON	No
NONCD0000261	CRAVEN COUNTY	HAVELOCK	CRAVEN	No
NONCD0000262	CRAVEN COUNTY-VANCEBORO	VANCEBORO	CRAVEN	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000333	CREEDMORE DUMP	CREEDMOOR	GRANVILLE	No
NONCD0000430	CRESCENT RESOURCES INC.	LEMLEY	MECKLENBURG	No
NONCD0000620	CRESWELL REFUSE DISPOSAL	CRESWELL	WASHINGTON	No
NONCD0000122	CROSSNORE REFUSE DUMP	CROSSMORE	AVERY	No
NONCD0000741	CUMBERLAND CO LDFL		CUMBERLAND	No
NONCD0000736	CUMBERLAND CO LDFL - BEAVER		CUMBERLAND	No
NONCD0000733	CUMBERLAND CO LDFL - BONES		CUMBERLAND	No
NONCD0000734	CUMBERLAND CO LDFL - TRAILER		CUMBERLAND	No
NONCD0000735	CUMBERLAND CO LDFL - WADE		CUMBERLAND	No
NONCD0000279	DALTON REFUSE DUMP	MOCKSVILLE	DAVIE	No
NONCD0000753	DAN JOHNSON LDFL	ELKIN	WILKES	No
NONCD0000575	DANBURY DUMP	DANBURY	STOKES	No
NONCD0000272	DARE COUNTY DUMP	MANTEO	DARE	No
NONCD0000738	DAVIDSON CO LDFL		DAVIDSON	No
NONCD0000428	DAVIDSON LANDFILL	DAVIDSON	MECKLENBURG	No
NONCD0000591	DAVIDSON RIVER DUMP		TRANSYLVANIA	No
NONCD0000184	DAVIDSON SANITARY LANDFILL	DAVIDSON	CABARRUS	No
NONCD0000309	DEMOLITION LANDFILL		FORSYTH	No
NONCD0000275	DENTON DUMP	DENTON	DAVIDSON	No
NONCD0000277	DENTON LANDFILL	DENTON	DAVIDSON	No
NONCD0000276	DENTON LANDFILL	DENTON	DAVIDSON	No
NONCD0000408	DENVER LANDFILL	DENVER	LINCOLN	No
NONCD0000391	DOBBS FARM DUMP	KINSTON	LENOIR	No
NONCD0000259	DOVER REFUSE DUMP	DOVER	CRAVEN	No
NONCD0000531	DRAPER DUMP	DRAPER	ROCKINGHAM	No
NONCD0000172	DREXEL DUMP	DREXEL	BURKE	No
NONCD0000144	DUBLIN REFUSE DUMP	DUBLIN	BLADEN	No
NONCD0000671	DUDLEY LANDFILL	DUDLEY	WAYNE	No
NONCD0000769	DUDLEY SHOALS RD LDFL #1	DUDLEY SHOALS	CALDWELL	No
NONCD0000770	DUDLEY SHOALS RD LDFL #2	DUDLEY SHOALS	CALDWELL	No
NONCD0000292	DUKE AND GREGSON ST. DUMP	DURHAM	DURHAM	No
NONCD0000650	DUKE POWER DUMP	HICKORY	ALEXANDER	No
NONCD0000351	DUNN REFUSE DISPOSAL	DUNN	SAMPSON	No
NONCD0000352	DUNN-ERWIN DUMP	ERWIN	HARNETT	No
NONCD0000666	DUPONT DUMP	RALEIGH	WAKE	No
NONCD0000289	DURHAM COUNTY LANDFILL		DURHAM	No
NONCD0000293	DURHAM COUNTY SANITARY LF		DURHAM	No
NONCD0000291	DURHAM LAND DISPOSAL AREA	DURHAM	DURHAM	No
NONCD0000723	DURHAM ST LDFL	BURLINGTON	ALAMANCE	No
NONCD0000169	DYSARTSVILLE DUMP	DYSARTSVILLE	BURKE	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000236	E.Z. SANITATION DUMP	LATTIMORE	CLEVELAND	No
NONCD0000439	EAGLE SPRINGS DUMP	EAGLE SPRINGS	MOORE	No
NONCD0000178	EARNHARDT ROAD DUMP	KANNAPOLIS	CABARRUS	No
NONCD0000757	EAST LAKE SHORE DRIVE LDFL	WILIMINGTON	NEW HANOVER	No
NONCD0000541	EAST SPENCER DUMP	EAST SPENCER	ROWAN	No
NONCD0000614	EAST WAKE COUNTY LF	KNIGHTDALE	WAKE	No
NONCD0000245	ECHO SERVICE, INC.	SHELBY	CLEVELAND	No
NONCD0000233	EDENTON LANDFILL	EDENTON	CHOWAN	No
NONCD0000653	EDGECOMBE COUNTY LANDFILL	TARBORO	EDGECOMBE	No
NONCD0000488	ELIZABETH CITY LF	ELIZABETH CITY	PASQUOTANK	No
NONCD0000145	ELIZABETHTOWN REFUSE DISP	ELIZABETHTOWN	BLADEN	No
NONCD0000123	ELK PARK DUMP	ELK PARK	AVERY	No
NONCD0000581	ELKIN LANDFILL	ELKIN	SURRY	No
NONCD0000547	ELLENBORO DUMP	ELLENBORO	RUTHERFORD	No
NONCD0000516	ELLERBE DUMP	ELLERBE	RICHMOND	No
NONCD0000638	ELM CITY REFUSE DISPOSAL	ELM CITY	WILSON	No
NONCD0000730	ELON COLLEGE LDFL - AMICK RD	ELON COLLEGE	ALAMANCE	No
NONCD0000212	EMERALD ISLE DUMP	EMERALD ISLE	CARTERET	No
NONCD0000340	ENFIELD REFUSE DISPOSAL	ENFIELD	HALIFAX	No
NONCD0000367	ENGLEHARD DUMP	ENGLEHARD	HYDE	No
NONCD0000410	ENVIRONETICS BURN SITE	LINCOLNTON	LINCOLN	No
NONCD0000632	EUREKA REFUSE DISPOSAL	EUREKA	WAYNE	No
NONCD0000396	EVERETT GARBAGE SERVICE DUMP	KINSTON	LENOIR	No
NONCD0000255	FAIR BLUFF DUMP	FAIR BLUFF	ROBESON	No
NONCD0000365	FAIRFIELD DUMP	FAIRFIELD	HYDE	No
NONCD0000521	FAIRMONT DUMP	FAIRMONT	ROBESON	No
NONCD0000287	FAISON DUMP	FAISON	DUPLIN	No
NONCD0000498	FALKLAND DUMP	FALKLAND	PITT	No
NONCD0000641	FALL CREEK COMM. DUMP		YADKIN	No
NONCD0000497	FARMVILLE REFUSE DISPOSAL	FARMVILLE	PITT	No
NONCD0000267	FAYETTEVILLE CITY LF	FAYETTEVILLE	CUMBERLAND	No
NONCD0000163	FISHBURNE REFUSE DUMP		BUNCOMBE	No
NONCD0000179	FISHERTOWN DUMP	KANNAPOLIS	CABARRUS	No
NONCD0000328	FONTANA VILLAGE DUMP	FONTANA VILLAGE	GRAHAM	No
NONCD0000554	FOREST CITY	FOREST CITY	RUTHERFORD	No
NONCD0000496	FOUNTAIN REFUSE DISPOSAL	FOUNTAIN	PITT	No
NONCD0000379	FOUR OAKS DUMP	FOUR OAKS	JOHNSTON	No
NONCD0000313	FRANKLIN COUNTY SANITARY LF		FRANKLIN	No
NONCD0000412	FRANKLIN DISPOSAL	FRANKLIN	MACON	No
NONCD0000310	FRANKLINTON DUMP	FRANKLINTON	FRANKLIN	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000508	FRANKLINVILLE DUMP	FRANKLINVILLE	RANDOLPH	No
NONCD0000628	FREMONT REFUSE DISPOSAL	FREMONT	WAYNE	No
NONCD0000606	FUQUAY VARINA DUMP	FUQUA VARINA	WAKE	No
NONCD0000580	GARBAGE SERVICE DUMP	MT AIRY	SURRY	No
NONCD0000562	GARLAND DUMP	GARLAND	SAMPSON	No
NONCD0000604	GARNER TRASH DUMP	GARNER	WAKE	No
NONCD0000188	GARNES REFUSE DUMP		CALDWELL	No
NONCD0000321	GASTON CO LF (MT HOLLY LF)	MT HOLLY	GASTON	No
NONCD0000324	GASTON COUNTY LF (HARDEN RD.)	DALLAS	GASTON	No
NONCD0000475	GASTON REFUSE DISPOSAL	GASTON	NORTHAMPTON	No
NONCD0000658	GASTONIA REFUSE DUMP		GASTON	No
NONCD0000327	GATES COUNTY LF	GATESVILLE	GATES	No
NONCD0000326	GATESVILLE DUMP	GATESVILLE	GATES	No
NONCD0000564	GIBSON REFUSE DUMP	GIBSON	SCOTLAND	No
NONCD0000338	GIBSONVILLE TOWN LF	GIBSONVILLE	GUILFORD	No
NONCD0000173	GLEN ALPINE DUMP	ST PAUL	BURKE	No
NONCD0000630	GOLDSBORO DUMP	GOLDSBORO	WAYNE	No
NONCD0000227	GOLDSTON DUMP	GOLDSTON	CHATHAM	No
NONCD0000576	GORDON'S DUMP		STOKES	No
NONCD0000104	GRAHAM DISPOSAL	GRAHAM	ALAMANCE	No
NONCD0000186	GRANITE FALLS DUMP	GRANITE FALLS	CALDWELL	No
NONCD0000121	GREEN VALLEY DUMP		AVERY	No
NONCD0000336	GREENE COUNTY LF	SNOW HILL	GREENE	No
NONCD0000500	GRIFTON DUMP	GRIFTON	PITT	No
NONCD0000495	GRIMESLAND REFUSE DUMP	GRIMESLAND	PITT	No
NONCD0000150	GRISSETTOWN LANDFILL	SEASIDE	BRUNSWICK	No
NONCD0000343	HALIFAX DUMP	HALIFAX	HALIFAX	No
NONCD0000418	HAMILTON DUMP	HAMILTON	MARTIN	No
NONCD0000515	HAMLET DUMP	HAMLET	RICHMOND	No
NONCD0000519	HAMLET TRASH DISPOSAL AREA	HAMLET	RICHMOND	No
NONCD0000722	HANOVER RD LDFL	BURLINGTON	ALAMANCE	No
NONCD0000317	HARDIN REFUSE DUMP		GASTON	No
NONCD0000207	HARKERS ISLAND REFUSE DISP	HARKERS ISLAND	CARTERET	No
NONCD0000370	HARMONY REFUSE DISPOSAL	HARMONY	IREDELL	No
NONCD0000258	HAVELOCK REFUSE DUMP	HAVELOCK	CRAVEN	No
NONCD0000548	HAWKINS REFUSE DISPOSAL	FOREST CITY	RUTHERFORD	No
NONCD0000235	HAYESVILLE DUMP	HAYESVILLE	CLAY	No
NONCD0000553	HAYNES REFUSE DUMP		RUTHERFORD	No
NONCD0000355	HAZELWOOD DUMP	HAZELWOOD	HAYWOOD	No
NONCD0000191	HELTON REFUSE DUMP		CALDWELL	No

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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000680	HENDERSON DR LDFL	JACKSONVILLE	ONSLOW	No
NONCD0000359	HENDERSON DUMP	HENDERSONVILLE	HENDERSON	No
NONCD0000538	HENDIX GARBAGE DUMP		ROWAN	No
NONCD0000549	HENDRICKS DUMP	FOREST CITY	RUTHERFORD	No
NONCD0000171	HENRY RIVER COMM. DUMP		BURKE	No
NONCD0000718	HERTFORD CO LDFL	UNION	HERTFORD	No
NONCD0000492	HERTFORD DUMP	HERTFORD	PERQUIMANS	No
NONCD0000651	HICKORY LANDFILL	HICKORY	CATAWBA	No
NONCD0000707	HIGH POINT TRASH DUMP	HIGH POINT	GUILFORD	No
NONCD0000319	HIGH SHOALS DUMP		GASTON	No
NONCD0000413	HIGHLANDS REFUSE DISPOSAL	HIGHLANDS	MACON	No
NONCD0000170	HILDEBRAN DISPOSAL AREA	HILDEBRAN	BURKE	No
NONCD0000483	HILLSBOROUGH DUMP	HILLSBOROUGH	ORANGE	No
NONCD0000771	HILLSBOROUGH LDFL	HILLSBOROUGH	ORANGE	No
NONCD0000345	HOBGOOD DUMP	HOBGOOD	MARTIN	No
NONCD0000429	HOLBROOK RD. LF	HUNTERSVILLE	MECKLENBURG	No
NONCD0000154	HOLDEN BEACH LF	CEDAR GROVE	BRUNSWICK	No
NONCD0000478	HOLLY RIDGE REFUSE DISPOSAL	HOLLY RIDGE	ONSLOW	No
NONCD0000605	HOLLY SPRINGS DUMP	HOLLY SPRINGS	WAKE	No
NONCD0000335	HOOKERTON DUMP	HOOKERTON	GREENE	No
NONCD0000264	HOPE MILLS DUMP	HOPE MILLS	CUMBERLAND	No
NONCD0000535	HOPKINS GARBAGE DUMP	LEAKSVILLE	ROCKINGHAM	No
NONCD0000664	HORN OPEN DUMP		RUTHERFORD	No
NONCD0000416	HOT SPRINGS REFUSE DISPOSAL	HOT SPRINGS	MADISON	No
NONCD0000402	HOWARD CREEK LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000435	HURLEY'S DUMP	BISCOE	MONTGOMERY	No
NONCD0000763	I-85 LANDFILL	SALISBURY	ROWAN	No
NONCD0000269	INDEPENDENT TRASH SERVICE	MAMIE	CURRITUCK	No
NONCD0000311	J.H. WINSTON DUMP	BUNN	FRANKLIN	No
NONCD0000232	J.W. BRADLEY DUMP	EDENTON	CHOWAN	No
NONCD0000767	JACKSON DUNES, LOT 14	OCRACOKE	HYDE	No
NONCD0000469	JACKSON REFUSE DISPOSAL	JACKSON	NORTHAMPTON	No
NONCD0000479	JACKSONVILLE DUMP	JACKSONVILLE	ONSLOW	No
NONCD0000713	JAMES DEBRAHL LAFAYETTE TRANSP		ROBESON	No
NONCD0000421	JAMESVILLE DUMP	JAMESVILLE	MARTIN	No
NONCD0000273	JENNETTE'S DUMP	BUXTON	DARE	No
NONCD0000749	JOHNSONVILLE MODIFIED LDFL	JOHNSONVILLE	HARNETT	No
NONCD0000400	JONES AIRPORT LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000643	JONESVILLE DUMP	JONESVILLE	YADKIN	No
NONCD0000646	JOYNER REFUSE DUMP	YADKINVILLE	YADKIN	No

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ID Number	Site Name	City	County	In Other IHS Category
NONCD0000136	KELFORD DUMP	KELFORD	BERTIE	No
NONCD0000282	KENANSVILLE DUMP	KENANSVILLE	DUPLIN	No
NONCD0000380	KENLY DUMP	KENLY	JOHNSTON	No
NONCD0000393	KENNEDY HOME DUMP	KINSTON	LENOIR	No
NONCD0000626	KERMIT GURLEY DUMP	GOLDSBORO	WAYNE	No
NONCD0000303	KERNERSVILLE DUMP	KERNERSVILLE	FORSYTH	No
NONCD0000678	KERR CITY PARK	JACKSONVILLE	ONSLOW	No
NONCD0000271	KILL DEVILS HILLS DUMP	KILL DEVIL HILLS	DARE	No
NONCD0000572	KINGS DUMP	KING	STOKES	No
NONCD0000675	KINGS MOUNTAIN LANDFILL	KINGS MOUNTAIN	CLEVELAND	No
NONCD0000239	KINGS MTN. DUMP	KINGS MOUNTAIN	CLEVELAND	No
NONCD0000491	KIRKLAND'S DUMP	HAMPSTEAD	PENDER	No
NONCD0000175	KIRKSEY DRIVE LF	MORGANTON	BURKE	No
NONCD0000603	KNIGHTDALE DUMP	KNIGHTDALE	WAKE	No
NONCD0000461	KURE BEACH REFUSE DISPOSAL	KURE BEACH	NEW HANOVER	No
NONCD0000394	LA GRANGE REFUSE DISPOSAL	LA GRANGE	LENOIR	No
NONCD0000228	LAKE HINASSEE RESORT DUMP		CHEROKEE	No
NONCD0000357	LAKE LOGAN DUMP	CANTON	HAYWOOD	No
NONCD0000552	LAKE LURE DUMP	LAKE LURE	RUTHERFORD	No
NONCD0000592	LAKE TOXAWAY DUMP	LAKE TOXAWAY	TRANSYLVANIA	No
NONCD0000253	LAKE WACCAMAW DUMP	LAKE WACCAMAW	COLUMBUS	No
NONCD0000697	LAKES APTS	RALEIGH	WAKE	No
NONCD0000539	LANDIS WASTE DISPOSAL AREA	LANDIS	ROWAN	No
NONCD0000237	LATTIMORE DUMP	LATTIMORE	CLEVELAND	No
NONCD0000565	LAURINBURG DUMP	LAURINBURG	SCOTLAND	No
NONCD0000534	LEAKSVILLE LANDFILL	LEAKSVILLE	ROCKINGHAM	No
NONCD0000411	LEDFORD PICK-UP SERVICE	FRANKLIN	MACON	No
NONCD0000193	LENOIR DUMP	LENOIR	CALDWELL	No
NONCD0000140	LEWISTON REFUSE DISPOSAL	LEWISTON	BERTIE	No
NONCD0000512	LIBERTY DUMP	LIBERTY	RANDOLPH	No
NONCD0000266	LIEBER SANITATION DUMP		CUMBERLAND	No
NONCD0000350	LILLINGTON DUMP	LILLINGTON	HARNETT	No
NONCD0000746	LILLINGTON MODIFIED LDFL	LILLINGTON	HARNETT	No
NONCD0000409	LINCOLN COUNTY LF	LINCOLNTON	LINCOLN	No
NONCD0000405	LINCOLNTON REFUSE DISPOSAL	LINCOLNTON	LINCOLN	No
NONCD0000304	LINK ROAD DUMP	WINSTON-SALEM	FORSYTH	No
NONCD0000423	LINVILLE FALLS REFUSE DISPOSAL	LINVILLE FALLS	MCDOWELL	No
NONCD0000422	LITTLE SWITZERLAND LANDFILL	LITTLE SWITZERLAND	MCDOWELL	No
NONCD0000339	LITTLETON DUMP	LITTLETON	HALIFAX	No
NONCD0000155	LONG BEACH REFUSE DISPOSAL	LONG BEACH	BRUNSWICK	No

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NONCD0000219	LONG VIEW REFUSE DUMP	LONG VIEW	CATAWBA	No
NONCD0000315	LOUISBURG DUMP	LOUISBURG	FRANKLIN	No
NONCD0000655	LOUISBURG SITE #2	LOUISBURG	FRANKLIN	No
NONCD0000657	LOUISBURG SITE #3	LOUISBURG	FRANKLIN	No
NONCD0000373	LOVE VALLEY DUMP		IREDELL	No
NONCD0000323	LOWELL REFUSE DUMP	LOWELL	GASTON	No
NONCD0000522	LUMBER BRIDGE REFUSE DISPOSAL	LUMBER BRIDGE	ROBESON	No
NONCD0000527	LUMBERTON DUMP	HESTERTOWN	ROBESON	No
NONCD0000296	MACCLESFIELD DUMP	MACCLESFIELD	EDGECOMBE	No
NONCD0000407	MACHPELAH LANDFILL	IRON STATION	LINCOLN	No
NONCD0000619	MACKEY'S DUMP		WASHINGTON	No
NONCD0000617	MACON DUMP	MACON	WARREN	No
NONCD0000536	MADISON LANDFILL	MADISON	ROCKINGHAM	No
NONCD0000286	MAGNOLIA DUMP	MAGNOLIA	DUPLIN	No
NONCD0000220	MAIDEN DUMP	MAIDEN	CATAWBA	No
NONCD0000748	MAMERS MODIFIED LDFL	MAMERS	HARNETT	No
NONCD0000270	MANTEO DUMP	MANTEO	DARE	No
NONCD0000425	MARION REFUSE DISPOSAL	MARION	MCDOWELL	No
NONCD0000415	MARS HILL REFUSE DISPOSAL	MARS HILL	MADISON	No
NONCD0000414	MARSHALL REFUSE DISPOSAL	MARSHALL	MADISON	No
NONCD0000203	MARSHALLBERG DUMP	MARSHALLBERG	CARTERET	No
NONCD0000600	MARSHVILLE DUMP	MARSHVILLE	UNION	No
NONCD0000747	MASON'S STORE MODIFIED LDFL	MAMERS	HARNETT	No
NONCD0000781	MATTHEWS POINT DUMP	HAVELOCK	CRAVEN	No
NONCD0000524	MAXTON DUMP	MAXTON	ROBESON	No
NONCD0000387	MAYSVILLE REFUSE DISPOSAL	MAYSVILLE	JONES	No
NONCD0000318	MCADENVILLE DUMP	MCADENVILLE	GASTON	No
NONCD0000101	MEBANE DUMP	MEBANE	ALAMANCE	No
NONCD0000545	MICHAEL'S DUMP		RUTHERFORD	No
NONCD0000449	MIDDLESEX DUMPMIDDLESEX		NASH	No
NONCD0000215	MILES GARBAGE DUMP	YANCEYVILLE	CASWELL	No
NONCD0000462	MILITARY CUTOFF LANDFILL	WILIMINGTON	NEW HANOVER	No
NONCD0000204	MILL CREEK REFUSE DUMP	MILL CREEK	CARTERET	No
NONCD0000513	MODERN GARBAGE DUMP	RANDLEMAN	RANDOLPH	No
NONCD0000752	MONROE CRAIG LDFL	WALNUT COVE	STOKES	No
NONCD0000599	MONROE LANDFILL	MONROE	UNION	No
NONCD0000720	MOORE CO LDFL-CARTHAGE	CARTHAGE	MOORE	No
NONCD0000376	MOORESVILLE DUMP	MOORESVILLE	IREDELL	No
NONCD0000374	MOORESVILLE LANDFILL		IREDELL	No
NONCD0000205	MOREHEAD CITY REFUSE DUMP	MOREHEAD CITY	CARTERET	No

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000177	MORGANTOWN DUMP	MORGANTON	BURKE	No
NONCD0000116	MORVEN DUMP	MORVEN	ANSON	No
NONCD0000585	MOUNT AIRY LF	MT AIRY	SURRY	No
NONCD0000434	MOUNT GILEAD DUMP	MT GILEAD	MONTGOMERY	No
NONCD0000181	MOUNT PLEASANT DUMP	MT PLEASANT	CABARRUS	No
NONCD0000709	MT OLIVE LDFL	MOUNT OLIVE	WAYNE	No
NONCD0000584	MT. AIRY DUMP	MT AIRY	SURRY	No
NONCD0000631	MT. OLIVE REFUSE DISPOSAL	MOUNT OLIVE	WAYNE	No
NONCD0000362	MURFREESBORO DUMP	MURFREESBORO	HERTFORD	No
NONCD0000230	MURPHY REFUSE DUMP	MURPHY	CHEROKEE	No
NONCD0000737	N DAVIDSON CO LDFL		DAVIDSON	No
NONCD0000634	N. WILKESBORO DUMP	NORTH WILKESBORO	WILKES	No
NONCD0000456	NASHVILLE DUMP	NASHVILLE	NASH	No
NONCD0000783	NC 7 DUMP	BELMONT	GASTON	No
NONCD0000607	NC DEPT. OF AGRICULTURE LF	RALEIGH	WAKE	No
NONCD0000611	NC STATE FAIR LF	RALEIGH	WAKE	No
NONCD0000263	NEW BERN SANITARY DUMP	NEW BERN	CRAVEN	No
NONCD0000463	NEW HANOVER CO. LANDFILL	CAROLINA BEACH	NEW HANOVER	No
NONCD0000368	NEW HOLLAND DUMP	SWAN QUARTER	HYDE	No
NONCD0000196	NEWBY'S TRASH SERVICE DUMP	CAMDEN	CAMDEN	No
NONCD0000124	NEWLAND REFUSE DUMP	NEWLAND	AVERY	No
NONCD0000559	NEWTON GROVE DUMP	NEWTON GROVE	JOHNSTON	No
NONCD0000221	NEWTON LANDFILL	NEWTON	CATAWBA	No
NONCD0000615	NORLINA DUMP	NORLINA	WARREN	No
NONCD0000403	NORTH BROOK LANDFILL	VALE	LINCOLN	No
NONCD0000246	NORTH EARL DUMP	EARL	CLEVELAND	No
NONCD0000625	NORTHERN WAYNE LF	BUCK SWAMP TNSP	WAYNE	No
NONCD0000570	NORWOOD DUMP	NORWOOD	STANLY	No
NONCD0000417	OAK CITY DUMP	OAK CITY	MARTIN	No
NONCD0000569	OAKBORO DUMP	OAKBORO	STANLY	No
NONCD0000656	OCEAN ISLE DUMP	OCEAN ISLE	BRUNSWICK	No
NONCD0000153	OCEAN ISLE LANDFILL	OCEAN ISLE	BRUNSWICK	No
NONCD0000369	OCRACOKE DUMP	OCRACOKE	HYDE	No
NONCD0000111	OLD ALEXANDER COUNTY LF (SR	TAYLORSVILLE	ALEXANDER	No
NONCD0000110	OLD ALEXANDER COUNTY LF (SR	TAYLORSVILLE	ALEXANDER	No
NONCD0000113	OLD ALLEGHENY COUNTY LF	SPARTA	ALLEGHANY	No
NONCD0000106	OLD CITY OF BURLINGTON SOLID	BURLINGTON	ALAMANCE	No
NONCD0000290	OLD DURHAM COUNTY LF		DURHAM	No
NONCD0000424	OLD FORT REFUSE DISPOSAL	OLD FORT	MCDOWELL	No
NONCD0000665	OLD HOLLY SPRINGS DUMP/ CARY	HOLLY SPRINGS	WAKE	No

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000375	OLD IREDELL COUNTY DISPOSAL SITE		IREDELL	No
NONCD0000404	OLD LINCOLN COUNTY LF	LINCOLNTON	LINCOLN	No
NONCD0000684	OLD RALEIGH LF #1	RALEIGH	WAKE	No
NONCD0000693	OLD RALEIGH LF #10	RALEIGH	WAKE	No
NONCD0000694	OLD RALEIGH LF #11	RALEIGH	WAKE	No
NONCD0000685	OLD RALEIGH LF #2	RALEIGH	WAKE	No
NONCD0000686	OLD RALEIGH LF #3	RALEIGH	WAKE	No
NONCD0000687	OLD RALEIGH LF #4	RALEIGH	WAKE	No
NONCD0000688	OLD RALEIGH LF #5	RALEIGH	WAKE	No
NONCD0000689	OLD RALEIGH LF #6	RALEIGH	WAKE	No
NONCD0000690	OLD RALEIGH LF #7	RALEIGH	WAKE	No
NONCD0000691	OLD RALEIGH LF #8	RALEIGH	WAKE	No
NONCD0000692	OLD RALEIGH LF #9	RALEIGH	WAKE	No
NONCD0000445	OLD ROBBINS-HIGH FALLS LF	ROBBINS	MOORE	No
NONCD0000299	OLD ROCKY MOUNT LF	ROCKY MOUNT	EDGECOMBE	No
NONCD0000698	OLD SHELBY LANDFILL	SHELBY	CLEVELAND	No
NONCD0000777	OLD SMITHFIELD LANDFILL	SMITHFIELD	JOHNSTON	No
NONCD0000156	OLD SOUTHPORT LF	SOUTHPORT	BRUNSWICK	No
NONCD0000648	OLD YADKIN COUNTY LF	YADKINVILLE	YADKIN	No
NONCD0000593	OLIN-MATHEISON DUMP	PISGAH FOREST	TRANSYLVANIA	No
NONCD0000681	ONSLOW PINES RD LDFL	JACKSONVILLE	ONSLOW	No
NONCD0000760	OPTIMIST BALL PARK	WILIMINGTON	NEW HANOVER	No
NONCD0000486	ORIENTAL DUMP	ORIENTAL	PAMLICO	No
NONCD0000198	OTWAY COMMUNITY REFUSE DUMP	OTWAY	CARTERET	No
NONCD0000784	OVERHILLS LANDFILL		CUMBERLAND	No
NONCD0000331	OXFORD DUMP	OXFORD	GRANVILLE	No
NONCD0000719	PAMLICO CO LDFL	REELSBORO	PAMLICO	No
NONCD0000130	PANTEGO DUMP	BELHAVEN	BEAUFORT	No
NONCD0000133	PANTEGO REFUSE DISPOSAL	PANTEGO	BEAUFORT	No
NONCD0000520	PARKTON DUMP	PARKTON	ROBESON	No
NONCD0000249	PATTERSON SPRINGS	EARL	CLEVELAND	No
NONCD0000118	PEACHLAND DUMP	PEACHLAND	ANSON	No
NONCD0000229	PEACHTREE COM. DUMP	PEACHTREE	CHEROKEE	No
NONCD0000525	PEMBROKE DUMP	PEMBROKE	ROBESON	No
NONCD0000474	PERDUE, INC.	CONWAY	NORTHAMPTON	No
NONCD0000234	PERQUIMANS-CHOWAN LF	TYNER	CHOWAN	No
NONCD0000677	PHILLIPS PARK LANDFILL	JACKSONVILLE	ONSLOW	No
NONCD0000240	PHILLIPS REFUSE DUMP	GROVER	CLEVELAND	No
NONCD0000629	PIKEVILLE DUMP	PIKEVILLE	WAYNE	No
NONCD0000708	PIKEVILLE LDFL	PIKEVILLE	WAYNE	No

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000583	PILOT MT. REFUSE DUMP	PILOT MT	SURRY	No
NONCD0000440	PINE BLUFF DUMP	PINE BLUFF	MOORE	No
NONCD0000382	PINE LEVEL DUMP	PINE LEVEL	JOHNSTON	No
NONCD0000298	PINETOPS REFUSE DUMP	PINETOPS	EDGECOMBE	No
NONCD0000427	PINEVILLE DUMP	PINEVILLE	MECKLENBURG	No
NONCD0000397	PINK HILL DUMP	PINK HILL	LENOIR	No
NONCD0000621	PLYMOUTH REFUSE DUMP	PLYMOUTH	WASHINGTON	No
NONCD0000115	POLKTON DUMP	POLKTON	ANSON	No
NONCD0000248	POLKVILLE DUMP	POLKVILLE	CLEVELAND	No
NONCD0000388	POLLOCKSVILLE DUMP	MAYSVILLE	JONES	No
NONCD0000776	POLLOCKSVILLE DUMP #2	POLLOCKSVILLE	JONES	No
NONCD0000164	POND ROAD LF #1	ASHEVILLE	BUNCOMBE	No
NONCD0000727	PORTER AVENUE LDFL	GRAHAM	ALAMANCE	No
NONCD0000137	POWELLSVILLE REFUSE DISPOSAL	AHOSKIE	HERTFORD	No
NONCD0000383	PRINCETON DUMP	PRINCETON	JOHNSTON	No
NONCD0000297	PRINCEVILLE DUMP	TARBORO	EDGECOMBE	No
NONCD0000482	PUMPKIN CENTER LF	JACKSONVILLE	ONSLOW	No
NONCD0000132	PUNGO DUMP	PANTEGO	BEAUFORT	No
NONCD0000364	RAEFORD DUMP	RAEFORD	HOKE	No
NONCD0000610	RALEIGH LANDFILL - DORTHEA DIX	RALEIGH	WAKE	No
NONCD0000506	RAMSEUR	RAMSEUR	RANDOLPH	No
NONCD0000511	RANDLEMAN DUMP	RANDLEMAN	RANDOLPH	No
NONCD0000481	RAY'S RURAL DUMP	JACKSONVILLE	ONSLOW	No
NONCD0000211	RAYNOR GARBAGE DISP DUMP	BOGUE	CARTERET	No
NONCD0000529	RED SPRINGS DUMP	RED SPRINGS	ROBESON	No
NONCD0000537	REIDSVILLE LANDFILL	REIDSVILLE	ROCKINGHAM	No
NONCD0000711	RENNERT LANDFILL	RENNERT	ROBESON	No
NONCD0000190	RHODHISS DUMP	RHODHISS	CALDWELL	No
NONCD0000176	RHODHISS LANDFILL	ICARD	BURKE	No
NONCD0000715	RHONE ANDERSON LDFL	WHITEVILLE	COLUMBUS	No
NONCD0000473	RICH SQUARE REFUSE DISPOSAL	RICH SQUARE	NORTHAMPTON	No
NONCD0000742	RICHARD FRANKLIN LDFL	WAYNESVILLE	HAYWOOD	No
NONCD0000566	RICHFIELD DUMP	RICHFIELD	STANLY	No
NONCD0000477	RICHLANDS REFUSE DISPOSAL	RICHLANDS	ONSLOW	No
NONCD0000251	RIEGELWOOD DUMP	RIEGELWOOD	COLUMBUS	No
NONCD0000347	ROANOKE RAPIDS CITY LF	THELMA	HALIFAX	No
NONCD0000341	ROANOKE RAPIDS LANDFILL	ROANOKE RAPIDS	HALIFAX	No
NONCD0000437	ROBBINS DUMP	ROBBINS	MOORE	No
NONCD0000329	ROBBINSVILLE DUMP	ROBBINSVILLE	GRAHAM	No
NONCD0000420	ROBERSONVILLE DUMP	ROBERSONVILLE	MARTIN	No

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000528	ROBESON COUNTY LANDFILL-PHASE I		ST PAULS	ROBESON No
NONCD0000530	ROBESON COUNTY LF	ROWLAND	ROBESON	No
NONCD0000517	ROCKINGHAM DUMP	ROCKINGHAM	RICHMOND	No
NONCD0000455	ROCKY MOUNT LANDFILL	ROCKY MOUNT	NASH	No
NONCD0000710	ROCKY MOUNT LDFL (LIEBERS)	ROCKY MOUNT	EDGECOMBE	No
NONCD0000601	ROLESVILLE DUMP	ROLESVILLE	WAKE	No
NONCD0000618	ROPER REFUSE DISPOSAL	ROPER	WASHINGTON	No
NONCD0000281	ROSE HILL DUMP	ROSE HILL	DUPLIN	No
NONCD0000561	ROSEBORO DUMP	ROSEBORO	SAMPSON	No
NONCD0000590	ROSMAN DUMP	ROSMAN	TRANSYLVANIA	No
NONCD0000589	ROSMAN RESEARCH LF		TRANSYLVANIA	No
NONCD0000523	ROWLAND REFUSE DUMP	ROWLAND	ROBESON	No
NONCD0000494	ROXBORO DUMP	ROXBORO	PERSON	No
NONCD0000139	ROXOBEL REFUSE DISPOSAL	KELFORD	BERTIE	No
NONCD0000467	RURAL GARBAGE SERVICE		NEW HANOVER	No
NONCD0000274	RURAL GARBAGE SERVICE, INC.	THOMASVILLE	DAVIDSON	No
NONCD0000555	RUTHERFORDTON DISPOSAL	RUTHERFORDTON	RUTHERFORD	No
NONCD0000724	S MEBANE ST LDFL	BURLINGTON	ALAMANCE	No
NONCD0000557	SALEMBURG DUMP	SALEMBURG	SAMPSON	No
NONCD0000543	SALISBURY LANDFILL	SALISBURY	ROWAN	No
NONCD0000505	SALUDA REFUSE DUMP	SALUDA	POLK	No
NONCD0000706	SAMPSON CO LDFL (CARTERS	GARLAND	SAMPSON	No
NONCD0000702	SAMPSON CO LDFL (INGOLD)	INGOLD	SAMPSON	No
NONCD0000703	SAMPSON CO LDFL (IVANHOE)	IVANHOE	SAMPSON	No
NONCD0000701	SAMPSON CO LDFL (MT GILEAD)	MT GILEAD	SAMPSON	No
NONCD0000700	SAMPSON CO LDFL (SPIVEYS	SPIVEYS CORNER	SAMPSON	No
NONCD0000704	SAMPSON CO LDFL (SUTTONTOWN)	SUTTONTOWN	SAMPSON	No
NONCD0000514	SANDFILL INDUSTRIAL DUMP	ROCKINGHAM	RICHMOND	No
NONCD0000390	SANFORD DUMP	SANFORD	LEE	No
NONCD0000305	SANITARY LANDFILL		FORSYTH	No
NONCD0000109	SANITARY PICK-UP SERVICE	TAYLORSVILLE	ALEXANDER	No
NONCD0000637	SARATOGA DUMP	SARATOGA	WILSON	No
NONCD0000563	SCOTLAND COUNTY COMM. DUMP	LAURINBURG	SCOTLAND	No
NONCD0000344	SCOTLAND NECK DUMP	SCOTLAND NECK	HALIFAX	No
NONCD0000596	SCUPPENONG COMM. DUMP	SCUPPERNONG	TYRRELL	No
NONCD0000471	SEABOARD REFUSE DISPOSAL	SEABOARD	NORTHAMPTON	No
NONCD0000507	SEAGROVE DUMP	SEAGROVE	RANDOLPH	No
NONCD0000381	SELMA REFUSE DUMP	SELMA	JOHNSTON	No
NONCD0000398	SEVEN SPRINGS DUMP	SEVEN SPRINGS	LENOIR	No
NONCD0000472	SEVERN REFUSE DISPOSAL	SEVERN	NORTHAMPTON	No

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N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000159	SHALLOTTE REFUSE DUMP	SHALLOTTE	BRUNSWICK	No
NONCD0000152	SHALLOTTE SANITARY LANDFILL	SHALLOTTE	BRUNSWICK	No
NONCD0000450	SHARPSBURG DUMP	SHARPSBURG	NASH	No
NONCD0000242	SHELBY REFUSE DUMP	SHELBY	CLEVELAND	No
NONCD0000195	SHEW REFUSE DISPOSAL		CABARRUS	No
NONCD0000225	SILER CITY DUMP	SILER CITY	CHATHAM	No
NONCD0000639	SIMS REFUSE DISPOSAL	SIMS	WILSON	No
NONCD0000385	SMITHFIELD REFUSE DUMP	SMITHFIELD	JOHNSTON	No
NONCD0000337	SNOW HILL DUMP	SNOW HILL	GREENE	No
NONCD0000493	SOLOMON'S DUMP	ROXBORO	PERSON	No
NONCD0000775	SOUND SHORES LOTS 18 & 19	OCRACOKE	HYDE	No
NONCD0000247	SOUTH EARL DUMP	EARL	CLEVELAND	No
NONCD0000668	SOUTH SAUDERS STREET DUMP	RALEIGH	WAKE	No
NONCD0000762	SOUTHERN PINES DUMP	SOUTHERN PINES	MOORE	No
NONCD0000447	SOUTHERN PINES LANDFILL	SOUTHERN PINES	MOORE	No
NONCD0000480	SOUTHWEST LF	JACKSONVILLE	ONSLOW	No
NONCD0000114	SPARTA REFUSE DISPOSAL	SPARTA	ALLEGHANY	No
NONCD0000542	SPENCER LAND DISPOSAL AREA	SPENCER	ROWAN	No
NONCD0000550	SPINDALE REFUSE DISPOSAL	SPINDALE	RUTHERFORD	No
NONCD0000533	SPRAY DUMP		ROCKINGHAM	No
NONCD0000452	SPRING HOPE DUMP	SPRING HOPE	NASH	No
NONCD0000268	SPRING LAKE DUMP	SPRING LAKE	CUMBERLAND	No
NONCD0000432	SPRUCE PINE REFUSE DISPOSAL	SPRUCE PINE	MITCHELL	No
NONCD0000526	ST. PAULS DUMP	ST PAULS	ROBESON	No
NONCD0000206	STACY REFUSE DUMP		CARTERET	No
NONCD0000567	STANFIELD DUMP	STANFIELD	STANLY	No
NONCD0000316	STANLEY REFUSE DUMP	STANLEY	GASTON	No
NONCD0000371	STATESVILLE DUMP	STATESVILLE	IREDELL	No
NONCD0000635	STATONSBURG DUMP	STANTONSBURG	WILSON	No
NONCD0000265	STEDMAN DUMP	STEDMAN	CUMBERLAND	No
NONCD0000578	STOKES COUNTY LF		STOKES	No
NONCD0000573	STOKES GARBAGE SERVICE DUMP		STOKES	No
NONCD0000721	STONE QUARRY RD LDFL	BURLINGTON	ALAMANCE	No
NONCD0000532	STONEVILLE DUMP	STONEVILLE	ROCKINGHAM	No
NONCD0000330	STOVALL DUMP	STOVALL	GRANVILLE	No
NONCD0000125	SUBURBAN SANITATION SERVICE	WASHINGTON	BEAUFORT	No
NONCD0000518	SUBURBAN WASTE & GARBAGE CO.	ROCKINGHAM	RICHMOND	No
NC0210020541	SUNNY POINT BASE LANDFILL	SOUTHPORT	BRUNSWICK	No
NONCD0000588	SWAIN COUNTY DUMP	BRYSON CITY	SWAIN	No
NONCD0000366	SWAN QUARTER DUMP	SWAN QUARTER	HYDE	No

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N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000476	SWANSBORO DUMP	SWANSBORO	ONSLOW	No
NONCD0000378	SYLVA DUMP		JACKSON	No
NONCD0000257	TABOR CITY DUMP	TABOR CITY	COLUMBUS	No
NONCD0000759	TALLMAN CLAY PIT	WILMINGTON	NEW HANOVER	No
NONCD0000143	TAR HEEL REFUSE DISPOSAL	TAR HEEL	BLADEN	No
NONCD0000112	TAYLORSVILLE DUMP	TAYLORSVILLE	ALEXANDER	No
NONCD0000278	THOMASVILLE LANDFILL	THOMASVILLE	DAVIDSON	No
NONCD0000406	TIN MINE LANDFILL	LINCOLNTON	LINCOLN	No
NONCD0000750	TOWN OF HAMLET LDFL	HAMLET	RICHMOND	No
NONCD0000714	TOWN OF MAXTON LDFL	MAXTON	ROBESON	No
NONCD0000135	TOWN OF WASHINGTON PK DUMP	WASHINGTON PARK	BEAUFORT	No
NONCD0000356	TOWN OF WAYNESVILLE DUMP	WAYNESVILLE	HAYWOOD	No
NONCD0000386	TRENTON REFUSE DISPOSAL	TRENTON	JONES	No
NONCD0000436	TROY LANDFILL	TROY	MONTGOMERY	No
NONCD0000504	TRYON REFUSE DISPOSAL	TRYON	POLK	No
NONCD0000223	UNKNOWN	CONOVER	CATAWBA	No
NONCD0000661	UNKNOWN #1 - PITT		PITT	No
NONCD0000662	UNKNOWN #1 - RANDOLPH	PLEASANT RIDGE	RANDOLPH	No
NONCD0000660	UNKNOWN #2 - PITT	GREENVILLE	PITT	No
NONCD0000663	UNKNOWN #2 - RANDOLPH	COLERIDGE	RANDOLPH	No
NONCD0000238	UPPER CLEVELAND DUMP	FALLSTON	CLEVELAND	No
NONCD0000174	VALDESE REFUSE DUMP	VALDESE	BURKE	No
NONCD0000260	VANCEBORO DUMP	VANCEBORO	CRAVEN	No
NONCD0000487	VANDEMERE DUMP	VANDEMERE	PAMLICO	No
NONCD0000441	VASS DUMP	VASS	MOORE	No
NONCD0000676	W DAVIDSON CO LDFL		DAVIDSON	No
NONCD0000772	W R BONSAL #1	LILESVILLE	ANSON	No
NONCD0000774	W R BONSAL #2		ANSON	No
NONCD0000243	WACO DUMP	WACO	CLEVELAND	No
NONCD0000117	WADESBORO LANDFILL	WADESBORO	ANSON	No
NONCD0000613	WAKE FOREST TOWN LF	WAKE FOREST	WAKE	No
NONCD0000288	WALLACE DUMP	WALLACE	DUPLIN	No
NONCD0000577	WALNUT COVE DUMP	WALNUT COVE	STOKES	No
NONCD0000574	WALNUT COVE LF	WALNUT COVE	STOKES	No
NONCD0000189	WALSH REFUSE DUMP		CALDWELL	No
NONCD0000334	WALSTONBURG DUMP	WALSTONBURG	GREENE	No
NONCD0000609	WALTON'S DUMP	WENDELL	WAKE	No
NONCD0000696	WALTON'S SANITATION SERVICE	MORRISVILLE	WAKE	No
NONCD0000616	WARRENTON DUMP	WARRENTON	WARREN	No
NONCD0000285	WARSAW DUMP	WARSAW	DUPLIN	No

APPENDIX II
N.C. INACTIVE HAZARDOUS SITES INVENTORY BY CATEGORY
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11. OLD UNLINED LANDFILL LIST

ID Number	Site Name	City	County	In Other IHS Category
NONCD0000129	WASHINGTON DUMP	WASHINGTON	BEAUFORT	No
NONCD0000134	WASHINGTON PARK DUMP	WASHINGTON	BEAUFORT	No
NONCD0000624	WATAUGA COUNTY LF	BOONE	WATAUGA	No
NONCD0000598	WAXHAW DUMP	WAXHAW	UNION	No
NONCD0000667	WE BUFFALOE, JR PRIVATE DUMP	GARNER	WAKE	No
NONCD0000161	WEAVERVILLE LANDFILL	WEAVERVILLE	BUNCOMBE	No
NONCD0000346	WELDON CITY LANDFILL	WELDON	HALIFAX	No
NONCD0000342	WELDON REFUSE DISPOSAL	WELDON	HALIFAX	No
NONCD0000438	WEST END DUMP	WEST END	MOORE	No
NONCD0000586	WEYERHAUSER LF	ELKIN	SURRY	No
NONCD0000652	WHEELERS SAND ROCK PIT DUMP		DAVIDSON	No
NONCD0000444	WHISPERING PINES DUMP		MOORE	No
NONCD0000453	WHITAKERS DUMP	WHITAKERS	NASH	No
NONCD0000146	WHITE LAKE REFUSE DUMP	WHITE LAKE	BLADEN	No
NONCD0000256	WHITEVILLE DUMP	WHITEVILLE	COLUMBUS	No
NONCD0000670	WICKER PARK LANDFILL	PINEHURST	MOORE	No
NONCD0000754	WILKES CO LDFL	ROARING RIVER	WILKES	No
NONCD0000633	WILKESBORO REFUSE DISPOSAL	WILKESBORO	WILKES	No
NONCD0000419	WILLIAMSTON DUMP	WILLIAMSTON	MARTIN	No
NONCD0000466	WILMINGTON LANDFILL	WILMINGTON	NEW HANOVER	No
NONCD0000756	WILMINGTON LDFL (KIDDER ST)	WILIMINGTON	NEW HANOVER	No
NONCD0000640	WILSON SANITARY LF	WILSON	WILSON	No
NONCD0000141	WINDSOR REFUSE DISPOSAL AREA	WINDSOR	BERTIE	No
NONCD0000597	WINGATE DUMP	WINGATE	UNION	No
NONCD0000151	WINNABOW LANDFILL	WINNABOW	BRUNSWICK	No
NONCD0000210	WINSTON HILL LF	ATLANTIC	CARTERET	No
NONCD0000499	WINTERVILLE DUMP	WINTERVILLE	PITT	No
NONCD0000360	WINTON DUMP	WINTON	HERTFORD	No
NONCD0000758	WISTERIA DR LDFL	WILMINGTON	NEW HANOVER	No
NONCD0000468	WOODLAND REFUSE DISPOSAL	WOODLAND	NORTHAMPTON	No
NONCD0000464	WRIGHTSVILLE BEACH DUMP	WRIGHTSVILLE BEACH	NEW HANOVER	No
NONCD0000647	YADKINVILLE REFUSE DISPOSAL	YADKINVILLE	YADKIN	No
NONCD0000158	YAUPON BEACH DUMP	OAK ISLAND	BRUNSWICK	No
NONCD0000608	ZEBULON DUMP	ZEBULON	WAKE	No

Annual Report to the North Carolina General Assembly

The NC Brownfields Program

October 2004

NCDENR

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Division of Waste Management
www.wastenotnc.org

North Carolina Brownfields Program
www.ncbrownfields.org

Department of Environment and Natural Resources

Michael F. Easley
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Brownfields Property Reuse Act
Annual Report to the General Assembly
October 2004

Executive Summary

This report to the General Assembly, required by the Brownfields Property Reuse Act (BPRA) of 1997 (G.S. 130-310.30 *et seq.*), describes the activities and status of the N.C. Brownfields Program in 2004. DENR is pleased to report continued success and growth in the state's efforts to revitalize and safely reuse brownfields properties through the N.C. Brownfields Program and its partnership with the U.S. Environmental Protection Agency. The program is a model of high return on public investment in that the relatively small sums of public funds spent leverage large sums of private investment in brownfields redevelopment. Furthermore, DENR receives no state-appropriated funds for the program. The public dollars spent are federal funds from a cooperative agreement with the U.S. EPA.

Previous years' reports have detailed the program's results on a calendar year basis. Therefore, this report will project out to year's end, based on the status of current projects and on prorated results in the first three quarters of this year. The program projects to complete 22 brownfields agreements in 2004 (there were 15 in 2003), bringing the total of completed agreements to 61. These 61 projects and others in the pipeline represent $1 billion in private investment committed to the redevelopment of environmentally impacted properties under the state's brownfields statute. Moreover, demand for program services continues to increase. DENR projects that a record 45 applications to the program (Letters of Intent) will have been received from prospective developers during 2004 (there were 34 in 2003).

Major activities accomplished in 2004 are summarized below:

- Implemented the first year work plan of the U.S. EPA 128(a) Brownfields Cooperative Agreement;
- Successfully followed its plan to coordinate with the Land-of-Sky Regional Council through a cooperative agreement with Land-of-Sky to station a Brownfields Program staffer at Land-of-Sky offices in Asheville;
- Hired three additional staff with the federal funds including a Hydrogeologist (stationed in Asheville), a Toxicologist, and an Applications Programmer;
- Held the education/outreach event attended by 170 people, *Brownfields Workshop for Developers and Local Governments in Raleigh* at the McKimmon Center at N.C. State University, April 1, 2004;
- In July the program achieved milestones that mark the 100th site in the program and the 50th completed brownfields agreement;
- Increased the total committed private investment in brownfields redevelopment in North Carolina from $550 million to $1 billion;
- Obtained a renewal of the U.S. EPA 128(a) Brownfields Cooperative Agreement for 2005 with funding of $968,572.

Background

Redeveloping brownfields properties has become increasingly popular as developers and cities realize these properties offer viable opportunities to bring economic growth, public health protection, jobs, and quality of life benefits to cities and rural areas. Brownfields are abandoned, idled or underutilized properties where environmental contamination hinders redevelopment due to concerns about environmental liability. The BPRA gives DENR the authority to enter into brownfields agreements with prospective developers who did not cause or contribute to site contamination. The BPRA modifies the environmental liability barrier for prospective developers and motivates them to bring these properties and their hindrances to DENR's attention. DENR partners with the prospective developer to evaluate the possible risks associated with site contamination, and negotiates a brownfields agreement that stipulates the steps necessary to make the site safe for a specific intended reuse. The result is a redevelopment project that works economically and also protects public health and the environment.

Because brownfields agreements afford prospective developers liability protection for as long as they make and maintain the site safe for its intended reuse, the specter of open-ended financial uncertainty is lifted. This economic shield allows prospective developers to obtain financing previously unavailable for these properties.

Thus, the BPRA provides guidelines for a new public policy that allows DENR to distinguish between prospective developers of brownfields properties and the properties' polluters. Instead of mandating the site be cleaned to current standards, the BPRA requires developers to make the site safe for reuse. The program must examine the risks to public health or environment posed by the site. Then, DENR determines what the prospective developer must do to ensure safe redevelopment. These actions can range from land-use restrictions to cleanup, or a mixture of both. In addition to holding prospective developers accountable to their agreements, DENR reserves the right to enforce against those parties responsible for the original contamination. The process is summarized in Table 1 below.

Table 1. Summary of the Brownfield Process

Step 1 – A prospective developer with a brownfield site that needs liability protection submits a letter of intent with basic site facts. DENR determines if the prospective developer and the property proposed for reuse are eligible under the BPRA statute.
Step 2 - DENR reviews existing site data to determine the risk posed by contamination at the site. If the data are insufficient to evaluate such risk, DENR advises the prospective developer on further site assessment to gather the necessary data.
Step 3 - DENR determines what actions are necessary to make the site safe for reuse and includes these actions in a draft brownfields agreement. The prospective developer pays statutory fee and negotiates/concurs with DENR on provisions in brownfields agreement.
Step 4 - The brownfields agreement is published with a 60-day public comment period.
Step 5 - The brownfields agreement is finalized after any public comments are considered and incorporated. The prospective developer uses the final brownfields agreement, which provides liability protection, to obtain financing for the project. Liability protection is contingent upon the completion of the actions required by the brownfields agreement. The brownfield agreement makes the site eligible for the brownfields property tax incentive.

The ancillary brownfields property tax incentive for prospective developers allows them to recoup funds spent on assessment and cleanup. The program motivates the market to recycle these sites to productive reuse, while preserving or reducing the use of pristine or undeveloped "greenfield" property. While the environmental benefits are obvious, most redevelopments also create a significant number of jobs and put properties back on the tax rolls. This dual economic-environmental gain benefits the state, local government, and the brownfields developer.

As these benefits become better known, the program's popularity increases. After four successive years of growth at the end of 2004, the program will have 61 completed brownfields agreements and approximately 60 others in the pipeline. Approximately $1 billion in private investment dollars have been committed to redevelop abandoned properties that blight urban and rural landscapes.

The overall result is a win-win scenario for both the environment and economic development. Risk reductions and cleanups are achieved at sites that could have harmed the public or the environment, and prospective developers redevelop abandoned properties that once had little hope for productive reuse. The public benefits of job creation, improved quality of life in the surrounding neighborhoods, local tax base expansion and contribution to the general fund are other positive impacts.

The program also supports smart growth, sustainability and the One North Carolina Naturally agenda. Every project that reuses property in urban centers reduces suburban sprawl and preserves green space. In a very real sense, for each brownfield redeveloped, a greenspace is saved. The properties that have received the 61 completed agreements are estimated to represent a minimum of 1,100 acres and the 60 more in the pipeline have an acreage of 1,050. This is, in effect, acreage that is being recycled.

Program Status

The program has long partnered with the U.S. EPA for funding. This year has been focused on the implementation of the first year of funding from the U.S. EPA 128(a) Brownfields Cooperative Agreement under the federal brownfields act. This increased funding from about $170,000 annually in previous years to $1,000,000 this year. This large infusion of funds required the program to develop goals and commitments to achieve under its work plan with the U.S. EPA, one of which involved creating and filling numerous program staff positions to expand the program enough to handle additional demand for brownfields agreements. By September 30, 2004, the end of the first year of this federal funding, all positions that were proposed to EPA in the work plan had been hired and were in place. These staff members are all fully engaged in processing brownfields agreements as the program continues to employ these federal funds to increase its capabilities, produce more agreements, and facilitate more brownfields redevelopment.

The number of projects seeking brownfields agreements has increased each year of the program despite mixed economic conditions in the development sector, and 2004 is no exception with 45 Letters of Intent projected for the year. We anticipate continued increases in demand as the program's expansion serves to better educate both the public and the development community

about the benefits of brownfields redevelopment. The federal grants for brownfields assessment and cleanup that were awarded by the U.S. EPA to local governments in 2003 and 2004 (Greensboro, Concord, Farmville, Raleigh, Laurinburg, and the Land-of-Sky Regional Council) will further increase demand as these communities begin local brownfields redevelopment efforts. North Carolina local governments received more EPA grant funding than any other southeastern state in EPA Region 4.

In September 2004, the U.S. EPA's Region 4 approved DENR's application for continued brownfield cooperative agreement funding and awarded DENR $968,572 under Section 128 of the federal Small Business Liability Relief and Brownfields Revitalization Act. The funds are authorized for use starting October 1, 2004 through September 30, 2005. A portion of these funds is used to support pre-regulatory landfill identification activities of the Inactive Hazardous Sites Program.

Technical positions in the Brownfields Program now include five program managers, a toxicologist, and an IT data programmer for database development.

Outreach and Education

The program is largely market driven in that prospective developers bring their sites to the program in order to break liability barriers for financing. One of the clear goals of the program is to educate the development community and local governments as to the program's existence and usefulness as a tool for both private and public redevelopment stakeholders. This increase in awareness about the program will in turn result in more redevelopment projects moving forward. This year the program focused its educational efforts on its statewide *Brownfields Workshop for Developers and Local Governments* held in Raleigh on April 1. The conference was co-sponsored by DENR, the U.S. EPA, the NC Division of Commerce, and the NC League of Municipalities. At the conference local government attendees learned how to compete for federal brownfields grants. Developers and lenders learned about how the Brownfields Program alleviates the uncertainty in liability so they can obtain or loan project financing. Response was overwhelming among the over 170 attendees. Since this workshop, the program has seen a noticeable jump in the number of project applications.

Cooperation with Local Government

The program has had close cooperation with local governments, especially since its cooperative agreement with the City of Charlotte that placed a DENR employee in Charlotte in May of 2002. This agreement maximized the effectiveness of the program by having a Brownfields Program staff person co-located with local government staff also working on brownfields redevelopment. This also provides direct face to face cooperation with the developers in that locality. This formula has enabled the completion of 23 brownfields agreements in the Charlotte area.

Seeking to duplicate this success, the program proposed to EPA a similar approach to coordination with local government in the Asheville area. Thus, one of the new positions funded by this cooperative agreement has been placed in the offices of the Land-of-Sky Regional Council. This project manager works with Land-of Sky in much the same way as our Charlotte staff member works with Charlotte, bringing their combined efforts to bear on encouraging

brownfields redevelopment. Several new projects are underway in the western part of the state as a result of this partnership.

Site Summaries

For brief descriptions of all brownfields projects in the program as of June 30, 2004, please see the Appendix. The table there is divided into three sections: active eligible projects, projects pending eligibility, and projects with finalized brownfields agreements.

Active eligible projects have been deemed eligible for a brownfields agreement under BPRA statutory criteria. These developers are working with DENR in some stage of data gathering, analysis or agreement negotiation. As of June 30, 2004 there were 52 active projects. Projects at this stage receive guidance from DENR as the developers gather the additional data needed to ensure protection of public health and environment. Once research is complete, DENR analyzes the data, then drafts and negotiates the terms of the brownfields agreement with the prospective developer. At most of these sites, DENR is waiting for additional data requested by the program.

Projects pending eligibility are in the initial stage of the brownfields process as they apply for entry into the program. Sites in this category have yet to meet the requirements under the statute for eligibility for a brownfields agreement. For the sites in this category, the program has requested clarification or additional information from prospective developers regarding a site. Normally developers respond to these requests for clarification, the sites are usually deemed eligible and are quickly moved into the active eligible category. As of June 30, 2004, there were eight sites in this category.

Projects with finalized brownfields agreements have completed the public notice phase of the brownfields process and either have a signed brownfields agreement or are waiting for the agreement to be executed. As of June 30, 2004, 47 projects had finalized agreements, and 14 more final agreements are anticipated by the end of the year.

Milestone Projects

Indicative of the progress made in the last several years, the program has reached significant milestones in 2004. In June 2004 the program admitted its 100th site and nearly simultaneously completed its 50th brownfields agreement in July. These particular projects, summarized to the right and below, and are illustrative of the range of projects that are utilizing the program.

The 100th Site to Enter the Program
Pillowtex Plant 1 Site
Kannapolis, Cabarrus County

When this textile operation closed in August 2003, it left 5,000 workers jobless, making this facility closure the single largest loss of jobs in state history. The City of Kannapolis as the prospective developer is seeking a brownfields agreement for an alternative use project for this facility. At present there is a developer interested in multiple industrial and commercial uses including turning a portion of the site into a state of the art commercial sports complex. The Brownfields Program is guiding the City in assessments to determine the contamination on the site, which includes petroleum and chlorinated solvents. It will then formulate plans to ensure the safety of the proposed redevelopment through a brownfields agreement.

The Pillowtex plant project is a very large industrial textile facility. The textile industry's recent economic troubles and plant closures are well documented, and fully one fourth of the projects entering the Brownfields Program have been textile related. The program is hopeful that a completed brownfields agreement will help to facilitate the site's safe redevelopment and replacement of lost jobs.

The 50th Completed Brownfield Agreement
The Rusak Property
Charlotte, Mecklenburg County

This former metal plating operation located in Charlotte is adjacent to the Marie Davis Middle School. This 1.2-acre parcel will be razed and incorporated into school renovation/expansion plans thereby protecting public health and removing an eyesore. The Brownfields Program is guiding the Mecklenburg County Board of Education in the assessment and cleanup efforts to make the site safe for the proposed reuse as a plaza entranceway for the school. The agreement came out of public comment period on July 30, 2004.

The Rusak Property project is a small industrial facility that would be difficult, if not impossible, to consider as a parcel for expansion without the liability protection afforded by a brownfields agreement. Interestingly, both of these projects are being redeveloped by local government entities, though most ongoing projects are private sector redevelopments.

Brownfields Project Demographics

Brownfields sites in heavily industrialized regions of the country tend to be weighted toward urban areas. However, North Carolina's tradition of rural manufacturing creates a significant number of rural brownfields opportunities. This fact continues to be reflected in the distribution of the program's inventory of projects. While only 4 of the of the 22 agreements projected for completion during 2004 are rural, 19 of the program's total of 61 completed agreements and approximately half of the program's pending and eligible projects are rural sites.

The additional staff hired in 2004 allowed the program to continue to raise the level of its education and outreach efforts in order to make rural communities more aware of the state's Brownfields Program. As a result of these efforts, the public benefits enjoyed by urban areas with brownfields projects will extend to rural regions of the state as well. DENR will continue to focus on the importance of rural brownfields to their surrounding communities.

To effectively define the brownfields universe in our state and increase effectiveness of outreach efforts, several questions need to be answered. What are the basic demographics of all of the brownfield sites in North Carolina? How many and where are these brownfields? What industries do they come from, and what are their general characteristics? To find out, a key element to the program's EPA funded work plan is a demographic survey of brownfields in the state. The program has opened discussions with the Institute of Government at UNC-Chapel Hill on developing this survey and hopes to implement it in 2005. The survey will be conducted with several local government entities and then statistically extrapolated to determine data on a statewide basis. The goal is to determine the number and geographic distribution of brownfield properties in the state.

Improving Effectiveness

Throughout its existence, the Brownfields Program has provided a high "bang" for the federal "bucks" it uses for operation funds. The program's 61 brownfields agreements and 60 other projects in the pipeline represent $1 billion in committed private redevelopment investment. The high ratio to which the federal funds have been successfully leveraged into private development dollars for brownfields redevelopment is just one measure of the effectiveness and efficiency of the BPRA.

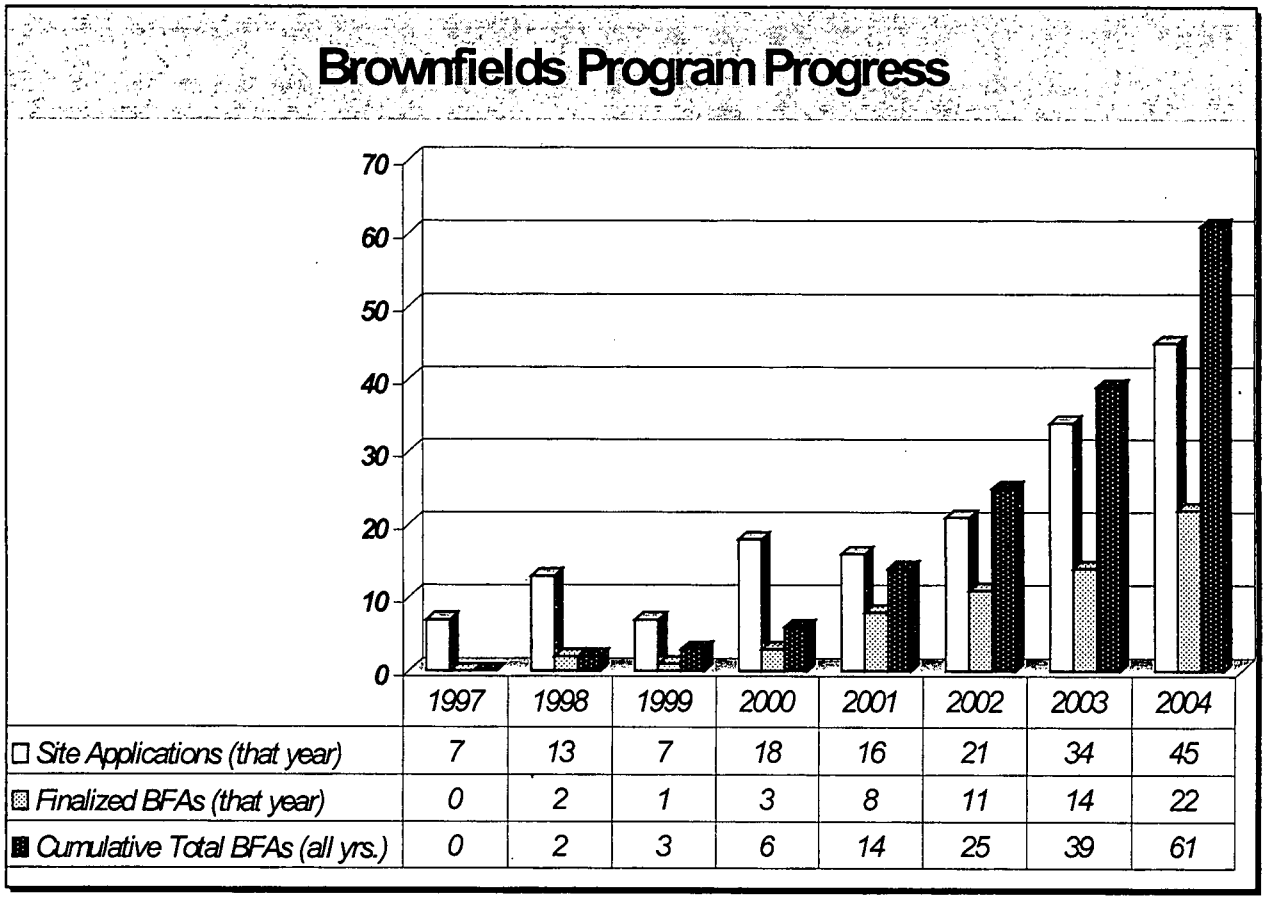
By continuing to add needed staff in 2004 the program has significantly increased its volume capacity as the demand for brownfields agreements continues to increase. New internal technical protocols, more experienced project managers, and an improved project tracking system reduced process time, as did streamlining and standardizing various administrative elements. The program continues to upgrade and update its Web site, which helps disseminate essential and timely information to brownfields stakeholders. These efforts have allowed staff to spend less time conveying information and more time processing applications and advancing projects through the brownfields process. This increase in effectiveness and efficiency is largely responsible for the program's record of 22 projected agreements completed during 2004.

The program believes strongly that increased cooperation between DENR and local governments has yielded significant benefits and is a trend it wants to continue to strengthen. DENR has recognized the effectiveness of placing a staff person in the City of Charlotte offices and has duplicated that effort by placing a staffer in the offices of the Land-of-Sky Regional Council. Land-of-Sky has received two EPA brownfields grants this year and is viewed as a strong advocate for brownfields redevelopment in EPA Region 4.

The program will continue its educational outreach for local governments and encourage and facilitate their application for federal brownfields funds through these efforts. The program believes that a staff person serving as a local government outreach liaison would be of significant

benefit. Although it has no additional funds for such a position, DENR will explore this concept under future work plans with the U.S. EPA.

Lastly, the summary table below shows the progress during the program's history since the BPRA became effective in 1997. One turning point evident in the chart is that the program had a



	1997	1998	1999	2000	2001	2002	2003	2004
Site Applications (that year)	7	13	7	18	16	21	34	45
Finalized BFAs (that year)	0	2	1	3	8	11	14	22
Cumulative Total BFAs (all yrs.)	0	2	3	6	14	25	39	61

*Numbers for 2004 are projected on a prorated basis from 3rd quarter data.

noticeable upswing in completed agreements in 2000 when the program received sufficient EPA funds to hire its first full time staff person. Successive hires in years 2002 onward have lead to greater brownfields agreement processing capacity and outreach ability. Hence, the growth in applications into the program and completed agreements.

As for legislative efforts that could continue to increase BPRA's effectiveness, DENR recognizes that textile mills and furniture plants have been especially hard hit in the current economy and therefore supports the concepts contained in last session's legislative bill H1743/S1345. This bill provides additional tax incentives for brownfields redevelopment projects of these hard hit industries so as to encourage the reuse of their closed facilities. The demographic survey of North Carolina brownfields DENR is pursuing through the Institute of Government likely would be able to confirm or refute the notion that there are significant and increasing numbers of brownfields from the textile and furniture industries.

Fund Status

The Brownfields Property Reuse Act Implementation Account receives the $2,000 fee charged to prospective developers who enter the program and is to be used by DENR to defray the cost of the program. For fiscal year July 1, 2003 through June 30 2004, the Brownfields Property Reuse Act Implementation Account had a beginning balance of $48,674, receipts from fees and interest of $48,047, and expenditures of $2,076. This yields an ending balance in the fund of $96,645. The expenditures were for supplies and for expenses for the *Brownfields Workshop for Developers and Local Governments* held April 1, 2004. Plans for the use of this fund for the future include additional outreach, software, database development needs, and possibly staff for coordination and assistance for local governments in applying for and using their U.S. EPA brownfields grant funds effectively.

Further Information

For additional information on the Brownfields Program and how it works, please visit our Web site at **www.ncbrownfields.org.**

APPENDIX

Status Summary of Brownfield Projects as of June 30, 2004

Appendix

Status Summary of Brownfield Projects as of June 30, 2004

Project Inventory is divided into three segments as follows:

Active eligible projects have been deemed eligible for a brownfields agreement under BPRA statutory criteria. These developers are working with DENR in some stage of data gathering, analysis or agreement negotiation.

Projects pending eligibility are in the initial stage that sites are in as they enter the program. Sites in this category have yet to meet the requirements under the statute for eligibility for a brownfields agreement.

Projects with finalized brownfields agreements have completed the public notice phase of the brownfields process and either have a signed brownfields agreement or are waiting for the agreement to be executed.

ACTIVE ELIGIBLE PROJECTS (52)

PD = Prospective Developer; RP = Responsible Party

8th STREET LANDFILL West 8th Street Kannapolis, Rowan Co. PD: City of Kannapolis	Former landfill operated by Cannon Mills for the disposal of residential, commercial, and industrial waste from the early 1900s through 1972. Landfill contents may include hazardous and regulated compounds. PD intends to redevelop the site for public recreational and dedicated open space uses.
ABC ENGRAVERS 724 North I-85 Charlotte, Mecklenburg Co. PD: Holden Business Park, LLC	Former engraving and plating facility with known chromium and chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site as an office complex.
ALPHA MILLS 312 E. 12th St. Charlotte, Mecklenburg Co. PD: Crosland, Inc.	A 5.77-acre parcel that was historically a textile mill. Most recently the site was the former Consolidated Group Incorporated engraving facility. The site has known soil, groundwater, surface water, and sediment impacts from historical site operations. PD intends to redevelop the property for residential apartments with compatible commercial and retail development.
AIRPORT EXXON 3305 North Liberty St. Winston-Salem, Forsyth Co. PD: Mrs. Becky Flowers	Former automobile engine repair and maintenance facility with known soil and likely groundwater contamination involving petroleum and degreasing solvent constituents. Intended redevelopment is a gas station/convenience store to serve the Smith-Reynolds Airport users and employees.
ALAMAC AMERICAN 1885 Alamac Road Lumberton, Robeson Co. PD: Alamac American Knits, LLC	The former knit textile manufacturing facility has perchloroethylene contamination associated with former drycleaning operations. The PD is using the facility to also manufacture knit textiles but does not use perchloroethylene on the premises.

AMERICAN CYANAMID Donald Ross Road Charlotte, Mecklenburg Co. PD: DRR of the Carolinas, LLC	Former pesticide formulation facility with petroleum and chlorinated hydrocarbons and metals contamination in soil and groundwater. PD intends to initially redevelop the site as a gravel parking lot for car and trailer storage. Future use may include other light industrial or commercial uses.
FORMER AMP FACILITY 1126 Church Street Greensboro, Guilford Co. PD: Church Street Medical, LLC	Approximately 10-acre site is the former location of AMP Incorporated, a metal stamping, plating, and manufacturing facility. Closed since the mid-1980s, the site has known chlorinated solvent contamination in groundwater, which is being remediated under an approved Corrective Action Plan within the NC DWQ Groundwater Section. PD intends to redevelop the site as a medical office campus.
ANDREX INDUSTRIES 220 Deaverview Road Asheville, Buncombe Co. PD: Milkco, Inc.	A 9-acre light manufacturing site formerly used as a textile production facility that operated a knitting, weaving and cutting business along with dry cleaning, shrinking and packaging of fabrics. Tetrachloroethylene groundwater contamination from drycleaning operations being remediated by RP with pump-and-treat system. PD is adjacent property owner, a milk processing and distributing plant. Initial plan is to use part of property for truck and trailer parking. Within 3 years they plan to demolish Andrex buildings and expand the Milkco Plant to double capacity within 8 years.
BOULIGNY SITE 2320 N. Davidson St. Charlotte, Mecklenburg Co. PD: NODA Properties, LLC	Approximately 3.5-acre parcel that was the former R.H Boulingy facility. The site has known groundwater impacts from chlorinated solvents. PD intends to redevelop the property for mixed-use development with commercial, retail, industrial and residential.
PADGETTE LANE PROPERTY 105 Padgett Lane and Carrboro, Orange Co. PD: Main Street Properties of Chapel Hill LLC	This 1-acre site was used as a small motor and automobile repair facility and an auto salvage yard since about 1960. Suspected impacts to soil and/or groundwater include petroleum hydrocarbons and chlorinated solvents. Site will be redeveloped into high-density residential units serving students at UNC-CH.
CAMDEN ROAD 1600 Camden Road Charlotte, Mecklenburg Co. PD: Harris Murr & Vermillion, LLC	Approximately 0.25-acre parcel in Historic SouthEnd of Charlotte. The site has known groundwater impacts from historical site operations as a gas station, tire repair, plumbing repair, and other uses. PD intends to redevelop the property for commercial and retail purposes
CAROLINA LOG BUILDINGS Howard Gap Rd at US Hwy. 25 Fletcher, Henderson Co. PD: Town of Fletcher	Former wood treating facility with known pentachlorophenol contamination in soil and groundwater. PD intends to redevelop the 30-acre site as the new heart of the Town of Fletcher to include various office and retail uses.
CEDAR CREEK 3468 Cedar Creek Road Fayetteville, Cumberland Co. PD: DAK Resins, LLC	The property was formerly operated by Monsanto to produce herbicide and before that was used to produce nylon and polyester. DAK Resins, LLC plans to use the onsite utilities to produce steam and cooling water, use storage and distribution facility. Resin production may occur on the site in the future.
CHARLOTTE TANK TRUCK Border Drive Charlotte, Mecklenburg Co. PD: WR Deal Holdings LLC	Propane manufacturing company with soil and groundwater contamination from an adjacent property. PD intends to expand his current site operations.

CHATHAM PARK NC Hwy. 268 Elkin, Surry Co. PD: Town of Elkin	A 30-acre site containing solid waste disposal area used by former textile manufacturing facility. Known VOC and SVOC contamination exists in groundwater at the site. PD intends to redevelop the property for park and recreational uses in keeping with the current use of adjoining property as baseball fields.
CHESTER STREET PROPERTY North Chester Street (Hwy 321) Gastonia, Gaston County	Site contained former Carson Dry Cleaner located in the center city area of Gastonia. Property has known chlorinated solvents contamination in the soil and groundwater. PD intends to redevelop the site in commercial retail uses.
CSX RIVERFRONT 515 Nutt Street Wilmington, New Hanover County PD: Riverfront Developers, LLC	An 8.26-acre tract on the Cape Fear River in downtown Wilmington. Former CSX railroad property last used for offloading of diesel for rail distribution. Minor naphthalene contamination in the groundwater and some polynuclear aromatic hydrocarbons in soil. Intended use is multi-purpose development that could include a hotel, private residences, professional offices, retail stores, restaurants and private marina. Public waterfront amenities, with a 600' extension of Wilmington's historic riverfront.
EAST PARK – DOROTHY HALL 1423 & 1427 E. Fourth St Charlotte, Mecklenburg Co. PD: Torrence Street Partners	Approximately 0.8-acre parcel that is a portion of the East Park Development Project, with known chlorinated solvent and gasoline contamination. PD intends to redevelop the site as a pedestrian urban infill multiple use development with commercial, residential, recreational and common open space. The site is part of the City of Charlotte's East Park re-development zone.
EAST PARK – Craver 1601,1609,1615 Elizabeth Ave Charlotte, Mecklenburg Co. PD: Torrence Street Partners	Approximately 0.65-acre parcel that is a portion of the East Park Development Project, with known chlorinated solvent and gasoline contamination. PD intends to redevelop the site as a pedestrian urban infill multiple use development with commercial, residential, recreational and common open space. The site is part of the City of Charlotte's East Park re-development zone.
EASTWAY PHASE I 3014 Eastway Drive Charlotte, Mecklenburg Co. PD: Blaine Lake, LLC	Shopping Plaza in the City of Charlotte that has contamination from a dry cleaning operation and adjacent properties. The groundwater is contaminated. PD intends to redevelop the shopping plaza and maintain jobs in the area.
EASTWAY PHASE II 3124 Eastway Drive Charlotte, Mecklenburg Co. PD: Blaine Lake, LLC	Shopping Plaza in the City of Charlotte that has contamination from a dry cleaning operation and adjacent properties. The groundwater is contaminated. PD intends to redevelop the shopping plaza and maintain jobs in the area.
ECUSTA 1 Ecusta Road Pisgah Forest, Transylvania Co. PD: Ecusta Business Development Center, LLC	In its prime, this 540-acre site was the world's largest non-wood pulp and specialty paper manufacturing facility. Closed since late 2002, the site has known metals, caustic and solvent contamination. PD intends to re-start flax pulping operations and to market the pulp to paper manufacturers. PD may also undertake other uses of site buildings and facilities, including office space and possible use of excess wastewater treatment capacity by local municipalities.

ELK MOUNTAIN LANDFILL Elk Mountain Road Woodfin, Buncombe Co. PD: Town of Woodfin	Approximately 156-acre site contains a former municipal landfill which was operated under lease by the City of Asheville, and which has been closed since the late 1970s. PD has operated a 9-hole golf course on the site since 1990. PD will conduct assessment activities to determine if there is actual contamination at the site. PD intends to redevelop the site into an 18-hole golf course and approximately 250 condominiums in areas outside of the waste cells.
FISHBURNE EQUIPMENT Airport Road Arden, Buncombe Co. PD: R. & P. Van Praag	Former metal fabrication and tobacco press manufacturing facility with suspected VOC contamination in soil and groundwater, based on detection of these compounds on adjoining, downgradient property, the former Buncombe County landfill. PD intends to redevelop the site for light manufacturing/assembly, warehousing, and public storage uses.
GATEWAY AT OLD SALEM Multiple parcels (24, 30 and 408 Salem Avenue, 1007, 1016, 1019, and 1100 S. Marshall, 1100, 1122 and 1315 S. Main Street, 212 Stafford Street, 1198, 1405, and 1480 Broad Street.) Winston-Salem, Forsyth County PD: Southeast Gateway Ventures, LLC	Project size is approximately 51 acres. The property is planned for mixed-use redevelopment including offices, commercial/retail space, residences, a YWCA , a private school and parking. Contamination is from a former Duke Power Plant substation (PCBs, PAHs in soil) and groundwater contamination from a number of sources, mainly petroleum but with a few chlorinated solvents.
GENERAL WOOD 1901 Wood Treatment Road Leland, Brunswick County PD: Leland Land, LLC	A 120-acre pole treatment facility (creosote, chromated copper arsenate (CCA) and pentachlorophenol (PCP)) under Chapter 11 bankruptcy that is currently under RCRA jurisdiction. PD's intent is to be able to distinguish old from new contamination and then continue with pole treatment (CCA and PCP only). Groundwater contamination mainly associated with creosote and petroleum. Metal and PCP contamination in soil.
GLEN RAVEN MILLS 114 Raven Circle Kings Mountain, Cleveland Co. PD: Consortium for Progress	Former textile manufacturing facility with solvent contamination in groundwater. PD intends to redevelop the property as a residential/retirement center for senior citizens. Responsible party will continue assessment and/or cleanup activities under state Voluntary Cleanup Program.
GREY HOSIERY MILL Fourth & Laurel Streets Hendersonville, Henderson Co. PD: Old Mill Arts Committee	Former hosiery manufacturing facility located in downtown Hendersonville with low concentrations of chlorinated solvents in site groundwater. PD intends to renovate the building and redevelop the property as a performing arts center.
GUILFORD MILLS – W. Market Street 4925 W. Market Street Greensboro, Guilford County PD: Kim's Greensboro Real Estate, LLC	A 19.8-acre vacant textile facility with ancillary buildings. Minor groundwater contamination associated with former underground storage tanks. Other non-UST contamination has been documented but information has not yet been sent to us. PD plans to use the site for general commercial property.

HISTORIC COTTON MILL 191 Riverside Drive Asheville, Buncombe Co. PD: RiverLink, Inc.	A 2.63-acre site formerly occupied by a cotton mill that operated from the 1900s but has been abandoned for many years. PD will conduct environmental assessment to determine if the site has any contamination. PD intends to redevelop the site in mixed commercial/retail and residential uses. This project is part of the Asheville French Broad Riverfront Plan.
HOME INNOVATIONS SITE Hwy 52 S & Ratliff Gin Road Morven, Anson Co. PD: Dan River Inc.	Former textile manufacturing facility with petroleum hydrocarbon and VOC contamination in soil and groundwater. PD intends to redevelop the site as a modern textile manufacturing operation where present environmental contaminant compounds are not used. Project has significant job creation potential.
KIDD LANE BATTERY DISPOSAL 3607 Kidd Lane Charlotte, Mecklenburg Co. PD: Joshua's Farm	Abandon dairy farm with historical lead battery disposal operations. The approximately 1-acre parcel is adjacent to a 22-acre horse & animal farm area for the Joshua's Farm Operations. The site has a limited area with lead contamination in the surficial soils. PD intends to redevelop the area as a parking lot for the horse and animal farm operations.
MODEL LINEN PD: QUB Studios 120 West Lewis Street Greensboro, Guilford Co.	The site was used to manufacture wood stoves and has low levels of chlorinated solvents in the groundwater. The site will be redeveloped as a photographic studio and other commercial space.
NATIONAL TEXTILES Jamestown Road Morgantown, Burke Co. PD: National Textiles	Former textile manufacturing facility with chlorinated solvent contamination in soil and groundwater. The applicant PD intends to sell the site to an identified potential buyer for conversion and reuse as a furniture manufacturing facility.
NORTH HILLS MALL 4217 Six Forks Road Raleigh, Wake Co. PD: North Hills Mall Ownership Organization, LLC	This 31-acre site was originally developed in 1963, and was expanded into one of Raleigh's earliest enclosed malls. The site has known petroleum and chlorinated solvent contamination in soil and groundwater from auto gas and repair facilities and from an off-site drycleaner. DP intends to redevelop the site into a pedestrian friendly mixed-use retail, commercial and residential complex.
PADGETTE LANE PROPERTY 105 Padgette Lane Carrboro, Orange County PD: Downtown Urban Ventures, LLC	Less than 1-acre site with a 3,500 square foot former automobile repair shop. Contamination appears to be restricted to incidental housekeeping related releases from site activities. PD intends to redevelop the site for 55 residential condos and/or apartments for a total of 63,950 square feet with the intent to market students at UNC-Chapel Hill.
PARKER HANNIFIN 12415 Capitol Blvd. Wake Forest, Wake Co. PD: St. Ives 200 Commercial, LLC	A 33-acre former air control devices manufacturing facility with known trichloroethene contamination in soil and groundwater resulting from former wastewater treatment operations. PD intends to redevelop the site in mixed commercial, retail, and office space uses. Responsible party is currently undertaking assessment and remediation within RCRA and N.C. Hazardous Waste Section oversight.

PILLOWTEX PLANT 1 1 Lake Circle Drive Kannapolis, Rowan & Cabarrus Counties, NC PD: City of Kannapolis	A 158-acre site with 5.6 million square feet in 17 buildings. Closed/bankrupt textile manufacturing plant is available for purchase through bankruptcy court. The PD is working with SouthEast Developers to purchase and redevelop the property as a sports and entertainment complex, office space and other businesses. The City is working on submitting a bid to purchase the property through the bankruptcy court. Potential or known contamination at the site includes gas, diesel fuel, varsol, PAHs, acids, caustics, alcohols, maleic acid, formaldehyde, benzidine, naphthylamines, used oil, coal (PAHs, inorganics).
RADIATOR SPECIALTY 1900 Wilkinson Blvd. Charlotte, Mecklenburg Co. PD: Suttle Avenue, LLC	Idled automotive chemicals & hardware, and plumbing supplies manufacturing facility with volatile, semi-volatile, and metals contamination is site soil and groundwater. PD intends to redevelop the property into a major mixed-use office, retail, commercial, and multi-family residential development.
RESCO PRODUCTS 3514 West Wendover Avenue Greensboro, Guilford County PD: CarMax Auto Superstores, Inc.	1.943-acre tract that is currently on undeveloped portion of Resco Products. CarMax has adjacent property and intends to expand its operations by using this site as paved parking for its vehicles, allowing expansion of its rehabilitation activities on used cars on other portions of it's property (including cleaning, repairing and servicing used vehicles). This larger manufacturing operation will allow CarMax to expand its operations significantly in North Carolina creating 30-50 additional jobs at this site and allowing them to develop three to four new dealerships in the Triangle region of North Carolina, each employing approximately 125 people (total of 400-550 new jobs).
RUSAK PROPERTY 3004 Bank Street/ 3331 Griffith Street Charlotte, Mecklenburg Co. PD: Charlotte Mecklenburg Board of Education	A 1.21-acre parcel that is adjacent to the Marie G. Davis Middle School. The site is contaminated from historical operations as a metal plating facility. The PD intends to incorporate the adjacent parcels into the new middle school construction. The brownfields parcel will be the plaza entrance.
SALEM UNIFORM 4015 N. Cherry Street Winston-Salem, Forsyth County PD: Winston Weaver Co. Inc.	2.53-acre site that has been vacant for many years. Was leased out from 1967-83 to Salem Uniform and from 1983-86 to Cintus Corporation who purchased the assets for Salem Uniform. During a Limited Site Assessment for petroleum USTs, high levels of PCE were discovered, probably from dry cleaning solvents. PD is currently leasing space, but would like to improve it for use for fertilizer storage and other commercial usage.
FORMER SCHLAGE LOCK FACILITY 3551 North Wesleyan Blvd. Rocky Mount, Nash County PD: Community Resource Exchange	49.15 acre/196,000 square foot former manufacturing facility for lock/doorknob plating and assembly that used PCE as a degreasing solvent. Working with the Hazardous Waste Section as it site is a RCRA TSD post-closure facility with active voluntary GW remediation system (Ingersoll-Rand is RP). Chlorinated solvents (PCE, TCE, 1,2-DCE, toluene and acetone are main constituents of concern in both soil and groundwater. PD is non-profit organization who needs loan in order to make improvements to former manufacturing facility in order to provide tenant space for non-profit organizations such as the Red Cross, Habitat for Humanity, United way and the Division of Emergency Management. Also intend to develop outparcels for light industrial businesses and commercial/retail businesses.

SHELBY DYEING & FINISHING 1000 West Grover Street Shelby, Cleveland Co. PD: GMAC Commercial Credit, LLC	Former textile dyeing and finishing facility with solvent and metals contamination in soil and groundwater. Through its sale of the property to Environmental Fibers, PD intends to facilitate the redevelopment of the site as a cotton recycling facility, bringing the two site buildings back into productive use, and bringing jobs and tax base improvements to the community.
SHELBY WILLIAMS 401 Meacham Road Statesville, Iredell Co. PD: Lou Jay Associates, LLC	The 28-acre site is contains an idled furniture manufacturing facility with metals contamination in soil and groundwater from former plating operations conducted at the site. Applicant-PD intends to up-fit the facility for the production of high-end cabinetry and add an estimated 650 jobs in the next three years.
SOUTH BOULEVARD MGP Site 1424 South Boulevard Charlotte, Mecklenburg Co. PD: Summit Properties Partnership, L.P.	This former manufactured gas plant has limited residual PAH and BETX contamination. The PD intends to redevelop the site into a high-density, multi-family housing development or a mixed-use commercial and residential development.
SUTTON SHOPPING CENTER NW Corner of Walkup & Sutherland Ave Monroe, Union Co. PD: Whitley Commercial Properties	The site is an old run-down shopping strip center in the Monroe Area. The site has known soil and groundwater contamination from chlorinated solvents and gasoline constituents. PD intends to renovated the shopping center and expand the building area.
TAR HEEL LIFT 7055 Albert Pick Road Greensboro, Guilford Co. PD: Idlewild Grading Co., LLC	This 8-acre site contains a forklift sales, maintenance, and repair facility. The site has known environmental contamination from historic operations of the forklift facility. The site is currently underused, and PD intends to relocate and expand its grading business from Winston-Salem, NC to this brownfields property.
UNITY PLACE Multiple Parcels (~58) in and around Broad & Fourth Street Winston-Salem, Forsyth County PD: Unity Partners, LLC	A 15-acre property consists of former car dealership, gas station, printing business, dry cleaner, automotive repair shops, etc. Redevelopment plan is for a European-style town center that is mixed use, and will have include Krispy Kreme's headquarters, multi-screen and IMAX theatres, shops, town houses, office space and parking facilities. At this point known contamination consists of stoddard solvent/mineral spirits in groundwater and soil contaminated with hydraulic fluid.
V. F. Site 2831 Wilson Park Road Statesville, Iredell Co. PD: Statesville Partnership LLC	This former textile plant has chlorinated solvent contamination as a result of on site drycleaning operations. The PD plans to upgrade the property for light manufacturing or distribution facility.
WILSON LANDFILL 6700 Ward Boulevard Wilson, Wilson Co. PD: Dillon Properties, LLC	This underused 14-acre site was formerly occupied by a wastewater treatment facility owned and operated by the City of Wilson. The site has known metals contamination in groundwater. PD intends to redevelop in mixed commercial, warehousing, and residential uses.
YADKIN BRICK YARD 44052 Yadkin Brick Road New London, Stanly Co. PD: Numantec, LLC	Industrial sludges were stockpiled on the site, which led to soil and groundwater contamination, by petroleum products, VOCs and arsenic. The PD plans to reuse the facility to manufacture fertilizer from poultry litter.

PROJECTS PENDING ELIGIBILITY (8)

PD = Prospective Developer; RP = Responsible Party

ABBOTT LABORATORIES 16900 North U.S. Hwy 15/402 Bypass (Aberdeen Road) Laurinburg, Scotland Co. PD: Marketta LLC	50.75-acre site with three main structures totally approximate 300,000 square feet of space. Used by Abbott Laboratories from 1970-2002 for manufacture of medical devices (anesthesia kits, specialty intravenous injection sets). Trichloroethene and BTEX groundwater contamination. PD intends to use site for production and manufacture of skin care products, with anticipated creation of 250 new jobs. Currently awaiting additional information to determine eligibility.
ALLISON MANUFACTURING 930 Old Charlotte Road Albemarle, Stanly County PD: NCSC Properties, LLC	A18.93-acre parcel with a 120,000 square foot former manufacturing facility used in silk-screen production, fabric printing and knitting. PD needs loan in order to improve and repair facility and recruit additional tenants. Naphthalene, 1,1-DCD and PCE in soil; petroleum hydrocarbons and chlorinated solvents in groundwater.
CULTURAL ARTS CENTER 205 McDonald Street, and Old Braswell Library 344 Falls Road Rocky Mount, Nash County, NC PD: Imperial Centre Partners, LP	Former Imperial Tobacco Plant is 2.42 acres with140,000 square feet of floor space and Braswell Memorial Library is 4.93 acres with 16,000 square feet floor space. The PD owns the site and is working with City to finance and redevelop the site into the Rocky Mount Cultural Arts Center (RMCAC). The RMCAC will be the new home to the Children's Museum, the Arts Center and the Playhouse Theater, all of which were lost to major flood damage from the overflowing Tar River during Hurricane Floyd in September 1999. Contamination at the site includes gas, diesel, heating oil from USTs and #6 fuel oil from AST, lead, chlordane, asbestos.
FORMER DAYCO FACILITY Location: 2150 South Main Street Waynesville, Haywood County PD: Haywood Advancement Foundation	The site consists of 35.29 acres with existing buildings totaling 600,000 square feet plus a separate warehouse of 250,000 square feet. The facility was used for rubber hose manufacturing until it closed in 1997. The facility contained numerous ASTs and USTs, both soil and groundwater contamination exists on site. Contamination has been identified primarily as Toluene with some soil PAHs. Currently the ROR Group, a rubber manufacturer, occupies the Banbury building and the Haywood County Sheriff's office occupies a small office section. The majority of the facility is abandoned and in extremely poor condition. The Haywood Advancement Foundation is working with a potential developer to redevelop the property into a commercial property with retail stores.
GRIFFITH STREET PROPERTY 565 Griffith St. & 536 Jetton St. Davidson, Mecklenburg Co. PD: Five Six Five, LLC	Prior industrial operations resulted in soil and groundwater contamination by petroleum and VOCs. The PD plans to redevelop the facility as a charter school and as retail and commercial space.
MOSER-HALL Indian Trail, Union Co. PD: Moser-Hall, LLC	Property with petroleum hydrocarbon contamination in groundwater which has migrated onto the property. The source of the contamination was a release from a leaking underground storage tank system located on an adjoining parcel. PD intends to redevelop the site in commercial/retail use.

OLD WNC FAIRGROUNDS Location: Intersection of James Street and Mill Street East Flat Rock, Henderson County PD: Henderson County Public Schools	Project is former Western North Carolina Fairgrounds, it is currently vacant land, approximately 27 acres. The site was also used as training grounds for the Blue Ridge Fire Department. The training exercises led to soil contamination consisting of petroleum hydrocarbons in the training area. The PD intends to redevelop the property into an industrial park with the assistance of Henderson County Partnership for Economic Development.
PILLOWTEX WWTP West C Street & Glenn Ave. Kannapolis, Rowan PD: City of Kannapolis	A 118-acre abandoned Wastewater treatment facility for the Pillowtex Plant 1 property. It is owned by the bankrupt Pillowtex Corporation and is available for purchase. The Phase I ESA states that a pond on this property was used for alum sludge by the City of Kannapolis Water Treatment Plant. Thus, due to potential liability on part of PD, until a potential buyer is identified, there are no immediate plans for redevelopment of this property. PD is seeking viable buyers at this time.

FINALIZED BROWNFIELDS AGREEMENTS (47) EITHER IN FORCE OR PENDING SIGNATURE

PD = Prospective Developer; RP = Responsible Party

ALAMAC KNIT FABRIC Hamilton, Martin Co.	Former textile manufacturing facility with known soil and groundwater contamination involving chlorinated solvents. Site is undergoing active remediation under NC DWQ. Intended reuse is as a non-polluting school locker manufacturing facility that will employ some 350 workers.
ANCHOR MILL Huntersville, Mecklenburg Co.	Abandoned textile manufacturing facility with known metals contamination in soil, and lead, chlorinated solvent, and petroleum hydrocarbon contamination in groundwater. PD intends to redevelop the 32-acre site as a mixed-use transit village that reuses the old mill building and adds new office, retail, and residential components.
ARCHDALE MARKETPLACE Charlotte, Mecklenburg Co.	Approximately 13-acre parcel known as Archdale Marketplace Shopping Center. Groundwater is contaminated at the Property due to historical site operations by an A&P grocery store, Sno-White Cleaners, and K-mart auto service center. PD intends to redevelop the property for commercial and retail.
BALDOR ELECTRIC Charlotte, Mecklenburg Co.	Former electric motor and motor component assembly and manufacturing facility with solvent impacted soil and groundwater. PD intends to redevelop the property for use as industrial condominiums.
BROWN'S SOLVENT CO. Charlotte, Mecklenburg Co.	Former paint and solvent formulation facility with known solvent-impacted soil and groundwater. PD intends to initially renovate & reuse the existing structure for office/warehouse use, and ultimately raze the building and redevelop the site as a mixed office/retail complex in keeping with other redevelopment taking place in Charlotte's South End.

BURKHART CAROLINA Henderson, Vance Co.	Former pickle processing and packing facility with chloride impacted soil and groundwater and minor solvent contamination in groundwater. PD intends to redevelop the property for commercial retail use. Simultaneously, the responsible party will implement groundwater remediation at the site under separate action. The PD's development will provide an impervious cap on the site, further assisting remedial efforts.
BURLINGTON – JAMESTOWN Jamestown, Guilford Co.	A 22-acre site containing a abandoned chemical formulation facility operated in support of Burlington Industries textile manufacturing operations. Known chlorinated and petroleum hydrocarbon contamination exists in site soil and groundwater and is being addressed under a consent order with DENR. PD intends to redevelop the property as polyurethane and polyacrylate emulsions manufacturing facility.
BURLINGTON MILLS Mooresville, Iredell Co.	Abandoned textile manufacturing facility with known petroleum hydrocarbon contamination in soil and groundwater, and chlorinated solvent contamination in groundwater. PD intends to redevelop the site as an auto racing industry complex with office, flex, shop, and R&D space.
CAMDEN SQUARE Charlotte, Mecklenburg Co.	Abandoned Knitting and Printing Operations rebuilt into the "Design Center of the Carolinas". Development supported by the Wilmore Community as a vital redevelopment in an economically depressed area. Land Use restrictions for chlorinated solvents in groundwater.
CAMDEN SQUARE ADDITION Charlotte, Mecklenburg Co.	This project will add, by amendment, 4.5 acres to the first brownfields agreement completed in North Carolina, Camden Square, in Charlotte's South End redevelopment corridor. Contamination includes VOC- and SVOC-impacted soil and groundwater. Intended reuse is for mixed office and retail.
CAROLINA PRODUCTION FINISHING Asheville, Buncombe Co.	Former textile finishing facility with metals contamination in both soil and groundwater. PD intends to redevelop the site for warehousing and as a sewing operation. PD is in the process of reviewing DENR's draft brownfields agreement for this site.
CENTRAL PARK LANDFILL Winston-Salem, Forsyth Co.	Former municipal landfill for the City of Winston-Salem. Site is 7.23 acres in size, and has been used as a city park since the 1950s. Low levels of chlorinated solvents, with no surficial soil contamination. PD intends to redevelop the site for soccer and a softball field for the adjoining Salem Academy and College so their current fields can be used for additional building space. A passive methane collection system will be installed prior to installation of the recreational fields.
CHEROKEE OIL Charlotte, Mecklenburg Co.	Approximately 2-acre site was formerly a non-permitted hazardous waste storage facility and the site of an EPA removal action. Known arsenic, oil & grease, and solvent contamination exists in site soil and groundwater. PD intends to redevelop the property as a nightclub and parking facility.

CITY WEST COMMONS Charlotte, Mecklenburg Co.	Dilapidated shopping center seized in a drug raid by the U.S. Dept. of Justice that has been approved for transfer to the city of Charlotte. Site had VOC and chlorinated solvent contamination in soil and groundwater. The City intends transfer the property to a not-for-profit development corporation to redevelop the site as commercial retail shopping facility.
C.K. LAND DEVELOPMENT Charlotte, Mecklenburg Co.	A large mixed use development on a former industrial services firm adjacent to a manufactured gas plant. Ground floor retail and studio with Office and residential units above. Project is in vicinity of Camden Square and provides redevelopment to economically depressed area. Capping and land use restrictions regarding PAHs in soil and chlorinated solvents in soil and groundwater.
CUMBERLAND SHOPPING CENTER Greensboro, Guilford Co.	Site of former shopping center and dry cleaners with chlorinated solvent impacted soil and groundwater. PD is a not-for-profit community development corporation. The PD has performed soil remediation activities and intends to redevelop the site with affordable residential housing.
DYNATECH INDUSTRIES Charlotte, Mecklenburg Co.	Former plating facility with metals-impacted soil and groundwater. EPA conducted soil removal activities at the site and has classified it as NFRAP. PD intends to redevelop the property for use as mixed office/retail complex.
EAST GANNON PROPERTY Zebulon, Wake Co.	This property consists of four parcels of land totaling 1.75 acres with four exiting structures (former restaurant, current auto sales, auto service garage and hair salon). Site planned to be redeveloped into a stand-alone Eckerd Drug Store, with other surrounding complimentary retail tenants. Soil and groundwater are contaminated with petroleum constituents from above ground storage tanks used by previous gas station.
EAST PARK – BOYER 1607 & 1611 E. Fourth St. Charlotte, Mecklenburg Co. PD: Torrence Street Partners	Approximately 0.39-acre parcel that is a portion of the East Park Development Project, with known chlorinated solvent and gasoline contamination. PD intends to redevelop the site as a pedestrian urban infill multiple use development with commercial, residential, recreational and common open space. The site is part of the City of Charlotte's East Park re-development zone.
EAST PARK – JOAL REALTY Charlotte, Mecklenburg Co.	Part of the 24-acre site encompassing a six-block area with known chlorinated solvent contamination. PD intends to redevelop the site as a model for urban infill mixed use development with an emphasis on the needs of pedestrians in an urban setting. The site is part of the City of Charlotte's East Park re-development zone located between the CBD and the historic residential neighborhoods of Elizabeth and Myers Park.
EAST PARK – KOSSOVE Charlotte, Mecklenburg Co.	Part of the 24-acre site encompassing a six-block area with known chlorinated solvent contamination. PD intends to redevelop the site as a model for urban infill mixed use development with an emphasis on the needs of pedestrians in an urban setting. The site is part of the City of Charlotte's East Park re-development zone located between the CBD and the historic residential neighborhoods of Elizabeth and Myers Park.

ERWIN SQUARE Durham, Durham Co.	This approximately 6-acre property is a portion of a decommissioned former Burlington Industries site, other portions of which have already been redeveloped. There is known chlorinated solvent contamination in groundwater, and these impacts are being addressed under an approved Division of Water Quality corrective action plan. PD intends to redevelop the site in high-density residential use.
FLEMINGTON LANDFILL Wilmington, New Hanover Co.	Site of a closed (1979), privately operated domestic and industrial solid waste landfill with VOC-impacted soil and groundwater. Intended reuse is for a soccer complex. This is the first former landfill property proposed for redevelopment under the NC brownfields statute, and the project's feasibility and technical challenges are being carefully evaluated.
FOOD LION Winston-Salem, Forsyth Co.	A new large supermarket placed on the site of an abandoned grocery store in urban Winston-Salem. Project had strong community support as a quality of life issue as the community had no supermarket. Land use restrictions for chlorinated solvent contamination in groundwater. Brownfield Assessment determined the source to be nearby drycleaner.
GUILFORD MILLS Greensboro, Guilford Co.	A 55-acre site containing former textile manufacturing facility with known VOC contamination in soil and groundwater. PD intends to redevelop the property in mixed retail uses. Public benefits include the creation of an estimated 500 jobs and substantial tax roles increases.
HAMILTON PROPERTY Charlotte, Mecklenburg Co.	As small, dilapidated property bought for the expansion of Cost Effective Maintenance Inc., a small business in the South End area of Charlotte. Expansion into this property allowed CEM to stay in Charlotte instead of move to suburbs. Land use restrictions for chlorinated solvent contamination in groundwater.
HILLSBOROUGH VENTURES Raleigh, Wake Co.	Project involves redeveloping an area of parking lots and dilapidated, underused retail structures. Land use restrictions are in place for the petroleum hydrocarbon and chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the property as mixed residential (private student dormitory for N.C. State University) and retail complex.
HILLSBOROUGH VENTURES ADDITION Raleigh, Wake Co.	Prospective developer added acreage to the footprint of original Hillsborough Ventures project, which involves redeveloping an area of parking lots and dilapidated, underused retail structures adjacent to N.C. State University for mixed residential (private student dormitory) and retail uses.
HOME DEPOT – South Blvd. Charlotte, Mecklenburg County	A 12-acre site currently occupied by a produce grocer and office rental store (1 acre), parking (7 acres), abandoned plant nursery (1 acre); the rest is undeveloped. Operations at adjacent Academy Steel Drum (ASD) from 1947-69 included the disposal of wastes and sludge from drums into pits/lagoons. The location of the lagoons and overflow drainage is suspected to have been partially on subject property. After ASD burned in 1969 the property was thoroughly re-graded with contaminated soil moved around. Elevated concentrations of lead, chromium, and PCBs in soil along with lead, 2-chlorophenol, and trichloroethene. PD plans to lease property to Home Depot for construction of a new Home Depot home improvement retail store.

LEWITH TEXTILE Charlotte, Mecklenburg Co.	Project involves the redevelopment of 50+ acres of abandoned and underused commercial and industrial property, including the former Lewith Textile facility. Contaminants include Petroleum hydrocarbon and chlorinated solvents in soil and groundwater. PD intends to redevelop the site as an industrial park for light manufacturing and warehousing/distribution.
LUCENT TECHNOLOGIES Greensboro, Guilford Co.	Former cotton mill and manufacturing facility with chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site in mixed commercial retail/office and residential.
MALLARD CREEK Charlotte, Mecklenburg Co.	A 21-acre site adjacent to former auto service station and chainsaw service center operations. Petroleum hydrocarbon and chlorinated solvent contamination in groundwater, sourced from underground and aboveground storage tanks releases on the adjacent site, has migrated onto the subject property. PD intends to redevelop the property as an apartment complex.
OXFORD PRINTING Oxford, Granville Co.	Former textile printing and finishing facility with VOC contamination in groundwater. PD has conducted remediation of floor drain contents. PD intends to redevelop the site for industrial/distribution use.
PILOT MILLS Raleigh, Wake Co.	Abandoned, condemned turn-of-the-century textile mill in Downtown Raleigh redeveloped into office space and preserved on the National Register of Historic Places. Land use restrictions for chlorinated solvent in groundwater and capping of mercury in soils.
QUALITY METAL PRODUCTS Gastonia, Gaston Co.	This 11- acre site contains an abandoned facility of 48,000 square feet formerly used as for metal fabrication. Parts cleaning activities resulted in solvent impacts to site soil and groundwater. PD intends to refurbish the facility for metal fabrication utilizing high-tech, non-contaminating methods.
REDMAN HOMES Mebane, Orange Co.	Former mobile home manufacturing facility with metals and solvent contamination in soil and groundwater. PD has performed drum removal and soil remediation activities. PD intends to redevelop the site as a manufacturing facility to produce windows and doors.
SANFORD WWTP Sanford, Lee Co.	Former municipal wastewater treatment plant site with petroleum impacted sewer sludge and metals impacts in site soils and low concentrations of volatile and semi-volatile compounds in groundwater. PD intends to redevelop the property in commercial use, including restaurant, retail space and a multi-screen movie theater.
SINGER COMPANY Chocowinity, Beaufort Co.	Abandoned rural manufacturing facility with lead and phthalate contamination in soil and groundwater. The brownfields agreement provides for partial site remediation. PD intends to redevelop the site with mixed retail and light industrial uses.
SMITH METAL & IRON Charlotte, Mecklenburg Co.	Former site of a scrap metal yard and of a waste cell created for the temporary disposal of impacted soil removed during the construction of the adjoining Carolina Panther's practice field. The waste in the cell has been removed, and minor chlorinated solvent impacts remain in site groundwater. PD intends to redevelop the site in high density residential with additional office, entertainment, and retail potential.

SMITH PROPERTY Shelby, Cleveland Co.	Project involves the redevelopment of an area occupied by seven underused and dilapidated residential homes with petroleum hydrocarbon and chlorinated solvent contamination in groundwater. PD has the support of local residents to reuse the site as a parking lot serving the Cleveland County Offices.
SOUTH TRYON STREET Charlotte, Mecklenburg Co.	A 2.88-acre parcel near historic SouthEnd. PD intends to redevelop the property for commercial purposes such as office and showroom condominiums. Groundwater is contaminated at the Property due to historical site operations as industrial/warehouse storage.
SOUTHERN MANUFACTURING Charlotte, Mecklenburg Co.	This 9-acre site located in inner Charlotte was a former asbestos tile manufacturing facility. Operations involving asbestos were discontinued in 1986, and the facility was closed in 1999. The site has known asbestos contamination in soils. Intended reuse of the site includes an outdoor amphitheater, a technical business park, or a mixed-use development with industrial, commercial, and residential components.
STATE FARM ROAD Boone, Watauga Co.	Project involves the redevelopment of property occupied by a rural residence with chlorinated solvent contamination in groundwater and in a spring from an off-site source. PD intends to redevelop the site as a medical office complex.
TARTAN MARINE Hamlet, Richmond Co.	Former boat manufacturing facility with lead contamination in soil. Additional site sampling conducted by the PD has shown previous soil removal actions have left no health-based lead problems. PD intends to redevelop the site as a chair and table base manufacturing facility.
TERRELL MACHINE Charlotte, Mecklenburg Co.	Site of former textile manufacturing and gear box machining operations, property in Charlotte's South End district is being redeveloped with ground floor retail and office/residential above. Remedial actions to eliminate hot spot contamination included soil removal and groundwater pump and treat. Land use restrictions are in place to address chlorinated solvent contamination remaining in groundwater.
VANIER GRAPHICS Eden, Rockingham Co.	Former printing facility with petroleum and chlorinated hydrocarbon contamination in the soil and solvent contamination in the groundwater. PD intends to redevelop the site as a furniture assembly and upholstering facility.
WEST MOREHEAD Charlotte, Mecklenburg Co.	Former automobile repair and maintenance facility with chlorinated solvent contamination in soil and groundwater. PD intends to redevelop the site, to include both facility renovation and new construction for use as commercial office/retail.

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

September 16, 2004

MEMORANDUM

TO: ERC Co-Chairs: Senators Albertson and Clodfelter
Representatives Gibson and McComas

FROM: William G. Ross, Jr.

SUBJECT: The Dry-Cleaning Solvent Cleanup Act Program – 2004 Annual Report

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In 1997 the North Carolina General Assembly enacted the Dry-Cleaning Solvent Cleanup Act to address contamination at current and former dry-cleaning facilities and wholesale distribution facilities that store, distribute and sell dry-cleaning solvents. This legislation requires annual reporting to the Environmental Review Commission. Thirty-five copies of the 2004 annual status report are enclosed.

Should you have any questions, please feel free to call either myself or Jack Butler, Chief, Superfund Section, Division of Waste Management at 733-2801, ext. 293.

Attachment

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Annual Report to the Environmental Review Commission North Carolina General Assembly

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The Dry-Cleaning Solvent Cleanup Act Program

October 2004

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

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DRY-CLEANING SOLVENT CLEANUP ACT ANNUAL REPORT

Executive Summary

As required by the Dry-Cleaning Solvent Cleanup Act (DSCA) of 1997 and amendments (G.S. 143-215.104A *et seq.*), this report provides an annual update on activities conducted in the DSCA Program in 2004. The DSCA of 1997 and its amendments created a fund for assessment and cleanup of drycleaning solvent environmental contamination at dry-cleaning and wholesale distribution facilities.

Significant progress has been made in all aspects of program implementation. Areas of program development showing the most progress are Prioritization Assessment Agreements, Assessment and Remediation Agreements, work authorizations, Prioritization Assessments, priority ranking, contracting, guidance development, database development and outreach.

The Department of Environment and Natural Resources (DENR) has identified 169 operating or abandoned drycleaning facilities with environmental contamination by drycleaning solvent. Of these, 99 have voluntarily petitioned for acceptance, and 95 have been certified into the DSCA Program. Prioritization Assessment Agreements have been executed for 79 sites and 44 sites have been prioritized.

The majority of claims against the Fund to date have been for "past costs." The DSCA Program is authorized to reimburse petitioners for reasonable, necessary and documented costs incurred between October 1997 and June 2001 in certain situations. Petitioners have submitted past cost reimbursement claims for 13 sites totaling $2,612,290. Previously, the DSCA Program could only reimburse up to 10 percent of the previous fiscal year's revenue credited toward the Fund. However, on July 1, 2004 Senate Bill 1219 was signed into law by the Governor increasing the percentage that could be used for past cost claims from 10 percent to 25 percent. This also allows the DSCA Program to reimburse up to $200,000 per site during FY 2004-05 for all eligible costs from past cost claims. Eligible costs above $200,000 will be reimbursed during FY 2005-06. Reimbursement of these claims commenced during May 2004 beginning with sites of highest priority.

With the infusion of the sales tax monies, which began in July 2003, DSCA now appears to have sufficient financial resources to assess and clean up the contaminated drycleaning facilities identified to date by DENR. New discoveries will continue to be reported, largely due to property transactions. However, with 17 new sites reported in 2004, if the rate of discovery remains steady, the influx of new sites into the program should not overwhelm the DSCA Fund.

Program Status

The DENR has made significant progress in implementing the DSCA. DENR has solicited input from members of the DSCA Stakeholders Working Group (DSCA Stakeholders) and other interested parties to develop new policies and procedures. Participants in the DSCA Stakeholders include the following:

- DENR representatives and its attorneys from the Department of Justice,
- Drycleaners from leadership of the North Carolina Association of Launderers and Cleaners,
- Environmental consultants,
- Representatives from environmental advocacy organizations,
- Drycleaners using alternative dry-cleaning technologies,
- North Carolina State University's School of Textiles faculty, and
- Private attorneys representing drycleaners and shopping centers.

A summary of DSCA program site status is provided in Table 1. Specific areas of discussion include program development, risk-based rule development, reimbursement of past-cost claims, state-lead contracts, Assessment and Remediation Agreements, Prioritization Assessment Agreements, prioritization assessments, prioritization of sites, database development and outreach.

Table 1. DSCA Program Site Status

Step 1. The drycleaner or property owner petitions DENR for certification.	To date, 99 sites have petitioned for entry into the Program. The main motivating factors for petitioning have been real estate transactions and redevelopment.
Step 2. DENR certifies the site and checks for imminent threats.	Of the 99 sites that have petitioned, 95 sites have been certified into the Program. The four sites that have not yet been certified are currently under review. Each petition is reviewed for imminent threats to human health and the environment. Drinking water sources have been identified in proximity to several sites. Evaluation of potential imminent threats has been expedited for these sites.
Step 3. The drycleaner signs an assessment agreement with DENR.	The Prioritization Assessment Agreement (PAA) is a legally binding agreement between DENR and the petitioner that commits the Petitioner to conduct a prioritization assessment (PA) at the site. DSCA has executed 79 PAAs. Beginning in September 2004, the PAA will be replaced by an Assessment and Remediation Agreement that covers all phases of work at a site including the prioritization assessment. All work done under these agreements will be performed by environmental contractors hired by DENR.

Step 4. The drycleaner conducts a prioritization assessment.	Following execution of the PAA, petitioners have 30 days to submit a detailed PA work plan and corresponding cost proposal to DSCA for approval. To date, 73 PA proposals have been negotiated and approved. Beginning in September 2004, all new prioritization assessments will be performed by environmental contractors hired by DENR. Petitioners will be billed by DSCA for site deductible costs after the costs have been incurred.
Step 5. DENR ranks the site and checks again for imminent threats.	Information collected during the PA is used by DSCA to rank each site in terms of risk to human health and the environment. The DSCA Prioritization Ranking System and supporting database application were developed to efficiently assign priority ranking scores to sites. To date, 44 sites have been prioritized.
Step 6. DENR contracts for comprehensive assessment and cleanup.	In August 2004, DENR executed contracts with four state-lead environmental contractors to perform site assessment and remediation. These four firms have been granted three-year contracts totaling $2.4 million. Following execution of the Assessment and Remediation Agreements with the petitioners beginning in September 2004, all DSCA assessment and remediation work will be performed by these state-lead contractors.

Program Development

The primary objective of DSCA in 2004 was to continue working toward full implementation of the program. To attain this goal, DSCA staff directed significant energy towards the development of supporting policies, procedures, and guidance. To reduce resource consumption and optimize customer service, DSCA uses its web site (www.ncdsca.org) and e-mail as the primary means to deliver program documents to its customers. As in the previous year, DSCA staff continued reviewing petitions, determining site eligibility, executing prioritization assessment agreements, screening sites for imminent hazards, supply well sampling and prioritizing sites.

Specifically, progress was achieved in the following areas:

- Risk-Based Rule Development
- Past-Cost Reimbursement
- State-Lead Contracts
- Assessment and Remediation Agreement
- Prioritization Assessment Agreements
- Prioritization Assessments
- Prioritization of Sites
- Database Application
- Outreach

Risk-Based Rule Development

DENR has been delegated the task of developing rules that establish a risk-based approach to assess, prioritize and clean up dry-cleaning solvent contamination that resulted from releases at certified facilities or abandoned sites. During the past year, the DSCA Program has evaluated risk-based programs that have been established in other states. It was discovered that many states have hired independent consultants who specialize in risk analysis and training to help the states develop their rules and implementation guidance. These consultants also develop customized spreadsheets that perform the risk calculations necessary to determine site-specific, risk-based cleanup levels. By hiring a risk consultant to assist in rulemaking, the DSCA Program would benefit from the expertise and authority of experienced professionals who have performed this work for other regulatory agencies. The DSCA Program intends to solicit bids through DENR's Purchase and Services Section in October 2004 to hire a firm to assist in rulemaking and guidance development. Once a contract is executed (presumably in November 2004), development of draft rules will commence.

A small subgroup consisting of select members from the DSCA Stakeholder Working Group was formed to review and comment on draft rules and related documents as they are developed. Individuals selected for the subgroup represent a cross-section of interested parties (dry-cleaners, consultants, attorneys, property owners and university faculty).

Past-Cost Reimbursement

The majority of claims against the Fund to date have been for "past costs." The DSCA Program is authorized to reimburse petitioners for reasonable, necessary and documented costs incurred between October 1997 and June 2001 in certain situations. Petitioners have submitted past cost reimbursement claims for 13 sites totaling $2,612,290. After subtracting the required $50,000 deductible for each site, a total of $1.96 million could potentially be reimbursed for all necessary and reasonable costs pursuant to Section 2.(a) of House Bill 1062 (Session Law 2001-265).

Previously, the DSCA Program could only reimburse up to 10 percent of the previous fiscal year's revenue credited toward the Fund. In FY 2002-03, $1.08 million was credited toward the Fund. Pursuant to House Bill 1062, the total amount that could be reimbursed during FY 2003-04 was $108,000 (ten percent of the previous year's revenue). This amount was reimbursed to the highest prioritized site in May 2004.

On July 1, 2004, Senate Bill 1219 was signed into law by the Governor increasing the percentage that could be used for past cost claims from 10 percent to 25 percent. This bill also allows the DSCA Program to reimburse up to $200,000 per site during FY 2004-05 for all eligible costs from past cost claims. Eligible costs above $200,000 per site will be reimbursed during FY 2005-06. Reimbursement of these claims commenced during July 2004 beginning with sites of highest priority.

State-Lead Contracts

In July 2004, DENR executed contracts with four environmental engineering firms to perform state-lead assessment and remediation at DSCA sites. The contracts total $2.4 million with a term of three years. These contractors will begin performing prioritization assessments for new sites and comprehensive assessments for higher priority sites in September 2004.

Assessment and Remediation Agreement

An Assessment and Remediation Agreement that will be executed by the DSCA Program and petitioners for certified sites was developed during 2004 and is currently under final review. This agreement will encompass all phases of site work (prioritization and comprehensive assessments and remedial action) and will allow DSCA to direct all work using its state-lead contractors. These agreements will be issued to petitioners in September 2004.

Prioritization Assessment Agreements

As stated above, Prioritization Assessment Agreements (PAAs) will be phased out beginning in September 2004 and will be replaced by Assessment and Remediation Agreements. During the past year, eight PAAs were executed. Co-petitioner PAAs were also executed for sites that have more than one petitioner. The co-petitioners then receive the same liability protection as granted to the primary petitioner with respect to the assessment and remediation of the site.

Prioritization Assessments

Work plans are required by the DSCA Program from environmental contractors that propose to conduct work at certified dry-cleaning contamination sites. If the work is authorized by the DSCA project manager, the cost of the work is eligible for application toward the site deductible or for reimbursement from the Trust Fund if the deductible has been met.

The majority of work approved during 2004 was site prioritization assessments. This is the first phase of work performed following site certification. To date site prioritization has been the responsibility of the petitioner. The PAA requires that the petitioner contract an environmental consultant to perform a prioritization assessment within 30 days of executing this agreement. DSCA staff reviewed and approved proposals for work at 50 sites in 2004.

At this phase of program development, it is critical that the review process focuses on continuity and consistency in terms of work plan scope and work plan costing. This is being achieved using a multi-phased approach. Each DSCA project manager reviews work plans for cost effectiveness and technical soundness. The DSCA program manager

is then responsible for the final review and approval of each authorized work plan. This ensures consistency between project managers and individual projects.

As previously stated, beginning in September 2004 all work at DSCA sites will be assigned to the four state-lead contractors. For sites that had been issued a PAA prior to this date, DSCA will allow the petitioner to hire their own environmental contractor to perform the prioritization assessment. In order to accommodate the added prioritization work as well as comprehensive assessments, DSCA may solicit bids for additional state-lead contractors as early as October 2004.

A prioritization assessment guidance document that details the necessary scope for this work phase is currently under final review and should be released in September 2004. A standard reporting format for prioritization assessments is also under development and is anticipated to be released by November 2004.

Prioritization of Sites

Environmental contractors are required to report their prioritization assessment findings in a Prioritization Assessment Report (PAR) and also to complete a prioritization ranking form (PRF). DSCA uses the PRF to assign a numeric ranking score to each site. Currently, 44 sites have been ranked. The numeric ranking score assigned to each site allowed DSCA staff to categorize the site as either "higher" or "lower" priority. This prioritization is required by statute so that available funds are obligated to higher priority sites first.

After review of completed prioritization scores, DSCA staff concluded that these rankings did not in all cases accurately reflect the specific risk posed to potential receptors at the sites. As a result, DSCA developed a new priority scoring system that was based on the threat of contamination to nearby receptors such as supply wells and surface water. The new scoring system assigns a score that corresponds to the specific receptor that is being threatened. For example, a score of "1.2" indicates that "an active domestic drinking water supply well is impacted or immediately threatened by the release and that the user has no access to another public or private water supply." DSCA staff can immediately know what actual or potential hazard exists at a site based simply on its score. If multiple sites are assigned the same score, then DSCA staff evaluate other factors such as magnitude of contamination in determining priority order. All 44 prioritized sites have been re-evaluated using the new prioritization system and the sites have been ordered in terms of priority. The DSCA staff will present the results of the new prioritization system to the DSCA Stakeholders in September 2004.

Database Application

The DSCA Program has invested significant time and effort to develop and refine its database/GIS application. Rapid application development techniques have been used to ensure its ability to manage data is flexible and can grow with the program. Technical and financial information has been entered into the database. The programmatic tracking

and reporting applications are frequently revised to respond to changing information management needs.

Major improvements in 2004 focused on refining the database so that it could track project account details. Reporting capabilities include project status, planned site actions, site deductibles, costs applied toward the deductible, past cost reimbursements, invoices, payments, work authorized on a per cost basis and change orders.

Outreach

DENR continues its outreach efforts to educate drycleaners about the Minimum Management Practices Rules (15A NCAC 2S) and DSCA procedures and policies. DSCA staff have spoken at North Carolina Association of Launderers and Cleaners (NCALC) and local Korean drycleaners association meetings. DSCA has published several articles in the NCALC newsletters in an effort to reach all drycleaners in North Carolina. Outreach efforts have also been made to shopping mall owners, environmental service providers and the legal community.

To improve outreach to Korean drycleaners, in September 2004 DSCA will secure the services of a Korean graduate student from Duke University to serve as an intern for the DSCA Program. This intern, Mr. YongJin Kim, will be totally funded by the Korean Government though Duke's International Development Policy Program. Mr. Kim has been employed for the past 20 years with the Korean Ministry of Environment. Mr. Kim will work on developing guidance for both minimum management practices and the DSCA cleanup program for the Korean community. He is expected to start work on September 1, 2004. His internship will end on May 31, 2005.

DSCA also uses its web address, www.ncdsca.org, to provide programmatic information, guidance documents, applicable laws, rules and downloadable forms to assist the public and the regulated community.

Finally, DSCA has continued its association with dry-cleaning programs in other states through its participation in the State Coalition for the Remediation of Drycleaners. This work group is sponsored by the EPA's Technology Innovation Office. DSCA has benefited greatly from this organization by learning from the experiences of other states.

Annual Report Elements Required by G.S. 143-215.104U

(1) DRY-CLEANING SOLVENT CONTAMINATION REPORTED TO THE DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

DSCA maintains files and a database inventory of 169 sites that are contaminated by dry-cleaning solvent. This number represents all dry-cleaning solvent releases known to DENR, assuming other agencies have forwarded notices of release to DSCA. However, it has been estimated that over 900 contaminated current or former dry-cleaning sites exist in North Carolina. Table 2 provides a list, by county, of all sites contaminated with dry cleaning solvent. A total of 17 new dry-cleaning solvent releases were reported to DSCA in 2004. The new reports appear to have resulted from real estate transactions and redevelopment projects.

(2) SITES CERTIFIED BY THE COMMISSION

DSCA must review a petition and the site file to determine if the site and the petitioner meet the statutory criteria for certification into the Program. Of the 99 sites that have petitioned for Program entry, 95 have been certified into the Program. The four sites that have not yet been certified are newly received petitions that are currently under review. The certified sites, along with the dates of certification, are shown in Table 2.

Table 2. Sites with Drycleaning Solvent Contamination

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
ALAMANCE COUNTY (2)					
001-0001	DELUXE CLEANERS AND LAUNDRY				
001-0002	WORKMAN PROPERTY				
BRUNSWICK COUNTY (2)					
010-0001	TOWN GATE CLEANERS	7/25/2001	1/10/2002	10/11/2002	3/2/2004
010-0002	LOVE CLEANERS, INC.	10/20/2002	10/30/2002	11/20/2002	9/9/2003
BUNCOMBE COUNTY (2)					
011-0001	SWANNANOA LAUNDRY	8/31/2001	11/2/2001	3/25/2003	11/14/2003
011-0002	QUORUM KNITTING	2/11/2004			
BURKE COUNTY (1)					
012-0001	FERREE CLEANERS	8/22/2003			
CABARRUS COUNTY (1)					
013-0001	FULLER SUPPLY COMPANY	11/1/2002	12/17/2002	5/7/2003	
CARTERET COUNTY (1)					
016-0001	COASTAL DRY CLEANERS	7/24/2002	7/18/2002	4/21/2003	
CLEVELAND COUNTY (1)					
023-0001	FOLKS DRY CLEANERS	1/2/2002	2/6/2002	1/30/2003	6/19/2003
CUMBERLAND COUNTY (4)					
026-0001	MAYFLOWER LAUNDRY AND DRY CLEANING	6/28/2002	9/16/2002	12/19/2002	5/3/2004
026-0002	EASY WASH DRY CLEANERS				
026-0003	SMITTYS CLEANERS				
026-0004	KORE-O-MAT LAUNDROMAT	3/27/2002	5/15/2002	4/2/2003	
DARE COUNTY (1)					
028-0001	SPEEDY WASH				
DAVIE COUNTY (1)					
030-0001	FALLIES DRY CLEANING				
DURHAM COUNTY (8)					
032-0001	ONE HOUR KORETIZING				
032-0002	PLANTS UNLIMITED				
032-0003	TRIANGLE SQUARE CLEANERS	8/16/2001	1/10/2002	3/17/2003	
032-0004	EAKES CLEANERS				
032-0005	AMERICAN DRY CLEANERS	6/28/2002	9/26/2002	5/30/2003	
032-0006	AMERICAN DRYCLEANERS				
032-0007	MODEL LAUNDRY	4/26/2004	4/26/2004		
032-0008	W.P. BALLARD	11/5/2001	1/23/2002	10/24/2002	2/2/2004

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
FORSYTH COUNTY (14)					
034-0001	CAMEL CITY CLEANERS				
034-0002	SHORES CLEANERS				
034-0003	A CLEANER WORLD				
034-0004	HOOKER FURNITURE				
034-0005	KLEAN RITE CLEANERS				
034-0006	YOUNG CLEANERS				
034-0007	CAMELOT CLEANERS	6/28/2002	9/23/2002	4/1/2003	
034-0008	HOUR GLASS CLEANERS	6/17/2002	8/15/2002	10/11/2002	3/23/2004
034-0009	SMITH DRY CLEANERS	12/17/2003	12/17/2002	6/29/2004	
034-0010	C AND S CLEANING SERVICES				
034-0011	CAMELOT CLEANERS	3/25/2002	5/14/2002	12/10/2002	3/11/2003
034-0012	A CLEANER WORLD	5/19/2004	5/24/2004		
034-0013	A CLEANER WORLD #161, PEACE HAVEN	7/9/2004	7/20/2004		
034-0014	CAMEL CITY CLEANERS - REYNOLDA ROAD				
GASTON COUNTY (3)					
036-0001	UNTZ DRYCLEANERS - NPL SITE				
036-0002	CARSONS DRYCLEANERS				
036-0003	DE-LUX CLEANERS	5/3/2004			
GRANVILLE COUNTY (1)					
039-0001	OXFORD DRY CLEANERS				
GUILFORD COUNTY (18)					
041-0001	CLEANER IMAGE	10/16/2002	12/16/2002	1/7/2004	
041-0002	CINDERELLA CLEANERS				
041-0003	U.S. $1.75 CLEANERS	2/17/2004	2/17/2004	3/12/2004	6/22/2004
041-0004	COLUMBIA LAUNDRY CORP				
041-0005	DUTCH CLEANERS				
041-0006	EASTGATE CLEANERS	11/8/2002	9/3/2002	12/16/2002	5/3/2004
041-0007	MASTER KLEEN	6/26/2002	10/25/2002	2/21/2003	9/17/2003
041-0008	A CLEANER WORLD	6/24/2002	11/4/2002	3/26/2003	2/5/2004
041-0009	EVERHART DRY CLEANERS	11/30/2001	12/6/2001	1/6/2003	6/9/2003
041-0010	GLAM-O-RAMA				
041-0011	O HENRY CLEANERS				
041-0012	STOKESDALE FIRE DEPARTMENT				
041-0013	BANNER LAUNDRY				
041-0014	MASTER KLEEN CLEANERS	7/6/2001	12/6/2001	11/18/2002	10/16/2003
041-0015	A CLEANER WORLD				
041-0016	$2.50 PRO CLEANERS				
041-0017	PREMIER CLEANERS	4/24/2003	6/6/2003	6/24/2003	
041-0018	DRY CLEAN AMERICA	2/27/2003	3/24/2003	4/16/2003	

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
HENDERSON COUNTY (2)					
045-0001	BLUE RIDGE CLEANERS				
045-0002	VILLAGE ONE HOUR CLEANERS	10/18/2001	9/19/2002		
IREDELL COUNTY (3)					
049-0001	SMITHS DRY CLEANERS				
049-0002	JOHNSON CLEANERS, INC.	1/14/2002	1/25/2002	8/5/2003	
049-0003	BROOKDALE CLEANERS	1/12/2004	1/15/2004	1/31/2004	
LENOIR COUNTY (1)					
054-0001	VICKS CLEANERS	8/16/2004	8/17/2004		
LINCOLN COUNTY (1)					
055-0001	LINCOLN CLEANERS	1/9/2002	7/17/2002	11/26/2002	
MARTIN COUNTY (1)					
059-0001	WILLIFORD CLEANERS				
MCDOWELL COUNTY (1)					
056-0001	NICHOLS LAUNDRY AND DRY CLEANING				
MECKLENBURG COUNTY (33)					
060-0001	A CLEANER WORLD				
060-0002	AMERICAN DRY CLEANER				
060-0003	CROSSROADS DRY CLEANERS				
060-0004	MINUTE MAN CLEANERS	5/10/2002	6/13/2002	1/6/2003	6/11/2003
060-0005	MITCHELLS FORMAL WEAR WAREHOUSE	6/28/2002	10/1/2002	2/10/2003	8/13/2003
060-0006	PEOPLES CLEANERS				
060-0007	QUAIL DRY CLEANERS	3/25/2003	4/24/2003	8/5/2003	5/20/2004
060-0008	SNO-WHITE CLEANERS AND LAUNDERERS	6/28/2002	9/26/2002	6/9/2003	
060-0009	SPRINGFRESH CLEANER				
060-0010	BOGGS AND COMPANY	2/17/2004	12/2/2002	3/12/2004	8/28/2003
060-0011	SNO-WHITE CLEANERS	6/28/2002	10/25/2002	5/30/2003	
060-0012	DOMESTIC LAUNDRY	2/11/2002	2/21/2002	4/1/2003	
060-0013	CUNNINGHAM CLEANERS				
060-0014	ONE PRICE DRYCLEANING	3/27/2002	4/26/2002	1/6/2003	
060-0015	CARRIAGE FINE DRY CLEANING				
060-0016	60 MINUTE CLEANERS	7/1/2002	1/30/2003		
060-0017	GATEWAY VILLAGE DEVELOPMENT				
060-0018	SUDS N DUDS				
060-0019	CUNNINGHAM CLEANERS				
060-0020	HOME DEPOT				
060-0021	HEARTS DRY CLEANERS	8/29/2002	10/25/2002	6/9/2003	
060-0022	RAINBOW CLEANERS				
060-0023	PRESTOWN LAUNDRY AND CLEANERS	8/16/2001	12/6/2001	2/21/2003	
060-0024	60 MINUTE CLEANERS	10/8/2001	12/21/2001	12/16/2002	
060-0025	HO CLEANERS	10/3/2001	12/11/2001	12/16/2002	2/3/2004
060-0026	SNO-WHITE CLEANERS	1/25/2002	4/26/2002	12/19/2002	10/1/2003
060-0027	CHARLIE BROWNS DRY CLEANERS				

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
MECKLENBURG COUNTY (cont.)					
060-0028	SHARON CLEANERS	3/15/2002	7/2/2002	4/8/2003	
060-0029	ABRA COSTUMES	4/29/2003	5/6/2003	5/14/2003	6/4/2003
060-0030	VILLAGE CLEANERS	6/11/2003	7/14/2003	7/23/2003	
060-0031	SNO-WHITE CLEANERS	8/26/2003	3/10/2004	4/30/2004	
060-0032	EASTWAY QUICK CLEAN SERVICE	2/16/2004	2/23/2004	3/9/2004	4/7/2004
060-0033	JONES DRY CLEANERS				
MOORE COUNTY (4)					
063-0001	PINEHURST HOTEL CLEANERS	8/24/2001	12/21/2001	1/7/2003	
063-0002	CARTERS FABRICARE				
063-0003	CARTERS LAUNDRY AND CLEANING	3/25/2002	5/7/2002		
063-0004	SOAPY BUBBLES	8/30/2002	9/24/2002	12/16/2002	
NASH COUNTY (2)					
064-0001	CLEAN-CLEAN DRY CLEANERS				
064-0002	CLEAN-CLEAN DRY CLEANERS				
NEW HANOVER COUNTY (5)					
065-0001	MODERN DRY CLEANERS AND LAUNDRY	1/3/2003	6/9/2003		
065-0002	COASTAL DRY CLEANERS	6/26/2002	11/8/2002	2/7/2003	
065-0003	COASTAL DRY CLEANERS AND COIN LAUNDRY				
065-0004	COASTAL DRY CLEANERS	6/28/2002	11/8/2002	2/12/2003	
065-0005	WILLIAMS CLEANERS	12/7/2001	12/17/2001	2/12/2003	1/22/2004
ONSLOW COUNTY (5)					
067-0001	ABC ONE HOUR CLEANERS - NPL				
067-0002	SOUTHERN CLEANERS AND LAUNDRY	12/20/2001	5/2/2002	11/14/2002	6/11/2003
067-0003	COASTAL DRY CLEANERS				
067-0004	COASTAL DRY CLEANERS				
067-0005	VILLAGE CLEANERS	5/21/2002	6/24/2002	11/18/2002	6/22/2004
ORANGE COUNTY (4)					
068-0001	KSP CLEANERS	10/19/2001	2/6/2002	3/25/2003	6/5/2003
068-0002	AMERICAN DRY CLEANERS				
068-0003	DELUXE CLEANERS	6/10/2003	7/11/2003	9/23/2003	
068-0004	SCOTT AND ROBERTS DRY CLEANERS	6/3/2004	8/9/2004		
PASQUOTANK COUNTY (1)					
070-0001	SOUTHGATE KORETIZING	5/6/2002	6/14/2002	2/12/2003	6/23/2003
PITT COUNTY (5)					
074-0001	KORETIZING CLEANERS				
074-0002	AYDEN PLAZA				
074-0003	BETTER LOOK GARMENT CARE				
074-0004	BOWENS CLEANERS	11/5/2003	8/28/2003	12/18/2003	
074-0005	BOWEN CLEANERS	7/21/2003			
POLK COUNTY (1)					
075-0001	BROCKS CLEANERS	10/22/2001	1/28/2002	2/27/2003	
RANDOLPH COUNTY (1)					
076-0001	HILLSIDE LAUNDROMAT				

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
ROBESON COUNTY (1)					
078-0001	STEVENS DRY CLEANERS				
ROWAN COUNTY (2)					
080-0001	SHUPING CLEANERS	12/17/2002	1/10/2002	5/6/2003	1/8/2004
080-0002	AVALON CLEANERS				
RUTHERFORD COUNTY (1)					
081-0001	CONE MILLS				
SURRY COUNTY (1)					
086-0001	MODERN LAUNDRY AND DRY CLEANERS	7/22/2002	9/16/2002	11/18/2002	11/10/2003
WAKE COUNTY (28)					
092-0001	PRO CLEANERS	8/17/2001	12/13/2001	11/20/2002	
092-0002	SHERRILLS DRY CLEANERS				
092-0003	RAINBOW CLEANERS AND LAUNDRY	6/28/2002	9/26/2002	5/30/2003	
092-0004	MEDLIN-DAVIS CLEANERS	4/22/2003	4/29/2003	5/14/2003	
092-0005	DJ CLEANERS	8/12/2003	8/14/2003	9/2/2003	
092-0006	HILKERS CLEANERS	3/21/2002	6/12/2002	2/27/2003	
092-0007	BROTHERS CLEANERS	12/7/2001	1/23/2002	7/10/2003	
092-0008	JOHNSONS DRY CLEANERS	1/10/2002	5/6/2002	4/2/2003	1/14/2004
092-0009	KNIGHTDALE CLEANERS				
092-0010	FULLER SUPPLY COMPANY	2/2/2004	2/11/2004		
092-0011	MEDLIN-DAVIS CLEANERS	11/21/2001	2/6/2002	7/3/2003	6/2/2004
092-0012	NEWTONS CLEANERS	6/28/2002	12/12/2001	8/14/2003	1/20/2004
092-0013	MEDLIN-DAVIS CLEANERS	6/28/2002	12/12/2001	8/14/2003	1/20/2004
092-0014	GLAM-O-RAMA CLEANERS	2/12/2002	2/27/2002		
092-0015	EMPORIUM CLEANERS	2/20/2002	3/28/2002	10/24/2002	10/10/2003
092-0016	NEW HOPE CLEANERS AND TAILORS	4/8/2002	5/17/2002	3/31/2003	
092-0017	BROTHERS CLEANERS	8/23/2002	9/12/2002	11/7/2002	10/7/2003
092-0018	ACE DRY CLEANERS	6/28/2002	1/30/2003	2/27/2003	6/24/2004
092-0019	SANITARY LAUNDRY	8/9/2002	10/8/2002		
092-0020	SHERRILL'S DRY CLEANING AND LAUNDRY	3/13/2003	4/7/2003	4/24/2003	
092-0021	T AND J CLEANERS	3/31/2003	4/22/2003	6/19/2003	5/28/2004
092-0022	MEDLIN DAVIS CLEANERS	4/2/2003	4/21/2003	5/14/2003	3/4/2004
092-0023	POPES DRY CLEANERS		9/24/2003		
092-0024	PLEASANT VALLEY CLEANERS	2/2/2004	4/7/2004	8/11/2004	
092-0025	HILKERS CLEANERS	3/15/2004	3/29/2004		
092-0026	IDEAL CLEANERS				
092-0027	EAGLE CLEANERS	3/25/2004	3/30/2004		
092-0028	JOY CLEANERS	5/20/2004	8/11/2004		
WAYNE COUNTY (1)					
096-0001	PENNY DRY CLEANERS				

DSCA ID	Site Name	Petitioned	Certified	Agreement	Prioritized
WILSON COUNTY (5)					
098-0001	KORETIZING CLEANERS	4/15/2002	5/21/2002	2/6/2003	
098-0002	DISCOUNT CLEANERS	4/15/2002	7/19/2002	5/7/2004	7/23/2004
098-0003	EXCLUSIVE CLEANERS				
098-0004	EXCLUSIVE CLEANERS				
098-0005	FRIENDLY CLEANERS				
TOTALS:	169 Identified Contaminated Sites	98	95	79	39

Data from these petitions have been compiled to evaluate general site characteristics. A summary is presented in Table 3. The majority of the petitioners are property owners (79), as opposed to drycleaner business owners/operators (49). Of the sites that applied, 60 percent are abandoned sites.

Table 3. DSCA Site Statistics

Petition Status	Number	Percent of Total
Sites Petitioned in Program	99	---
Sites Certified	95	96
Sites Pending Certification	4	4
Site Status		
Sites with Executed Agreements	79	83
Sites Prioritized	44	56
Site Classification		
Abandoned	60	60
Wholesale Distribution	2	2
Operating	35	35
Undetermined	2	2
Size Distribution of Operating Sites		
Small Size (1-4 employees)	11	31
Medium Size (5 - 9 employees)	10	29
Large Size (≥ 10 employees)	14	40
Distribution and Classification of Petitions [1]		
Property Owners	79	62
Dry Cleaning Business Owners/Operator	49	38

(3) COST ESTIMATE FOR ASSESSMENT AND REMEDIATION OF CERTIFIED SITES

Actual costs to assess and remediate DSCA sites are anticipated to vary widely from site to site. Factors influencing costs include site geology, age of release, the chemical nature of the solvents released and the threats posed to potential receptors. However, an annual spending cap of $200,000 per site is applied by statute unless contamination at a site poses an imminent threat to public health. In these cases, annual expenditures are capped at $400,000 per site.

Based on costs figures provided by other states, DSCA can calculate an approximate total cleanup cost for those sites that have been certified into the program. The 95 certified sites can be divided into four groups based on priority with higher priority sites having higher cleanup costs. Based on these assumptions, the total projected cost to remediate these sites is approximately $25 million.

DSCA's efforts to control costs have been quite successful. Project cost control measures are applied at the beginning of site work in the prioritization assessment stage. Since every DSCA site must have a prioritization assessment to be ranked, it is important that these cost control measures be applied effectively. DSCA reviews, negotiates and pre-approves all proposals. Staff analyze proposed costs using their professional knowledge and experience. DSCA also refers to cost control policies developed by the Underground

[1] Reflects multiple petitioners for some sites.

Storage Tank Section for general guidance. All proposals are required to provide sufficient detail (e.g., unit costs, subcontractor bids) to allow for an effective pre-approval review. Beginning in September 2004, unit costs allowed for work performed by the state-lead contractors will be in accordance with the rates established in each firm's contract.

Thus far, the cost of a PA appears to average about $13,000. This figure falls within the $10,000 to $15,000 range DENR originally estimated for these initial assessments. This cost typically includes soil sampling, installation of three to four monitoring wells, a receptor survey, and preparation of the Prioritization Assessment Report and Prioritization Ranking Form.

(4) RECEIPTS AND DISBURSEMENTS FOR THE FUND

The primary funding sources for the dry-cleaning solvent cleanup fund are a tax on dry-cleaning solvents and, beginning in July 2003, the state portion of the current sales tax on dry-cleaning. The DSCA Fund's finances for FY 2003-04 (through June 30, 2004) are summarized below:

Collections FY 97-98	$ 474,717.47
Collections FY 98-99	$ 927,004.50
Collections FY 99-00	$ 968,993.09
Collections FY 00-01	$ 863,772.16
Collections FY 01-02	$1,061,298.70
Collections FY 02-03	$1,076,826.57
Collections FY 03-04	$9,487,233.94 *
Revenue (all years)	$13,706,545.94
Interest	$ 1,153,300.49
Total Collections	$14,859,846.43
Dept. of Revenue Expenses	$ 22,100.42 **
Cleanup Expenses	$ 149,136.58
DENR Administrative Expenses	$ 1,140,621.93
Fund Balance	$13,547,987.50

* The significant increase in collections during FY 03-04 compared to previous years is due to the addition of the sales tax on dry-cleaning revenue.

** This represents the actual amount charged by the Department of Revenue for its expenses. The Department of Revenue is authorized by DSCA to charge no more than $125,000 per year.

(5) CLAIMS AGAINST THE FUND

There are two types of claims against the DSCA Fund. The majority of claims come from petitioners that incurred past investigative/remedial costs in response to an order or notice of violation from DENR prior to DSCA implementation. Reasonable, necessary and documented costs in excess of $50,000, incurred from October 1, 1997 through June 30, 2001, are reimbursable. Thirteen petitioners submitted claims for reimbursement of

past cost expenditures totaling $2,612,290.79. As per DSCA, claims will be paid in order of site priority. Payout for past cost claims was originally limited by DSCA to 10 percent of the DSCA Fund's income in the previous year, however, Senate Bill 1219 increased this to 25 percent of the DSCA's Fund's previous year's revenue.

In addition, the law allows petitioners to apply past costs toward the site's deductible in some circumstances. Fifteen petitioners submitted claims for application toward their site's deductible totaling $336,948.99.

The second type of claim against the DSCA Fund is for approved costs for site work which exceed the site's deductible. To date, 73 sites have at least one authorized work plan for site work. The total amount authorized to date is $610,718.10. Of this total amount, approximately $235,000.00 will exceed the sites' deductibles and will be reimbursed to the petitioners.

(6) RECOMMENDATIONS TO ASSURE THE SOLVENCY OF THE FUND

The DENR has no recommendations regarding fund solvency at this time. Prior to passage of statutory amendments to the DSCA in 2000 (S.L.2000-19), it was clear that the fund balance was inadequate to address all of the dry-cleaning sites in the state. However, with the passage of the DSCA Amendments that established a second funding mechanism, the General Assembly took the most important step necessary to assure future fund solvency. With the infusion of the sales tax monies, which began July 2003, DSCA now appears to have sufficient financial resources to assess and remediate the contaminated drycleaning facilities on a priority basis.

The Fiscal Note on the DSCA Amendments (S.L. 2000-19) anticipated that the funding mechanisms would provide the fund with $8 million to $10 million annually. As noted above, total collections for FY 2003-04 were approximately $9.5 million. Therefore, the DSCA Program is solvent.

NCDENR
North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

RECEIVED
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RESEARCH DIVISION

TO: Senator Daniel G. Clodfelter, Co-chair
Environmental Review Commission

Representative Daniel F. McComas, Co-chair
Environmental Review Commission

Senator Charles W. Albertson, Co-chair
Environmental Review Commission

Representative Pryor A. Gibson, Co-chair
Environmental Review Commission

George Givens, Counsel
Environmental Review Commission

FROM: William G. Ross Jr., Secretary

RE: Report of Superfund Cost Share Fund Expenditures for North Carolina's 10 Percent Share for Cleanup of Sites on the National Priorities List

Section 15.12 (a) of House Bill 352 (ratified August 28, 1997) authorizes the Department of Environment and Natural Resources, with the approval of the Office of State Budget and Management, to use available funds for the 10 percent cost share required for Superfund cleanups on the National Priorities List sites.

Section 15.12 (b) directs the DENR to report to the Environmental Review Commission and the Joint Legislative Commission on Governmental Operations as to "the amount and source of the funds used pursuant to subsection (a) of this section within 30 days of the expenditure of these funds." The attached report provides this information.

If you have any questions, please contact Mr. David Lown, Head, Federal Remediation Branch, Superfund Section at 733-2801 x.278.

WR/djl

Attachment

cc: Dexter R. Matthews, Director
Division of Waste Management

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 \ FAX: 919-715-3060 \ Internet: www.enr.state.nc.us/ENR

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Report to the Environmental Review Commission

Expenditures from the Superfund Cost Share Fund For North Carolina's 10 Percent Share

May 2004

NCDENR

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Division of Waste Management
Superfund Section
www.wastenotnc.org/

REPORT TO THE ENVIRONMENTAL REVIEW COMMISSION ON EXPENDITURES FROM THE SUPERFUND COST SHARE FUND FOR NORTH CAROLINA'S 10 PERCENT SHARE OF CLEANUPS FOR SITES ON THE NATIONAL PRIORITIES LIST

At present, 29 hazardous waste sites in North Carolina are included on the NPL. Thirteen of the NPL sites are fund-financed sites, where no viable responsible parties have been identified. These sites are being cleaned up using a combination of federal and state public funds. The Hazardous Response Trust Fund (the Superfund) contributes 90 percent of the money for remedial actions at these sites and the state contributes the remaining 10 percent.

The state's 10 percent contribution comes from the Superfund Cost Share Fund (SCSF). As of March 31, 2004, the fund had accumulated $12,007,185 in appropriations, interest and other income. Of that total, $8,756,660 has been encumbered or disbursed to pay for the state's share of clean up costs at eight NPL sites with signed Superfund State Contracts (SSCs).

Other disbursements and reductions have removed $1,496,966 from the SCSF, leaving only $1,753,559 available for future cleanup actions. Available funding could be obligated for cleanups in the next few months. Remedial actions needed at five NPL sites have not begun. To date, no SSCs have been negotiated for these sites. In addition to the sites discussed above, other sites will be added to the NPL. Some of these sites will require a 10 percent state cost share for cleanup. In addition to the 10 percent cost share at these fund-financed NPL sites, the state is responsible for the operation and maintenance (O&M) costs as well. The funds to perform O&M also come from the Superfund Cost Share Fund.

The attached table, Fund-Financed NPL Sites, lists the eight fund-financed sites for which an SSC has been signed. The table also shows all encumbrances and disbursements that have occurred due to the state's 10 percent cost share requirement. Note that some sites are divided into Operable Units (OU). This is common practice in the cleanup of NPL sites, because it makes designing and executing the cleanups more structured and easier to control.

One disbursement totaling $126,091 was made the SCSF in March 2004. The payment was made for ABC Cleaners OU-1. This is the only disbursement since December 2003. The department is seeking additional resources for the SCSF.

FUND-FINANCED NPL SITES
AMOUNTS ENCUMBERED AND DISBURSED
(as of 03/31/2004)

Site Name and Location	Dates SSC Signed	Estimated Total Cost of Remediation	Cost to State	Dates Disbursed	Amounts Disbursed	Remaining Amount Encumbered
ABC One Hour Cleaners	9/12/96	$3,760,000	$376,000	11/20/97	$94,000	
Operable Unit # 1				10/15/01	$26,964	
Jacksonville, Onslow Co.				3/31/04	$126,091	
Site Totals		**$3,760,000**	**$376,000**		**$247,055**	**$128,945**
ABC One Hour Cleaners	9/19/97	$750,000	$75,000	11/20/97	$18,750	
Operable Unit # 2				7/31/03	$3,803	
Jacksonville, Onslow Co.				11/30/03	$5,133	
Site Totals		**$750,000**	**$75,000**		**$27,686**	**$47,314**
Benfield Industries	9/27/96	$6,729,200	$672,920	11/20/97	$168,230	
Hazelwood (Waynesville)				3/31/01	$69,841	
Haywood Co.						
Site Totals		**$6,729,200**	**$672,920**		**$238,071**	**$434,849**
Cape Fear Wood Preserving	9/29/94	$16,965,300	$1,696,530	3/31/01	$1,758,697	
Fayetteville, Cumberland Co.	9/22/00	$4,350,000	$435,000			
	9/20/02	$3,092,274	$309,227			
				5/14/03	$478,263	
Site Totals		**$24,407,574**	**$2,440,757**		**$2,236,960**	**$203,798**
Carolina Transformer	9/25/97	$9,851,700	$985,170	11/20/97	$246,293	
Fayetteville, Cumberland Co.	1/14/00	$4,634,850	$463,485	4/30/01	$20,266	
	9/28/01	$2,000,000	$200,000	2/28/03	$1,181,561	
	9/20/02	$3,513,450	$351,345			
	5/13/03	$2,000,000	$200,000			
Site Totals		**$22,000,000**	**$2,200,000**		**$1,448,120**	**$751,880**
Davis Park Road TCE Site	4/1/00	$3,873,299	$387,330	3/31/01	$49,061	
Gastonia, Gaston Co.				12/3/01	$13,226	
				11/30/03	$21,958	
Davis Park Road TCE Site	4/1/00	$3,873,299	$387,330	3/31/01	$49,061	
Gastonia, Gaston Co.				12/3/01	$13,226	
				11/30/03	$21,958	
Site Totals		**$3,873,299**	**$387,330**		**$84,245**	**$303,085**

FUND-FINANCED NPL SITES (continued)
AMOUNTS ENCUMBERED AND DISBURSED
(as of 03/31/2004)

Site Name and Location	Dates SSC Signed	Estimated Total Cost of Remediation	Cost to State	Dates Disbursed	Amounts Disbursed	Remaining Amount Encumbered
FCX-Statesville	9/12/96	$4,161,525	$416,153	11/20/97	$104,038	
Operable Unit # 1				5/31/03	$3,245	
Statesville, Iredell Co.						
Site Totals		**$4,161,525**	**$416,153**		**$107,283**	**$308,869**
FCX-Statesville	9/25/97	$4,840,000	$484,000	11/20/97	$121,000	
Operable Unit # 2				4/30/01	$53,979	
Statesville, Iredell Co.	2/22/02	$1,160,000	$116,000			
				3/31/02	$379,969	
				4/30/03	$23,814	
Site Totals		**$6,000,000**	**$600,000**		**$578,762**	**$21,238**
North Belmont PCE Site	7/26/00	$7,535,000	$753,500	12/3/01	$31,835	
North Belmont, Gaston Co.				5/14/03	$223,157	
Site Totals		**$7,535,000**	**$753,500**		**$254,992**	**$498,508**
Potters Septic Tank Pits	9/16/94	$8,000,000	$800,000	1/30/95	$200,000	
Maco, Brunswick Co.	6/15/98	$350,000	$35,000			
Site Totals		**$8,350,000**	**$835,000**		**$200,000**	**$635,000**
TOTALS		**$87,566,598**	**$8,756,660**		**$5,423,173**	**$3,333,486**

NCDENR
North Carolina Department of Environment and Natural Resources
Michael F. Easley, Governor
William G. Ross Jr., Secretary

To: Environmental Review Commission Members

From: William G. Ross

Date: October 1, 2004

Re: Report on One Stop Permit Assistance and Coordination

Section 12.12. (a) of S.L. 2004-124 requires the Department of Environment and Natural Resources report to the Environmental Review Commission on permitting time frames in its One-Stop Permit Assistance and Coordination program. Attached is this year's report.

Please contact Edythe McKinney at 919-733-0823 if you have any questions.

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NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
CUSTOMER SERVICE CENTER
ONE-STOP PERMIT ASSISTANCE AND COORDINATION LEGISLATIVE REPORT
OCTOBER 1, 2004

This report fulfills the requirements of S.L. 2004-124, Section 12.12.(a), to provide information on environmental permits that exceed the projected time line developed by the one-stop permit assistance coordinators. Since ratification of S.L. 2004-124 on July 20, 2004, no permits have exceeded the projected time line.

DENR would like to take this opportunity to provide an overview of the One-Stop Permit Assistance and Coordination Program, including an outline of the additional tracking procedures that will be used to implement the statewide expansion of this program. In addition, this report will briefly describe the Express Review Pilot Program. These permit improvement programs complement each other and, in regional offices where both programs exist, the One-Stop coordinator also serves as the Express Review coordinator.

ONE-STOP PERMIT ASSISTANCE AND COORDINATION

The One-Stop Permit Assistance and Coordination Program was authorized by S.L. 2000-67 to provide a single point of contact for businesses, citizens and local governments to obtain information about all of the state's environmental permits and requirements. This program was established as part of the Department of Environment and Natural Resources' Customer Service Center. As a pilot, permit assistance coordinators were located in DENR's Wilmington and Mooresville regional offices. The coordinators identify environmental permits and requirements that may apply to the proposed project; arrange pre-application meetings with appropriate agencies; identify timeframes for the permitting process; and help track the progress of the permits. The role of the coordinator functions largely to keep the lines of communication open between the client and permitting staff and resolve problems.

To date, the greatest demand has been for assistance in the early stage of project development. In many cases, clients contact the One-Stop program before they are ready to apply for permits -- often before they have even identified a specific site for the project. These clients need a knowledgeable contact who can identify the permits that may be needed for the project and guide them through the regulatory process. Since January 2004, the One-Stop coordinators have helped 100 clients identify the permits needed for their projects. Clients have included small businesses, existing companies looking to expand or relocate, and out-of-state consultants and business leaders.

For clients ready to submit permit applications, the One-Stop coordinator can develop a timeframe for permit decisions, advise of permit options (such as express review) and track permit progress. During the pilot effort, only a small number of clients asked the One-Stop program to track their individual permit applications. Most clients preferred to deal with the permitting program staff directly once the application was submitted. The pilot project has shown, however, that the One-Stop program's upfront work to identify necessary permits, arrange pre-application meetings or site visits, and address scheduling concerns led to a smoother and quicker permitting process even for permit applications the One Stop program did not track. Timelines have been developed and applications tracked for six projects this year through the One-Stop program. Permit decisions have not yet been made in all cases, but all of the decisions issued to date have been on schedule or ahead of schedule.

EXPRESS REVIEW PILOT PROGRAM

The Express Review Pilot Program was established by the N.C. General Assembly in 2003 to assist applicants seeking environmental permits. The goal of the express permitting program was to significantly reduce permit-processing times without compromising environmental protection. The program was particularly focused on time-sensitive development projects that required multiple permits. As a result, express permitting has been available for the following permits or authorizations: coastal stormwater permits; Section 401 water quality certifications for wetland and stream impacts (and associated stream determinations); erosion and sedimentation control plan approvals; Coastal Area Management Act permits; and water quality non-discharge permits. Applicants using the express permitting program pay higher permit fees for shorter turnaround time. The fees are used to hire additional permit engineers to do the express permit reviews.

The pilot program initially implemented express permitting in the Wilmington and Raleigh regional offices of DENR. During the first six months of 2004, 144 permits were issued through the program. Because of the lower ratio of permit applications to staff, permit review time was significantly reduced under the express program as compared to the normal permit review track. The legislature has directed DENR to expand the express permitting program to two additional regions in 2004-2005.

TRACKING IMPROVEMENTS

DENR is in the process of improving its permit information management system. The development of a comprehensive data-management framework will allow for better tracking of permits across programs. In future reports, DENR will be able to provide greater detail on permitting times and the reasons for permit reviews that exceed 90 days or go beyond projected time frames.

Timelines developed by the One-Stop program coordinator include an estimated decision date for each permit required. The state permits identified for these projects will be tracked in future reports. (In many cases, federal or local permits may also be required for the project.) The types of permits covered in the One-Stop report will depend on the projects that come through the program, since different permits are required for different types of projects. The most common permits or approvals needed for new facilities include: erosion and sedimentation control plan approvals; stormwater permits; Section 401 water quality certifications; air quality permits; wastewater treatment permits (such as discharge permits or permits for subsurface systems); water lines/water treatment system permits; and, in the coastal region, Coastal Area Management Act permits.

As the One-Stop Permit Assistance and Coordination Program is expanded to provide statewide coverage, it should be easier for developers, citizens, economic developers and small businesses to learn about environmental requirements and meet them in a timely manner.

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Land Resources

James D. Simons, P.G., P.E.
Director and State Geologist

Michael F. Easley, Governor
William G. Ross Jr., Secretary

October 4, 2004

MEMORANDUM

TO: Members of the Environmental Review Commission

FROM: James D. Simons

SUBJECT: Annual Mining Permit Fee Use Report

G.S. 113A-241(c) requires the Department of Environment and Natural Resources to report to the Environmental Management Commission on the mining permit fee use in implementing the state's mining program. Attached is this year's report.

If you have any questions, please contact Mell Nevils in the Division of Land Resources, 733-4574.

CC. Johanna Reese
Mell Nevils
Floyd Williams

MINING PERMITTING PROGRAM

1. Monies Collected

Total fee monies of $61,670 were collected during fiscal year 2003-2004.

2. Monies Expended

Salaries and Benefits	$43,172.00
Purchased Services	$10,480.00
Supplies	$209.00
Property, Plant & Equipment	$575.00
Other Expenses & Adjustments	$589.00
Intragovernmental Transfer	$26.00
Total	$55,051.00

One position, an assistant mining specialist, was funded this year to assist in application review and permit issuance.

October 21, 2004 ERC Meeting
EXHIBIT E

Review of Legislative Action on the Environment

2003 General Assembly
Regular Session 2004

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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21 October 2004

To: Environmental Review Commission Members
From: Environmental Review Commission Staff
Re: 2004 Environmental Legislation

We are pleased to present you with this overview of the Environmental Review Commission and a review of environmental actions taken by the General Assembly in the 2004 Regular Session. The review includes the following documents:

1. Membership of the Environmental Review Commission
2. Authorizing Legislation
3. List of the final disposition of bills recommended by the Environmental Review Commission during the 2004 Session
4. 2004 Summaries: Environment and Natural Resources Legislation
5. Summary of Funding for Environmental Initiatives, 2004 Session
6. Table of Reports by the Environmental Review Commission Required or Authorized by North Carolina Law
7. Table of Reports to the Environmental Review Commission Required or Authorized by North Carolina Law

ENVIRONMENTAL REVIEW COMMISSION
2003-2004

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North Carolina General Statutes
ARTICLE 12D.

Environmental Review Commission.

§ 120-70.41. Commission established.

The Environmental Review Commission is hereby established.

§ 120-70.42. Membership; cochairs; vacancies; quorum.

(a) The Environmental Review Commission shall consist of six Senators appointed by the President Pro Tempore of the Senate, six Representatives appointed by the Speaker of the House of Representatives, who shall serve at the pleasure of their appointing officer, the Chair or a Cochair of the Senate Committee on Agriculture, Environment, and Natural Resources or the equivalent committee, the Chair or a Cochair of the House of Representatives Committee on Environment and Natural Resources or the equivalent committee, the Chair or a Cochair of the Senate Committee on Appropriations – Natural and Economic Resources or the equivalent committee, and the Chair or a Cochair of the House of Representatives Committee on Appropriations – Natural and Economic Resources or the equivalent committee.

(b) The President Pro Tempore of the Senate shall designate one Senator to serve as cochair and the Speaker of the House of Representatives shall designate one Representative to serve as cochair.

(c) Except as otherwise provided in this subsection, a member of the Commission shall continue to serve for so long as the member remains a member of the General Assembly and no successor has been appointed. A member of the Commission who does not seek reelection or is not reelected to the General Assembly may complete a term of service on the Commission until the day on which a new General Assembly convenes. A member of the Commission who resigns or is removed from service in the General Assembly shall be deemed to have resigned or been removed from service on the Commission. Any vacancy that occurs on the Environmental Review Commission shall be filled in the same manner as the original appointment.

(d) A quorum of the Environmental Review Commission shall consist of nine members.

§ 120-70.43. Powers and duties.

(a) The Environmental Review Commission shall have the following powers and duties:

(1) To evaluate actions of all boards, commissions, departments, and other agencies of the State and local governments as such actions relate to the environment or protection of the environment, including but not limited to an evaluation of:

a. Benefits of each program relative to costs;

b. Achievement of program goals;

c. Use of measures by which the success or failure of a program can be measured; and

d. Conformity with legislative intent;

(2) To study on a continuing basis the organization of State government as it relates to the environment or to the protection of public health and the environment, including but not limited to:

a. Improvements in administrative structure, practices, and procedures;

b. Increased integration and coordination of programs and functions;

c. Increased efficiency in budgeting and use of resources;

d. Efficient administration of licensing, permitting, and grant programs;

e. Prompt, effective response to environmental emergencies;

f. Opportunities for effective citizen participation; and

g. Broadening of career opportunities for professional staff;

(3) To make any recommendations it deems appropriate regarding the reorganization and consolidation of environmental regulatory agencies and the recodification of statutes relating to the environment, including but not limited to:

a. Ways in which agencies may operate more efficiently and economically;

b. Ways in which agencies can provide better services to the State and to the people; and

c. Instances in which functions of agencies are duplicative, overlapping, incomplete in scope or coverage, fail to accomplish legislative objectives, or for any other reason should be redefined or redistributed;

(4) To review and evaluate changes in federal law and regulations, relevant court decisions, and changes in technology affecting the environment or protection of the environment;

(5) To review existing and proposed State law and rules affecting the environment or protection of the environment and to determine whether any modification of law or rules is in the public interest;

(6) To make reports and recommendations, including draft legislation, to the General Assembly from time to time as to any matter relating to the powers and duties set out in this section; and

(7) To undertake such additional studies as it deems appropriate or as may from time to time be requested by the President Pro Tempore of the Senate, the Speaker of the House of Representatives, either house of the General Assembly, the Legislative Research Commission, the Joint Legislative Commission on Governmental Operations, the Joint Legislative Utility Review Committee, or the Joint Select Committee on

Low-Level Radioactive Waste and to make such reports and recommendations to the General Assembly regarding such studies as it deems appropriate; provided that the Environmental Review Commission shall not undertake any study which the General Assembly has assigned to another legislative commission or committee.

(b) The Environmental Review Commission may continue the study of environmental agency consolidation and reorganization. The study of environmental agency consolidation shall include, but is not limited to:

(1) Monitoring the implementation of Session Laws 1989, c. 727;

(2) Evaluation of the organization, programs, and operation of the Department of Environment and Natural Resources;

(3) Evaluation of the organization, functions, powers, and duties of the components of the Department of Environment and Natural Resources, including boards, commissions, councils, and regional offices; and

(4) Recodification of the General Statutes relating to the environment and environmental agencies.

(c) In addition to its general powers and duties, the Environmental Review Commission shall have the following powers and duties with respect to hazardous waste management:

(1) To study the current and projected need for hazardous waste treatment, storage, and disposal capacity in the State in light of anticipated generation of hazardous waste and alternatives for hazardous waste treatment and disposal;

(2) To evaluate the potential for the development of additional hazardous waste treatment, storage, and disposal capacity by the private sector;

(3) To study the necessity for and scope of hazardous waste treatment, storage, and disposal facilities which are sited, owned, or operated by the State;

(4) To review progress in securing a volunteer county to host a hazardous waste treatment facility;

(5) To study incentives and compensation for the community which hosts, either voluntarily or involuntarily, a hazardous waste treatment facility, including any additional incentives and compensation which may be needed, whether there should be differential compensation for a volunteer county, options for use of funds by local governments, distribution of compensation among local governments, and methods of providing flexibility in the development of an incentives and compensation package for a particular local community;

(6) To review progress in developing interstate agreements for the treatment, storage, and disposal of hazardous waste;

(7) To assist in the development of cooperative, comprehensive regional approach to hazardous waste treatment and disposal;

(8),(9) Repealed by Session Laws 2001-474, s. 12.

(10) To study the capacity assurance requirement under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Pub. L. No. 96-510, 94 Stat. 2767, 42 U.S.C. 9601 et seq., as amended, and the Superfund Amendments and Reauthorization Act of 1986, Pub. L. No. 99-499, 100 Stat. 1613, as amended as it relates to the continued eligibility of North Carolina for remedial actions under Superfund;

(11) To study alternatives available to the State for dealing with hazardous waste and the ramifications of those alternatives; and

(12) To receive and evaluate reports of every State agency, board, and commission which has any power or duty with respect to hazardous waste management.

§ 120-70.44. Additional powers.

The Environmental Review Commission, while in the discharge of official duties, may exercise all the powers provided for under the provisions of G.S. 120-19, and G.S. 120-19.1 through G.S. 120-19.4. The Environmental Review Commission may meet at any time upon the call of either cochairman, whether or not the General Assembly is in session. The Environmental Review Commission may meet in the Legislative Building or the Legislative Office Building upon the approval of the Legislative Services Commission.

Notwithstanding any rule or resolution to the contrary, proposed legislation to implement any recommendation of the Environmental Review Commission regarding any study the Environmental Review Commission is authorized to undertake or any report authorized or required to be made by or to the Environmental Review Commission may be introduced and considered during any session of the General Assembly.

§ 120-70.45. Compensation and expenses of members.

Members of the Environmental Review Commission shall receive subsistence and travel expenses at the rates set forth in G.S. 120-3.1.

§ 120-70.46. Staffing.

The Legislative Services Officer shall assign as staff to the Environmental Review Commission professional employees of the General Assembly, as approved by the Legislative Services Commission. Clerical staff shall be assigned to the Environmental Review Commission through the offices of the Supervisor of Clerks of the Senate and Supervisor of Clerks of the House of Representatives. The expenses of employment of clerical staff shall be borne by the Environmental Review Commission.

§ 120-70.47. Funding.

From funds available to the General Assembly, the Legislative Services Commission shall allocate monies to fund the work of the Environmental Review Commission.

Final Disposition of Bills Recommended by ERC in 2004

short title	Bill Numbers	Sponsors	Final Disposition
ABC Licensees to Recycle Beverage Containers	HB 1575	Hackney	HENR
	SB 1269	Kinnaird	SAENR
Dry Cleaning Solvent Cleanup Act Amendments	HB 1583	Gibson	HENR
	SB 1219	Clodfelter	S.L. 2004-48
Environmental Reports Amendments	HB 1615	Gibson	HENR
	SB 1303	Albertson	SAENR (contents enacted in SB 823; S.L. 2004-195)
Environmental Technical Corrections	HB 1616	Gibson	HENR
	SB 1302	Albertson	SAENR (contents enacted in SB 823; S.L. 2004-195)
Hatteras Village/Temp. Unvegetated Beach Area	HB 1411	Culpepper	S.L. 2004-1
Leaking UST Fund Liquidity	HB 1584	Gibson	HENR
	SB 1220	Clodfelter	SAENR
Limit Liability for Environmental Cleanups	HB 1603	McComas	HENR
	SB 1222	Clodfelter	S Judiciary I
Phase II Stormwater Management -1	HB 1585	Gibson	HENR
	SB 1210	Clodfelter	S.L. 2004-163
Phase II Stormwater Management Amendments -2	HB 1581	Gibson, McComas	HENR
	SB 1211	Clodfelter, Albertson	SAENR
Phosphorous Nutrient Mgt./Animal Feedlots	HB 1112	Gibson	S.L. 2004-176
Septic System Setbacks for Pre-1977 Lots	HB 1568	Hill	H Health
	SB 1202	Soles	S.L. 2004-140
State Nature & Historic Preserve Removals	HB 1607	Minor, Weiss	S.L. 2004-25
	SB 1224	Horton	SAENR

* Indicates version which became law.

short title	Bill Numbers	Sponsors	Final Disposition
State Parks System Adds. & Study	HB 1574	Hackney	S.L. 2004-24
	SB 1270	Kinnaird	H Rules
Tax Credit for Certain Real Property Donations	HB 1602	McComas	S.L. 2004-134 (Enacted as "Delays Dollar Limit on Credit for Partnerships"
	SB 1214	Clodfelter	S Finance
Water Conservation/Submeters	HB 1582	Gibson, Black	HENR (contents enacted in HB 1083; S.L. 2004-143)
	SB 1221	Clodfelter	SAENR

* Indicates version which became law.

Environment and Natural Resources Legislation
2004 Regular Session of the 2003 General Assembly

Tim Dodge (TD), George F. Givens (GG), Jeff Hudson (JH), and Jennifer McGinnis (JM)

Enacted Legislation

Coastal Development

Hatteras Village/Temporary Unvegetated Beach Area

S.L. 2004-1 (HB 1411) designates certain oceanfront areas on Hatteras Island as temporary unvegetated beach areas. The affected properties include the oceanfront areas on Hatteras Island west of the new inlet breach in Dare County where the vegetation line was destroyed by Hurricane Isabel on September 18, 2003, and by the construction of an emergency berm. The act allows oceanfront setbacks for new development or redevelopment to be measured from the vegetation line that is depicted in Dare County orthophotographs dated February 4, 2002 through February 10, 2002. The designation will continue until stable, natural vegetation is reestablished or until the Coastal Resources Commission permanently designates the area as an unvegetated beach area by rule.

This act became effective May 26, 2004. (TD)

New Urban Waterfront Development Pilot

S.L. 2004-117 (SB 732) directs the Coastal Resources Commission (CRC) to implement a pilot project under which one county may designate an area as a new urban waterfront (NUW). A NUW area, as defined by the act, is an area designated for development that includes a mixture of residential and commercial uses, recreational areas, and facilities for governmental or other civic purposes; provides for pedestrian access to residential, commercial, civic, and recreational areas; and incorporates open space for recreational and other public purposes. Under the pilot project, a developer could submit an application for a major development permit pursuant to the Coastal Area Management Act of 1974 (CAMA) for development in the NUW area subject to certain requirements, including obtaining a National Pollutant Discharge Elimination System (NPDES) permit for stormwater management prior to commencement of any construction of the development.

Current rules adopted under CAMA define urban waterfronts as areas that lie wholly within the corporate limits of a municipality and are located in either a central business district where there is minimal undeveloped land, mixed land uses, and urban level services such as water, sewer, and streets, or in an industrial zoned area adjacent to a central business district. These rules subject development in urban waterfronts to special use standards with regard to requirements for riparian buffers along shorelines and limits on construction of impervious surfaces. Current rules do not allow for the creation of additional urban waterfronts.

The act authorizes development in the NUW area to the same extent and subject to the same use standards and permitting requirements as development within areas designated as urban waterfronts under rules adopted under CAMA, except that the NUW area must be located outside of the corporate limits of any municipality and development in the NUW area must comply with a 30-foot buffer requirement along all natural shorelines.

If the development in the NUW area fails to include commercial development, civic development, and open space substantially in accordance with the development proposed in the application for the major development permit within six years of the date of issuance of the major development permit, the act provides that the developer must provide mitigation for encroachment into riparian buffers that would otherwise be required under standards adopted by the CRC for development on public trust and estuarine shorelines.

The act also directs the CRC to evaluate the impacts on water quality and other environmental impacts from the development, and the costs and benefits of the development and annually report its interim findings and recommendations to the Environmental Review Commission beginning October 1, 2005, and to report its final findings and recommendations no later than October 1, 2010.

This act became effective July 17, 2004. (JM, GG)

Environmental Health

Septic System Setbacks for Pre-1977 Lots

S.L. 2004-140 (SB 1202) reduces the minimum horizontal separation distance requirements between two subsurface wastewater disposal systems from 20 feet to 10 feet under certain circumstances. The act allows the installation and operation of a subsurface wastewater disposal system that will be located 10 feet or more from an existing subsurface wastewater disposal system if the lot or tract of land on which the new system will be located meets the following criteria:

- The lot was platted prior to July 1, 1977.
- The system will be operated in Soil Group I soils (sandy texture soils, which are primarily found in the Coastal Plain and in the Sandhills area of the State).
- The lot is of insufficient size to allow the minimum horizontal separation distance requirements for a conventional wastewater system.
- The system will receive sewage from only one single-family residence not to exceed four bedrooms.
- The residence is not capable of being served by a public or community wastewater system at the time construction of the system commences.

This act became effective July 29, 2004, and applies to applications for permits made on or after that date. If the Commission for Health Services adopts a permanent rule to implement the provisions of the act, the act will expire when the permanent rule becomes effective. (TD)

Water Conservation/Submeters

S.L. 2004-143 (HB 1083) modifies the requirements for landlords who submeter and charge tenants for providing water or sewer service in apartment complexes, mobile home parks, and other multi-family housing units. The act authorizes the Utilities Commission (Commission) to adopt procedures to allow landlords to submeter and charge for providing water or sewer service. All charges for water or sewer service must be based on the tenant's metered consumption of water and not by any partial measurement of water consumption, unless specifically authorized by the Commission. The rate charged by the landlord may not exceed the unit consumption rate charged by the supplier of water or sewer service. The landlord may, however, charge a reasonable administrative fee for providing water or sewer service.

The act directs the Commission to develop an application that landlords must submit for authority to charge for water or sewer service. The Commission must approve or disapprove an application within 30 days of the filing of a completed application with the Commission. If the Commission has not issued an order disapproving a completed application within 30 days, the application shall be deemed approved. In order to change the rate or administrative fee, a provider must file a notice of revised schedule of rates and fees with the Commission. A notification of revised schedule of rates and fees becomes effective upon 14 days notice to the Commission, unless otherwise suspended or disapproved by an order issued by the Commission within 14 days after filing.

The act also:

- Prohibits landlords from disconnecting or terminating a tenant's water or sewer service due to the tenant's nonpayment of the costs for water and sewer services.
- Prohibits landlords from charging tenants a late fee because of the tenant's failure to pay for water or sewer services.
- Restates that landlords may not use nonpayment of the costs for water or sewer services owed by a tenant as a basis for termination of a lease or eviction.

- Requires a landlord to notify tenants of any violations of water quality standards under the North Carolina Drinking Water Act if the landlord is charging for the cost of providing water or sewer service and has knowledge of the contamination.
- Clarifies the responsibility for monitoring, analysis, and record keeping, as well as for the operation, maintenance, or repair of the providing water system.
- Exempts landlords that submeter and charge for providing water and sewer service from certain bonding and reporting requirements generally required by the Commission.

This act became effective August 1, 2004. (TD, GG)

Fisheries

Under Dock Oyster Culture Program

S.L. 2004-124, Sec. 12.7B (HB 1414, Sec. 12.7B) establishes the Under Dock Oyster Culture Permit Program (Program), which authorizes the holder of a permit to attach up to 90 square feet of oyster cultivation containers to a dock or pier owned by the permit holder. Permit applications must be submitted to the Director of the Division of Marine Fisheries who will issue a permit only if the Director determines that:

- The dock or pier is not located in polluted waters.
- The applicant has satisfied training requirements adopted by the Marine Fisheries Commission.
- The oyster culture activities are compatible with all lawful uses by the public of other marine and estuarine resources, such as navigation, fishing, and recreation.

It is unlawful for a permit holder to sell oysters cultivated under the permit and a permit will be revoked if the permit holder fails to comply with the requirements of the Program.

This section became effective July 1, 2004. (JH)

Amend Fishery Management Plan Requirements

S.L. 2004-160 (HB 1429) amends the requirements for development of Fishery Management Plans (FMPs) so that each FMP will include:

- Conservation and management measures that will attain a "sustainable harvest" rather than an "optimal yield." "Sustainable harvest" is the amount of fish that can be taken from a fishery on a continuing basis without reducing the stock biomass of the fishery or causing the fishery to become overfished.
- A specific time period for ending overfishing and achieving a sustainable harvest. This provision only applies to fisheries that are overfished and does not apply to a fishery where the biology of the fish or the environmental conditions would make ending overfishing and achieving a sustainable harvest within 10 years impracticable.

This act became effective August 2, 2004. (JH)

Amend Shellfish Laws

S.L. 2004-150 (HB 1427) makes the following changes to the law governing shellfish cultivation leases:

- Changes shellfish cultivation lease fees as follows:
  - Increases the initial application filing fee for a bottom shellfish cultivation lease from $100.00 to $200.00.
  - Increases the renewal application filing fee for a bottom shellfish cultivation lease from $50.00 to $100.00.
  - Increases the annual rental fee for a bottom shellfish cultivation lease from $5.00 per acre to $10.00 per acre.

- Alters the annual rental fee for a 5-year water column shellfish cultivation lease from $100.00 for the first four years and $500.00 for the fifth year to $100.00 per year for all five years.

➢ Directs the Marine Fisheries Commission (MFC) to adopt rules to establish training requirements for persons who apply for shellfish cultivation leases. The training requirements will be designed to encourage the productive use of shellfish cultivation leases. The training requirements will not apply to a person who already holds a shellfish cultivation lease that is meeting shellfish production requirements.

➢ Adds failure to comply with the training requirements to the list of conditions for which a shellfish cultivation lease may be terminated.

➢ Authorizes the MFC to study whether and how to establish a process by which shellfish cultivation leases that have been terminated may be leased without reverting to public bottom.

➢ Authorizes the MFC to study issues related to corporate ownership of shellfish cultivation leases.

The provisions changing the fees for shellfish cultivation leases become effective July 1, 2005. All other provisions of this act became effective August 2, 2004. (JH)

Saltwater Fishing Fund/Holdover Appointments

S.L. 2004-187, Secs. 1-4 and 6-13 (HB 831, Secs. 1-4 and 6-13), as amended by S.L. 2004-124, Sec. 12.16 (HB 1414, Sec. 12.16), establish the North Carolina Saltwater Fishing Fund and a program for the licensing of coastal recreational fishing.

North Carolina Saltwater Fishing Fund. – The North Carolina Saltwater Fishing Fund (Fund) is established as a nonreverting fund in the office of the State Treasurer to receive license revenues. The State Treasurer will invest the assets of the Fund and disburse investment income only as directed by the Board of Trustees of the North Carolina Saltwater Fishing Fund (Board). State agencies, local governments, and nonprofit corporations whose primary purpose is conserving, preserving, or restoring the State's marine resources are eligible to apply for a grant from the Fund. The Board may authorize disbursement for:

➢ Resource and habitat enhancement;

➢ Fisheries management research for specifically designated species;

➢ Acquisition of land that provides for the enhancement of fishery habitat or public access to coastal fishing waters;

➢ Purchase or construction of public beach access areas and public marinas; (if the Board purchases or constructs a public marina, it may establish a boat docking fee.)

➢ Emergency dredging for the restoration of access to public fishing areas;

➢ Establishment of scholarships for individuals pursuing degrees in marine sciences; and

➢ Administrative and operating expenses of the Board (no more than 2% of the annual Fund balance or $1,250,000, whichever is greater, may be used).

The Board may not authorize disbursement for law enforcement. The Board will be composed of eleven members as follows:

➢ Three members, each of whom holds a saltwater fishing license (SFL), to be appointed by the Governor;

➢ Three members, each of whom holds a SFL, to be appointed by the Speaker of the House of Representatives;

➢ Three members, each of whom holds a SFL, to be appointed by the President Pro Tempore of the Senate;

➢ The Director of the Division of Marine Fisheries (Division) or the Director's designee (*ex officio* and non-voting); and

➢ The Chair of the Marine Fisheries Commission (MFC) or the Chair's designee (*ex officio* and non-voting).

The Chair of the Board will report to the Joint Legislative Commission on Seafood and Aquaculture by September 30 of each year on the source and amounts of monies credited to the Fund and the purpose and amount of all expenditures from the Fund during the prior fiscal year.

General provisions governing saltwater fishing licenses. –

- It is unlawful for an individual to engage in recreational fishing in coastal fishing waters without having purchased a SFL. An individual may engage in recreational fishing by means of recreational gear without holding a SFL if the individual is 18 years of age or younger and is currently enrolled in school and is making progress toward obtaining a high school diploma or its equivalent.
- A SFL does not authorize the license holder to sell fish taken under the license.
- Any SFL may be purchased or renewed at designated offices of the Division; from the Division by mail, electronic mail, the Internet, or telephone; or at locations designated by the Board.

Types of Saltwater Fishing Licenses.

License Type	Fee	Duration
1-year SFL	$15.00	Valid for a period of one year from the date of issuance
2-year SFL	$30.00	Valid for a period of two years from the date of issuance
3-year SFL	$45.00	Valid for a period of three years from the date of issuance
7-day SFL	$1.00	7 day duration, but may be purchased only once per year
Subsistence SFL	No charge	Valid for a period of one year from the date of issuance
Lifetime SFL:		Lifetime duration
Younger than 6 years of age	$100.00	
6 to younger than 11 years of age	$150.00	
11 to younger than 18 years of age	$200.00	
18 years of age and older	$500.00	

Miscellaneous Provisions. –

- The MFC will adopt rules to define recreational gear and commercial gear.
- The MFC and the Division may not disclose personal information provided by a license applicant.
- The Board shall develop a plan for the implementation of the licensing provisions of the act and study the creation of a unified fishing license for inland and coastal fishing. The Board will report to the Joint Legislative Commission on Seafood and Aquaculture on the plan and study no later than April 15, 2005.
- The act appropriates up to $5,000,000 from the General Fund to the North Carolina Saltwater Fishing Fund for fiscal year 2004-2005 to be used by the Board to implement the act. The Board will repay the $5,000,000 to the General Fund by July 1, 2010. (**Note:** S.L. 2004-124, Sec. 12.16 (HB 1414, Sec. 12.16) provides that if HB 831 becomes law, the appropriations section is repealed. Instead, Sec. 12.16 provides that of the funds appropriated to the Department of Environment and Natural Resources for the 2004-2005 fiscal year, the Division may use up to $450,000 and the Board may use up to $300,000 to implement HB 831. The Board shall repay all of these funds to the General Fund by July 1, 2008.)

The licensing provisions become effective January 1, 2006. With the exception of the appropriations section, Section 13, which was repealed by S.L. 2004-124, Sec. 12.16, all other provisions of this act became effective August 17, 2004.

Section 5 of this act provides that vacancies may be filled in certain offices during a holdover period. For additional information on this section, see **State Government**. (JH)

Parks and Public Spaces

State Parks System Additions & Study

S.L. 2004-24 (HB 1574) authorizes the Department of Environment and Natural Resources to add the Lower Haw River State Natural Area to the State Parks System. The Lower Haw River State Natural Area will be located in Chatham County where the Haw River enters Jordan Lake. This stretch of the Haw River is considered nationally significant for its biological resources including, rare species of fish (Cape Fear Shiner), mussels (Brook Floater), and dragonflies (Septima's Clubtail). Along the river's edge, scenic bluffs and rock outcrops alternate with areas of high quality floodplain forests. In addition to its biological significance, the river is used extensively by canoeists and kayakers who value its rapids and rocky islands.

This property is contiguous with property of Jordan Lake State Recreation Area. The Division of Parks and Recreation (Division) proposes to manage the Lower Haw River State Natural Area as a satellite of Jordan Lake State Recreation Area, using staff from the Recreation Area. Recreational development of the State Natural Area will be limited to trails, canoe access, and associated parking. The State Natural Area is not suitable for campgrounds and similar intensive uses, which are available nearby at Jordan Lake State Recreation Area.

The act also directs the Division to study the establishment of a new State recreation area at Blewett Falls Lake and report its findings and recommendations, including any legislative proposals, to the Environmental Review Commission on or before December 1, 2005.

This act became effective June 25, 2004. (JM)

State Nature & Historic Preserve Removals

S.L. 2004-25 (HB 1607) removes property from the State Nature and Historic Preserve (Preserve) and the State Parks System (System). The act:

- Removes a portion of two parcels at Hemlock Bluffs State Natural Area from the Preserve that are needed by the Town of Cary for a right-of-way for the widening of Kildaire Farm Road. This property must be removed from the Preserve before the State can grant easements to the Town of Cary for the right-of-way. The property was purchased with funds from the Federal Land and Water Conservation Fund, thus restrictions cover the property and require that the property be replaced. The Town of Cary plans to acquire additional property that is adjacent to the existing Natural Area, some of which will be used to replace the property used for the road right-of-way.
- Removes the Horne Creek Living Historical Farm located within the boundaries of Pilot Mountain State Park from the System to allow the property to be reallocated to the Department of Cultural Resources.

This act became effective June 25, 2004. (JM)

Twenty-Four Hour Access to Fort Fisher State Recreation Area During the Fall and Winter/Funds for Department Study/Activities at Fort Fisher

S.L. 2004-124, Sec. 12.3 (HB 1414, Sec. 12.3) provides that members of the public who pay a fee for access to Fort Fisher State Recreation Area (Fort Fisher) may have 24-hour access to the beach at Fort Fisher from September 15 through March 15 of each year.

The section also directs the Department of Environment and Natural Resources (DENR) to conduct a study of vehicle use at Fort Fisher including consideration of:

- The demand for vehicle access to the beach during different times of the year;
- The impact of vehicles on sea turtles and nesting birds;
- The sea turtle and bird nesting activity at Fort Fisher as compared with the nesting activity on the adjoining beach managed by the Bald Head Conservancy and on Masonboro Island; and
- The economic impact of restricting 24-hour vehicle access to the beach.

DENR must report its findings and recommendations, including any legislative proposals, to the Environmental Review Commission by February 1, 2005. The section also provides that of the funds appropriated to DENR for the 2004-2005 fiscal year, $25,000 shall be used to conduct the study and for other educational, conservation, and enforcement activities at Fort Fisher.

This section became effective July 1, 2004. (JM)

One-time Grant to Swain County

S.L. 2004-124, Sec. 12.11 (HB 1414, Sec. 12.11) directs the Wildlife Resources Commission to provide a one-time grant of $37,500 for the 2004-2005 fiscal year from the Wildlife Resources Fund to Swain County as compensation for the loss of ad valorem taxes associated with the purchase by the Wildlife Resources Commission of the 3,431 acre Needmore game lands property located on the Little Tennessee River in Swain County.

This section became effective July 1, 2004. (TD)

Delay Dollar Limit on Credit for Partnerships

S.L. 2004-134 (HB 1602) postpones until 2006 (previously 2005) the imposition on partnerships and limited liability companies of the dollar amount limitation on the credit allowed for real property donations and provides that the Revenue Laws Study Committee should study the credit.

This act became effective July 29, 2004. (CA)

Underground Storage Tanks

Leaking Petroleum Underground Storage Tank Cleanup Funds Solvency

S.L. 2004-124, Sec. 30.10 (HB 1414, Sec. 30.10) allocates additional funds from the motor fuels tax to the Commercial Leaking Petroleum Underground Storage Tank (UST) Cleanup Fund and the Noncommercial Leaking Petroleum UST Cleanup Fund (UST Funds) and makes other changes to the Leaking Petroleum UST Cleanup Program.

Allocation of Funds. – The sum of $19 million is to be credited to the UST Funds and to the Water and Air Quality Account in September 2004 and an additional fractional amount is to be credited throughout the 2004-2005 fiscal year. The act also appropriates funds from the Commercial Fund for one new accounting tech position and to cover legislative salary increases for UST program staff.

Preapproval. – The act authorizes the Department of Environment and Natural Resources (DENR) to identify and develop a list of tasks that require preapproval. DENR may not approve any tasks that require preapproval unless DENR determines that sufficient funds will be available to pay the claim for reimbursement within 90 days after the claim has been approved.

There are two exceptions to the limitation on preapproval of UST work:

- First, at the request of the UST owner, operator, or landowner, DENR may preapprove tasks when sufficient funds are not available to pay the claim for reimbursement within 90 days if the owner, operator, or landowner agrees that the claim will not be paid until after DENR has paid all claims for reimbursement that were submitted through the normal preapproval process.
- Second, DENR may preapprove tasks if the discharge or release creates an emergency situation. These tasks may be reimbursed on the same basis as those approved through the normal preapproval process.

The act provides that this provision does not invalidate any existing rules concerning pre-approval of UST work.

Prioritization of noncommercial sites. – The act directs DENR to establish the degree of risk to human health and the environment posed by noncommercial UST releases and to determine a schedule for

further assessment and cleanup based on those factors. Once DENR has established a cleanup schedule, the costs of any assessment or cleanup activities are not eligible for reimbursement from the Noncommercial Fund until the actions are authorized by DENR pursuant to the schedule. An owner, operator, or other person may choose to undertake assessment or cleanup before receiving authorization from DENR, but the costs for the assessment or cleanup will be reimbursed only after DENR has paid or reimbursed the costs for all assessments and cleanups authorized by DENR. A similar provision that applies to commercial UST releases was enacted in 2003. The prioritization requirements will expire on October 1, 2005.

Study UST Program. – The act directs the Environmental Review Commission (ERC) and the Joint Legislative Transportation Oversight Committee to jointly study the role of the State and DENR in implementing the UST cleanup program. The issues to be considered include:

- The role of the State in assisting owners and operators of USTs in meeting applicable financial responsibility requirements and the availability and adequacy of private insurance.
- The adequacy of current and projected future revenue into the UST Funds.
- The feasibility and desirability of privatizing some or all of the functions of the UST Funds.
- The State's role in the cleanup of orphan UST sites.
- Whether existing UST rules are adequate to prevent future releases from USTs.

The ERC and the Joint Legislative Transportation Oversight Committee are to report the results of their study, including any legislative proposals, to the General Assembly no later than January 31, 2005.

The portions of this section that address prioritization and preapproval become effective October 1, 2004. The remainder of the section became effective July 1, 2004. The portions that address prioritization expire on October 1, 2005. (GG, TD)

Water Quality/Quantity/Groundwater

Dry-Cleaning Solvent Cleanup Act Amendments

S.L. 2004-48 (SB 1219) increases the percentage of revenue credited to the Dry-Cleaning Solvent Cleanup Fund (Fund) that may be used to pay for the costs of assessment or remediation of dry-cleaning solvent contamination that occurred prior to July 1, 2001, to 25% of the revenues credited to the Fund in the preceding fiscal year. Previously, the total payments made for the costs of assessment or remediation that occurred prior to July 1, 2001 could not exceed 10% of the revenues credited to the Fund in the preceding fiscal year.

The act became effective July 1, 2004. (TD)

Limit Use of Impervious Parking Surfaces For Sale of Nursery Stock

S.L. 2004-124, Sec. 6.29 (HB 1414, Sec. 6.29) makes changes to the law concerning the regulation of stormwater runoff. This section provides that a retail merchant may not use more than 400 square feet of impervious surface within the merchant's vehicular parking area for the display and sale of nursery stock as defined by the Board of Agriculture. The Board defines nursery stock as all wild or cultivated plants trees, shrubs, vines, and bulbs. This definition specifically excludes, however, annual plants, cut flowers, true seeds, decorative plants without roots, and perennial plants intended for indoor use that are produced in North Carolina.

This section does not apply to retail merchants that either:

- Collect or treat stormwater on-site using a treatment system that is designed to remove at least 85% of total suspended solids.
- Collect or store stormwater for reuse on-site for irrigation or other purposes.
- Collect and discharge stormwater to a local or regional stormwater collection and treatment system.

The Secretary of Environment and Natural Resources may impose a civil penalty of not more than $25,000 for a violation of this section. For continuous violations, this penalty may be imposed per day, unless otherwise stipulated. A civil penalty of $10,000, or in the case of a continuous violation, a penalty of $10,000 per day may be assessed if a civil penalty had been imposed against the violator within the five years preceding the violation.

This section becomes effective January 1, 2005, and applies only to retail merchants that first open a retail premises for business on or after that date or that submit an application for a building permit for the construction or renovation of a retail premises after that date. (TH)

Stormwater Pilot Project

S.L. 2004-124, Sec. 30.20 (HB 1414, Sec. 30.20) directs the Department of Transportation to use up to $15,000,000 of funds available to the Department during the 2004-2005 fiscal year for a stormwater pilot project that will use new and innovative technologies and filtering mechanisms to clean up State-maintained ocean outfalls and associated outlets.

This section became effective July 1, 2004. (TD)

Phase II Stormwater Management-1

S.L. 2004-163 (SB 1210) provides for the temporary implementation of federal Phase II stormwater management requirements.

Phase II Stormwater Permit Application and Standards. – Section 1 provides that an application for a Phase II National Pollutant Discharge Elimination System (NPDES) permit for stormwater management (stormwater permit) that was submitted to the Department of Environment and Natural Resources (DENR) in accordance with the application schedule set out in Section 6 of the temporary Phase II stormwater management rule adopted by the Environmental Management Commission (EMC) on October 10, 2002, will be deemed timely received. A local government applicant for a stormwater permit must develop, implement, and enforce a stormwater management plan that is approved by DENR and that meets federal requirements. The evaluation of the stormwater permit applications by DENR will be conducted as provided in Section 10 of the temporary Phase II stormwater management rule adopted by the EMC on October 10, 2002, as modified by this act. A municipality with a population of less than 1,000 is not required to obtain a stormwater permit unless the municipality is shown to be contributing to an impairment of State waters.

New Development and Redevelopment in Unincorporated Areas of Counties. –Section 2 provides that new development and redevelopment located in the unincorporated area of a county must comply with the stormwater management standards set forth in Section 10 of the temporary Phase II stormwater management rule adopted by the EMC on October 10, 2002, as modified by this act, beginning July 1, 2006 if the new development or redevelopment is located in:

- An area that is federally designated as an urbanized area.
- An unincorporated area of a county that is delineated as a regulated coverage area. An unincorporated area is delineated as a regulated coverage area based on its geographical proximity to a municipality and the environmental impact of stormwater discharges within or from the area.
- A county in which the unduplicated sum of: (i) the area that is federally designated urbanized area; (ii) the area delineated as a regulated coverage area; (iii) the jurisdiction of a regulated entity designated pursuant to Section 7 of this act; and (iv) the area that is regulated by a stormwater permit required pursuant to Section 8 of this act equals or exceeds 85% of the total geographic area of the county.

Coordination of Phase II and Other Stormwater Management Programs. –Section 3 provides that if there are conflicting or overlapping stormwater management requirements, the most stringent requirements will apply.

General Permit. – Section 4 directs DENR to develop and issue a Phase II NPDES general permit for stormwater management containing postconstruction stormwater management measures developed in accordance with Section 10 of the temporary Phase II stormwater management rule adopted by the EMC on October 10, 2002, as modified by this act. A local government may opt to be covered under the Phase II NPDES general permit for stormwater management developed by DENR rather than developing its own individual permit.

Delegation. – Section 5 provides that a public entity that does not administer a stormwater permit throughout the entirety of its planning jurisdiction and whose planning jurisdiction includes a regulated

coverage area may voluntarily undertake the implementation of a local stormwater management program approved by DENR.

Phase II Stormwater Implementation Deadlines. – Section 6 provides deadlines for when DENR must make certain permitting decisions. Section 6 also provides that:

- A public entity federally designated as a regulated entity will develop and implement postconstruction stormwater management measures within 24 months of the issuance of its stormwater permit.
- A public entity designated as a regulated entity pursuant to subdivisions (2)(the State designation process) and (3)(designation under a total maximum daily load (TMDL) implementation plan) of Section 7 of the act will develop and implement postconstruction stormwater management measures within 36 months of the issuance of its stormwater permit.

Designation. – Section 7 provides a detailed designation process by which the EMC may require additional local governments and other entities to obtain a stormwater permit.

Petition Process. – Section 8 provides a detailed petition process by which the EMC may require additional local governments and other entities to obtain a stormwater permit upon the petition of any person.

Model Ordinance. – Section 9 directs the EMC to develop a stormwater model ordinance to assist local governments and others in developing and implementing stormwater management programs and controls. In the development of the model ordinance, the EMC will provide for options that take into consideration differences among local governments in the State, including but not limited to population, financial resources, and human resources.

Design Manual. – Section 10 provides for the development of a stormwater design manual to assist local governments and others in determining which controls are best suited to their unique characteristics, including but not limited to hydrology, topography, climate, soils, and receiving waters.

Federal and State Development or Redevelopment Projects. – Section 11 provides that DENR will have exclusive jurisdiction to establish stormwater management requirements with respect to a particular project that is not under the jurisdiction of a federal or State agency that holds a Phase I or Phase II NPDES permit for stormwater management that applies to all of the agency's activities or that applies to the particular project.

Definitions. – Section 12 provides definitions for the act and its implementation.

Construction of Act. – Section 13 provides that:

- Nothing in the act shall be construed to alter the authority of the EMC or a local government with regard to stormwater management.
- The act shall not be construed to affect pending litigation.
- Except as specifically provided by the act, the act shall not be construed to give effect to any Phase II stormwater management rules that have not become effective as provided in the Administrative Procedure Act.
- The federal exemptions from NPDES permit requirements for agriculture and silviculture apply to this act.
- The act shall not be construed to affect any vested right to development under any provision of statutory or common law.
- The act shall not be construed to affect any delegation of power or duty to the EMC or DENR.

This act became effective August 2, 2004, and expires October 1, 2011. (GG, JH)

Phosphorus Nutrient Management/Animal Feedlots

S.L. 2004-176 (HB 1112), as amended by S.L. 2004-195, Sec. 1.9 (SB 823, Sec. 1.9), implements requirements applicable to National Pollution Discharge Elimination System (NPDES) permits and animal waste management plans governing animal feeding operations to make the State permit requirements consistent with federal regulations. The act:

- Amends the definition of "animal operation" to include agricultural feedlots with liquid animal waste management systems that discharge to surface waters.
- Requires owners and operators of animal operations to apply for a NPDES permit 180 days prior to construction of a new animal waste management system (System) or expansion of an

existing System and to obtain the NPDES permit prior to commencement of construction or expansion.

- Requires owners and operators of proposed new dry litter poultry facilities of a certain size to apply for NPDES permits 180 days prior to operation of a new System.
- Establishes deadlines for existing animal operations and dry litter facilities of a certain size to apply for NPDES permits.
- Requires that Systems be constructed and operated so that the animal operation the System serves does not result in a discharge except as may result because of rainfall from a storm event more severe than the 100-year, 24-hour storm.
- Requires certain dry litter poultry facilities to develop animal waste management plans and specifies the components of the plan.
- Provides that phosphorus shall be a rate-determining element for land application of animal waste if testing demonstrates the need to limit the application of phosphorus in order to comply with the nutrient management standard.
- Establishes a three-tier system of annual permit fees for dry litter poultry facilities. The annual fee will be $50.00, $150.00, or $300.00, depending on the size of the facility.
- Directs the Department of Environment and Natural Resources (DENR) to evaluate the need for and availability of information to identify poultry facilities that may be subject to regulation. DENR must report its findings and recommendations, including any legislative proposals, to the Environmental Review Commission on or before January 1, 2005.

S.L. 2004-195, Sec. 1.9 (SB 823, Sec. 1.9) modified the effective date of Section 7 of S.L. 2004-176, which directs DENR to evaluate the information needs for the identification of poultry facilities that may be subject to regulation, thus the section became effective August 2, 2004. The remaining sections of S.L. 2004-176 become effective January 1, 2005. (JM, GG)

Miscellaneous

River Basins Advisory Commissions

S.L. 2004-83 (SB 859) establishes the Catawba/Wateree River Basin Advisory Commission and the Yadkin/Pee Dee River Basin Advisory Commission. Each commission will consist of 15 members from North Carolina and South Carolina. The commissions have no regulatory authority. The purpose of the commissions is to:

- Provide guidance and make recommendations to local, state, and federal legislative and administrative bodies on the use, stewardship, and enhancement of the water and other natural resources within the respective river basin.
- Provide a forum for discussion of issues affecting the river basin's water quality, water quantity, and natural resources.
- Promote communication, coordination, and education among stakeholders.
- Identify problems and recommend appropriate solutions.
- Undertake studies and publish reports related to water quantity, water quality, and other natural resources of the river basin.
- Determine the optimum approach to comprehensively and collaboratively provide recommendations for integrated river management.

This act is similar to legislation enacted by the General Assembly of South Carolina on July 6, 2004 (2004 South Carolina Laws Act 262).

This act became effective July 8, 2004. (JM)

Requirements for Animal Waste Management Systems Technical Specialists

S.L. 2004-124, Sec. 12.7C (HB 1414, Sec. 12.7C) provides that the requirements and qualifications for animal waste management systems technical specialists (technical specialists) shall not be changed and the scope of the work they are authorized to perform shall not be decreased before July 1,

2006. Technical specialists are approved by the Soil and Water Conservation Commission to provide various forms of assistance to farmers in the development and certification of their animal waste management plans.

This section became effective July 1, 2004. (TD)

Expand Express Review Pilot Program

S.L. 2004-124, Sec. 12.9 (HB 1414, Sec. 12.9) expands the geographic coverage of the Express Review Pilot Program (Program) that was established by S.L. 2003-284, Sec. 11.4A. Under the Program, the Department of Environment and Natural Resources (DENR) provides expedited review of certain environmental permits, approvals, and certifications and may charge fees higher than those set by statute for the normal review process. The Program may apply to permits, approvals, and certifications under the erosion and sedimentation control program, the coastal management program, and the water quality programs, and focuses on stormwater permits, stream origination certifications, water quality certifications, erosion and sedimentation control permits, and Coastal Area Management Act permits.

The original Program was implemented in the Wilmington and Raleigh Regional Offices of DENR. S.L. 2004-124, Sec. 12.9 (HB 1414, Sec. 12.9) directs DENR to expand the Program to two additional regional offices and authorizes DENR to establish additional positions to administer the Program. No later than March 1, 2005, DENR will report to the Fiscal Research Division and the Environmental Review Commission on the Program and whether it should be continued or expanded.

This section became effective July 1, 2004. (JH)

Expand One-Stop Permit Assistance Program Statewide

S.L. 2004-124, Sec. 12.12 (HB 1414, Sec. 12.12) expands statewide and makes permanent the one-stop environmental permit application assistance and tracking system pilot project established by S.L. 2000-67, Sec. 13.7. Under the expanded, permanent one-stop environmental permit application assistance and tracking system program (Program), the Department of Environment and Natural Resources (DENR) must provide each person who submits a complete application for a permit with a time frame within which the applicant may expect a final decision regarding the issuance or denial of the permit. Unless otherwise provided by law, when an applicant has provided DENR with all required information and documentation and DENR fails to issue or deny the permit within 60 days of the projected date for a final decision, the permit shall be automatically issued. The permit will not automatically issue if the applicant substantially amends an application or agrees to receive a final decision at a later date.

DENR shall track the time required to process each complete permit application that is subject to the Program, compare the actual and projected dates of final permit decisions, and identify each permit that was issued or denied more than 90 days after receipt of a complete application and document the reasons for the delayed action. No later than October 1 of each year, DENR shall report to the House of Representatives and the Senate Appropriations Subcommittees on Natural and Economic Resources, the Fiscal Research Division, and the Environmental Review Commission on this information and shall recommend permit time frames for all major permits it issues.

This section becomes effective January 1, 2005. (JH)

Monitoring and Emergency Cleanup Funds for Texfi Site Contamination

S.L. 2004-124, Sec. 12.14 (HB 1414, Sec. 12.14) authorizes the Department of Environment and Natural Resources (DENR) to use up to $50,000 of money appropriated to the Division of Waste Management of DENR for cost share of federal Superfund cleanup funds to monitor and perform emergency cleanup activities at the Texfi site in Cumberland County.

This section became effective July 1, 2004. (TD)

Amend Environmental Laws-3/Appointments

S.L. 2004-195 (SB 823) amends various environmental laws and makes other changes, including:

- Makes technical corrections to various laws related to the environment and natural resources.
- Modifies environmental reporting requirements.
- Abolishes the Watershed Protection Advisory Council and the Scientific Advisory Council on Water Resources and Coastal Fisheries Management.
- Extends by one year the time available to the Environmental Management Commission to develop and adopt permanent rules governing water conservation and water reuse during drought and emergency water situations.
- Provides for staggered terms of the members of the Agricultural Finance Authority, appoints members to the Authority, and limits future members of the Authority from serving more than three successive three-year terms.
- Prohibits the sale or dispensing of raw milk and raw milk products to anyone other than a permitted milk hauler or a milk processing facility.

This act became effective August 17, 2004.

Section 7 of this act provides that vacancies may be filled in certain offices during a holdover period. For additional information on this section, see **State Government**. (TD)

Wetlands Reimbursement/Local Tax Base

S.L. 2004-188 (SB 933) requires State and local government agencies that acquire land for wetlands mitigation in an enterprise tier one or tier two county to reimburse the county in which the land is located a sum equal to the estimated amount of property taxes that would have accrued to the county for the next 20 years. The requirement does not apply when the land purchased and the wetlands permitted to be lost are located in the same county.

This act became effective August 17, 2004. (CA)

Finance Vital Projects/Studies

S.L. 2004-179, Parts 2, 3, 4, and 8 (HB 1264, Parts 2, 3, 4, and 8) authorize the issuance of special indebtedness (certificates of participation, or "COPs") for the financing of parks projects and clean water projects, including various capital projects, and for the financing of natural heritage projects. The act sets a cap on the maximum principal amount of special indebtedness that may be incurred of $45,000,000, $20,000,000 of which may be incurred for land near military bases, and $25,000,000 of which may be incurred for parks and gamelands. Up to $32,000,000 (of the total $45,000,000) in special indebtedness may be issued before July 1, 2005. Repayment of the debt for these purposes would be made from existing revenue streams dedicated to the Parks and Recreation Trust Fund, the Natural Heritage Trust Fund, and the Clean Water Management Trust Fund. The act requires that the Parks and Recreation Authority allocate funds from the Parks and Recreation Trust Fund with a geographic distribution across the State to the extent practicable. The act states that it is the intent of the General Assembly that the purposes for which parks, heritage, and clean water indebtedness may be incurred include, as a high priority, acquiring land near military bases to prevent encroachment. The act further provides that none of the parks, heritage, and clean water debt proceeds may be used to acquire property by eminent domain.

These parts became effective August 5, 2004.

Parts 5 and 7 of this act create the Debt Affordability Advisory Committee and authorize the State Treasurer to study the use of innovative public financing tools. For additional information on this section, see **Finance**.

Part 6 of this act authorizes the University of North Carolina and the State Board of Community Colleges to study the mission and education program needs for the University System and the Community College System. For additional information on this section, see **Education**. (JM)

Studies

Legislative Research Commission

Light Pollution and Conservation Studies

S.L. 2004-161, Secs. 2.1(1)c and 2.1(9)c (SB 1152, Secs. 2.1(1)c and 2.1(9)c) authorize the Legislative Research Commission to study:

- Light pollution.
- Soil and water conservation issues.

These sections became effective August 2, 2004. (TD)

New/Independent Studies/Commissions

Saltwater Fishing Fund

S.L. 2004-187, Secs. 12(c) and 12(d) (HB 831, Secs. 12(c) and 12(d)) direct the Board of Trustees of the North Carolina Saltwater Fishing Fund to study issues related to the establishment of a unified recreational fishing license for recreational fishing in both the inland and coastal fishing waters of the State. The Board shall make specific findings as to whether a unified licensing system should be adopted for recreational fishing in the State and, if so, what the system should be and how it should be implemented. The Board shall submit the results of this study to the Joint Legislative Commission on Seafood and Aquaculture no later than April 15, 2005.

These sections became effective August 17, 2004. (JH)

Referrals to Existing Commissions/Committees

Coastal Resources Commission

New Urban Waterfront Development Pilot

S.L. 2004-117 (SB 732) directs the Coastal Resources Commission (CRC) to implement a pilot under which one county may designate an area as a new urban waterfront (NUW area), and allows for the development of a NUW area as provided in the act. A NUW area as defined by the act is an area designated for development that includes a mixture of residential and commercial uses, recreational areas, and facilities for governmental or other civic purposes; provides for pedestrian access to residential, commercial, civic and recreational areas; and incorporates open space for recreational and other public purposes.

Section 4 of the act directs the CRC to evaluate the impacts on water quality and other environmental impacts from the NUW area, and the costs and benefits from the development, in order to determine whether additional developments within NUW areas should be allowed, and whether rules governing the developments should be modified. The CRC is directed to annually report its interim findings and recommendations to the Environmental Review Commission beginning October 1, 2005, and to report its final findings and recommendations no later than October 1, 2010.

This act became effective July 17, 2004. (JM)

Commission for Health Services

Innovative Peat-Based Wastewater Systems Study

S.L. 2004-161, Part VIII (SB 1152, Part VIII) directs the Commission for Health Services (Commission) to evaluate whether to implement a pilot program testing innovative septic systems that utilize peat-based technology. The Commission will identify two or more counties that would participate in the pilot program as part of the evaluation. The Commission will report the results of its evaluation to the Senate and House of Representatives Appropriations Subcommittees on Natural and Economic Resources, the Fiscal Research Division, and the Environmental Review Commission on or before January 15, 2005.

This part became effective August 2, 2004. (TD)

Environmental Review Commission

Leaking Petroleum Underground Storage Tank Cleanup Funds Solvency

S.L. 2004-124, Sec. 30.10(f) (HB 1414, Sec. 30.10(f)) directs the Environmental Review Commission (ERC) and the Joint Legislative Transportation Oversight Committee to jointly study the role of the State and the Department of Environment and Natural Resources in implementing the Leaking Petroleum Underground Storage Tank (UST) Cleanup Program. The issues to be considered include:

- The role of the State in assisting owners and operators of USTs in meeting applicable financial responsibility requirements and the availability and adequacy of private insurance.
- The adequacy of current and projected future revenue into the Commercial Leaking Petroleum UST Cleanup Fund and the Noncommercial Leaking Petroleum UST Cleanup Fund (UST Funds).
- The feasibility and desirability of privatizing some or all of the functions of the UST Funds.
- The State's role in the cleanup of orphan UST sites.
- Whether existing UST rules are adequate to prevent future releases from USTs.

The ERC and the Joint Legislative Transportation Oversight Committee are to report the results of their study, including any legislative proposals, to the General Assembly no later than January 31, 2005.

This section became effective July 1, 2004. (TD, GG)

Environmental Review Commission Studies

S.L. 2004-161, Part XIX (SB 1152, Part XIX) directs the Environmental Review Commission (ERC) to study:

- Whether the State should modify the current highway use tax so that all or a portion of the highway use tax paid on a private passenger vehicle is based on the fuel efficiency rating of the vehicle.
- Whether the State should modify the current vehicle registration fee so that all or a portion of the annual vehicle registration renewal fee for a passenger vehicle is based on the vehicle miles traveled by the vehicle.

The ERC shall consider whether these modifications should be made on a revenue neutral basis or should be made so as to generate additional revenue to be used to fund initiatives designed to improve air quality and the efficiency of the State's transportation system.

Part XIX also authorizes the ERC to study:

- The overall effectiveness of the State's efforts to protect the environment and conserve the natural resources of North Carolina.
- Whether information compiled by the Statewide Floodplain Mapping Unit would be useful and relevant to dam operators, local agencies, and State agencies with regard to making decisions about coordinating and controlling water releases from dams, flood control, floodplain management, and emergency evacuation procedures.

- Water restriction guidelines created by the Department of Environment and Natural Resources and implemented by local governments.
- Various approaches to prevent and reduce stormwater pollution throughout the State.
- Other topics:
  - Development and funding of regional water supply systems.
  - Establishing a Clean Air Trust Fund.
  - Revocation of contracts under certain circumstances.
  - The feasibility of encouraging permeable surfaces as a deterrent to stormwater runoff.
  - Ways to protect a property owner whose land is adjacent to or downstream from a site on which alterations of the existing flow of stormwater will occur.

This part became effective August 2, 2004. (TD)

Joint Legislative Commission on Seafood and Aquaculture

Study Taking of Shrimp with Trawl Nets in Certain Inland Waters

S.L. 2004-161, Part XXV (SB 1152, Part XXV) authorizes the Joint Legislative Commission on Seafood and Aquaculture to study whether it should be unlawful to take shrimp with trawl nets in certain inland waters. The Commission may report the results of its findings, with any recommended legislation, to the 2005 General Assembly.

This part became effective August 2, 2004. (JH)

Joint Legislative Growth Strategies Oversight Committee

Joint Legislative Growth Strategies Oversight Committee

S.L. 2004-161, Part III (SB 1152, Part III) provides that the Joint Legislative Growth Strategies Oversight Committee may study the following issues:

- Delegating authority to cities and counties;
- Modernizing city and county planning; and
- Transferable development rights.

The provision amends the Committee's expiration and reporting requirements contained in Section 3.3 of S.L. 2001-491. The change extends the Joint Legislative Growth Strategies Oversight Committee's expiration date and reporting requirements to January 16, 2007.

This section became effective August 2, 2004. (JHM)

Marine Fisheries Commission

Amend Shellfish Laws

S.L. 2004-150, Secs. 6 and 7 (HB 1427, Secs. 6 and 7) authorize the Marine Fisheries Commission (MFC) to study:

- Whether and how to establish a process by which shellfish cultivation leases that have been terminated may be leased without reverting to public bottom.
- Issues related to corporate ownership of shellfish cultivation leases.

If the MFC undertakes either study, the MFC shall report its findings and recommendations to the Joint Legislative Commission on Seafood and Aquaculture no later than December 1, 2004.

These sections became effective August 2, 2004. (JH)

Referrals to Departments, Agencies, Etc.

State Parks System Additions & Study

S.L. 2004-24, Sec. 2 (HB 1574, Sec. 2) directs the Division of Parks and Recreation (Division) of the Department of Environment and Natural Resources to study the feasibility and desirability of acquiring land and establishing a new State recreation area at Blewett Falls Lake, including estimation of the cost of developing the proposed recreation area. The Division must report its findings and recommendations, including any legislative proposals, to the Environmental Review Commission on or before December 1, 2005.

This section became effective June 25, 2004. (JM)

Twenty-Four Hour Access to Fort Fisher State Recreation Area During the Fall and Winter/Funds for Department Study/Activities at Fort Fisher

S.L. 2004-124, Secs. 12.3(b) and 12.3(c) (HB 1414, Secs. 12.3(b) and 12.3(c)) direct the Department of Environment and Natural Resources (DENR) to conduct a study of vehicle use at Fort Fisher State Recreation Area (Fort Fisher) including consideration of:

- The demand for vehicle access to the beach during different times of the year;
- The impact of vehicles on sea turtles and nesting birds;
- The sea turtle and bird nesting activity at Fort Fisher as compared with the nesting activity on the adjoining beach managed by the Bald Head Conservancy and on Masonboro Island; and
- The economic impact of restricting 24-hour vehicle access to the beach.

DENR must report its findings and recommendations, including any legislative proposals, to the Environmental Review Commission by February 1, 2005. The section also provides that of the funds appropriated to DENR for the 2004-2005 fiscal year, $25,000 shall be used to conduct the study and for other educational, conservation, and enforcement activities at Fort Fisher.

These sections became effective July 1, 2004. (JM)

Phosphorous Nutrient Management/Animal Feedlots

S.L. 2004-176, Sec. 7 (HB 1112, Sec. 7), as amended by S.L. 2004-195, Sec. 1.9 (SB 823, Sec. 1.9), directs the Department of Environment and Natural Resources (DENR) to evaluate the need for and availability of information to identify poultry facilities that may be subject to regulation. DENR must report its findings and recommendations, including any legislative proposals, to the Environmental Review Commission on or before January 1, 2005.

S.L. 2004-195, Sec. 1.9 (SB 823, Sec. 1.9) modifies the effective date of this act, therefore, this provision became effective August 2, 2004. (JM)

Stream Mapping

S.L. 2004-161, Part XXXIII (SB 1152, Part XXXIII) directs the Geographic Information Coordinating Council and the Department of Environment and Natural Resources to develop and recommend a plan to improve the mapping and digital representation of surface waters in North Carolina, including intermittent and perennial streams, lakes, and ponds, to the General Assembly and the Environmental Review Commission on January 15, 2005.

This part became effective August 2, 2004. (TD)

Office of State Personnel Study – DENR Parks and Recreation Law Enforcement Officers

S.L. 2004-161, Part XLII (SB 1152, Part XLII) directs the Office of State Personnel to conduct a reclassification study of all sworn law enforcement officers employed in the Division of Parks and Recreation of the Department of Environment and Natural Resources. The Office of State Personnel is directed to report the results of this study to the General Assembly and the Fiscal Research Division of the General Assembly by January 3, 2005.

This part became effective August 2, 2004. (TM)

Summary of Funding for Environmental Initiatives
2004 Legislative Session

	FY 2004-05	
Total Funding for Environmental Initiatives	**$3,274,387**	
Environmental Permitting	**$200,000**	
Express Permitting Pilot Program: Expand to two additional regions	100,000	NR
One-Stop Permitting Program: Expand state-wide	100,000	
Environmental Health	**$50,000**	
Shellfish Sanitation Program	50,000	
Waste Management	**$1,000,000**	
Superfund Cost Share Matching Funds	1,000,000	NR
Water Resources	**$263,777**	
River Basin Water Supply Initiative	150,000	
	33,254	NR
Water Resources Projects Environmental Engineer	80,523	
Natural Resource Programs	**$1,760,610**	
Forest Resources positions	105,101	
Forest Resources equipment	15,000	NR
Recreational Fishing License funds	750,000	NR
Center City Park (Greensboro)	500,000	NR
Soil and Water Regional Coordinator	41,749	
Additional Grassroots Science Museum funding	296,000	
Additional Partnership for the Sounds funding	52,760	

Prepared by Fiscal Research Division, October 2004

Studies to be Conducted by the Environmental Review Commission

Organized by topics: air quality, coastal issues, environmental health, fishing, general, hazardous substances, land quality, parks and conservation, solid waste, water quality, water quantity, wetlands

air quality

ERC	Report To/ Authority	Report Due
Shall study whether the State should modify the current highway use tax so that all or a portion of the highway use tax paid on a private passenger vehicle is based on the fuel efficiency rating of the vehicle (Sen. Clodfelter)	2005 General Assembly S.L. 2004-161, sec. 19.10(1)	upon convening
Shall study whether the State should modify the current vehicle registration fee so that all or a portion of the annual vehicle registration renewal fee for a passenger vehicle is based on the vehicle miles traveled by the vehicle (Sen. Clodfelter)	2005 General Assembly S.L. 2004-161, sec. 19.10(2)	upon convening
May study establishment of Clean Air Trust Fund	2005 General Assembly S.L. 2004-161, sec. 19.6	upon convening

general

ERC	Report To/ Authority	Report Due
May study the overall effectiveness of State's efforts to protect the environment and conserve the natural resources of NC.	2005 General Assembly S.L. 2004-161, sec. 19.2	upon convening
May study the development of a plan to Share Floodplain Mapping Information (Rep. Daughtridge)	2005 General Assembly S.L. 2004-161, sec. 19.3	upon convening
May study issues related to the fair bargain act - study the revocation of contracts under certain circumstances (Sen. Horton)	2005 General Assembly S.L. 2004-161, sec. 19.7	upon convening

water quality - general

ERC	Report To/ Authority	Report Due
May study various approaches to prevent and reduce stormwater pollution throughout the State, including but not limited to: low impact design as a stormwater management technique; financial and regulatory incentives; ...(Rep. Gibson)	2005 General Assembly S.L. 2004-161, sec. 19.11	upon convening
May study the feasibility of encouraging permeable surfaces as a deterrent to stormwater runoff (Sen. Horton)	2005 General Assembly S.L. 2004-161, sec. 19.8	upon convening
May study ways to protect a property owner whose land is adjacent to or downstream from a site on which alterations of the existing flow of stormwater will occur (Sen. Rucho)	2005 General Assembly S.L. 2004-161, sec. 19.9	upon convening

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

water quality - ground

ERC	Report To/ Authority	Report Due
May study issues related to the LUST program, including any of the following: 1) the adequacy of program funding; 2)Options for management of available funds, including prioritization and preapproval; 3) changes in deductible and copayment reqs., etc.	General Assembly SL 2003-352, Sec. 12	2004 Regular Session or 2005 General Assembly

ERC and the Joint Legislative Transportation Oversight Committ	Report To/ Authority	Report Due
Shall study the role of the State and DENR in implementing the Leaking Petroleum Underground Storage Tank (UST) Cleanup Program. Several direct areas of focus listed in act.	General Assembly S.L. 2004-124, Sec. 30.10.(f)	31 Jan 2005

water quantity

ERC	Report To/ Authority	Report Due
May study water restriction guidelines created by the DENR and implemented by local governments, including an evaluation of economic impacts and recommendations for establishing consistency (Rep. Gibson)	2005 General Assembly S.L. 2004-161, sec. 19.4	upon convening
May study the issue of the development and funding of regional water supply systems (Sen. Shaw)	2005 General Assembly S.L. 2004-161, sec. 19.5	upon convening

* "oral" indicates oral report was given to ERC or S+A; "mail" indicates the report was mailed to members; "in" indicates that the report has been received but not yet distributed.

Status of Reports to the ERC Required by Law

Organized by topics: air quality, coastal issues, environmental health, fishing, general, hazardous substances, land quality, parks and conservation, solid waste, water quality, water quantity, wetlands

air quality

DAQ	Report To/ Authority	Report Due	Status*
Study issues related to monitoring emissions of mercury and the development and implementation of standards and plans to implement programs to evaluate available control technologies; shall estimate the benefits and costs of alternative strategies to	EMC, ERC S.L. 2002-4, Section 12	Annually (Interim 1 Sep 2003) (Findings 1 Sep 2005)	Sep 03 distrib 2/24/04 Sep 04 in
Study issues related to the development and implementation of standards and plans to implement programs to control emissions of carbon dioxide (CO2) from coal-fired generating units and other stationary sources; evaluate available control technologies and	EMC, ERC S.L. 2002-4, Section 13	Annually (Interim 1 Sep 2003) (Findings 1 Sep 2005)	Sep 03 distrib 2/24/04 Sep 04 in

DENR	Report To/ Authority	Report Due	Status*
Progress in increasing the use of alternative-fueled and low emission light duty cars and trucks in privately owned fleets	ERC GS 143-215.107C(c); SL 1999-328, Sec. 4.5	Annually (Oct 1)	16 Mar 00 27 Sep 00 oral Oct 03 distrib 02/06/04
Cost of the Title V program	ERC, Fiscal Research GS 143-215.3A(c)	Annually (1 Nov)	Mar 00 mail 3/29/00 May 02 oral 5/21/02 Jan 04 distrib 2/24/04

DENR, Utilities Commission	Report To/ Authority	Report Due	Status*
Implementation of SL 2002-4 (Clean Smokestacks)	ERC, Joint Legislative Utility Review Committee S.L. 2002-4, Section 14	Annually (1 Jun 2003)	28 Jan 03 30 May 03 distrib 2/24/04 June 04 in

Department of Transportation	Report To/ Authority	Report Due	Status*
Evaluation/ adjustment of region served by each Metropolitan Planning Organization	ERC, Joint Legislative Transportation Oversight Committee GS 136-202(d)	Nov 1 of each year regions evaluated and adjusted (every 5 years, including year following federal census)	
Plan developed with DOA, Commerce, DENR to reduce VMT & vehicle emissions from private sector employee travel.	ERC, Joint Legislative Transportation Oversight Committee GS 143-215.107C(e); SL 199	Annually (Oct 1)	16 Mar 00 oral 27 Sep 00 distrib 02/02/04 distrib 3/25/04 Included in TDM Program

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	Report To/ Authority	Report Due	Status*
EMC			
Progress in rulemaking to regulate NOx from complex sources (EMC Quarterly Report)	ERC SL 1999-328(4.9)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 Apr 03 oral 2/24/04 April 04 oral 3/25/04 July 04 distrib 10/21/04 Oct 04 oral 10/21/04
Desirability of requiring and the feasibility of obtaining reductions in emissions of oxides of nitrogen (Nox) and sulfur dioxide (SO2) beyond those required by G.S. 143-215.107D.	ERC, General Assembly SL 2002-4, Section 11	Annually, starting 2005 (Sep 1)	
Office of State Personnel	**Report To/ Authority**	**Report Due**	**Status***
Plan developed with DOA, DOT, DENR to reduce VMT & vehicle emissions from State employee travel.	ERC, Joint Legislative Transportation Oversight Committee SL 1999-328(4.6)	Annually (Oct 1)	09/00 Oral 12/00 Mar 02 Distrib 5/21/02 Letter distrib 02/24/04
Promotion of telecommuting, as recommended by State Auditor	ERC SL 1999-328(4.8)	Annually (Oct 1)	09/00 Oral 12/00 Distrib 1/18/01 Feb 02 Distrib 5/21/02 Letter distrib 02/24/04

coastal issues

	Report To/ Authority	Report Due	Status*
CRC			
Evaluate the impacts on water quality and other environmental impacts from the new urban waterfront area development authorized by this act and evaluate the costs and benefits from the development to the area in which the development is located.	ERC S.L. 2004-117, Sec. 4	Annually (beginning 1 Oct 05). Final report due 1 Oct 2010.	

fishing

	Report To/ Authority	Report Due	Status*
CRC, EMC, and MFC			
Progress in developing and implementing Coastal Habitat Protection Plans	ERC, S&A GS 143B-279.8(e)	Annually (Sep 1)	Sep 99 oral 11/23/99 Sep 00 oral 01/11/01 Sep 01 distrib 01/30/02 Sep 03 distrib 2/06/04 Aug 04 in
DENR	**Report To/ Authority**	**Report Due**	**Status***
Fish kills within the preceding year	ERC GS 143B-279.7(c)	Annually (Dec 1)	Dec 99 oral 1/20/00 Jan 01 oral 1/18/01 Feb 02 oral 2/21/02 Jan 04 distrib 2/24/04

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	Report To/ Authority	Report Due	Status*
DENR (Secretary)			
Individual Coastal Habitat Protection Plans	ERC, S&A GS 143B-279.8(f)	30 days after complete or substantially revise draft plan	Aug 04 in

general

	Report To/ Authority	Report Due	Status*
DENR			
Cost of State's environmental permitting program	ERC, Fiscal Research GS 143-215.3A(c)	Annually (Nov 1)	April 00 distrib
Cost of implementing the Mining Act of 1971	ERC GS 74-54.1(c)	Annually (Sep 1)	Jan 02 distrib 01/30/02 Aug 03 distrib 02/06/04 Sep 04 in
One-Stop Permit Assistance Program - # of environmental permits subject to this section that took more than 90 days to issue or deny, the types of permits those were, the reasons for the extended processing time of those permits, ...	ERC, NER subcommittees, Fiscal Research S.L. 2000-67(13.7) S.L. 2001-424 (19.6) S.L. 2004-124, Sec. 12.12	Annually (beginning 1 Oct 04)	Apr 01 mail 05/04/01 29 July 2003 oral 5/05/04
DENR (Secretary)	**Report To/ Authority**	**Report Due**	**Status***
State of the Environment Report	General Assembly,ERC GS 143B-279.5(a)	Feb 15 of each odd-numbered year	Feb 1, 2000
EMC	**Report To/ Authority**	**Report Due**	**Status***
EMC operation, activities, programs, and progress (see also other reports with "EMC Quarterly Report" noted at the end of the topic line)	ERC GS 143B-282(b)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15); upon request	Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 Apr 03 distrib 2/6/04 Jan 04 oral 2/6/04 July 04 distrib 10/21/04 Oct 04 oral 10/21/04
Geographic Information Coordinating Council and DENR	**Report To/ Authority**	**Report Due**	**Status***
Develop and recommend a plan to improve the mapping and digital representation of surface waters in North Carolina, including intermittent and perennial streams, lakes, and ponds	General Assembly and ERC S.L. 2004-161, sec. 33.1	15 Jan 2005	

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hazardous substances

DENR	Report To/ Authority	Report Due	Status*
Implementation of the Resident Inspectors Program at commercial hazardous waste facilities	ERC GS 130A-295.02(m)	Annually (Sep 1)	Sep 99 distrib 11/99 Oct 00 distrib 1/18/01 Oct 01 distrib 10/29/01 Oct 2002 (distrib 1/16/03) Sep 03 distrib 02/24/04 Sep 04 in
Evaluation of effectiveness of Brownfields Property Reuse Act	ERC GS 130A-310.40	Annually (Oct 1)	interim oral 3/16/00 11/00 oral 1/18/01 Feb 02 oral 2/21/02 Jan 03 oral 1/28/03 Jan 04 oral 2/24/04

DENR (Division of Waste Management)	Report To/ Authority	Report Due	Status*
Implementation of comprehensive hazardous waste management plan; implementation of the comprehensive hazardous waste plan, including an evaluation of how well the State and private parties are managing and cleaning up hazardous waste.	ERC GS 130A-294(i) SL 2002-148, Sec. 4	Annually (1 Oct)	8/11/00 distrib 1/18/01 8 Nov 2002 5 Oct 03 distrib 02/24/04 July 04 in

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Inactive Hazardous Waste Sites Program	ERC GS 130A-310.10	Annually (Oct 1)	11/00 oral 1/18/01 11/01 mail 11/09/01 1/30/02 oral Jan 03 oral 1/28/03 Sep 03 oral 2/24/04

DENR, Office of State Budget and Management	Report To/ Authority	Report Due	Status*
Amount and source of available funds used for 10% cost share required for Superfund cleanup of NPL sites, the o&m costs associated w/ these cleanups, and the cleanup of priority inactive hazardous substance or waste sites	ERC, Gov Ops SL 1999-237(15.6)(b)	30 days after spend Superfund/ Inactive Haz Sites funds	Sep 00 distrib 1/18/01 May 01 distrib 10/29/01 Dec 01 distrib 01/30/02 Feb 02 distrib 03/21/02 Sep 03 distrib 2/24/04 June 04 in

land quality

DENR	Report To/ Authority	Report Due	Status*
Annual report and analysis of how the implementation of SPCA is affecting activities that contribute to the sedimentation of streams, rivers, lakes, and other waters of the State; shall also review effectiveness of local programs	ERC G.S. 113A-67; S.L. 2004-195, Sec. 2.1	Annually (beginning 1 Oct 05)	

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parks and conservation

DENR	Report To/ Authority	Report Due	Status*
Report on the conservation easement program + inventory of all conservation easements held by DENR	ERC GS 113A-235(c) SL 2004-195, Sec. 2.2	Annually (Oct 1)	12/00 oral 12/21/00 Feb 02 oral 2/21/02 (Jan 03 oral 1/16/03) Dec 03 oral 4/22/04
Shall study vehicle use at Fort Fisher State Recreation Area, including consideration of: the demand for vehicle access to the beach during different times of the year; the impact of vehicles on sea turtles and nesting birds;...	ERC S.L. 2004-124, Secs. 12.3.(b) and 12.3.(c)	1 Feb 2005	

DENR (North Carolina Parks and Recreation Authority)	Report To/ Authority	Report Due	Status*
Activities and allocations from the Parks and Recreation Trust Fund from the prior fiscal year	ERC, Gov Ops, NER, Fiscal Research GS 113-44.15(c)	Annually (Oct 1) + progress (March 15)	Mar 01 mail 05/04/01 Oct 01 mail 10/29/01 Feb 02 distrib 03/21/02 (Jan 03 oral 1/16/03) Mar 03 distrib 03/20/03 Oct 03 oral 4/22/04 Oct 01 in

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Acquisitions made with funds from the Natural Heritage Trust Fund	ERC, NHTF Trustees, Gov Ops, NER, Fiscal Research GS 113-77.9(e)	Semiannually, within 30 days of each revision	10/18/00 oral 10/13/00 Mar 01 mail 05/04/01 Aug 01 distrib 10/29/01 Feb 02 oral 2/21/02 (Jan 03 oral 1/16/03) Mar 03 distrib 03/20/03 Nov 03 oral 4/22/04 Sep 04 in
Progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands	ERC, Governor GS 113A-241(c) S.L. 2004-195, Sec. 2.3	Annually (Oct 1)	Sep 00 oral 10/13/00 Oral 2/21/02 Jan 03 oral 1/16/03 Dec 03 oral 4/22/04 Sep 04 in

Division of Parks and Recreation of DENR	Report To/ Authority	Report Due	Status*
Study the feasibility and the desirability of acquiring land and establishing a State Recreation Area at Blewett Falls Lake. The study shall include estimates of the cost of developing the proposed recreation area.	ERC S.L. 2004-24, Sec. 2	1 December 2005	

solid waste

DENR	Report To/ Authority	Report Due	Status*
Solid Waste Management Annual Report (see also other reports with "SWM Annual Report" noted at the end of the topic line)	Governor, ERC GS 130A-309.06(c)	Annually (Jan 15)	Mar 99 mail, oral 11/4/99 Mar 00 oral 4/6/00 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03 Jan 04 oral 3/25/04

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Assessment of the recycling industry and recyclable materials market (SWM Annual Report)	ERC GS 130A-309.06(c)(6)	Annually (Jan 15)	Jan 02 oral 1/30/02 Jan 03 oral 1/28/03 Jan 04 oral 3/25/04
Condition and use of funds in the Solid Waste Management Trust Fund (SWM Annual Report)	ERC GS 130A-309.12(c) GS 130A-309.06(c)(8)	Annually (Jan 15)	Sep 99 oral 11/04/99 Sep 00 oral 11/27/00 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03 Jan 04 oral 3/25/04
Scrap Tire Disposal Account (SWM Annual Report)	ERC GS 130A-309.63(e) GS 130A-309.06(c)(10)	Annually (Jan 15)	May 99 mail Oct 99 oral 4/6/00 Oct 00 oral 11/27/00 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03 Jan 04 oral 3/25/04
Management of white goods (SWM Annual Report)	ERC, Revenue Laws Study Committee GS 130A-309.85 GS 130-309.06(c)(11)	Annually (Jan 15)	Feb 99 oral Feb 00 oral 4/6/00 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03 Jan 04 oral 3/25/04
Recycled materials specified or used in DOT contracts (SWM Annual Report) (DPPEA portion)	ERC, Gov Ops, Trans Oversight GS 136-28.8(g) GS 130A-309.06(c)(12)	Annually (Jan 15)	Dec 99 oral 4/6/00 Dec 00 oral Jan 02 oral 1/30/02 Jan 03 oral 1/28/03 Jan 04 oral 3/25/04
Purchase of materials and supplies with recycled content by State institutions (SWM Annual Report) (DPPEA portion)	ERC, Gov Ops GS 143-58.2(f) GS 130A-309.06(c)(13)	Annually (Jan 15)	Dec 99 oral 4/6/00 Dec 00 oral Jan 02 oral 1/30/02 Jan 03 oral 1/28/03 Jan 04 oral 3/25/04
DOT and DOA	**Report To/ Authority**	**Report Due**	**Status***
Bid procedures and the purchase and use of reusable, refillable, repairable, more durable, and less toxic supplies and products (SWM Annual Report)	ERC GS 130A-309.14(a1)(3) GS 130A-309.06(c)(9) S.L. 2003-340, Sec. 1.6	Annually (Jan 15)	Oct 00 Distrib 1/18/01 Jan 02 oral 1/30/02 Jan 03 oral 1/28/03
Governor	**Report To/ Authority**	**Report Due**	**Status***
Litter enforcement, prevention, and removal efforts.	ERC, JLTOC, NER Subcommittees SL 2001-512, Sec. 9 and 10 GS 147-12(b)	Semiannually (March 1 and Sep 1)	Mar 02 oral 3/21/02 Dec 03 oral 4/20/04 Oct 04 distrib 10/21/04
State Board of Education	**Report To/ Authority**	**Report Due**	**Status***
Recycling efforts of public schools in the State	ERC, Joint Legislative Education Oversight Committee SL 2001-512, Sec. 11	Annually by Dec 15 (2003-2007)	Dec 03 distrib 04/20/04

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water quality - general

Catawba/Wateree River Basin Advisory Commission	Report To/ Authority	Report Due	Status*
Annual report, including any recommendations.	Governor of NC, ERC, Governor of SC, SC General Assembly G.S. 77-117	Annually (1 Oct)	

Clean Water Management Trust Fund (Chair, Board of Trustees)	Report To/ Authority	Report Due	Status*
Implementation of the Clean Water Management Trust Fund; Projects awarded grants	ERC, Gov Ops, NER Subcommittees, Fiscal Research GS 113-145.6A(a) SL 2002-148 (Sec. 3)	Annually (Dec 1)	Nov 99 oral 11/4/99 Feb 02 oral 2/21/02 Jan 03 oral 1/16/03 Dec 03 oral 4/22/04

Commission for Health Services	Report To/ Authority	Report Due	Status*
Shall evaluate the desirability and feasibility of developing and implementing a pilot program whereby any individual seeking to use an innovative wastewater system that employs peat based technology, at the individual's residence must meet certain reqs.	NER Committees, Fiscal Research, ERC S.L. 2004-161, sec. 8.1	15 Jan 05	

DENR	Report To/ Authority	Report Due	Status*
Status of permitting and inspecting animal waste management systems/ Animal Waste Compliance Report	ERC, Fiscal Research GS 143-215.10M SL 2002-148 (Sec. 6)	Annually (Oct 1)	Sep 00 oral 11/27/00 Nov 01 oral 01/30/02 Apr 02 dist 5/28/02 Nov 2002 (dist 01/16/03) Oct 03 oral 3/25/04
Shall evaluate the need for and availability of information that identifies poultry facilities that may be subject to regulation under G.S. 143-215.10C, or options for obtaining this information.	ERC S.L. 2004-176, sec. 7	1 Jan 05	
Wastewater Discharge Elimination System program	ERC, Fiscal SL 2001-452(2.9)	Annually (15 Oct)	Dec 03 distrib 02/06/04

DENR (Division of Water Quality)	Report To/ Authority	Report Due	Status*
Compliance/ enforcement of water quality laws for facilities that discharge into surface waters	ERC, Fiscal Research GS 143-215.9A SL 2002-148(Sec. 5)	Annually (Oct 1)	Oct 00 oral 11/27/00 Nov 01 oral 01/30/02 May 02 distrib 5/28/02 Dec 03 oral 3/25/04

DENR (Divisions of Water Quality, Soil & Water Conservation)	Report To/ Authority	Report Due	Status*
Pilot program for inspection of animal waste management systems, including a comparison of the costs of conducting operations reviews and inspections under the pilot program with the costs of conductng ors and insps pursuant to 143-215.10D and 143-215.10F	ERC, Fiscal Research SL 1999-329(3.3) SL 2001-254(6) SL 2002-176 (1.2)	Semiannual: 15 April and 15 Oct Final: Oct 1, 2005.	Sep 00 oral 11/27/00 Dec 01, May 02 oral 5/21/02 Oct 03 oral 3/25/04

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	Report To/ Authority	Report Due	Status*
DENR (Soil and Water Conservation Commission)			
Effectiveness of projects funded under the Agriculture Cost-Share Program for Nonpoint Source Pollution Control	ERC, Fiscal Research GS 143-215.74(e)	Annually (Jan 31)	Jan 99 oral Oct 00 Distrib 1/18/01 21 March 2002 Dec 03 distrib 2/24/04
DENR, EMC	**Report To/ Authority**	**Report Due**	**Status***
Basinwide Water Quality Management Plans	ERC GS 143-215.8B(d)	Annually (Oct 1)	Jan 01 distrib 1/18/01 Feb 02 oral 2/21/02 Apr 02 oral 4/25/02 Oct 03 oral 2/6/04
EMC	**Report To/ Authority**	**Report Due**	**Status***
Progress in developing and implementing wastewater collection system permit program (EMC Quarterly Report)	ERC 143-215.9B	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 Apr 03 distrib 2/6/04 Apr 03 oral 2/24/04 April 04 oral 3/25/04 July 04 distrib 10/21/04 Oct 04 oral 10/21/04
Implementation of stormwater runoff rules and programs	ERC GS 143-214.7(e)	Annually (Oct 1)	Jan 03 oral 1/16/03 Dec 03 oral 2/6/04 Update 3/25/04
Extent to which facilities seeking new or modified discharge permits are funded with public funds; their impact on water quality; whether there are cost-effective alt. technologies that would achieve greater water quality benefit (EMC Quarterly Report)	ERC GS 143-215.1(h)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 Apr 03 distrib 2/6/04 Apr 03 oral 2/24/04 April 04 oral 3/25/04 July 04 distrib 10/21/04 Oct 04 oral 10/21/04
Progress in developing engineering standards to allow regional interconnection of municipal and domestic wastewater collection systems (EMC Quarterly Report)	ERC SL 1999-329(11.1)	Quarterly (Jan 15, Apr 15, Jul 15, Oct 15)	Jan 02 oral 1/30/02 Apr 02 oral 4/25/02 Jan 03 oral 1/16/03 Apr 03 oral 2/24/04 April 04 oral 3/25/04 July 04 distrib 10/21/04 Oct 04 oral 10/21/04
Roanoke River Basin Bi-State Commission	**Report To/ Authority**	**Report Due**	**Status***
Annual report, including any recommendations.	Governor of NC, ERC, Governor of VA, General Assembly of VA G.S. 77-98	Annually	

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UNC System (UNC-CH Water Resources Research Institute)	Report To/ Authority	Report Due	Status*
Modeling and Monitoring of the Neuse River	ERC, Gov Ops, GS 143-215.8C	Progress reports Jan 1/ July 1 until complete	Jan 99 oral 11/23/99 Jan 01 oral 1/18/01

Upper Neuse River Basin Association	Report To/ Authority	Report Due	Status*
Activities and programs to develop cooperative, comprehensive, integrated State-local watershed management plan for the Upper Neuse Rier Basin to serve as a model watershed management approach	ERC, Gov Ops, Fiscal Research SL 1998-212(14.15)	Mar 1 each year until plan is complete (begin 1999)	Mar 00 oral 4/6/00 Feb 02 oral 2/21/02 Oct 03 distrib 02/06/04

Water Quality Workgroup (DENR & NCSU)	Report To/ Authority	Report Due	Status*
Status of tasks: Synth current science on water quality;Identify knowledge gaps, fill with projects;Maintain water quality data website; Org & eval existing water quality databases; Prioritize knowledge gaps for $; Develop Rivernet mon syst.	ERC, NER Chairs, Chancellor of NCSU G.S. 143-215.8D	Annually (Jan 30)	Jan 00 oral 3/16/00 Jan 02 oral 2/21/02 Present to SAENR 6/04

Yadkin/Pee-Dee River Basin Advisory Commission	Report To/ Authority	Report Due	Status*
Annual report, including any recommendations.	Governor of NC, ERC, Governor of SC, SC General Assembly G.S. 77-117	Annually (1 Oct)	

water quality - ground

DENR	Report To/ Authority	Report Due	Status*
Implementation of Pay for Performance Program (in UST report)	ERC SL 2001-442, SL 2003-340, Sec. 2	Annually 1 Sept (ending Oct 1, 2006)	21 Mar 2002 16 Jan 2003 Mar 04 oral 5/05/04

DENR (Secretary)	Report To/ Authority	Report Due	Status*
Contamination, site, and fiscal information related to the Dry-Cleaning Solvent Cleanup Act of 1997	ERC GS 143-215.104U	Annually (Oct 1)	Oct 99 oral 2/17/00; oral 4/25/00 Oct 00 Distrib 1/18/01 Jan 02 oral 2/21/02 Dec 03 distrib 3/25/04 Sep 04 in
Leaking Petroleum Underground Storage Tank Cleanup Program	ERC GS 143-215.94M SL 2002-148(Sec. 7)	Annually (1 Sept)	Mar 01 distrib 10/29/01 Sep 01 distrib 01/30/02 Mar 02 distrib 03/21/02 Jan 03 oral 1/16/03 Jan 04 oral 4/22/04

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water quantity

DENR	Report To/ Authority	Report Due	Status*
Evaluate water conservation measures being implemented in the State and identify incentive programs and other voluntary programs that can help foster water conservation and reuse.	ERC, EMC SL 2002-167, Sec. 5; SL 2004-195, Sec. 4	Interim 15 Mar 03 Final 15 Feb 04	25 Aug 03 oral 3/25/04

DENR (Division of Water Resources)	Report To/ Authority	Report Due	Status*
Implementation of State Water Supply Plan	ERC, Gov Ops GS 143-355(n)	Annually (Sep 1)	Sep 99 in, oral 1/20/00 Oct 00 oral 1/18/01 Jan 02 oral 1/30/02 (Jan 03 oral 1/16/03) Sep 03 oral 2/24/04

Droughty Management Advisory Council	Report To/ Authority	Report Due	Status*
Shall report on implementation of act; include review of drought advisories issued by the Council and any recommendations to improve coordination among local, State, and federal agencies; public water systems; and water users	Secretary of ENR, Governor, and ERC G.S. 143 355.1(g); S.L. 2004-195, Sec. 2.5	Annually (beginning 1 Oct 05)	

wetlands

DENR	Report To/ Authority	Report Due	Status*
Implementation of Wetlands Restoration Program and use of Wetlands Restoration Fund, including inventory of property and easements	ERC GS 143-214.13	Annually (Nov 1)	Nov 99 oral 1/20/00 Dec 00 oral 1/11/01 Dec 01 oral 01/30/02 Jan 03 oral 1/28/03 Dec 03 oral 5/5/04

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Division of Water Quality
Presentation

Environmental Review Commission

October 21, 2004

Legislative Reports

- Animal Waste Compliance Report
- Facilities That Discharge to Surface Waters Report
- Basinwide WQ Management Plan Report
- Implementation of Stormwater Rules and Programs Report

Animal Waste Compliance Report

	2000	2001	2002	2003	2004 Fiscal Year
# Permits	2622	2575	2527	2529	2527
Inspections	3162	2610	2760	1800	2550
Discharges	152	58	51	103	77
Freeboard Violations	285	102	49	537	391
Civil Penalties	$404,850	$149,500	$107,440	$356,972	$339,519

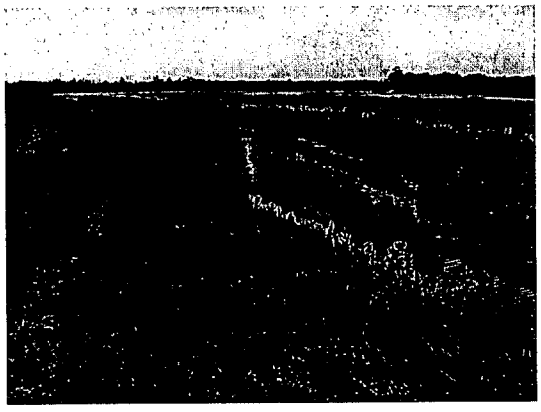
Facilities That Discharge to Surface Waters Report

	2001	2002	2003	2004 Fiscal Year
# Permits	1485	1444	1454	1398
Inspections	1172	1100	846	1097
Penalties	$828,470	$856,832	$954,248	$703,360

Basinwide WQ Management Plan Report

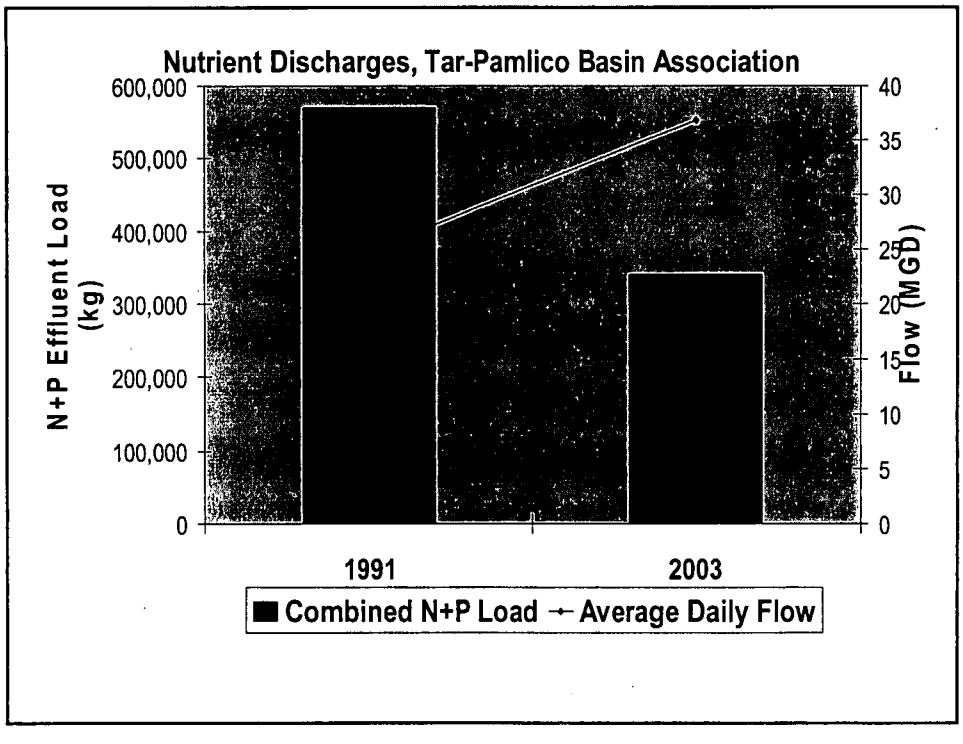
- Plans Approved
  - Tar-Pamlico
  - Lumber
  - Catawba
- Plans In Progress
  - French Broad
  - New
  - Cape Fear

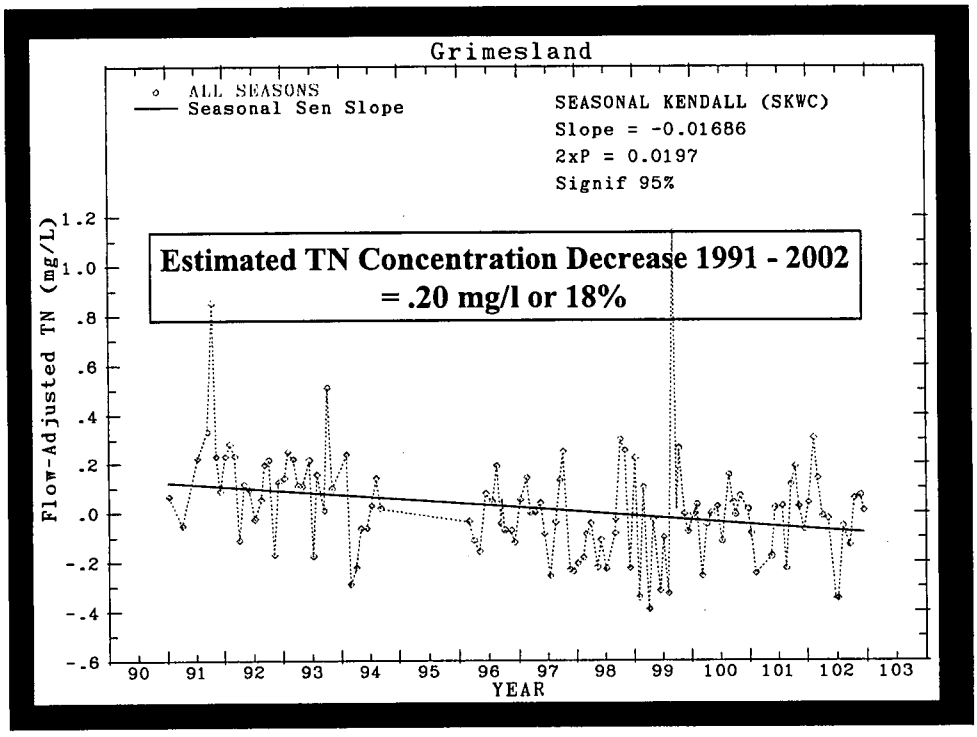
Agricultural Progress

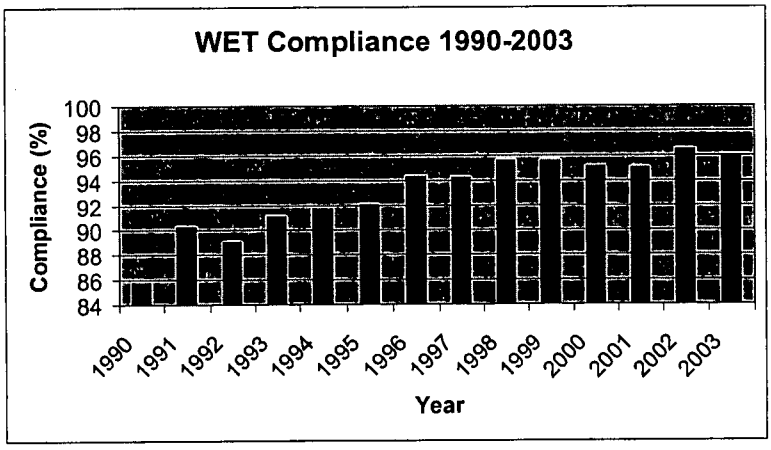


Estimated N Loss Reductions

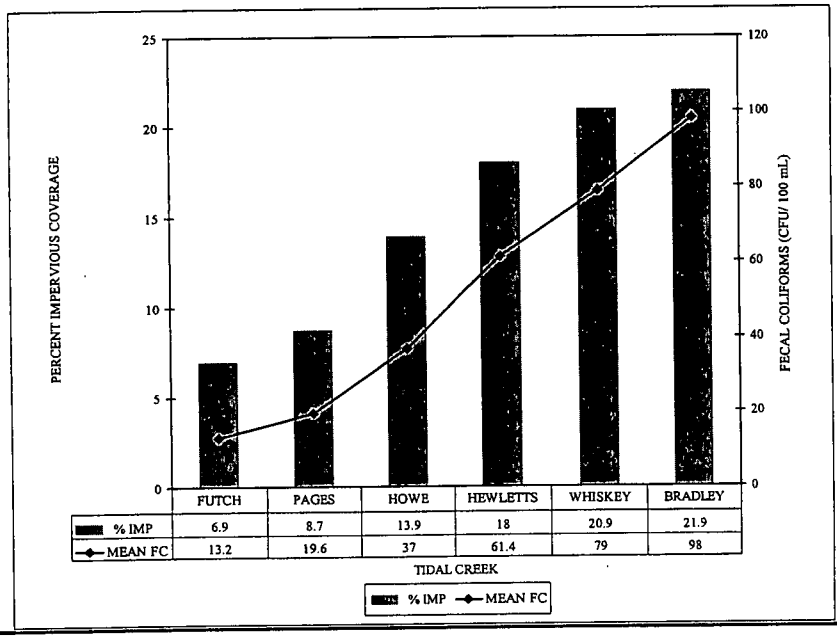
County	1992-2001	1992-2003
Beaufort	19%	35%
Edgecombe	22%	40%
Franklin	42%	43%
Granville	43%	56%
Halifax	42%	39%
Hyde	39%	63%
Martin	24%	40%
Nash	51%	54%
Person	49%	49%
Pitt	46%	48%
Vance	52%	60%
Warren	46%	58%
Washington	12%	25%
Wilson	56%	46%
Basin Total	35%	45%




Grimesland
ALL SEASONS
Seasonal Sen Slope
SEASONAL KENDALL (SKWC)
Slope = -0.01686
2xP = 0.0197
Signif 95%
Estimated TN Concentration Decrease 1991 - 2002
= .20 mg/l or 18%
Flow-Adjusted TN (mg/L)
1.2
1.0
.8
.6
.4
.2
.0
-.2
-.4
-.6
90 91 92 93 94 95 96 97 98 99 100 101 102 103
YEAR


WET Compliance 1990-2003
Compliance (%)
100
98
96
94
92
90
88
86
84
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003
Year

Impervious Surface and Fecal Contamination



Implementation of Stormwater Rules and Programs Report

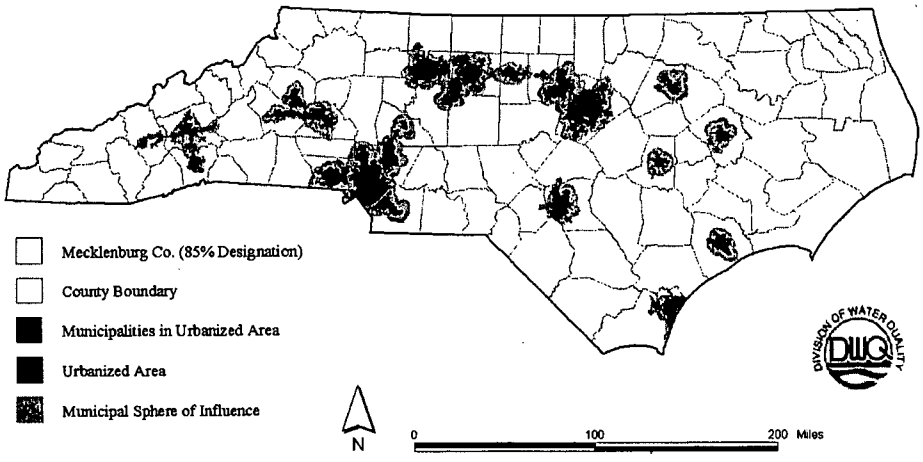
Federal Stormwater Program Requirements

1. Public Education and Outreach
2. Public Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Controls
5. Post Construction Runoff Controls
6. Pollution Prevention

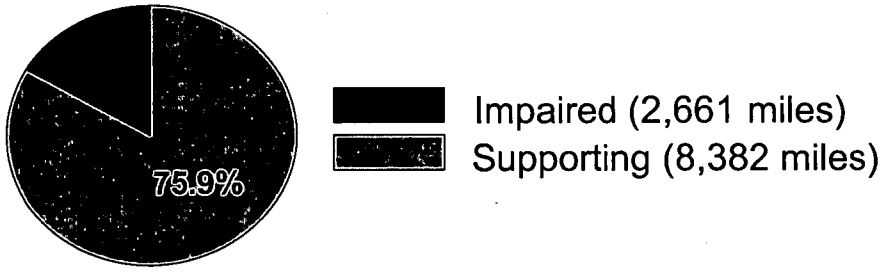
Phase II Stormwater Management (SB1210) Ratified 7/12/04

- Permits
- Model Ordinance Development
- Design Manual
- State Implementation

North Carolina Phase II Stormwater Program



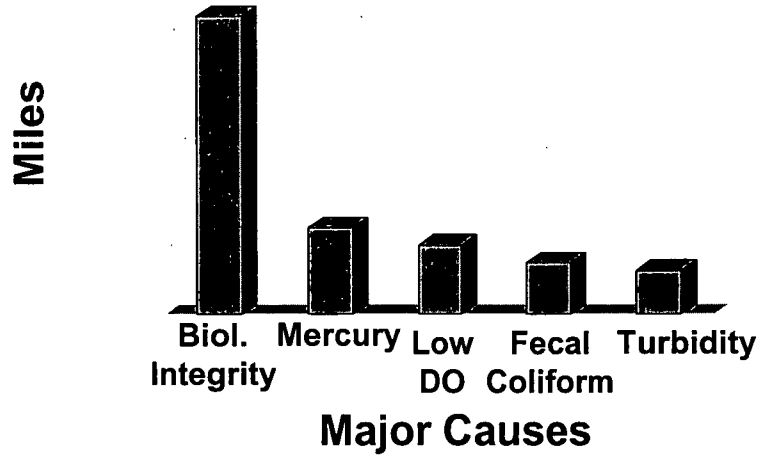
About One Quarter of rated freshwater stream are impaired



Of the total 11,043 miles (30%) of rated freshwater streams, 24.1% are impaired.

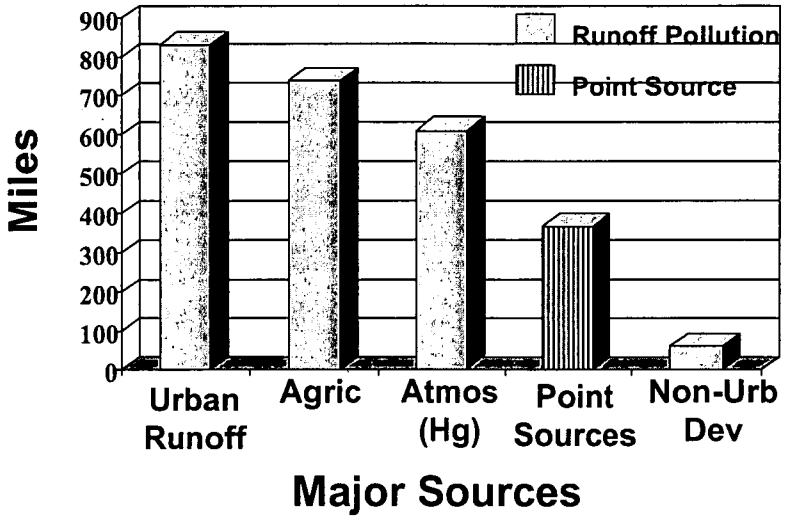
Source: 2004 Draft Combined 305(b)/303(d) Report (May 2004)

Major Causes of Stream Impairment (Top five causes)



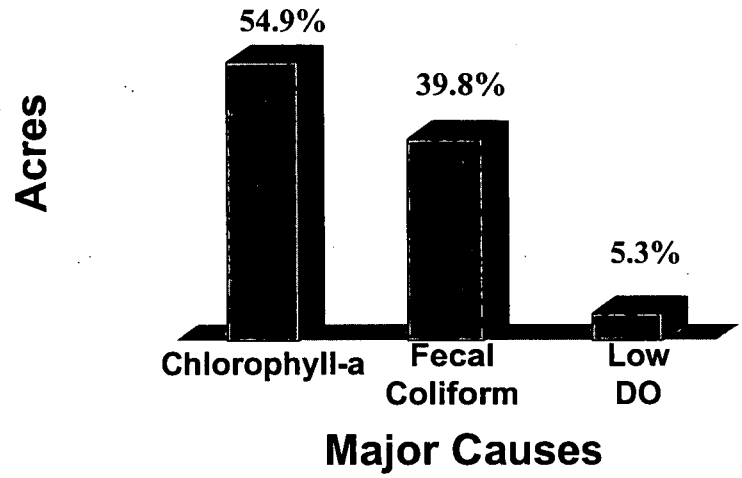
Source: 2004 Draft Combined 305(b)/303(d) Report (May 2004)

Major Sources of Stream Impairment (Top five sources)



Source: 2004 Draft Combined 305(b)/303(d) Report (May 2004)

Major Causes of Estuarine Impairment

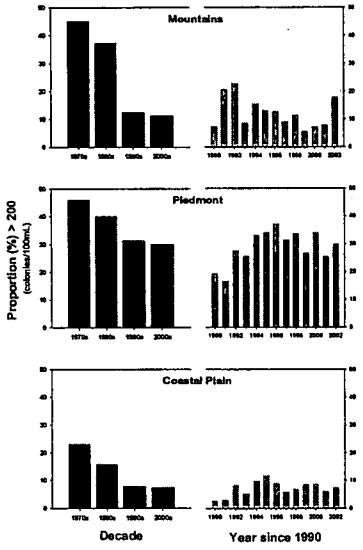


Source: 2004 Draft Combined 305(b)/303(d) Report (May 2004)

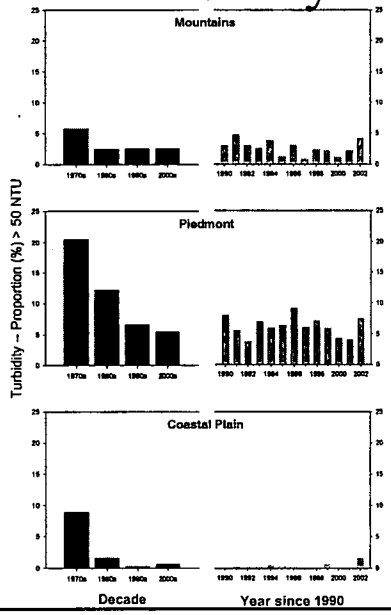
Source Trends in Order of Priority

1. Stormwater Runoff
2. Point Sources
3. Mercury – Fish Consumption Advisories
4. Agriculture – Animal Production
5. Agriculture – Cultivated Cropland

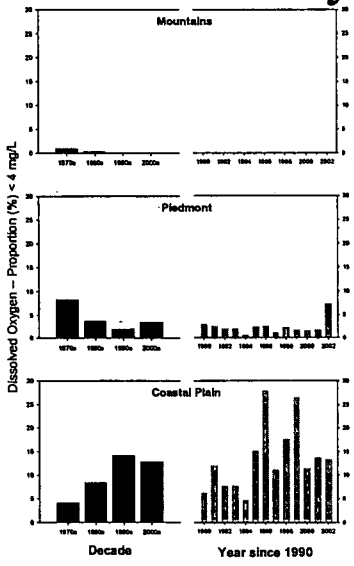
Fecal Coliform



Turbidity

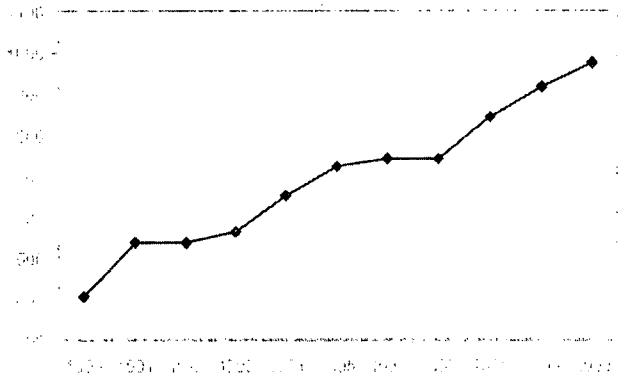


Dissolved Oxygen



Water Quality Degradation

Shellfish Harvest Closures in Outstanding Resource Waters



Data Source: Shellfish closure areas from DEH Shellfish Sanitation and Recreational Water Quality Section

Need for Reorganization

- Eliminate duplication & inefficiencies
- Improve workload distribution
- Improve regional & central interactions
- Improve permit turn around times
- Strengthen nonpoint source activities
- Minimize permit writer burnout
- Elevate data management to encompass Division level needs

October 21, 2004 ERC Meeting
EXHIBIT G

Annual Report to the North Carolina General Assembly Environmental Review Commission

The Status of Leaking Petroleum Underground Storage Tanks, the State Cleanup Funds, and the Groundwater Protection Loan Fund

SEPTEMBER 1, 2004

NCDENR
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Underground Storage Tank Section
Division of Waste Management

Department of Environment and Natural Resources

Michael F. Easley
Governor

William G. Ross Jr.
Secretary
NC Department of Environment and Natural Resources

Dexter R. Matthews
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Division of Waste Management

DENR
Division of Waste Management
UST Section
1637 Mail Service Center
Raleigh, NC 27699-1637
(919) 733-8486
http://wastenot.nc.us/

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Appendices (available upon request - please contact Jane Comer at 919.733.1302)

Appendix A - LUSTs reported 7/1/88-6/30/04
Appendix B - LUSTs reported 7/1/03-6/30/04
Appendix C - LUSTs closed out 7/1/88-6/30/04

EXECUTIVE SUMMARY

The Department of Environment and Natural Resources prepares an annual report on the status of leaking petroleum underground storage tanks.

North Carolina's underground storage tank program is administered by the Division of Waste Management's UST Section within DENR. The section enforces UST regulations and manages funds used to perform cleanups of petroleum UST discharges or releases. The program was initiated in 1988 in response to growing reports of USTs leaking petroleum into soil and drinking water supplies. Funding for the program has been provided by the Commercial and Noncommercial Trust Funds, the Groundwater Protection Loan Fund, the Federal UST Regulatory Grant and the Federal Leaking UST Fund.

For the period July 1, 2003 through June 30, 2004

Commercial Fund Revenues	$26,934,685
Commercial Fund Total Expenditures	$26,041,631
Noncommercial Fund Revenues	$ 8,060,151*
Noncommercial Fund Total Expenditures	$ 9,001,443
Petroleum UST Incidents – Reported	1650
Petroleum UST Incidents - Closed	1345

* Includes transfer of $2,036,932 motor fuel and kerosene tax from commercial to noncommercial trust fund.

For the entire UST program period of July 1, 1988 until June 30, 2004

Commercial Fund Revenues	$373,785,729
Commercial Fund Total Expenditures	$370,677,394
Noncommercial Fund Revenues	$ 81,409,726
Noncommercial Fund Total Expenditures	$ 79,776,706
Petroleum UST Incidents - Reported	18,146
Petroleum UST Incidents - Closed Out	9,336

The status of the Commercial and Noncommercial Funds as of June 30, 2004

Commercial Fund Balance	$ 3,077,997
Commercial Fund Claims Pending	$30,522,435
Noncommercial Fund Balance	$ 1,635,015
Noncommercial Fund Claims Pending	$ 5,646,580

The initiation of expedited claim reviews beginning May 2001 contributed to an increase in payments from the Commercial Fund. A significant backlog of pending claims was processed

and, as a result, reimbursements nearly doubled during the six-month period between July 1, 2001 and December 31, 2001. Beginning in June 2002, a decision to make reimbursements from the Commercial Fund only when funds became available was implemented. This resulted in a significant backlog of claims with payments pending in the Commercial Trust Fund. For the 12-month period from July 1, 2003 through June 30, 2004 claims paid, both for the Commercial and Noncommercial funds, decreased relative to the previous fiscal year. This is due primarily for the following reasons: more cost-effective corrective actions being implemented, a continued delay in completing reimbursements for the Commercial Fund which began back in 2002, and a transfer to the Noncommercial Fund of $2,036,932 in accordance with NCGS 119-18(b).

The Noncommercial Fund is not currently able to meet all obligations based on the current rate of claims submitted. Claims pending exceed the Noncommercial balance for the second year in a row since the inception of the Fund.

PURPOSE OF THE UNDERGROUND STORAGE TANK REGULATORY PROGRAM AND THE COMMERCIAL AND THE NONCOMMERCIAL TRUST FUNDS

The purpose of the UST regulatory program is to:

(1) Set standards for the installation and operation of commercial petroleum underground storage tanks. These technical standards are designed to prevent the accidental release of petroleum products into the environment and to provide early notice of any leaks that do occur;

(2) Insure that steps are taken to correct UST systems that are improperly installed, improperly operated, or malfunctioning; and

(3) Provide oversight for assessment and cleanup of soil and groundwater contamination caused by leaking UST systems.

NOTE: The State does not regulate the installation and operation of noncommercial underground storage tanks (such as home heating oil tanks).

The purpose of the Commercial UST Trust Fund is to help the owners of commercial UST systems meet a federal requirement that they demonstrate sufficient financial responsibility to pay for assessment and cleanup of petroleum releases from their UST systems. The UST owner must also demonstrate the ability to pay any claim by a third party for bodily injury or property damages resulting from a petroleum release (such as contamination of a drinking water well). By paying most of the costs of assessment, cleanup and damages related to leaking USTs, the Commercial Trust Fund provides the required financial assurance and relieves the tank owner of the need to demonstrate financial responsibility in some other way -- through the purchase of private environmental insurance or the posting of a bond, for example.

The purpose of the Noncommercial UST Trust Fund is to assist owners and operators of those UST systems (primarily home heating oil tanks) in paying for assessment and cleanup of petroleum releases from those tanks.

B & B Mini Mart, 4869 Highway 421 North, Vilas, NC 28692, Incident Number 23895

In January 2002, Watauga County Emergency Management personnel responded to a resident complaining of petroleum odors inside his home. The smell was determined to be coming from gasoline in the soil beneath the home and the source of the gasoline traced to a leaking underground storage tank (UST) system at a convenience store/gasoline station across the highway from the residence.

The leaking UST contaminated six drinking water wells and a small creek with benzene, toluene, xylene, MTBE, and other gasoline constituents. Accumulated vapors from the petroleum-contaminated groundwater caused the state toxicologist to order the evacuation of one home while the home was ventilated. It took almost one year of ventilation before benzene levels in

the home were low enough for the evacuated residents to safely return to the house. Bottled water, well water filtering systems, and new wells were provided for the residents of the four homes affected. No municipal or county water lines are available in the area.

DENR's investigation revealed that the soil beneath the convenience store/gasoline station was severely contaminated and the plume of contaminated groundwater extended over 1000 feet downgradient of the leaking UST system. Three UST systems were removed from the site and a fourth system closed in place before remediation began. Aggressive steps were taken to remove grossly contaminated groundwater, free product on the groundwater and soil vapors. Remediation did not remove all groundwater contamination. The final steps in remediation involve removal of contaminated soil followed by monitoring. After the tank owners paid the $20,000 deductible amount, the Commercial Trust Fund reimbursed an additional $256,202. Another claim for $147,349 has been submitted, which included third-party costs of $80,079. We have no projections for final costs at this time.

UST SYSTEMS IN NORTH CAROLINA

Active and temporarily closed USTs as of 31 Dec 2003

Regulated Petroleum USTs:	30,758
Regulated Hazardous Substance USTs:	242
Commercial Heating Oil USTs:	2,627
Total USTs:	33,627

Active and temporarily closed USTs paying tank fees as of 30 April 2004

USTs over 3,500 gallons capacity:	26,191
USTs less than or equal to 3,500 gallon capacity:	5,863
Total USTs paying tank fees:	32,054

Note: USTs owned by the federal government, hazardous substance tanks, and tanks not in use after 12/22/88 do not pay tank fees.

UST Construction

Steel tanks:	16,895
Fiberglass Reinforced Plastic (FRP):	8,279
Steel/FRP:	5,826
Single Wall Tanks:	30,193
Double Wall Tanks:	807

UST Owners

There are 4860 UST owners with 2 or less facilities who own 5163 facilities which contain 12,770 USTs.

There are 572 owners with more than 2 facilities who own 6813 facilities which contain 20,857 USTs.

UST Age

Install Dates	Active USTs	Temp Closed USTs	Total USTs	% of Total
Before 1973	3609	1361	4970	16
1974 to 1983	6101	604	6705	22
1984 to 1993	12399	261	12660	41
1994 to 2004	6637	28	6665	21

RISK CLASSIFICATION OF DISCHARGES AND RELEASES FROM UST SYSTEMS

North Carolina Administrative Code Title 15A, Subchapter 2L, Section .0115 directs DENR to classify the risk of each known discharge or release as high, intermediate, or low. Basically, state rules classify the discharge based on immediate threat to public health or the environment. The classification scheme was designed to be used in deciding the level of cleanup required as well as the immediacy of the need for cleanup
Generally, a **High Risk** release is one that directly threatens public health or the environment and must be responded to immediately. Some examples of high risk releases are those that have contaminated a water supply well or have created an explosion hazard from petroleum vapors.

An **Intermediate Risk** release is one that has contaminated or threatens to contaminate surface water, is located in a wellhead protection area or an area that provides recharge to drinking water aquifers, or where the contamination concentrations are more than 1000 times levels allowed under State groundwater standards or federal drinking water standards. Intermediate risk releases generally do not represent immediate threats as compared to high risk releases that have already contaminated drinking water wells. However, intermediate risk releases have the potential to endanger public health and the environment if not addressed. At many intermediate risk releases, action must be taken quickly to prevent contamination from increasing in concentration and in area.

Low Risk releases are those that do not meet the criteria for "high risk" or "intermediate risk" releases or are ones which pose no significant risk to human health or the environment. Generally, low risk releases are those that require some cleanup to make the property completely safe for any use, but do not require immediate action. Low risk releases may have significant levels of contamination; the difference is that the contamination does not, at the time of classification, have the potential to reach wells or surface waters. It is important to remember that the risk classification represents a snapshot of conditions at the time of the assessment. Low risk releases can quickly become high risk releases if conditions change. For example, if a water

supply well is installed near a low risk release with contaminated ground water, the risk classification would change to high risk.

Some releases are classified as **Unconfirmed Risks** because, at the time of risk classification, there is insufficient data available to quantify the risk. Generally, unconfirmed risk releases are those which are newly reported or those for which the assessments are not complete.

Corner Pantry 600 Howard Gap Road, Hendersonville, NC Incident Number 28103

In April 2003, an environmental assessment of the Corner Pantry (for a real estate transaction) detected soil contaminated with gasoline constituents. The UST system owner began an investigation to find the source of the gasoline release. Several months later, a homeowner drilled a new well on his property about 700 feet from the Corner Pantry and discovered that the well water had a peculiar odor. When the well water was tested, it was found to contain MTBE and traces of gasoline constituents. The source of the contamination was traced back to the Corner Pantry. The UST Section continued sampling other water supply wells in the area, finding high levels of MTBE. Investigation revealed that the plume of contaminated groundwater extended over 1000 feet to the south and southwest of the Corner Pantry.

The actual source of the gasoline release has not yet been fully determined, but on-site investigation confirmed that the release is not continuing. The contamination may be from an old leak that went undetected for a period of time. The Hendersonville area has fractured bedrock fairly close to the surface and the contamination has moved into these fractures. To date, approximately 60 water supply wells have been sampled and tested. Many of the wells have been contaminated; the water supply for several hundred people has been affected. Sampling and testing of wells is continuing.

At the first sign of contaminated drinking water supplies, alternative sources of water--bottled water, filter systems, or temporary hookups to unaffected wells--were provided to those affected. The long term plan is to extend water lines from Hendersonville to connect affected water users to the Hendersonville water system. Cleanup of the contamination will involve remediation systems that vaporize petroleum constituents in the groundwater and in the soil. After the tank owner paid the $20,000 deductible amount, the Commercial Trust Fund reimbursed the tank owner an additional $24,158. Another $187,045 in claims, primarily for water line extension, have been submitted. At this time, final costs are unknown but are projected to exceed $1 million.

PETROLEUM UST INCIDENTS

Discharges or releases from petroleum USTs are reported to DENR regional offices where they are added to an incident management database. Table 1 lists the number of incidents reported and closed in each region during the twelve-month period from July 1, 2003 through June 30, 2004, as well as the number of incidents reported and closed since the UST program began in 1988. Table 1 also shows that there are 9311 active incidents. In addition, there have been 6086 UST systems closures where no discharges or releases were reported or where the releases were

below action levels. These UST closures are not technically "incidents" but are tracked as "clean closures."

Beginning Jan. 2, 1998, the UST Section implemented risk-based corrective action rules for petroleum UST incidents. Discharges or releases under these rules receive a risk classification of "high," "intermediate," or "low" based on the potential threat to human health and the environment. Of the total number of UST incidents closed since 1988, 63 percent were closed following implementation of Risk-Based Corrective Action. The total number of active incidents has generally increased since 1988; however, recent data indicates the trend may be leveling off (see Figure 1, page 6).

Table 1 - Petroleum UST Incidents by Region

REGION	7/1/03 - 6/30/04		7/1/88 - 6/30/04		
	Reported	Closed	Reported	Closed	Active
Asheville	125	100	2,018	1239	779
Fayetteville	67	111	1,372	644	728
Mooresville	45	231	3,847	2,292	1555
Raleigh	266	410	3,872	1,954	1918
Washington	35	189	2,320	1,281	1039
Wilmington	89	107	1,438	635	803
Winston-Salem	255	311	4,185	2,362	1823
State-Lead	756	59	756	59	697
TOTAL	**1638**	**1518**	**19,808**	**10,466**	**9342**

Reported incidents affecting groundwater that have been closed:	3,334
Total reported incidents closed since implementation of RBCA[1]:	5,892
Total remaining active incidents:	9,342
Active incidents involving regulated USTs:	6,900
Active incidents involving nonregulated USTs:	2,285
Active incidents involving regulated and nonregulated USTs:	106
USTs closed with no reported release or less than action level release:	6068

1. Risk-based corrective action implemented 1/2/98.

Figure 1 - Active UST Incidents

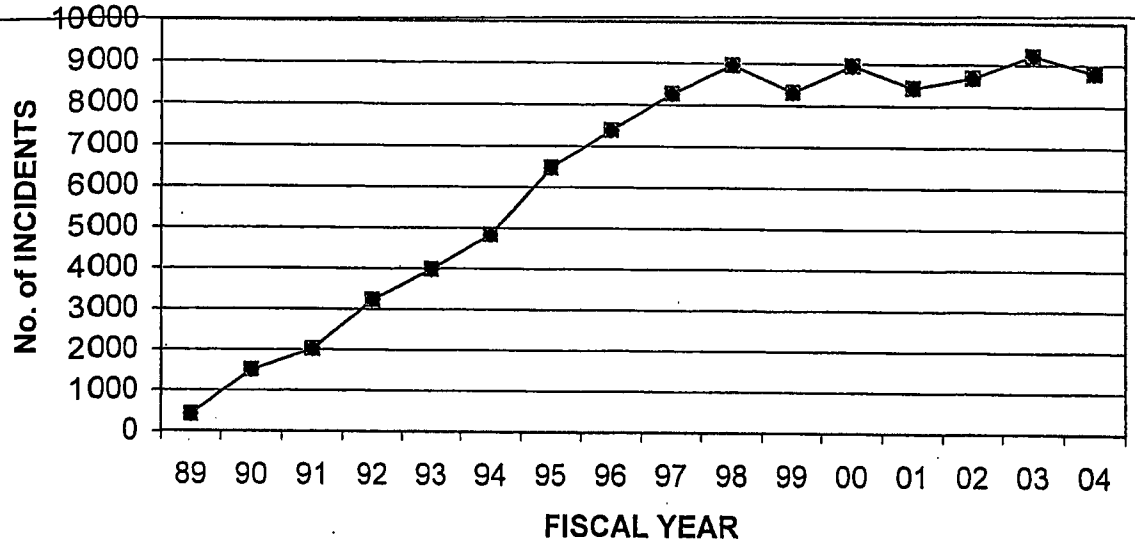


Table 2 - Summary of Active USTs

Region	Active	Commercial				Noncommercial				Both				Database Error				Totals
		H	I	L	U	H	I	L	U	H	I	L	U	H	I	L	U	
Asheville	779	190	82	217	97	49	15	84	43	0	0	0	0	0	0	0	2	779
Fayetteville	728	106	99	285	92	6	10	69	25	2	0	8	2	2	0	13	9	728
Mooresville	1555	218	251	318	454	36	19	67	157	4	2	9	9	0	0	1	10	1555
Raleigh	1918	395	224	175	519	131	33	141	266	4	3	3	13	2	0	0	9	1918
Washington	1039	300	126	120	98	51	69	182	86	2	2	3	0	0	0	0	0	1039
Wilmington	803	194	107	177	139	60	13	69	33	3	0	5	3	0	0	0	0	803
Winston-Salem	1239	307	137	201	349	67	22	65	84	1	1	2	3	0	0	0	0	1239
Guilford County	584	74	63	77	145	50	17	49	100	1	1	0	6	0	0	0	1	584
State Lead	697	380	43	60	81	55	4	21	37	7	2	4	1	0	2	0	0	697
State Totals	9342	2164	1132	1630	1974	505	202	747	831	24	11	34	37	4	2	14	31	9342
Total High Risk	2697			H = High Risk														
Total Inter Risk	1347			I = Intermediate Risk														
Total Low Risk	2425			L = Low Risk														
Total Unc. Risk	2873			U = Unconfirmed Risk														

TRENDS IN REGULATED UST RELEASES AND CLAIMS AGAINST THE COMMERCIAL TRUST FUND

1. We track reported releases only, which we must assume are all releases.

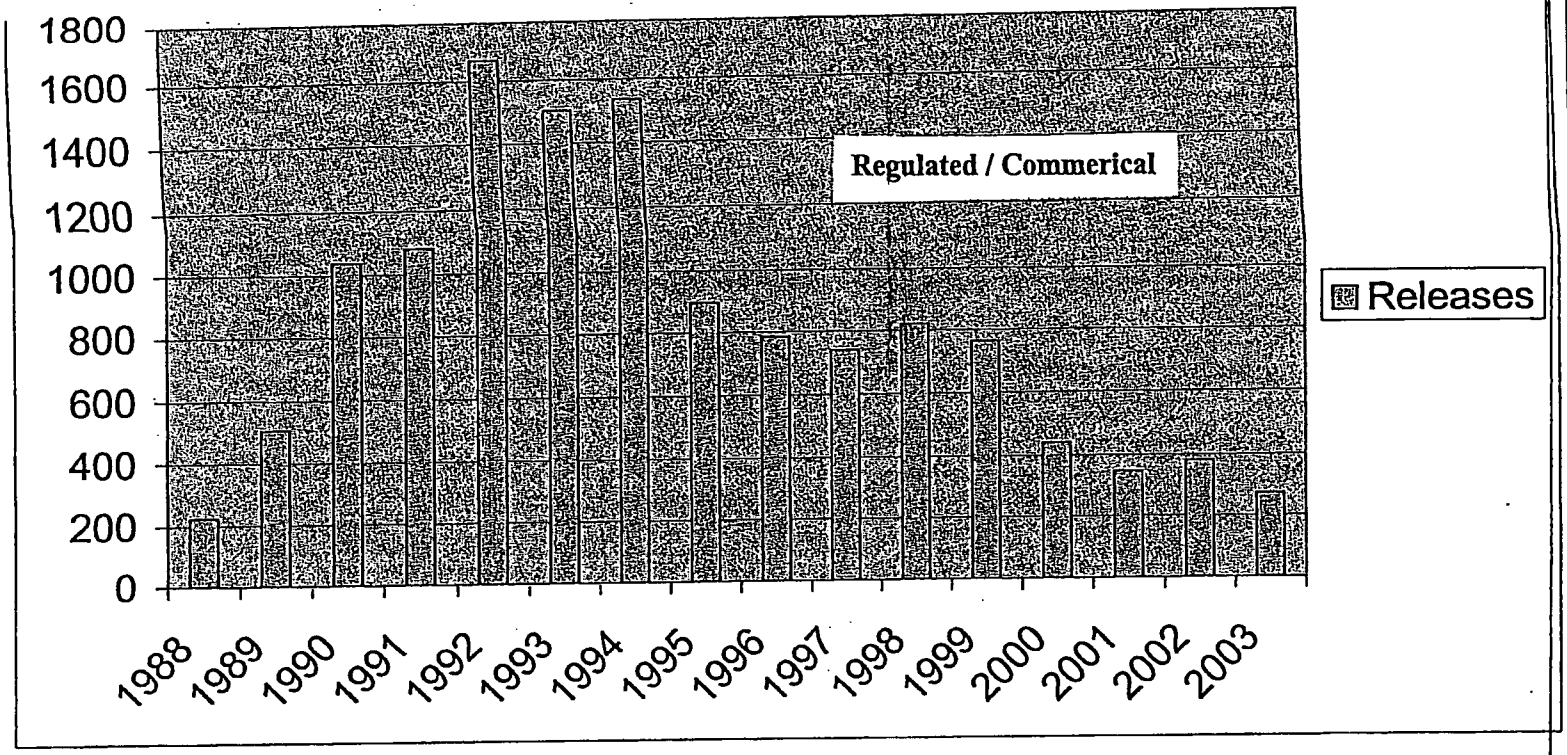
2. The federal and state UST programs began in 1988. The rules required all USTs installed after December 1988 to have leak detection, financial responsibility, and an assessment at tank closure. They further required that all existing USTs be upgraded to those standards by December 1993.

   The increase in reported releases from 1988 until 1993 may have resulted from (1) the start up and initial growth of the UST consulting industry; (2) the closure of many USTs as owners decided they could not or would not bring their existing USTs up to standards; and (3) the legislated decrease in the deductible amount from $50,000 to $20,000 for 1992 and 1993.

3. After 1994, the number of yearly reported releases decreased, but not down to present year levels. This decrease may have been the result of the end of the 1993 upgrade deadline. The remaining releases may have been the result of USTs being modified, assessed, and closed in response to additional federal and state rules which required all UST systems to have corrosion protection and spill and overfill prevention by December 1998.

4. After 1999, the number of reported releases decreased to the present level of 200 to 400 per year. This decrease may be the result of the effect of the end of the regulatory upgrades of 1993 and 1998. All USTs should now be upgraded to the required standards, so all reported releases after 1999 should be either from upgraded tank systems or from old releases that are just now being discovered. In addition, in 1997, the trust fund balance dropped significantly and the reimbursement waiting time began to increase. The decrease in reported releases after 1999 may also be partially the result of the consulting community marketing their services to non-regulated tanks since the noncommercial trust fund remained viable and reimbursements were much faster.

5. Presently, the number of reported releases from regulated USTs continues to show a slowly decreasing trend. We should be seeing releases only from upgraded tank systems or from old releases that are only now being discovered. However, there are a significant number of older tank systems in North Carolina and, as these USTs continue to age, we expect the leak rate to increase. About 16% of the tank systems are over 30 years old, and an additional 22 % are over 20 years old. In addition, further upgrade requirements, such as secondary containment of existing UST systems, could cause a resurgence of release reporting, as construction is performed on tank systems and "old" releases are discovered.


1800
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Regulated / Commerical
Releases
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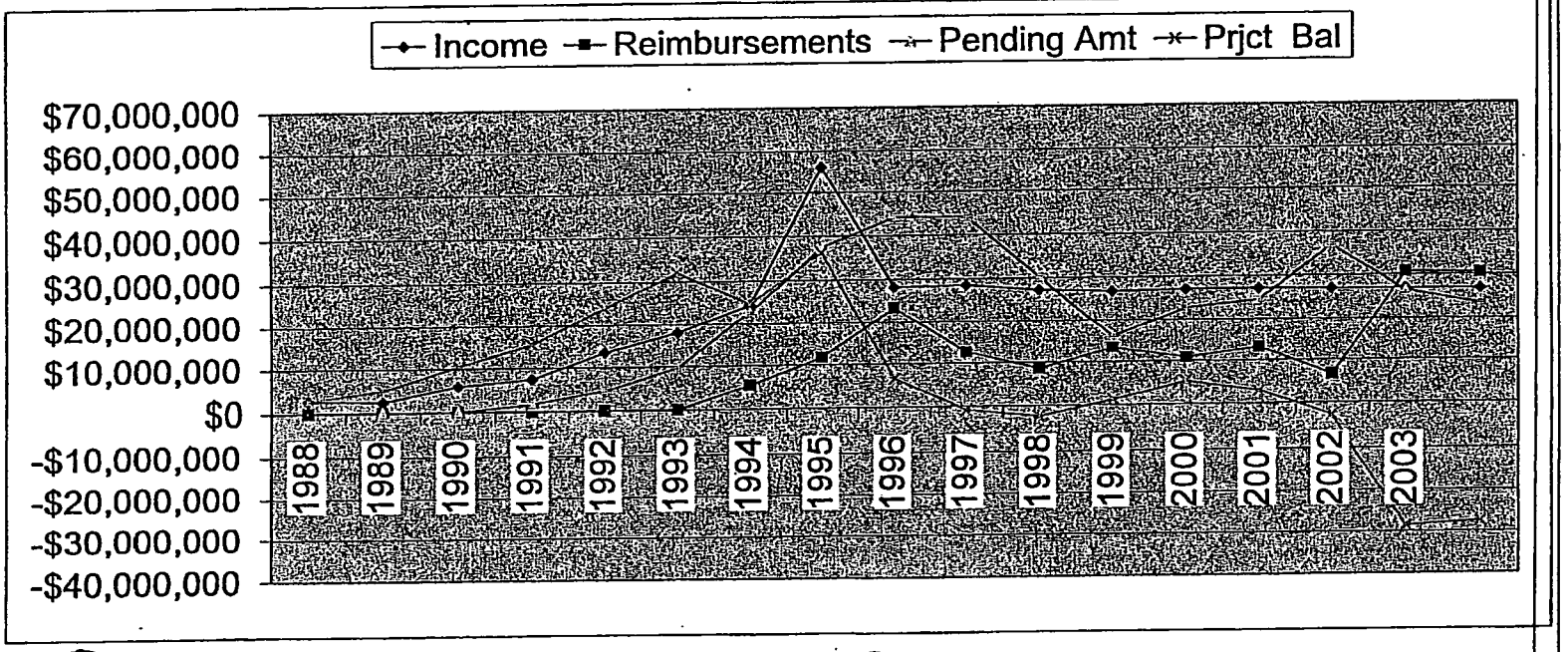
Income
Reimbursements
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-$30,000,000
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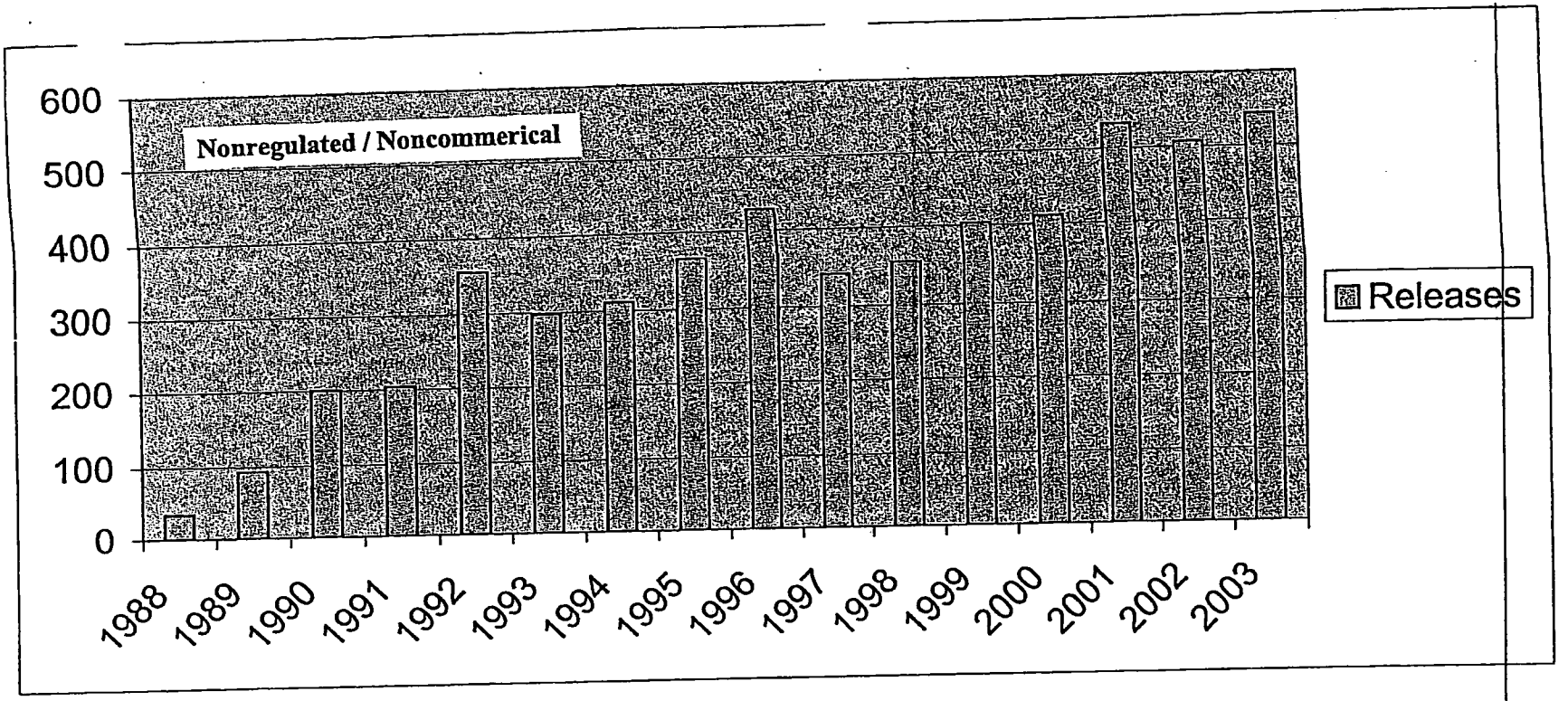
2003

TRENDS IN NONREGULATED UST RELEASES AND CLAIMS AGAINST THE NONCOMMERCIAL TRUST FUND

1. We know of and track only reported releases and reported "clean" closures from unregulated USTs. Since inspections and registration of unregulated tanks are not required, and we do not know the number of such tanks in existence, we are unsure if these numbers accurately reflect unregulated tank activity.

2. Since the inception of the program in 1988, we have seen a general increase in the number of reported releases. This increase can be attributed to (1) start up of the UST consulting industry; (2) an increase in the environmental awareness of home buyers and lenders; and (3) conversion of home heating systems from oil to gas. In addition, in the last several years, we have seen an upswing in the marketing of consulting services. Some of this marketing may be due to the fact that, during this same time period, the commercial trust fund balance dropped significantly and the reimbursement waiting time began to increase, and the consulting community began marketing their services to non-regulated tanks since the noncommercial trust fund remained viable and reimbursements were much faster.

3. We expect this increasing trend in the number of reported releases from nonregulated USTs to continue and to be driven primarily by property transfers and marketing.


Nonregulated / Noncommerical
600
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400
300
200
100
0
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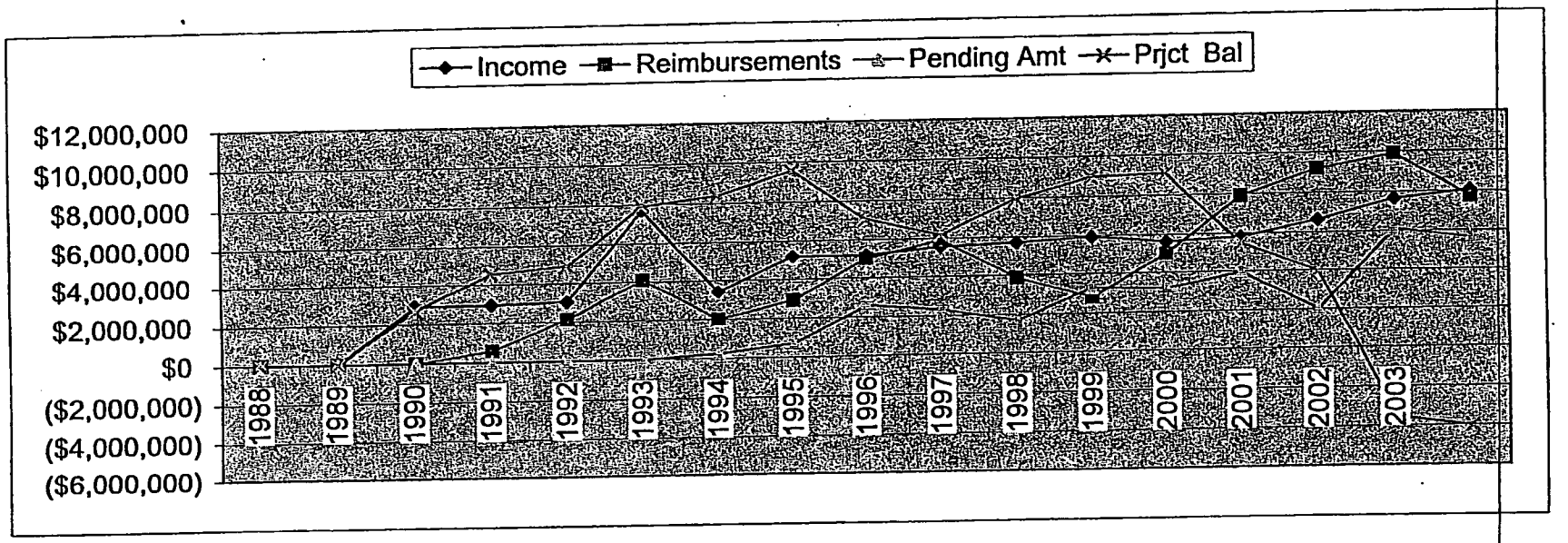
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Releases


Income
Reimbursements
Pending Amt
Prjct Bal
$12,000,000
$10,000,000
$8,000,000
$6,000,000
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($2,000,000)
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1988
1989
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FUNDING FOR THE UNDERGROUND STORAGE TANK PROGRAM

Program funding is provided by revenues from the Commercial and Noncommercial Trust Funds and the Groundwater Protection Loan Fund. The Federal UST Regulatory Grant and the Federal Leaking UST Fund are provided by the Environmental Protection Agency. Of the 94 staff positions assigned to the UST program, state revenue funds 63 positions and 31 are supported by federal grants. In addition, the trust funds and federal grant pay for one laboratory position and four regional administrative positions which support the program.

Commercial and Noncommercial Trust Funds

The Leaking Petroleum Underground Storage Tank Cleanup Act of 1988* established two separate funds: the Commercial Trust Fund and the Noncommercial Trust Fund. Both may be used to reimburse eligible UST owners, operators and landowners for reasonable and necessary costs incurred as a result of environmental cleanup and third party liability claims. Additionally, both funds enable UST Section staff to:

- record and track UST release incidents;
- register and permit commercial USTs, manage a database and receive annual UST operating fee payments;
- identify responsible parties;
- provide technical assistance to tank owners and operators;
- inspect USTs to ensure compliance with UST regulations;
- monitor site cleanups;
- review site assessments and corrective action plans;
- evaluate innovative assessment and cleanup technologies;
- review reimbursement claim procedures;
- manage contracts for cleanups designated as "State Lead";
- inspect and monitor land applications of contaminated soil; and
- identify and evaluate abandoned petroleum USTs.

The UST Section has the authority to contract for the cleanup of petroleum UST incidents if the owner or operator cannot be identified or located, if the owner or operator is financially unable to perform cleanup or if the owner or operator refuses to perform the required cleanup. In the latter case, the section is authorized by general statute to recover costs incurred during assessment and cleanup activities.

Sources of funding for the Commercial Trust Fund include:

- a motor fuel and kerosene inspection tax,
- an excise tax (0.297 cents per gallon) on motor fuel and kerosene sales,
- annual payment of UST operating fees,
- costs recovered from UST owners and operators for State Lead sites,
- loan collection and interest for the Groundwater Protection Loan Fund, and
- interest earned on the account.

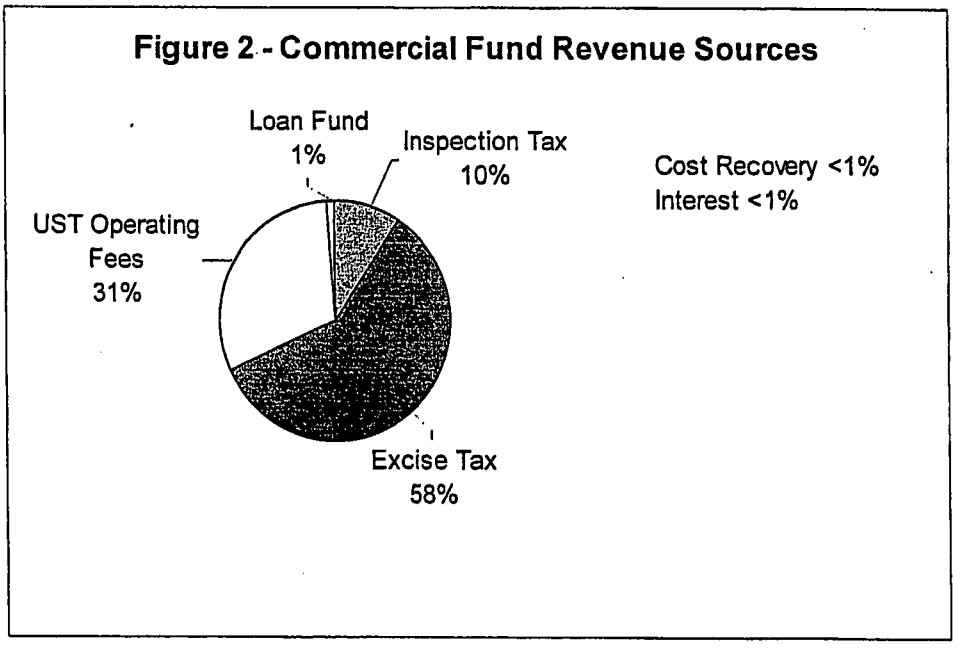
* General Statute 143-215.94A et.seq.

Owners and operators are required to pay annual operating fees to receive operating permits and to be eligible for the Commercial Fund. Annual fees for commercial USTs began at a rate of $30 for tanks with a capacity equal to or less than 3,500 gallons (small tanks) and $60 for tanks with a capacity in excess of 3,500 gallons (large tanks). Tank fees increased annually from 1989 to 1993. From 1993 to 1997, fees were $150 for small tanks and $225 for large tanks. Beginning Jan. 1, 1997, annual fees were increased to $200 for commercial USTs with a capacity equal to or less than 3,500 gallons and $300 for commercial USTs with capacity in excess of 3,500 gallons. Revenues received for the Commercial Fund for the twelve-month period from July 1, 2003 to June 30, 2004 were approximately $27 million (Table 3). The relative contributions to the Commercial Fund from each of the funding sources are illustrated in Figure 2.

Table 3 - Commercial Trust Fund Revenues
7/1/03- 6/30/04

Motor Fuel & Kerosene Inspection Tax	$ 2,562,662
Motor Fuel & Kerosene Excise Tax	$ 15,622,250
UST Operating Fees	$ 8,309,807
State Lead Cost Recovery	$ 86,592
Interest	$ 88,817
Loan Fund Collection and Interest	$ 264,556
Total Commercial Revenues	**$ 26,934,685**
Transfers to Noncommercial	$ (2,036,932)
Net Commercial Revenues	**$ 24,897,752**

Figure 2 - Commercial Fund Revenue Sources



Funding for the Noncommercial Trust Fund is provided by a motor fuel and kerosene inspection tax and excise taxes (0.047 cents per gallon) on kerosene and motor fuel sales.[1] Owners and operators of noncommercial USTs are not required to pay annual operating fees. Revenues

received for the Noncommercial Fund for the 12-month period from July 1, 2003 to June 30, 2004 were approximately $8 million (Table 4).

[1] House Bill # 681 of 1993

Table 4 - Noncommercial Trust Fund Revenues
7/1/03 - 6/30/04

Motor Fuel & Kerosene Inspection Tax	$ 2,468,195
Motor Fuel & Kerosene Excise Tax	$ 3,496,240
Interest	$ 58,279
Transfer from Commercial Fund	$ 2,036,932
Cost Recovery	$ 505
Total Noncommercial Revenues	**$ 8,060,151**

Groundwater Protection Loan Fund

The Groundwater Protection Loan Fund Program was created in 1991.* It provided financial assistance to owners of commercial USTs who replaced or upgraded their tanks to meet the performance standards required for all USTs by Dec. 22, 1998. Administrative rules implementing the program were adopted by DENR and became effective Dec. 1, 1992. Revenues for the fund were generated through a 0.0025 cent (one quarter of one cent) per gallon motor fuel excise tax received from Jan. 1, 1992 through Dec. 31, 1994.

*Session Laws 1991, c. 538, s. 25 - G.S. 143-215.94P

Federal UST Regulatory Grant Program

This program promotes compliance with UST regulations. It provides the state's UST Section with $186,675 per year to fund three positions in the DWM central office. The positions provide technical assistance to the owners and operators of USTs, develop materials, conduct educational activities, train regional staff and conduct UST inspections.

Federal Leaking UST Fund

The Federal Leaking UST Trust Fund is used to clean up petroleum contamination from leaking USTs, provide potable water to affected third-parties, perform emergency activities, relocate residents affected by leaking USTs and conduct enforcement activities. This fund is limited to USTs regulated by federal agencies, primarily commercial tanks used for storing motor fuels. Tanks used for heating oil and those used for farm or residential uses (1,100 gallons capacity or less) are not covered by this fund.

Individuals (i.e., owners/operators) do not have access to the fund. Only the federal government and states with cooperative agreements with the EPA can draw on the fund. It may be used in situations when: (1) the responsible party cannot be identified; (2) the responsible party is

financially unable to pay for the cleanup; or (3) the responsible party is unwilling and refuses to undertake assessment and/or cleanup actions.

Since the state's UST program began in 1988, the Federal Leaking UST Fund has made 20 awards totaling $40,216,813 to the state's UST Section. As of June 30, 2004, the state spent $37,845,194 from these awards. Of this amount, $17,609,555 was spent for cleanup-related activities and $617,220 for enforcement actions. Administrative, operating, travel and equipment costs totaled $16,618,415.

The program is obligated to seek recovery of all costs incurred during state lead cleanups. As of June 30, 2004, the UST Section had recovered $1,625,358 in federal cleanup money through cost recovery actions. Of this amount, $801,209 came from the North Carolina Commercial Fund for sites determined eligible for Commercial Fund coverage after cleanup activities had begun. Cost recovery funds totaling $1,527,135 were returned to the Federal Trust Fund to be used for additional corrective action expenditures.

The EPA approved $1,957,081 for North Carolina from the Leaking UST Fund for FY 2003-2004.

RECEIPTS AND DISBURSEMENTS: COMMERCIAL AND NONCOMMERCIAL TRUST FUNDS AND GROUNDWATER PROTECTION LOAN FUND

Commercial and Noncommercial Funds

UST owners, operators and landowners may submit reimbursement claims for reasonable and necessary costs incurred during environmental assessment and cleanup activities. Claims may be submitted if the eligibility requirements for the trust funds are met. Deductibles that must be met before receiving reimbursement from the Commercial Fund range from $20,000 to $75,000. Noncommercial Fund deductibles are $0 for UST owners and operators, and $5,000 for landowners. Table 5 lists the receipts and disbursements by fiscal year for both funds for the period July 1, 1988 to June 30, 2004.

Table 5 - Receipts & Disbursements for Cleanups
7/1/88 - 6/30/04

FISCAL YEAR	RECEIPTS		DISBURSEMENTS[1]	
	Commercial	Noncommercial	Commercial	Noncommercial
FY 88-89	$ 2,337,685	$ 0	$ 14,768	$ 0
FY 89-90	5,773,632	2,905,035	79,080	0
FY 90-91	7,330,573	2,934,347	1,616,760	564,206
FY 91-92	13,484,008	3,018,344	4,409,229	2,143,155
FY 92-93	18,032,784	7,693,288	9,651,948	4,069,497
FY 93-94	24,438,966	3,404,086	22,904,802	2,012,312
FY 94-95	56,037,135[2]	5,194,725	37,405,510	2,900,368
FY 95-96	28,178,768	5,215,550	44,060,639	5,029,109
FY 96-97	28,564,034	5,587,781	44,163,273	5,924,799
FY 97-98	27,291,220	5,717,592	30,267,392	3,869,091
FY 98-99	26,783,344	5,945,461	16,104,152	2,776,105
FY 99-00	27,178,623	5,636,563	22,820,069[3]	5,028,505
FY 00-01	27,240,303	5,811,666	24,566,132[4]	7,890,618[5]
FY 01-02	27,124,210	6,620,808[6]	36,872,426	9,182,320
FY 02-03	27,055,759	7,664,329[7]	26,498,565	9,898,806
FY 03-04	26,934,685	8,060,151	23,514,179[8]	7,756,579
TOTAL	**$373,785,729**	**$ 81,409,726**	**$344,948,924**	**$ 69,045,470**

[1] Does not include administrative costs.
[2] Commercial receipts for FY 94-95 included $31,288,889 that was transferred from the Groundwater Protection Loan Fund.
[3] Adjustment due to a transfer from the Commercial Fund to the Federal Trust Fund of $288,117 as a cleanup expenditure rather than as an administrative cost.
[4] $33,866 transferred to Federal Trust Fund as a cleanup expenditure.
[5] $2 million transferred out of Noncommercial Fund to the state's General Fund.
[6] Includes transfer of $784,382 from Circle K Settlement Fund
[7] Includes transfer of $3,418,990 of motor fuel and kerosene tax from Commercial to Noncommercial trust funddue to balance below $5 million - General Statute 119-18(b).
[8] Includes transfer of $2,036,932 from Commercial to Noncommercial trust funds per GS 119.18(b); transfer of $90,000 to Dept. of Agriculture; and transfer of $52,722 to Federal Trust Fund as a cleanup expenditure.

The administrative budget for the state-funded portion of the UST program is derived from the Commercial and Noncommercial Funds. Table 5 lists past administrative expenditures since the beginning of the UST program.

Table 6 - Administrative Expenditures

FISCAL YEAR	COMMERCIAL	NONCOMMERCIAL
FY 89-90	$ 201,255	$ 201,254
FY 90-91	547,595	547,595
FY 91-92	517,221	517,221
FY 92-93	601,687	601,686
FY 93-94	694,424	694,423
FY 94-95	666,270	666,270
FY 95-96	2,322,632	783,684
FY 96-97	2,623,339	801,143
FY 97-98	2,530,036	667,724
FY 98-99	2,567,668	620,574
FY 99-00	2,579,540*	570,738
FY 00-01	2,730,236	733,811
FY 01-02	2,397,264	913,755
FY 02-03	2,221,851	1,166,494
FY 03-04	2,527,451	1,244,864
TOTAL	**$ 25,728,469**	**$10,731,236**

Incorporating the administrative costs into receipts and cleanup disbursements yields these Commercial and Noncommercial Fund balances:

Commercial Fund Balance (as of June 30, 2004)	**$ 3,077,997**
Noncommercial Fund Balance (as of June 30, 2004)	**$ 1,635,015**

* Adjustment due to a transfer of $288,117 from the Commercial Fund to the Federal Trust Fund as a cleanup expenditure rather than an administrative cost.

Groundwater Protection Loan Fund

After the Groundwater Protection Loan Fund was created, 11 North Carolina banks agreed to administer the loan program. As of June 30, 1995, four loans totaling $1,228,350 had been closed. After this date, remaining funds of $31,288,889 were deposited into the Commercial Trust Fund. Loan repayments are also deposited into the Commercial Fund. During the twelve-month period ending June 30, 2004, $249,047 was repaid. Total receipts for the Loan Fund since its inception in January 1992 are $33,036,751.

CLAIMS AGAINST THE CLEANUP FUNDS

Claims against both the Commercial and Noncommercial Funds are processed on a "first-come, first-served" basis. The status of all claims requesting reimbursement from both funds that were received as of June 30, 2004 is presented in Table 7. These claims only include costs claimed to date, and do not represent the total costs for cleanups.

UST Section staff have supervised contract cleanups at 308 commercial and noncommercial sites (Table 7, 241 commercial and 67 noncommercial). Currently, DENR has four contracts with environmental engineering/geology firms that perform a range of assessment and cleanup actions. The term of these contracts is 18 months with an option to renew for an additional 18 months.

Table 7 - Claims Against the Cleanup Funds
7/1/88 - 6/30/04

	Commercial Fund		Noncommercial Fund	
	Number	Cost	Number	Cost
Claims Paid	21,915	$338,698,495	8,090	$ 67,625,873
Incidents Denied Totally [1]	33	$ 4,573,040	4	$ 59,845
Claims Denied Partially [2]	13,250	$ 70,826,206	3,812	$ 9,598,853
Total Deductibles Paid	-------	$ 66,445,056	-------	$ 390,090
Claims Pending	2,219	$ 30,522,435	548	$ 5,646,580
Contracted Cleanups [3]	289	$ 9,940,930	77	$ 2,460,050

[1] Ineligible
[2] Excessive or undocumented costs
[3] State Lead actions undertaken or completed

COMMERCIAL AND NONCOMMERCIAL FUND BALANCES AND PROJECTED NEEDS

Commercial Fund

As of June 30, 2004, the Commercial Fund balance was $3,077,997 with pending claims of $30,522,435 (see Figure 3, Page 14). Since Jan. 1, 2002, the difference between the fund balance and the pending amount has continued to increase (see Figure 4, Page 14). During the six-month period from July 1, 2001 to Dec. 31, 2001, expedited reviews were initiated in an effort to reduce claim review time. While the claim review time has been reduced, the result has been a delay in issuance of the reimbursement checks, since the Commercial Fund can only pay out what has been received for the month. Claim amounts continue to increase as well as the backlog of claims awaiting payment. Revenues, however, remain steady.

Figure 3 - Commercial Fund Balance and Claims Pending

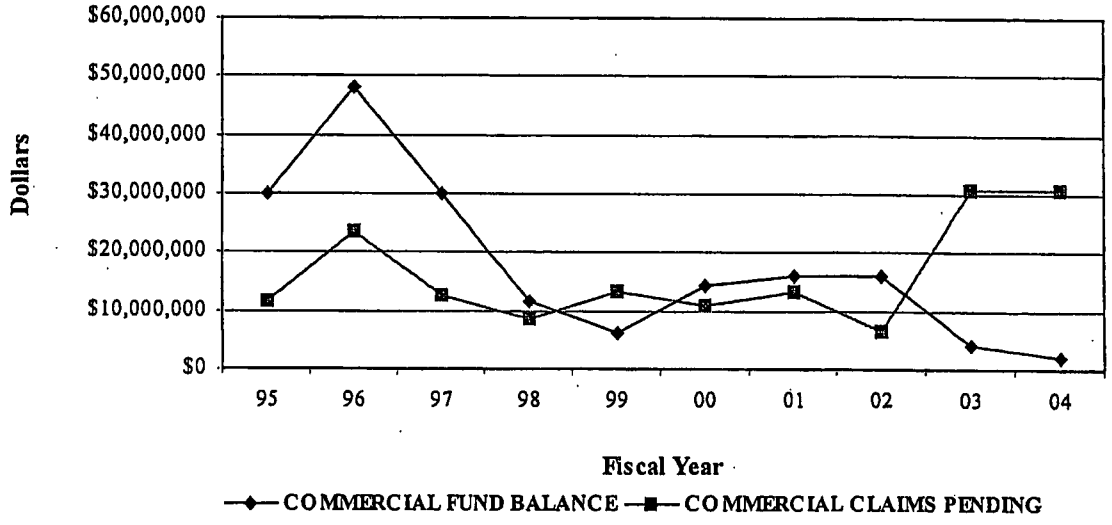


Figure 4 - Commercial Fund Balance Minus Claims Pending

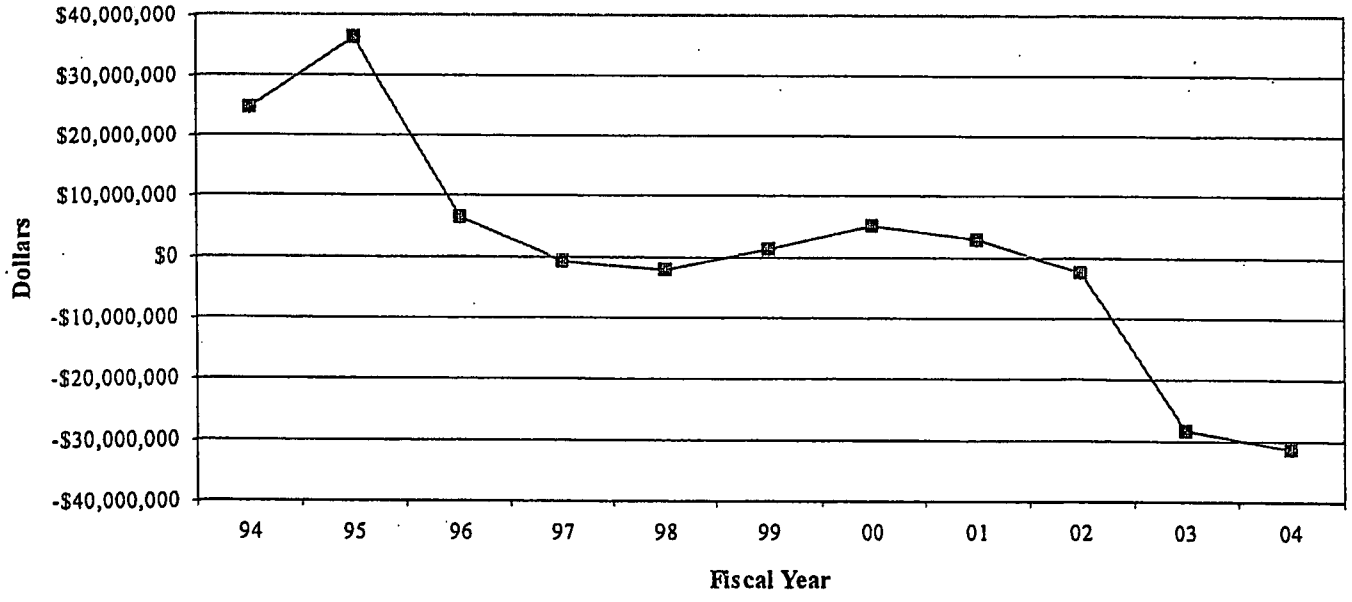


Table 8 - Total Commercial Fund Revenues and Expenditures
7/1/03 – 6/30/04

Total Commercial Revenues (see Table 3, page 14)	**$26,934,685**
Total Claims and Contracted Cleanups	$23,514,179
Administrative Costs	$ 2,527,451
Total Commercial Expenditures	**$26,041,630**

One initiative which may affect a future demand on the Commercial Fund is pay-for-performance based cleanups. On Oct. 1, 2001, the General Assembly ratified House Bill 1063, which allows responsible parties to participate in the pay-for-performance program on a voluntary basis. Pay-for-performance is a reimbursement method that requires cleanup goals to be met before payments can be made to environmental consultants. This reimbursement method requires the Trust Fund to obligate the contracted cleanup costs. Pay-for-performance obligations may initially place a higher demand on the Trust Fund, but should greatly decrease the costs of cleanups and thus result in a lesser burden to the Trust Fund.

Another factor that may effect future demands on the Commercial Fund is third-party claims. There are currently several pending third-party claims under review which have the potential to place a burden of many hundreds of thousands of dollars on the Commercial Fund. Other third party claims may be planned that have not yet been submitted for review.

After UST operating fees were raised on Jan. 1, 1997, revenue from this funding source declined through the end of FY 1998-99 (see Table 9). This decrease was likely due to the reduction in the number of registered USTs that occurred as a result of the federal 1998 upgrade regulations. The number of registered USTs continued to increased during the period from July 1, 2003 to June 30, 2004. However, UST operating fees have remained essentially stable.

Table 9 - Commercial UST Population and Operating Fee Revenue

Fiscal Year	No. of Commercial USTs Billed	Operating Fee Revenue
FY 1996-97	37,776	$ 10,839,975
FY 1997-98	36,563	$ 10,008,917
FY 1998-99	34,428	$ 8,697,468
FY 1999-00	33,558	$ 8,844,093
FY 2000-01	33,776	$ 8,464,019
FY 2001-02	32,839	$ 8,553,715
FY 2002-03	31,155	$ 8,087,033
FY 2003-04	32,005	$ 8,309,807

At present, approximately 7,488 commercial incidents have yet to be closed out. With minor work performed in accordance with the risk based rules, many of these sites may receive "no further action" letters. However, some will require additional assessment and corrective action, that will subsequently result in additional demands on the Commercial Fund.

Data tracking improvements are continuosly made to the UST incident management database. These changes will enable the UST Section to better predict the number of incident closures and project Commercial Fund expenditures.

UST systems pose a substantial threat to human health and the environment. On average, over 1,200 leaks are reported each year. Maintaining the quality of North Carolina's drinking water depends on preventing releases to the environment. Direct education and technical assistance for tank owners and operators is critical. Only education and assistance ensure responsible handling of petroleum products, including methyl tertiary-butyl ether, and early detection in the event of a leak.

North Carolina currently has about 31,956 active regulated USTs at 10,836 facilities. We estimate that 40 to 50 percent of the facilities are located within 500 feet of both domestic and public drinking water supplies. Our inspection data show that over 30 percent of tank owners and operators do not comply with UST regulations. These regulations cover proper operation and maintenance, with an emphasis on leak detection. If we are to preserve the quality of North Carolina's drinking water, improving compliance must be a future priority.

Noncommercial Fund

As of June 30, 2004, the Noncommercial Fund balance was $1,635,015. The total for pending claims stood at $5,646,580. Based on the past 12 month period, it appears that demands on the Fund will increase. We anticipate this will result in delayed claim payments, just as the Commercial Fund was affected (see Figure 5). Similar to the Commercial Fund, the difference between the fund balance and the pending amount has continued to increase (Figure 6). For FY 2003-2004, Table 10 shows a summary of the noncommercial revenue versus the expenditures.

Figure 5 – Noncommercial Fund Balance and Claims Pending

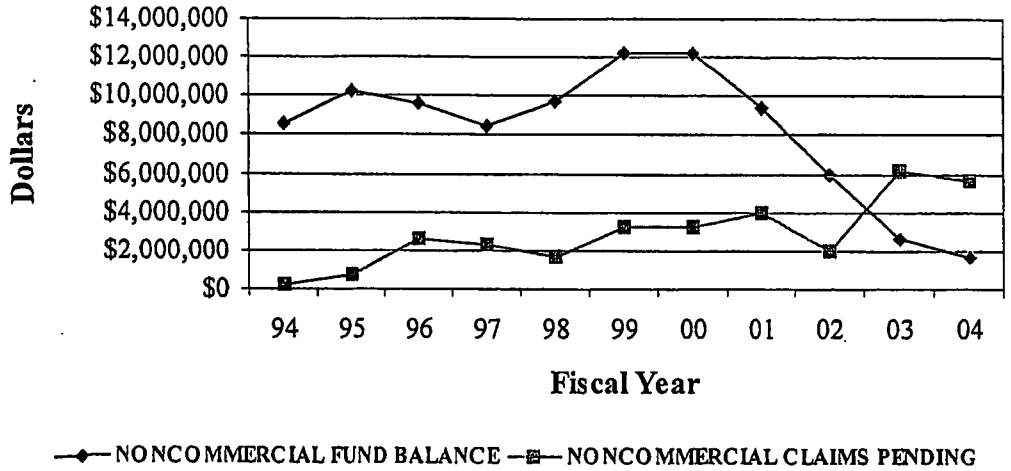


Figure 6 – Noncommercial Fund Balance Minus Claims Pending

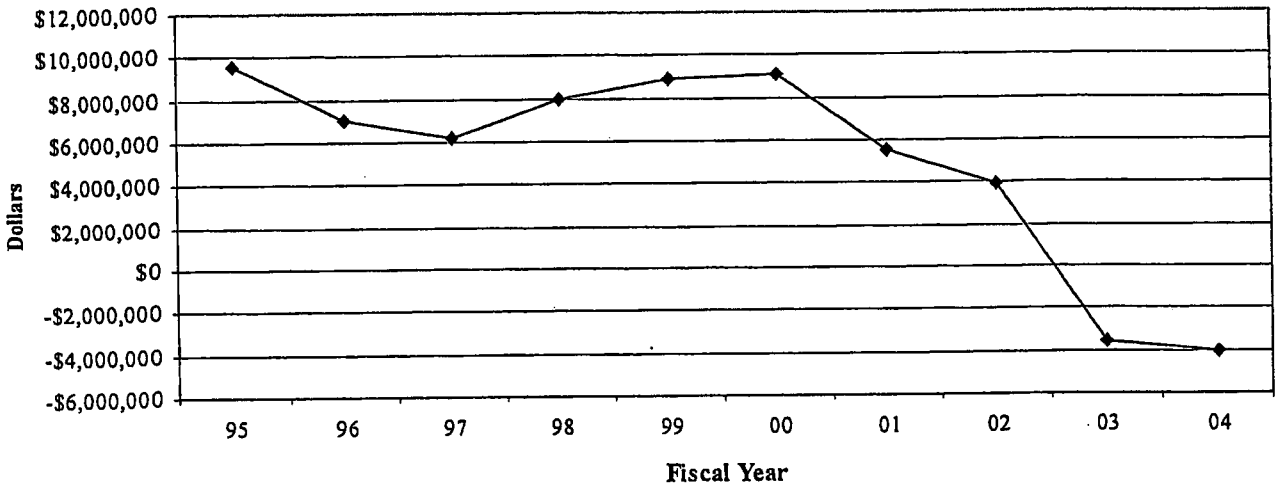


Table 10 – Total Noncommercial Fund Revenues and Expenditures

7/1/03-6/30/04

Total Noncommercial Revenues (see Table 2, page 3)	**$ 8,060,151**
Total Claims and Contracted Cleanups	$ 7,756,579
Administrative Costs	$ 1,244,864
Total Noncommercial Expenditures	**$ 9,001,443**

Table 11 shows the estimated cost to complete cleanups for noncommercial incidents reported from July 1, 2003 to June 30, 2004. It should be noted, however, that cleanups can easily extend over several years and costs may vary greatly. In addition, these figures do not include remedial costs for reported releases from past fiscal years.

Table 11 - Estimate of Cleanup Costs for Noncommercial Incidents
Reported July 1, 2003 - June 30, 2004

Region	Incidents*	Total Estimated Cleanup Cost**
Asheville	44	$ 1,086,800
Fayetteville	25	$ 617,500
Mooresville	82	$ 2,025,400
Raleigh	131	$ 3,235,700
Washington	77	$ 1,901,900
Wilmington	45	$ 1,111,500
Winston-Salem	104	$ 2,568,800
Total	**508**	**$12,547,600**

* Calculations of the last twelve-month period indicate that approximately 56 percent of reported new releases are from noncommercial sites.

** An average cost of $24,700 is used as an estimate of total cleanup costs for noncommercial sites.

PAY FOR PERFORMANCE

On Oct. 15, 2001, House Bill 1063 was enacted by the North Carolina General Assembly. This bill gives the Division of Waste Management's Underground Storage Tank program the authority to allow performance-based cleanups of sites where petroleum has been discharged or released from underground storage tanks. Sites selected for the pilot program will be posted for competitive bidding in the North Carolina Interactive Purchasing System. A performance-based contract will be awarded to the qualified environmental services firm that submits the lowest, technically qualified bid for an acceptable remedial proposal for the advertised site. A series of milestones (generally percentage reductions in contaminate levels in the soil and groundwater) must be achieved before payments are made to the cleanup firm from the Commercial or Non-Commercial Fund.

On Nov. 2, 2001, the Division of Waste Management convened a stakeholders workgroup consisting of representatives of the Professional Engineers of North Carolina, the Consulting Engineers Council of North Carolina, the North Carolina Board for the Licensing of Geologists and the North Carolina Petroleum Marketer's Association to develop a temporary rule. A follow-up meeting on Nov. 9, 2001 resulted in the further refinement of the rule and the discussions of the contract and bidding procedures proposed for use with the rule.

The proposed temporary rule was presented to the Groundwater Committee of the Environmental Management Commission on Dec. 12, 2001 and received a favorable vote to proceed to full commission review in February 2002. On Feb. 14, 2002, the EMC voted to approve the publication of the temporary rule in the North Carolina Register. The temporary rule was published for public comment between March 15 and April 15, 2002 in Volume 16, Issue 18, p. 2019 of the NC Register. No comments were received. The Commission adopted the temporary rule on May 14, 2002. On July 11, 2002 the Commission voted to allow the Division of Waste Management to proceed with permanent rule making and to publish the permanent rule in the NC Register. The permanent ruke was made effective on July 1, 2004 and published in the July 2004 Issue of the NC Register.

In July of 2003, House Bill 897 was passed that allowed $2.5 million from the Commercial Fund and $250,000 from the Non-Commercial Fund to be allocated for the Pay-For-Performance Program in each fiscal year. At this time, there are five sites, two Federal-Lead and three responsible party lead sites awaiting finalization of the PFP contract language. Currently, the contract language is being reviewed by the Attorney General's Office. Pending approval, UST staff will meet with representatives of the Purchase and Services Division and the Department of Administration to finalize the PFP contract submittal procedure. Once completed, the five sites will be sampled to provide a current picture of the contamination levels remaining and then the contracts will be placed in the Interactive Purchasing System for awarding.

RECOMMENDATIONS

Based on the results of this report, the UST Section makes the following recommendations for the Commercial and Noncommercial Trust Funds:

- Additional revenue should be made available for expedited payment of Commercial Fund and Noncommercial Fund claims.

- Responsible parties of UST releases should continue to be encouraged to consider pay-for-performance cleanups at their sites. Pay-for-performance is a reimbursement method that requires cleanup goals to be met before payments can be made to environmental consultants. PFP programs in other states have dramatically reduced the costs for cleanups. Costs are down 66 percent in Florida and 50 percent in South Carolina. PFP also accelerates the rate of cleanups. The Department of Environment and Natural Resources will monitor the obligated costs for pay-for-performance contracts and the potential cleanup cost savings of the PFP program.

- Establish a statute of limitations for filing claims. Because fund deductable amounts vary, we propose grouping all years with like deductables (Example: releases detected 6/88-12/91 and 1/92-12/93) and assigning a common claim submittal deadline. The UST section can inform its customers of the new deadline, and then provide one year for all claims to be prepared and filed. By learning more about the outstanding claims, the UST Section can increase its ability to predict future expenditures.

- Consider private insurance as the FR mechanism for new installations and phase in existing USTs.

Box #15

1. 2003-2004 Environmental Review Commission
2. 2000 House Select Committee on a State Lottery (Draft)

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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5 November 2004

TO: Members of the Environmental Review Commission
Interested Parties

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of November Commission Meetings**
Notice of Planning Meeting
Coastal Site Visits
Schedule of Future Meetings
Meetings of Interested Parties (605 Working Groups)
Additional Information

COMMISSION MEETING:

The Environmental Review Commission (ERC) will meet jointly with the Joint Legislative Commission on Seafood and Aquaculture (JLCSA) at 11:00 a.m. Thursday 18 November 2004 in Room 544 of the Legislative Office Building in Raleigh. The meeting will focus on the development and implementation of the Coastal Habitat Protection Plan pursuant to G.S. 143B-279.8 and a discussion of issues regarding the implementation of the coastal recreational fishing license established by S.L. 2004-187 (Saltwater Fishing Fund). **We anticipate that the meeting will last until late afternoon. Boxed lunches will be provided for members of the ERC and JLCSA.**

The ERC will meet for its regular monthly business meeting at 9:30 a.m. Friday 19 November 2004 in Room 544 of the Legislative Office Building in Raleigh. At this meeting, the ERC will begin or continue studies for which the ERC is responsible, hear reports from State agencies, discuss topics to be considered at future meetings, and attend to other matters. Listed below are potential agenda topics for this meeting and for future meetings. More specific information regarding the agenda for the 19 November meeting of the ERC will be developed at the staff planning meeting discussed below. **We anticipate that the meeting will last until early to mid afternoon. Boxed lunches will be provided for members of the ERC.**

STUDY TOPICS:

Air Quality:

1) Modification of the current highway use tax so that all or a portion of the highway use tax paid on a private passenger vehicle is based on the fuel efficiency rating of the vehicle (S.L. 2004-161, Sec. 19.10(1))

2) Modification of the current vehicle registration fee so that all or a portion of the annual vehicle registration renewal fee for a passenger vehicle is based on the vehicle miles traveled by the vehicle (S.L. 2004-161, Sec. 19.10(2))

3) Issues related to greenhouse gas emissions and global climate change

Miscellaneous:

4) Effectiveness of the State's efforts to protect the environment and conserve the natural resources of NC (S.L. 2004-161, sec. 19.2)

5) Development of a plan to share floodplain mapping information (S.L. 2004-161, Sec. 19.3)

6) Efforts to stimulate renewable energy production in the State

7) Results of the conservation needs assessment conducted by the Land for Tomorrow Coalition

Water Quality:

8) Approaches to prevent and reduce stormwater pollution throughout the State (S.L. 2004-161, Sec. 19.11)

9) Issues related to the Leaking Petroleum Underground Storage Tank (UST) Cleanup Program (S.L. 2003-352, Sec. 12)

10) The role of the State and DENR in implementing the Leaking UST Cleanup Program (S.L. 2004-124, Sec. 30.10.(f)) (joint study with the Joint Legislative Transportation Oversight Committee)

11) Identification and closure of inactive or abandoned animal waste management lagoons

Water Quantity:

12) Water restriction guidelines created by DENR and implemented by local governments, including an evaluation of economic impacts and recommendations for establishing consistency across the State with respect to classes of water use (S.L. 2004-161, Sec. 19.4)

13) Development and funding of regional water supply systems (S.L. 2004-161, Sec. 19.5)

14) Water conservation measures being implemented in the State and incentive programs and other voluntary programs that can help foster water conservation and reuse

15) Expansion of the guaranteed energy savings contracts program for governmental units to include contracts that provide for the conservation of water and sewer usage

REPORT TOPICS:

Air Quality:

16) Annual report on the cost of the Title V Program (G.S. 143-215.3A(c)

17) Annual report on implementation of S.L. 2002-4 (Clean Smokestacks Act) (S.L. 2002-4, Sec. 14)

18) Annual report on issues related to the development and implementation of standards and plans to implement programs to control emissions of mercury and carbon dioxide from coal-fired generating units and other stationary sources of air pollution (S.L. 2002-4, Sec. 12-13)

19) Annual report on increasing the use of alternative-fueled and low-emissions light-duty cars and trucks in privately owned fleets (G.S. 143-215.107C(c))

20) Annual report on development and implementation of a plan to reduce vehicle miles traveled by private sector employees and vehicle emissions resulting from job-related travel, including commuting to and from work (G.S. 143-215.107C(e))

21) Annual report on development and implementation of a plan to reduce vehicle miles traveled by State employees and vehicle emissions resulting from job-related travel, including commuting to and from work (S.L. 1999-328(4.6))

22) Annual report on promotion of telework/telecommuting for State employees and achieving the goal of reducing State employee vehicle miles traveled in commuting by 20% without reducing total work hours or productivity (S.L. 1999-328(4.8))

23) Report on the evaluation and adjustment of the boundaries of the area served by each Metropolitan Planning Organization (G.S. 136-202(d))

Parks and Recreation / Land Conservation:

24) Parks and Recreation Trust Fund Annual Report, Fiscal Year 2003-2004 (G.S. 113-44.15(c))

25) North Carolina Natural Heritage Trust Fund Award Report, Fiscal Year 2003-2004 (G.S. 113-77.9(e))

26) Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands (G.S. 113A-241(c))

27) Annual report on implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR (G.S. 113A-235(c))

Water Quality:

28) Annual report on the Wastewater Discharge Elimination Program (S.L. 2001-452, Sec. 2.9)

Water Quantity:

29) Annual report on the progress of water supply planning (G.S. 143-355(n))

Wetlands:

30) Implementation of the Wetlands Restoration Program and use of funds in the Wetlands Restoration Fund (G.S. 143-214.13)

PLANNING MEETING:

To facilitate development of the agenda for the 19 November meeting of the ERC, to plan for subsequent meetings of the ERC, and to receive input from interested persons regarding the work of the ERC, the Commission Counsel will hold an informal planning meeting at **10:00 a.m. on Tuesday 9 November 2004 in Room 605 of the Legislative Office Building**. Persons who wish to participate in the development of the agenda for meetings of the ERC, or who are interested in any matter before the ERC, are invited to attend.

COASTAL SITE VISITS:

Members and staff of the ERC and JLCSA will visit several coastal sites in the Atlantic Beach/Morehead City/Beaufort area related to marine fisheries beginning at 9:00 a.m. on Monday 29 November 2004. These site visits will be similar to those originally scheduled for 27 September 2004 but were subsequently canceled because of Hurricane Jeanne. No business meeting will be held in conjunction with the 29 November 2004 site visits. Members should, however, plan to arrive in Atlantic Beach by 5:00 p.m. Sunday 28 November 2004 if possible. Further information on the site visits, including information on accommodations, will be sent to members of the ERC and the JLCSA in the next week.

SCHEDULE OF FUTURE MEETINGS:

The ERC will not meet on 22, 23, or 30 November, so it is no longer necessary to ask that you reserve these dates. Below is a schedule of meetings of the ERC for December 2004 through January 2005. This schedule is tentative and subject to adjustment. For planning purposes, please reserve these dates.

Commission Meeting	Staff Planning Meeting
Tuesday 7 December 2004	Wednesday 1 December 2004
Wednesday 12 January 2005	Wednesday 5 January 2005
Thursday 13 January 2005	
Thursday 20 January 2005	
Tuesday 25 January 2005	

MEETINGS OF INTERESTED PARTIES (605 WORKING GROUPS):

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Limit Liability for Environmental Cleanups Working Group (HB 1603/SB 1222)
10:00 a.m. Thursday 2 December 2004 – 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel or other Commission staff at (919) 733-2578.

General Assembly of North Carolina

Joint Legislative Commission on Seafood and Aquaculture
and
Environmental Review Commission

Agenda

11:00 a.m. Thursday, November 18, 2004
Room 544 Legislative Office Building

1. Call to order
   Senator Charles W. Albertson, presiding

2. Introductory remarks by Co-chairs
   Senator Charles W. Albertson
   Senator Daniel G. Clodfelter
   Representative Pryor A. Gibson
   Representative Daniel F. McComas
   Representative Bonner L. Stiller
   Representative William L. Wainwright

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Report on progress in developing and implementing the Coastal Habitat Protection Plan; opportunity to review and comment on the Plan (G.S. 143B-279.8)
   Michael W. Street, Chief
   Habitat Protection Section, Division of Marine Fisheries, DENR

WORKING LUNCH – Estimated for 12:00 p.m. to 1:00 p.m. (Lunch Provided)

Robin W. Smith, Assistant Secretary for Planning and Policy
DENR

5. Discussion of issues regarding the implementation of the coastal recreational fishing license established by S.L. 2004-187 (Saltwater Fishing Fund)
   Jeff W. Hudson, Commission Counsel

   Preston P. Pate, Director
   Division of Marine Fisheries, DENR

   Richard B. Hamilton, Executive Director
   Wildlife Resources Commission

   Daniel J. Whittle, Senior Attorney
   North Carolina Regional Office, Environmental Defense

   Michael G. Ward, President
   Coastal Conservation Association of North Carolina

   Benjamin "Mac" Currin, Member
   Marine Fisheries Commission

   Ron McPherson, Coordinator
   1999 Coastal Recreational Fishing License Survey

   Additional Comment

6. Discussion and announcements

7. Adjourn

VISITOR REGISTRATION SHEET

DATE Nov. 18, 2004

Jt. ERC / StA mtg.

JOINT LEGISLATIVE COMMISSION ON SEAFOOD AND AQUACULTURE

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Steve Wall	DENR	
Michael Buhl	NCDMF	(252)-726-7021
Dr. Louis Daniel	NCDMF	(252)-726-7021
Jim Gulick	NCAGO	
Tom Bean	NC Environ Defense	(919) 445-1445
Bryan Gillikin	MFC	(252) 659-2222
Mike Lozanski	DCM	(919) 733-2293
Steve Underwood	DCM	(919) 733-2293
Ed Gavin	NCAGO	919 716-6964
Larry Cobb	MV WA	
Robin Smith	DENR	919 715-4141
Lisa Martin	NC Home Builders	919-676-1045
Briton Shackelford		(252) 475-1727
John Goodman	Allen Associates	822-4771
Zeb Allen	Allen Associates	822-4771

VISITOR REGISTRATION SHEET

DATE Nov. 18, 2004

Jt. ERC / StA Mtg -

JOINT LEGISLATIVE COMMISSION ON SEAFOOD AND AQUACULTURE

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE
Jess Nawlen	Division of Marine Fisheries	252-726-7021
Johanne Reece	DENR	715-4184
Katy West	DMF/NMFS	946-[illegible]
Britton Shackelford		475-1723
Ross Williams	NCDA&CS	733 7887
Ron Fish	NCDA&CS	733-7887
Ernie Foster	[illegible]	252-95[illegible]
Tom Harper	"HARPERS FOLLY"	252-986-1078
Ron Whitaker	"Release" Committee	252-986-1031
Denny Hemilright	FV-TARBABY	252-255-5791
B J Copeland	MFC	837-5024
Michael W Street	DENR-DMF	252-726-7021
SEAN MCKENNA	NCDMF	252-946-[illegible]
MAC CURZIN	MFC	914-821-[illegible]
LYNN HENRY	NC DMF	252-796-1322

VISITOR REGISTRATION SHEET

DATE Nov. 18, 2004

Jt. ERC / StA Mtg -

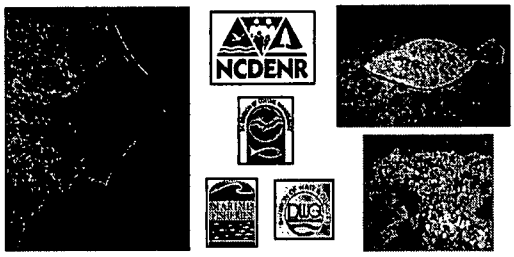
JOINT LEGISLATIVE COMMISSION ON SEAFOOD AND AQUACULTURE

VISITOR: Please sign below and return to clerk.

NAME	FIRM OR STATE AGENCY	TELEPHONE

North Carolina Coastal Habitat Protection Plan

November 2004



Eastern North Carolina's Economy

- Tourism
- Retirement
- Commercial fishing
- Recreational fishing
- Agriculture
- Forestry

- All are based on a healthy and productive environment

History

- CHPP builds on earlier studies
  - Albemarle-Pamlico Estuarine Study: 1994
  - Coastal Futures Committee Report: 1994
  - Blue Ribbon Advisory Council on Oysters: 1995
  - Fisheries Moratorium Steering Committee: 1996
  - Estuarine Shoreline Stakeholders Report: 1999
- All cited land use, stormwater runoff, habitat loss, fishing gear effects as majors issues affecting coastal habitat
- Limited implementation success

Coastal Habitat Protection Plans

- DENR program; CHPPs drafted by DMF staff
- Initial CHPP to be adopted by EMC, CRC, MFC by December 31, 204
  - Implementation plans January – June 2005
  - Begin implementation July 2005
- Technical oversight by CHPP Team (DMF, DCM, DWQ, DEH, WRC)
- Policy oversight by Intercommission Review Committee (IRC – two members each from CRC, EMC, MFC)
- ***THREE COMMISSIONS MUST COOPERATE***

Coastal Habitat Protection Plan goal

"...long-term enhancement of coastal fisheries associated with each habitat" (G.S. 143B-279.8)

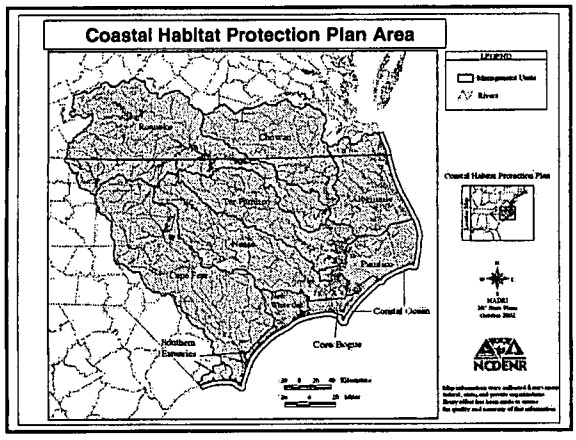
CHPP Requirements

[G.S. 143B-279.8.]

- **Describe and classify biological systems in the habitat**
- **Evaluate the function, value to coastal fisheries, and trends in habitat**
- **Identify existing and potential threats to the habitat and impact on coastal fishing**
- **Recommend actions to protect and restore the habitats**

CHPP and Science

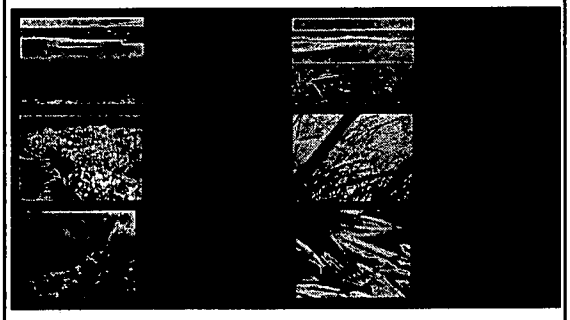
- CHPP is a scientific document
- Began drafting 1999
- > 50 scientists met to provide guidance in February 2000. Many continued to contribute information.
- Drafts reviewed and edited by dozens of scientists
- Reviewed by Intercommission Review Committee (Two members each from EMC, CRC, MFC)



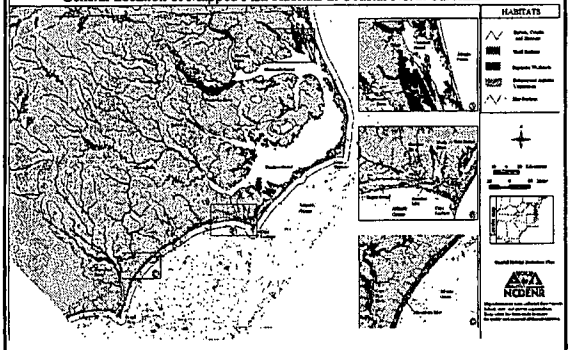
Fish Habitat Defined

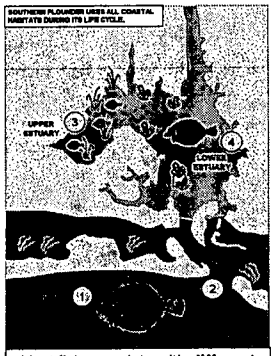
Freshwater, estuarine and marine areas that support any of the various life stages of commercial and recreationally important fish species, as well as those forage species important in the food chain

Six Interdependent Fish Habitats Support North Carolina's Coastal Fisheries



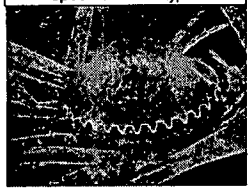
General Location of Mapped Fish Habitats in Coastal North Carolina





Most fish associate with **different habitats** at different life stages

Some fish depend strongly on **specific** habitat types

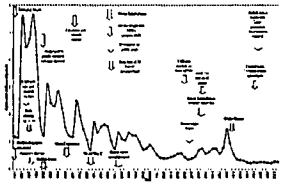


Because habitats are interdependent, all fish depend on the **total habitat system**

Loss and Degradation of Shell Bottom

The Evidence

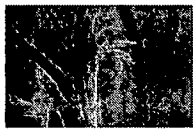
- Subtidal oyster reefs in Pamlico Sound system
  - Major losses due to oyster dredging late 1880s – early 1900s
  - Some displacement downstream due to flow and salinity changes and losses from harvesting, dredging, poor water quality
  - Not returning to previous levels [disease, bottom-disturbing fishing, greatly reduced cultch (surface for attachment)]
- Intertidal reefs more stable in southern coast.
- Partially mapped during 1880s and late 1980s to present



Loss and Degradation of SAV

The Evidence

- Most SAV mapped during late 1980s and early 1990s
- Anecdotal records suggest significant decline (> 50%) of low-salinity SAV in western Pamlico Sound and tributaries since the 1970s
- High salinity grasses fairly stable (Outer Banks – Bogue Sound)
- Water clarity is key factor for SAV survival
- Sediment and nutrients in water column reduce water clarity
- Some recovery in Chowan and other areas since 1980s as discharges removed and BMPs implemented

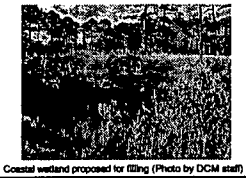


Loss and Degradation of Wetlands

The Evidence

- Coastal wetlands mapped
  - Hydric soil maps - 1950s
  - Wetland types - 1994
- Estimated 50% loss since pre-colonial times
- Most wetlands losses occurred prior to 1970s
- Current rate of loss has greatly slowed due to regulation

Cleared and ditched 404 wetland (Photo by DWQ staff)



Coastal wetland proposed for filling (Photo by DCM staff)

Water Quality Degradation
The Evidence

Nationwide Trends

- EPA report (2002) indicated that > 30% of U.S. rivers and 50% of estuaries and lakes are too polluted for swimming or fish consumption.
- Numerous studies show correlation between increasing human population and water quality degradation; which is a challenge given population growth on the coast, and in river basins that flow to coast.

North Carolina Trends

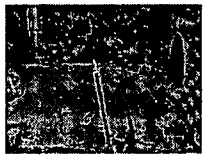
- According to land cover data, between 1982 and 1997, urban/built-up land and roads increased in coastal river basins by 43-132%

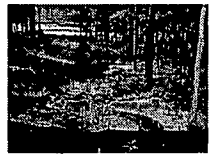
Corolla, NC

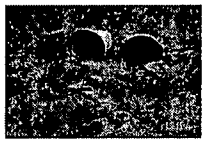
Water Quality Degradation
The Evidence

Impaired waters, increasing shellfish harvest closures, and fish kills indicate that significant water quality problems exist in North Carolina.

Sedimentation from Land Disturbing Activities

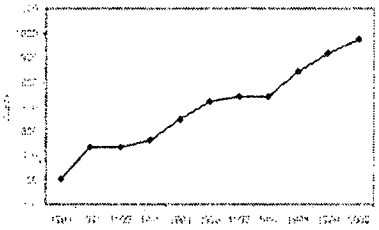






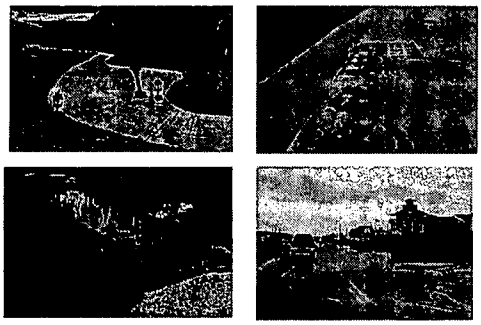
Water Quality Degradation
The Evidence

Shellfish Harvest Closures in Outstanding Resource Waters

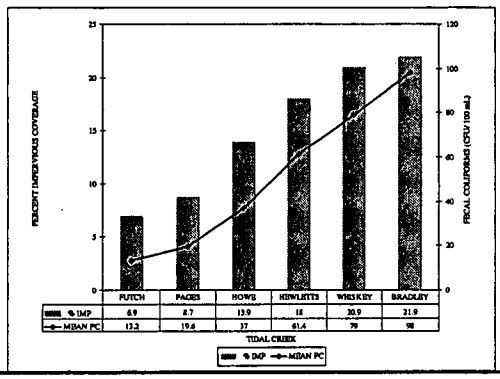


Data Source: Shellfish closure areas from DEH Shellfish Sanitation and Recreational Water Quality Section

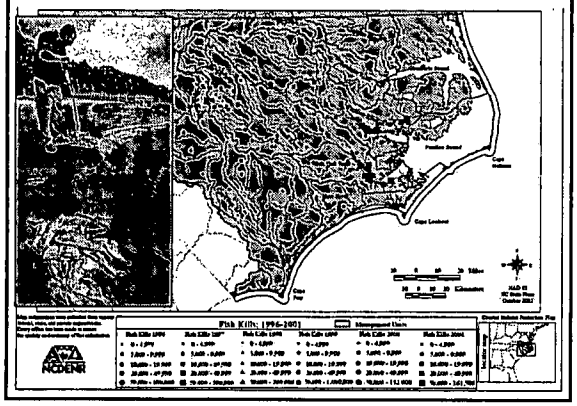
Runoff from Impervious Surfaces
(Mostly from urban/suburban areas and road networks)



Impervious Surface and Fecal Contamination



Observed Fish Kills

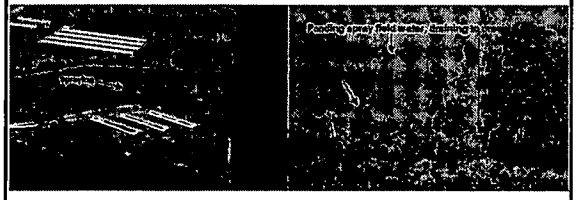


Storm Effects vs. Human Activities

Post *Hurricane Floyd* flooding

Wastewater Storage/Discharge

- Row crop agriculture has declined in North Carolina in recent years
- Animal operations have greatly increased, especially in Coastal Plain
- Waste can enter streams from lagoon breaches, runoff from spray field
- Waste can enter groundwater and increase nitrogen in air

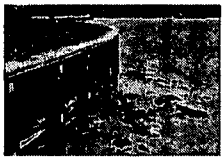
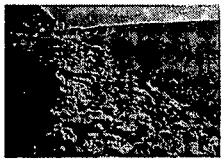
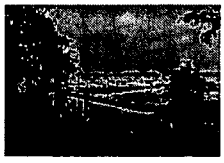


Animal operation - lagoon and spray field. (Photo by DWQ)

Saturated spray field. Spray effluent puddling on surface and draining to adjacent creek. (Photo by DWQ)

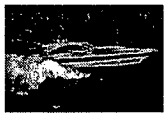
Shoreline Alteration

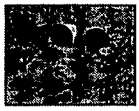
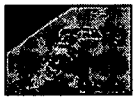
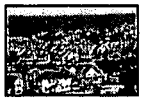
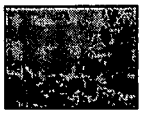
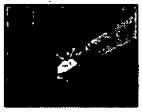
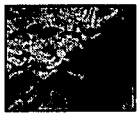
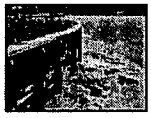
(Estuarine shoreline stabilization, marinas and docks, and beach nourishment)

Fishing Practices and Boating Activity

- Clam kicking and oyster dredging dig up soft bottom and oysters, and increase turbidity; some SAV is within clam kicking areas
- Wakes from high speed boat operations erode fringing wetland vegetation, increase turbidity, destabilize shell bottom



Effects on the Total Habitat System can be Individually Small, but Cumulatively Large

Public Participation

- Public Outreach prior to Public Meetings (10 each year)

2003	2004
- video	- mailings (>600)
- brochure (15,000)	- new tabloid (250,000)
- tabloid (250,000)	- internet (draft CHPP)
- internet	

- Focus of Public Meetings
  - 2003: identify threats & suggest actions
  - 2004: introduce & discuss recommendations
- Comments also received after each years' meetings via telephone, e-mail, U.S. Mail, and in person. Shared with IRC, DENR

Public Participation

- Additional meetings held with interest groups
  - 2003: local govt., agriculture, educators, civic groups
  - 2004: local govt., agriculture, forestry, developers, commercial and sport fishermen
- Estimated # of Internet downloads of draft CHPP
  > 12,000 (July 1 – October 31, 2004)

Public Comments

- Improve enforcement and compliance monitoring
- Coordinate rule-making and enforcement among Commissions and agencies
- Enhance education on habitat and threats
- Reduce stormwater impacts on water quality
- Enough studies – time for action

CHPP Goals & Recommendations

Goal 1 IMPROVE EFFECTIVENESS OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITATS

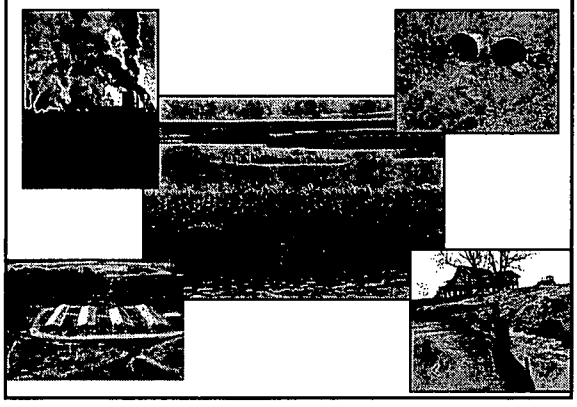
Goal 2 IDENTIFY, DESIGNATE, AND PROTECT STRATEGIC HABITAT AREAS (SHAs)

Goal 3 ENHANCE HABITAT AND PROTECT IT FROM PHYSICAL IMPACTS

Goal 4 ENHANCE AND PROTECT WATER QUALITY

CHPP Schedule

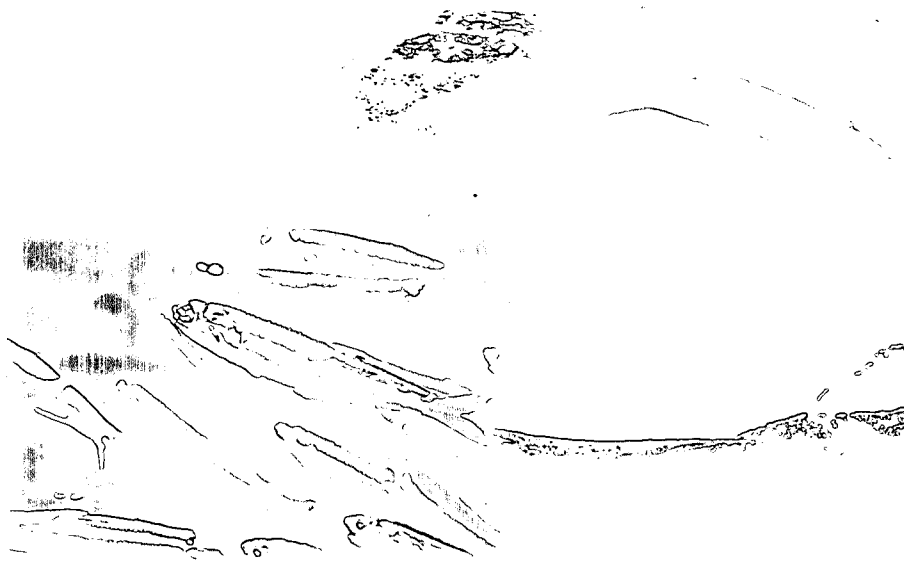
- July & Sept. 2004: Draft CHPP on DMF web site ☑
- July – August 2004: Coast wide public meetings ☑
- September 2004: Draft CHPP to Commissions ☑
- December 2004: Commissions adopt CHPP
- Early 2005: Commissions/DENR prepare implementation plans
- Mid-2005: Begin CHPP Implementation
- Every 5 years: Update CHPP

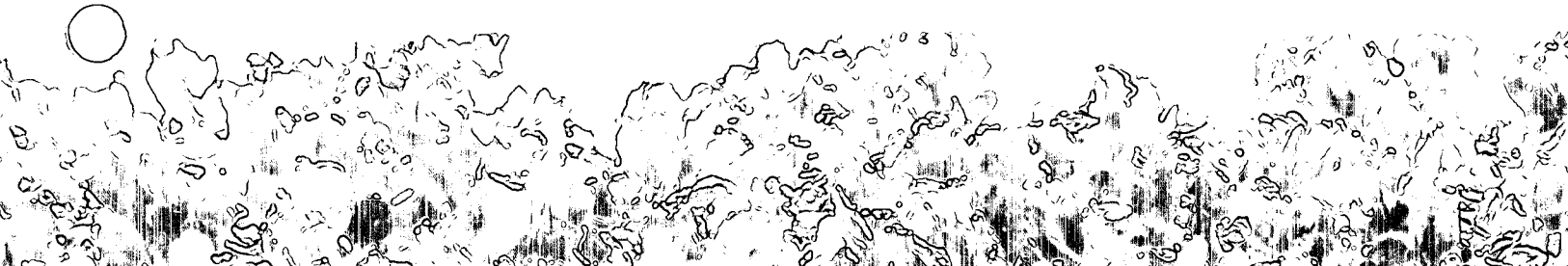


Caring For Our Fisheries

an introduction to the

Coastal Habitat Protection Plan





NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

Caring for Our Fisheries

Whether you live, work or play on North Carolina's coast, the condition of our coastal fish habitats affects you. I am pleased to announce that the Department of Environment and Natural Resources has released a bold plan to enhance, restore and protect these important habitats. A requirement of the Fisheries Reform Act of 1997, the Coastal Habitat Protection Plan (CHPP) identifies six vital habitats that sustain the foundation of our state's billion-dollar fishing industries and recommends ways the people of North Carolina can protect or restore them.

In developing the plan, we consulted with scientists, resource managers and commercial and recreational fishermen, and collected input from numerous citizens through two series of public meetings all along the coast. We constructed a plan based on science that balances a need to protect these significant ecological habitats while sustaining fisheries that are vital to our economy. We also tried to create achievable recommendations that will provide substantial benefits for our state.

The pages that follow provide a general introduction to the CHPP, the six vital habitats, and our recommendations submitted to the state's Environmental Management, Coastal Resources and Marine Fisheries commissions. These commissions will be working together to adopt and implement this ground breaking plan.

Please take a few minutes to review this publication. With your help and participation, we can protect and restore the critical fish habitats along our coast, with resulting benefits to the people and creatures who are sustained, entertained and inspired by our coast and its waters.

Thank you for your interest and dedication to improving those critical habitats upon which the fish and we depend so greatly.

William G. Ross, Jr.
Secretary,
N.C. Department of Environment and Natural Resources

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-733-4984 • FAX: 919-715-3060 • Internet: www.enr.state.nc.us

One North Carolina Naturally

Caring for Our Fisheries-

the Coastal Habitat Protection Plan (CHPP)

North Carolina's approximately 2.9 million acres of estuarine and marine waters comprise the largest estuarine system of any state along the Atlantic coast. These waters are not only vital for the state's important fish species, but are also critical to many of the fish that migrate along the East Coast from Florida to Maine. North Carolina, with its billion dollar commercial and recreational fishing industries, ranks among the nation's highest in seafood-producing states. Fish and shellfish species important to these industries depend on the quality and quantity of habitats found along our rivers, sounds and ocean waters. From shellfish beds, mud flats and marshes to freshwater streams and swamps, fish habitats once healthy and thought to be inexhaustible are in jeopardy. Pressures from development, loss of habitat, pollution and degraded water quality threaten more than an industry vital to North Carolina's economy. At stake are a way of life and the very character of North Carolina's coastal region.

A system of interconnected fish habitats provides the basic needs of fish and shellfish, including food, shelter and places to reproduce and grow.

Recognizing these threats, the N.C. General Assembly passed the Fisheries Reform Act of 1997. This law requires the state's Environmental Management, Coastal Resources and Marine Fisheries commissions to adopt a plan to protect and restore resources critical to North Carolina's commercial and recreational fisheries. The Department of Environment and Natural Resources (DENR) has been working since 1999 to develop the Coastal Habitat Protection Plan (CHPP) for the long-term enhancement of fisheries associated with coastal habitats.

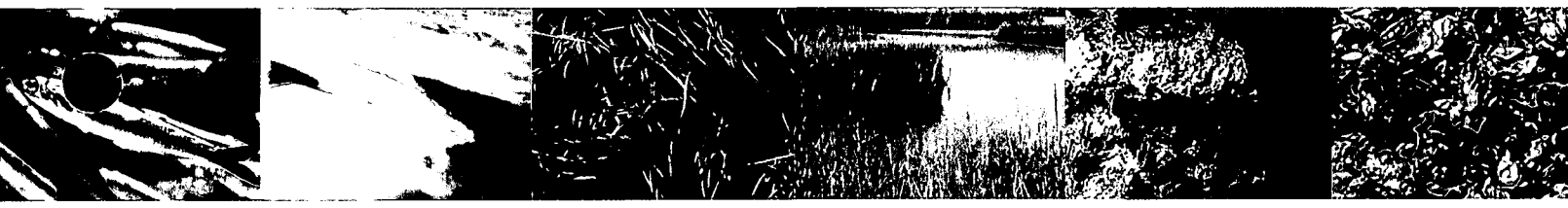
The CHPP is a detailed document, more than 500 pages long, describing the six major fish habitats and providing scientific information on their ecological functions and importance to marine species. It also identifies the threats to each habitat and recommends needed administrative, regulatory and research steps to protect and enhance each habitat.

The CHPP was developed through a cooperative, multi-agency effort with public input and sets the stage for unprecedented fish habitat protection and restoration initiatives. This booklet provides a brief introduction to the Plan's six fish habitats and why it benefits all of us to manage them wisely. Included in the back folder are the recommendations for research needs and for management actions to care for our fisheries.

Visit http://www.ncdmf.net to learn more about the CHPP or to download a copy of the report. Questions and comments can be directed to chpps@ncmail.net or by calling (252) 726-7021 or 800-682-2632.

The CHPP identifies six habitats that need protection or enhancement:

- Water Column
- Shell Bottom
- Submerged Aquatic Vegetation (SAV)
- Wetlands
- Soft Bottom
- Hard Bottom



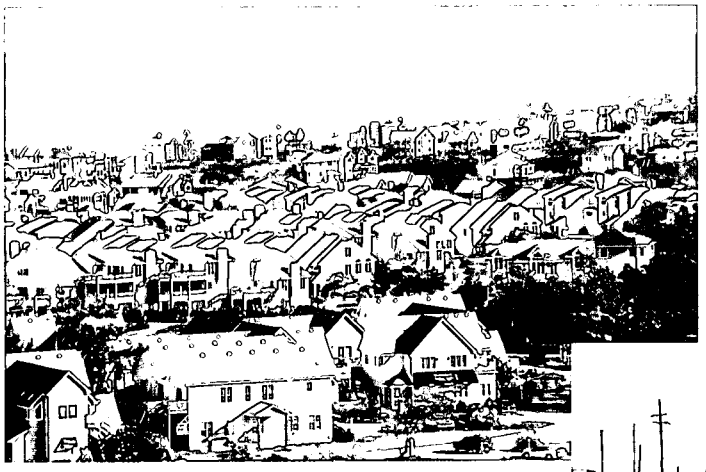
North Carolina is located at the convergence of the warm Gulf Stream flowing north and cool Labrador Current flowing south. These currents bring a wide variety of fish species into our coastal waters. The state's central location, vast estuarine system and extensive shoreline all play important roles in the health of fisheries all along the Atlantic coast. Maintaining healthy coastal habitats supports fish production and also benefits coastal residents and visitors.

Although different habitats are occupied by a variety of species, all fish habitats are integral components of the entire aquatic ecosystem because the water column connects them all. Organisms are not randomly or evenly distributed in aquatic systems. They occupy specific areas or habitats that meet their needs for each particular stage in their life. Certain areas are especially important to fish production, and some are particularly vulnerable to human impacts. To maintain a healthy coastal ecosystem it is not sufficient to protect individual habitat types – it is more effective to address the entire system of interdependent habitats.

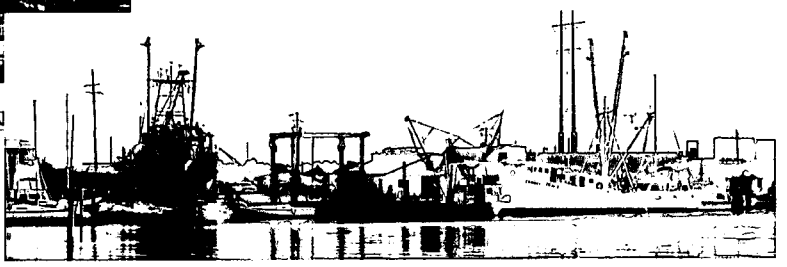
Because all fish habitats are connected through the water column, maintaining and restoring water quality is the basic component of habitat protection and enhancement. Runoff from developed land (buildings, parking lots, roads and lawns), agricultural operations, and intensively managed forests carries excess nutrients, excess sediment and other pollutants into surface waters. Excess nutrients can lead to algal blooms that reduce water clarity and decrease dissolved oxygen, leading to fish kills.

Credit: NOAA – Seawifs Satellite

The Gulf Stream brings southern species (such as shrimp, Spanish and king mackerel, snapper, and grouper) while the Labrador Current brings northern species (such as tautog, summer flounder, Atlantic mackerel).



Our developing coast....



Excess sediment clouds the water, reduces growth and survival of sea grasses and shellfish, and impairs spawning and nursery habitats. Pollutants such as heavy metals and pesticides that are carried with stormwater can accumulate in bottom sediments and contaminate fish and shellfish, making them unsafe for human consumption. Rainfall runoff also carries harmful bacteria and viruses to our rivers, sounds and beaches, requiring tens of thousands of acres of shellfishing waters to be closed for harvest to protect human health.

Estuary – where fresh water mixes with salty ocean water – our Sounds

Habitats provide important functions for fish species.

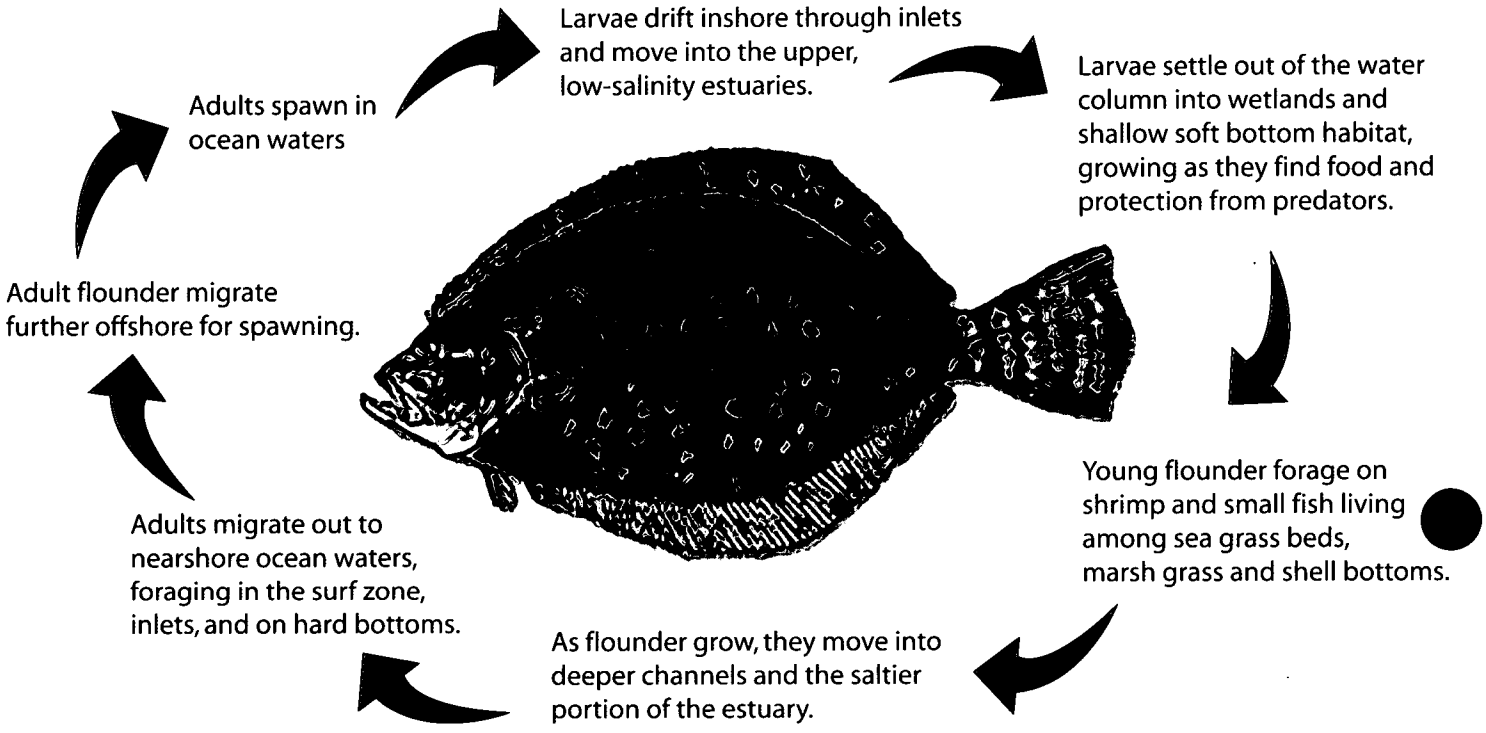
Refuge:	shelter for fish at various life stages and a place for plants and animals to attach
Nursery:	refuge and foraging habitat suitable for development of juvenile life stages of fish, shellfish and crabs
Spawning:	conditions that allow adults to reproduce
Foraging:	presence and accessibility of food sources
Corridor:	connectivity for safe passage between foraging, spawning and refuge areas

Complex habitats serve many functions.

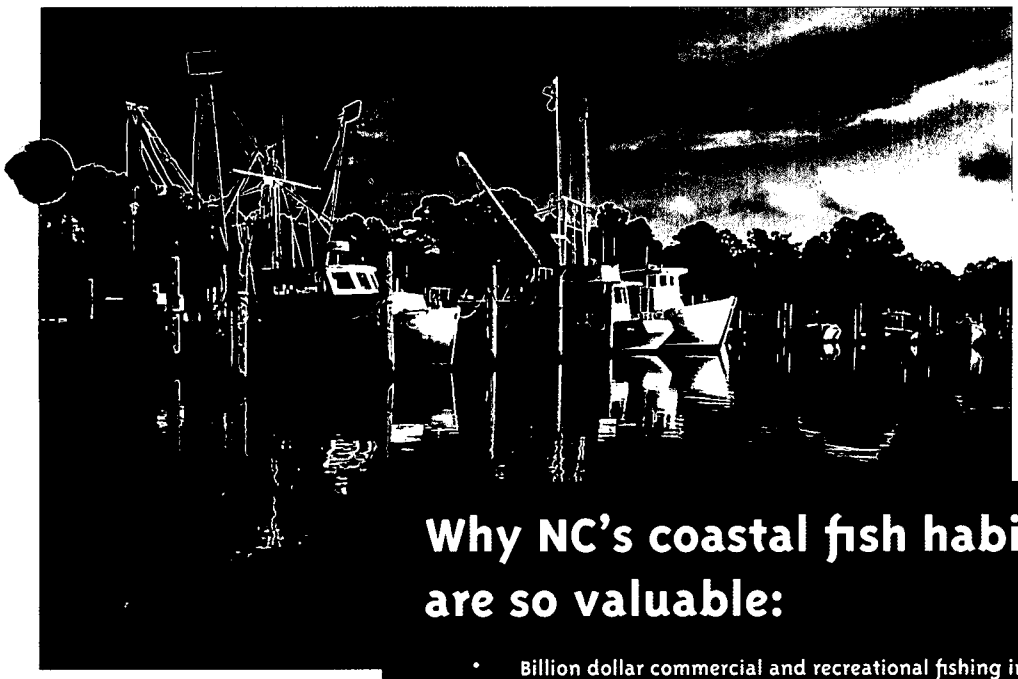
Caring for our Fisheries

While poor water quality puts the ability of habitats to function and support fish populations at risk, physical damage caused by humans is also a serious threat. Conversion of wetlands by draining, filling and water control projects are the major sources of wetland loss in eastern North Carolina. Shell bottom habitat along our coast has been decimated by a century of excessive mechanical harvests and diseases. More recently, dredging for navigation channels and marinas, as well as damage from trawling and other harmful fishing methods, have continued to reduce remaining shell bottom habitat and impede establishment of new shell bottom. Submerged aquatic vegetation is highly vulnerable to physical disturbances from boat propellers and bottom-disturbing fishing gear and to shading by docks and piers. These and other types of physical impacts affect the ability of fish habitats to sustain fisheries and increase their vulnerability to water quality problems.

Southern flounder uses all coastal habitat types during its life



The relationship of habitat conditions to the fishing industry is important and complex. In the past, the decline of a particular fish stock was often attributed to overfishing. We know now that the condition and quantity of fish habitats is important to healthy fish populations. Habitat loss and degradation make fish populations more susceptible to overfishing and can cause a delay in recovery even after management actions have successfully reduced fishing pressures. Thus, the status of fisheries can be an indicator of impacts to fish habitats. Successful implementation of the Coastal Habitat Protection Plan recommendations will help support productive fisheries for future generations.



Why NC's coastal fish habitats are so valuable:

- Billion dollar commercial and recreational fishing industry
- Largest system of estuaries and ocean waters of any Atlantic Coastal State
- Located at the meeting point of warm southern and cool northern currents
- Includes 6 distinct, but interdependent, habitats used by finfish and shellfish
- A strong heritage of commercial and recreational fishing
- Essential to a sustainable economy

North Carolina's coastal fish habitats provide important functions for the plants and animals living in them. This diversity of interconnected habitats provides food, shelter and places to reproduce and grow for a tremendous variety of fish, shellfish and crustaceans. Protecting and restoring these habitats is essential to the survival of North Carolina's fisheries.

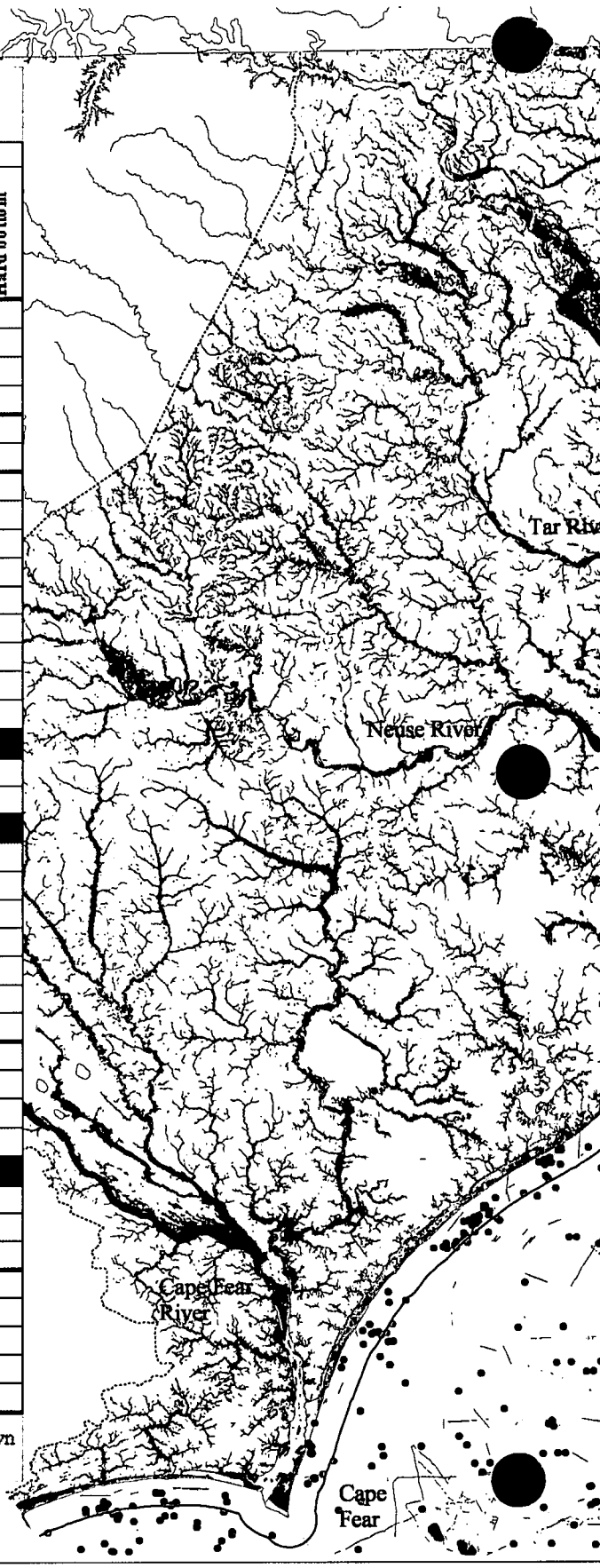
Habitat: "a place, or set of places, in which a fish or fish population finds the physical, chemical, and biological features needed for life."

General Location of Mapped Fish H

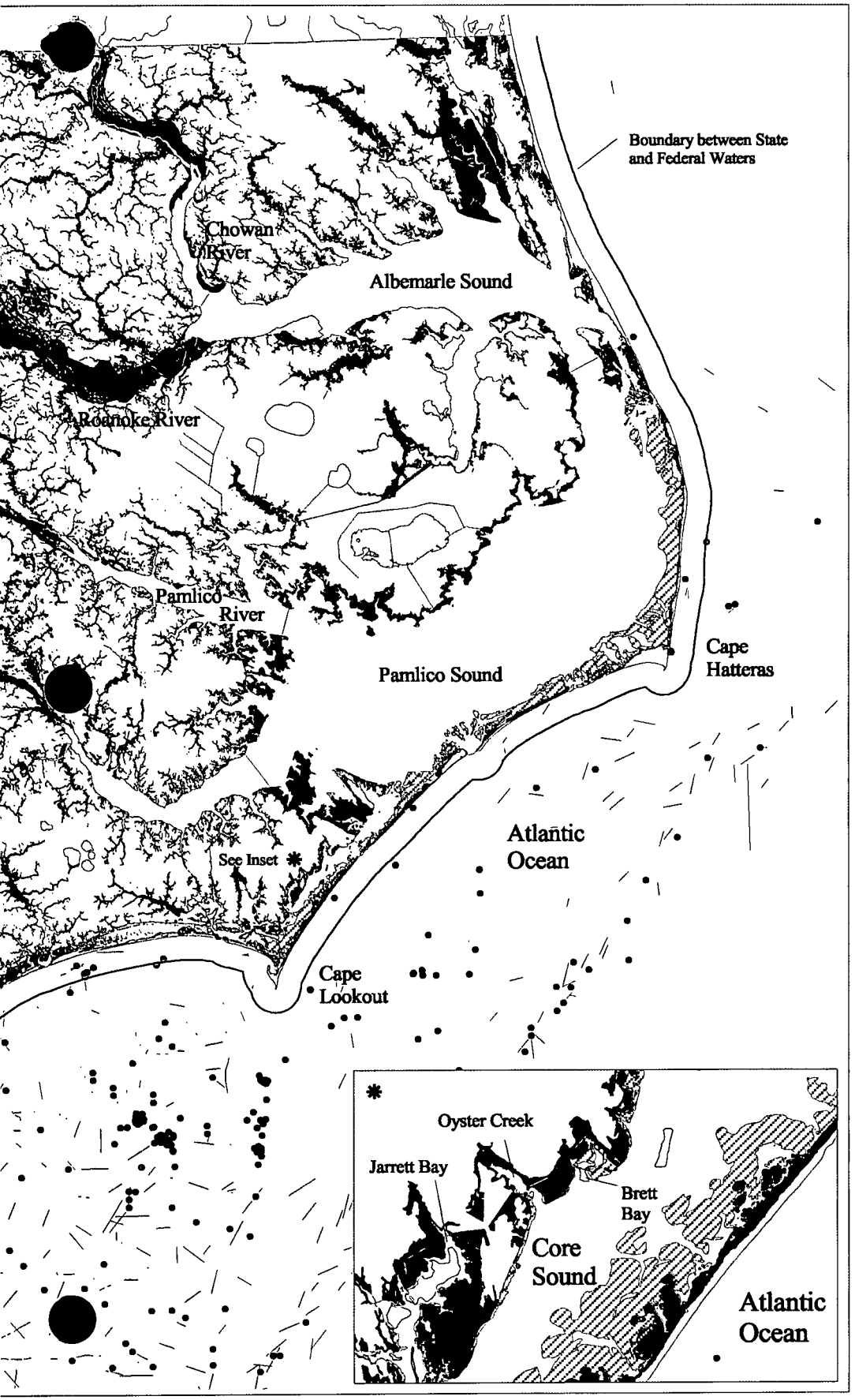
Evaluation of specific threats to coastal fish habitats based on hydrologic, physical, and water quality alterations.

ACTIVITY TYPE	THREAT / ACTIVITY	Coastal Fish Habitats					
		Water column	Shell bottom	SAV	Wetlands	Soft bottom	Hard bottom
AGRICULTURE/ AQUACULTURE RELATED	Animal operations	■		■			
	Aquaculture (incl. Discharges, intro spp.)						
	Cropland	■		■	■		
	Forestry	■	■		■		
WATER CONTROL	Dams	■			■		
	Water withdrawal	■					
DEVELOPMENT RELATED	Urban/suburban construction activities	■	■	■	■		
	Urban stormwater runoff (impervious surface)	■	■	■			
	On-site wastewater disposal						
	Permitted industrial wastewater discharges					■	
	Permitted domestic wastewater discharges	■		■		■	
	Waste disposal (landfills, ocean dumping)						
	Fiber optic cables/utility pipelines						
	Estuarine shoreline stabilization		■		■	■	
	Ocean shoreline hardening						
	Ocean beach nourishment						■
TRANSPORTATION RELATED	Impervious roadways	■	■	■	■		
	Culverts, bridges, and fill (physical blockages)	■			■		
FISHING RELATED	Bottom trawl		■	■			■
	Clam trawl (clam kicking)		■	■			
	Toothless dredge (bay scallop)						
	Toothed dredge (crab and oyster)		■	■			
	Long haul seines						
	Pots (crab)						
	Rakes, tongs						
	Rod and reel						
NAVIGATION RELATED	Marinas and docks - construction, assoc. NPS	■	■	■	■	■	
	Ports (incl. introduced spp. via ballast water)					■	
	Boating activity						
	Channel and inlet dredging		■	■	■		
	Dredge material disposal (on submerged land)					■	■
MINING RELATED	Phosphate and other minerals	■			■	■	
	Log salvage						
	Oil and gas exploration/drilling						
OTHER	Sea level rise						
	Storm events						
	Disease		■				
	Introduced or nuisance species	■					
	Marine debris/litter						

[1]Impact ranking Red - severe; Blue - moderate; Yellow - minor; White- none, unknown or potential



Habitats in Coastal North Carolina



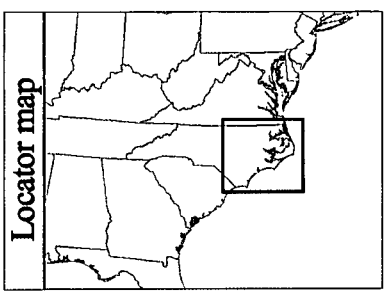
HABITATS

- Rivers, Creeks and Streams
- Shell Bottom
- Wetlands
- Submerged Aquatic Vegetation
- Hardbottom
- Mapped Area Extent

N

10 0 10 Kilometers

10 0 10 Miles



Coastal Habitat Protection Plan

NCDENR

Information for map was collected from various sources. Every effort has been made to ensure the quality and accuracy of this information. Map should be used for general reference only.

Water column is the habitat that connects and supports all aquatic plants and animals. It affects all other coastal fish habitats that it covers.

For fish and other aquatic plants and animals — water means life. All finfish, shrimp, crab and shellfish habitats depend on water to sustain them, so the quality of that water is a key factor that links fish, habitat and people. This is why the water column is the most essential habitat required for the growth, survival and reproduction of fish, shellfish and other aquatic species.

Fish travel through the water column to other coastal habitats that have suitable conditions for their current life stage – from freshwater rivers through brackish sounds into the saltier open ocean. Many aquatic species also move as water temperature changes, prompting them to migrate to their spawning grounds. Eggs and larvae can be carried through the water column to habitats favorable for their survival and growth. Particularly important areas of the water column include rivers, inlets, shallow estuarine spawning and nursery areas, and the nearshore surf zone.

Threats to Water Quality

Whether certain species will thrive and reproduce is strongly affected by conditions like water clarity, and oxygen and nutrient levels. Fish kills and harmful algal blooms during the 1980s and 1990s made it easy to see declines in coastal water quality. Although large fish kills and algal blooms have diminished somewhat in recent years, many coastal waters remain impaired.

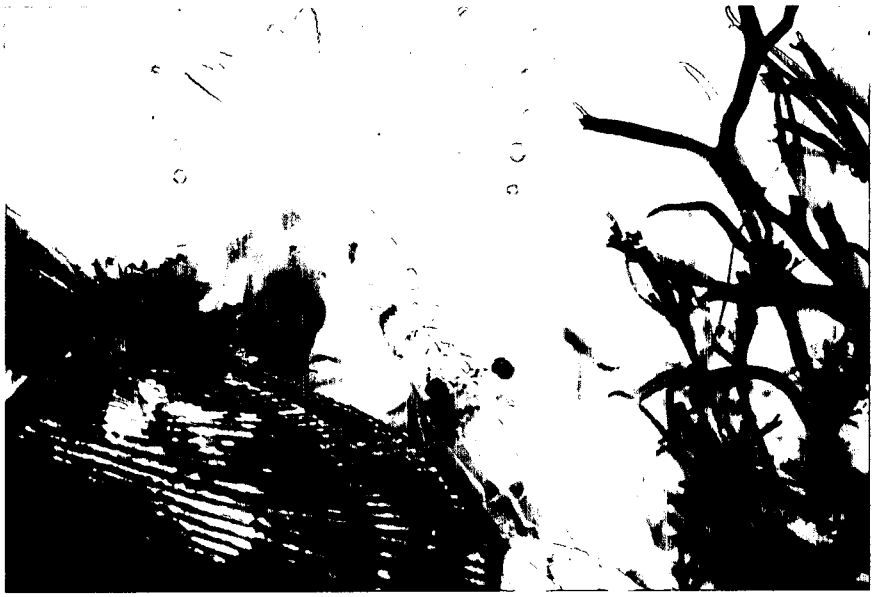
The condition of the water column also influences the health of other coastal habitats. For example, water depleted of oxygen by algae and bacteria can kill many animals inhabiting ***shell bottom*** and ***soft bottom*** habitats. Such oxygen depletion can occur due to natural events, but the chances of fish kills are much greater if there are too many nutrients in the water carried by runoff from developed or agricultural lands. Excessive nutrients can also lead to the death of ***submerged aquatic vegetation (SAV).*** In addition to algae, excessive sediment can cloud the water, which can shade ***SAV,*** and can smother aquatic life in ***shell, hard*** and ***soft bottom*** habitats. Additionally, chemicals and wastes in runoff after rainfall can kill or infect fish, shellfish, birds and people.

The ability of fish species of various life stages to move freely through the aquatic system is a critical component of a healthy water column habitat. Unobstructed waterways and natural flow patterns are particularly important to species that swim upstream to spawn in freshwater. More than 2,000 dams in North Carolina affect natural stream flow to coastal waters. Many streams have been straightened and deepened. Countless road crossings obstruct the natural flow of streams. The removal of obstructions to restore flow in streams and rivers has been highly successful in restoring populations of striped bass, American shad and river herring.

Human activities often change the chemistry of the water, reducing water quality. These changes can originate from point sources, such as industrial or wastewater discharges, or from development that allow pollutants and sediment to be carried in rainfall runoff. It is obvious how excess sediment clouds the water and fills a waterway, but beneath the water's surface, these particles also clog fish gills and bury plants, shellfish and other aquatic species.

Clean water is essential to aquatic life.

Numerous studies indicate that when impervious surfaces, such as roads, rooftops and parking lots, exceed 10 percent of a watershed's land area, water quality becomes impaired and habitats are damaged. It is estimated that more than half of North Carolina's coastal draining watersheds will exceed the threshold by 2012. North Carolina's coastal waters may be approaching a turning point in overall quality. **Once this point is reached, water quality and habitat improvements will be more difficult and costly to achieve.**



FACT:
1,315 miles of freshwater streams and nearly 70,000 acres of estuarine waters are classified as impaired in the coastal river basins.

Hope for the Future

The water column surrounds and supports all aquatic organisms and connects all coastal fish habitats. Consequently, clean and healthy waters are critical to the overall viability of coastal fish habitats and aquatic organisms. Therefore, efforts are needed to minimize threats and enhance water quality wherever possible. Sediment, excess nutrients, bacteria and toxins in the water must be reduced by addressing multiple sources. This includes enhancement of urban and agricultural best management practices (BMPs), more stringent controls on construction projects and improved natural buffers along our waterways.

HABITAT PROFILE

WATER COLUMN FUNCTIONS
- Connects all habitat types
- Allows fish to move among habitats
- Surrounds and supports aquatic animals and habitats

HOW FISH USE THE WATER COLUMN
- Transports eggs, larvae, and oxygen
- Nursery area for all fish species
- Foraging area for all fish species
- Spawning area for all fish species

HUMAN IMPACTS
- Excessive runoff after rainfall
- Pollution from toxic chemicals, nutrients and sediment
- Alteration of natural water flow by dams, ditches, roads and culverts
- Conversion of natural areas to agriculture and developed uses
- Loss of shoreline vegetation (buffers)

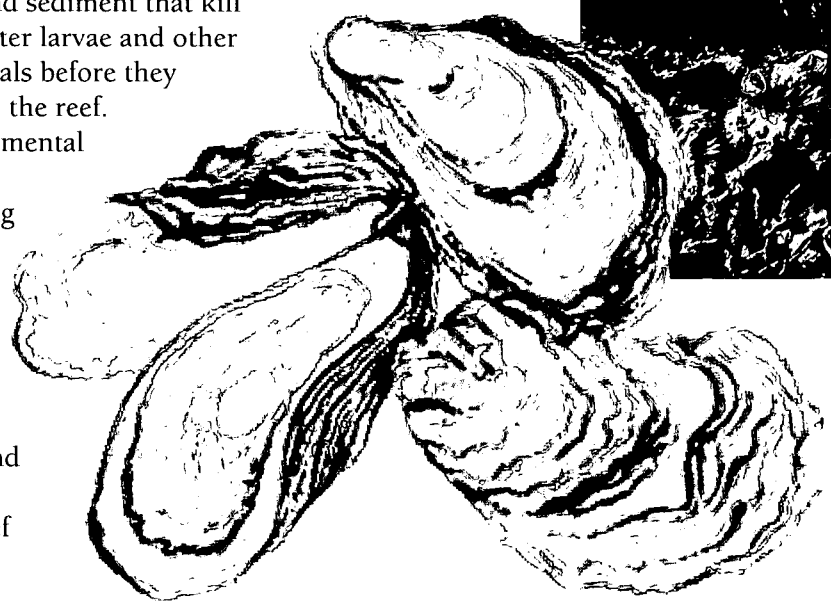
All coastal habitats are connected by water.

Shell bottom areas include reefs made of living oysters or shells, located in the subtidal or intertidal zone of sounds and estuaries.

Shell bottom is unique because it is the only coastal fish habitat that is also a fishery species (oysters). The ecological value of shell bottom has only recently been recognized to be as significant as the fishery itself, since it provides numerous habitat and water quality functions that are vital for other fishery and non-fishery species. Oysters provide habitat for themselves, as well as shelter and forage areas for numerous forms of marine life. These shellfish provide important water quality functions, such as filtering the water, so other animals and plants can survive. By pumping water through their bodies and filtering out food – mostly algae, bacteria and decaying plant material – oysters and other shellfish actually help clean the water. This water filtering ability makes shell bottom important to the overall health of our coastal fish populations.

Shell bottom performs vital functions for many fish species and adjacent habitats. Shellfish can clear dissolved and suspended material from murky water, allowing sunlight to reach nearby submerged aquatic vegetation (SAV). Mollusks attach to the hard, three-dimensional structure of the reef, while small fish, shrimp and crabs hide from predators among the crevices. Larger creatures use the edges of the reef as a good place to hunt for their next meal.

The formerly vast range of shell bottom habitat has shrunk to a fraction of what existed before 1889, when dredging the bottom to harvest oysters began. Since that time, North Carolina's commercial oyster harvest has decreased by 90 percent, indicating a loss of shell bottom resources. Although damage from harvesting has been greatly reduced, the shell bottom habitat has not recovered – largely due to adverse impacts of dredging and trawling, diseases and stormwater runoff containing chemicals and sediment that kill sensitive oyster larvae and other marine animals before they can attach to the reef. This environmental stress makes the remaining adult oysters vulnerable to diseases that kill them before they can reproduce and create more extensive reef systems.

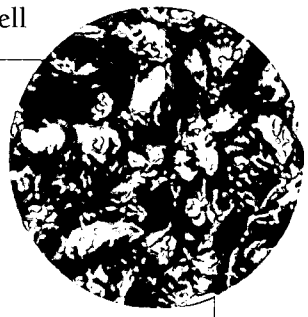


Shell bottom is the only coastal habitat that is also a fishery resource.

Threats to Shell Bottom

Shell bottom used to be found further up the coastal rivers, but increased drainage of stormwater from development, agriculture and forestry into coastal waterways has greatly lowered the salinity, while raising nutrient levels in the shallow Neuse and Pamlico estuaries. Harvesting shellfish without returning the shells continues to reduce this habitat. Damage from bottom-disturbing fishing gear, boats and dredging continue to destroy productive shell bottom. As scientists and lawmakers consider the actions required to restore our shell bottom habitat and oyster population, a way of life central to our coastal heritage hangs in the balance.

Shell bottom is considered to be one of the most threatened habitats because of its greatly reduced extent and because of its connection to other habitat types.



HABITAT PROFILE

SHELL BOTTOM FUNCTIONS

- Provides structure, shelter and food source
- Filters pollutants and other particles from water
- Protects shoreline by slowing wave energy

HOW FISH USE SHELL BOTTOM

- Place for oysters and other shellfish to attach
- Nursery area for blue crab, sheepshead and stone crab
- Foraging area for drum, black sea bass and southern flounder
- Spawning area for hard clams, toadfish and goby
- Refuge for goby, grass shrimp and anchovy

HUMAN IMPACTS

- Destruction by fishing gear, boats and dredging
- Excessive oyster harvest
- Runoff carrying toxic chemicals and sediment
- Excess nutrients causing decreased oxygen
- Excess freshwater inputs from drainage

Hope for the Future

The Division of Marine Fisheries shell bottom restoration efforts began in 1958, and some protected areas have been established. Recent efforts have shifted from restoring oysters just for harvest to enhancing shell bottom for habitat, but losses still greatly exceed gains from oyster habitat restoration. Currently North Carolina is working to rebuild shell bottoms using discarded shells and planting native oyster larvae.

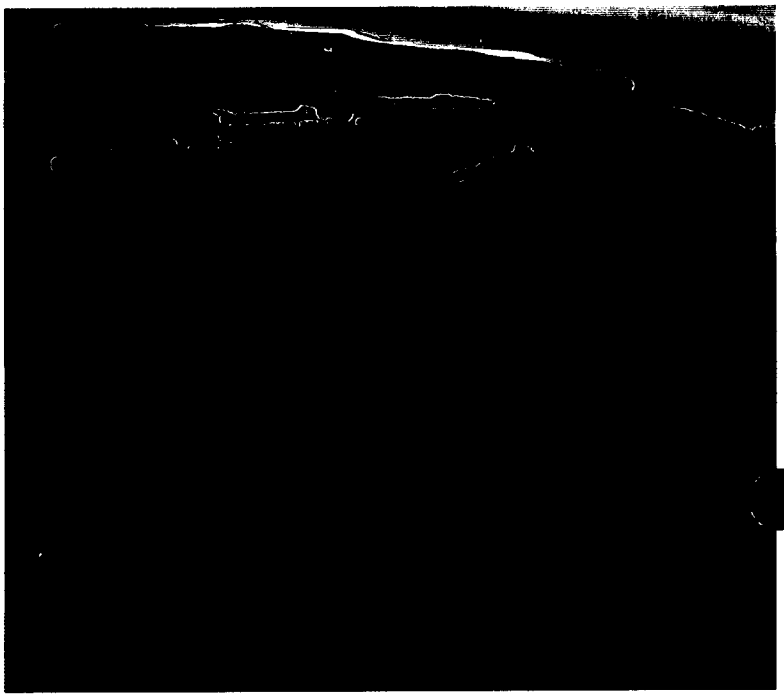
Restoring oyster beds in tidal creeks.

FACT:
Oyster beds were once so abundant that they were considered a navigation hazard.

Shell Bottom - *Building reefs & cleaning water*

Submerged Aquatic Vegetation (SAV) *- this fish habitat is dominated by one or more species of underwater plants, occurring in isolated patches or extensive meadows in shallow water in our sounds and rivers. This habitat includes temporarily unvegetated areas between vegetated patches.*

Like plants in gardens, sea grasses and other underwater plants need light to grow, and can only thrive in clear, relatively shallow waters. The underwater network of leaves and roots traps sediments and adds oxygen to the water. These grass beds form the base of a complex food web for coastal fish and other organisms, including water fowl. When these plants die, the decomposed material becomes food for shrimp, crabs, bacteria and fungi, which are in turn eaten by larger animals.



Many species occupy submerged aquatic vegetation (SAV) habitat at some point in their life cycle, hiding among the leaves or hunting for prey along the edge of the beds. This habitat is especially valuable for the young of many important commercial and recreational fish species, serving as a nursery and as refuge from larger fish. Where large sea grass meadows grow along estuarine shorelines, they absorb wave energy and reduce erosion.

Two types of SAV communities occur along the coast of North Carolina - one in higher salinity estuarine waters in the eastern sounds, and the other in lower salinity systems in the coastal rivers and Albemarle Sound. Both are extremely important to coastal fish species. These underwater gardens can actually move over time as the sands beneath them shift. The high salinity grass beds on the landward side of the Outer Banks appear relatively stable. However, the original extent of sea grass beds has been greatly reduced in low salinity areas on the mainland side of the Pamlico Sound and along much of the shoreline of the western Albemarle Sound. In recent years there has been some recovery of SAV beds in these areas. Once destroyed, SAV habitat is difficult and very expensive to restore, costing up to $1 million per acre.

Threats to SAV habitat

Large amounts of algae and sediment make the water so cloudy that light cannot reach the plants, reducing their growth, survival and productivity. Many everyday activities far from the coast such as land clearing, farming and lawn care practices contribute to polluted storm water runoff and impact SAV habitat. Other activities contribute to the pollution problem, such as wastewater discharges and sediment stirred up by boating, bottom-disturbing fishing gear and channel dredging. Dredges and boat propellers can have a direct effect on SAV habitat by uprooting and destroying the plants.

HABITAT PROFILE

SAV FUNCTIONS

- Provides refuge for fish and other aquatic animals
- Serves as food for fish and waterfowl
- Produces dissolved oxygen
- Reduces wave energy and limits erosion
- Uses nutrients and traps sediments

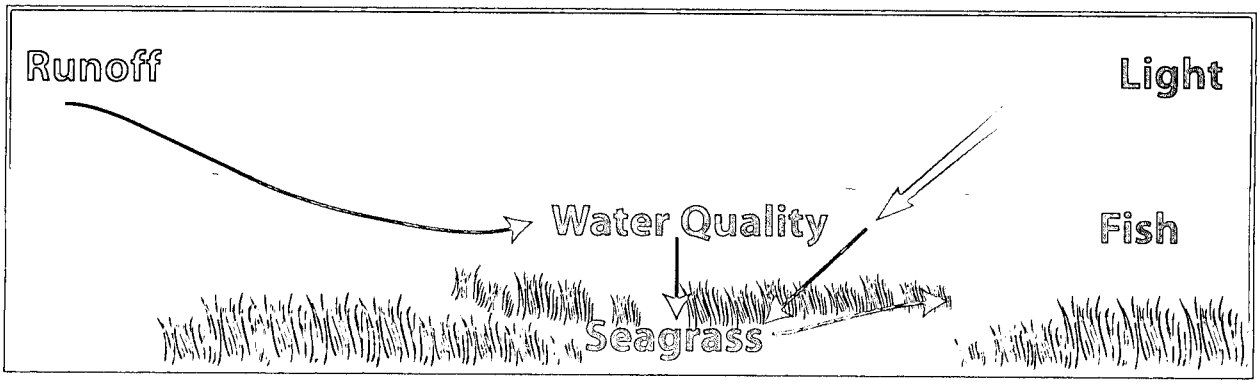
HOW FISH USE GRASS BEDS

- Nursery area for blue crab, pink shrimp and red drum
- Foraging area for spotted sea trout, gag and flounder
- Spawning area for spotted sea trout, grass shrimp and bay scallop
- Refuge for bay scallop and hard clam

HUMAN IMPACTS

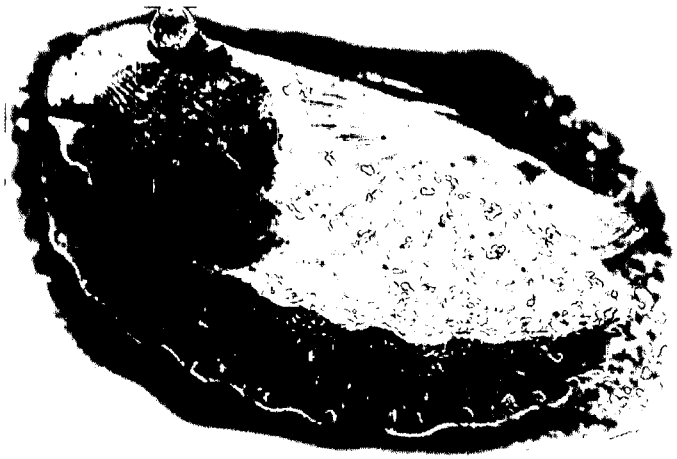
- Uprooting by boat props and fishing gear
- Pollution from excess nutrients
- Buried under excess sediment
- Shading by piers and docks
- Destruction from dredging and filling

FACT:
More than 40 different fish species use SAV habitat at some stage of their life.



Hope for the future

As human population and coastal development pressures increase, loss of SAV habitat will continue unless steps are taken to protect it and maintain suitable water quality. North Carolina needs to ensure that SAV habitat is protected from physical disturbances such as damage caused by boats and bottom disturbing fishing gear as well as make improvements in water quality and clarity.



SAV provides shelter, food and oxygen.

*A **wetland** is a lowland area, such as a marsh or swamp, that is saturated or flooded with fresh or salt water and contains plants adapted to wet conditions. Wetlands are essential to many fish and animals.*

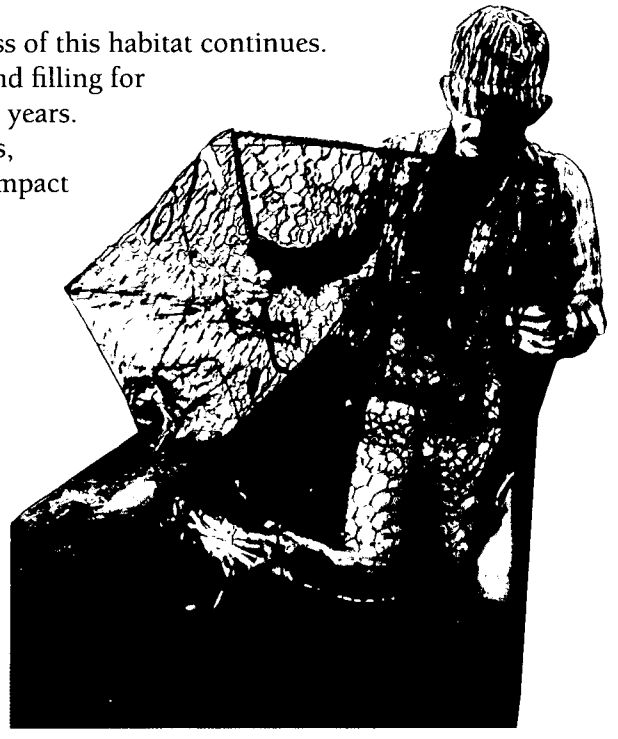
Early North Carolina settlers thought the only good swamp was a drained one, and quickly started draining wetlands for agriculture and development. We now have some understanding of the vital roles that wetlands play in providing habitat, along with slowing down rainfall runoff, reducing flooding, and recharging underground aquifers for our drinking water supply.

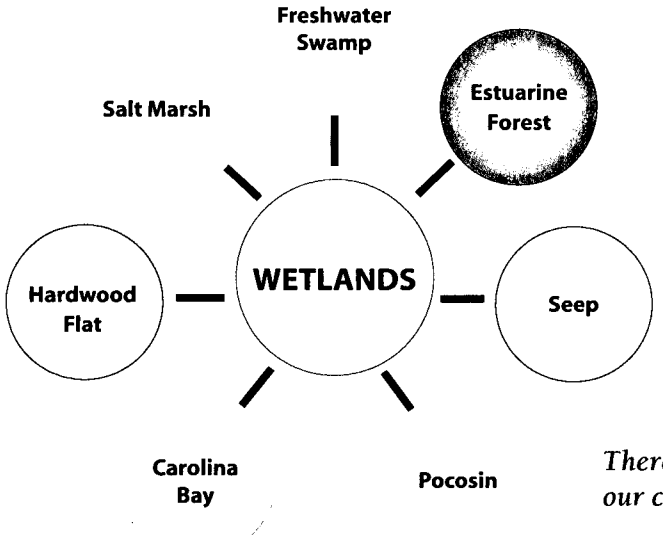
Wetlands are critical to a large number of fish species. At least 95 percent of the United States' commercially harvested finfish, shellfish and crabs depend on wetlands at some time during their life. The combination of shallow water and vegetation makes excellent nursery habitat for young fish, providing both food and refuge. Wetlands provide a protected corridor for fish to move among other habitats. The majority of North Carolina's designated Primary Nursery Areas include wetlands along with the adjacent shallow water and soft bottom.

North Carolina has many different types of wetlands. They can be open and grassy or forested. Each type of wetland is important in keeping our rivers, sounds and coastal waters clean and providing food and sanctuary for many fish and other animals.

Threats to Wetlands

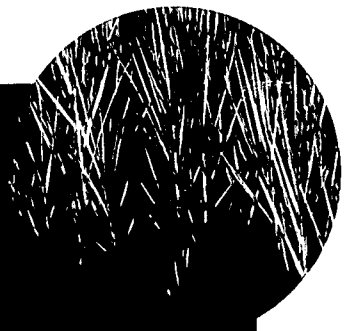
Half of North Carolina's original wetlands have been lost, and loss of this habitat continues. Ditching and draining for roads, construction of dams, mining and filling for development account for the majority of wetland losses in recent years. Additionally, small losses – from small actions (building of docks, bulkheads, filling and dredging) – add up to a large cumulative impact that affects the whole ecosystem.





There are many types of wetlands in our coastal region.

Coastal wetlands border vital nursery areas and serve as the primary buffer between land and water-based impacts.



HABITAT PROFILE

WETLAND FUNCTIONS

- Provide refuge and food for fish and other animals
- Filter pollutants
- Trap sediments
- Protect the shoreline by slowing wave energy
- Hold and slowly release flood waters

HOW FISH USE WETLANDS

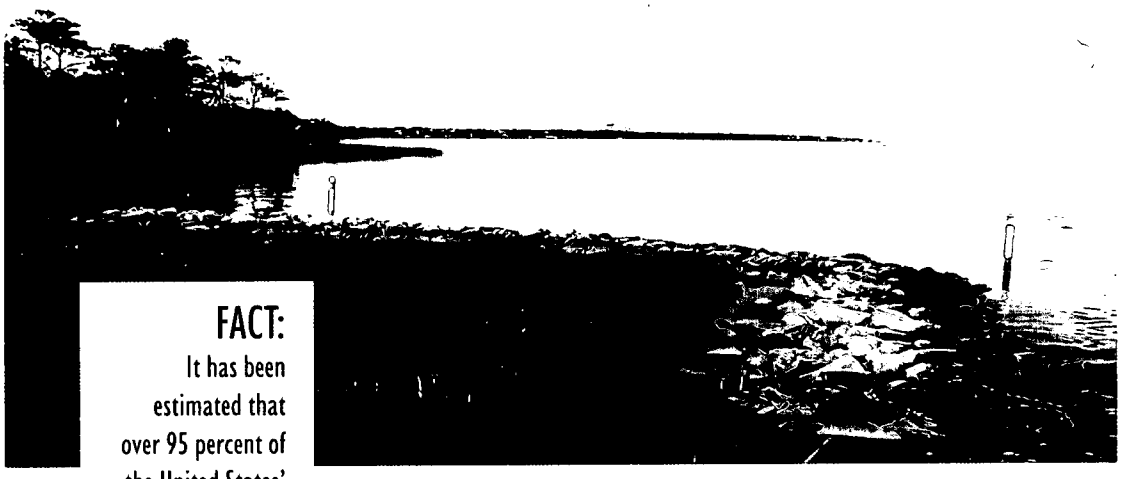
- Nursery area for blue crab, shrimp and southern flounder
- Foraging area for sea trout, red drum and flounder
- Spawning area for river herring, killifish and grass shrimp
- Refuge area for blue crab and grass shrimp

HUMAN IMPACTS

- Draining and ditching
- Filling for development
- Erosion from boat wakes and shoreline development
- Bulkheads and rip-rap

Hope for the Future

Current efforts such as buffer establishment, wetland restoration, land acquisition and preservation, and use of agricultural-forestry best management practices have lessened the impact on our wetlands. Rules protecting wetlands and reducing pollution have saved many acres from destruction. Additional actions are necessary to protect and enhance wetland habitat. The many fishery and water quality functions provided by wetlands make their preservation and restoration along North Carolina's coast a high priority.



FACT:
It has been estimated that over 95 percent of the United States' commercially harvested finfish and shellfish are wetland dependent.

Soft bottom includes muddy and sandy areas beneath coastal rivers, sounds and the ocean, where sediment moves with the waves so that plants cannot establish roots. It includes features such as mud flats, inlets, shoals, channel bottoms and ocean beaches.

Although soft bottom is defined as "unvegetated" and lacks visible structure, the sediments support an abundance of microscopic plants, worms, clams and bacteria. Like SAV, soft bottom is home to many tiny plants that use sunlight to grow. Other very small creatures graze on these algae, bacteria and fungi that grow on or near the soft bottom surface. Fish, shrimp and crabs forage on the bottom, while clams burrow into the mud or sand. Predators like sharks often hunt in soft bottom areas where water is deeper and flounder bury themselves in soft bottom to ambush prey.

Soft bottom habitat takes many forms throughout the coastal area, from freshwater creek bottoms to mud flats in the estuaries, and even includes inlets, sand bars, and shoals, along with the surf zone at the beach. Lacking the kind of structure provided in other habitats by shells, rocks or plants, the sediment itself must absorb the force of the waves. Normally, the currents and tides simply shift the sediments around within the area. When storm-driven wind and waves batter sand, the effect may be the relocation of channels, inlets and the barrier islands themselves. The soft bottom habitat is relatively resistant to this natural changing environment.

During each tidal cycle, as the bottom is exposed and then submerged, there are major shifts in temperature, salinity and contact with the air. Chemicals, excess nutrients and other pollutants that have been carried from local shorelines or far upstream settle into the sediment. This habitat also features the important ability to move many chemicals and essential elements in and out of the water column, storing them under certain conditions and releasing them at other times.

Dredging activities can impact soft bottom habitats.

Threats to Soft Bottom

Although years of land-based activities, pollution and toxic chemicals have adversely affected this habitat, inadequate information is available to clearly determine the current condition of soft bottom. In addition, many human activities aimed at enhancing the "coastal experience" inadvertently degrade this habitat. These important bottom areas are easily damaged by activities such as dredging and beach nourishment, building docks and marinas, and by certain types of fishing gear. Along the oceanfront, jetties form barriers to the movement of sand, altering the natural sediment cycle. Water quality problems that deplete oxygen and cause toxic chemical contamination can impact this habitat on which so many aquatic animals depend.

This habitat strongly influences the water column through its constant cycling of nutrients and sediments.

HABITAT PROFILE

SOFT BOTTOM FUNCTIONS

- Stores and recycles nutrients, microbes and chemicals
- Is a source of sand for other habitats
- Provides an area for marine animals to burrow

HOW FISH USE SOFT BOTTOM

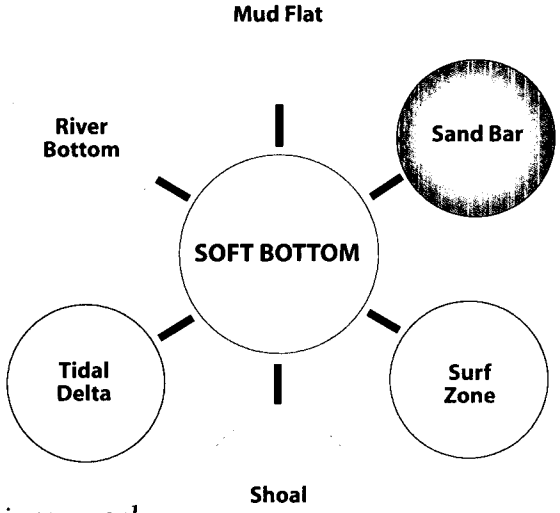
- Nursery area for blue crab, flounder and croaker
- Foraging area for sea trout, red drum and flounder
- Spawning area for shrimp, sturgeon and kingfish
- Refuge area for hard clam, shrimp and flounder

HUMAN IMPACTS

- Disturbance from dredging, filling and fishing gear
- Construction of docks, jetties and bulkheads
- Excavation for mining and beach nourishment

Hope for the future

A few basic modifications in human behavior can greatly improve the situation for the soft bottom habitat. We can minimize dredging in productive shallow bottom areas, properly manage beach nourishment projects and modify shoreline stabilization methods. Meanwhile, efforts to reduce polluted runoff from paved areas upstream can help keep the excess nutrients and toxins from reaching the coastal waters where they become trapped in the sediment. These are the primary management needs to protect and enhance the soft bottom habitat.



Soft bottom habitat is commonly called by many names.

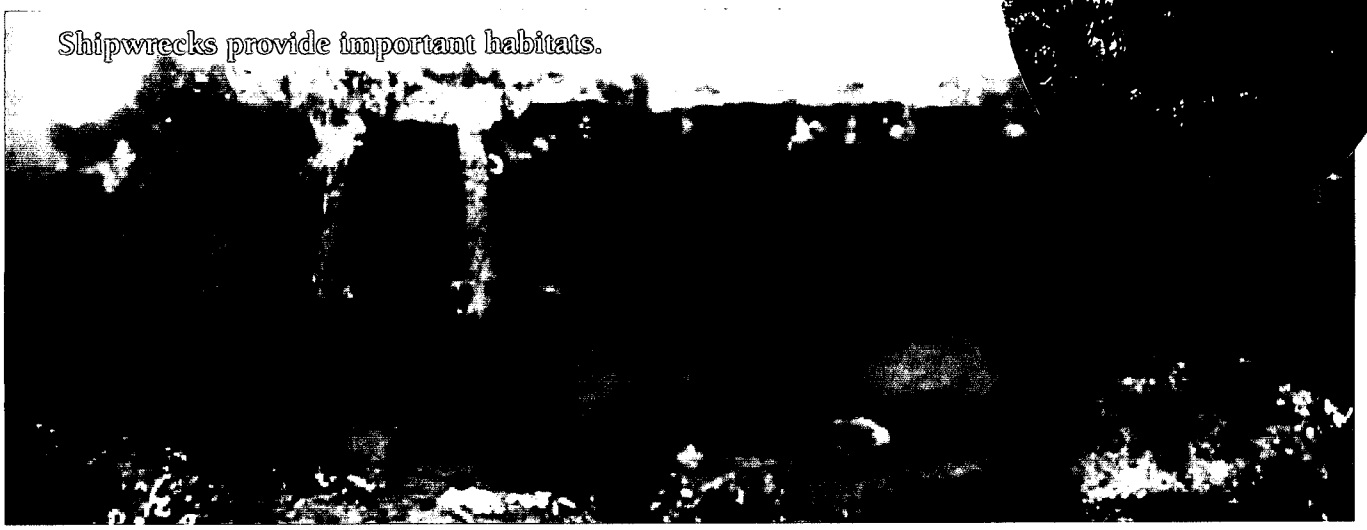
FACT:
Soft bottom covers about 2.3 million acres of estuarine and ocean bottom within State waters.

***Hard bottom** includes exposed areas of rock or other structures, primarily in the ocean, that provide a surface to which coral, algae and sponges can attach.*

Deep-sea anglers and divers know that if they want to find concentrations of fish, they need to locate a rocky reef or a sunken ship. Algae, sponges and other encrusting marine life colonize on naturally occurring rocks, ships and artificial reefs resulting in a complex habitat that provides protective cover. Fish are attracted to these rocky outcrops and structures for food, spawning and shelter. Larger fish will also congregate at these reefs to feed on smaller fish hiding in the nooks and crannies.

Hard bottom can be found nearshore and in deeper ocean waters. Combined with suitable water temperatures, this habitat supports a wide range of reef fish and a snapper-grouper fishery in North Carolina. Many economically important species, such as black sea bass, start their lives on nearshore hard bottom and use this area as a second nursery, moving between estuarine areas and offshore reefs. North Carolina's abundant shipwrecks and artificial reefs add to the total amount of hard structure available to marine organisms and may reduce fishing pressure on natural reefs.

Photo: Harold Quidley



Shipwrecks provide important habitats.

Photo: NOAA

FACT:

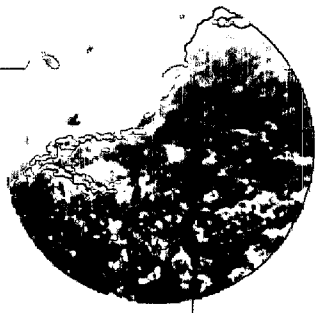
39 artificial reefs are located in ocean waters along North Carolina's coast and seven are located in estuarine waters. In addition, there are numerous shipwrecks along the coast providing habitat for reef-dwelling species.

Threats to Hard Bottom

Threats to nearshore hard bottom habitat in North Carolina include beach nourishment, channel dredging, bottom-disturbing fishing gear and water quality degradation. Channel dredging can directly remove hard bottom habitat or stir up enough sediment to smother the reef. Sand from nourished beaches can also cover hard bottom structures. Fishing gear that disturbs the bottom, such as boat anchors and bottom trawls, can uproot coral and tear loose chunks of rock. Poor water quality caused by excess nutrients, sediment, or toxins can impact growth or survival of the invertebrates living on hard bottom structure

Hope for the future

While artificial reefs have been shown to provide benefits for fish that use reef habitat, they do not fully replace all of the habitat functions provided by natural hard bottom. Management measures are being taken to protect this natural hard bottom from direct impacts including harvest and gear limitations. Additional measures to address water quality effects are needed. Since most of the polluted water that reaches near shore hard bottom areas originates from upstream sources, improving the quality of water flowing from estuaries into marine waters may have the largest overall positive effect.



HABITAT PROFILE

HARD BOTTOM FUNCTIONS

- Provides a place for sponges, seaweed and coral to attach
- Offers refuge for reef fish
- Supplies new sand through erosion

HOW FISH USE HARD BOTTOM

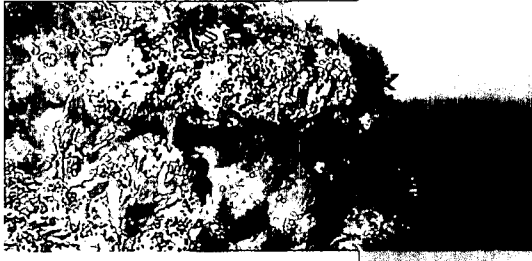
- Nursery habitat for goby, snapper and black sea bass
- Foraging area for king mackerel, gag and snapper
- Spawning area for black sea bass, grouper and damselfish
- Refuge area for goby, gag and black sea bass

HUMAN IMPACTS

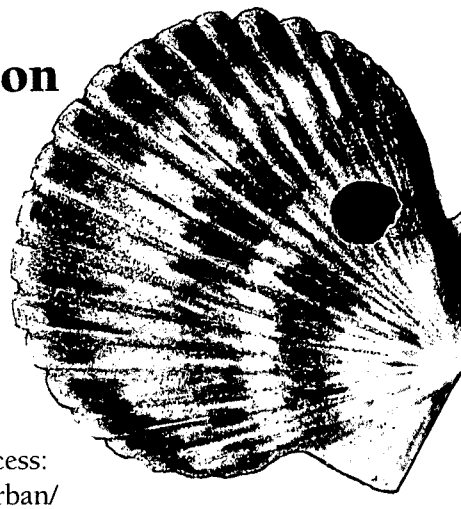
- Dredging for beach nourishment
- Damage from fishing gear, boat anchors and ocean dumping
- Harvesting of coral

Photo: Harold Quidley

The Hard Bottom habitat of the North Carolina coast is considered crucial spawning habitat for many commercially important species of grouper and snapper.



Recommendations for enhancement, restoration and protection of North Carolina Coastal Fish Habitats



After reviewing the results of hundreds of scientific studies along with input from experts and citizens alike, it became apparent that North Carolina's coastal fish habitats are seriously threatened and in need of protection, restoration and additional research.

Major threats revealed by the Coastal Habitat Protection Plan (CHPP) development process:

Human activities provide substantial impacts, particularly from development (urban/suburban), agriculture, transportation, channel dredging, marinas, bulkheads, docks and some forestry practices.

The most threatened habitats are shell bottom and water column: shell bottom because of its greatly reduced size, and the water column because there are so many pollution sources. Both habitats have connections to all the other habitat types.

Stormwater runoff presents the greatest single threat to North Carolina's coastal fish habitats, carrying sediment, wastes, excess nutrients, toxic chemicals and other pollutants into coastal waters, reducing water quality and clarity, promoting algal blooms, decreasing dissolved oxygen, and reducing the benefits a healthy coastal system provides to coastal residents and visitors.

The CHPP development process identified hundreds of management needs associated with each of the six habitats detailed in the CHPP. The Plan itself describes these management needs in the text of the habitat chapters. The final management recommendations are a result of scientific studies and deliberations of the Environmental Management, Marine Fisheries and the Coastal Resources commissions, along with input from citizens who attended 20 public meetings held during the development of the CHPP.

The recommendations are organized according to four general habitat protection goals:

GOAL 1. IMPROVE EFFECTIVENESS OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITATS.

GOAL 2. IDENTIFY, DESIGNATE, AND PROTECT STRATEGIC HABITAT AREAS.

GOAL 3. ENHANCE HABITAT AND PROTECT IT FROM PHYSICAL IMPACTS.

GOAL 4. ENHANCE AND PROTECT WATER QUALITY.

A summary of the recommendations is included in the pocket on the next page. Please refer to Chapter Nine of the CHPP for more details on these recommendations and to the habitat chapters in the Plan for information on how these management actions relate to each specific coastal fish habitat.

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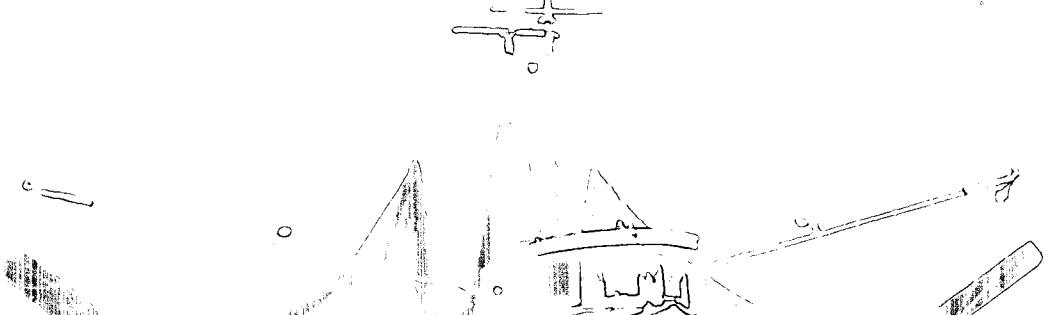
"When one tugs at a single thing in nature, he finds it attached to the rest of the world."

- John Muir



IMPROVE EFFECTIVENESS OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITATS

- Enhance enforcement of, and compliance with, Coastal Resources Commission (CRC), Environmental Management Commission (EMC), and Marine Fisheries Commission (MFC) rules and permit conditions.
- Coordinate and enhance water quality, physical habitat, and fisheries resource monitoring (including data management) from headwaters to the nearshore ocean.
- Enhance and expand educational outreach on the value of fish habitat, threats from human activities, effects of non-native species, and reasons for management measures.
- Coordinate rulemaking and enforcement among regulatory commissions and agencies.

North Carolina has a number of programs already in place to protect coastal fisheries and the natural resources that support them. The Marine Fisheries Commission has adopted rules addressing the impacts of certain types of fishing gear and fishing practices that may damage fish habitats. The Coastal Resources Commission regulates development impacts on certain types of critical habitat, such as saltwater marshes and primary nursery areas. The Environmental Management Commission has issued water quality standards that address pollution of coastal waters from both direct discharges and runoff. The Coastal Habitat Protection Plan has identified a number of gaps in the protection provided for critical fish habitats under these programs, but also notes that these habitats would benefit from stronger enforcement of existing regulations and better coordination among agencies.

- Develop and implement a comprehensive coastal marina and dock management plan and policy to prevent closures of shellfish harvest waters and minimize cumulative impacts on fish habitat.
- Reduce non-point source pollution from large-scale animal operations by the following actions:
  - support early implementation of environmentally superior alternatives to the current lagoon and spray field systems as identified under the Smithfield Agreement and continue the moratorium on new/expanded swine operations until alternative waste treatment technology is implemented,
  - seek additional funding to phase-out large-scale animal operations in sensitive areas and relocate operations from sensitive areas, and
  - use improved siting criteria to protect fish habitat.

Good water quality is essential to coastal fisheries because water is the common element in all the fish habitats. The water conditions necessary to support coastal fisheries include the right combination of temperature and salinity as well as the absence of harmful pollutants. Achieving and maintaining good water quality for purposes of fisheries productivity requires management of both direct discharges of pollutants and stormwater runoff. The CHPP provides additional support for policies directed toward better management of point and nonpoint sources of water pollution. In doing so, the CHPP recognizes a need to go beyond relying on regulatory programs alone. Addressing water quality impacts will also require targeted use of land acquisition programs, incentives for conservation, development of effective best management practices and assistance for local governments to upgrade wastewater infrastructure. Maintaining the water quality necessary to support vital coastal fisheries will not only benefit the commercial fishing industry – it will benefit a large sector of the entire coastal economy built around travel and tourism and recreational fishing.

Summary of DENR Recommendations (continues on back)*

GOAL 1: Improve Effectiveness of Existing Rules and Programs Protecting Coastal Fish Habitats
Enhance enforcement of, and compliance with, Coastal Resources, Environmental Management and Marine Fisheries Commissions rules and permit conditions.
Coordinate and enhance water quality, physical habitat, and fisheries resource monitoring (including data management) from headwaters to the nearshore ocean.
Enhance and expand educational outreach on the value of fish habitat, threats from human activities, effects of non-native species, and reasons for management measures.
Coordinate rulemaking and enforcement among regulatory commissions and agencies.
GOAL 2: Identify, Designate and Protect Strategic Habitat Areas
Evaluate potential Strategic Habitat Areas by : a) coordinating, completing, and maintaining baseline habitat mapping (including seagrass, shell bottom, and other bottom types) using the most appropriate technology, b) selective monitoring of the status of those habitats, and c) assessing effects of land use and human activities on those habitats.
Identify and designate Strategic Habitat Areas using ecologically based criteria, analyze existing rules and enact measures needed to protect Strategic Habitat Areas and improve programs for conservation (including voluntary actions) and acquisition of areas supporting of Strategic Habitat Areas.
GOAL 3: Enhance Habitat and Protect it from Physical Impacts
Greatly expand habitat restoration, including: a) creation of subtidal oyster reef no-take sanctuaries and b) re-establishment of riparian wetlands and stream hydrology.
Prepare and implement a coast wide beach and inlet management plan that requires ecologically-based guidelines for minimization of impacts to fish habitat, while addressing socio-economic concerns.
Protect SAV, shell bottom and hard bottom areas from fishing gear effects through improved enforcement, establishment of protective buffers around habitats, and further restriction of mechanical shellfish harvesting.
Protect fish habitat by revising estuarine and public trust shoreline stabilization rules using best available information, considering estuarine erosion rates, and the development and promotion of incentives for use of alternatives to vertical shoreline stabilization measures.
Protect and enhance habitat for anadromous fish by: a) incorporating water quality and quantity needs of fish in surface water use planning and rule making, and b) eliminating obstructions to fish movement, such as dams, locks, and road fills.

* refer to Chapter 9 of the CHPP for full recommendation text, actions and strategies.

GOAL 4: Enhance and Protect Water Quality
Reduce point source pollution from wastewater by: a) increasing inspections of wastewater treatment facilities, collection infrastructure, and land disposal sites, and b) providing incentives for upgrading all types of wastewater treatment systems.
Adopt or modify rules or statues to prohibit ocean wastewater discharges.
Prohibit new or expanded stormwater outfalls to coastal beaches and to coastal shellfishing waters (EMC surface water classifications SA and SB) except during times of emergency when public safety and health are threatened, and continue to phase-out existing outfalls by implementing alternative stormwater management strategies.
Enhance coordination with, and financial/technical support for, local government actions to better manage stormwater and wastewater.
Improve land-based strategies throughout the river basins to reduce non-point pollution and minimize cumulative losses to wetlands and streams through voluntary actions, assistance, and incentives, including: a) improved methods to reduce sediment pollution from construction sites, agriculture, and forestry, b) increased on-site infiltration of stormwater, c) documentation and monitoring of small but cumulative impacts to wetlands and streams resulting from approved, un-mitigated activities, d) incentives for low-impact development, e) increased inspections of onsite wastewater treatment facilities, and f) increased water re-use and recycling.
Improve land-based strategies to reduce non-point pollution and minimize cumulative losses to wetlands and streams through rule making, including: a) increased use of effective vegetated buffers, b) reduction of impervious surfaces where feasible and reduction of the level of impervious surface allowable in the absence of engineered stormwater controls, c) expansion of CAMA Areas of Environmental Concern (AECs) upstream and landward, and d) consideration of erosion rates as an additional factor in the siting of structures on estuarine and public trust shorelines.
Develop and implement a comprehensive coastal marina and dock management plan and policy to prevent closures of shellfish harvest waters and minimize cumulative impacts on fish habitats.
Reduce non-point source pollution from large scale animal operations by the following actions: a) support early implementation of environmentally superior alternatives to the current lagoon and spray field systems as identified under the Smithfield Agreement and continue the moratorium on new/expanded swine operations until alternative waste treatment technology is implemented, b) seek additional funding to phase-out large-scale animal operations in sensitive areas and relocate operations from sensitive areas, and c) use improved siting criteria to protect fish habitat.

* refer to Chapter 9 of the CHPP for full recommendation text, actions and strategies.
Visit http://www.ncdmf.net to learn more about the CHPP or to download a copy of the report.

NORTH CAROLINA
COASTAL HABITAT PROTECTION PLAN

Draft

By

Michael W. Street, Anne S. Deaton, William S. Chappell, and Peter D. Mooreside

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
Division of Marine Fisheries
Morehead City, NC 28557

July 1, 2004

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ADOPTION OF NORTH CAROLINA COASTAL HABITAT PROTECTION PLAN AND AGREEMENT TO PREPARE COOPERATIVE IMPLEMENTATION PLANS

The Chairmen of the North Carolina Environmental Management Commission, Coastal Resources Commission, and Marine Fisheries Commission affirm that their respective Commissions adopt the North Carolina Coastal Habitat Protection Plan, as provided in General Statute 143B-279.8.

We recognize the importance of North Carolina's coastal fisheries resources and the commercial and recreational fisheries they support. The continued existence and enhancement of these resources depend on the health of the aquatic habitats they occupy. We pledge to cooperatively manage these aquatic habitats to ensure the long-term viability of the coastal fisheries resources. We agree that these Commissions will work to accomplish the following goals:

GOAL 1 – Improve effectiveness of existing rules and programs protecting coastal fish habitats

GOAL 2 – Enhance fish habitats and protect them from physical impacts

GOAL 3 – Protect and enhance water quality

GOAL 4 – Identify, protect, and enhance all strategic habitats

By July 1, 2005, the three Commissions and the Department of Environment and Natural Resources will each prepare and adopt Cooperative Coastal Habitat Protection Implementation Plans to accomplish the goals listed above. The Implementation Plans will establish priorities and identify actions to be taken within specified time periods, including measures of success. The Department and the three Commissions will review progress annually and revise their plans at least every five years.

Draft

Chairman, Environmental Management Commission	Date
Chairman, Coastal Resources Commission	Date
Chairman, Marine Fisheries Commission	Date
Secretary, Department of Environment and Natural Resources	Date

ACKNOWLEDGEMENTS

Draft

EXECUTIVE SUMMARY

North Carolina's coastal fisheries are among the most productive in the United States because of the wide variety of habitats available, the largest estuarine system (2.3 million acres) of any single Atlantic coast state, location of North Carolina at the transition between mid-Atlantic and south Atlantic regions, and a management system that supports active citizen participation. The condition of some important fish stocks declined during the late 1980s and early 1990s (for example, river herring, weakfish, and summer flounder) as fish kills and water-borne disease outbreaks increased. Protection and enhancement of fish habitats utilized by such species would be especially beneficial in supporting stock recovery.

Recognizing the critical importance of healthy and productive habitats to produce fish for human benefits, the North Carolina General Assembly included a provision in the Fisheries Reform Act of 1997 instructing the Department of Environment and Natural Resources (DENR) to prepare Coastal Habitat Protection Plans (CHPPs). The legislative goal of the plans is long-term enhancement of coastal fisheries associated with each habitat.

A unique feature of the plans is that three regulatory commissions (Environmental Management, Coastal Resources, and Marine Fisheries Commissions) are to adopt and implement the plans, thus requiring a coordinated management approach. The plans are to include information on the description, distribution, function, status and trends of important habitats; threats to those habitats; and recommendations to address the threats. The CHPP area includes all eight of the river basins that drain to the coast of North Carolina up to the Fall Line, which is the upper limit of migration of almost all coastal fisheries species, as well as areas that influence the health of those waters.

The DENR and Commissions began working on the plans in 1998. The comprehensive approach established by the General Assembly had never been used before in the United States, so the department tried several different approaches before deciding to use the six basic fish habitat types as the framework for the plans:

- Water column
- Shell bottom
- Submerged aquatic vegetation (SAV)
- Wetlands
- Soft bottom
- Hard bottom

Once the habitat approach had been established, the DENR and Commissions moved on to address the tasks listed in the Act. After reviewing the results of hundreds of scientific studies and input from experts and citizens alike, it became even more apparent that North Carolina's coastal fish habitats are seriously threatened by human activities, including development (urban/suburban), agriculture, forestry, transportation, channel dredging, shoreline stabilization, and marinas. The water column and shell bottom are the most threatened habitats, shell bottom because there is so little of it left, and the water column because there are so many pollution sources. The greatest single threat to North Carolina's coastal fish habitats is probably stormwater runoff, which carries sediment, wastes, and chemical pollutants into coastal waters, reducing water clarity, promoting algal blooms, decreasing dissolved oxygen, and reducing the benefits that a healthy coastal system would provide to coastal residents and visitors.

The CHPP development process identified hundreds of management needs. The three Commissions reviewed the threats, along with possible management actions to address them. The Commissions selected four general goals and a series of recommendations to reach each goal, as shown below. Implementation of these recommendations will involve new program activities and revised priorities for existing programs

within DENR and other agencies. Significant new funding is essential. Prioritization of the recommendations will occur in each Commission's implementation plan to be developed in 2005.

GOAL 1. IMPROVE EFFECTIVENESS OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITATS

- Enhance enforcement of, and compliance with, Coastal Resources Commission (CRC), Environmental Management Commission (EMC), and Marine Fisheries Commission (MFC) rules and permit conditions.
- Coordinate and enhance water quality, physical habitat, and fisheries resource monitoring (including data management) from headwaters to the nearshore ocean.
- Enhance and expand educational outreach on the value of fish habitat, threats from human activities, effects of non-native species, and reasons for management actions.
- Coordinate rulemaking and enforcement among regulatory commissions and agencies.

GOAL 2. IDENTIFY, DESIGNATE, AND PROTECT STRATEGIC HABITAT AREAS

- Gather information to identify Strategic Habitat Areas by:
  a) Coordinating, completing, and maintaining habitat mapping (including seagrass, shell bottom, and other bottom types) using the most appropriate technology,
  b) Monitoring the status of those habitats, and
  c) Assessing effects of land use and human activities on those habitats.
- Identify and designate Strategic Habitat Areas using ecologically based criteria.
- Analyze existing rules and enact measures needed to protect Strategic Habitat Areas.
- Improve programs for conservation (including voluntary actions) and acquisition of areas supporting Strategic Habitat Areas.

GOAL 3. ENHANCE HABITAT AND PROTECT IT FROM PHYSICAL IMPACTS

- Greatly expand habitat restoration, including:
  a) Creation of subtidal oyster reef no-take sanctuaries, and
  b) Re-establishment of riparian wetlands and stream hydrology.
- Prepare and implement a coast wide beach and inlet management plan that requires ecologically based guidelines for minimization of impacts to fish habitats, while addressing socio-economic concerns.
- Protect Submerged Aquatic Vegetation (SAV), shell bottom, and hard bottom areas from fishing gear impacts through improved enforcement, establishment of protective buffers around habitats, and further restriction of mechanical shellfish harvesting.
- Protect fisheries resource habitat by revising estuarine and public trust shoreline stabilization rules using best available scientific information, considering estuarine erosion rates, and development and promotion of incentives for alternatives to vertical shoreline stabilization measures.
- Protect and enhance habitat for anadromous fishes by
  a) Incorporating the water quality and quantity needs of fish in surface water use planning and rule making, and
  b) Eliminating obstructions to fish movements, such as dams, locks, and road fills.

GOAL 4. ENHANCE AND PROTECT WATER QUALITY

Point sources

- Reduce point source pollution by:
  a) Enhancing inspections of sewage treatment facilities, collection infrastructure, and land disposal sites, and
  b) Providing incentives for upgrading all types of wastewater systems.
- Amend rules to prohibit ocean wastewater discharges.
- Prohibit new or expanded stormwater outfalls to coastal beaches and to coastal shellfishing waters (EMC surface water classifications SA and SB) and continue to phase-out existing outfalls by implementing alternative stormwater management strategies.

Non-point sources

- Improve land-based strategies to reduce non-point pollution and minimize cumulative losses to wetlands and streams through voluntary actions, Best Management Practices (BMPs) and incentives, including:
  a) Improved methods for reducing sediment pollution from construction sites, agriculture, and forestry;
  b) Increased on-site infiltration;
  c) Documentation and monitoring of small but cumulative impacts to wetlands and streams resulting from un-permitted/un-mitigated activities;
  d) Incentives for low impact development;
  e) Enhanced inspections of onsite wastewater treatment facilities;
  f) Increased water re-use and recycling.
- Improve land-based strategies to reduce non-point pollution and minimize cumulative losses to wetlands and streams through rule making, including:
  a) Larger vegetated buffers,
  b) More stringent impervious surface limits,
  c) Expansion of Areas of Environmental Concern (AECs) upstream and landward,
  d) Establishment of setbacks along estuarine and public trust shorelines.
- Develop and implement a comprehensive coastal marina and dock management plan and policy to prevent closures of shellfish harvest waters and cumulative impacts to fish habitats.
- Reduce non-point source pollution from animal operations by the following actions:
  a) Continue the moratorium on new/expanded swine operations until alternative waste treatment technology is implemented,
  b) Use a greater percentage of agricultural conservation funds to phase-out or re-locate concentrated animal operations in sensitive areas,
  c) Mandate the phase-out of waste lagoons by a specific deadline,
  d) Use improved siting criteria to protect fish habitats.

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CHAPTER 1. INTRODUCTION

1.1. PUBLIC TRUST DOCTRINE

North Carolina state government applies the Public Trust Doctrine in management of its coastal lands, surface waters, and the resources in those waters. The Public Trust Doctrine states that "public trust lands, waters, and living resources in a State are held by the State in trust for the benefit of all the people, and establishes the right of the public to fully enjoy public trust lands, waters, and living resources for a wide variety of recognized public uses. The doctrine also sets limitations on the States, the public, and private owners, as well as establishing the responsibilities of the States when managing these public trust assets" (Coastal States Organization, Inc. 1997).

The Constitution of North Carolina implements the Public Trust Doctrine in Article XIV, Section 5, which states: "It shall be the policy of this State to conserve and protect its lands and waters for the benefit of all its citizenry, and to this end it shall be a proper function of the State of North Carolina and its political subdivisions to acquire and preserve park, recreational, and scenic areas, to control excessive noise, and in every other appropriate way to preserve as a part of the common heritage of this State its forests, wetlands, estuaries, beaches, historical sites, open lands, and places of beauty."

Public trust resources include the waters to the upstream extent of navigation, including navigation by small recreational boats, such as canoes or kayaks [North Carolina Supreme Court (*Gwathmey v. State of North Carolina*, 342 N.C. 287, 464 S. E. 2d. 674, 1995)]; submerged lands beneath the waters up to the normal high tide line (or normal water level in areas not subject to lunar tides); and the fisheries resources within those waters (see definition below). Common public trust uses include navigation and commerce, fishing, bathing (swimming), and hunting. Under certain circumstances, private entities may own submerged lands, but public trust rights in the waters over those lands are not affected by such ownership.

The State can restrict exercise of public trust rights in the overall public interest. Such restrictions can be in the form of laws enacted by the North Carolina General Assembly or rules adopted as part of the North Carolina Administrative Code (NCAC) by regulatory commissions established by the General Assembly. A variety of regulatory commissions and administrative agencies established by the General Assembly has authority for management of North Carolina's coastal lands, waters, and fishes under state and federal laws. State authority generally applies within the boundaries of North Carolina, which extends from internal waters (creeks, rivers, and lakes) downstream through the coastal sounds, and into the Atlantic Ocean for three nautical (nm) or 3.45 statute miles from the state's Atlantic Ocean shoreline. Federal jurisdiction applies from that point out to 200 nm (230.16 statute miles) from shore, an area called the Exclusive Economic Zone (EEZ). Several state and federal agencies conduct major regulatory, research, and educational programs that affect North Carolina's coastal fisheries resources and their habitats (Appendix A).

1.2. THE FISHERIES REFORM ACT AND COASTAL HABITAT PROTECTION PLANS

The North Carolina Fisheries Reform Act of 1997 (FRA – S.L.1997-400, H.B. 1097) includes a provision [General Statute (G.S.) 143B-279.8] for preparation of Coastal Habitat Protection Plans (CHPPs) by the North Carolina Department of Environment and Natural Resources. This section of the FRA resembles the federal Magnuson-Stevens Fishery Conservation and Management Act reauthorization of 1996 [also known as the Sustainable Fisheries Act (SFA)]. The SFA requires the regional fishery management councils and National Marine Fisheries Service (NMFS) to amend federal fishery management plans to include provisions for the protection of "Essential Fish Habitat" (EFH) from federally funded activities. ***The legislative goal of the CHPPs is long-term enhancement of coastal fisheries associated with coastal habitats.*** The CHPP is to identify threats and recommend management actions to protect and restore

habitats critical to North Carolina's coastal fishery resources. The plans must be adopted by the Coastal Resources (CRC), Environmental Management (EMC), and Marine Fisheries (MFC) commissions. Once adopted, the plans will help to ensure consistent actions among commissions, as well as their supporting Department of Environment and Natural Resources (DENR) agencies. The passage of the FRA and the initiation of the CHPP program demonstrated the public desire and political will to better manage North Carolina's coastal fishery habitats.

Since the mid-1980s, the State of North Carolina, through the Governor and General Assembly, has convened several high level panels to examine coastal environmental and fishery management issues. Each has made numerous policy recommendations concerning improved management of fish habitat and water quality.

- The Albemarle-Pamlico Estuarine Study (1987 – 1994) recommended numerous water quality, fishery management, and land use reforms in its Comprehensive Conservation and Management Plan, including retain, restore, and enhance water quality; conserve and protect vital fish and wildlife habitats; and restore or maintain fisheries (Waite et al. 1994).
- The North Carolina Coastal Futures Committee was established in recognition of the 20th anniversary of passage of the Coastal Area Management Act (CAMA), which established North Carolina's coastal zone management system under the CRC. The Committee's report cited the tremendous growth in population and use of coastal resources, and recommended a number of important actions, including restoration and protection of important fisheries habitats, the need to address nonpoint source pollution, restoration of impaired coastal waters, and protection of freshwater wetlands similar to existing protection of coastal wetlands (North Carolina Coastal Futures Committee 1994).
- The Blue Ribbon Advisory Council on Oysters recommended a major increase in planting of oyster cultch to help restore oyster resources as well as changes in management of oyster culture practices (Frankenberg 1995).
- Most of the recommendations of the Fisheries Moratorium Steering Committee were included in the FRA in 1997, including development of this CHPP. The report also recommended reform of North Carolina's coastal fisheries management system, based on use of state Fishery Management Plans (FMPs) (MSC 1996).
- The CRC convened the Estuarine Shoreline Protection Stakeholders in 1999 to examine impacts of estuarine shoreline uses and water quality. The group's report included comprehensive recommendations to improve agency coordination, enhance basinwide water quality management, restoration of impaired waters, and reduction of point and nonpoint source pollution (North Carolina Estuarine Shoreline Stakeholders 1999).

Thus, there is a rich history of citizen participation in examination of coastal habitat and water quality issues in recent years. Based on public comments at 10 public CHPP meetings along the coast and inland during the summer of 2003 (Miller 2004), there is also considerable frustration that many, repeated recommendations have not been implemented. Because the CHPP uniquely brings together three major regulatory commissions, there is an expectation that positive actions will result from this effort.

While the MFC manages commercial and recreational fishing practices in coastal waters through rules implemented by the Division of Marine Fisheries (DMF), several other agencies directly and indirectly affect coastal fisheries and fish habitats. The EMC has wide-ranging authority over activities affecting water quality statewide. Rules adopted by the EMC govern point and nonpoint discharges, wastewater management, alteration of non-coastal wetlands, and stormwater management. The EMC is unique because its rules are implemented by several different DENR agencies, including the Division of Water Quality (DWQ), Division of Air Quality (DAQ), Division of Water Resources (DWR), and the Division of Land Resources (DLR). The DLR is also unique because it administers rules adopted by multiple regulatory commissions, including EMC, Sedimentation Control Commission, and the Mining

Commission. The CRC enacts rules to manage development and land disturbing activities along estuarine and ocean shorelines, shoreline stabilization, alteration of submerged bottoms and coastal wetlands, and marina construction. The Division of Coastal Management (DCM) implements rules adopted by the CRC. The North Carolina Wildlife Resources Commission (WRC) has a direct role in the management of fisheries through the designation of primary nursery areas in Inland Waters and, including many anadromous fish spawning areas, and regulation of fishing in those waters. There are a myriad of other state, federal, and interstate programs affecting coastal fisheries habitat in North Carolina (Appendix A).

This CHPP was written by DMF staff with assistance from the CHPP Development Team - scientists and planners from DMF, DCM, DWQ, Division of Environmental Health (DEH), and WRC (Appendix B). An Intercommission Review Committee (IRC), consisting of two members from each of the three commissions (Appendix B), provided policy oversight, reviewed this plan, and developed the management recommendations (Chapter 9.0).

1.3. PURPOSE AND ORGANIZATION OF DOCUMENT

The primary focus of this plan is habitats for coastal fisheries resources in eastern North Carolina, threats to those habitats, and management actions to address those threats. The CHPP identifies four goals for protection of coastal fisheries habitat:

1) Improve effectiveness of existing rules and programs protecting coastal fish habitats
2) Identify, designate, and protect all Strategic Habitat Areas
3) Enhance habitat and protect it from physical impacts
4) Enhance and protect water quality

The CHPP is built around six basic habitats utilized by coastal fishery species: water column, shell bottom, submerged aquatic vegetation (SAV), wetlands, soft bottoms, and hard bottoms. Within each of the following habitat chapters, there is detailed information on the habitat's description, distribution, ecological role and functions for finfish and shellfish species (primarily fishery species, but also forage and protected species), status and trends, threats, and management needs. The term "management" is defined broadly to include regulatory, enforcement, research, monitoring, and restoration activities affecting coastal fish habitat. Management needs are based on documented inadequacies in the current management framework and are highlighted in the habitat chapters with *italics*. A summary highlighting the most pressing management needs is provided at the end of each habitat chapter. A chapter (8.0) addressing strategic habitats (what they are and criteria for their designation) follows the habitat chapters. The final chapter lists the most pressing management recommendations as developed by the IRC. Each of the Commissions will use the threats, management needs, and recommendations to develop coordinated coastal habitat management strategies as provided in the Act. The DENR will also develop a coordinated strategy to implement the CHPP recommendations.

1.4. AREA DESCRIPTION

The CHPP area includes all waters flowing into North Carolina's coastal waters and the watersheds they drain. Table 1.1 shows that the CHPP area is approximately 12% water (3,181,881 acres) and 88% land (24,229,770 acres). Maps 1.1a and 1.1b show this area, including water bodies, the main towns, roads and other local and regional features noted throughout the CHPP. Local and regional differences in habitat and associated fish species are determined by climate, geology, ground water and surface water hydrology, land use, and associated human population.

Table 1.1. The land and water areas for each North Carolina Coastal Habitat Protection Plan Management Unit. *(Source: 1:100,000 scale USGS topographic quadrangle maps)*

Management Unit	Land area		Water area		Total area
	Acres	% of total	Acres	% of total	(acres)
Albemarle	1,669,684	72	658,400	28	2,328,084
Cape Fear	5,795,998	99	64,973	1	5,860,970
Chowan	3,183,877	98	51,691	2	3,235,568
Coastal Ocean	15,374	2	724,842	98	740,216
Core/Bogue	188,976	53	167,998	47	356,974
Neuse	3,466,244	96	135,571	4	3,601,815
New/White Oak	481,345	93	38,449	7	519,794
Pamlico Sound	394,337	27	1,061,613	73	1,455,950
Roanoke	6,118,980	98	140,827	2	6,259,807
Southern Estuaries	253,227	95	14,425	5	267,652
Tar/Pamlico	2,661,729	96	123,092	4	2,784,821
Total	**24,229,770**	**88**	**3,181,881**	**12**	**27,411,651**

To address local and watershed issues, the CHPP program will also produce individual Management Unit (MU) plans (after the CHPP development) based primarily on the same watershed boundaries used by DWQ for Basinwide Water Quality Plans. Since the CHPP is focused on fish and fisheries, some minor boundary changes were made to reflect similarities in fish habitats, or in estuarine and coastal water body dynamics. A watershed approach is necessary because many fisheries rely on the interconnectivity of waters within a watershed, and most pollutants are conveyed into estuarine waters via upstream conduits, such as rivers and streams. The eleven MU areas and their boundaries approved by the IRC are shown on Map 1.2. The units are Chowan, Albemarle, Roanoke (River), Pamlico Sound, Tar-Pamlico, Neuse, Core/Bogue, New-White Oak, Cape Fear, Southern Estuaries, and Coastal Ocean. Most of the Chowan and Roanoke River MUs, and part of the Albemarle MU, are located in Virginia. The Coastal Ocean MU includes North Carolina's territorial waters and ocean front beaches. Among MUs, the largest area of water (1,061,613 acres) is in Pamlico Sound, and the smallest area (14,425 acres) is in the Southern Estuaries (Table 1.1).

Climate and weather

Weather conditions, especially temperature, precipitation, wind, and storms, exert major influences on North Carolina's coastal area and the fishery resources of eastern North Carolina. The climate along the North Carolina coast is strongly influenced by the Atlantic Ocean. North Carolina's coastal ocean includes the convergence between two major oceanic currents: the warm, north-flowing Gulf Stream and the cool, south-flowing Virginia coastal current (also called the Labrador Current). The Gulf Stream current moves within 10 – 12 mi (16.1 – 19.3 km) of the coast at Cape Hatteras before turning northeast toward Europe, bringing southern species (such as brown, white, and pink shrimp; king and Spanish mackerel; snappers and groupers; and calico scallops) to North Carolina's waters. The Virginian (Labrador) Current ends at the Gulf Stream, supplying northern oceanic species (such as Atlantic mackerel, Atlantic herring, and Atlantic cod) to North Carolina.

The work of Orlando et al. (1994) closely examined coastal wind patterns. These winds vary at basically three time scales: seasonal (>1 month), synoptic (3-20 days) due to the passage of weather systems; and diurnal (<1 day) due to changes in local sea breezes. Seasonal winds blowing in the South Atlantic Bight (SAB) (area from Cape Hatteras, N.C. to Cape Canaveral, Fla.) originate either from the Bermuda-Azores High in the North Atlantic or from a smaller high pressure area centered over the Ohio Valley (Ohio Valley High). During winter (November – February), winds flowing from the northwest gradually shift to the north. Winds are stronger in North Carolina than in states to the south during this season. During

spring, the dominant influence of the Ohio Valley High is replaced by the Bermuda - Azores High, resulting in winds from the west and southwest. West and southwest winds cause offshore movement of surface water and inshore movement of bottom water along much of the North Carolina coast, resulting in upwelling in some near-shore areas. Autumn winds (September – October) flow more from the northeast.

Storms can have a significant impact on the geology of the coastal area. Tropical storms can bring storm surges over 16 ft (4.9 m) above sea level along the south Atlantic coast (VIMS 1974 in Orlando et al. 1994), causing coastal flooding. Between 1950 and 1996, 14 hurricanes struck the North Carolina coast. More recently, hurricanes Bertha and Fran hit North Carolina in 1996. In 1997 and 1998, two more hurricanes affected the coastal area: Danny in July 1997 and Bonnie in August 1998. Three sequential storms affected the North Carolina coast during late August - October 1999 (Hurricanes Dennis and Floyd, and Tropical Storm Irene), inundating the region with up to 3.3 ft (1m) of rainfall, resulting in several weeks of flooding and major environmental and economic damage (Bales et al. 2000; Paerl et al. 2001). Similarly, "nor'easter" storms during fall through spring also cause coastal flooding. For example, the Good Friday storm of 1962 was one of the most severe storms recorded to strike the United States' Atlantic coast, causing severe damage from North Carolina to New England.

Geology and hydrology

A chain of low-lying barrier islands extending from Virginia to Cape Fear dominates the geology and surface water hydrology of North Carolina's ocean coastline. Artificial barrier islands extending from the Cape Fear River to South Carolina were created by dredging the Atlantic Intracoastal Waterway (ICW) in the 1930s (Map 1.1b). The northern part of the natural barrier islands, the Outer Banks, separates the Albemarle/Pamlico sounds complex from the coastal ocean. Proceeding inland, eastern North Carolina's land area is divided between the Coastal Plain and Piedmont physiographic regions, with the majority of land in the Coastal Plain. These two regions are separated by the Fall Line (Map 1.3), where streams are characterized by falls and rapids. The Coastal Plain region extends from the seashore up to the Fall Line and varies in width from 120 to 160 mi (193.1 – 257.5 km). Streams in the western Coastal Plain have sandy bottoms. Going east, those sandy bottoms change to mud and clay in the eastern Coastal Plain, where there are extensive swamps and occasional large, shallow lakes (Menhinick 1991). The streams converge near the coast to form estuaries where fresh water mixes with salt water from the ocean. The Chowan, Roanoke, Tar-Pamlico, and Neuse rivers flow into the Albemarle-Pamlico estuarine system, the second largest estuary on the U.S. Atlantic coast. The Cape Fear River flows directly into the Atlantic Ocean.

The groundwater hydrology of coastal North Carolina is dominated by six major aquifers: the surficial, Yorktown, Black Creek, Castle Hayne, Cretaceous, and Peedee (Steel 1991; Giese et al. 1997). The various aquifers intersect the surface in zones running northeast to southwest. The Cretaceous aquifer is the most extensive and farthest west of Coastal Plain aquifers. The surficial and Yorktown are farthest east, and the Castle Hayne lies between the Yorktown and Cretaceous. The thickness of the aquifers varies from a several feet along the fall line, to more than 3000 m (9843 ft) at Cape Hatteras (Steel 1991).

Land use and human population

Estuarine and coastal areas contain some of the nation's most densely populated and rapidly growing areas (Beach 2002). Population density patterns reflect historical development and population pressures, location relative to transportation networks, and the natural resources of the coastal areas (NOS 1990). As population density increases, so does the potential for degradation of the natural environment by human activities (Cairns and Pratt 1992). In the year 2000, New Hanover County had the highest population density (803 persons/mi^2, Table 1.2) among the 20 coastal counties included in the Coastal Area Management Act (CAMA). Onslow, Pasquotank, Craven, Carteret, and Brunswick counties also had relatively high population densities (over 100 persons/mi^2).

Table 1.2. Human population, density, and growth in Coastal Plain counties of North Carolina sorted by Coastal Area Management Act (CAMA) counties and other Coastal Plain counties, and growth during 1990 – 2000. *(Source: North Carolina Office of State Budget and Management, 2002.)*

	1990		2000		1990-2000	
COUNTY	Population	Persons/ mi^2	Population	Persons/ mi^2	Growth	% growth
CAMA counties						
Brunswick	50,985	82.33	73,143	118.10	22,158	43.5
Pender	28,855	33.16	41,082	47.22	12,227	42.4
New Hanover	120,284	602.85	160,307	803.44	40,023	33.3
Currituck	13,736	52.55	18,190	69.59	4,454	32.4
Dare	22,746	59.33	29,967	78.17	7,221	31.7
Camden	5,904	24.57	6,885	28.65	981	16.6
Pamlico	11,368	33.40	12,934	38.00	1,566	13.8
Carteret	52,407	101.13	59,383	114.59	6,976	13.3
Gates	9,305	27.29	10,516	30.84	1,211	13.0
Craven	81,812	115.12	91,436	128.66	9,624	11.8
Pasquotank	31,298	137.96	34,897	153.83	3,599	11.5
Perquimans	10,447	42.28	11,368	46.00	921	8.8
Hyde	5,411	8.75	5,826	9.43	415	7.7
Chowan	13,506	78.19	14,526	84.09	1,020	7.6
Tyrrell	3,856	9.84	4,149	10.58	293	7.6
Beaufort	42,283	50.83	44,958	54.05	2,675	6.3
Hertford	22,317	63.01	22,601	63.81	284	1.3
Onslow	149,838	195.37	150,355	196.04	517	0.3
Washington	13,997	40.44	13,723	39.65	-274	-2.0
Bertie	20,388	29.16	19,773	28.28	-615	-3.0
Other Coastal Plain Counties						
Johnston	81,306	102.18	121,965	153.28	40,659	50.0
Hoke	22,856	102.56	33,646	150.98	10,790	47.2
Harnett	67,833	113.20	91,025	151.90	23,192	34.2
Sampson	47,297	49.96	60,161	63.55	12,864	27.2
Pitt	108,480	165.67	133,798	204.34	25,318	23.3
Greene	15,384	57.76	18,974	71.24	3,590	23.3
Duplin	39,995	48.82	49,063	59.89	9,068	22.7
Nash	76,677	141.28	87,420	161.08	10,743	14.0
Bladen	28,663	47.09	32,278	53.03	3,615	12.6
Wilson	66,061	176.54	73,814	197.25	7,753	11.7
Jones	9,361	19.75	10,381	21.90	1,020	10.9
Columbus	49,587	487.97	54,749	538.77	5,162	10.4
Cumberland	274,713	427.25	302,963	471.18	28,250	10.3
Wayne	104,666	187.92	113,329	203.47	8,663	8.3
Northampton	21,004	39.07	22,086	41.08	1,082	5.2
Lenoir	57,274	142.48	59,648	148.39	2,374	4.1
Halifax	55,516	76.39	57,370	78.94	1,854	3.3
Martin	25,078	54.23	25,593	55.34	515	2.1
Edgecombe	56,692	111.88	55,606	109.74	-1,086	-1.9

However, the highest-density areas in North Carolina were in the Piedmont region (Map 1.4), suggesting that at least some of the problem from highly mobile pollutants may be traced upstream. The lowest population densities in eastern North Carolina (about 10 persons/mi^2) were in Tyrrell and Hyde counties.

The human population of North Carolina's coastal area is growing rapidly. During the 1970s, counties within the Albemarle-Pamlico region grew at a rate below the statewide average, but in the 1980s, those counties exceeded the statewide average growth rate by 3.6% (Steel 1991). Growth rates were highest in oceanfront counties, except Hyde, in which all the oceanfront property is federally owned (Ocracoke

Island lies within Cape Hatteras National Seashore). Combined population growth in the eight counties bordering the Atlantic Ocean (Currituck, Dare, Hyde, Carteret, Onslow, Pender, New Hanover, and Brunswick) has exceeded 20% per decade since 1970 (North Carolina State Library, <http://data.osbm.state.nc.us/pls/linc>, 24 September 2003). During that period, population changes in those counties ranged from an increase of 91% (Dare County from 1970 to 1980) to a loss of 8% (Hyde County from 1980 to 1990). North Carolina's 44 Coastal Plain counties had a 16% population increase from 1990 to 2000 (1,919,186 to 2,229,888), compared to a 19% increase in non-Coastal Plain counties for the same time period. However, there was great variation among counties in the Coastal Plain (Map 1.5). As shown in Table 1.2, New Hanover, Pender, Currituck, Dare, and Brunswick counties had growth rates ranging from about 32 to 44%, while Onslow, Hertford, Washington, and Bertie counties had very low or negative growth rates (-3 to 1.3%).

The coastal counties of North Carolina experience tremendous seasonal population fluctuations due to the influx of tourists. The seasonal population of coastal cities and towns increased, on average, 54% from 1990 to 2000 (Table 1.3). These estimates do not include day visitors who come to the area, but do not stay overnight. The counties that border the ocean and sounds have the greatest population fluctuations due to tourism. In many of these counties, public facilities, including wastewater treatment, roads, and water supply systems, are being taxed to the limit (Steel 1991).

As population increases, so does the need for infrastructure (roads, schools, water and sewer facilities, electric transmission lines, etc.) to support those people, sometimes resulting in loss of important habitats and supporting areas, such as wetlands and riparian forests (see Water Column and Wetland chapters for more information on changes in land cover). Land cover data reported by the federal National Resource Inventory (D. Good, U.S. Department of Agriculture, Natural Resource Conservation Service, pers. com., 2001) show that urban/built-up land increased in coastal river basins by 83% from 1982 to 1997 (Appendix C and D).

Despite the growth in urban/built-up areas, land cover in coastal North Carolina is still primarily forest (53%) and cultivated crops (21.5%) (Appendix D). Beach (2002) showed that increases in developed areas have far outpaced population growth in coastal areas nationwide, resulting in a greater habitat impact than population data alone suggest. Beach (2002) concluded that conversion of land in the coastal zone from open space (forest and agricultural uses) to urban/suburban uses was the primary threat to coastal water quality. As of 1997, urban/built-up land covered 2.9-19.6% of the land area in North Carolina's coastal river basins (Appendix D).

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Table 1.4. Atlantic coast commercial fisheries landings by state, 1997 - 2001 (thousands of pounds, sorted in descending order of average landings). *(Source: National Marine Fisheries Service data)*

State	1997	1998	1999	2000	2001	Total	Average	%	Rank
Virginia	584,895	592,767	460,289	443,197	561,708	2,642,856	528,571	32	1
Maine	246,344	184,103	229,633	226,849	239,868	1,126,797	225,359	14	2
Massachusetts	229,915	257,438	198,877	187,861	242,066	1,116,157	223,231	13	3
New Jersey	175,172	197,550	168,974	171,804	168,403	881,903	176,381	11	4
North Carolina	228,433	180,238	153,310	155,214	139,277	856,472	171,294	10	5
Rhode Island	143,101	133,702	124,168	119,295	115,957	636,223	127,245	8	6
Maryland	76,599	61,479	66,419	48,913	55,536	308,946	61,789	4	7
New York	60,956	57,542	49,661	41,181	42,422	251,762	50,352	3	8
Florida (east coast)	32,719	29,959	30,417	40,607	37,130	170,832	34,166	2	9
Connecticut	19,072	17,625	18,430	19,563	18,687	93,377	18,675	1	10
South Carolina	17,350	17,653	18,574	15,835	14,111	83,523	16,705	1	11
New Hampshire	10,896	10,172	11,258	17,160	18,584	68,070	13,614	1	12
Georgia	14,511	13,196	12,250	9,694	9,036	58,687	11,737	1	13
Delaware	9,084	7,866	8,372	6,676	7,123	39,121	7,824	0	14
Total	**1,849,047**	**1,761,290**	**1,550,632**	**1,505,849**	**1,671,909**	**8,334,726**	**1,666,945**	**na**	**na**

Table 1.5. Atlantic coast marine recreational fisheries harvest by state, 1997 - 2001 (thousands of pounds, sorted in descending order of descending average landings). *(Source: National Marine Fisheries Service, Fisheries Statistics and Economics Division, pers. com., 2003)*

State	1997	1998	1999	2000	2001	Total	Average	%	Rank
Florida (east coast)	24,179	21,017	25,859	29,408	29,517	129,980	25,996	20	1
North Carolina	19,703	15,370	18,034	22,699	24,146	99,952	19,990	16	2
New Jersey	19,921	13,632	14,181	24,645	22,323	94,702	18,940	15	3
Virginia	16,835	13,993	11,507	13,112	17,732	73,179	14,636	11	4
New York	12,476	8,458	9,733	17,050	11,127	58,844	11,769	9	5
Massachusetts	9,865	9,252	7,626	15,538	15,984	58,265	11,653	9	6
Maryland	8,238	8,311	5,396	8,872	8,366	39,183	7,837	6	7
Rhode Island	3,225	3,567	3,817	7,020	4,457	22,086	4,417	3	8
South Carolina	4,492	3,356	2,628	2,834	3,156	16,466	3,293	3	9
Connecticut	3,228	3,424	2,575	3,029	3,432	15,688	3,138	2	10
Delaware	2,751	2,463	2,021	3,486	3,246	13,967	2,793	2	11
Georgia	1,339	1,049	1,772	2,202	2,017	8,379	1,676	1	12
Maine	1,516	705	802	1,571	1,964	6,558	1,312	1	13
New Hampshire	1,479	588	833	1,074	2,105	6,079	1,216	1	14
Total	**129,247**	**105,185**	**106,784**	**152,540**	**149,572**	**643,328**	**128,666**	**na**	**na**

Virtually all licensed commercial fishermen in North Carolina participate in several different fisheries during the course of a year [an "annual round" of work that, in total, provides for a year's employment and income (Johnson and Orbach 1996)]. Few can count on a full year's work in a single fishery. Most fishermen own a variety of fishing gears, and many own several vessels, each rigged for different fisheries. The nature of the target species (growth, seasonal migrations), weather variations, rule changes and restrictions, and other variables require that successful commercial fishermen exhibit great adaptability. Many fishermen hold non-fishing jobs as part of their annual work cycle. In fact, some persons with a commercial fishing heritage, who make very little money from commercial fishing, instead earning most of their income in non-fishing occupations, consider themselves to be commercial fishermen.

Recreational fishing is very important economically and culturally in coastal North Carolina. Hook and line fishing has been popular for generations. There are records of surf fishing from the early colonial period. Surf fishing along the Outer Banks for red drum and bluefish was the subject of articles in sporting magazines in the 1930s (Godwin et al. 1971). Tens of thousands of private recreational boaters fish the coastal waters, while thousands more fish from the shore, piers, and other structures. Since 1997, about 1.6 million anglers (64% non-residents) have made about 5.4 million fishing trips each year in coastal North Carolina. Diaby (1997) estimated that sport fishing contributed almost $75 million to the Carteret County economy, supporting over 1,800 jobs.

Protected species

North Carolina state law [G.S. 113-331] protects endangered, threatened, and special concern species of mammals, birds, reptiles, amphibians, freshwater fishes, and freshwater and terrestrial mollusks under the jurisdiction of the North Carolina Wildlife Resources Commission (Appendix E). The North Carolina Natural Heritage Program (NHP) lists seven marine and estuarine fishes. The shortnose sturgeon (*Acipenser brevirostrum*) is listed as endangered at the state and federal levels. The Atlantic sturgeon (*Acipenser oxyrhynchus*) is listed as Special Concern for state and federal protection. An MFC rule [15A NCAC 3M .0508] prohibits possession of any sturgeon in North Carolina's coastal waters. There are five marine and estuarine fishes listed as significantly rare: spinycheek sleeper (*Eleotris pisonis*), lyre goby (*Evorthodus lyrinus*), marked goby (*Gobionellus stigmaticus*), freckled blenny (*Hypsoblennius ionthas*), and opossum pipefish (*Microphis brachyurus*). All five of these species occur in marine and estuarine systems of the Cape Fear MU. Shortnose and Atlantic sturgeon occur in riverine, estuarine and marine systems of the CHPP management area. Other marine and estuarine species listed by NHP include Florida manatee (*Trichechus manatus*), loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), leatherback sea turtle (*Dermochelys coriacea*), and Kemp's ridley sea turtle (*Lepidochelys kempii*). There are also numerous birds, reptiles, and mammals listed by NHP associated with salt marshes and other coastal wetlands [(LeGrand and Hall 1999 (NHP animals); Amoroso 1999 (NHP plants)]. Listed estuarine species include the Carolina diamondback terrapin (*Malaclemys terrapin centrala*), Carolina salt marsh snake (*Nerodia sipedon williamenglelsi*), while the federally-listed piping plover (*Charadrius melodus*) occurs along ocean beaches and near inlets.

In addition to species listed by NHP, there are also species designated for protection under the Marine Mammal Protection Act (for example, bottlenose dolphin, *Tursiops truncatus*). Several species of marine mammals regularly utilize North Carolina's nearshore ocean waters as migratory corridors or nursery and feeding grounds. Northern right whales (*Balaena glacialis*), one of the world's most endangered species, pass by on their annual migrations between winter calving grounds along the Georgia coast and summer feeding areas from Cape Cod to the Bay of Fundy. Similarly, humpback whales (*Megaptera novaenagliae*) pass by offshore North Carolina during their annual journey between North Atlantic feeding grounds and winter calving areas off Hispañola. Bottlenose dolphin are year-round residents of the coastal ocean waters of North Carolina, and they utilize much of the estuarine system during the warmer months, going as far upstream as the lower Neuse River. Harbor porpoise (*Phocoena phocoena*) spend a part of each winter off the Outer Banks, as far south as Hatteras Bight, below Diamond Shoals. A number of other marine mammals occasionally utilize North Carolina's coastal waters, including pygmy sperm whales (*Kogia breviceps*) and pilot whales (*Globicephala melaena*).

1.5. STATUS OF FISHERIES

The current status of fisheries may be an indicator of the potential impacts of habitat degradation and loss. The status of North Carolina's coastal fishery resources is evaluated every year by DMF. Several pertinent definitions are provided for terms used in this section.

- Stock (<http://www.ncdmf.net/resource.htm>, 2002): A stock is a group of genetically similar fish that behave as a unit. Determining stock status requires long-term collection and subsequent analysis of data such as length, weight, age, catch, fishing effort, spawning stock biomass, juvenile abundance indices, and fishing mortality. All data are not available for all species, and there is no single measure or simple index that, by itself, describes the status of a given stock. Further, information from a single year does not indicate stock status. Therefore, the stock status assigned for each coastal fishery stock is based on the available time-series of data.
- Fishery Management Plan (FMP): Plan for achieving specified management goals for a fishery. It includes data, analyses, and management measures for a fishery. The process for preparing FMPs in North Carolina was established by the FRA [G.S. 113-182.1]. The FRA states:

"[t]he goal of the plans shall be to ensure the long-term viability of the State's commercially and recreationally significant species and fisheries…Each plan shall:

a. Contain necessary information pertaining to the fishery or fisheries, including… fishery habitat and water quality considerations consistent with Coastal Habitat Protection Plans …"

- Stock status descriptors used by DMF (<http://www.ncdmf.net/resource.htm>, 2003):
  - **Viable**: Viable stocks exhibit stable or significantly increasing trends in average length and weight, catch-per-unit-effort (CPUE), spawning stock biomass, juvenile abundance indices based on historical averages, stable age structure that includes representatives of the older age classes, and stable or declining trends in fishing mortality.
  - **Recovering**: Recovering stocks are those stocks previously listed as Overfished or Concern that show marked and consistent improvement in the criteria listed for a Viable stock. A recovering stock may still be Overfished but would show measurable and consistent improvement toward the target(s) established in the applicable FMP.
  - **Concern**: Stocks designated as Concern are those for which an assessment is incomplete or unavailable, but data show increased effort and landings, and/or a truncated age distribution. The nature of a given fishery may also be a reason for concern (such as the roe fishery for striped mullet). Stocks especially affected by diseases or adverse natural events may also fall into this category (for example, oysters). Species designated Concern may be reasonable candidates for FMP development if the concern is well-documented and justified.
  - **Overfished**: Overfished stocks are classified based on stock assessments conducted by the DMF or some other recognized fisheries management authority. Species designated as Overfished are priority candidates for FMP development.
  - **Unknown**: Stocks for which insufficient data are available to conduct a scientifically valid stock assessment are classified as Unknown. When data for species that have been designated Unknown are subsequently collected in DMF sampling programs and analyzed, a different status may be assigned.

Based on a combination of fishery landings and value, dependence (or association) of the stock on specific habitats, and importance of management and environmental issues associated with the fisheries, the primary coastal fisheries species in North Carolina and their status are listed in Table 1.6 (<http://www.ncdmf.net/resource.htm>, 2003). Of the more than 25 species and at least 24 fish stocks listed in Table 1.6, eight stocks are Viable (33%), two are Recovering (8%), eight are Concern (33%), three are Overfished (13%), and three are Unknown (13%). The status of most stocks has been evaluated since 1997. Some stocks have shown signs of improvement from 1997 to 2003, while others have declined (Table 1.7). For example, southern flounder status has gone from Viable in 1998, to Concern from 1999 to 2001, to Overfished in 2002 and 2003. Bay scallop status has also declined from Viable (1997-1999) to Concern (2000-2003). There have also been some improvements in stock status; summer flounder, weakfish, and Albemarle Sound striped bass have gone from Concern to Viable. For more information on the status of individual fishery species, see the DMF website (<http://www.ncdmf.net/stocks/index.html>).

Table 1.6. Average fisheries landings, fishery management plan (FMP) authority, stock status, and importance in Coastal Habitat Protection Plan management units in coastal North Carolina. *(Sorted by descending commercial fisheries landings. Source: Division of Marine Fisheries commercial and recreational fisheries landings data.)*

Species	Average commercial fisheries landings 1997-2002 (lb)	Average recreational fisheries landings 1997-2002 (lb)	Lead FMP agency	Stock status (2003)	Management units										
					Albemarle	Cape Fear	Ghoxem	Coastal Ocean	Core/Bogue	Neuse	New/White Oak	Pamlico	Roanoke	Subestuaries	Tar/Pamlico
Atlantic menhaden	63,330,289	Unknown	ASMFC	V				X	X	X		X			X
Blue crab	47,673,736	Unknown	DMF	C	X	X		X	X	X	X	X		X	X
Atlantic croaker	10,692,337	276,740	ASMFC	C	X			X	X	X		X			X
Shrimp	7,688,851	Unknown	DMF out to 3 miles, NMFS beyond 3 miles	V		X		X	X	X	X	X		X	X
Southern flounder	3,523,763	134,186	DMF	O	X				X	X	X	X		X	X
Bluefish	3,240,218	838,102	ASMFC/NMFS	R		X		X	X			X		X	
Summer flounder	2,938,425	381,729	ASMFC/NMFS	V		X		X	X			X			
Spot	2,563,527	1,028,822	ASMFC	V	X	X		X	X	X	X	X		X	X
Weakfish	2,531,015	116,632	ASMFC/NMFS	V	X			X	X	X		X			X
Striped mullet	2,311,092	Unknown	DMF	C	X	X		X	X	X	X	X		X	X
Snapper / grouper / seabass	1,788,967	409,521	NMFS	C				X							
Hard clams	67,716	Unknown	DMF	?		X			X		X	X		X	
Striped bass	555,421	663,626	ASMFC - ocean, DMF/WRC - internal waters	V-Ocean, Albemarle O-elsewhere	X		X	X		X			X		X
River herring	352,364	Unknown	ASMFC / DMF	O-Albemarle ?-elsewhere	X	X	X			X			X		
Spotted seatrout	290,303	419,273	ASMFC	V		X		X	X	X		X			X
Oysters	234,445	Unknown	DMF	C		X				X	X	X		X	
American shad	233,718	Unknown	ASMFC	?	X	X	X	X		X		X	X		X
Red drum	203,537	255,884	ASMFC/DMF	R		X		X	X	X	X	X		X	X
Bay scallops	39,903	Unknown	DMF	C					X						

*Stock status: V = viable, R = recovering, C = concern, O = Overfished, ? = Unknown)

Table 1.7. Trends in the stock status of species and stocks listed in Table 1.6. (1997 – 2003).

Species/stocks	1997	1998	1999	2000	2001	2002	2003
American shad							
Atlantic croaker							
Atlantic menhaden							
Bay scallops							
Black sea bass (North of Cape Hatteras)							
Black sea bass (South of Cape Hatteras)							
Blue crab							
Bluefish							
Gag							
Oysters							
Red drum (except Pamlico Sound)							
Red drum (Pamlico Sound)							
Reef fish							
River herring (Albemarle Sound)							
Shrimp							
Southern flounder							
Spot							
Spotted seatrout							
Striped bass (Albemarle Sound)							
Striped bass (except Ocean and Albemarle Sound)							
Striped bass (Ocean)							
Striped mullet							
Summer flounder							
Weakfish							

While much of the concern over declining fish stocks has been attributed to overfishing, habitat loss and degradation also make a stock more susceptible to overfishing. The effect of habitat loss and degradation could also be indicated by the lack of recovery of certain stocks after fishing pressure is reduced. For example, river herring stocks have not recovered despite reduced fishing effort in recent years. Although the role of environmental factors in the river herring decline are uncertain, the center of river herring abundance (Chowan and Roanoke rivers) has suffered from water quality problems since the 1970s.

A number of species/fisheries with high landings are not discussed because they occur primarily outside the areas emphasized in the CHPP program, such as wahoo, tunas, and dolphin, all of which live their entire lives in the ocean. Among MUs, the primary fisheries vary according to the range of salinity present. For example, Table 1.6 shows that the primary fisheries in low salinity estuaries (Albemarle, Chowan, and Roanoke MUs) include river herring, catfishes (*Ictalurus* and *Ameiurus*), striped bass, white perch (*Morone americanus*), American eel, and American shad. In areas with moderate salinities (Neuse, Tar-Pamlico, and Pamlico Sound MUs), species such as blue crab, shrimp, and spot are dominant. In higher salinity estuaries (i.e., Core/Bogue) and the near shore ocean, the primary fisheries include Atlantic menhaden, flounders, hard clams, and shrimp.

1.6. HABITAT CONCEPTS AND TERMINOLOGY

The following habitat chapters contain numerous technical terms and acronyms that may not be familiar

to the average reader. A complete list of terms and acronyms is found in Appendix F.

Habitat is simply the place where an organism lives (Odum 1959). Fish Habitat (FH) is hereby defined as freshwater, estuarine, and marine areas that support juvenile and adult populations of economically important fish species (commercial and recreational), as well as forage species important in the food chain. Fish habitat also includes land areas that are adjacent to, and periodically flooded by, riverine and coastal waters. Fish occupy specific areas or sites where the conditions are suitable for growth, protection, and/or reproduction. A species' use of specific areas can depend on various factors, including life stage, time of day, and tidal stage. Together, these habitat areas form a functional and connected system that supports the fish from spawning until death.

The upstream boundary of coastal fish habitat in North Carolina is approximately the Fall Line separating the Coastal Plain and Piedmont physiographic regions (Map 1.3) because only one coastal migratory species (American eel, *Anguilla rostrata*) has been reported significantly above the Fall Line (Menhinick 1991). Within North Carolina's coastal ecosystem, six habitat types were distinguished based on similar physical properties, ecological functions, and habitat requirements for living components:

- Water column: The water covering a submerged surface and its physical, chemical, and biological characteristics.
- Soft bottom: Areas of primarily unvegetated, unconsolidated sediment (particles smaller than rocks) beneath the water column, and not within other categories defined below.
- Submerged aquatic vegetation (SAV): Bottom recurrently vegetated by living structures of submerged, rooted vascular plants, (including roots, rhizomes, leaves, stems, propagules), as well as temporarily unvegetated areas between vegetated patches.
- Shell bottom: Intertidal or subtidal bottom composed of shell concentrations, including living oysters (*Crassostrea virginica*), hard clams (*Mercenaria mercenaria*), or other shellfish (such as whelks). Also referred to as oyster bars, oyster beds, oyster rocks, oyster reefs, clam beds, and shell hash.
- Hard bottom: Exposed areas of rock or consolidated sediments that may or may not be characterized by a thin covering of live or dead animals, generally located in the ocean rather than an estuary.
- Wetlands: Section 404 of the Federal Water Pollution Control Act defines wetlands as: "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in wet soil conditions." The CHPP will focus primarily on wetlands that are connected to coastal water bodies by surface water of sufficient depth to allow fish utilization. These "connected" wetlands are termed "riparian wetlands" in the CHPP because they border streams and other water bodies.

North Carolina's coastal fishery resources (the "fish") exist within a system of interdependent habitat types that provide the basis for long-term fish production available for use by people (the "fisheries"). The integrity of the entire system depends upon the health of areas and individual habitat types within the system. The areas that contribute most to the integrity of the system are another category of habitat termed Strategic Habitat Area. Strategic Habitat Areas (SHAs) are hereby defined as specific locations of individual fish habitat or systems of habitat that have been identified to provide critical habitat functions or that are particularly at risk due to imminent threats, vulnerability, or rarity. Criteria for delineation of SHAs are included in chapter 8.0 (Strategic Habitat Areas). The designation of SHAs is primarily reserved for the CHPP Management Unit plans.

Ecological role and functions

The ecological role of each habitat is discussed in the habitat chapters that follow in terms of productivity

and effect on overall water quality and quantity in an ecosystem. That discussion is followed by information on specific fish habitat functions. The general functions of habitat for fishery and forage species are grouped into the following categories:

- Refuge: Properties of the habitat that provide cover for organisms at various life stages to escape from predators and adverse environmental conditions. Structural refuge can also encourage attachment of colonizing sessile (stationary or non-mobile) organisms.
- Spawning: Properties of the habitat that provide the necessary conditions (substrate, temperature, flow, structure, etc.) for successful spawning of adults.
- Nursery: Properties of the habitat that provide a combination of refuge and foraging habitat resulting in successful development of subadult life stages of aquatic organisms. Nursery habitat can be further defined as habitats that contribute disproportionately to the production of individuals that recruit to adult populations (Beck et al. 2001).
- Foraging: Properties of the habitat that enhance growth of species' life stages through the presence, accessibility, and vulnerability of prey organisms.
- Corridor: Properties of the habitat that allow relatively safe passage (either active or passive) of species' life stages among foraging, spawning, and refuge areas. This function also addresses the connectivity of aquatic habitat and its effect on aquatic organisms.

Spatial scales

In ecological terms, spatial scales are differentiated by the variable resolution of landscape features (such as a forest to a tree to an individual branch) and the manifestation of different biological, chemical, or physical patterns at those resolutions. For example, individual oyster shells, the spaces between them, and the water surrounding them could define a very fine scale. Small organisms relate to these crevices by selecting them over the surrounding unstructured bottom. The small organisms are relatively separate from what is happening in the entire watershed, although watershed patterns can affect them through the surrounding water. The entire watershed occupies a much larger scale in which anadromous fish, for example, require different areas depending on time of year and life stage. Regional scales encompass multiple watersheds and affect individual watersheds with similar climatic patterns and other large-scale phenomena. Highly migratory organisms like tunas, whales, and sea birds relate to habitat at regional scales while at the same time selecting fine-scale habitat characteristics at any specific point in time. There are basically three larger scales used to describe habitat and ecosystem organization and function in this document: regional, watershed, and site-specific.

- Regional scale is defined by large biogeographic regions, such as the mid-Atlantic and South Atlantic Bights or the Coastal Plain and Piedmont physiographic regions of eastern North America.
- Watershed scale is defined by CHPP management units or by other hydrologic units based on DWQ or U.S. Geological Survey (USGS) delineations. Nationally, the typical watershed covers 40,000 to 250,000 acres (USGS 2001).
- Site-specific scale is defined by DWQ as water bodies delineated on 1:24,000 scale hydrographic maps or by features named on NOAA nautical charts. Within a given area, a given habitat type may be dominant, but not continuous, such as patchy distribution of SAV. Specific habitat features change continually, especially at their edges. Beds of SAV expand and contract. Thus there is a high degree of natural variability within habitats.

Impacts, sources, and threats

Coastal fisheries resources in North Carolina have evolved over geologic time to live within their existing conditions. Thus, they have adapted to the gradual climate shifts and episodic storm events that have occurred through time. But these natural and gradual changes did not include the host of artificial chemicals, deforestation of riparian lands, stormwater runoff, nutrient enrichment, destruction of habitats, and highly effective fishing practices that have developed during the last century, and are so pervasive

today. These threats to coastal fish habitat can be characterized by impacts types and sources.

Impacts are specific effects on habitat such as extremely low flow, nutrient enrichment, or erosion. These impacts have corresponding effects on living resources, which can be both positive and negative. Positive impacts can result from habitat preservation, enhancement, and restoration efforts. Negative impacts can result from habitat degradation and loss. Cumulative impacts are the combined outcome of numerous actions and stresses that alone may have relatively minor effects, but together lead to substantive habitat degradation or loss. Restoration of specific degraded habitats may cumulatively benefit dependent organisms.

The overall effect of human-induced, habitat impacts on living resources has been expanding areas of low dissolved oxygen, coupled with nutrient enrichment and suspended sediment. Species that can tolerate the low dissolved oxygen, algae growth, and excess sediment thrive in degraded areas. These species include smaller, less desirable organisms such as jellyfish (Breitburg 1992; Breitburg et al. 1994), and toxic algae (Paerl 1982; Tester and Fowler 1990). In areas where there is no oxygen, only a few bacteria species can survive. Degraded areas not only impair fishery resources, they also impair other human uses such as swimming and drinking water supply.

Impact sources are natural events or human activities that can have individual or multiple effects. Impact from pollution originates from both point (outfall pipes, ditches) and nonpoint sources (stormwater runoff), primarily affecting water quality (the biological, chemical, and physical suitability of water relative to standards that support desirable living communities). Natural events and human activities also affect the physical habitat through storms, floods, construction activities, land clearing, and fishing. These sources are discussed briefly below and in great detail in the following chapters.

Broad coast wide threats to fish habitat are identified below and discussed throughout the plan as they apply to each coastal fish habitat.

- Fishing gear impacts: Negative impacts of fishing gear on habitat have been the subject of numerous studies (Adkins et al. 1983; Van Dolah et al. 1991; Dorsey and Pederson 1992; Collie 1998; Auster and Langton 1999; ASMFC 2000). Effects include uprooting vegetation, breaking physical structures, and digging and suspending sediment. Oyster dredging, in particular, may have played a significant role in the eutrophication of Pamlico Sound (Jackson et al. 2001).
- Marina and dock siting, and boating: The cumulative effects of increasing boater access facilities and associated boating activities are a concern due to documented negative impacts from operation of individual boats (Lockwood 1990; Milliken and Lee 1990; Wisby and Lopazanski 1995; Stephan and Bigford 1997; Crawford et al. 1998; Fonseca et al. 1998; SAFMC 1998) and access facilities (Allen and Hardy 1980; Johnston 1981; Van Dolah et al. 1984; DWQ 1990; Wendt et al. 1990; DWQ 1991; Weis and Weis 1994; Wisby and Lopazanski 1995; McAllister et al. 1996; NMFS 1998; SAFMC 1998; Weis et al. 1998). Some effects include disturbance and removal of sediment, changes in currents, and degradation/loss of wetlands and SAV.
- Shoreline stabilization: The increasing modification of natural shorelines to prevent or reduce landward migration of the shoreline (a natural process) is a major concern documented in numerous studies (Mock 1966; Ellifrit et al. 1972; Garbisch et al. 1973; Gilmore and Trent 1974; Knutson 1977; Walton and Sensabaugh 1979; O'Rear 1983; Reilly and Bellis 1983; Pilkey and Wright 1989; Van Dolah et al. 1992; Byrne 1995; Hackney et al. 1996; Pilkey et al. 1998; SAFMC 1998; Titus 1998; Donaghue 1999; Jutte et al. 1999; Taylor 1999; Cahoon et al. 2000; DMF 2000; Peterson et al. 2000; Waters and Thomas 2001). These modifications often result in loss of wetlands and shallow water habitats, reduced fish diversity and abundance, and changes in runoff patterns.
- Nonpoint source (NPS) pollution: While great advances in the control and reduction of point source pollution have been made in the past 25 years (<http://www.epa.gov/OWOW/NPS/facts/point1>, 2002), NPS pollution has become the most widespread source of water quality degradation in North

Carolina's streams and estuaries (DWQ 2000 – 305(b) report). The impacts and contribution of nonpoint source pollutants have been well documented (Duda 1982; Duda and Klimek 1982; Humenik et al. 1983; DEHNR 1996b; Mallin et al. 1997; Scott 1997; SAFMC 1998; Paerl et al. 1999; DMF 2000; Mallin et al. 2000). Some impacts include reduced availability of dissolved oxygen, reduced water clarity, and excessive nutrients that trigger algal blooms.

- Habitat loss: The physical degradation and loss of habitat is the most widespread source of impairment in coastal North Carolina streams (DWQ 2000 – 305(b) report). Sources of physical degradation and loss include:
    - Dredging and draining of wetlands (Sutter 1999; Dahl 2000; DWQ 2000a);
    - Conversion of habitat to impervious surfaces (Mallin et al. 1998; Mallin et al. 2000; White et al. 2000; Natural Resources Conservation Service (NRCS), unpub. data); and
    - Installation of dams, culverts, bulkheads (Mock 1966; Ellifrit et al. 1972; Garbisch et al. 1973; Gilmore and Trent 1974; Knutson 1977; Walton and Sensabaugh 1979; O'Rear 1983; Reilly and Bellis 1983; Pilkey and Wright 1989; Van Dolah et al. 1992; Byrne 1995; Hackney et al. 1996; Pilkey et al. 1998; SAFMC 1998; Titus 1998; Donaghue 1999; Jutte et al. 1999; Taylor 1999; Cahoon et al. 2000; DMF 2000; Peterson et al. 2000; DCM, unpub. data), and jetties.
- Shellfish harvest area closures: The increasing closure to harvest of shellfishing waters has been correlated with increasing coastal development and stormwater runoff (Maiolo and Tschetter 1981; DWQ (DEM) 1994; Frankenberg 1995; Reilly and Kirby-Smith 1999; DWQ 2001 – White Oak Basinwide Water Quality Plan; and DMF 2001a, b). Although such closures have no direct impact on shellfish (only human harvest is affected), presence of indicator bacteria is strongly correlated with presence of other pollutants and nutrients (Mallin et al. 2000; 2001).

In spite of the great stresses on North Carolina's coastal ecosystem, it has proven to be quite resilient, and it is generally healthy (DWQ 2000a). However, the number of water bodies showing danger signs is growing as human activities further stress the coastal area (Maiolo and Tschetter 1981; DWQ 2000a). The trend toward a largely degraded coastal ecosystem must not only be stopped, but reversed.

SUMMARY OF INTRODUCTION

Development of an effective Coastal Habitat Protection Plan (CHPP) is critical for long-term enhancement of North Carolina's coastal fisheries. The habitat section of the North Carolina Fisheries Reform Act (FRA) of 1997 is similar in some ways to the 1996 federal Sustainable Fisheries Act, which requires federal fishery management plans to include provisions for the protection of Essential Fish Habitat. The FRA requires the North Carolina Department of Environment and Natural Resources (DENR) to prepare a Coastal Habitat Protection Plan for the long-term enhancement of fisheries associated with coastal habitats. The plan is to identify threats and provide recommendations for management actions to protect and restore habitats critical to North Carolina's coastal fishery resources. Once adopted by the Coastal Resources, Environmental Management, and Marine Fisheries commissions, the plan will help to ensure consistent actions among the commissions, as well as among their supporting DENR agencies.

The CHPP focuses on four goals for protection of coastal fisheries habitat: improve the effectiveness of existing rules and programs; enhance habitat and protect it from physical impacts; protect and enhance water quality; and identify, protect, and enhance "strategic" habitats. The CHPP is built around six basic habitats utilized by coastal fishery species: water column, shell bottom, submerged aquatic vegetation, wetlands, soft bottoms, and hard bottoms. Detailed information is provided on each habitat's description and distribution, ecological role and functions for finfish and shellfish resources, status and trends, threats, and management needs. Each of the three Commissions that adopt the CHPP will use it to develop coordinated coastal habitat protection strategies per the FRA requirements.

The CHPP area includes all waters flowing into North Carolina's coastal waters and the watersheds they drain, which are divided into 11 Management Units based on river basins. Plan development must take into account North Carolina's weather and climate, geology, and hydrology, as well as the effects of human population and land use. The current status of fisheries may be an indicator of the potential impacts of habitat degradation and loss, and the CHPP recommendations are intended to provide guidance that will support productive fisheries for future generations.

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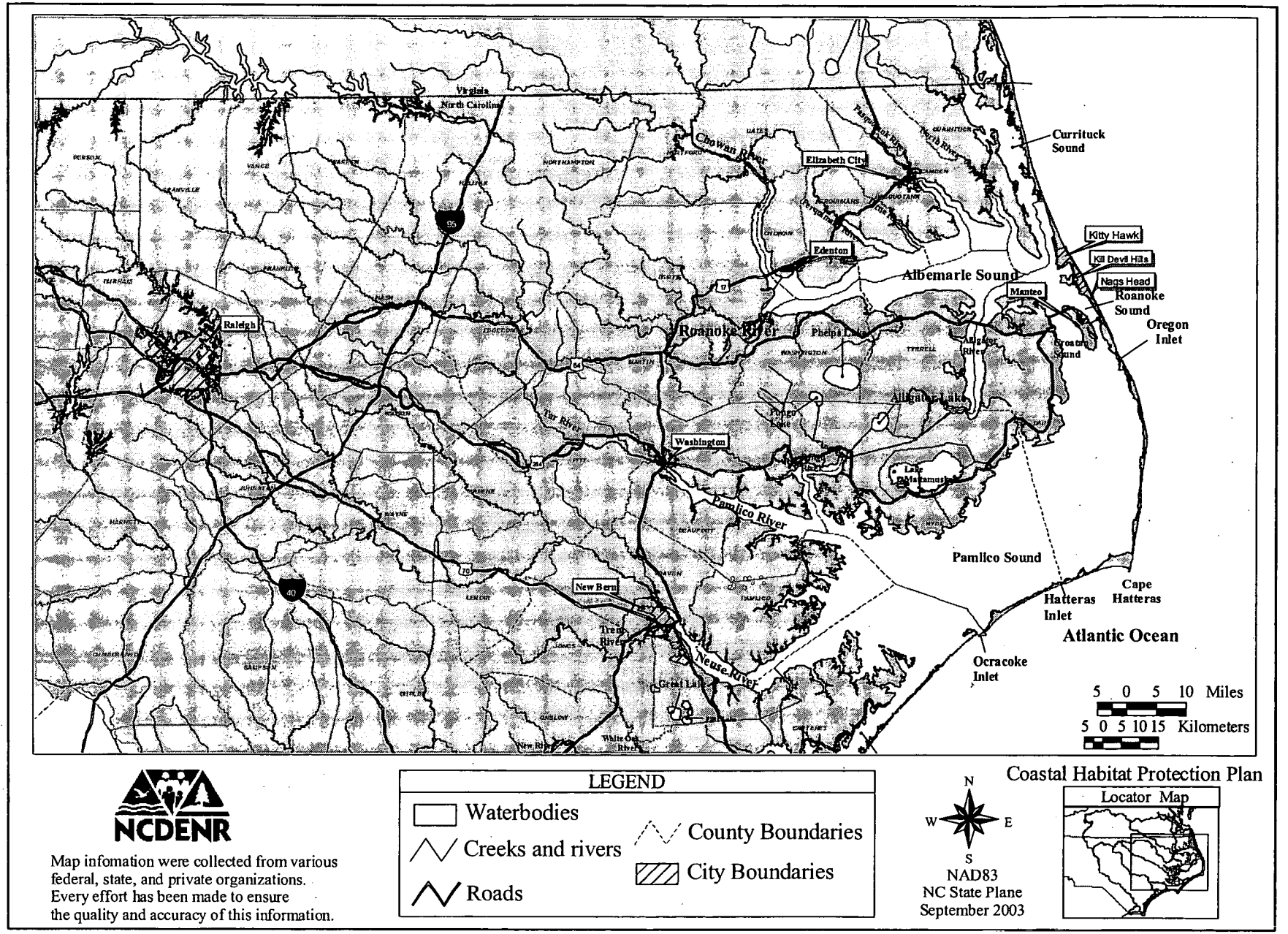
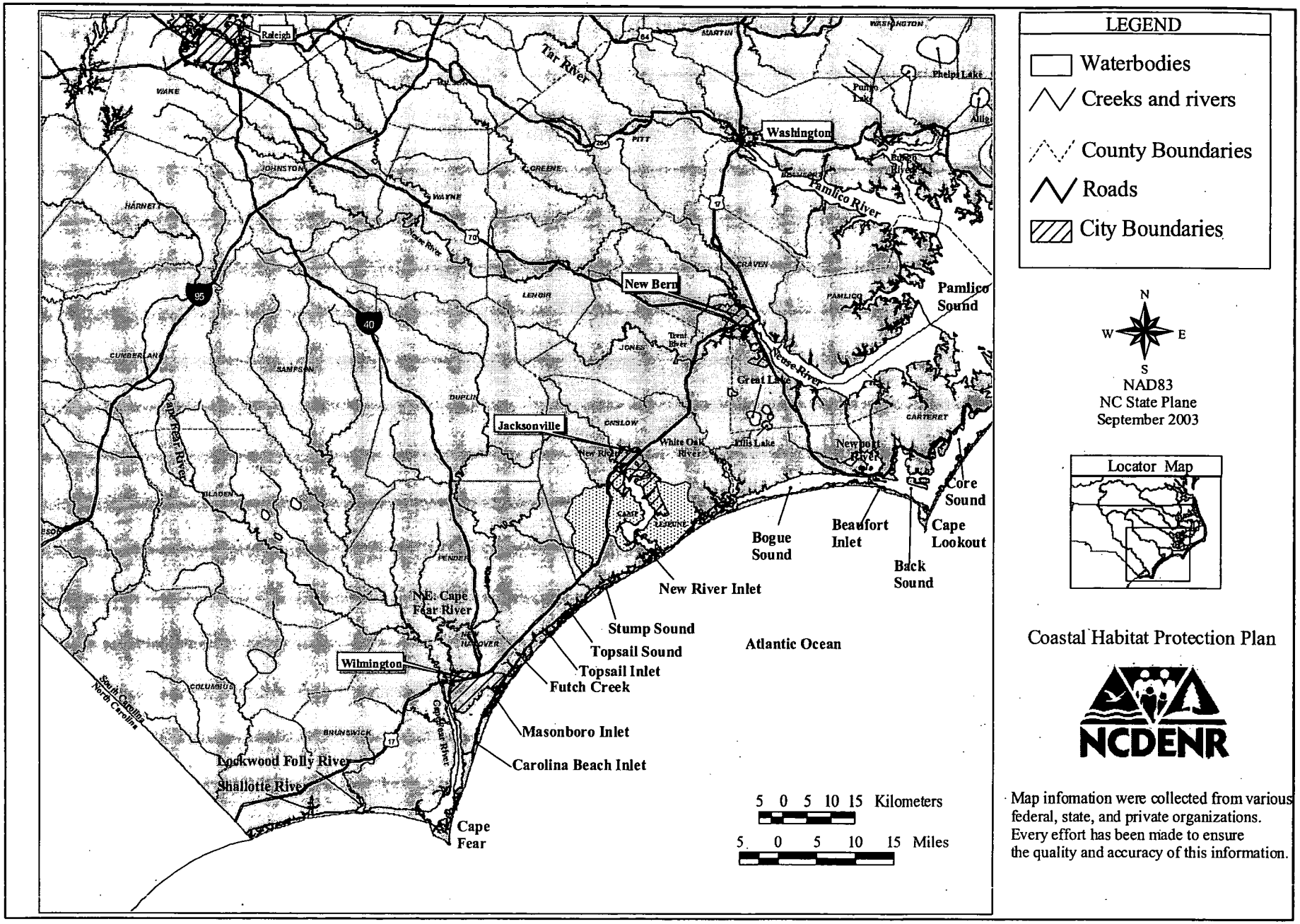
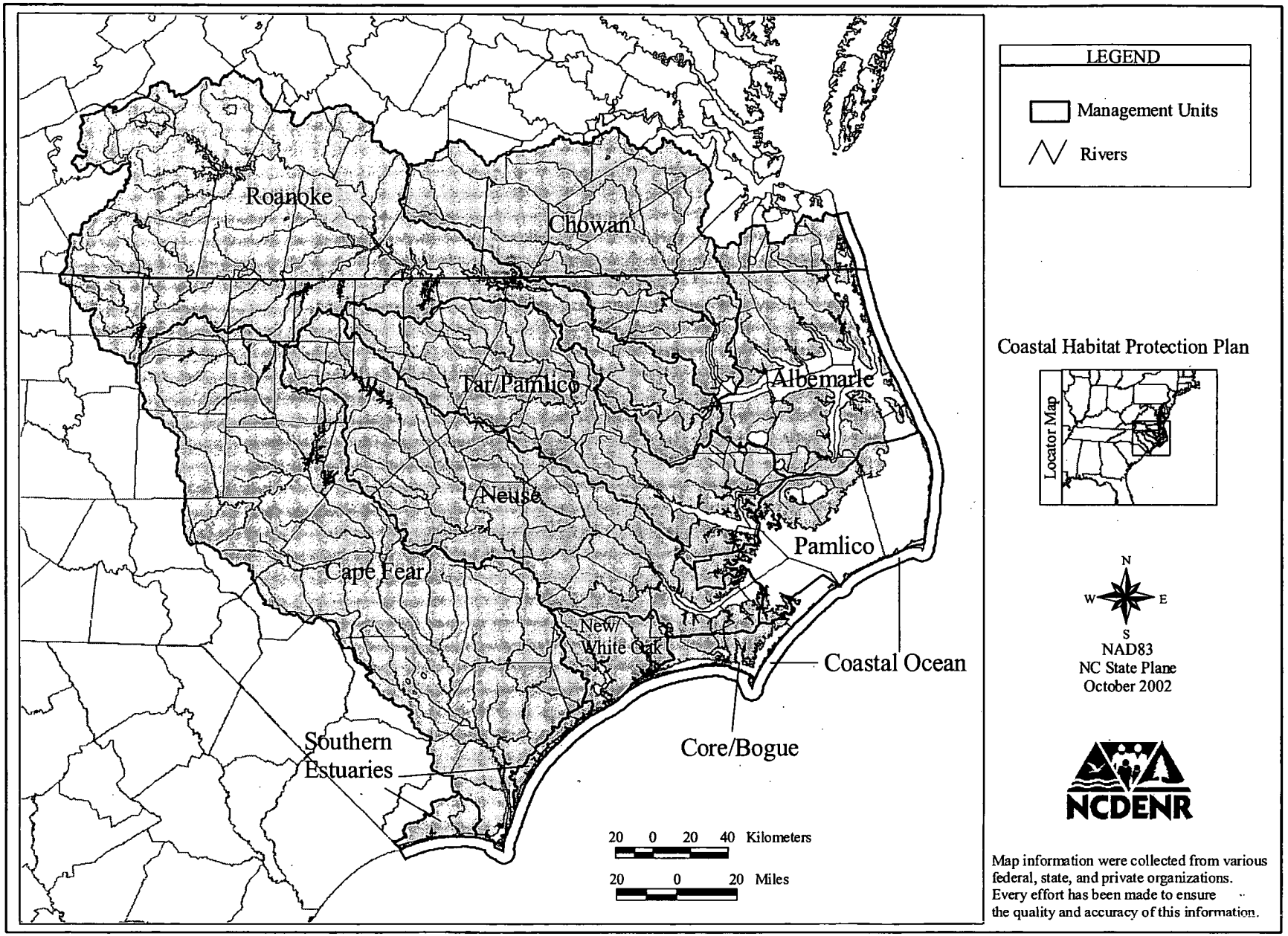


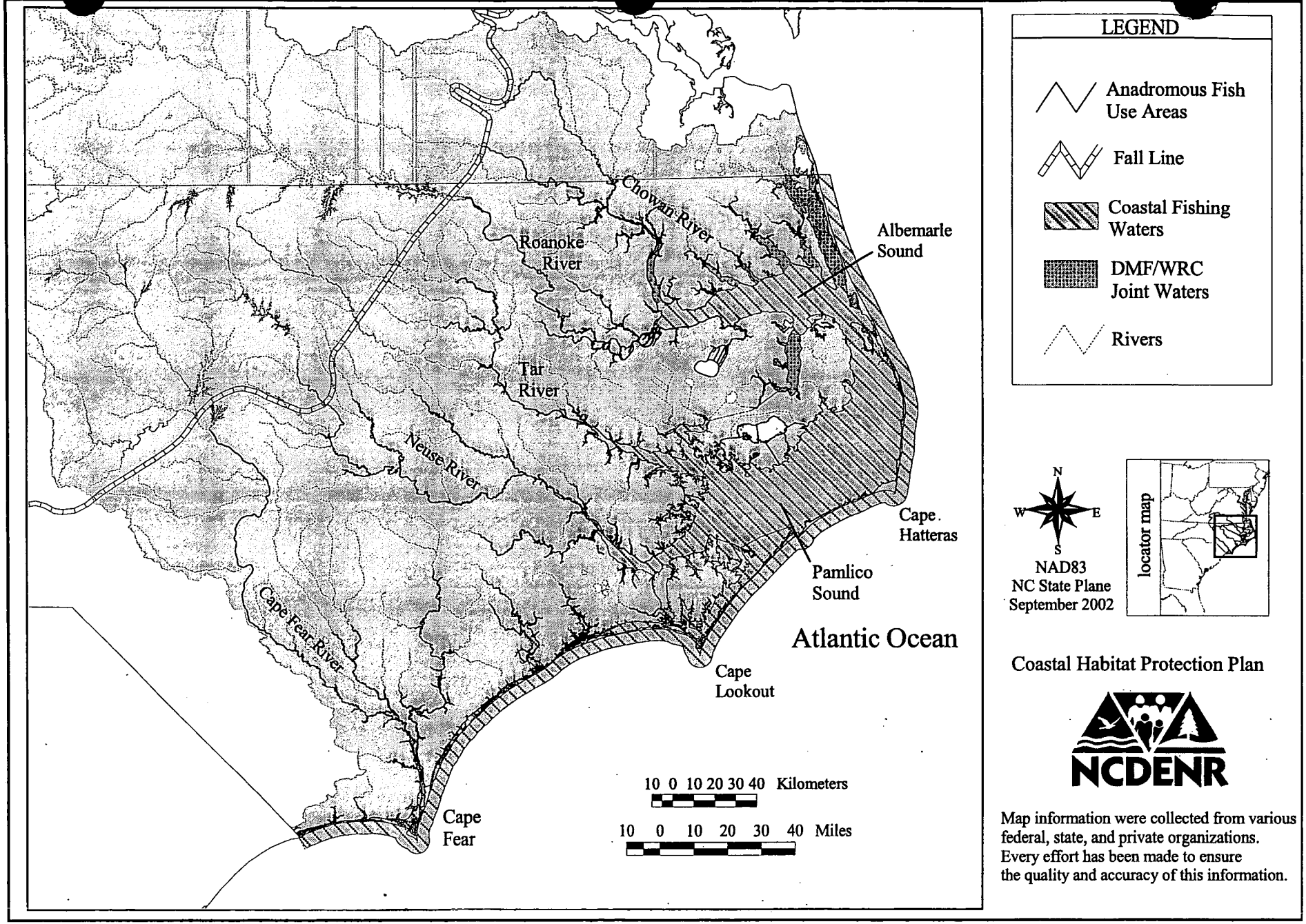
Map 1.1a. Hydrographic features in coastal North Carolina. (Data from 1:100,000 scale USGS topographic maps).



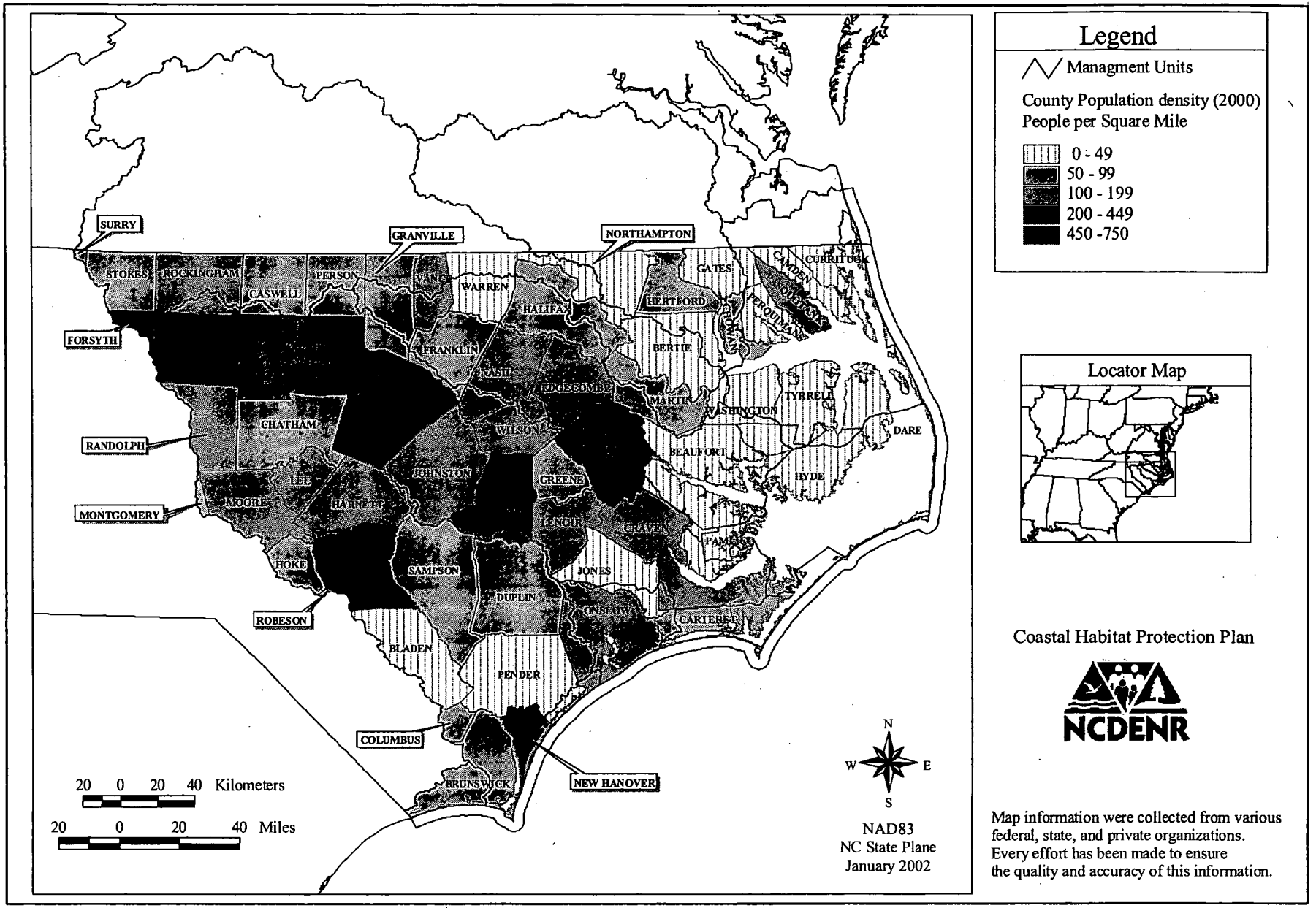
Map 1.1b. Hydrographic features in coastal North Carolina. (Data from 1:100,000 scale USGS topographic maps).



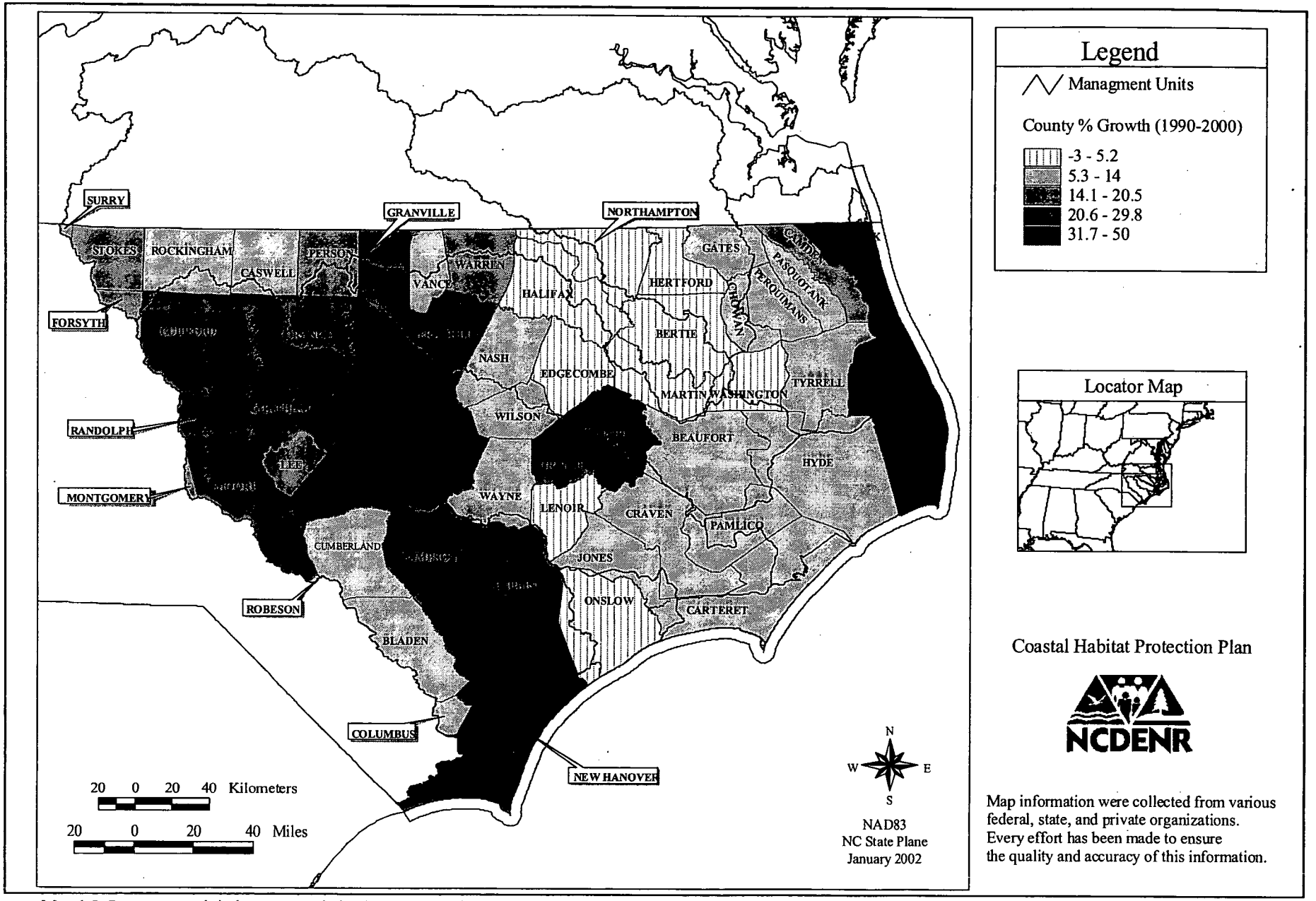
Map 1.2. North Carolina Coastal Habitat Protection Plan management unit boundaries



Map 1.3. Jurisdictional and effective boundaries of coastal fish habitat in North Carolina. [Anadromous fish use areas from North Carolina Division of Marine Fisheries data and Baker (1968), and fall line from Menhinick (1991)].



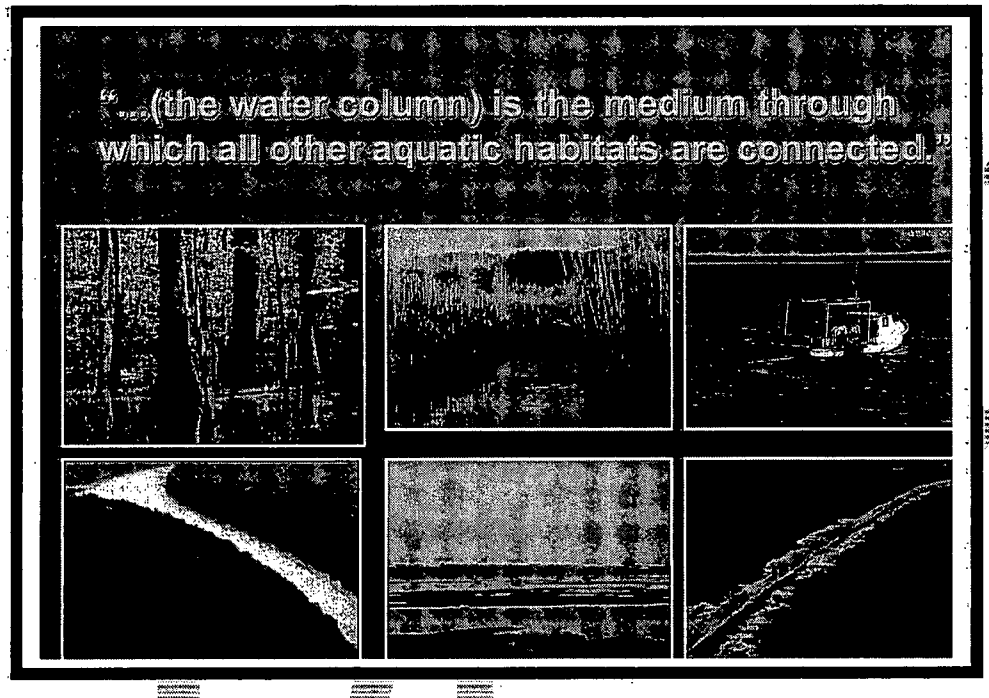
Map 1.4. Density of human population in the Coastal Habitat Protection Plan area of North Carolina (2000).
(Data from the North Carolina Office of State Budget and Management (August 2001). Persons/mi2 includes only land areas.)



Map 1.5. Percent growth in human population by county in the Coastal Habitat Protection Plan area during 1990-2000. [Data from the North Carolina Office of State Budget and Management (August 2001)].

CHAPTER 2. WATER COLUMN

The quality of our coastal waters affects fish species diversity, production, and distribution but also living fish habitats, such as submerged aquatic vegetation and oyster beds (shell bottom). Water quality in the water column is a key factor that links fish, habitat, and people. That linkage is affected by growing development pressures along our coast as well as far inland, making the protection and enhancement of water quality for fisheries resources a challenging task. Determining the best course of action for enhancing water quality requires detailed knowledge of the water quality characteristics that various species require throughout their life cycle, along with the status, trends, and threats of those characteristics.



Water column habitat is defined in this plan as "the water covering a submerged surface and its physical, chemical, and biological characteristics." Differences in the chemical and physical properties of the water affect the biological components of the water column - including fish distribution. Water column properties that may affect fisheries resources include temperature, salinity, dissolved oxygen (DO), total suspended solids, nutrients (nitrogen, phosphorus), and chlorophyll *a* (SAFMC 1998). Other factors, such as depth, pH, water velocity and movement, and water clarity, also affect the distribution of aquatic organisms.

Coastal fisheries habitat may be found both in waters that are privately owned and in waters that are held by the state for the use of the public. Private waters include many lakes, ponds and some small streams. Public trust waters include all navigable waters and the lands beneath them, from the mean high water mark or mean water level, within state jurisdiction. The public has the right to use public trust waters for travel, recreation, and other activities (i.e., commercial and recreational fishing) that do not degrade acceptable public uses or biological and physical functions of those water bodies [CRC rule 15A NCAC 07H .0207(a)-(c)].

The Environmental Management Commission (EMC) classifies surface waters according to the best use

of the water (e.g., water supply, aquatic life protection, and swimming) and adopts water quality standards intended to protect the designated uses. Supplemental surface water quality classifications provide additional protection to waters that have special physical, chemical, biological, or use characteristics. These standard and supplemental classifications are depicted in Maps 2.1a-b and 2.2a-b, and are also described below.

Primary Surface Water Classifications:
C or **SC***—Supporting secondary recreation (including swimming on an unorganized or infrequent basis); wildlife; fishing; fish and other aquatic life propagation and survival; agriculture and any other usage, except for primary recreation or water supply.
B or **SB***—Supporting primary recreation (including swimming on an organized or frequent basis) and all uses specified for Class C or SC (and not water supply use).
WS—Water supply in natural and undeveloped watersheds (WS-I), predominantly undeveloped watershed (WS-II), low to moderately developed watersheds (WS-III), and moderately to highly developed watersheds (WS-IV), plus former or industrial potable water supplies or waters upstream and draining to WS-IV waters (WS-V).
SA*—Commercial shellfishing waters and all Class SC and SB uses.
* = saltwater classification

Supplemental Surface Water Classifications:
ORW (Outstanding Resource Waters)—Unique and special waters that are of exceptional state or national recreational or ecological significance which require special protection to maintain existing uses. These waters have been identified as having excellent water quality in conjunction with at least one important resource value.
HQW (High Quality Waters)—Waters rated as excellent by DWQ; Primary Nursery Areas or other functional nursery area; Native and Special Native Trout Waters and their tributaries; WS-I, WS-II and SA waters and waters for which DWQ has received reclassification to WS-I or WS-II.
NSW (Nutrient Sensitive Waters)—Waters needing additional nutrient management due to their being subject to excessive growth of microscopic or macroscopic vegetation.
SW (Swamp Waters)—Waters with low velocities and other characteristics different from adjacent waterbodies (generally low pH, DO, high organic content).
FWS (Future Water Supply)—Water designated for future water supply use.
TR (Trout Waters)—Waters protected for natural trout propagation and stocked trout survival.

The Marine Fisheries Commission (MFC) designates areas subject to commercial and recreational fishing regulations (Map 1.3). The MFC and the Wildlife Resource Commission (WRC) also designate areas with ecological functions vital to fish and shellfish production, such as nursery and spawning areas for finfish and crustaceans (Maps 2.3 and 2.4).

Nursery areas: Those areas in which for reasons such as food, cover, bottom type, salinity, temperature and other factors, young finfish and crustaceans spend the major portion of their initial growing season [MFC rule 15A NCAC 03N .0102 (a)].
Primary nursery area: Those areas of the estuarine system where initial post-larval development takes place. These areas are located in the uppermost sections of a system where populations are uniformly very early juveniles [MFC rule 15A NCAC 03N .0102 (b)].
Secondary nursery areas: Those areas of the estuarine system where later juvenile development takes place. Populations are usually composed of developing sub-adults of similar size which have migrated from upstream primary nursery areas to the secondary nursery area located in the middle portion of the estuarine system [MFC rule 15A NCAC 03N .0102 (c)].
[Inland] primary nursery areas: Those [inland] areas inhabited by the embryonic, larval, or juvenile life stages of marine or estuarine fish or crustacean species due to favorable physical, chemical or biological factors [WRC rule 15A NCAC 10C.0502].
Anadromous fish spawning areas: Those areas where evidence of spawning of anadromous fish has been documented by direct observation of spawning, capture of running ripe females, or capture of eggs or early larvae [MFC rule 15A NCAC 031 .0101 (b) (20) (C)].
Anadromous fish nursery areas: Those areas in the riverine and estuarine systems utilized by post-larvae and later juvenile anadromous fish [MFC rule 15A NCAC 031 .0101 (b) (20) (D)].

The MFC and WRC habitat designations generally include a complex of habitats, of which the water column is one component. These definitions and classifications of water column habitat and their associated regulatory jurisdictions provide the authority for management actions.

2.1. DESCRIPTION AND DISTRIBUTION

The water column is the dominant component and bonding element of the entire coastal aquatic ecosystem, integrating aquatic influences from both land and sea (15A NCAC 07H .0206 (b)). The coastal aquatic ecosystem is divided among several river basins draining into North Carolina's coastal area. Within a river basin, characteristics of the water column change markedly from the basin's extreme headwaters to the ocean. The primary variable that changes is salinity. Based on salinity variation, there are three major systems in coastal North Carolina: 1) fresh water, 2) estuarine, and 3) marine. To a large extent, differences in salinity determine the species found in coastal waters (Ross and Epperly 1985; Noble and Monroe 1991). Within each system, additional variation occurs as a result of water velocity, substrate, sediment transport, and depth.

Freshwater systems

Freshwater systems are generally considered to have salinity between 0 and 0.5 ppt (Cowardin et al. 1979, SAFMC 1998; Map 2.5a-b). Freshwater water bodies include rivers, creeks, lakes, and ponds.

Rivers and creeks

The characteristics of river and creek water depend on climate, geology, topography, and land cover. The coastal plain is relatively flat, with a basin slope of approximately one foot per mile (DWQ 1997a), higher in the southern portion and lower in the northern portion. Streams in the coastal plain are often slow flowing, with extensive swamps, bottomland hardwood forest, and marshes in their floodplains (DWQ 1997a). These streams are often acidic from high inputs of dissolved organic matter, a condition known as "dystrophy" (Wetzel 2001). These "blackwater" systems often have moderate phytoplankton production, but, given a source of human-generated nutrients and an open canopy, shallow blackwater streams can support dense phytoplankton blooms (Ensign and Mallin 2001; Mallin et al. 2001a). Dissolved oxygen and pH are also influenced by dystrophy. Where slow-moving water bodies drain wetlands with decaying vegetation, the water column has high concentrations of dissolved organic carbon (humic acids), low pH, and low dissolved oxygen (DO). Water column characteristics change as one moves from the river's headwater tributaries to its mainstem channel. Changes include a shift to increasing turbidity, depth (Sheehan and Rasmussen 1993), phytoplankton abundance, and flooding frequency. There also tends to be a decrease in particle size of organic matter (Vannote et al. 1980), an increase in the importance of floodplain wetlands (Junk et al. 1989), and more continuous flow in downstream areas.

Rivers and creeks also exhibit seasonal variations in stream flow, suspended particle concentrations, and water temperature. Average monthly discharge among all coastal river basins peaks in March, declines throughout the summer and fall, and gradually increases again around November (Figure 2.1). This discharge pattern also corresponds with low and high-salinity time periods in downstream estuaries. Flow variability also follows the general discharge pattern, with the highest variability during March. Heavy spring flows carry relatively high sediment loads, which, in combination with spring algal blooms, result in increased turbidity. Water temperatures are generally highest from June to September (25-27° C) and lowest during December - January (5-9° C) (Figure 2.1). From 1969 to 1999, annual discharge patterns within river basins appear to rise and fall on a 2-5 year cycle (Figure 2.2; see Map 2.6 for USGS stream gauge stations used).

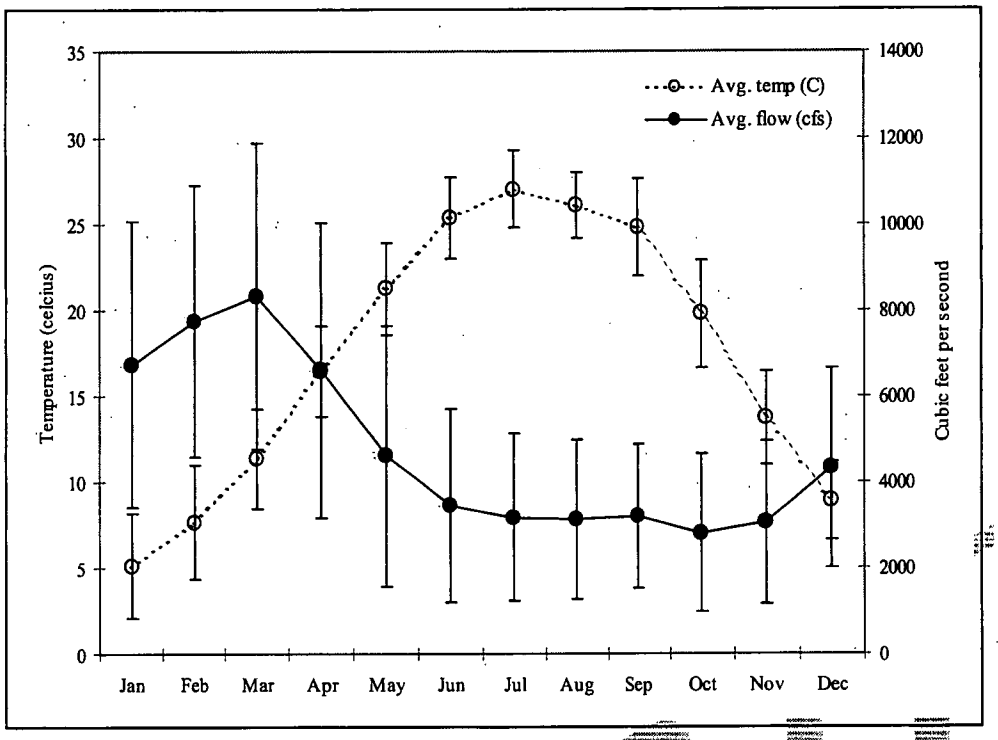


Figure 2.1. Average and standard deviation of monthly discharge (time period: 1969-1999, n = 1,464) and water temperature (time period: 1953-2001, data points per month = 52-123). *[Source: USGS hydrologic monitoring stations on the lower Roanoke, Tar, Neuse, and Cape Fear rivers, North Carolina. (Station locations are marked on Map 2.6.)]*

Five major riverine systems flow into North Carolina's coastal waters: Chowan, Roanoke, Tar-Pamlico, Neuse, and Cape Fear (Map 1.1). Smaller, coastal plain systems include the New and White Oak river basins, the blackwater rivers of the Pasquotank basin (Albemarle MU), and the coastal streams of the Lumber River basin (Southern Estuaries MU). Of the smaller systems, only the blackwater rivers of the Pasquotank basin (Albemarle MU) have a significant freshwater component. The New, White Oak, and coastal streams of the Lumber river (Southern Estuaries MU) basin are primarily estuarine.

The Chowan, Tar-Pamlico, Neuse, and Cape Fear Rivers are contained entirely within the coastal plain and piedmont regions, while the Roanoke River flows from the mountains to the coastal plain region. With the exception of the Albemarle, Chowan and Roanoke basins, which originate in Virginia, all are located entirely within North Carolina. The Cape Fear River is the only major river system that flows directly into the ocean. The other riverine systems all discharge into coastal estuaries behind barrier islands.

The WRC has designated most of the main stem of the Roanoke, Tar, Neuse, and Cape Fear rivers within its jurisdiction as Inland Primary Nursery Areas (Map 2.4). The WRC has also designated certain inland waters near the coast as PNAs based on recommendations by DMF. While there are few MFC designated nursery areas within inland fishing waters, DMF sampling data show many of freshwater tributaries function as anadromous fish spawning and nursery areas.

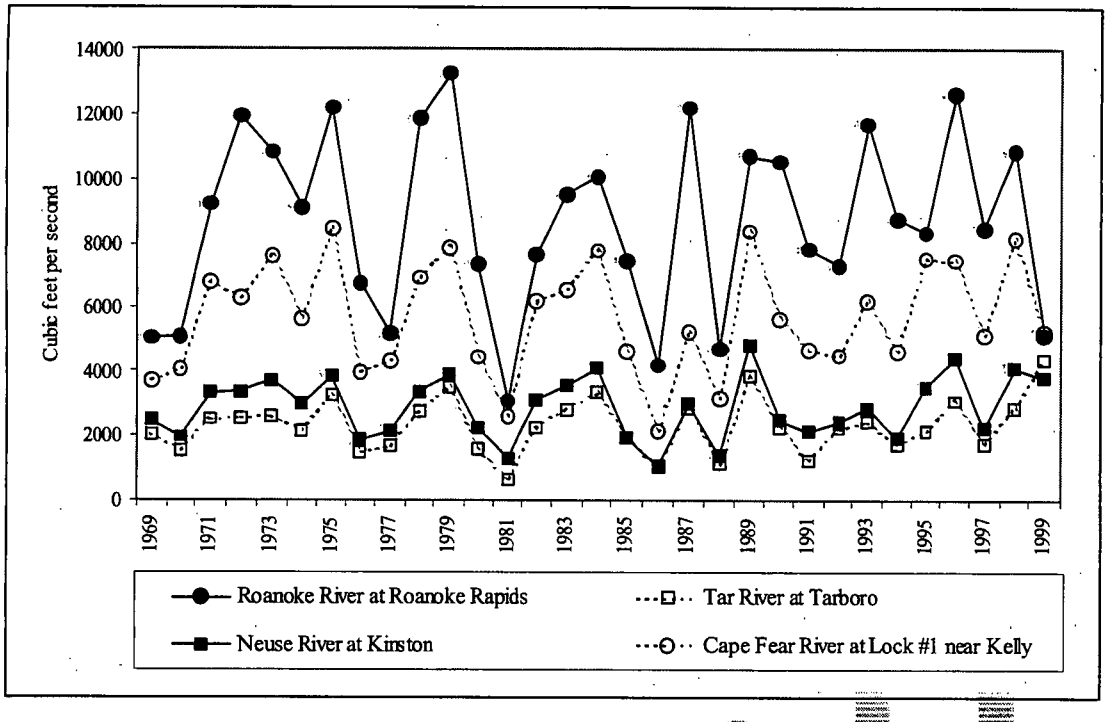


Figure 2.2. Average annual discharge in the Roanoke, Tar, Neuse, and Cape Fear rivers during 1969-2001 based on data from the USGS hydrologic monitoring stations. *(Station locations are marked on Map 2.6)*

Lakes and impoundments

The water column in lakes and ponds can be vertically stratified in temperature, DO, and related physical and chemical parameters. However, during strong winds or seasonal turnover (spring/fall), the water column's layers may become mixed so that there is less variability based on depth. Overall, water column characteristics in lakes depend on the lake's origin, underlying geology, and land cover in the watershed. Many natural lakes in North Carolina were formed by the solution of minerals in ground water (Menhinick 1991). They are shallow (maximum depth about 2 m) and generally circular (Crowell 1966). The Carolina Bays are an example of these systems. Most of these natural lakes, similar to coastal blackwater rivers and creeks, have low pH and are naturally dark in color from organic staining.

There are 16 natural lakes in North Carolina's coastal plain (Menhinick 1991). There are many other small natural ponds and impoundments. However, there are only a few lakes whose connection with coastal waters is unobstructed by a dam or other impassable feature. The lakes that directly connect to coastal waters include Alligator Lake, Great Lake, Ellis Lake, and Pungo Lake (Map 1.1). Lake Phelps has a sporadic connection to coastal water via several man-made canals. Except for Lake Phelps, which is designated as a State Park, these natural lakes are largely under federal government jurisdiction in Croatan National Forest and national wildlife refuges. The feeder creeks and canals flowing into them are partially under state and private ownership.

The natural coastal lakes range in size from 2,789 (Great Lake) to 41,084 acres (Lake Mattamuskeet). Lake Mattamuskeet, the largest natural lake in North Carolina, connects to coastal waters through several man-made drainage canals - a connection demonstrated by the frequent occurrence of adult blue crabs in the lake (Rulifson and Wall 1998). The canals draining Lake Mattamuskeet have historically supported significant anadromous alewife spawning runs that have shown signs of resurgence in recent years (Epperly 1985; Winslow et al. 1983b; R. Rulifson, ECU, pers. com., 2002). There are research and

management activities currently underway to maintain and enhance the connections between Lake Mattamuskeet and other lakes on the Albemarle-Pamlico peninsula and coastal waters to benefit coastal fishery species utilizing these waters (R. Rulifson, ECU, pers. com., 2002).

Estuarine systems

Water column characteristics in estuaries are a dynamic mix of adjacent riverine and marine systems. Estuaries occupy the transition between freshwater and marine systems, where circulation patterns are determined by prevailing winds, buoyancy-driven flows, and lunar tides. Estuarine-dependent species comprise more than 90% of North Carolina's commercial fisheries landings and over 60% of the recreational harvest (by weight) (from DMF annual commercial and recreational fisheries landings data). This Plan uses three salinity zones[1] for simplicity and consistency with established definitions (Bulger et al. 1993):

- low-salinity (0.5-5 ppt) (also known as oligohaline)
- moderate-salinity (5-18 ppt) (also known as mesohaline)
- high-salinity (18-30 ppt) (also known as polyhaline)

Boundaries between salinity zones change in response to water flow, weather conditions, and tidal fluctuations. Flooding can result in fresh water expanding seaward over denser masses of water in the "mixing zone" (0.5-25 ppt). Conversely, dry weather can result in seawater advancing into typically freshwater areas. Less drastic are tidal changes resulting in periodic additions of seawater to the mixing zone. The mixing zone receives coarser-grained sediments, saline water, and migrating organisms from the flood tide, while the ebb tide brings finer-grained sediment, fresh water, nutrients, and organic matter (SAFMC 1998). This dynamic system is mediated by a series of inlets along a chain of barrier islands separating the ocean from the adjacent estuary. Salinity in estuaries also varies in accordance with the seasonal pattern of river input depicted in Figure 2.1. Salinity within estuaries is generally lowest from December to early spring and highest from late spring to early fall (Orlando et al. 1994). Similarly, water temperatures are lowest during mid-winter and highest during the summer.

Pilkey et al.'s (1998) analysis of North Carolina's shore and barrier islands revealed much about the variation in salinity and tidal amplitude along North Carolina's coast due to the slope of the coast. Steeper slopes with relatively short basin profiles result in less river input and greater tidal amplitude from increasing oceanic influence. In these areas, numerous inlets develop along short barrier islands protecting narrow, back barrier sounds. Small rivers draining these areas form trunk estuaries (drowned river estuaries perpendicular to the coast) where low volumes of organic-stained fresh water mix with seawater. As a result, small trunk estuaries exhibit a distinct salinity gradient from upstream fresh waters to the ocean, while narrow back barrier sounds maintain high salinities from regular lunar tides. Other areas have gentler slopes and relatively long basin profiles, with more river input and lower tidal amplitude from reduced seawater intrusion; such areas have few inlets and long barrier islands protecting extensive back barrier sounds with highly variable salinity. Large rivers flowing into the sounds form trunk estuaries with very low salinity.

Strong winds are a major component of water movement in large, irregularly flooded estuarine systems. At locations relatively isolated from inlets in the Albemarle-Pamlico Sound system, the effects of lunar tides are small (a few inches at most) whereas those of wind tides can be much greater (especially during storms). A strong wind tide often floods the windward shore, exposing bottom along the leeward shore. This situation can also result in colder, nutrient-rich water welling up along the leeward shore. Wind tides also affect salinity in the estuary, by pushing high-salinity water from the ocean toward the estuary.

[1] A five-zone scheme was used on existing salinity maps from NOAA: 1) 0-0.5 ppt (fresh water), 2) 0.5-5 ppt (low-salinity), 3) 5-15 ppt (moderate-salinity), 4) 15-25 ppt (high-salinity), and 5) >25 ppt (highest salinity) (Map 2.6). The low-salinity zone used in this document covers NOAA's zone (2) and the moderate-salinity zone covers NOAA's zone (3). The high-salinity zone is a combination of NOAA's high (4) and highest (5) salinity zones (15 to >25 ppt).

For example, one model of the Albemarle-Pamlico system indicates that southwesterly winds cause the formation of low-salinity plumes from Oregon Inlet seaward while wedge-shaped high-salinity plumes enter Pamlico Sound from Hatteras and Ocracoke Inlets (Xie and Pietrafesa 1989). This hydrodynamic model predicted the opposite effect during cold fronts, when northwesterly winds caused a wedge-shaped, high-salinity plume on the sound side of Oregon Inlet.

Circulation, by wind or lunar tide, can increase DO levels in bottom water. But while lunar-driven systems receive regular circulation, wind-driven systems depend on variable weather conditions (Leuttich et al. 1999; Borsuk et al. 2001). Irregular mixing can result in stratification of the water column and hypoxia or anoxia during periods of warm, calm weather. Anoxia can also develop with light winds if a strong vertical salinity gradient is present, especially during westerly winds.

Large back barrier sounds and trunk estuaries

Large back barrier sounds occur north of Cape Lookout and include Albemarle, Currituck, Croatan, Roanoke, and Pamlico sounds (Map 1.1). Large trunk estuaries flowing into these northern sounds include the Alligator, Pungo, Pamlico, and lower Neuse rivers. The Albemarle-Pamlico sound system (not including Core Sound) connects with nearshore ocean waters through Oregon Inlet in the north, and Hatteras and Ocracoke inlets in the south. These large sounds are of prime importance for North Carolina's fishery productivity. Small tributary estuaries in west and northwest Pamlico Sound provide important fish nursery habitat. Outstanding Resource Waters within these northern estuaries include the Alligator River and an area extending offshore from Swan Quarter National Wildlife Refuge. The Alligator River is also classified as Swamp Water. Nutrient Sensitive Waters include the Pamlico, Neuse and Pungo rivers as well as southwest Pamlico Sound (Map 2.2a-b).

The Albemarle-Pamlico system has a long flushing period (about 272 days) relative to the other North Carolina estuarine systems. Since the large trunk estuaries flowing into Pamlico Sound flush more rapidly than Pamlico Sound, the sound acts as a settling basin for sediments and nutrients (Giese et al. 1979). Near inlets in the Albemarle-Pamlico system, lunar tides are the dominant influence on salinity variation and water column mixing (Orlando et al. 1994). Elsewhere, wind mixing is the dominant factor. Management of river flows can also affect salinity. Releases from Roanoke Rapids Lake and other Roanoke River reservoirs during low-flow periods are generally effective in keeping higher salinity waters out of Albemarle Sound (Giese et al. 1979), except during extreme droughts. Seasonal variation in fresh water has a major effect on salinity (Map 2.5a-b). Different salinity layers can occur in estuaries lacking a direct connection to the ocean, such as the Cape Fear and Northeast Cape Fear rivers (Orlando et al. 1994). Different salinity layers can also occur in Albemarle Sound during period of calm or high freshwater inflow (Steel 1991). Although the major factors driving large-scale salinity change are fairly simple in estuaries, the factors underlying smaller-scale horizontal and vertical variation can be very complex, both spatially and temporally.

Small back barrier sounds and trunk estuaries

South of Cape Lookout, back barrier sounds and trunk estuaries begin to narrow as the basin slope becomes steeper. Starting at Core Sound in the north, small back barrier sounds continue south with Bogue Sound and some very narrow sounds located between the small trunk estuaries of the New and White Oak estuaries and the more riverine lower Cape Fear River. Some of these smaller sounds are Stump Sound, Topsail Sound, Masonboro Sound, and Myrtle Grove Sound (Map 1.1). Other small trunk estuaries include the Newport and North rivers along Bogue and Back sound. These small back barrier and trunk estuaries contain numerous designated nursery areas and Outstanding Resource Waters (Map 2.3a-b). The only Nutrient Sensitive Water among small back barrier sounds and trunk estuaries is the upper New River (DWQ, unpub. data).

In Bogue and Back sounds, lunar tides are the dominant influence on salinity and water column mixing

(Orlando et al. 1994) and flushing rates are faster than in the larger sounds. Winds and freshwater inflow are secondary influences on salinity variation, but may cause major seasonal differences in salinity.

During late winter (January-March) and summer (June-August), surface and bottom salinities are only weakly stratified in Bogue Sound. Large seasonal differences in surface salinity occur. The very small back barrier sounds found in the Southern Estuaries MU have high salinities year-long. In upper sections of the New River, freshwater inflow is the dominant influence on salinity (Orlando et al. 1994). In the lower New River estuary, lunar tides have the greatest influence on salinity variation. Spatial and temporal salinity variation in the New and White Oak rivers can be seen in Map 2.5a-b.

Cape Fear River estuary

The Cape Fear River is the only major river in North Carolina flowing directly into the ocean, making the Cape Fear River estuary unique among North Carolina estuaries. The lower river is essentially a large trunk estuary, but with a much steeper gradient in salinity than large trunk estuaries in the northern part of the coast. The upper Cape Fear estuary is composed almost entirely of low-moderate salinity fish nursery areas (Map 2.5a-b).

In the upper Cape Fear River estuary (north of Wilmington), seasonal patterns of freshwater inflow have the greatest influence on salinity (Orlando et al. 1994). Discharge from the principal rivers in the Cape Fear basin is three times greater during the high-flow period than during the low-flow period. Short-term increases in freshwater discharge also influence salinity in the upper estuary, displacing bottom water downstream and homogenizing the water column (Giese et al. 1979). In the lower and middle estuary, lunar tides have the dominant effect on salinity variation. Due to the relatively high discharge and low volume of the Cape Fear estuary, the flushing rate is approximately 14 days (Table 2.1), the most rapid turnover among major estuaries in North Carolina. Map 2.5a-b depicts the seasonal salinity in the Cape Fear River system.

Table 2.1. Hydrologic and hydrodynamic characteristics of major estuaries in North Carolina. *(Source: Basta et al. 1990)*

Estuary	Drainage area (mi^2)	Surface area (mi^2)	Avg. depth (ft)	Volume (billion ft^3)	Avg. daily freshwater input (100 cfs)	Flushing period (days)
Albemarle-Pamlico sounds*	29,600	2,949	13	1,081	460	272
Pamlico-Pungo River	4,300	166	9	44	46	111
Neuse River	5,600	173	12	55	62	103
Bogue-Core sounds and White Oak River	700	102	5	13	13	116
New River	500	32	6	5	8	72
Cape Fear River	9,100	38	11	12	101	14

* Includes Core Sound NOTE: flushing period = volume / average daily freshwater input

Marine systems

Marine systems are defined as open ocean waters overlying the continental shelf and its associated high-energy coastline where salinities exceed 30 ppt (Cowardin et al. 1979). This Plan addresses the ocean waters within the State's territorial jurisdiction, which extends three nautical miles offshore.

The effects of tides and bottom friction are most evident near inlets and along the shoreline. Tidal amplitude along North Carolina's ocean shoreline is greatest in the southern coastal area where the

continental shelf is widest. The average tidal height in North Carolina is approximately 2 ft (0.6 m) near Cape Hatteras and 4.3 ft (1.3 m) near Cape Fear. A considerable amount of mixing is provided by the turbulence of twice-daily tides.

The effects of freshwater runoff are also most apparent near inlets and river mouths. Salinities are lowest in coastal marine systems during periods of maximum freshwater runoff in April. The Cape Fear River is a major source of direct river runoff into southern North Carolina's ocean waters. Low-salinity waters also enter the ocean through the multiple inlets along the coast and from southerly flow of Chesapeake Bay waters along the Outer Banks. The plume of lower-salinity Chesapeake Bay water is pushed southward by the southerly-flowing coastal frontal zone (CFZ).

Winds are important in all layers of the marine water column. Wind stress can alter or reverse the generally southern pattern of flow in the CFZ (Blanton et al. 1999). Winds can also mix and move water masses inshore. In the mid-Atlantic, waters from Gulf Stream intrusions move across the shelf at a rate of approximately 2-3 mi/day (3-5 km/day), and parallel to the coast at a rate of approximately 3-9 mi/day (5-15 km/day) (Hare et al. 1999). Georgian shelf waters flow into the Carolina Capes region during periods of persistent southwesterly winds, while Virginian coastal waters flow south across Diamond, and occasionally Lookout, shoals during periods of persistent northerly winds (Pietrafesa 1989). Current and wind patterns will have a strong effect on the recruitment and retention of various fish larvae from different offshore areas.

Major oceanic currents off North Carolina are the Gulf Stream and Virginia Coastal Labrador current. The warm, north-flowing Gulf Stream and cool, south-flowing Virginia Coastal Labrador current meet near Cape Hatteras, separating mid- and south Atlantic waters. The position of these major water masses is clearly seen in sea surface temperature data from satellite imagery (Map 2-7). Warm Gulf Stream waters tend to elevate temperatures and salinities in the water column south of Cape Hatteras (Menzel 1993). The cool, lower salinity Virginia Current runs along the northern shore of the Outer Banks, and tends to lower temperature and salinity of the water column (Pietrafesa 1989). Temperatures on the inner shelf are uniform throughout the water column in the fall and winter. During summer, inner shelf waters are often stratified (Menzel 1993). Gulf Stream waters are the transport mechanism for many larval fish species, nutrients, and phytoplankton into North Carolina's shelf waters (Govini and Spach 1999). The red tide episode that occurred in North Carolina coastal waters in 1987 was attributed to a Gulf Stream water intrusion, carrying the toxic dinoflagellate *Ptychodiscus brevis* (Tyler 1989).

Shoals extending roughly perpendicular from shore accompany capes and inlets along North Carolina's coastal ocean. Oceanic currents interacting with these shoals create upwellings of nutrient-rich bottom water. There is also a strong upwelling along the beaches north of Oregon Inlet during the summer caused by southwest winds, resulting in surface water temperature changes of 10° F (5.5°C) in one or two days. In offshore areas, the interaction of frontal zones and bottom topography can often result in nutrient-rich upwellings. Upwellings also recycle nutrients locked under a strong halocline. The most probable locations of upwellings and their associated blooms are around Cape Hatteras. Upwellings, associated currents, and winds can also transport phytoplankton and floating *Sargassum* weed (from the Sargasso Sea) into nearshore coastal waters.

Habitat requirements for aquatic life

Unlike other fish habitats, the water column will persist regardless of environmental conditions. However, the quality of the water column may not be suitable to support certain fish species or ecological functions. Fish and invertebrate species occur where physical and chemical characteristics (i.e., temperature, DO, salinity, clarity) suit their physiological requirements. The following paragraphs discuss the differentiation of fish community structure along important physical and chemical gradients in coastal North Carolina.

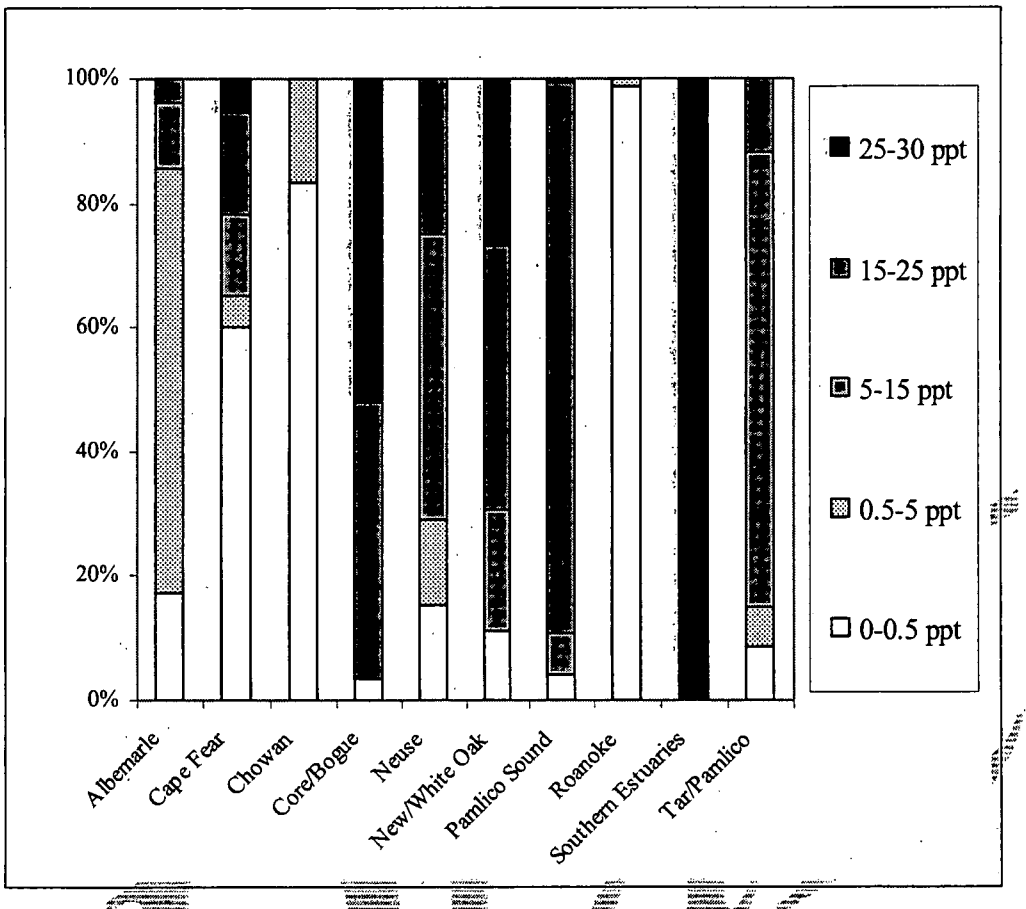


Figure 2.3. The relative proportion of average salinity zones within CHPP management units (excluding the coastal ocean). *[Source: NOAA's 1:100,000 scale salinity mapping (Coastal Ocean Resource Assessment Program). The area for 0-0.5 ppt includes only mainstem rivers and lakes in the management unit.]*

Salinity

The proportion of the different salinity-based systems within each CHPP management unit varies (Table 2.2). The Albemarle, Chowan, and Roanoke MUs are primarily freshwater and low-salinity systems, whereas Core/Bogue, Coastal Ocean and Southern Estuaries MUs are primarily high-salinity estuarine or marine systems (Figure 2.3). The salinity characteristics of any given estuary are a major determinant of aquatic community composition.

Salinity is among the key factors shaping fish communities in North Carolina estuaries (Ross and Epperly 1985; Noble and Monroe 1991). Some aquatic species are capable of tolerating large variations in salinity (blue crab), while others are capable of living in only a narrow salinity range (i.e., black sea bass). Salinity has a major role in the distribution of aquatic species (Szedlmayer and Able 1996). A partial list of important fish species in North Carolina coastal waters is shown in Table 2.3. Species are organized by salinity zones of spawning and nursery areas to give an indication of where species occur in coastal waters.

In low-salinity areas of the Albemarle-Pamlico system, the fish community is dominated by freshwater and anadromous species (Table 2.3). In late winter, river herring (blueback herring and alewife), striped

bass, Atlantic sturgeon, and other anadromous species migrate from the ocean and lower estuary to spawn upstream in freshwater areas. After spawning, the adults migrate back to the lower estuary or oceans, while the juveniles spawned in spring begin their seaward migration in late fall. This pattern holds for all the rivers in eastern North Carolina (Sholar 1975; Marshall 1976; Sholar 1977; Fischer et al. 1979; Hawkins 1980). The Albemarle-Pamlico system also has a resident population of striped bass that contribute little to the ocean migratory stock (Hassler et al. 1981; DMF 2003b).

Table 2.2. Area of average salinity zones in North Carolina Coastal Habitat Protection Plan management units (excluding the coastal ocean). *[Source: NOAA's 1:100,000 scale salinity mapping (Coastal Ocean Resource Assessment Program)]*

	Freshwater	Estuarine Salinity Zones				Total estuarine
Management unit	0-0.5 ppt	0.5-5 ppt	5-15 ppt	15-25 ppt	25-30 ppt	acres
Albemarle	113,081	450,036	70,750	24,533	0	545,320
Cape Fear	38,934	3,364	8,521	10,580	3,574	26,039
Chowan	43,082	8,609	0	0	0	8,609
Core/Bogue	6,076	0	23	74,386	87,513	161,921
Neuse	20,904	18,648	62,156	33,863	0	114,667
New/White Oak	4,239	1	7,520	16,369	10,319	34,210
Pamlico Sound	42,842	97	71,921	939,104	7,651	1,018,772
Roanoke	138,821	2,006	0	0	0	2,006
Southern Estuaries	0	0	0	5	15,248	15,253
Tar/Pamlico	10,694	7,832	89,950	14,616	0	112,397
TOTAL	**418,673**	**490,593**	**310,840**	**1,113,455**	**124,305**	**2,039,194**

In the Albemarle-Pamlico system, striped bass and American shad primarily use the Roanoke, Tar, and Neuse rivers (Steel 1991). River herring spawn in these rivers as well as most of the smaller tributaries of the Albemarle Sound system and the canals connecting Lake Mattamuskeet with coastal waters. River herring are also present in riverine waters south of the Albemarle-Pamlico system, where they have been studied in the New and White Oak rivers (Sholar 1975) and Cape Fear River (Sholar 1977; Fischer 1979; Rulifson et al. 1982).

During spring and summer, juvenile and adult estuarine species spawned in high-salinity estuarine waters (i.e., blue crab, red drum, weakfish) or the nearshore ocean (i.e., Atlantic menhaden, Atlantic croaker, spot, southern flounder) occupy the low-salinity zone (Table 2.3). There are also some resident species that complete their entire life cycle in the low-salinity zone. Residents include estuarine species like bay anchovy but are dominated by freshwater species, such as white perch, yellow perch, catfishes, sunfishes, and minnows (Keefe and Harriss 1981; Copeland et al. 1983; Epperly 1984). Prominent species in this resident group include the spring-spawning white perch and white catfish (Keefe and Harriss 1981). Both species use the entire Chowan River and other areas as nursery habitat, but generally occupy deeper areas during winter (Hester and Copeland 1975). The low-salinity zone is also occupied by the catadromous American eel.

In moderate- and high-salinity estuarine zones, the young of offshore winter and spring spawners, such as Atlantic menhaden, spot, and Atlantic croaker, predominate (Table 2.3; refer to Nursery function section). Common, year-round residents of the nearshore marine zone include bottom fish such as black sea bass, gag, kingfishes, dogfish sharks, and summer flounder, along with more pelagic species like Spanish mackerel, king mackerel, cobia, silversides, and bluefish. Juveniles and adults of these species are also common in the high-salinity estuarine zone (NOAA 2001). Many high-salinity estuarine species are also found in the nearshore ocean (i.e., red drum, spotted seatrout, weakfish, black drum). During late fall and winter, the nearshore marine zone is flooded with adult offshore spawning estuarine species like southern

Table 2.3. Spawning location/strategy ("spawning guild") and vertical orientation of some prominent coastal fish and invertebrate species.

SPAWNING GUILD		Vertical orientation[1]	
Common name	Scientific name	Demersal	Pelagic
ANADROMOUS FISH			
Alewife	***Alosa pseudoharengus***	**E**	**A, J, L**
American shad	***Alosa sapidissima***	**E**	**A, J, L**
Atlantic sturgeon	*Acipenser oxyrhynchus*	A, J, E	
Blueback herring	***Alosa aestivalis***	**E**	**A, J, L**
Shortnose sturgeon	*Acipenser brevirostrum*	A, J, E	
Striped bass	***Morone saxatilis***		**A, J, E, L**
CATADROMOUS FISH			
American eel	*Anguilla rostrata*	A	J, E, L
ESTUARINE SPAWNING AND NURSERY			
Bay anchovy	***Anchoa mitchilli***		**A, J, E, L**
Bay scallop	*Argopecten irradians*	A, J, E	L
Grass shrimp	*Palaemonetes spp.*	A, J, E	L
Hard clam	*Mercenaria spp.*	A, J	E, L
Mummichog	*Fundulus heteroclistus*	A, J, E	L
Oyster	*Crassostrea virginica*	A, J	E, L
Silversides	***Menidia spp.***	E	**A, J, L**
INLET & ESTUARINE CHANNEL SPAWNING / ESTUARINE NURSERY ARE			
Black drum	*Pogonias cromis*	A, J	E, L
Blue crab	*Callinectes sapidus*	A, J, E	L
Cobia	***Rachycentron canadum***		**A, J, E, L**
Red drum	*Sciaenops ocellatus*	A, J	E, L
Spotted seatrout	*Cynoscion nebulosus*	A, J	E, L
Weakfish	*Cynoscion regalis*	A, J	E, L
MARINE SPAWNING / LOW-HIGH SALINITY NURSERY			
Atlantic croaker	*Micropogonias undulatus*	A, J	E, L
Atlantic menhaden	***Brevoortia tyrannus***		**A, J, E, L**
Shrimp	*Penaeus spp.*	A, J, E	L
Southern flounder	*Paralichthys lethostigma*	A, J	E, L
Spot	*Leiostomus xanthurus*	A, J	E, L
Striped mullet	***Mugil cephalus***	**A**	**J, E, L**
MARINE SPAWNING / HIGH SALINITY NURSERY			
Black sea bass	*Centropristis striata*	A, J	E, L
Bluefish	***Pomatomus saltatrix***		**A, J, E, L**
Florida pompano	*Trachinotus carolinus*	A, J	E, L
Gag	*Mycteroperca microlepis*	A, J	E, L
Gulf flounder	*Paralichthys albigutta*	A, J	E, L
King mackerel	***Scomberomorus cavalla***		**A, J, E, L**
Kingfish	*Menticirrhus spp.*	A, J	E, L
Pinfish	***Lagodon rhomboides***		**A, J, E, L**
Sheepshead	*Archosargus probatocephalus*	A, J	E, L
Spanish mackerel	***Scomberomorus maculatus***		**A, J, E, L**
Summer flounder	*Paralichthys dentatus*	A, J	E, L

[Sources include Epperly and Ross (1986), Funderburk et al. (1991), Pattilo et al. (1997), SAFMC (1998), NOAA (2001), USFWS species profiles (see literature cited: reference titles beginning with Species life histories and Environmental Requirements), and DMF (unpub. data).]

[1] Demersal species live primarily in, on, or near the bottom while pelagic species occur primarily in the water column. A=adult, J=juvenile, L=larvae, and E=egg. **Bold species** have shown no particular preference for bottom types.

flounder, Atlantic croaker, spot, shrimp, striped mullet, and Atlantic menhaden. Florida pompano and Gulf kingfish are common species in the nearshore marine zone (primarily during the summer).

Temperature

Temperature patterns in North Carolina coastal waters affect fish distribution and functions. The North Carolina coast is located at the southern end of the cooler Mid-Atlantic Bight and the northern end of the warmer South Atlantic Bight, with Cape Hatteras marking the transition between these two major zones. As a result, some northern species are abundant in coastal ocean and estuarine waters north of Cape Hatteras, and some southern species are abundant south of Cape Hatteras. Predominantly northern fish include summer flounder, weakfish, spiny dogfish, and migratory striped bass, whereas primarily southern species include snappers, groupers, southern shrimps, and southern flounder.

In riverine systems, water temperature increases downstream from river headwaters to the estuary. The gradual increase in temperature is determined naturally by elevation, shading, and water velocity. Temperature in riverine systems is one of the primary cues for anadromous fish spawning. For example, spawning of striped bass in coastal rivers is triggered by increasing water temperatures in early spring (Funderburk et al. 1991).

The greatest variation in temperature within North Carolina's estuaries occurs from season to season and is highly influenced by high spring flows in the rivers feeding the estuary (Figure 2.1). Apart from very high river flows, the temperature of upper estuarine waters is most affected by air temperatures. For example, average monthly temperatures in the Pamlico River estuary range from 41°F (5°C) in January to 81°F (27°C) in July and August, but in extreme conditions may range from 32° to 86°F (0-30°C) (Copeland et al. 1984). The seasonal temperature range of the Pamlico River estuary follows the average monthly temperature of upstream rivers very closely (Figure 2.1). Estuarine water temperature also responds to the tides (Peterson and Peterson 1979). In winter, water temperatures near ocean inlets rise abruptly with the incoming tide, whereas, during summer, the incoming tide is cooler (Peterson and Peterson 1979). Estuarine, and especially slow-moving or stationary, organisms have adapted to survive these short-term and seasonal conditions.

In general, all estuarine organisms can tolerate a very wide range of temperatures, if given adequate time to acclimate (Nybakken 1993). Organisms cannot readily adapt to a rapid increase or decrease in temperature. Early life stages of many species (i.e., clams, oysters, spot, croaker, flounder, menhaden) have a much narrower temperature tolerance than adults (Kennedy et al. 1974). If water temperature becomes too low, or falls too rapidly, there can be a fish kill of sensitive species like seatrout and red drum. Great variability in annual reported catch is typical for seatrout species and seems related to climatic conditions of the preceding winter and spring. Low catches follow severe winters; winter cold shock of juveniles and adults is cited as a primary factor in local and coastwide declines in spotted seatrout (<http://www.ncdmf.net/stocks/spectrou.htm>, July 2003).

Temperature varies least in the marine system (Peterson and Peterson 1979; Nybakken 1993) and marine species tend to be less tolerant of temperature extremes and rapid changes in temperature. Water temperature is one of the most important factors in determining use of coastal ocean habitat by warm temperate and tropical species (SAFMC 1998). Tropical species occur off the North Carolina coast where offshore bottom water temperatures range from approximately 52-81°F (11–27°C) (SAFMC 1998). Temperatures less than 54°F (12°C) may result in the death of some tropical fish and invertebrates (SAFMC 1998; Wenner et al. 1984). Estuarine-dependent species in the nearshore ocean, such as black sea bass and southern flounder, have a broader temperature tolerance (Steimle et al. 1999; Reagan and Wingo 1985). Research in North Carolina marine waters has found that fish species composition at hard bottom shifted over a 15 year period, with an increase in tropical species and decrease in temperate

and other parameters in order to evaluate the relative contribution of water clarity in determining fish community structure.

Flow and water movement

Estuaries are mixing zones with complex water movements between fresh and salt water. The four principal factors that affect water movement in North Carolina's estuaries are: (1) rainfall (inflow), (2) wind, (3) lunar tides, and (4) density gradients (salinity and temperature) (DMF 2003b). Each creek, river, bay, or sound is uniquely different due to these four factors.

Flow and circulation patterns within North Carolina's estuaries are complex due to interacting physical, chemical, and biological factors. Variation in water flow occurs at a broad range of spatial scales in estuarine and marine systems. The interaction of topographic features (e.g., shoals, bays) and tidal or wind-driven circulation patterns creates large-scale (km) spatial variation (Xie and Eggleston 1999; Inoue and Wiseman 2000). At much smaller scales (<1m), topographic changes or the presence of bottom habitat structure (e.g., SAV, oyster reef, pilings, stumps, logs) can create areas of reduced and increased water velocity (Jokiel 1978; Gambi et al. 1990; Komatsu and Murakami 1994; Lenihan 1998). Temporal variation in flow is caused by regular tidal flushing or irregular circulation by the wind.

Each organism in an estuary relies upon certain circulation patterns to provide the conditions that it needs to flourish at a given life stage. Some conditions benefit one species or species life stage more than others. The conditions needed by a species do not always occur at the same time and location each year due to variations in weather. However, the expansive nature of North Carolina's estuaries almost assures that proper conditions for a particular species will occur somewhere, but conditions may not be optimal in all locations (DMF 2003b).

The aquatic organisms that flourish in estuaries rely on flow and water movement to: (1) deliver the nutrients and physical water conditions for appropriate food and nursery area development at the opportune time; (2) keep eggs and larvae of pelagic spawners in suspension to enhance survival; (3) transport and distribute eggs, larvae, and juveniles to the appropriate nursery area for optimum food availability and protection from predators; and (4) distribute sediment and affect structures that serve as habitats (i.e., shell bottom, SAV, soft bottom) for many fish species (DMF 2003b).

High flows serve as a cue for spawning activity of anadromous fish, whereas low flows correspond to the growth and recruitment period of young fish (Orth and White 1993). Successful spawning of striped bass coincides with optimal water velocities between 3.3 and 6.6 ft/s (100-200 cm/s), while adult American shad prefer water velocities between 2 and 3 ft/s (61-91 cm/s) (Fay et al. 1983a; Mackenzie et al. 1985). For example, recruitment of larval river herring in tributaries of the Chowan system is related to flow conditions (O'Rear 1983). However, water velocity is not the only cue for anadromous fish spawning; increasing light and temperature are also important factors.

Flows have a major effect on biological interactions. Powers and Kittinger (2002) found that blue crab predation on juvenile hard clams and bay scallops decreased with increasing water velocity, while whelk predation on bay scallops increased under the same treatment. Dilution of water-borne chemical cues was likely the reason for reduced blue crab predation (Powers and Kittinger 2002). Tamburri et al. (1996) found that chemical cues successfully induced larval settlement of oysters regardless of flow conditions. In another study, Palmer (1988) showed that higher current velocities increased erosion of small animals from below the sediment surface (meiofauna) into the water column, resulting in increased predation by spot (a more non-visual feeder). Species that rely primarily on visual cues would not be affected by dilution of chemical cues. However, all mobile aquatic organisms (including visual predators) also seek to minimize the energetic cost of movement through the water column while maximizing foraging efficiency.

As fish grow and develop, flow regime requirements or preferences change (Ross and Epperly 1985). Larvae and juveniles generally prefer lower velocities than adults, enabling them to settle out and maintain their positions in the estuary. Consequently, juvenile, estuarine-dependent fish are highly abundant in shallow, side-channel habitats where velocities are low (Ross and Epperly 1985; Noble and Monroe 1991).

There is little information on flow preference of estuarine species. Hydrologic modifications can, in some situations, negatively impact optimum flow conditions for aquatic organisms (refer to threats section for more details). *Research is needed on the preferred flow regimes of estuarine species in order to refine distributional patterns and better understand the effect of hydrological modifications on fish species.*

pH

The pH of the water column is a basic chemical characteristic that affects egg development, reproduction, and the ability of fish to absorb DO (Wilbur and Pentony 1999). Among freshwater, estuarine, and marine systems, pH varies naturally, and the organisms of the aquatic community have adapted to that natural variation. However, most fish require pH >5 (Wilbur and Pentony 1999), within a possible range of 0 (extremely acidic) – 14 (extremely basic). The pH of seawater is the most stable among systems and varies between 7.5 and 8.5 (Nybakken 1993). The pH of estuaries depends on the dynamic mix of seawater and upstream fresh waters. In high-salinity estuaries with little river input (i.e., Core and Bogue Sound), pH is near that of seawater. Fresh water has the most variable pH, depending on the buffering, or acid controlling, capacity of the water and organic matter input. Freshwater water bodies with low buffering capacity and high organic matter (i.e., swampy creeks) can have very low pH (≤5). The pH standard for surface fresh waters in North Carolina is between 6.0 and 9.0. The pH may fluctuate dramatically between day and night, associated with algal blooms. The pH can affect chemical cycling, availability, and ionic balance of compounds within the water column, some of which may be toxic to aquatic organisms under appropriate pH conditions, but have no effect otherwise.

The pH of the water is an important requirement for reproduction of estuarine organisms. For example, the optimum pH for normal egg development and larval growth of oysters occurs between 8.25 and 8.50 (Calabrese 1972; Calabrese and Davis 1966). Oysters also have an optimum pH of 7.8 for spawning and >6.75 for successful recruitment. Likewise, hard clam eggs and larvae require pH levels of 7.0-8.75 and 7.5-8.50, respectively, for the same functions (Funderburk et al. 1991). Anadromous fish species can generally tolerate fresh water with lower pH. For example, alewife eggs and larvae require pH between 5.0-8.5 pH and blueback herring eggs and larvae require pH levels between 5.7-8.5 (Funderburk et al. 1991). This pattern of pH requirements between systems also illustrates the adaptation of freshwater and estuarine organisms to their environment.

2.2. ECOLOGICAL ROLE AND FUNCTIONS

The water column is the lifeblood of aquatic ecosystems. It is the medium through which all other aquatic habitats are connected. As such, the water column provides a basic ecological role and function for organisms within it. The water column also provides other functions, both by itself and due to benthic-pelagic coupling. Benthic-pelagic coupling refers to the influence of the benthic community and sediments on the water column and, in turn, the influence of the water column on them, through integrated events and processes such as resuspension, settlement, and absorption (Warwick 1993).

Productivity

The potential productivity of fish and invertebrates in a system is determined by the assimilation of energy and nutrients by green plants and other life at the base of the food chain. The potential productivity of a habitat can indicate its relative value in supporting fish populations. Although

productivity in the water column is derived mostly from phytoplankton, it can also come from bacterial decomposition of plants (detritus), floating plants, and macroalgae. The foundation of riverine production during elevated flows is detritus from adjacent wetlands and fine particulate organic matter from upstream areas (Vannote et al. 1980; Junk et al. 1989). As flows decline through summer, phytoplankton can maintain its position in the water column and photosynthetic production supports the majority of secondary production. In some coastal rivers (i.e., Perquimans River), floating macrophytes such as duckweed can make up a significant portion of primary production during some years (S. Chappell, DMF, pers. com., 2003). Rivers play a dominant role in providing nutrients and flushing for downstream estuaries in the Albemarle, Tar-Pamlico, Pamlico, Neuse, and Cape Fear management units. These nutrients, in turn, contribute to primary productivity. The amount and type of production are determined by flushing (retention) and season.

Historically, phytoplankton productivity in estuarine systems was thought to be relatively low compared to that of other primary producers (Peterson and Peterson 1979). For instance, Marshall (1970) estimated that phytoplankton contributed only 50 g carbon/m^2/yr to New England's subtidal shoal waters, compared to a contribution of 125 g carbon/m^2/yr for all macrophytes. In the Newport River estuary near Beaufort, North Carolina, Williams and Murdoch (1966) and Thayer (1971) estimated that phytoplankton produce about 110 g carbon/m^2/yr. Subsequent research suggested a higher contribution to overall primary production from phytoplankton (Peterson and Peterson 1979). Sellner and Zingmark (1976) found phytoplankton production as high as 350 g carbon/m^2/yr in shallow tidal creeks and estuaries of South Carolina. Various data sources for North Carolina estimate phytoplankton productivity anywhere from 67 (Beaufort Channel adjacent estuaries) to 500 g carbon/m^2/yr (Pamlico River estuary) during the growing season. Mallin et al. (2000a) found that the highest phytoplankton production is in riverine estuaries where flushing is limited by extensive barrier islands (i.e., Neuse River), whereas areas that are well flushed or unconstrained (i.e., Cape Fear River) support a much lower phytoplankton biomass and productivity. Complex, estuarine creek/salt marsh systems generally have moderate phytoplankton productivity. Lucas et al. (1999) used a depth-averaged numerical model to predict the productivity of phytoplankton in an estuary with shallow shoals, deep channels, and variable turbidity and benthic grazing. The model predicted that phytoplankton growth rate was generally greater in deeper areas when benthic grazing is high and turbidity is low. Conversely, when turbidity was high and benthic grazing was low, phytoplankton growth rate was generally greater in shallow areas.

However, phytoplankton productivity is still generally considered secondary to detritus-based production in salt marsh-dominated estuaries (Peterson and Peterson 1979; Dame et al. 2000). A study conducted on a Georgia salt marsh found a net productivity of 6,850 kcal/m^2/year from emergent vegetation and only 1,600 kcal/m^2/yr from the various algae (Teal 1962). Compared to broad, open water areas, narrow tidal creeks and their associated marsh would likely contribute more detritus than phytoplankton. However, some research suggests that much of the detrital production from emergent vegetation remains in the marsh and that phytoplankton are the major production export (Haines 1979). Planktivorous fish (i.e., menhaden) and detritivores (i.e., shrimp) can also export production from shallow marsh creeks and bays to more open waters (SAFMC 1998).

Phytoplankton production in shallow estuaries may also be secondary to phytobenthic (microscopic plants that live on the bottom) production. In North Carolina, benthic microalgal biomass frequently exceeds phytoplankton in the nearshore ocean water column by a factor of 10 to 100 (Cahoon and Cooke 1992). Based on relative rates of primary production and nutrient cycling, Webster et al. (2002) found that phytobenthos was the dominant primary producer in a shallow estuary where light was not limiting, results that may not be applicable to North Carolina estuaries with higher turbidity. Net productivity for any given estuary depends on the relative proportion of wetlands, shallow soft bottom and water column in the system.

In nearshore ocean waters, the depth that light penetrates to allow photosynthesis (euphotic zone) may be

quite shallow because of high turbidity and wind mixing. Proceeding offshore there is generally a sharp decrease in chlorophyll *a* where the water column becomes more stratified. Menzel (1993) reported that primary production rates decreased significantly from the inner shelf to the outer shelf of the South Atlantic Bight. Production levels may increase by a factor of three to ten with warm core intrusions from the Gulf Stream. Because these intrusions occur irregularly on the inner shelf zone, this nearshore area depends more on nutrients recycled or resuspended by wind or tidal forces (Menzel 1993). Zooplankton distribution is directly related to location of phytoplankton blooms. Cahoon et al. (1990) found that on the inner shelf in Onslow Bay, 80% of the chlorophyll *a* was associated with the sediment. Benthic microalgal biomass (36.4 mg chlorophyll *a*/m^2) always exceeded phytoplankton biomass (8.2 mg chlorophyll *a*/m^2) (Cahoon and Cooke 1992). Hackney et al. (1996) reported that, because of circulation patterns, inorganic nutrients could be resuspended and retained in sufficient amounts to allow localized phytoplankton blooms within the surf zone. Primary production within the water column can also come from macroalgae detached from hard substrate (i.e., *Enteromorpha*) or floating on the surface (i.e., *Sargassum*).

Fish utilization

Although all fish technically use the water column, this section focuses primarily on species associated with open water (pelagic) habitat. Pelagic species are those most commonly found near the surface of the water column and include the adult stages of alewife, American shad, blueback herring, striped bass, bay anchovy, silversides, Atlantic menhaden, bluefish, cobia, Spanish mackerel, and striped mullet. Table 2.5 summarizes the life functions provided by the water column to pelagic fish at various life stages. In addition to these species, eggs and larvae of most fish species depend on the open water for passive transport and food (see Corridor and connectivity function).

Corridor and connectivity

The corridor function is the most basic function of the water column because the various life stages of fish species must move through it to utilize other habitats supporting other functions. The corridor function is particularly important for anadromous species such as river herring, shad, and striped bass, species that must migrate as adults from high-salinity waters, through estuarine waters, and upstream into freshwater systems to spawn in the spring. As a catadromous species, adult American eel must migrate from upstream freshwaters through estuarine waters to their spawning grounds in the Atlantic Ocean. The upstream limit of anadromous and catadromous fish migration in North Carolina is depicted on Map 1.3. All that is needed for transporting anadromous fish eggs and larvae to downstream nursery areas is relatively clear, unobstructed, and flowing water.

Table 2.5. Partial list of important fish and invertebrate species using pelagic habitat in coastal North Carolina, and ecological functions provided for those species. *(Sources: Funderburk et al. 1991, Pattilo et al. 1997, SAFMC 1998, and NOAA 2001)*

SPAWNING GUILD	Water Column Functions						Stock Status[2]
Species	Corridor	Spawning	Nursery	Foraging	Refuge	Fishery[1]	(2003)
ANADROMOUS FISH							
River herring (blueback herring and alewife)	X	X	X	X	X	X	O-Albemarle Sound, U-central/southern
American shad	X	X	X	X	X	X	C
Hickory shad	X	X	X	X	X	X	U
Striped bass	X	X	X	X	X	X	V-Albemarle Sound, Atlantic Ocean, O-central/southern
ESTUARINE SPAWNING AND NURSERY							
Bay anchovy	X	X	X	X	X		
Silverside spp.	X	X	X	X	X		
INLET & ESTUARINE CHANNEL SPAWNING / ESTUARINE NURSERY AREA							
Cobia	X	X	X	X	X	X	
MARINE SPAWNING / LOW-HIGH SALINITY NURSERY							
Atlantic menhaden	X	X	X	X	X	X	V
Striped mullet	X	X	X	X	X	X	C
MARINE SPAWNING / HIGH SALINITY NURSERY							
Bluefish	X	X	X	X	X	X	R
Spanish mackerel	X	X	X	X	X	X	V
Pinfish	X	X	X	X	X	X	
King mackerel	X	X	X	X	X	X	V

[1] Existing commercial or recreational fishery. Fishery and non-fishery species are also important as prey.

[2] V=viable, R=recovering, C=Concern, O=overfished, U=unknown (DMF 2003 - Stock Status Report)

The large estuaries of North Carolina function as settling basins where coastal rivers meet the sea (Giese et al. 1979). As such, the flow of water between the rivers and the estuaries, and between the estuary and the ocean, must be maintained so that settlement of transported larvae to the estuary is successful. Nearly all fish and shellfish species in coastal North Carolina occupy the estuarine water column at some point in their life cycle. Meroplankton (organisms that spend only part of their life cycle in the plankton), in particular, rely on the corridor function of the water column to transport them to favorable nursery areas.

The surf zone and shallow intertidal waters are important corridors for seasonal fish migrations and for larval transport in and out of estuarine waters. Several studies have directly targeted surf zone fishes in North Carolina (Francesconi 1994; Hackney et al. 1996; Ross and Lancaster 1996). These studies reported 47 species in North Carolina's surf zone. About 130 species of fishes have been reported from North Carolina through Georgia (Tagatz and Dudley 1961).

Common species inhabiting the Surf Zone
Atlantic menhaden, striped anchovy, bay anchovy, rough silverside, Atlantic silverside, Florida pompano, spot, Gulf kingfish, striped mullet, and Spanish mackerel, flounders, bluefish, Atlantic sharpnose shark, red drum

The surf zone is an important migratory path for larval and juvenile fish moving toward the estuaries in the winter and spring. Adult fish are thought to migrate close to shore in the surf zone during the fall migration offshore (Hackney et al. 1996). Adult fish abundance in the surf zone is highly seasonal with lowest abundance and diversity in the winter and maximum abundance and diversity in the late summer (Hackney et al. 1996). Maximum biomass occurs in the fall when juveniles are at peak sizes, and large schools of fish migrate from the estuaries along the beaches. Table 2.5 provides information on habitat utilization of some of the most important fishery and prey species in the water column.

Larval fish are an important component of zooplankton in the coastal ocean water column. In Onslow Bay, Powell and Robbins (1998) documented a total of 110 families from ichthyoplankton samples. Estuarine-dependent species such as menhaden, spot, and Atlantic croaker are an important component of the ichthyoplankton during late fall and winter. These species spawn offshore and must be transported into estuaries through the water column. Ichthyoplankton from estuarine-dependent species that spawn in the sounds, inlets, and nearshore ocean waters during spring and early summer (i.e., pigfish, silver perch, weakfish) were also found in the ocean water column shortly afterward. Reef fish larvae were most abundant during spring, summer, and early fall. The frequent occurrence of larvae from deep-water oceanic species indicates that Gulf Stream waters transported those larvae to shelf waters off North Carolina.

Inlets are important corridors (or bottlenecks) through which many fish must successfully pass to complete their life cycles. Larval fish diversity in North Carolina's inlets is very high. Sixty-one larval species have been found in Oregon Inlet; Atlantic croaker and summer flounder were particularly abundant (Hettler and Barker 1993). Some of the other species included bluefish, black sea bass, gray snapper, several flounder species, pigfish, pinfish, spotted seatrout, weakfish, spot, kingfish, red drum, mullet, and butterfish. Beaufort, Ocracoke, and Oregon inlets also support significant larval fish passage, although Oregon Inlet may be especially important due to the great distance between it and adjacent inlets, its orientation along the shoreline, and the direction of prevailing winds. Oregon Inlet provides the only opening into Pamlico Sound north of Cape Hatteras for larvae spawned and transported from the Mid-Atlantic Bight.

Peters et al. (1995) and Peters and Settle (1994) documented species' utilization and temporal trends in larval fish transport through Beaufort Inlet. Table 2.6 depicts the time periods during which various larval species immigrated through the inlet. Over 52 taxa including 29 species were identified, although menhaden, spot, Atlantic croaker, and pinfish dominated the majority of the samples. Peak larval abundances for those species occurred between September and April.

Table 2.6. Peak larval abundance of seven important fish species near Beaufort Inlet. *(Source: Peters et al. 1995)*

Species	Month						
	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Menhaden							
Summer flounder							
Southern flounder							
Spot							
Pinfish							
Gulf flounder							
Atlantic croaker							

Research projects conducted under the South Atlantic Bight Recruitment Experiment (SABRE) studied transport of winter-spawned fish larvae into the estuaries. Larvae concentrate on the shelf in a narrow "withdrawal zone" upwind of an inlet within the 23-foot (7m) deep isobath. Upon the appropriate conditions of ocean currents, the larvae pass through the inlets. Even during best wind and tidal conditions, only about 10% of the available larvae are successfully drawn into the inlet (Blanton et al. 1999). Larvae passing downwind and outside the narrow withdrawal zone pass seaward of the inlet shoals and, given the right conditions, will be transported into the next available inlet downstream. Churchill et al. (1999) noted that transport dynamics in the immediate vicinity of inlets are complex, and that larvae may also remain near an inlet or move in and out repeatedly before actually immigrating. However, since the along-shore flow component of the coast is four to five times greater than the cross-shelf component, larvae are highly dependent on being transported along the shore in a narrow zone and then injected through the inlet (Hare et al. 1999). Offshore-spawning, estuarine-dependent species include many of North Carolina's most important commercial and recreational fish species, such as menhaden, spot, Atlantic croaker, pinfish, flounders, shrimp, black sea bass, and gag. Red drum and blue crabs, which spawn in and near the inlets, also require transport of larvae through inlet systems. Consequently, successful movement of larvae through the inlets is of great importance to North Carolina fisheries, particularly where inlets are limited, such as along the Outer Banks.

Spawning

Fish that spawn in open waters generally broadcast planktonic eggs. Survival of these eggs is affected by flow and circulation patterns. With increasing light, flow, and temperature during the spring, open-water freshwater systems provide spawning habitat for resident freshwater and anadromous fish (Orth and White 1993). Anadromous fish species such as river herring (alewife and blueback herring), striped bass, and shads (hickory and American shad) use the freshwater water column to broadcast eggs which develop as they float downstream. All of the life stages of these species use the water column as their primary habitat. Environmental conditions such as heavy rainfall, high water flow, and temperature affect anadromous fish life cycle stages and migration patterns in freshwater systems. Conditions for anadromous fish spawning are typically met from mid-February to mid-June in North Carolina (Table 2.7), although spawning periods vary according to species and drainage basin (Steel 1991).

Sufficient rainfall is needed to provide suitable current velocities for spawning. The strongest currents are required by striped bass and blueback herring (Table 2.8). Slower current velocities are needed for American shad and alewife; alewife spawn in slow-moving oxbows and small streams, as well as fast-water sites. Adequate DO levels in slow-moving backwaters are critical to alewife spawning because the eggs require >5 mg/l DO (Funderburk et al. 1991) (Table 2.4). During their spawning migration, anadromous fish actively avoid waters with low DO and extremely high turbidity (Steel 1991).

Estuarine spawners fall into two basic groups, estuarine spawning species and inlet/estuarine channel spawning species. The estuarine spawning species are mostly resident forage finfish species that spawn

in shallow water during the warmer months (Table 2.7). This group also includes some important shellfish species (i.e., oysters, hard clams, bay scallop). Spawning for oysters, clams, and scallops is triggered primarily by increasing water temperatures during spring and/or decreasing water temperatures in fall (Fay et al. 1983c; Burrell 1986; Eversole 1987). Table 2.7 shows spawning seasons for coastal fish and invertebrate species found in North Carolina waters. The specific time of spawning for anadromous fishes is determined by coincidence of physical conditions in the water column (Table 2.8).

The inlet/estuarine channel spawning group includes mostly large fish species such as weakfish, red drum, and cobia that spawn in or near deep flowing waters. The environmental requirements for successful spawning and egg development for estuarine spawners are shown in Table 2.9.

The marine spawning species generally spawn in locations where prevailing currents will carry their eggs and larvae to nursery areas within estuaries and nearshore ocean waters. Spot, Atlantic croaker, southern flounder, Atlantic menhaden, and striped mullet spawn offshore where they produce planktonic eggs and larvae from fall to late winter (Table 2.7) (Anderson 1958; Epperly and Ross 1986). Their larvae are transported into the estuaries where they settle in nursery areas with low to moderate salinity. The spawning function of pelagic waters for demersal species is therefore limited to egg dispersal (discussed in Corridor section). The specific time of spawning is determined by coincidence of environmental conditions in the water column (Table 2.10). The other group of marine spawners reproduces at various times, but their nursery habitat is limited to higher salinity areas.

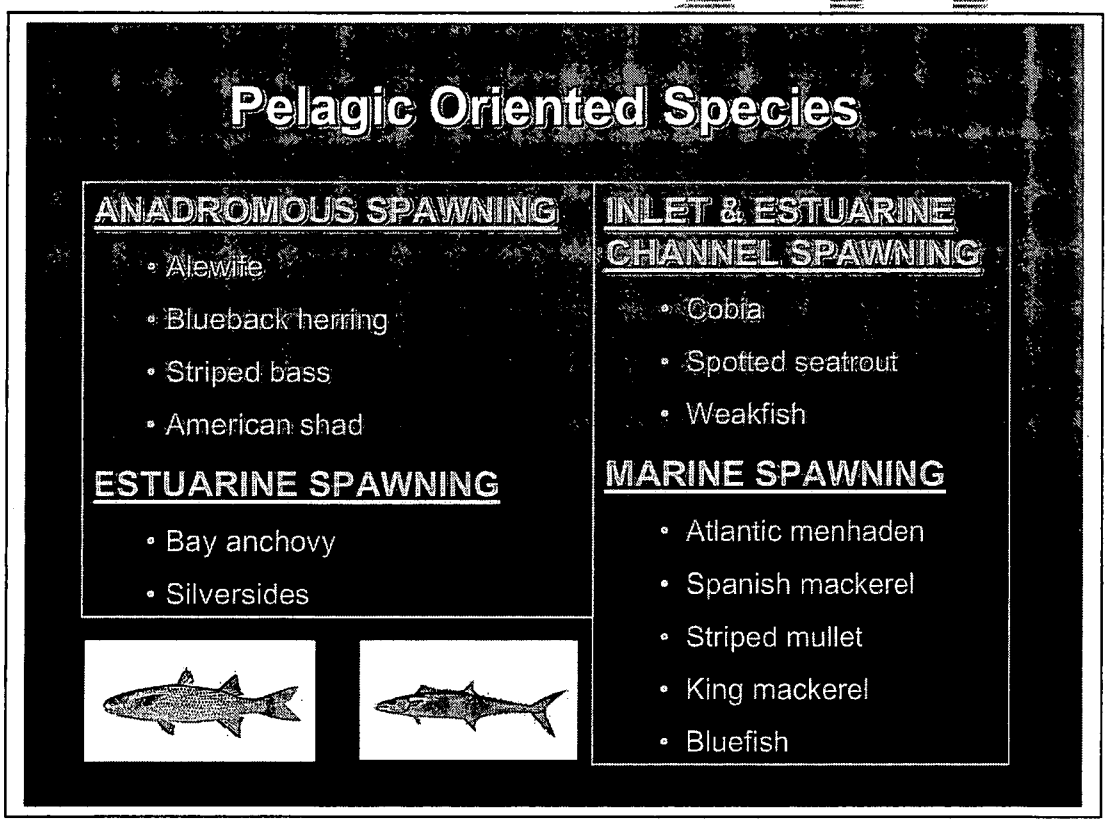
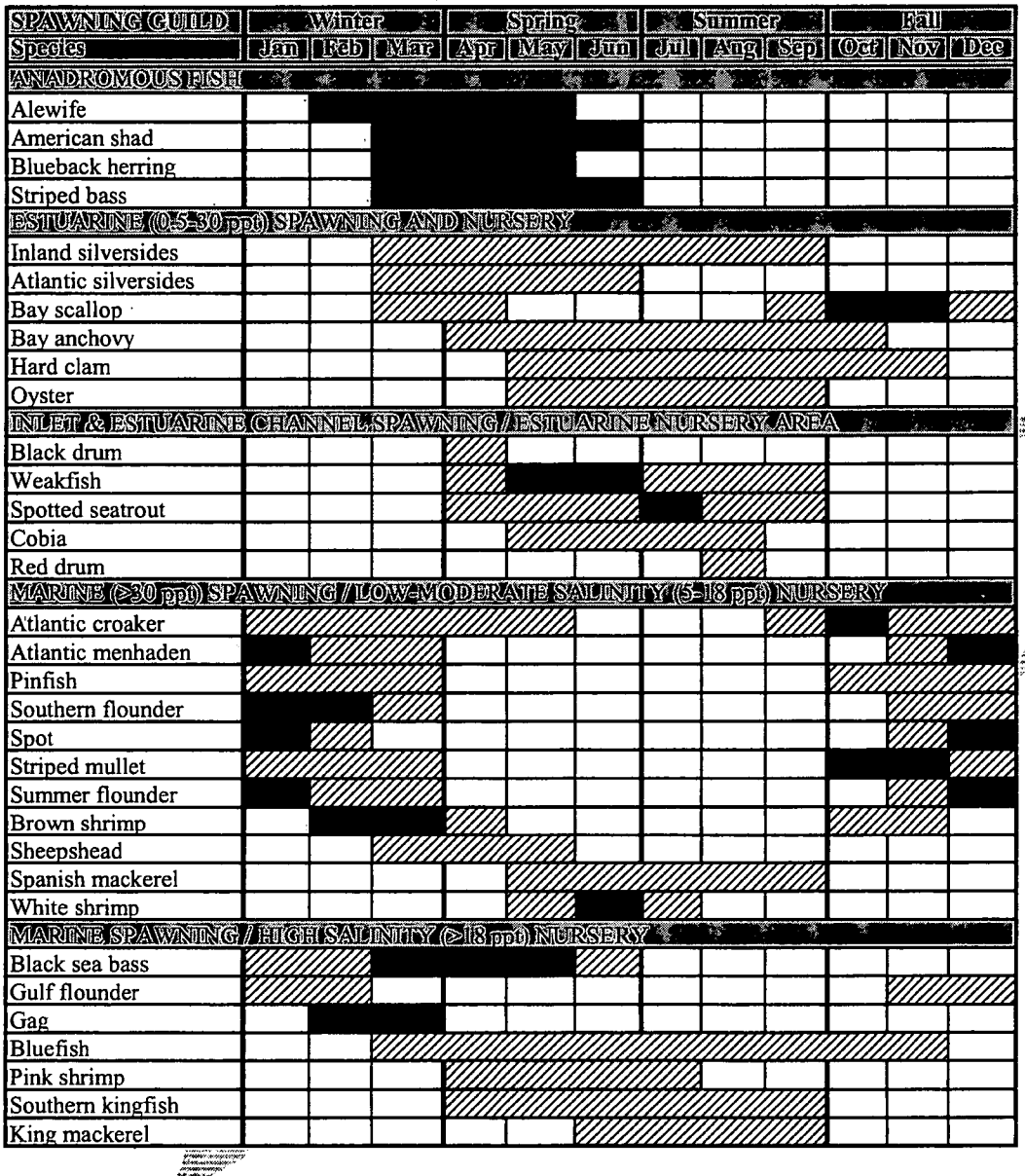


Table 2.7. Spawning seasons for coastal fish and invertebrate species occurring in North Carolina that broadcast planktonic or semidersal eggs.



Black squares indicate peak spawning. **Cross-hatched** squares indicate spawning period.

[Sources: USFWS species profiles (see literature cited: reference titles beginning with Species life histories and Environmental Requirements), DMF fishery management plans, Funderburk et al. 1991, Pattilo et al. 1997, Luczkovich et al. 1999, NOAA 2001, and DMF 2003a]

Table 2.8. Physical spawning and egg development requirements for anadromous fishes inhabiting coastal North Carolina.

SPAWNING GUILD	Salinity (ppt)		Temperature (C)		Water velocity (cm/s)	Other parameters
Species	Spawning	Egg	Spawning	Egg	Spawning	Egg
Alewife	[S] 0-5	[S] 0-5 [O] 0-2	[S] 12-16	[S] 11-28 [O] 17-21	[O] slow current	[S] Suspended solids <1000 mg/l
American shad	[S] 0-18	[S] 0-18	[S] 11-25	[S] 13.0-26.0	[S] 30-90	
Blueback herring	[S] 0-5	[S] 0-22 [O] 0-2	[S] 14-17	[S] 14-26 [O] 20-24	[O] strong current	[S] Suspended solids <1000 mg/l
Striped bass	[S] 0-5	[S] 0.5-10	[S] 13-24 [O] ~18-22	[S] 12-23	[S] 30.5-500 [O] 100-200	

[S] = Suitable, and [O] = Optimum

[Sources: NOAA 2001, Funderburk et al. 1991, SAFMC 1998, Pattilo et al. 1997, USFWS species profiles (see literature cited: reference titles beginning with Species life histories and Environmental Requirements), and Wannamaker and Rice 2000. (refer to Table 2.4)]

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Table 2.9. Water quality requirements for spawning of fish and invertebrates in the estuarine waters of coastal North Carolina.

SPAWNING GUILD	Salinity (ppt)		Temperature (C)		Other parameters
Species	Spawning	Egg	Spawning	Egg	Spawning
ESTUARINE (0.5-30 ppt) SPAWNING AND NURSERY					
Bay anchovy	[S] 0.5 to >30	[S] 0.5 to >30	[S] 11-30	[S] 13-30	
Bay scallop		[S] 18-30	[S] >15 and <30	[O] 15-20	[S] Suspended solids <500 mg/l
Hard clam	[S] 18 to >30	[S] 18 to >30	[S] 16-30	[S] 16-30	
Inland silversides	[S] 3.6-31.5	[S] 0-31.5	[S] 15-30	[S] 13-34 [O] 20-25	
Atlantic silversides		[O] ~30	[S] 14.5-30	[S] 15-30	
Oyster	[S] 5 to >30	[S] 7.5-34 [O] 10-22	[S] 21 to 30	[S] 19-32	
INLET & ESTUARINE CHANNEL SPAWNING / ESTUARINE NURSERY AREA					
Black drum	[S] 5 to >30	[S] 8.8-34 [O] 23-34	[S] 16-25	[S] 16-20	
Cobia	[S] >30	[S] >30	[S] 21 to ≥30	[S] 21 to ≥30	
Red drum	[S] 5 to >30	[S] 10-40 [O] 29-32	[S] 21-30	[S] 21-30	
Spotted seatrout	[S] 5 to >30	[S] 15-28 [O] ~28	[S] 16-30	[S] 16 to ≥30 [O] ~28	
Weakfish	[S] 5 to ≥30	[S] 5 to >30	[S] 16-30	[S] 16-30	

[S] = suitable, [O] = optimum

[Sources: NOAA 2001, Funderburk et al. 1991, SAFMC 1998, Pattilo et al. 1997, USFWS species profiles (see literature cited reference titles beginning with Species life histories and Environmental Requirements), and Wannamaker and Rice 2000. (refer to Table 2.4)]

Table 2.10. Water quality requirements for fish spawning in the marine waters of coastal North Carolina.

SPAWNING GUILD	Salinity (ppt)		Temperature (C)	
Species	Spawning	Egg	Spawning	Egg
MARINE (>30 ppt) SPAWNING / LOW-MODERATE SALINITY (5-18 ppt)				
Atlantic croaker	[S] 18 to >30	[S] high	[S] 16-25	[S] 16-25
Atlantic menhaden	[S] 18 to >30	[S] 18 to >30	[S] 5-25	[S] 5-25
Pinfish	[S] 18 to >30	[S] 0-43.8	[S] 16-30	[S] 16-30
Sheepshead	[S] >30	[S] >30	[S] 21-30	[S] 5 to >30
Southern flounder	[S] 18 to >30	[S] high	[S] 11-25	[S] 5-30
Spanish mackerel	[S] >30	[S] >30	[S] 21 to >30	[S] 21 to >30
Spot	[S] >30	[S] 30-35	[S] 16-25	[S] 16-25
Striped mullet	[S] 18 to >30	[S] 28-36.5,	[S] 16-30	[S] 11 to >30
Summer flounder	[S] >30	[S] >30	[S] 5-25	[S] 5-25
MARINE (>30 ppt) SPAWNING / HIGH SALINITY (>18 ppt) NURSERY				
Black sea bass		[S] Sensitive		
Bluefish	[S] 18 to >30	[S] 26.6-34.9,	[S] 21-25	[S] 16-30
Gulf flounder	[S] >30	[S] high	[S] 16-25	[S] 16-25
Southern kingfish	[S] >30	[S] >30	[S] 11-25	[S] 16-25

[S] = suitable, [O] = optimum
[Source: NOAA 2001, Funderburk et al. 1991, SAFMC 1998, Pattillo et al. 1997, USFWS species profiles (see literature cited: reference titles beginning with Species life histories and Environmental Requirements), and Wannamaker and Rice 2000. (refer to Table 2.4)]

Nursery

Open water provides nursery habitat for most planktivorous larvae and many juvenile pelagic species (i.e., bluefish, river herring, menhaden, Spanish mackerel). The value of open water habitat for these species depends on the abundance and timing of planktonic food sources and their coincidence with required environmental conditions needed for growth during this critical time period. Areas that have been designated as Primary, Permanent Secondary, or Special Secondary Nursery Areas by the Marine Fisheries Commission are shown in Map 2.3a-b and total approximately 162,300 acres of coastal waters. Of this total, roughly 80,800 acres are Primary Nursery Areas, 35,000 acres are Permanent Secondary Nursery Areas, and 46,500 acres are Special Secondary Nursery Areas.

Anadromous fish nurseries

Nursery habitat for anadromous fishes is generally downstream from spawning locations but still within the freshwater low-salinity system. Alewife larvae in the Chesapeake Bay moved slightly downstream from spawning areas only where salinities were less than 12 ppt (Fay et al. 1983d). Juvenile alewife and blueback herring in the Potomac River exhibited apparent upstream movement over the four months before emigration. Both species were most abundant in surface waters through September. Juvenile blueback herring remained in the upper portion of the water column during their stay in nursery areas. Juvenile alewife, however, increased in abundance at a depth of 15 feet (4.6 m) and on the bottom for the two months prior to emigration (Warinner et al. 1969).

Juvenile alewife and blueback herring emigrate from freshwater/estuarine nursery areas by November of their first year of life (Burbidge 1974; Kissil 1974; Richkus 1975; O'Neill 1980). Heavy rainfall, high water flow, and sharp declines in water temperature have been found to influence the initiation of migration from nursery areas (Cooper 1961; Kissil 1974; Richkus 1975). The water quality requirements for anadromous fish larvae and juveniles inhabiting pelagic waters are listed in Table 2.11.

Table 2.11. Larval and juvenile water quality requirements for anadromous fish species inhabiting coastal North Carolina.

Species	Salinity (ppt)		Temperature (C)		Dissolved oxygen (mg/l)	
	Larvae	Juvenile	Larvae	Juveniles	Larvae	Juvenile
Alewife	[S] 0-3	[S] 0-5	[S] 8-31	[S] 10-28	[S] >5.0 mg/l	[S] >3.6
American shad	[S] 0-18	[S] 0-30	[S] 15.5-26.1	[S] 15.6-23.9		
Blueback herring	[S] 0 to 18	[S] 0-2	[S] 14-28	[S] 10-30	[S] >5.0 mg/l	[S] >3.6 mg/l
Striped bass	[S] 1.0-10.5	[S] 0-16	[S] 12-23	[S] 10-27		

[S] = suitable, [O] = optimum
[Source: NOAA 2001, Funderburk et al. 1991, SAFMC 1998, Pattilo et al. 1997, USFWS species profiles (see literature cited: reference titles beginning with Species life histories and Environmental Requirements), and Wannamaker and Rice 2000]

Larval striped bass move downstream from spawning locations in the upper river during summer and early fall, where they inhabit shoal waters less than six feet deep (Funderburk et al. 1991). As the larvae grow into juveniles, they move progressively downstream, where they seem to prefer shallow-water, nearshore areas (Funderburk et al. 1991). During winter, young striped bass may move farther downstream and into deeper water (Kay et al. 1983a; Hill et al. 1989).

Juvenile American shad use the same general nursery areas as river herring, but the young shad prefer deeper pools away from the shoreline and occasionally move into shallow riffles (Funderburk et al. 1991). During summer, juvenile shad migrate from the bottom during the day to the surface at night (Loesch and Kriete 1984). A decrease in temperature during the fall and slight increases in river flow seem to trigger downstream movement of American shad (Funderburk et al. 1991). Nursery area surveys conducted by DMF noted decreased catch of juvenile shad in October on the Cape Fear River, Neuse River, and Albemarle Sound (Winslow 1990a).

Low-moderate salinity nurseries

The interactions of spawning locations, physical processes, environmental factors (salinity and temperature), chemical cues, and habitat preferences are determining factors for the time and place of larval settlement in estuaries (Brown 2002; Luckenbach 1985; Peterson et al. 2000c). The total nursery area for larvae of most estuarine-dependent species extends from the spawning locations to juvenile nursery habitat. For species spawned offshore in winter, the larval (primary) nursery habitat extends from the inlet water column, across primarily inshore-flowing channels, to the upper reaches of estuaries. Survival to the juvenile life stage and beyond is then dependent on the estuarine nursery areas providing the biological, physical and chemical characteristics needed for growth (Table 2.12).

In the Pamlico Sound, salinity and circulation patterns are the key physical conditions affecting the species composition occurring in juvenile nursery habitat (Noble and Monroe 1991). Low-salinity nurseries include the Pamlico, Pungo, and Neuse rivers, the eastern portion of Albemarle Sound (including Croatan and Roanoke sounds), and the upper Cape Fear estuary. During spring through fall, shallow areas within these systems are dominated by juvenile Atlantic menhaden, striped mullet (Epperly

and Ross 1986), silversides, anchovies (Nelson et al. 1991), and demersal species such as Atlantic croaker, brown shrimp, blue crab, and southern flounder (Noble and Monroe 1991).

Table 2.12. Water quality requirements for selected larval and juvenile estuarine fish species inhabiting low-moderate salinity (0.5-18 ppt) open water habitat in coastal North Carolina.

	Salinity (ppt)		Temperature (C)		Dissolved oxygen (mg/l)	
Species	Larvae	Juvenile	Larvae	Juveniles	Larvae	Juvenile
Atlantic croaker	**[S] 1-21**	[S] 0-36.7 [O] 10-20	**[S] 11 to 25**	[S] 0.6-38		[S] >3-4
Atlantic menhaden	**[S] 1/2 to >30**	**[S] 0 to >30**	**[S] 0 to >30**	**[S] 0 to >30**		
Bay anchovy	**[S] 0-15**	**[S] 9-30**	**[S] 15-30**	**[S] 10-30**		
Black drum	**[S] 0-36**	[S] 0-80 [O] 9-26	**[S] 11-16**	[S] 0 to >30		
Blue crab	**[S] >20**	[S] 2-21	**[S] 16-30**	[S] 16-30		
Brown shrimp	**[S] 24-36**	[S] 0-45 [O] 10-20	**[S] 21 to >30**	[S] 0 to >30		
Grass shrimp	**[S] 15-46 [O] 20-25**	[S] 0-55 [O] 2-36		[S] 16 to >30		
Inland silversides	**[S] 0-30 [O] 2-8**	**[S] 0-34.5**	**[S] 21-30**	**[S] 5-33 [O] 22-26.5**		**[S] >1-7**
Mummichog	**[S] 0 to >30**	[S] 0 to >30	**[S] 11-30**	[S] 5-30		[S] >1
Oyster	**[S] 12-27**	[S] 12-27	**[S] 19-32**	[S] 0 to >30		
Pinfish	**[S] 0-43.8**	**[S] 0-43.8 [O] >4**	**[S] 16-30**	**[S] 5 to >30**		
Red drum	**[S] 8-36.4 [O] 20-40**	[S] 0-45 [O] >20	**[S] 16 to >30**	[S] 0 to >30	**[S] >1.8**	[S] 5.2-8.4
Sheepshead	**[S] 5-24.9**	**[S] 0.3-43.8**	**[S] 21-30**	**[S] 21-30**		
Southern flounder	**[S] 10-30**	[S] 2-60 [O] 2-37	**[S] 0-30**	[S] 0 to >30		[S] >3-7
Spot	**[S] 6-35 [O] 30-35**	[S] 0-36.2 [O] >10	**[S] 5-25**	[S] 0 to >30		
Spanish mackerel	**[S] 28-37.4**	**[S] 0.2-37 [O] >10**	**[S] 16-30**	**[S] 11 to >30**		
Spotted seatrout	**[S] 8-40 [O] 20-35**	**[S] 0-48 [O] 8-25**	**5 to >30**	**[S] 5 to >30 [O] ≥28**	**[S] >4**	
Striped mullet	**[S] 16-36.5 [O] 26-33**	**[S] 0-75 [O] 20-28**	**[S] 16-30**	**[S] 5 to >30**	**[S] ~4**	**[S] <4**
Summer flounder	**[S] 1/2 to >30**	[S] 0 to >30	**[S] 0 to >30**	[S] 0 to >30		
Weakfish	**[S] 5 to >30**	**[O] 2-11**	**[S] 11-30**	**[S] 5 to >30**		
White shrimp	**[S] 0.4-37.4**	[S] 0.3-41 [O] <10	**[S] 11-30**	[S] 5 to >30		

Bold signifies life stage with pelagic orientation. [S] = suitable, [O] = optimum

[Source: NOAA 2001, Funderburk et al. 1991, SAFMC 1998, Pattilo et al. 1997, USFWS species profiles (see literature cited: reference titles beginning with Species life histories and Environmental Requirements), and Wannamaker and Rice 2000]

Moderate-salinity areas include the bays and open waters of Pamlico Sound. In addition to juvenile species present in lower salinity areas, spotted seatrout, weakfish, silver perch, and red drum are also abundant in these moderate-salinity estuaries (Noble and Monroe 1991). Young weakfish and silver perch tend to occupy deeper waters of the moderate and high-salinity zones, while young blue crabs and other demersal species prefer shallow areas (Epperly and Ross 1986). There seem to be little or no data on the depth distribution for juvenile spotted seatrout in North Carolina. However, information from the Gulf coast suggests that the species prefers shallow, sheltered waters (Blanchet et al. 2001). The most common characteristics of water bodies supporting juvenile red drum in North Carolina are water depth (<16 feet or <5 m) and relative wind protection (Ross and Stevens 1992).

Different species arrive in nursery areas at different times of the year and remain for variable periods. For

example, juvenile spot begin entering nursery areas in February (Steel 1991). Postlarval Atlantic croaker arrive over an extended period from August to May, with peak recruitment during winter and early spring (Purvis 1976). Similar to Atlantic croaker, postlarval striped mullet enter low-salinity nurseries primarily in winter (Nelson et al. 1991). Menhaden postlarvae arrive in low-moderate salinity nurseries from February to June (Purvis 1976), whereas juvenile anchovies and silversides are generally year-long residents (Nelson et al. 1991). Juvenile brown shrimp are most abundant in moderate-salinity nurseries during spring to early fall (Nelson et al. 1991), migrating to higher salinity areas as they grow larger. By late fall, many of these nonresident estuarine fish migrate to the ocean or to deeper regions of the estuary to overwinter (Epperly and Ross 1986).

High-salinity nurseries

High-salinity nurseries (>18 ppt) include the eastern side of Pamlico Sound, Core and Bogue sounds, the mouth of the Cape Fear River, and the southern coastal estuaries. The dominant juvenile species in shallow waters of the high-salinity zone include pinfish, pink shrimp, black sea bass, gag, pigfish, red drum, gulf flounder, and summer flounder (Noble and Monroe 1991). Juvenile spot, brown shrimp, striped mullet, and southern flounder are also abundant in high-salinity estuaries (Epperly and Ross 1986), and juvenile red drum reach their highest abundance in this salinity zone (Nelson et al. 1991). With the exception of summer flounder (Powell and Schwartz 1977), these high-salinity species prefer protected, shallow waters over deeper areas. However, young Spanish mackerel, bluefish, and cobia prefer deeper, more open waters (NOAA 2001). The water quality requirements for larvae and juvenile species inhabiting open waters of the high-salinity zone are listed in Table 2.13. As with juveniles in lower salinity areas, the timing of juvenile arrival in high-salinity nurseries depends on their preceding spawning conditions. Bluefish begin spawning in March, and their young become abundant in Bogue Sound (a high-salinity estuary) around mid-May (Nelson et al. 1991). Juvenile pinfish spawned offshore in winter become abundant in Bogue Sound by late March, and juvenile sheepshead spawned later in winter and early spring become abundant in Bogue Sound by April (Nelson et al. 1991). Spanish mackerel appear (although rarely) in Bogue Sound in mid-May (Nelson et al. 1991).

Data from the Estuarine Trawl Survey indicate that the diversity of juvenile species found in designated primary nursery areas is somewhat larger in waters north of Cape Lookout than south of Cape Lookout. From 1990 to 2002, an average of 68 species was collected from core sampling stations north of Cape Lookout during the months of May and June. During the same time span, an average of 55 species was collected south of Cape Lookout (DMF, unpub. data). The greater diversity in northern waters may be due to the larger variation in salinity regimes or its location at a major transition point for species distribution. North of the cape, the total number of observed species generally changed by less than 10 species from year to year. The number of species collected was lowest in 1992 (49 species) and highest in 1998 (83 species). Annual changes in observed species diversity south of Cape Lookout also appear to be relatively consistent (45 and 49 species were collected in 1999 and 2001, respectively).

Bluefish, Florida pompano and Gulf kingfish use the surf zone and nearshore ocean waters as a nursery (Hackney et al. 1996). Juveniles of these species tend to stay in one area and use the surf zone for an extended time (>25 days during the summer months) (Ross and Lancaster 1996). Some fish, such as anchovies and king mackerel, rely on the nearshore boundaries of ocean water masses as nursery habitats (SAFMC 1998). Juveniles of other estuarine species, such as red drum, Spanish mackerel, bluefish, and black sea bass, use the surf zone and nearshore waters seasonally while migrating between estuarine and ocean waters (Godcharles and Murphy 1986; DMF 2000a). Pelagic species that use nearshore ocean waters as a nursery to some extent include butterfish, pinfish, striped anchovy, striped mullet, and Atlantic thread herring (F. Rohde, DMF, pers. com., 2001). The major recruitment period for juvenile fish to surf zone nurseries is late spring through early summer.

Table 2.13. Water quality requirements of selected larval and juvenile coastal estuarine fish species inhabiting high-salinity open water habitat in coastal North Carolina.

Species	Salinity (ppt)		Temperature (C)		Dissolved oxygen (mg/l)	
	Larvae	Juvenile	Larvae	Juveniles	Larvae	Juvenile
Bay scallop	**[S] 22-35 [O] 25**	[S] 16-30	**[S] 16-30**	[S] 11 to >30		
Hard clam	**[S] 20-33 [O] 27-28**	[S] 12-33 [O] 22-28	**[S] 11 to >30**	[S] 0 to >30		
Cobia	**[S] 18 to >30**	**[S] 18 to >30**	**[S] 21 to >30**	**[S] 16 to >30**		
Black sea bass	**[S] 30-35**	[S] 8-38 [O] >18		[S] 5.6-30.4		
Bluefish	**[S] 26.7-38 [O] ~33**	**[S] 8-36.2**	**[S] 16-30**	**[S] 16-30**		**[S] >3-4**
Florida pompano	**[S] 31.2-37.7**	[S] 9.3-36.7, [O] >20		[S] 11 to >30		
Gulf flounder	**[S] >21**	[S] 6-35 [O] >20	**[S] 16-25**	[S] 5 to >30		
Pink shrimp	**[S] 12-43**	[S] <1-47 [O] >20	**[S] 21-30**	[S] 0 to >30		
Southern kingfish	**[S] 5 to >30**	[S] 1/2 to >30	**[S] 11 to >30**	[S] 11 to >30		

Bold signifies life stages with a pelagic orientation. [S] = suitable, [O] = optimum
[Sources: NOAA 2001, Funderburk et al. 1991, SAFMC 1998, Pattilo et al. 1997, USFWS species profiles (see literature cited: reference titles beginning with Species life histories and Environmental Requirements), and Wannamaker and Rice 2000]

Foraging

The primary food sources abundant in open waters are decayed plant material (detritus), phytoplankton and zooplankton. Most fish, during the larval stage in particular, consume plankton at some point in their life cycle. Of the 43 species listed in Table 2-3, nearly all larval stages eat phytoplankton or zooplankton. Resuspended benthic microalgae are also an important source of food.[2] The diet of juveniles and adults includes zooplankton (the relatively most common component), detritus, or phytoplankton (the least common). In addition, pelagic fish may consume benthic copepods, mysids, and amphipods as they rise through the water column at night (P. Peterson, UNC-IMS, pers. com., 2003). Some adult fish also forage on other fish. Overall, about 60% of juvenile species and 50% of adult species listed in Table 2.3. eat detritus, phytoplankton, zooplankton, or fish eggs/larvae (NOAA 2001).

In low-salinity estuaries and riverine systems, tributaries are the dominant source of water inputs. Because of this, the foundation of the food chain is typically incoming detritus from the watershed (Fairbanks 1963). Detritus comprises a large portion of the diet of small animals in the water column and on the bottom; these animals are in turn eaten by larger organisms. Estuarine and riverine fish can be characterized as omnivores and opportunistic feeders. Many fish, including the anadromous species, shift their food preferences as they grow. Most of the prey species important to finfish live in the water column. Some of the pelagic estuarine fish that feed on other fish in the water column include weakfish, bluefish, Spanish mackerel, and cobia (NOAA 2001).

Within an estuary, menhaden, anchovy, silversides, striped mullet, and other pelagic species use suspended organic matter exported from the adjacent marshes, SAV, and oyster reefs without physically occupying these structured bottom habitats (SAFMC 1998). The relative contributions of detritus and phytoplankton between the estuarine and nearshore ocean ecosystem are demonstrated by the foraging behavior of Atlantic menhaden. Lewis and Peters (1994) confirmed that the dominant food source for

[2] Refer to the soft bottom section for more information on how soft bottom habitat contributes to water column productivity through benthic-pelagic cycling.

menhaden was detritus in shallow, estuarine systems, but phytoplankton in coastal waters.

A large number of fish inhabits the marine water column as adults. Coastal pelagics, highly migratory species, and anadromous fish species are dependent on the water column for adequate foraging. The boundaries of water masses (coastal fronts) in the nearshore ocean are favorite foraging areas for mackerel and dolphin (SAFMC 1998). King and Spanish mackerel feed on baitfish that congregate seasonally on shoals and natural and artificial reefs. National Marine Fisheries Service (SAFMC 1998) has designated the cape shoals of North Carolina as Habitat Areas of Particular Concern (HAPC) for both mackerels. Anadromous species such as shad, river herring, and striped bass utilize the cape shoals as a staging area for migration along the coast. Large aggregations of striped bass have been documented in the northern, nearshore coastal area of the state during winter months, feeding and resting prior to initiation of an extensive northward spawning migration (Laney et al. 1999; Holland and Yelverton 1973). This wintering ground is shared by the Chesapeake, Hudson, and Roanoke/Albemarle striped bass stocks, and is therefore important to the entire Atlantic coast population (Benton 1992). The water column off the Outer Banks during winter supports an abundance of anchovies and menhaden, weakfish and other sciaenoids, on which the striped bass feed. Laney et al. (1999) considered the existence of an area with such abundant food sources to be critical for building energy reserves for successful migration and reproduction of striped bass.

Refuge

The water column provides a basic, but relatively minor, function as refuge for adult finfish and invertebrates. However, the water column does provide some indirect protection for forage species that need unobstructed, open water for protective schooling behavior (Table 2.5). For example, silversides can create such dense schools that DO concentrations are low enough to repel predators (Fay et al. 1983b). Other areas of low DO can provide refuge for prey species whose predators are less tolerant of low DO. For example, copepods and zooplankton have a high tolerance for low DO, which could impact the food web in areas where the small invertebrates use low DO areas for refuge (Breitburg et al. 1997; Keister et al. 2000). Large expanses of open water can also provide protection for forage species by reducing their encounters with predators. Turbidity in the water column can provide prey species refuge from visual predation (Bruton 1985) (refer to Light and water clarity section above). For example, bay anchovy may be attracted to more turbid areas for the refuge it provides (Livingston 1975). Snags from woody debris or overhanging branches extending from the shoreline provide excellent refuge for fish.

Deep water provides an important refuge from birds that feed in shallow water and protection from colder surface temperatures during winter. Deep, open-water habitats also provide refuge for fish and invertebrates during low tide (Ayvasian et al. 1992). Floating aquatic plants in fresh water such as duckweed may provide refuge for some open water fish. The value of floating plants has been evaluated in marine systems, where *Sargassum* floating in the water column supports a diverse assemblage of marine organisms, including at least 145 species of invertebrates, 100 species of fish, four species of marine turtles, and numerous marine birds (SAFMC 1998). *Sargassum* is concentrated as small patches, large rafts, or weedlines at the convergence of water masses in the coastal ocean, such as those found along "tide lines" near coastal inlets. The greatest concentrations of *Sargassum* patches are found in the Sargasso Sea and on the outer continental shelf of the South Atlantic, although they can be pushed into nearshore waters by winds and currents. Large pelagic adult fish such as dolphin and sailfish feed on the small prey in and around *Sargassum*. This behavior prompts sport fishermen to target *Sargassum* patches.

Areas within the water column that have been found to have a particularly important ecological role or function include inlets, shallow nursery areas, and the nearshore surf zone. *These areas and others should be considered for designation as Strategic Habitat Areas.*

2.3. STATUS AND TRENDS

In North Carolina, news of massive fish kills, increasing events of oxygen depletion and harmful algal blooms caused widespread concern over water quality and fisheries between the late 1980s and late 1990s. The catastrophic events that made news headlines have abated, but the concern over coastal water quality has not disappeared. There are many indications from a variety of sources that the nation's overall water quality is becoming increasingly degraded over time (EPA 2002; Heinz Center 2002). In a recent EPA report on national water quality, using data through 2000, more than one third of the surveyed rivers and one half of all lakes and estuaries were too polluted for swimming or fishing (EPA 2002; <http://www.epa.gov/305b/>, 2003). From 1998 to 2000, the percent of polluted streams increased from 35% to 39% and the percent of polluted estuaries increased from 44% to 51%.

This section briefly describes ongoing water quality and fishery monitoring programs that help determine the status and trends of water column habitat in North Carolina. Status and trends are described in terms of physical and chemical conditions (such as salinity and the presence of nutrients) and fisheries associated with the open water subsystem of water column (i.e., bluefish, Atlantic menhaden).[3]

Physical and chemical environment

Although water quality monitoring data are abundant for North Carolina, differences in sampling methodology, such as duration, magnitude, and parameters studied, complicate comparisons within and among river basins over time. However, information obtained from ongoing state and federal programs allow for some indirect evaluations. At the coast-wide level, water quality evaluations are conducted by DWQ and USGS. Detailed information on water quality within specific coastal river basins is available from DWQ's basinwide water quality plans (<http://h2o.enr.state.nc.us/basinwide/index.html>, 2004).

Statewide and regional water quality monitoring

The status of water quality conditions in North Carolina's coastal waters, as well as the probable causes of water quality problems, is determined primarily by DWQ's use support assessments. Water quality data are collected and summarized by river basin on five-year cycles. The information is used to assess whether waters are supporting their designated use (Use Support). Surface waters are assigned a use support status based on assessment of DWQ's biological sampling (benthic macroinvertebrates and fish); chemical and physical data from surface water monitoring; lake monitoring data; shellfish sanitation surveys; and other information. Impaired waters do not meet one or more water quality standards or some other criterion. If data are inconclusive for a determination of use support, the water body is not rated. If no data are available, the water use support status is "no data."

Because of changes in methodology and in EPA requirements for assessing use support and improvements in analytical methodologies, current use support ratings cannot be directly compared to previous assessments, and trends cannot be readily identified. Division of Water Quality use support assessments give a snapshot of recent water quality conditions and can be used to determine where further studies or different management strategies are needed (DWQ 2000a). The DWQ Use Support status of water bodies is referred to throughout this document as a general indicator of the current condition of some North Carolina coastal waters.

The DWQ use support information reported in this document is taken from the 1998-1999 305(b) report (DWQ 2000a). In this report only one overall use support rating was given for individual water bodies. However, beginning with the 2000 Roanoke River Basin Plan, use support ratings are separated into six categories where applicable. Because of the rotation of river basin plan development, not all river basins have been assessed with this different methodology. Therefore the 2000 305(b) report was used in the

[3] Further information on threats and specific trends in water quality parameters is discussed in the threats section.

CHPP to briefly summarize and compare the general condition of all coastal river basins at one time period. Water quality data will be updated when the CHPP is updated.

The U.S. Geological Survey's National Water-Quality Assessment (NAWQA) was established in 1991 to evaluate the condition of the Nation's estuaries. The Albemarle-Pamlico Study Unit was one of 20 study areas evaluated nationwide. Data for the Albemarle-Pamlico study unit provide an assessment of water quality within each study unit by analysis of historical (pre-1992) and current (1992-95) water quality information. Surface water samples collected from the Coastal Plain and Piedmont and ground-water samples from the Coastal Plain of the Albemarle-Pamlico drainage area were analyzed to characterize current water quality conditions in the basin and identify potential problems in the study area. Because of potential human health and environmental implications, nutrients (nitrogen, ammonia, and phosphorus) and pesticides were the primary focus of the NAWQA effort (refer to Threats section). The study found that, although the water quality conditions tended to be more degraded than the national average, the fish communities were less degraded than the national average. This inconsistency could indicate that inappropriate measures were used to calculate a national fish community index, fish communities in the North Carolina study areas were relatively tolerant to water quality degradation or there were flaws in the water quality testing.

Freshwater and estuarine water quality

As of 2002, surface water quality monitoring stations for freshwater areas within the CHPP area include approximately 145 DWQ ambient stations, 104 USGS stream gauges, 91 NAWQA stations, and 41 Citizen's Water Quality Monitoring Stations (Table 2.14, Map 2.8). Based on total watershed land areas, the mostly heavily sampled freshwater areas are located in the Neuse, Tar-Pamlico, and Cape Fear management units.

Table 2.15 shows the extent to which North Carolina's coastal rivers are able to support their intended uses. Of the total 15,771 freshwater stream miles in coastal river basins, 12,456 miles (94%) were rated by DWQ during 1995-1999. Of the 94% that were rated, 89% were fully supporting their intended uses; seven percent of streams were partially supporting and 1% were not supporting (DWQ 2000a). Current Use Support Assessments by DWQ do not use the "partially supporting" category. Of all monitored and evaluated streams, the river basin with the lowest percentage of fully supporting streams was the Chowan (42%). However, only about half of the stream waters were evaluated in the Chowan river basin primarily because of problems evaluating swamp waters. Recent refinements in the classifications of swamp waters in the Chowan River basin suggest less impairment (DWQ 2001a).[4]

Use-support evaluations in estuaries are based on 119 DWQ ambient stations, nine USGS stations, 31 Citizen's Water Quality Monitoring Stations, and other information sources (discussed below in Threats section). The typical coverage of monitoring stations in estuarine systems is somewhat less than in freshwater streams, particularly in Pamlico Sound, which has only five monitoring stations (Table 2.14). However, it is noteworthy that there are 1,263 DEH bacterial contamination-monitoring stations, which are often the primary basis for use-support ratings in estuaries (P. Fowler, DEH, pers. com., 2002). These DEH stations could provide a more balanced picture of coastal water quality than the lack of estuarine monitoring stations implies (to the degree that fecal coliform contamination indicated other forms of degradation). *There is a need to coordinate and enhance water quality, physical habitat, and fisheries resource monitoring efforts by DWQ, DMF, WRC, USFWS, USGS, NMFS, DEH, and others to determine status and trends of coastal waters and resources. There should also be concurrent efforts to provide a more thorough analysis of existing water quality data at multiple spatial and temporal scales.*

[4] Sources of impairment are discussed in the Threats section.

Table 2.14. Number of freshwater and estuarine surface water quality monitoring stations in North Carolina coastal drainages (as of 2002). The limit of estuarine waters was depicted using the spatial component of the salinity zone data presented in Table 2.2.

Management unit	Number of stations (freshwater/estuarine)						TOTALS	
	DWQ ambient stations	USGS Stream gauge	USGS Water quality	USGS Gauge + water quality	Citizens monitoring sites	Other	freshwater stations	estuarine stations
Albemarle	1/12	1/0	0/0	2/2	2/20	0/X[1,5,7]	12	37+
Chowan	11/3	2/0	0/0	0/0	12/1	X[7]/0	34+	4
Roanoke	17/2	17/1	1/0	3/1	1/0	X[7]/0	52+	4
Tar-Pamlico	20/26	14/0	0/0	0/0	17/5	0/X[2,5,7,8]	67	31+
Pamlico Sound	0/3	0/0	0/0	0/0	0/2	0/X[1,5,7,8]	0	5+
Neuse	30/25	32/1	0/2	3/1	9/17	0/X[3,5,6,7,8,9]	117	64+
Cape Fear	61/4	37/0	0/0	0/0	0/0	29/24[4,6,10,11]	127	28
Core/Bogue	0/12	0/0	0/0	0/0	0/10	0/X[5]	0	22+
New/White Oak	3/17	1/0	0/0	0/0	0/1	0/8[4,5,7]	5	26
Southern estuaries	2/16	0/0	0/0	0/0	0/0	8/29[5,10,11]	2	45
TOTAL	**145/120**	**104/2**	**1/2**	**8/4**	**41/56**	**?**	**387+**	**187+**

[1] = Dare County Surface Water Monitoring program
[2] = ECU Institute of Coastal and Marine Resources stations
[3] = Neuse River MODeling and MONitoring Program (MODMON)
[4] = UNC-W Lower Cape Fear River Program
[5] = DEH microorganism contamination surveys
[6] = Discharge coalition monitoring sites
[7] = National Water Quality Assessment (NAWQA) stations
[8] = FerryMon program
[9] = NCSU Center for Applied Aquatic Ecology (CAAE)
[10] = UNC-W Tidal Creeks Program
[11] = UNC-W Wilmington Watersheds Program

DWQ=Division of Water Quality, USGS=U.S. Geological Survey, ECU=East Carolina University, UNC=University of North Carolina, and DEH=Division of Environmental Health. X=number unspecified.

Table 2.15. Use Support status for streams in each North Carolina portion of coastal river basins (1995-1999).

DWQ river basin	Total Stream Miles	Use Support Totals (Miles)						Not Rated	% of total
		Fully Supporting	% of rated	Partially Supporting	% of rated	Not Supporting	% of rated		
Cape Fear	6,049	4,296	91	286	6	118	3	1,349	22
Chowan	788	332	72	129	28	0	0	327	41
Neuse	3,440	2,133	82	349	13	109	4	849	25
Pasquotank	478	360	88	45	11	3	1	70	15
Roanoke	2,389	1,974	91	185	9	0	0	230	10
Tar-Pamlico	2,335	1,780	96	78	4	2	0	475	20
White Oak	292	266	96	11	4	0	0	15	5
Total	15,771	11,141	89	1,083	9	232	2	3,315	6

Note: DWQ no longer differentiates a "partially supporting" category, so data are not comparable with more recent data.

Table 2.16. Use Support status for estuaries in each coastal river basin (1995-1999).

River Basin	Total acres	Use Support Totals (Miles)							
		Fully Supporting	% of rated	Partially Supporting	% of rated	Not Supporting	% of rated	Not Rated	% of total
Cape Fear	39,200	29,673	76	8,602	22	0	0	0	0
Lumber	4,800	2,178	45	2,622	55	0	0	0	0
Neuse	328,700	296,162	90	32,538	10	0	0	0	0
Pasquotank	868,800	862,813	99	5,987	1	0	0	0	0
Tar-Pamlico	634,000	622,420	99	8,280	1	0	0	3,300	1
White Oak	121,875	109,934	90	11,941	10	0	0	0	0
Total	**1,997,375**	**1,923,180**	**96**	**69,970**	4	**0**	0	**3,300**	0

Note: DWQ now evaluates 6 separate use support rating categories for each river basin and has changed the use support classifications, so data are not comparable with more recent data.

Based on use-support ratings, the water quality of estuaries in North Carolina was considered in overall good condition in 1999 (DWQ 2000a). According to the DWQ 305(b) Report (DWQ 2000a), 96% of North Carolina estuaries were rated as fully supporting, with only 4% rated as partially supporting (Table 2.16). However, several changes in the use support assessment methodology will result in a substantial number of SA waters being downgraded to impaired for shellfish harvesting use support. The only ratings now used are fully supporting or impaired. Conditionally approved waters that in the past were rated as "fully supporting but threatened" or "partially supporting" are now rated as impaired. As an example, from 1995-1999, 10% of the rated waters in the White Oak River basin were classified as partially supporting and 0% were classified as not supporting for overall use support; whereas in 2001, 24% were rated as impaired for shellfish harvest use support. The increase is primarily attributed to the change in methodology, rather than additional shellfish closures.

Ocean water quality

There are a limited number of water quality monitoring stations in North Carolina's ocean waters. Since 2000 the University of North Carolina at Wilmington has maintained eight water quality monitoring stations in Onslow Bay and seven stations in Long Bay through the NOAA-supported Coastal Ocean Research and Monitoring Program (CORMP). There are also four NOAA Coastal-Marine Automated Network (C-MAN) stations in our coastal waters. The C-MAN stations are permanent automated climatic stations that typically record barometric pressure, wind direction, speed and gust, and air temperature. However, some C-MAN stations also measure seawater temperature, water level, wave height, relative humidity, precipitation, salinity, underwater light availability, and visibility. In North Carolina state waters, the only C-MAN station that measures water temperature is located off Cape Hatteras (see <http://www.ndbc.noaa.gov/Maps/Southeast.shtml>, 2003, for list of parameters measured by each C-MAN station). The EPA has three water quality sampling stations off the Outer Banks of North Carolina located approximately five nm off Currituck Beach, Sanderling, and Kitty Hawk. Parameters measured biannually since 1999 include total phosphorus, total nitrogen, chlorophyll *a*, and visibility (G. Gibson, EPA, pers. com., 2001). *To improve our understanding of current conditions in coastal waters, and the effect of estuarine inputs and human activities, water quality monitoring and research on coastal processes in North Carolina's nearshore ocean waters is needed.*

In 1997, the Division of Environmental Health, Shellfish Sanitation Office began a recreational swimming water quality-monitoring program. The purpose of the program is to test for bacterial contamination (total coliform, fecal coliform, and *E. coli*) to determine safety for swimmers. Bacterial

contamination often comes from stormwater discharges along the ocean beaches. There are 33 ocean sampling stations in the northern region, 13 stations in the central region, and 22 in the southern section (Map 2.9a-c). Samples are taken from the surf zone where the public frequently swims. Stations are located near known stormwater outfalls and populated beach communities. In general, the results of the sampling have been within the SB water quality standards (<geometric mean of 200/100 ml MF fecal coliform). It has been necessary, however, to post temporary precautionary swimming advisories along the coast following heavy rain events because of potential contamination from stormwater discharge onto the beach or water.

Fisheries associated with pelagic habitat

Trends in fish abundance may be an indication of changes in water quality. The status and trends of some open water fishery species are described in Table 2.5. Because many variables affect fish abundance, trends in stock status do not necessarily indicate a corresponding trend in water quality. The data necessary for evaluating trends in species abundance come from several sources:

- Fisheries-dependent data on commercial catch and effort (beginning in 1994 with the DMF trip ticket program).
- Fisheries-dependent data on commercial catch from fish house samples (since 1972 for many species).
- Creel survey data on recreational catch collected by NOAA (since 1979) and by DMF (since 1987).
- Fisheries-independent data from several coast-wide biological surveys (conducted by DMF from the early 1970s to the present).

The objective of these programs is to obtain biological and fisheries data on economically important fishes for use in fishery management decisions. Long-term trends in length, weight, and age for each stock are analyzed. The data collected provide information on species composition, relative abundance, distribution, migration, and seasonality of various fisheries. In riverine and estuarine waters, sampling focuses on juvenile estuarine and anadromous fish species, although data on adult fishes are collected from several fisheries. In ocean waters, the primary commercial fisheries sampled include the winter trawl (flynet and flounder trawl) and sink net fisheries. Other programs collect information on the snapper-grouper, coastal pelagic, red drum, beach seine fishery, other fisheries, as well as catch and effort data. The information from the sampling programs is used in conjunction with commercial fishery landings data and recreational fishing surveys to evaluate stock status of important fishery species and to prioritize development of state fishery management plans. A stock status report is issued annually by the DMF.

Of at least fifteen pelagic species identified in Table 2.5, nine species, comprising at least eleven stocks, were evaluated for fishery status. Of the ten stocks whose status was known, two were designated as overfished (20%), two as concern (20%), one as recovering (10%), and five as viable (50%) (DMF 2003a, Figure 3.4). Specifically, the Albemarle Sound stock of alewife and blueback herring (classified jointly as "river herring" in the stock status report) and the Central/Southern stock of striped bass were listed as "overfished", while the stocks of American shad and striped mullet were identified as "concern." Viable stocks included those of Atlantic menhaden, Spanish mackerel, king mackerel, and striped bass in the Atlantic Ocean and Albemarle Sound.

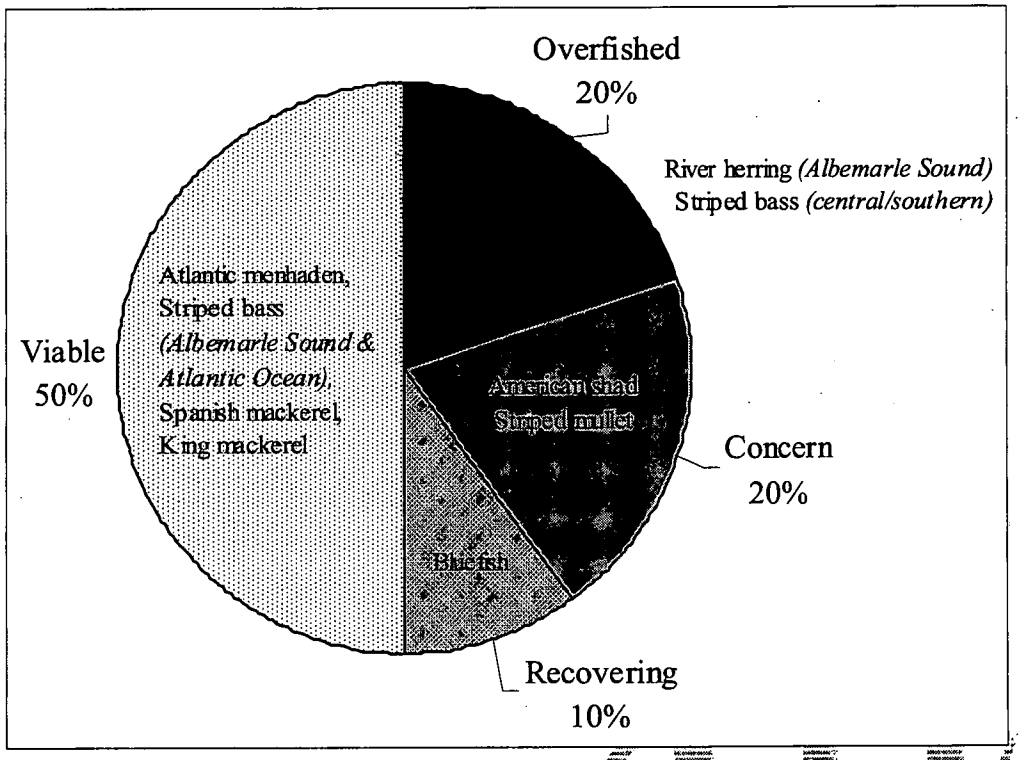

Figure 2.4. Percent of pelagic fish stocks classified as Overfished, Concern, Recovering, or Viable in the 2003 DMF Stock Status Report.

DMF Fishery-independent surveys

DMF conducts several monitoring programs to obtain information on the status of fish species. These programs include the estuarine trawl survey, the Pamlico Sound survey, and the juvenile anadromous survey. The estuarine trawl survey is conducted during May and June at 105 core stations in primary nursery areas. The Pamlico Sound survey samples in June and September at 50-52 random grid locations in Pamlico Sound, Pamlico River and Neuse River. The juvenile anadromous survey, from June to October in western and central Albemarle Sound, includes trawl sampling for juvenile striped bass and seine sampling at 11 core stations for juvenile herring and 19 for striped bass. These surveys collectively provide information on the abundance and diversity of juvenile finfish in North Carolina's estuaries. Juvenile abundance indices (JAIs) are calculated as a standardized measure of catch per unit effort.

Figure 2.5 shows a sharp and consistent decline in blueback herring and a concurrent decline in the commercial catch of river herring beginning around 1986. River herring stocks in the Albemarle Sound Management Area are now considered Overfished and represent a collapsed fishery. The DMF River Herring FMP addressed habitat and water quality issues associated with these species (alewife and blueback herring). Striped bass (Figure 2.6), in contrast to the river herring, indicate a stock that was Overfished during the early 1970s, but is now rapidly recovering as a result of improved management. As a result, both the juvenile abundance index and the commercial catch are increasing. It is important to note that quotas and other fishery management restrictions are limiting the annual commercial landings for both fisheries.

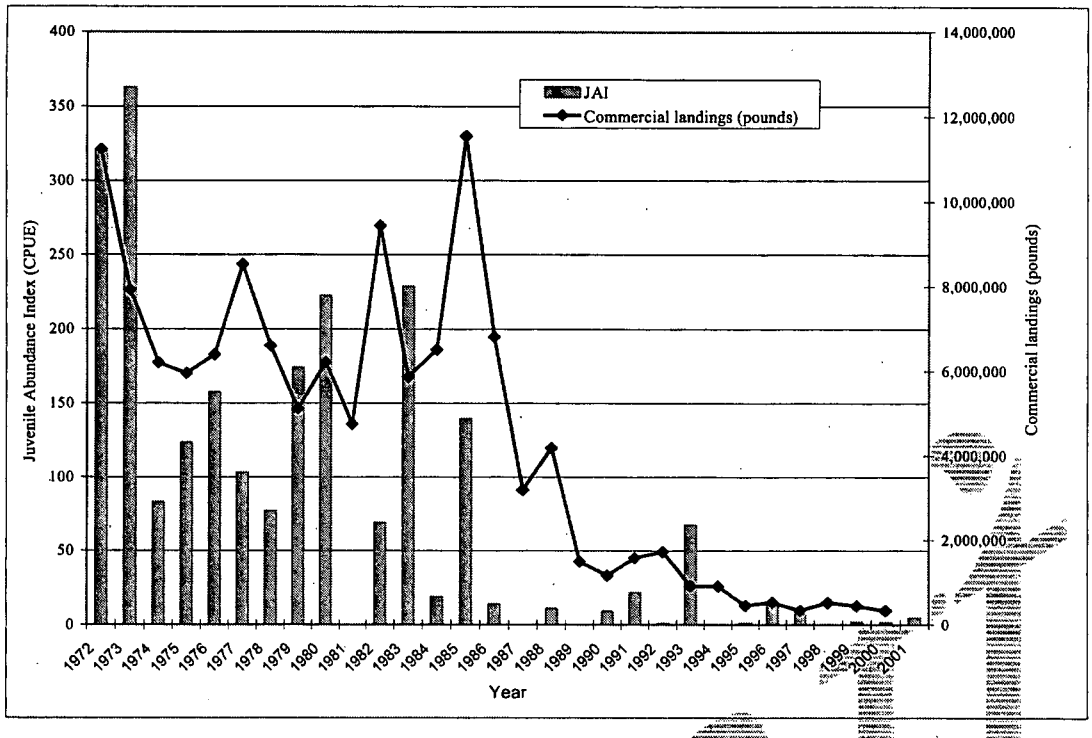

Figure 2.5. Annual North Carolina Division of Marine Fisheries juvenile abundance indices (seine survey) for blueback herring in the Albemarle Sound Management Area and total commercial landings of river herring (alewife and blueback herring), 1972-2001.

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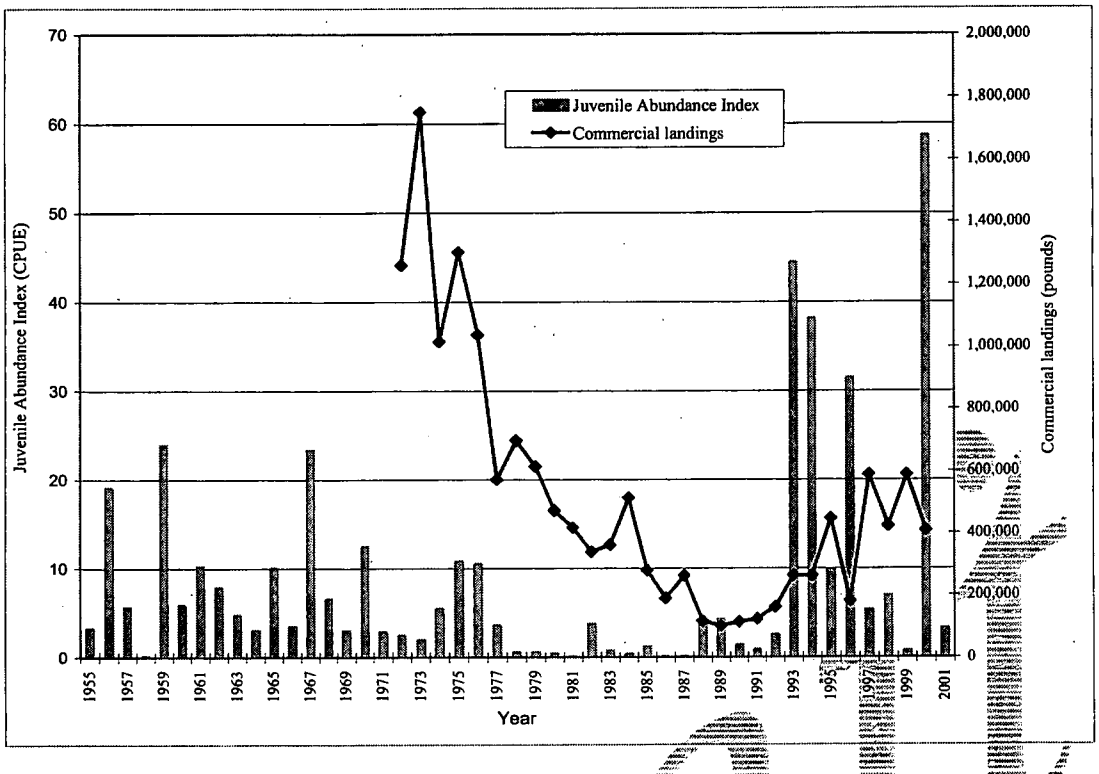

Figure 2.6. Annual DMF juvenile abundance indices of striped bass in the Albemarle Sound Management Area (1972-2001) and total commercial landings of striped bass (1972-2000).

In summary, only half of the predominantly pelagic stocks listed in Table 2.5 are considered viable or recovering stocks. Of the stocks that have a status of Concern or Overfished, the majority are anadromous. Of those anadromous species, river herring (alewife and blueback herring) are the most threatened. For river herring, the suspected causes of stock reductions were both overfishing and degradation of water quality and quantity (DMF 2000c). The only estuarine species of concern was striped mullet. However, potential overfishing (not habitat degradation) is responsible for their concern status (R. Wong, DMF, pers. com. 2002). Juvenile abundance indices of common estuarine species do not indicate clear trends of increasing or decreasing abundance, except for pinfish, which had a large increase in the past few years. However, more apparent trends may be found analyzing data at the watershed or waterbody level (reserved for Management Unit plans).[5]

2.4. THREATS AND MANAGEMENT NEEDS

Human activities can negatively impact fish communities by altering naturally occurring water quality or flow conditions. Hydrological modifications—such as dam and culvert construction; surface water withdrawal; channelization; channel modification; streambank modification; and shoreline erosion—can obstruct fish passage or affect flow and quality of the water column. Pollutant loading from point or nonpoint sources affects the quality of the water column. Drainage projects and point source discharges can also affect the natural distribution and movement of water.

Excessive inputs of nutrients, bacteria, sediment, or toxins, from point or nonpoint sources alike, can lead to visible signs of habitat degradation, including algal blooms, hypoxia, and fish kills. Likewise,

[5] Trends in the condition of the water column will be discussed in the Threats Section.

evidence of the diminished capacity and relative quality of fishery resources is indicated by increased disease incidence, decreased recruitment, lowered reproductive success, or reduced abundance of fish and invertebrates. Threats are organized and discussed in this section by hydrological modifications, water quality degradation, introduced species, and other threats.

The susceptibility of individual fish or invertebrates to threats in the water column will vary by species, lifestage, location, diet, residency, tolerance to change, and the cumulative impact from exposure to multiple stressors. The condition of the water column can affect all other coastal fish habitats. Therefore, identification and evaluation of threats to the water column will aid in protecting coastal fish habitats.

Hydrological Modifications

The ability of various lifestages of fish species to move unobstructed through the aquatic system is a critical component of a healthy water column habitat. Physical structures not only obstruct fish passage but can also alter water flow. The natural flow patterns (volume and timing) of rivers or streams are important mechanisms for maintaining adequate oxygen, salinity, and temperature levels and for dissipating wastes throughout the watershed, including the downstream estuary (DMF 2003b). Unobstructed passage and natural flow patterns are crucial to anadromous species, since they travel great distances and their migration patterns are closely linked to flow conditions. Adult anadromous fish migrating upstream to spawning grounds are generally attracted to higher flows that typically occur in North Carolina rivers in late winter and early spring.[6] Flow pattern alterations, through surface water withdrawal, reservoir storage, or drainage/discharge, affect habitat conditions for anadromous and estuarine fish. Construction of dams, reservoirs, road fill, culverts, bridges, and shoreline stabilization structures can alter flow characteristics or obstruct fish passage. In addition, ground water withdrawals and channelization can alter natural flow patterns.

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Flow regulation

Dams/impoundments

Dams have been constructed throughout N.C. to provide flood control, hydropower generation, water supply, irrigation, navigation, recreation, fish and wildlife ponds, debris and sediment control, and fire protection (DLR, unpub. data). The location of dams is shown in Map 2.10. The majority of dams in North Carolina occur in the upstream portions of estuaries, rivers, and streams. In the coastal plain, dams are most abundant in the upper reaches of the Cape Fear, Neuse, Tar-Pamlico, Roanoke, and Chowan rivers (Table 2.17). These structures primarily impact striped bass, river herring, sturgeon, and shad, migrating upstream to spawn, and the catadromous American eel migrating downstream to spawn. These species often migrate hundreds of miles to reach their traditional spawning sites in rivers, streams, and swamps. Eggs and larvae are less likely to survive if passage to their historical spawning areas is obstructed by dams or other alterations (Moser and Terra 1999). The level of impact on spawning and recruitment depends on the location of the dam, spawning grounds, and species requirements. Large dams located in the main stem of coastal rivers primarily impact striped bass, shortnose sturgeon, and Atlantic sturgeon, which spawn in these areas far upstream. Small millpond dams located along tributaries and narrow streams are more problematic for blueback herring and alewife (river herring), which spawn in the shallow upper reaches of streams or swamp waters. Movements of estuarine-dependent pelagic species, such as menhaden, and coastal pelagics, such as Spanish mackerel, are generally not impeded by dams, although water quality and flow characteristics can be affected in ways that impact them.

[6] Refer to Ecological Role and Function Section for more on the importance of flow in anadromous fish spawning.

Table 2.17. Partial or total obstructions in the water column by Management Unit. *(Source: North Carolina DOT – culverts; North Carolina DWR – dams)*

Management unit	Dams	Pipe culverts	Reinforced Concrete Box Culverts
Cape Fear	1160	324	340
Neuse	596	154	219
Roanoke	445	101	78
Tar-Pamlico	241	83	124
Chowan	21	32	20
Southern Estuaries	4	8	4
New-White Oak	4	19	8
Core-Bogue	1	8	0
Pamlico	1	5	2
Albemarle	0	27	16
Total	**2473**	**761**	**811**

Recently efforts have been made to restore spawning habitat for anadromous species by removing dams that are no longer necessary. In 1997, the Quaker Neck Dam on the Neuse River near Goldsboro was removed, making an additional 74 miles of historic spawning habitat available upstream to the Milburnie Dam near Raleigh. Similarly, the Rains Mill Dam on the Little River in Johnston County was removed in 1999, opening an additional 49 miles of spawning grounds for anadromous species. After dam removal, striped bass spawned further upstream and juvenile American shad used the entire river downstream of the fall line as a nursery area (Hightower and Jackson 2000). Nationwide, about 40 dams have been removed since 1999, and an additional 63 dams in 15 different states are scheduled for removal in 2002. One of these removals is located in a coastal North Carolina drainage, a tributary of Marks Creek in the Neuse River basin (Map 2.10). *This is a positive trend for fish habitat that should be continued.* It is estimated that 30% of the dams in the United States are no longer needed and are more costly to renovate and repair than to remove. Removal has demonstrated almost immediate positive benefits for migratory species (Hightower and Jackson 2000).

Where obstructions cannot be removed, fish passages can be constructed that allow fish to maneuver upstream. In the Chesapeake Bay region, several different types of fish passages are utilized (<http://www.chesapeakebay.net>, 2003). The Denil fishway, which is commonly used in Chesapeake Bay, consists of a series of sloped channels that allow the fish to swim over the dam or obstruction. Wooden baffles are placed at regular intervals within the channels to slow the velocity of the water. There are resting pools between each section of the fishway to conserve the energy of the migrating fish. The necessary slope and length of the fishway is determined by the swimming ability of the predominant species at the site. A fish lift or fish elevator is generally only used at very large obstructions. In this design, a flow of water guides the fish into a large hopper, which then raises the fish over the dam. At the top of the dam, the fish can be released into the river.

In the Cape Fear River, locking procedures were modified and a fishway was installed in 1997 to improve passage of anadromous fish (refer to Appendix H). The U.S. Army Corps of Engineers (COE) has proposed constructing an artificial bypass channel around the lowermost dam (Lock and Dam # 1). The bypass will allow about 10% of the river flow to travel around the dam in a meandering channel that approximates a natural stream (COE 2002). It is not recommended that the dam itself be removed because saltwater intrusion would likely result, impacting the City of Wilmington's water supply. This stream restoration project should greatly benefit habitat conditions for Atlantic and shortnose sturgeon, American shad, striped bass, American eel, blueback herring and hickory shad stocks (COE 2002). Following the construction of the bypass channel, it is hoped that Lock and Dam #2 and 3 can be

removed. *Restoration efforts through removal or modification of dam structures that impede migration of anadromous fish should remain a high priority to continue in North Carolina, focusing on the lowermost structures in rivers or streams, and advancing upstream. In particular, the Cape Fear system (i.e., Lock and Dam #1) should be a high priority, since striped bass, shortnose sturgeon, and Atlantic sturgeon have not recovered.*[7]

Water withdrawals

Water is withdrawn from surface and ground waters for multiple purposes (Table 2.18). Surface water is withdrawn for industrial uses (such as cooling water for nuclear and fossil fuel power plants), municipal water supply, crop irrigation, and other uses. Thermoelectric power generation accounts for the greatest amount of surface water withdrawals. Excluding thermoelectric use, non-agricultural industrial use accounts for the largest source of water withdrawal from both public water supply and self-supplied surface water. Domestic use is responsible for the second largest amount of water withdrawn. Public water supply systems withdraw primarily surface water (633 mgd) and a lesser amount of ground water (135 mgd).

Table 2.18. Most recent estimate of statewide water use compiled by the USGS in 1995, by type of use, in millions of gallons per day (mgd). *(Source: DWR 2001).*

Type of use	Self-supplied surface water	Self-supplied ground water	Public water supply (PWS)	Total
Domestic	0	172	332	504
Commercial	0.3	7.3	138	146
Industrial	308	61	193	562
Mining	4.3	11.7		16
Irrigation	181	57		238
Livestock	207	90		297
Thermoelectric	7,417	0.1	0.4	7,417
PWS losses	-	-	105	105
Total	8118	399	769	9,286

Most surface water withdrawals for power plants or water supply are located in fresh water and associated with a dam or reservoir. Although increasing numbers of potable water intakes are being located in the mainstem of coastal plain rivers (e.g., Neuse, Tar). In some large rivers, such as the Cape Fear, there is a considerable amount of water directly withdrawn from the river for industrial use. The quantity of water removed can be large enough to significantly affect river flow patterns below the intake. The impact of the withdrawal may be offset if treated wastewater or cooling water is discharged back into the same river system. Most cooling water is returned in close proximity to its source, reducing the effect on overall water quantity (DWR 2001). Interbasin transfers could result in large permanent flow reductions (DMF 2003b). Hydropower operations impact water flow conditions for anadromous species by severely altering natural discharge patterns over a short time period. For example, flows on the Roanoke River can increase from 2,000 cfs to up to 18,500 cfs within a few hours, causing rapid change in water depth and temperature, and can quickly affect water levels in adjacent floodplain forest (DMF 2003b). Such drastic changes in flow and temperature can have a major effect on spawning and egg development of anadromous species.

Surface water withdrawal for municipal uses will likely become a major issue for future water conservation. Within the North Carolina portion of the Roanoke River basin, where over half of the total water use is currently derived from surface water, estimated water demand in 43 public water systems is projected to increase 55% by 2020 (DWQ 2001c). Similarly, overall demand for water from public

[7] Refer to Soft bottom section for more information on sturgeon.

sources is forecasted to grow 55%, 70%, and 73% by 2020 for the Tar-Pamlico, Neuse, and Cape Fear River basins, respectively, where surface water presently serves as the primary water supply (DWR 2001). At a minimum, public education is needed to encourage greater voluntary re-use and recycling of water within communities.

The amount of water withdrawn from surface and ground water is tracked through water withdrawal registrations. The Registration of Water Withdrawals and Transfers law (G.S.143-215.22H) requires users who withdraw predetermined amounts of ground and surface water in North Carolina to register annually with the Division of Water Resources (if non-agricultural) or with the Department of Agriculture and Consumer Services (if agricultural) (Table 2.19). Agricultural activities include those "directly related or incidental to the production of crops, fruits, vegetables, ornamental and flowering plants, dairy products, livestock, poultry, and other agricultural products" (G.S.143-215.22H). Because persons or entities who fall below the required use designations are exempt from registration, data obtained from Water Withdrawal Registrations represent minimum estimates of the total water usage.

Table 2.19. Surface and groundwater volumes requiring user registration inside and outside of Central Coastal Plain Capacity Use Area (CCPCUA), North Carolina.

User type	Gallons of water per day (gpd)	
	Inside CCPCUA	Outside CCPCUA
Non-agricultural	> 10,000	≥ 100,000
Agricultural	> 10,000	> 1,000,000

Within the coastal-draining river basins, surface water intakes are permitted in four river basins –Cape Fear, Roanoke, Tar-Pamlico, and Neuse (Table 2.20). The maximum permitted volume of water withdrawal ranges from 73 to 184 million gallons per day (mgd) in the Tar-Pamlico and Neuse, but is more than three times greater in the Cape Fear. The Cape Fear has 27 permitted intakes with a combined maximum flow of 406 mgd. However, these numbers exclude public water supply systems and hydropower facilities. Including public water supply intakes and hydropower facilities, there are at least 33 surface water intakes in the Cape Fear River basin (DWQ, unpub. data; Map 2.11). The North Carolina portion of the Roanoke River and entire Neuse River basin have a similar amount of maximum permitted volume of water withdrawal. Municipal water withdrawals are the largest threat to instream flow in the Cape Fear River. Some of the larger municipalities that receive water from these water intakes include Cary, Apex, Wake County, Fayetteville, and Wilmington. In the Roanoke, withdrawal for power plant use accounts for the majority of the water volume removed. Water withdrawals in the Tar-Pamlico and Neuse river basins are for a mixture of industrial and municipal water supplies. *More research is needed to assess the impact of water withdrawals on water column habitat and fish populations in the affected river basins.*

Table 2.20. Number of surface water intakes and maximum permitted volume of water that can be withdrawn daily (millions of gallons per day) for municipal surface water intake systems in CHPP MUs. *(Source: DWR 2001 and DMF 2003b)*

CHPP MU	Year of data	Number of surface water intakes	Maximum surface water flow (mgd)
Cape Fear	1997	27	405.90
Roanoke (North Carolina portion)	2000	26	147.08 [1]
Neuse	1997	11	183.70
Tar-Pamlico	1997	6	73.30

[1] This figure excludes public water systems and power generating facilities.

Withdrawal of groundwater from wells can also reduce river flows by reducing subsurface flow into

adjacent rivers (Bair 1995; DMF 2003b). Removal of shallow groundwater can be particularly detrimental during low flow periods when subsurface flow is more critical to maintaining baseflow levels. Of the 50 inches of total precipitation per year in this area, it is estimated that approximately 22% enters streams through ground-water seepage, 2% seeps into large rivers and sounds, 10% becomes surface runoff, 66% evaporates, and only 2% percolates into confined aquifers (J. Bales, USGS, pers. com., 2001). These statistics emphasize the significance of ground water seepage in maintaining base flow in streams and the slow process of replenishing aquifers. Eastern North Carolina is experiencing a decline in the quantity of ground water. Between 1989 and 1998 in the Black Creek Aquifer, 10-year reductions in groundwater levels ranged between 3 ft in Greene County and 45 ft in Onslow County. Groundwater levels declined 27 ft decline in Craven County and 22 ft in Beaufort County (J. Bales, USGS, pers. com., 2001). *Assessments of groundwater water supplies in coastal counties should be made to determine what the environmental consequences will be if the increase in water withdrawals continues.*

Effective August 01, 2001, the Environmental Management Commission (EMC) designated 15 coastal counties as the Central Coastal Plain Capacity Use Area (CCPCUA)—Beaufort, Carteret, Craven, Duplin, Edgecombe, Greene, Jones, Lenoir, Martin, Onslow, Pamlico, Pitt, Washington, Wayne, and Wilson—and composed corresponding rules "to protect the long-term productivity of aquifers within the designated area [CCPCUA] and to allow the use of ground water for beneficial uses at rates which do not exceed the recharge rate of the aquifers within the designated area" (15A NCAC 2E .0501). Specifically, to promote the sustainable use of groundwater, "adverse impacts" to existing aquifers are to be avoided or minimized. Examples of adverse impacts include dewatering (i.e., "when aquifer water levels are depressed below the top of a confined aquifer or water table declines adversely affect the resource"), saltwater encroachment, and land subsidence or sinkhole development (15A NCAC 2E .0502). Farming- and non-farming-related users of surface water and groundwater within this area must register if they withdraw greater than 10,000 gpd (Table 2.19). Furthermore, in CCPCUA counties, any user of 100,000 gpd or more of groundwater is required to apply for and obtain a withdrawal permit. Quarterly reporting of groundwater withdrawals and monitoring of groundwater levels are then mandatory requirements for permitted users.

Rules also require reductions in withdrawals from the Peedee, Black Creek, Upper Cape Fear and Lower Cape Fear aquifers, and are being implemented over a 16-year period. One implication is that the demand for high quality surface waters will gradually increase through time. However, permits are not currently required for surface water usage within the CCPCUA. In addition, "intermittent" users are exempted from the groundwater reduction requirements; "intermittent" is defined as "persons who withdraw ground water less than 60 days per calendar year; or who withdraw less than 15 million gallons of ground water in a calendar year; or aquaculture operations licensed under the authority of G.S. 106-761 using water for the initial filling of ponds or refilling of ponds no more frequently than every five years" (15A NCAC 2E .0507). Although several coastal counties (e.g., Hyde, Tyrrell, Currituck, Brunswick, New Hanover) and adjacent aquifers (e.g., Castle Hayne) are omitted from the designated area, the CCPCUA provides a potential foundation for comprehensive, regional conservation of aquifers.

Impingement and entrainment

Cooling water intake systems can cause mortality of fish and other aquatic life by pulling organisms into cooling water systems (entrainment) or trapping them on parts of the cooling water intake structure (impingement). Cooling water intake structures transport surface waters to the intake pump where the force of the water passing through the structure can cause the impingement of organisms. The organisms then suffocate because the water current prevents opening of their gill covers, or die from starvation, exhaustion, or descaling (ASMFC 2002). Fish impinged for a short period can survive or experience delayed mortality from the stress. Protected species, such as shortnose sturgeon, sea turtles, or manatees have also been trapped against or within intake structures. Usually only small organisms, including early life stages of fish and invertebrates, can pass through the mesh screens. The early life stages of fish are particularly vulnerable to damage because their soft tissues offer little protection against thermal or

mechanical stress (EPA 2002). Once entrained, organisms can be subjected to physical, thermal, and toxicity stresses. Studies have shown that very large numbers of fish larvae can be entrained through a power plant and that mortality is high, but varies by species and life stage. Entrainment survival studies found that mortality rates ranged from 2% for naked goby larvae to 97% for bay anchovy (ASMFC 2002). The primary concern of cooling water intake structures is the cumulative impact of multiple facilities on fish populations (ASMFC 2002). For example, in the Delaware Bay estuary, which has four power plant facilities, it was estimated that an average of 14.3 million fish/year were impinged and more than 616 million fish/year were entrained (EPA 2002).

The ASMFC recently formed a Power Plant Panel to conduct a coastwide assessment of the cumulative impact of power plant impingement and entrainment. The results of this workgroup will provide a method for estimating mortality rates based on loss estimates and power plant data. Also, EPA is developing national standards under section 316(b) of the Clean Water Act for cooling water intake structures to ensure that the location, design, construction and water capacity reflect the best technology available to minimize adverse environmental impacts. Standards have already been developed for Phase 1 (new facilities), while Phase II standards for existing electric generating plants using large amounts of cooling water (>50 mgd) are under development. Phase III standards for existing plants that use smaller amounts of water will be developed last. There are 70 surface water intakes for water withdrawals in North Carolina. There are a particularly large number of intakes in the Cape Fear and Roanoke rivers (Table 2.20). In the lower Cape Fear River, a study at the Brunswick Steam Electric Plant found that the combined use of fish diversion structures, fine mesh screens, a fish return system, and flow minimization reduced the number of impinged or entrained larvae and fish by 40–70% (Thompson 2000). The study concluded that the plant operation did not have a significant adverse effect on the fisheries of the Cape Fear Estuary. *Until standards are implemented and effective exclusive technology is available, withdrawals should be reduced as much as possible during and following spawning season in areas known to be used by eggs, larvae and early juveniles. This would include DMF designated PNAs and anadromous fish spawning and nursery areas that are currently being mapped by DMF staff.*

Status and trends in flow regulation

Of the North Carolina coastal river basins, flows are regulated through a combination of dams, reservoirs, and water withdrawals within the Chowan, Roanoke, Tar-Pamlico, Neuse, and Cape Fear river systems. Flows in the Pasquotank, New, White Oak, and Northeast Cape Fear are generally unregulated. All of these rivers historically supported striped bass and other anadromous fish populations (DMF 2003b). Alteration of natural flow patterns by operation of reservoirs and dams can negatively impact fish species. Water releases in the Roanoke River adversely affect flow conditions needed for some anadromous fish species and lower dissolved oxygen levels (Fay et al. 1983a, d; USFWS, unpub. letter 2001). Among other factors, low oxygen levels have been implicated in the decline of the Albemarle/Roanoke River stock of striped bass as well as in fish kill events (USFWS 1992). Status and trends in flow regulation (DMF 2003b) are detailed in Appendix H.

Efforts should continue to remove or modify the lowermost dams in the Cape Fear, Neuse, Tar-Pamlico, and Chowan rivers, in order to increase spawning habitat available to anadromous fish species. *Additionally, new dam construction should be avoided whenever possible or designed and sited to minimize impacts to anadromous fish use and to maintain appropriate flow conditions. Flow alterations that may significantly change the temporal and spatial features of inflow and circulation that are required for successful spawning of anadromous fish should be prohibited. A process that fully evaluates cumulative impacts from water withdrawals and other hydrological modifications should be developed and implemented.* Several other options concerning flow regulation listed in the Striped Bass FMP, which should be implemented (DMF 2003b):

- For free flowing rivers, work with water resources authorities in North Carolina and/or Virginia and South Carolina, as appropriate, to secure commitments for preservation of the unaltered flow regimes.

- For rivers which are presently dammed to such a degree that flow patterns depart significantly from a free flowing condition, require establishment of appropriate flow regimes for striped bass and other anadromous fish spawning and nursery areas, and work with the appropriate regulatory agencies to secure commitments for preservation of such a regime.
- Require water allocation for riverine fish habitat as part of the local water supply planning process and future water allocation processes.

Road fill and culverts

Road construction over rivers, streams, or wetlands often involves blockage of a portion of the original stream. Bridges are the preferred method of crossing over water and wetlands, since they disturb wetlands and obstruct water flow the least. However, bridges can narrow water passages (due to fill placed at the stream edge to support the structure), cause localized erosion, or alter current velocities. Culverts are a common, yet less expensive, alternative to bridges in small water bodies. Depending on the type of culvert and its location, water passages can be partially obstructed. Pipe and box culverts vary in dimensions, but are generally low and narrow passages that reduce light levels in the culverts and constrict water flow. Other concerns are the effects of increased current velocity, erosion around the pipe entrance, vibrations from road traffic, and improper placement of the pipe at height above the natural streambed (Mudre et al. 1985; Clay 1995). Any of these factors may prevent fish from entering the culverts and prevent migration to traditional spawning grounds. However, culvert designs have been improved to minimize impacts from current velocity and erosion (Moser and Terra 1999).

The effect of reduced light from culverts and bridges on river herring migration behavior was examined in a study conducted in tributaries of Albemarle Sound, and Neuse, Pamlico, and Cape Fear rivers in 1999 (Moser and Terra 1999). Results showed that river herring preferred to migrate through areas with some ambient lighting during the day, but required only a low amount of light – at least 1.4% of ambient light. Where lighting was less than 1.4% ambient conditions, avoidance was observed. Light measurements in the center of the structures were below this threshold in six ft diameter corrugated metal pipes and 6' by 6' box culverts. Sufficient light was available in 12 ft diameter pipes and bridges more than one meter above the water surface. Light was marginally adequate in bridges less than one meter above the water surface. Light penetrated approximately ten feet inside the 6 ft diameter culverts. Since the average length of the 6 ft diameter pipes was 54 ft, approximately 30 feet in the center of the pipes was dark. Although culverts may reduce the number of herring passing upstream of the structures, some fish did successfully pass through culverts at night and, in some cases, under low light conditions (<1%) during the day. Culverts and bridge locations in North Carolina are shown in Map 2.12. Table 2.17 summarizes the number of dams and culverts in each CHPP MU.

In 1999, three hurricanes hit North Carolina within a four-week period, causing major flooding in the eastern part of the state. Although the hurricanes were natural events, the magnitude and duration of flooding and the associated human disaster were exacerbated by the extensive man-made modifications to the natural drainage systems (Riggs 2000). Modifications to the drainage system include dams, road blockages, stream channelization, dikes, ditching and draining of secondary floodplains and upland pocosins, and increased impervious surface (reduced infiltration and increased polluted runoff) resulting from urban development (Riggs 2000). In the aftermath of this flooding, it became apparent that culverts also severely slowed drainage pathways.

Because of the observed hydrological impacts, the MFC supported replacement of all temporary stream crossing structures with structures that were "herring friendly", including bridge piling structures and properly designed and situated box culverts. In 2001, an interagency team including staff from DOT, DENR, COE, and other state and federal agencies began meeting to discuss such changes, as well as other changes in permit processing improvements and mitigation. From this effort, the team established an Ecosystem Enhancement Program (EEP), which will manage watershed-based compensatory mitigation

for the entire state, incorporating ongoing monitoring and management of mitigation projects, as well as emphasis on resource preservation and restoration of wetlands, streams, and other resources impacted by DOT projects. *Through this process, additional focus on restoring stream flow and fish habitat through the replacement of culverts with bridges should be accelerated. Funding should be allocated for replacing filled channels and streams with "fish friendly" culverts or bridges and upgrading existing culverts to "fish friendly" structures, prioritizing structures that are known to impede anadromous fish migration to spawning grounds or have been found to be particularly problematic to the natural hydrology of a system.*

Transportation-related activities (e.g., road fill, diversion) have been responsible for altering thousands of stream acres per year, based on 401 water quality certifications (DWQ, unpub. data). The impacts have frequently occurred in headwater streams, which are known to assimilate many times more nitrogen than larger streams within a watershed (Peterson et al. 2001). Using a subset of 426 project records from 1987 to 2003, transportation-related activities accounted for 42% of the total stream distance impacted. The majority of impacts during the 2001/2002 fiscal year were to intermittent (often headwater) streams (WRP 2002). In previous years, the majority of impacts were in piedmont and large urban areas (WRP 2001). Some of the authorized stream impacts were offset by stream restoration. The net distance of stream impacted from 1999 to 2002 was 126,091 linear feet, a very small percentage of total stream mileage in coastal river basins. However, the total stream distance impacted does not address the concentration of impacted stream reaches, which could lead to localized degradation of water column functions for anadromous fish.

Channelization and ditching

Channelization is the deepening and straightening of a natural stream, or dredging of a new channel, to improve drainage of adjacent lands or for navigation (North Carolina Sea Grant 1997). These activities can affect the slope, depth, width and roughness of the channel, disturbing the dynamic equilibrium of the stream. Channelized streams take up less land and allow adjacent wetlands to be drained and used for agriculture. Channelized streams are often deeper, with more extreme flows, less woody debris and less variable depth than natural streams. These changes primarily affect smaller species and early life stages that use shallow stream margins, since these areas are reduced with channelization. Water in low slope areas can back up in the channel and overflow the banks during large storm events, allowing some continued function of the floodplain (North Carolina Sea Grant 1997).

Channelization has a number of impacts on the coastal aquatic environment. By removing the meanders of the channel and increasing the slope of the shoreline, water velocities in the altered stream are higher. Higher water velocity results in higher erosional-energy and downcutting of the channel, which in turn prevents further meandering. Erosion often results in an increased sediment load in the channelized stream, which will be deposited downstream. In many channelized streams in the middle and lower coastal plain, storm flows are confined primarily to the main channel rather than passing through wetlands and achieving some filtration of pollutants and other wetland functions. In addition, the natural woody vegetation along the sides of the stream is often removed in the process of channelization. Consequently, loading and movement of sediment and other nonpoint source pollutants are often greater in channelized sections than natural streams, which can have negative impacts on water quality and therefore fish habitat (EPA 2001; White 1996). Nutrients, particularly nitrogen and phosphorus, may increase with channelization. Elevated water velocities can also deter or prevent movement of adult and juvenile fish. A study in the Tar River, for example, found that high water velocities in channelized sections of a stream prevented the entrance of adult and juvenile herring into those areas (DMF 2000c; Frankensteen 1976). Also, early larval river herring in the tributaries of the Chowan system were found to be highly associated with the stream edge and waters with minimum flow (O'Rear 1983). In addition, the spoil banks created by disposal of spoil along the shoreline prevent fish from accessing sloughs, floodplain forest, and other adjacent wetlands (DMF 2000c).

Due to their typically short length and relatively lower habitat quality, channelized streams generally support fewer fishery resources than unaltered, meandering streams. Several studies have found that the size, number, and species diversity of fish in channelized streams are reduced and the fisheries associated with them are less productive than those associated with unchannelized reaches of streams (Tarplee et al. 1971; Schoof 1980; Hawkins 1980). Pate and Jones (1981) compared nursery areas that were altered and unaltered by channelization and found that brown shrimp, spot, croaker, southern flounder, and blue crab were more abundant in nursery habitats with no man-made drainage. They attributed this to the unstable salinity conditions that occurred in areas adjacent to channelized systems following moderate to heavy rainfall (>1 inch/24 hr). Channelized streams have also been found to have less suitable spawning habitat and reduced recruitment success for anadromous species (Sholar 1975). These observed declines in habitat quality are attributed to the changes in flow characteristics, water quality, and decrease in structural complexity.

The amount of in-stream vegetation, woody debris and streamside vegetation is generally reduced in channelized streams (DMF 2000c). Removal of in-stream vegetation and woody debris reduces the substrate for fertilized herring eggs, the protective cover for adult and juvenile fish, and habitat for invertebrates (DMF 2000c). Macroinvertebrate species richness, biomass and production are higher on snags and debris than any other habitat in Coastal Plain streams. In the Satilla River, Georgia, a typical Coastal Plain river, 90% of the food items and 60% of prey biomass of most large fish are invertebrates dwelling on these habitats (Smock and Gilinsky 1992). Removal of large woody debris also contributes to accelerating water velocity. Streamside vegetation is important as a source of in-stream woody debris and shade from the overhanging tree canopy, which helps maintain cooler water temperatures. Clearing of the woody vegetation along the riparian shoreline will therefore result in less woody debris in the water, higher water temperatures, and reduced bank stability.[8] *De-snagging of woody debris from streams for navigation or other purposes should be minimized to enhance water column habitat value.*

The formation of new channels involves ditching or the creation of vegetated swales (very wide ditches with sloping banks) to control stormwater runoff for urban development, agriculture, or forestry. The ditches often connect and drain into headwaters, altering the natural hydrology of downstream systems. Ditches can degrade water quality and alter flow conditions by moving stormwater from uplands more rapidly, causing pulses of stormwater with lower salinity or high levels of sediment, nutrients, toxic chemicals, or bacteria (Heath 1975; Jones and Sholar 1981). In a Florida estuary, Serafy et al. (1997) found differences in fish community structure from stable salinity habitats versus those adjacent to freshwater canals. The difference was attributed to the varying ability of species to adapt to salinity changes. For example, pinfish were more tolerant of salinity change than spotted seatrout. In tidal creeks with extensive channelization and ditching, the volume and speed of stormwater runoff increased considerably during storm events, and resulted in elevated fecal coliform levels (White et al. 2000).

In coastal North Carolina, channelization activities include drainage and flood control projects, clearing and de-snagging of freshwater streams, creation of ditches and canals for drainage of low-lying agricultural land, dredging of new navigation channels, maintenance dredging of existing channels, road construction, and residential development (DEHNR 1995b). Most streams in eastern North Carolina have been channelized to some extent (North Carolina Sea Grant 1997). North Carolina has a long history of stream channelization and drainage. Many of the original canals and waterways in North Carolina, dating to the 1770s, were constructed for inland navigation. In the late 1800s, a large portion of state-owned wetlands was sold for large-scale timber harvesting. This led to a need for additional drainage required for mechanized harvesting. In addition, a large network of canals and ditches was constructed to drain wetlands for agriculture, following World War II, primarily on the Albemarle-Pamlico Peninsula. These drained wetlands have become the most productive cropland in North Carolina, accounting for more than 50% of the total annual crop yield (North Carolina Sea Grant 1997). Much of the land around the

[8] Refer to the Wetlands section of this plan for more information on the impacts of channelization to wetlands.

Albemarle-Pamlico estuary is drained and must remain drained to accommodate existing agriculture and forestry. It is estimated that over two million acres of land have been drained and developed for agriculture and forestry along the North Carolina coast. Within every square mile of agricultural land in coastal North Carolina there are estimated to be more than 20 miles of field ditches, collector canals, and main canals (Heath 1975 and Daniel 1978). Many of the roads on the Albemarle-Pamlico Peninsula were constructed on top of spoil piles between canals to prevent flooding. Ditching of wetlands or uplands is also common in other areas of the coast for flood control and drainage. In many urbanized coastal areas, ditches are typically constructed along neighborhood streets, which to nearby coastal waters.

There are many policies currently in place that restrict new channelization. Stream channelization for flood control and drainage of low-lying farmland and mosquito ditching are no longer common practices. "Swampbuster" provisions of the 1985 Farm Bill prohibited the practice of draining wetlands for conversion to cropland. However, some stream channelization projects for agricultural drainage are still maintained in North Carolina by drainage districts (DEHNR 1995a). There have been no new drainage projects since the mid-1970s (Chicod Creek, Pitt and Beaufort counties, Tar-Pamlico MU). *New channelization projects should not be constructed unless found to be absolutely necessary and designed to minimize or adequately mitigate any negative habitat and water quality impacts.* Although channelization for flood control and drainage has greatly decreased, the existing alterations continue to alter flow and salinity patterns. *Dechannelization of streams, particularly in areas historically utilized as fish nurseries, implementation of alternative drainage control practices, and acceleration of innovative BMP development are needed where feasible. Increased funding and educational outreach to farmers and other landowners are also needed for such projects.* These habitat enhancements could improve fish productivity and recruitment success.

Ditching for stormwater control and draining of wetlands are regulated by the state. In 1999, DWQ adopted a wetland draining policy to ensure that required wetland conditions are maintained (<http://h2o.enr.state.nc.us/ncwetlands/ditch.html>, 1999). In addition, inspections were made of previously ditched wetlands to determine if the ditching was conducted in a manner that violated wetland standards. Of the 65 ditching projects inspected, there were 24 Notices of Violation issued (SCC 1999). Turbidity was the standard most frequently violated by ditching. Where violations occurred, property owners were required to restore the natural hydrology through the filling of the ditches. Approximately 50% of the ditched wetlands are to be restored, 22% are likely not to be restored, and the status of the remainder is undetermined (J. Steenhuis, DWQ, pers. com., 2002). Fishermen in Brunswick County reported to DMF staff that, for two or three years following wetland ditching, there was a distinct absence of blue crabs and other finfish in a creek receiving newly ditched runoff (D. Beresoff, commercial fisherman, pers. com., 2003). Dissolved oxygen levels were found to be very low (DMF, unpub. data). After several years, however, fishery landings appeared to return to levels similar to nearby unaffected areas. This may be because some of the ditches upstream of the creek had been in violation and DWQ ordered these to be restored. Other ditches, although not appearing to violate water quality standards, continue to transport stormwater into coastal waters. *Additional monitoring, paid for by the party responsible for the ditching, is needed to better assess impacts where extensive areas of wetlands were drained. More DWQ staff are needed to inspect for compliance with the wetland draining policy.*

Dredging (channels, boat basins)

Dredging for channel maintenance, marina basin construction, shipping channels, ports, or mining for sand or minerals has similar impacts to the water column as channelization. Dredged channels associated with ports are generally much deeper and more extensive than other navigational channels. Elevated turbidity during and after dredging can affect juvenile fish by clogging their gills, which can result in mortality or reduced feeding or movement (Ross and Lancaster 1996). Dredged channels act as sediment traps, accumulating fine silt and pollutants (DEHNR 1990). This fine material can easily be resuspended by boat wakes, wind, or periodic channel maintenance. Chemicals, metals, nutrients, and organic matter stored in the sediment can then re-enter the water column, causing short-term increases in turbidity, algal

blooms, and biological oxygen demand (BOD). *The cumulative impact of these episodic increases in turbidity, algal blooms, and biological oxygen demand on fish stocks, including growth, survival, and feeding success of early life stages and visual feeders, is unknown and should be assessed.*

The conversion from shallow to deep water areas can also result in a proportional loss of nursery habitat for some estuarine-dependent species (Rozas 1992). Habitat alteration from dredging may have been responsible for some major reductions noted in brown shrimp (-88%), blue crab (-75%), Atlantic croaker (-45%), and spot (-19%) following dredging for a marina site on Pierces Creek (Neuse River) (DMF, unpub. data). Recruitment of invertebrate larvae, growth of filter feeding invertebrates, and visual foraging for prey by adult and juvenile fish are also affected by turbidity from dredging (Reilly and Bellis 1983; Hackney et al. 1996; Peterson et al. 2000a).

Lindquist and Manning (2001) quantified the effect of dredging on visual foraging by Florida pompano. When pompano were exposed to turbidity levels of roughly 80 NTUs, predation on coquina clams and mole crabs decreased by 40.5% and 30%, respectively. This represents turbidity levels that are conservatively similar to what was generated by a nearby disposal project and substantially above natural turbidity conditions (340 NTUs near the discharge point; 59 NTUs 70 m downstream; 6 – 30 NTUs at upstream control site). Dredging and resulting turbidity plumes occurring near inlets during mid to late winter and spring could potentially impact larval fish survival alongshore and through inlets into estuaries due to gill clogging or exposure to low DO levels, toxic heavy metal concentrations, and sulfides (J. Miller, NCSU, pers. com., 2001). Dredging of borrow areas may also result in anoxic or low-oxygen conditions within the excavated areas, degrading the area for fish use and possibly causing mortality of invertebrates (Lalancette 1984). *Dredging and beach nourishment activities must be managed in a manner that minimizes impacts to the water column and other habitats. Completion and implementation of a DENR Beach Management Plan that is consistent with the CHPP would provide guidelines that minimize environmental impacts.*

There are two major commercial shipping ports in North Carolina which have extensive areas of dredged channels and basins. The ports are located in Morehead City and Wilmington. The dredged areas are as deep as 38 – 44 ft. Navigational channels were dredged through most major coastal water bodies in North Carolina by the COE in the 1930s to create the Intracoastal Waterway. The locations of ports and major navigational channels are shown in Map 2.13a-c. The primary dredging activities still occurring within North Carolina's coastal waters are maintenance or improvement dredging of existing navigation channels (DEHNR 1995a).

Dredging in estuarine waters is prohibited from March to November in order to avoid disturbing the bottom in nursery areas when juvenile fish are present. Navigational dredging in inlets by the COE is allowed at any time of the year and is not subject to any mandatory dredging moratoriums unless sea turtle take quotas are exceeded. Industry-owned hopper dredges working in the Wilmington and Morehead City port areas and Oregon Inlet have a voluntary dredge window of January 1 – May 31, to minimize taking of turtles (T. Wilder, COE, pers. com., 2003; NMFS 1997). Side-cast dredging can be conducted at any time of the year (COE 1979). Seven inlets are maintenance dredged on a regular basis with a hopper or pipeline dredge. Many of the remaining inlets are dredged periodically as needed with a side-cast dredge. Dredged material from the side-cast dredge is moved from the channel's center to its edge (T. Wilder, COE, pers. com., 2003). Material collected from a pipeline dredge is pumped onto a nearby downdrift beach. This method can move larger volumes of sediment, but often cannot be used in the inlets due to rough seas or shallow water depth. Excavated material from a hopper dredge is disposed of in the surf zone along the 10-foot depth contour, or transported to an offshore dredge disposal site. This is the most frequently used method in North Carolina's inlets.

Dredging impacts fish populations by engulfing fish larvae primarily near the bottom. The allowed dredging period during winter corresponds to when ocean-spawned larvae are passing through inlets and

the lower estuaries toward their nursery areas in the upper estuary. However, this time period was selected to minimize sea turtle impacts, DO impacts, and to avoid ecosystem function impacts during the active growing season. While turbidity from dredging may protect young fish from visual predators, it may also expose them to heavy metals and other pollutants stored in the sediment[9] (refer to Toxic chemical subsection later in this section).

Mining

In coastal North Carolina, there are surface, open pit mines for sand/gravel, crushed stone, and phosphate. Sand/gravel and crushed stone mines occur generally in upland areas, although some may be located in or adjacent to wetlands (M. Street, DMF, pers. com., 2004). Sand/gravel mines are the most common mine in coastal North Carolina (<www.geology.enr.state.nc.us/ Permitted%20Mines%201999-2000/permitte.htm>, June 2004). In CAMA counties during 2001, there were 249 permits for sand/gravel mining, seven permits for crushed stone mining, and two permits for phosphate mining. The two phosphate mining permits, totaling 15,952 acres, were for PCS Phosphate in Beaufort County. In the past, whole creeks were lost to PCS Phosphate's mining activities. The open pits created by coastal mines fill with groundwater that is often pumped out into ditches and rivers (G. Cooper, DWR, pers. com., 2004). The discharge can contain sediment, nutrients, and heavy metals. However, the discharge of pollutants from mines is undoubtedly small compared to stormwater runoff from farms and urban/developing areas. Among coastal mining operations, PCS Phosphate is the largest discharger. Before 1992, PCS Phosphate was discharging 50-60 million gallons/day of phosphate-rich water into Pamlico Sound (Steel 1991). This nutrient-rich effluent was contributing to eutrophication of the Pamlico River. Today, PCS Phosphate uses a water recycling process that has greatly reduced discharge of nutrients.

The focus of mining activities in coastal waters has been mostly limited to sand acquisition for beach nourishment projects. Dredge material from inlet and other navigation projects is also used for beach protection purposes.[10] In addition, there are currently two areas in North Carolina ocean waters that are used as sand sources (borrow areas), one off Carolina Beach and the other off Bogue Banks. Another borrow area has been proposed off Bodie Island. Impacts of dredging to intertidal beach, soft bottom, and hard bottom are discussed in those sections of the plan.

Log salvage operations are a form of mining involving removal of submerged logs from lakes, rivers, or estuaries. In North Carolina, log salvage operations have been permitted in the Cape Fear, Roanoke, and Perquimans rivers. The major concern with the removal of logs is the procedure's effect on water quality. The Log Salvage Policy Development Team was created by DENR, in response to growing interest by commercial operations in this industry, to assess the potential impacts of this activity and to establish the most appropriate permit process. Their habitat and water quality concerns included (DENR 2000c):

- Increased turbidity and sediment loading could negatively impact the integrity of anadromous fish spawning and nursery areas, SAV, and waters classified as NSW.
- Resuspension of sediments with toxic materials released into the water column could impact fishery resources or their prey.
- Where located above the surface, removal of woody debris and structure used by anadromous and resident fish reduces its habitat value.

Log salvage operations may also need to be restricted from anadromous fish nursery areas, due to the primarily freshwater distribution of those species. The Log Salvage Policy Development Team made recommendations to minimize adverse impacts to aquatic systems. Recommendations affecting water quality include:

[9] Refer to: Corridor function subsection under Ecological Role and Function section; Light and water clarity subsection of Ecological Role and Function section; Toxic chemical subsection later in this section.

[10] Refer to the Soft Bottom section for more detailed discussion of beach nourishment.

- Preparing a programmatic EIS for log salvage operations as a comprehensive approach to provide sufficient information to decide permit approval.
- The Secretary of DENR should adopt BMPs and operation conditions developed by the Team until appropriate policies can be implemented.
- Address impacts on a regional scale in North Carolina, with consideration of the variety of aquatic habitats and living resources.
- Log salvaging should be prohibited in areas with SAV or shell bottom. A seasonal moratorium should be established regionally, to avoid salvage operations during peak fish spawning and juvenile recruitment periods.

Jetties

Jetties can potentially interfere with the passage of larvae and early juveniles from offshore spawning grounds into estuarine nursery areas. Approximately 60 species of larval fish and 34 species of juvenile and adult fish have been documented moving through Beaufort Inlet, Ocracoke Inlet, and Oregon Inlet in the winter and an even greater number of species during the summer months (Peters et al. 1995; Hettler and Barker 1993). Successful transport of larvae from fish spawning on the continental shelf through the inlet occurred within a narrow zone parallel to the shoreline and was highly dependent on along-shore transport processes (Blanton et al. 1999; Churchill et al. 1999; Hare et al. 1999). Obstacles such as jetties adjacent to inlets block the natural passage for larvae into inlets and reduce recruitment success (Blanton et al. 1999; Kapolnai et al. 1996; Churchill et al. 1997). Impacts may be greatest in coastal areas like the Outer Banks, where there are few inlets. Offshore spawning, estuarine-dependent species that might be impacted by jetties include many of North Carolina's most important commercial and recreational fish species such as menhaden, spot, Atlantic croaker, shrimp, gag, black sea bass, and flounders.

Most of North Carolina's inlets do not have jetties. There is a long dual jetty system at Masonboro Inlet and single groins at Beaufort and Oregon inlets (Map 2.14). There is also a jetty at Cape Lookout, although it is not immediately adjacent to Barden's Inlet. The Oregon Inlet project proposed to lengthen the existing groin and add a similar jetty on the other side of the inlet. Miller (1992) and Settle (NMFS, unpub. data), in reviewing the potential impacts of a dual jetty system at Oregon Inlet, estimated that successful passage of winter-spawned, estuarine-dependent larvae through Oregon Inlet could be reduced 60-100%.

The jetty construction's effect on fisheries has been discussed and reviewed at length by the scientific community in association with the proposed construction of a dual jetty system at Oregon Inlet (COE 1999). In the latest EIS (COE 1999), The Fish and Wildlife Coordination Act Report concluded that the Oregon Inlet project should not be constructed because of, among other concerns, the impact of jetties on larval fish passage. Although there are conflicting opinions on the magnitude of fisheries impacts of a dual jetty system at Oregon Inlet, there is valid concern that construction of the structures would prevent some portion of ocean spawned larvae from reaching estuarine nursery areas (COE 1999). Construction or lengthening of jetties, particularly where inlets occur infrequently along the coast (for example, Oregon Inlet), could lower successful fish recruitment and fishery productivity (Blanton et al. 1999; Churchill et al. 1997; Kapolnai et al. 1996). *Construction of new or expanded jetties or groins along North Carolina's ocean shoreline should not be allowed until field research has been completed to assess the impact of jetties on successful larval passage through inlets into estuaries, particularly in Pamlico Sound where inlets are limited. Environmental outreach to the public, particularly commercial and recreational fishermen, regarding the effect of inlet stabilization on coastal fish habitat is needed to educate the public on this issue and gain support for maintaining natural barrier island processes.*

Shoreline stabilization

Shoreline stabilization using vertical structures, such as seawalls on the ocean shoreline or bulkheads on the estuarine shoreline, can impact the condition of the nearshore water column in several ways. During

construction, soil disturbance may increase turbidity in adjacent waters and reduce light penetration. This can reduce primary productivity, interfere with respiration and feeding of fish and invertebrates, release heavy metals that may occur in the sediment, and smother aquatic vegetation (Watts 1987). Although shoreline stabilization structures may retain eroding sediments from land, the continual scouring of sediment at the base and downdrift of the structure may resuspend sediment, chronically elevating turbidity adjacent to bulkheads (Watts 1987; Clark 1974). The scouring action at the toe of seawalls and bulkheads results in deepening of the adjacent water, reducing or eliminating shallow water habitat preferred by many juvenile fish (SAFMC 1998; DMF 2000a). *The state should enforce the prohibition of hardened structures on the oceanfront. In addition, existing seawalls and hardened structures on the oceanfront should be removed if they are more than 50% damaged and if removal will be beneficial to coastal fish habitat. Where shoreline stabilization structures such as rock revetments, sills, or bulkheads are allowed adjacent to fringing wetlands, permit conditions should require openings in the structures to allow adequate fish ingress and egress and water circulation. To minimize impacts to the water column and its functions, CRC estuarine shoreline stabilization regulations should be modified.*[11]

Water Quality Degradation

In addition to altering erosion and sedimentation dynamics, human activities can and often do change the chemistry of the water. Changes in chemistry causing degradation of water quality can originate from defined points such as industrial or wastewater discharges (point sources) or from land-use patterns contributing pollutants by sheet flow or through drainage features (nonpoint sources). The primary point source pollutants are oxygen-consuming wastes, nutrients, and toxins, including chlorine, ammonia, and metals. A National Pollutant Discharge Elimination System (NPDES) permit is needed for all point source discharges. Most NPDES discharges treated municipal or industrial wastewater (Map 2.15).

Nonpoint source pollution is pollution that enters waters through diffuse sources with no defined point of entry. Nonpoint pollutants are generally carried into waters by rainfall, runoff, snowmelt, or air deposition. Stormwater drains and swales also carry polluted stormwater into coastal waters, but are technically considered nonpoint sources. Unlike point sources, nonpoint pollutant loading varies with weather patterns and land disturbance. The North Carolina Coastal Nonpoint Source Program categorizes nonpoint pollution by land activities:

- Hydromodification (drainage ditches),
- Agriculture,
- Forestry,
- Marinas, and
- Urbanization.

Each activity associated with these categories can contribute multiple pollutants. Sediment and nutrients are most often associated with nonpoint source pollution, but other pollutants, including fecal coliform bacteria, toxic chemicals such as heavy metals, oil, and pesticides, may be carried into coastal waters as well (DWQ 2000a). The biological impacts and human sources associated with these pollutants are discussed below, as well as status and trends.

Land cover and water quality

Land cover and water quality within a watershed are closely linked (EPA 1992). Table 2.21 below provides a brief overview of some river basin characteristics (population, land cover), and major water quality problems that were noted in the summaries of the river basin plans. When considering the overall population of each river basin, the Neuse and Cape Fear river basins are the most densely populated, and the Chowan and Pasquotank are the least populated. The distribution of population is not even; there are

[11] Refer to the Wetlands and Soft Bottom Sections for more information on the impacts of shoreline stabilization to those coastal fish habitats and the status of this activity.

Table 2.21. Overview of coastal river basin conditions based on population, land use, and major nonpoint water quality problems. *(Source: DWQ Basinwide Plans 1999-2002)*

River basin[1]	Population[2]	Population density (persons/mi²) 1990	Major water quality problems noted in most recent basinwide plan	Land cover[3] Type	% within basin (1997)	% change since 1982
Neuse (DWQ 2002)	1,320,379	211	Nutrient enrichment from urban build-up agriculture, hydromodifications Low DO Fecal coliform contamination	Urban/built	13.1	+ 89
				Cult. crop	23.9	- 17
				Uncult. crop	1.5	+ 311
				Pasture	3.7	+ 16.7
				Forest	44.9	- 7
				Federal	2.3	+11.6
				Other	10.6	+1.5
Cape Fear (DWQ 2000)	1,494,011	163	Large increase in urban development riparian vegetation, storms Large increase swine population Low DO	Urban/built	8.8	+ 43
				Cult. crop	18.2	- 8
				Uncult. crop	1.1	+ 18
				Pasture	4.8	- 3
				Forest	56.1	- 5
				Federal	0.0	0
				Other	8.8	+ 17
White Oak (DWQ 2001)	146,240	141	Fecal coliform contamination Increase in urban development	Urban/built	8.1	+ 81.6
				Cult. crop	4.9	- 15.1
				Uncult. crop	0.4	+ 490.0
				Pasture	0.4	+ 170.6
				Forest	29.1	- 9.7
				Federal	19.9	0
				Other	37.3	- 0.8
Roanoke (DWQ 2001)	335,194	107	Habitat degradation, erosion control Increasing development Water flow regulation	Urban/built	6.1	+ 132.8
				Cult. crop	17.0	- 21.8
				Uncult. crop	2.1	+ 86.1
				Pasture	3.9	- 21.2
				Forest	61.5	- 0.2
				Federal	0.9	+ 19.5
				Other	8.5	+ 17.7
Tar-Pamlico (DWQ 1999)	364,862	80	Low DO Fecal coliform contamination Nutrient enrichment	Urban/built	1.0	+ 62
				Cult. crop	22.0	- 7.7
				Uncult. crop		+ 158.9
				Pasture	3.0	- 15.1
				Forest	55.0	- 3.9
				Federal	0.0	0
				Other	20.0	
Lumber (DWQ 1999)	259,539	78	Large increase in Brunswick Co. population Large increase in swine population	Urban/built	6.0	+ 48.8
				Cult. crop	26.1	- 6.4
				Uncult. crop	0.7	- 0.7
				Pasture	1.5	- 16.7
				Forest	59.1	- 0.3
				Federal	0.8	0
				Other	5.9	+ 5.4
Chowan (DWQ 2002)	61,034	48	Nutrient enrichment from agriculture Habitat degradation Low DO and pH - swamp waters	Urban/built	2.8	+ 62.1
				Cult. crop	32.6	- 0.8
				Uncult. crop	0.2	+ 150.0
				Pasture	1.0	- 23.8
				Forest	54.9	- 1.0
				Federal	0.0	0
				Other	8.6	- 2.0
Pasquotank (DWQ 2002)	118,912	46	Fecal coliform contamination Increase in urban development	Urban/built	3.3	+ 86.2
				Cult. crop	21.3	- 11.4
				Uncult. crop	0.0	+ 10.0
				Pasture	0.3	+ 71.8
				Forest	23.9	- 26.5
				Federal	13.2	+ 293.3
				Other	37.9	- 0.5

[1] Data taken from most recent DWQ basinwide plan available at time of writing

[2] Population data for Tar-Pamlico, Lumber, White Oak are from 1990, while others are from 2000 census.

[3] Land cover data from USDA-NRCS, NRI. Change since 1982 compared to 1992 data for Lumber, Tar-Pamlico, and Cape Fear , and 1997 data for others

watersheds. So while impervious cover is overestimated by the NRI classifications, percent imperviousness is underestimated for the areas that most influence coastal waters. *These numbers indicate that water quality problems associated with development and excessive impervious cover will continue to worsen unless improved land-based strategies that reduce nonpoint source pollution are voluntarily utilized at a local level. Such strategies could include providing incentives for low impact development, improved BMPs and other techniques.*

Table 2.22. Percent increase and percent coverage of the NRI's urban/built-upon + rural transportation land cover classes within North Carolina's coastal drainages.

USGS hydrologic unit	% increase (1982-1997)	% Urban/built-up and rural transportation[1] 1997 (measured)	2012 (predicted)
Upper Neuse	91.8	**24.8**	**47.6**
Haw	50.21	**23.8**	**35.7**
Carolina Coastal-Sampit	131.58	**20.5**	**47.5**
Upper Cape Fear	78.71	**15.1**	**27.0**
Deep	47.14	**13.2**	**19.4**
Upper Dan	87.04	**12.7**	**23.7**
New	33.23	**11.9**	**15.8**
Lower Tar	60.82	**11.8**	**19.0**
Upper Tar	81.03	**10.7**	**19.3**
Roanoke Rapids	77.55	**10.3**	**18.2**
Contentnea	51.27	9.5	**14.4**
Lower Cape Fear	66.5	9.4	**15.7**
Middle Neuse	43.03	8.9	**12.7**
Bogue-Core Sounds	89.58	6.8	**13.0**
Northeast Cape Fear	54.38	6.6	**10.2**
Middle Roanoke	139.22	6.2	**14.7**
Lower Dan	92.36	5.8	**11.2**
Lower Roanoke	41.02	5.8	**8.1**
Black	62.57	5.6	**9.2**
Lower Neuse	36.31	5.6	7.6
Pamlico	30.58	5.3	6.9
Meherrin	32.77	4.7	6.3
Albemarle	62.4	4.1	6.6
Chowan	33.33	3.9	5.2
Fishing	28	3.9	5.0
Pamlico Sound	83.72	1.3	2.4

[1]This land cover classification represents a close approximation of percent impervious cover, but could somewhat overestimate in some areas.

USGS HUs in **bold** were >10% urban/built-up and rural transportation in 1997.
USGS HUs in *italics* are predicted to reach >10% by 2012.

Any activities which alter vegetated riparian buffers can affect water quality. Logging operations, particularly clear-cutting and stream crossing, can also cause considerable hydrological and water quality change to freshwater and brackish streams. A study of Goshen Swamp, a Coastal Plain blackwater stream that was clearcut, found that the clearcut caused violations of ambient N.C. water quality standards for turbidity, chlorophyll *a*, fecal coliform bacteria and DO compared with a control stream (Ensign and Mallin 2001). Despite a 10 m (33 ft) buffer left along the streambank, these violations occurred over a two-year period following the clearcut. The buffer was less than the state BMP recommending a 50 ft minimum buffer. Desbonnet et al. (1994) summarized studies documenting the different benefits of various buffer widths. Scientific literature suggests that minimum buffers between 26 ft (8m) and 75 ft (23 m) wide are needed to protect water quality and riparian habitat from logging impacts (Desbonnet et al. 1994; Ensign and Mallin 2001). In the Neuse, Tar-Pamlico, and Catawba river basins, there is a mandatory buffer of 50 ft from mean high water, with exemptions for managed forests and selective harvesting of high value trees. *Mandatory 50 ft buffer zones should be required along all streams*

draining to coastal fish habitat in North Carolina.

All forestry-related land-disturbing activities, regardless of river basin, must be conducted in accordance with forestry practice guidelines related to water quality to qualify for exemption from Sedimentation Pollution Control Laws. A streamside management zone must be established and maintained wide enough to confine visible sediment resulting from accelerated erosion. The guidelines included a recommended buffer of 50 ft, which is not always followed (Ensign and Mallin 2001). *Therefore, increased funding and incentives are needed to encourage compliance with forest practice guidelines. In addition, converted riparian wetland areas should be restored or enhanced to increase filtration and retention of upland runoff.*

Nutrients

Nutrients are chemical compounds or elements that are needed for growth of living organisms and are beneficial in appropriate amounts. Nitrogen and phosphorus are the major plant nutrients responsible for regulating growth of phytoplankton, algae, and other marine plants (DeAngelis et al. 1989). Most North Carolina estuaries already have relatively high nitrogen levels; adding nitrogen to those systems may degrade water quality. Freshwater systems tend to be limited in ability to receive added phosphorus without adverse effects (North Carolina Sea Grant 1997). While a certain level of these nutrients is needed to support aquatic life, an overabundance of nutrients due to human activities may have a negative impact on the environment. Nutrient overenrichment and the resultant problems are called eutrophication.

Nutrient enrichment is a problem to coastal fish habitat for several reasons. Elevated nutrients can trigger a rapid increase in phytoplankton, resulting in algal blooms. Blooms tend to occur when water temperatures are warmer, water flow is slower, and where mixing of the water column is reduced due to salinity or temperature gradients. In freshwater areas, blue-green algae are usually associated with blooms, and they have lower nutritional value to aquatic life than other types of algae. In estuarine and marine waters, dinoflagellates are usually responsible for algal blooms (North Carolina Sea Grant 1997). With nutrient enrichment, there is a shift in the dominant plant community from slower growing SAV and perennial macroalgae to faster growing phytoplankton, microphytobenthos, and ephemeral macroalgae (Duarte 1995). Another direct effect of eutrophication on estuaries is the increased biological oxygen demand resulting from the sedimentation and resuspension of accumulating organic matter (Gray et al. 2002). Nutrient enrichment and algal blooms are therefore often accompanied by oxygen depletion.

Elevated levels of phytoplankton in the water column reduce water clarity. Reduced water clarity reduces successful feeding by some visually orienting fish (Peterson et al. 2000a). When light penetration is sufficiently reduced, survival and growth of submerged aquatic vegetation can be impacted. Other indirect effects of nutrient enrichment include changes in the biomass, community structure, growth and reproduction rates of invertebrates, and change in the organic carbon inputs and biogeochemistry of the sediments (Cloern 2001). Algal blooms are also aesthetically undesirable to the public; the unpleasant odor and degraded visual appearance of the water's surface (green scum) discourage swimming, boating and fishing.

Some dinoflagellate species release toxic chemicals into the water column. Neurotoxins from algae, released into the water upon death, harm fish and shellfish by affecting their nervous systems and paralyzing their respiratory systems (Tyler 1989). Organisms such as clams, oysters, and some benthic fish can die of suffocation because of nervous system paralysis. Humans that eat contaminated seafood can also experience neurological symptoms (Tyler 1989). These blooms are sometimes referred to as "red tide" because the dinoflagellates can make the water appear red in color. In 1987, there was a large red tide event in North Carolina waters attributed to Gulf water intrusion into nearshore waters, carrying the toxic dinoflagellate *Karenia brevis* (Tyler 1989). This event resulted in contamination of shellfish and coastal fish consumption advisories for an extensive time period, significantly impacting several North

Carolina fisheries. Globally, the incidence and frequency of red tides has increased in recent decades. Eutrophication is considered to be partially responsible for this increase, as well as transport of algal bloom species through ship ballast water (Hallegraeff 1998).

Another toxic dinoflagellate, *Pfiesteria piscicida*, may have contributed to a number of large fish kills in North Carolina estuarine waters since the late 1980s. *Pfiesteria* produces a toxin that could be responsible for large fish kills (Burkholder et al. 1992a). Since then a second species, *Pfiesteria shumwayii,* has been discovered, and fish kills in Chesapeake Bay have been attributed to these organisms (Glasgow et al. 2001). Other studies suggest that the mechanism of fish mortality in *Pfiesteria* is actually micropredation, rather than toxin release (Vogelbein et al. 2002). There is not full scientific consensus on the human effects of *Pfiesteria* exposure (Gratten et al. 1999; Rubin et al. 2001). Burkholder et al. (1995), Burkholder and Glasgow (1997), and Glasgow et al. (2001) provide data on numerous estuarine fish kill events, including number of fish killed, concentrations of *Pfiesteria*, DO and nutrients present at the site, whether toxicity of *Pfiesteria* was confirmed by subsequent laboratory bioassays, presence of lesions on fish, presence of other potentially toxic algal species, and water temperature. It is important to note that, since *Pfiesteria* abundance is stimulated by nutrient loading into estuaries, the occurrence of *Pfiesteria* is not independent of other eutrophication effects (Burkholder and Glasgow 1997; Glasgow et al. 2001). Low DO has also been documented to cause large fish kills in areas where *Pfiesteria* was also present (Paerl et al. 1998) (refer to oxygen depletion section). Conditions such as bacterial, viral, parasitic, and fungal infections, ammonia toxicity, chemical pollutants, sudden changes in temperature or salinity, and bycatch from commercial fishing are also possible causes of fish kills.

Fish sampling was initiated in 1998 by DWQ, DMF and NCSU to determine the occurrence of and species impacted by *Pfiesteria* and ulcerative mycosis (UM) in three estuarine systems with a history of large fish kills – Neuse, Tar-Pamlico, and New rivers. Lesions were found to be most common on menhaden and occurred on fish captured in areas with low to moderate salinities within the Pamlico River (Noga et al. 1989). Similar signs of disease were found on fish representing 19 species, including southern flounder, striped bass, weakfish, spot, croaker, silver perch, bluefish, pinfish, gizzard shad, and hogchoker. Both benthic and pelagic species were affected. The observed incidence of disease ranged from 10.0% in the Pungo River to 33.0% in the middle Pamlico River; 18.2% in the lower Neuse to 44.2% in the upper Neuse River; and 3.9% in the upper to 10.2% in the middle of the New River (DMF 2000b). Disease incidence was highest in May in all river systems, followed by the months of November and December. The presence of low DO, a stratified water column, increased phytoplankton, and active fertilizer application and pesticide spraying on farmland in the spring may have increased stress levels in fish, leading to increased disease in May (DMF 2000b). While skin ulcers were the most frequent abnormality observed in fish, fin erosion, abnormal pigmentation, tumors, skeletal abnormalities, and operculum damage were also reported.

Sources of nutrient enrichment

Nutrients enter surface waters from point and nonpoint sources. While point sources are highly regulated and effluent quality has improved over the years, nonpoint sources have only recently been recognized as significant contributors to eutrophication and are more difficult to control because of the diffuse pathways into coastal waters. Primary point sources of nutrients are (DWQ 2000b):

- Municipal wastewater and stormwater discharges; and
- Industrial wastewater discharges.

There are a total of 901 NPDES discharges into coastal waters covered by the CHPP management area (Map 2.15). Of these, 74 are major and 75 are minor municipal NPDES discharges. There are also 143 major and 609 minor non-municipal NPDES discharges within the CHPP. Non-municipal discharges include those from water treatment plants, fish houses, reverse-osmosis plants, phosphate mines and industrial activities. Nutrients also enter water from spills, plant failures, or inadequate treatment. In

2002, a relatively dry year, there were 2,047 spills reported from government or private waste collection systems that reached surface waters, totaling 56.9 million gallons (DWQ, unpub. data). In wet years, the totals are generally larger. The Albemarle-Pamlico National Estuarine Program's Status and Trends Report (Steel 1991) listed point sources as the cause for degradation in 12% of evaluated streams. *Loading of nutrients into coastal waters from mechanical failures, spills, and inadequate treatment must be reduced. This will require additional funding to upgrade plants and infrastructure. Increased inspections of sewage treatment facilities, collection infrastructure, land disposal sites, and onsite wastewater treatment facilities is necessary to identify and prioritize sites needing upgrades.*

There are numerous nonpoint sources of nutrients. Agriculture is believed to be the single largest contributor of nutrients in watersheds of the southeastern United States (SAFMC 1998). The primary land use activities that contribute nonpoint delivery of nitrogen and phosphorus to North Carolina waters are (Spruill et al. 1998; USDA 1997; Steel 1991):

- Agricultural fertilizer from crop production;
- Livestock waste from concentrated animal operations;
- Urban development (lawns, pets, sewage, golf courses); and
- Air emissions from industry and vehicles.

Nutrients enter coastal waters through stormwater runoff, air deposition, groundwater discharge and rainfall. In the Albemarle-Pamlico system, nonpoint sources are estimated to account for the majority of the nutrient loading (94% for nitrogen and 84% for phosphorus) (Spruill et al. 1998). Precipitation accounts for about 20-30% of the total nitrogen inputs from nonpoint sources in the Albemarle-Pamlico basin (Spruill et al. 1998). Sources of nitrogen in the air and rain are car exhaust, industrial emissions, and waste from animal operations (USGS 2003). Within the coastal river basins, 44.7% of the impaired miles of freshwater streams in 1998-1999 were related to agricultural runoff (cropland and animal operations) (Table 2.23).

In a study of the Albemarle-Pamlico estuarine system, the four major river basins (Chowan, Roanoke, Tar-Pamlico, and Neuse) contained elevated concentrations of nitrogen and phosphorus (Spruill et al. 1998). Crop agriculture and animal operations were estimated to contribute approximately 50% of the nitrogen load and 75% of the phosphorus load. The effect of crop agriculture on water quality depends on the specific crops grown, weather, and the use of Best Management Practices (BMPs) (Steel 1991). The acreage of cultivated crop agriculture in coastal North Carolina has remained about the same or declined since the early 1980s. In addition, use of effective BMPs is increasing primarily due to availability of funds and technical assistance from multiple programs administered through the U.S. Department of Agriculture, Natural Resources Conservation Service, North Carolina Department of Agriculture and Consumer Services, and North Carolina Division of Soil and Water Conservation (DSW). *However, because of the large percent of nutrients attributed to crop agriculture, aggressive steps should continue to reduce nutrient loading.*

While crop production has declined in North Carolina's coastal plain, animal operations have greatly increased in the past 10-15 years (Table 2.24). The location of current animal operations is shown in Map 2.16. The primary types of animal operations using liquid waste-management systems are swine, cattle, and poultry. Swine operations are the most abundant and poultry the least abundant (Table 2.24). There are a total of 1,999 swine operations, with a design capacity of approximately 7 million animals, in the CHPP management area. The numbers of facilities and swine are greatest and most concentrated in the Cape Fear MU, followed by the Neuse, and Tar-Pamlico. Although relatively uncommon, cattle operations are most abundant in the Cape Fear, and poultry operations are most abundant in the Neuse. The Core/Bogue and Southern Estuaries MUs have a small number of animal operations. Nationally, North Carolina is one of the largest swine and poultry producing states in the U.S., having undergone much growth in those industries in the past decade (Barker and Zublena 1995).

Table 2.23. Sources of impairment for freshwater streams and percent of impaired freshwater stream miles with identified nonpoint sources.

Nonpoint Sources		River basin								
		Cape Fear	Chowan	Lumber	Neuse	Pasquotank	Roanoke	Tar-Pamlico	White Oak	Total
Agricultural Runoff	Miles	139	88	0	335	48	85	28	0	**723**
	%	29.6	64.7	0.0	52.6	66.7	44.0	28.0	0.0	**44.7**
Forestry	Miles	0	0	0	34	0	40	0	0	**74**
	%	0.0	0.0	0.0	5.3	0.0	20.7	0.0	0.0	**4.6**
Construction/ development	Miles	15	0	0	65	12	0	0	0	**92**
	%	3.2	0.0	0.0	10.2	16.7	0.0	0.0	0.0	**5.7**
Urban Runoff	Miles	247	0	0	138	0	16	12	8	**421**
	%	52.6	0.0	0.0	21.7	0.0	8.3	12.0	72.7	**26.0**
Mining	Miles	12	0	0	0	0	4	0	0	**16**
	%	2.6	0.0	0.0	0.0	0.0	2.1	0.0	0.0	**1.0**
Land Disposal	Miles	0	0	0	0	12	1	0	0	**13**
	%	0.0	0.0	0.0	0.0	16.7	0.5	0.0	0.0	**0.8**
Hydro-modification	Miles	5	27	0	7	0	19	15	0	**73**
	%	1.1	19.9	0.0	1.1	0.0	9.8	15.0	0.0	**4.5**
Unknown/ other	Miles	52	21	0	58	0	28	45	3	**207**
	%	11.1	15.4	0.0	9.1	0.0	14.5	45.0	27.3	**12.8**
Total Impaired miles		470	136	0	637	72	193	100	11	**1619**

Table 2.24. Estimated number and capacity of animal operations within CHPP MUs. *(Source: DWQ, unpub. data)*

CHPP MU	Cattle			Poultry			Swine		
	# of Facilities	Design Capacity	Total Steady State Live Weight	# of Facilities	Design Capacity	Total Steady State Live Weight	# of Facilities	Design Capacity	Total Steady State Live Weight
Albemarle	1	120	96,000	-	-	-	46	43,815	11,742,657
Cape Fear	48	15,062	18,001,400	-	-	-	1,158	4,702,601	679,649,855
Chowan	-	-	-	-	-	-	56	110,869	28,201,508
Coastal Ocean	-	-	-	-	-	-	-	-	-
Core/Bogue	-	-	-	-	-	-	2	951	542,655
Neuse	9	1,699	2,006,600	3	190,000	760,000	501	1,659,072	254,123,458
New/White Oak	-	-	-	-	-	-	47	142,873	21,059,365
Pamlico	-	-	-	-	-	-	4	1,969	1,688,977
Roanoke	17	3,965	4,378,000	-	-	-	42	59,344	20,077,500
Southern Estuaries	-	-	-	-	-	-	3	6,510	878,850
Tar/Pamlico	9	3,250	3,224,000	20	1,775,200	6,781,600	140	370,137	86,628,302
Total	84	24,096	27,706,000	23	1,965,200	7,541,600	1,999	7,098,141	1,104,593,127

Total steady state live weight is a standardized measure in pounds calculated from number of animals.

The presence of concentrated animal operations on river floodplains has been shown to be a danger to fish survival and habitat suitability (Mallin et al. 2000a; Mallin et al. 2001c). Animal wastes are highly concentrated sources of nutrients, fecal coliform bacteria and other pathogenic microbes, and oxygen-consuming materials (Sobsey 1996; Burkholder et al. 1997; Mallin et al. 1997; Mallin et al. 2000a).

Waste from animal operations is commonly discharged into lagoons, where it undergoes some anaerobic digestion and is then sprayed on fields. Pollutants may be transported into surface waters or groundwater if the lagoon ruptures, leaks or overflows. Pollutants can also enter groundwater beneath sprayfields and move laterally down slope toward streams (Mallin et al. 2000a). Between 1995 and 1999, multiple animal waste lagoon accidents and several hurricanes resulted in breaching, overtopping, and flooding of animal waste into coastal waters (Burkholder et al. 1997; Mallin et al. 1997; Mallin et al. 2000a). Lagoon waste also entered streams via spraying onto fields already saturated from rain (Mallin et al. 2000a; Mallin et al. 2001c). In 1995, the spilling of concentrated animal wastes into coastal waters in the lower Cape Fear and New Rivers resulted in anoxic and hypoxic conditions; high nitrogen and phosphorus concentrations; dense phytoplankton blooms, high bacteria levels, high turbidity, and fish kills (Burkholder et al. 1997; Mallin et al. 1997).

Groundwater can be contaminated through leaking lagoons or leaching of waste applied on sprayfields. Preliminary estimates by DENR indicate 25% of lined facilities may leak, thereby potentially contaminating groundwater. DENR data show that conventional sprayfields seem to be just as problematic as lagoons. Increased levels of nutrients in the air and deposition into coastal waters have been associated with the substantial increase in livestock operations (Paerl and Whitall 1999). Approximately two-thirds of the nitrogen in the swine excretions are emitted to the air due to the design of lagoon and sprayfield systems. According to a DENR study, swine facilities are responsible for an estimated 20% of North Carolina's total atmospheric nitrogen compounds, 53% of which was contributed by eastern North Carolina alone. Those compounds react with other constituents in the air and are deposited on land, vegetation, and water bodies.

The N.C. legislature has taken a number of steps to reduce water quality impacts from animal operations:

- Since 1995, operators at swine facilities with 250 or more animals are required to be trained.
- Beginning in 1996, new and expanding facilities are required to obtain permit.
- In 1997, DWQ was directed to inspect all animal waste management facilities annually.
- A moratorium on new or expanding swine operations was imposed in 1997 and has been extended several times. The moratorium currently extends to 2005.
- DENR was required to develop and adopt economically feasible odor control standards.

In addition, the Clean Water Management Trust Fund (CWMTF) provided funds to the Division of Soil and Water Conservation to buy out hog farms located in floodplains. To date, 14 swine operations have been bought out at cost of $5,737,500. In 2002 the Division of Soil and Water Conservation received a second grant of $6,062,000, which will be used to buy out approximately 11–12 additional operations (D. Williams, DLR, pers. com., 2002). Research on cost-effective alternatives to the lagoon and sprayfield system is underway (D. Ramsey, DWQ, pers. com., 2002). *More funding is needed to buy out or relocate additional animal operations from environmentally sensitive areas. The moratorium should remain in effect until alternative waste treatment is implemented that will reduce pollutant loading to streams and nitrogen release into the air. In addition EMC should phase out use of waste lagoons or reclassify waste lagoon systems from nonpoint to point source discharges, and be permitted accordingly, as recommended in DENR's Neuse River Nutrient Sensitive Waters Management Strategy* (DWQ 1997b).

Other ongoing initiatives to reduce water quality impacts from crop or animal agriculture include the Conservation Reserve Enhancement Program (CREP) and the Farmland Protection Program. CREP targets riparian protection and wetland restoration in river basins designated as Nutrient Sensitive Waters. Objectives include reducing sediment and nutrient impacts through installation of forested riparian buffers, grassed filter strips, wetland restoration BMPs, water control structures, and livestock exclusion. Landowners in the Neuse, Tar-Pamlico, and Chowan river basins and the Jordan Lake watershed are eligible to participate in CREP. The 2002 Farm Bill represents an unprecedented investment in conservation on private lands, committing over $13 billion nationally over a six-year period (USDA 2002). In 2002, The Farmland Protection Program allocated over $2 million to North Carolina and the

Wetlands Reserve Program allocated $5 million. The funding will be used primarily to purchase conservation easements and provide technical and financial assistance to landowners to address wetland, wildlife habitat, soil, water, and other natural resource concerns. *A greater portion of agricultural conservation funds should be allocated to the buy out or relocation of animal operations from sensitive areas, and for the purchase of conservation easements.*

These initiatives offer promise in reducing pollutant inputs from agriculture, but voluntary BMPs for agriculture have not been adequate to protect environmentally sensitive areas such as primary nursery areas (Preyer 1994). *Additional measures to reduce inputs from agriculture should be considered by the CRC, EMC, MFC, and NRCS, such as removing their exclusion of agriculture from CRC and EMC regulations, expansion of funding for BMPs and cost-share programs for nonpoint pollution control.*

In June 2002, the N.C. General Assembly took a major step toward reducing nitrogen and sulfur emissions from power plants by enacting the "Clean Smokestacks" Act. The Air Quality/Electric Utilities Bill (SB 1078) required significant emissions reductions from coal-fired power plants in North Carolina. Under the Act, power plants must reduce their nitrogen oxide emissions 77% by 2009 and sulfur dioxide emissions 73% by 2013. The cuts in both SO_2 and NO_x emissions will improve respiratory conditions for North Carolina residents, as well as reduce acid rain and airborne deposition of nitrogen in coastal waters. Certain technologies used to reduce SO_2 and NO_x also reduce mercury emissions. A statewide mercury advisory currently warns against consumption of four ocean fish species (king mackerel, shark, swordfish, and tilefish) and three freshwater fish species (bowfin, chain pickerel, and largemouth bass) in eastern North Carolina because of high mercury levels. The Act also requires DENR to evaluate issues specifically related to the control of mercury and carbon dioxide emissions and make recommendations on the development of standards and plans to control these emissions.

Automobiles are the largest contributor of air pollution in North Carolina. This is attributed to increasing urban sprawl; members of a more dispersed human population typically drive longer distances per day in vehicles, contributing to increased nitrogen emissions. *The Division of Air Quality and DENR should implement the planned expansion of car inspections as soon as possible. In addition, North Carolina legislators, state agencies, and local governments should adopt coastwide or statewide "Smart Growth" policies to provide incentives and direct growth into more highly developed areas and preserve rural land uses.*

Nutrients are also transported into coastal waters through shoreline erosion processes. A study in the Chesapeake Bay region found that sediments from eroding high bank shorelines were significant sources of nitrogen and phosphorus loading (Ibison et al. 1992). The nutrient loading rates from highly eroding shorelines in the study varied considerably but were higher than that estimated from typical agricultural runoff. Adjacent land use was also a factor in nutrient loading concentrations in eroding sediments. In the Chesapeake study, sediment from active farms had the greatest average total nitrogen and phosphorus loading concentrations (Ibison et al. 1992). A study by UNC-W, in New Hanover County, found that soils under suburban and golf course grasses were highest in phosphorus, followed by soils in wet detention ponds and runoff channels. Soils in undisturbed forests had the least phosphorus associated with them (Mallin et al. 2002a). Their results indicated that fertilizer use was positively correlated with phosphorus levels. Both studies suggest that sites with high sediment loss and intense fertilizer use, such as agricultural land, golf courses, or manicured lawns, have high potential for nutrient contributions to the water column. North Carolina's shorelines should be evaluated to identify potential hot spots of nutrient inputs from eroding shorelines. *Additional education is also needed on proper application of fertilizers to reduce runoff of nutrients into coastal waters, targeting homeowners, golf course owners, and landscape businesses (Mallin and Wheeler 2000).* New Hanover County recently produced a publication entitled "Homeowner's Guide to Lawncare Best Management Practices" that offers information on proper dosages and methods of fertilizer application and other lawn care strategies. *Similar efforts are needed to reach and educate all fertilizer users throughout coastal North Carolina.*

Mallin and Wheeler (2000) studied the effect of golf courses in New Hanover and Brunswick counties on water quality in adjacent water bodies. This study found that ammonium and orthophosphate appeared to be fairly tightly bound to the soils and remained on site during normal base flow conditions. However, nitrate levels in streams leaving golf courses were greater than streams entering the courses. Nitrate levels at some sites were high enough to cause significant increases in phytoplankton biomass and algal blooms in the spring and summer. Nitrate levels varied widely and appeared to be related to stormwater management practices. Waters adjacent to golf courses having vegetated buffer zones, wet detention ponds, and wooded wetland areas had considerably lower nutrient levels than sites without these landscape features and management tools (Mallin and Wheeler 2000). *BMPs, including vegetated buffers, detention ponds, and wetland areas, should be required on all new and existing golf courses draining to coastal waters to help reduce nutrient concentrations.*

Status and trends in nutrient enrichment

Nutrient levels can be measured directly (levels of nitrogen and phosphorus) or indirectly (chlorophyll *a* concentrations). Chlorophyll *a,* a component of most algae, is a commonly used indicator of algal biomass and relative nutrient levels. The North Carolina standard for chlorophyll *a* in lakes, reservoirs, and slow-moving waters not designated as trout waters is 40 µg/l. Concentrations greater than the standard are an indication of a nutrient problem and potential algal bloom. The miles of freshwater streams and acres of estuarine waters that were classified as impaired by chlorophyll *a* for the 1995-1999 time period are shown in Tables 2.25 and 2.26. In terms of measurements, the Neuse River has the most estuarine acres impacted by nutrients, followed by the Tar-Pamlico and White Oak river basins. In the freshwater portion of the river basins, the White Oak had the most stream miles impaired by chlorophyll *a*, followed by the Neuse and Cape Fear river basins. However, this is only one indicator of nutrient enrichment. For example, in the lower Cape Fear River, Mallin et al. (2001c) reported reasonably high nutrient levels in the river channels, but algal blooms rarely occurred. This was attributed to high flushing and reduced water clarity from turbidity and color, which reduced photosynthesis (Mallin et al. 2001c).

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Table 2.25. Number and percentage of freshwater stream miles rated as impaired in 1998-1999 305(B) report, by river basins and major pollutant causes. (Source: DWQ 2000a)

Major Causes		DWQ River Basin							
		Cape Fear	Chowan	Neuse	Pasquotank	Roanoke	Tar-Pamlico	White Oak	Totals
Ammonia (NH_3)	Miles	12	0	0	0	0	0	0	**12**
	%	3.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.9**
Fecal coliform	Miles	130	0	3	0	0	13	0	**146**
	%	32.2	0.0	0.7	0.0	0.0	16.3	0.0	**11.1**
Habitat Degradation[1]	Miles	284	4	164	0	38	0	0	**490**
	%	70.3	3.1	35.8	0.0	20.5	0.0	0.0	**37.3**
Low DO	Miles	0	46	132	40	24	13	8	**263**
	%	0.0	35.7	28.8	83.3	13.0	16.3	72.7	**20.0**
Chlorine	Miles	4	0	0	0	0	0	0	**4**
	%	1.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.3**
pH	Miles	0	51	7	28	0	0	0	**86**
	%	0.0	39.5	1.5	58.3	0.0	0.0	0.0	**6.5**
Turbidity	Miles	26	0	5	0	0	0	0	**31**
	%	6.4	0.0	1.1	0.0	0.0	0.0	0.0	**2.4**
Metals	Miles	0	0	0	0	13	0	0	**13**
	%	0.0	0.0	0.0	0.0	7.0	0.0	0.0	**1.0**
Chlorophyll a	Miles	1	0	7	0	0	0	11	**19**
	%	0.2	0.0	1.5	0.0	0.0	0.0	100.0	**1.4**
Total impaired miles		**404**	**129**	**458**	**48**	**185**	**80**	**11**	**1315**

[1] Habitat degradation is identified where there is a notable reduction in habitat diversity or change in habitat quality. This term includes sedimentation, bank erosion, channelization, scour, loss of pools or riffles, and loss of woody habitat.

Table 2.26. Estuarine acres rated as impaired in 1998-1999 305(B) report, by river basins and major pollutant causes (DWQ 2000a).

River Basin	Major Causes (Acres)		
	Fecal coliform	Low DO	Chlorophyll *a*
Cape Fear	3,602	5,000	0
Lumber	2,622	0	0
Neuse	3,588	0	28,950
Pasquotank	4,862	1,125	0
Tar-Pamlico	4,825	0	3,455
White Oak	8,936	0	3,005
Total	28,435	6,125	35,410
% PS or NS miles	41	9	51

PS = partially supporting, and NS = not supporting

Another factor which affects chlorophyll *a* concentrations is tidal stage. A study of tidal creeks in New Hanover County found that chlorophyll *a* concentrations were greatest at mid to low tide (Mallin et al. 1999a). The reason for higher nutrient levels at lower tides was primarily attributed to transporting of nutrients from the adjacent marsh and headwater areas. Headwater areas often have the

highest chlorophyll *a* concentrations within a tidal creek (Laws et al. 1994; Mallin et al. 1996; Mallin et al. 1999a). Other studies have also found that falling tides transport algae from upstream to downstream sources (Litaker et al. 1987; 1993).

Based on NAWQA results, nutrient concentrations in the Albemarle-Pamlico basin were high relative to other areas in the country (Spruill et al. 1998). Several stations in the Neuse and Tar-Pamlico systems were among the highest 25–50% of stations sampled in the United States, with the Neuse River having the highest nitrogen and phosphorus yields. The lowest nutrient levels occurred in streams of the predominantly forested Chowan River basin. Permitted point sources (municipal wastewater treatment plants and industrial facilities) of nitrogen and phosphorus account for less than 5 percent of the nutrient source inputs in all basins. However, pollution from these sources enters directly into streams, contributing up to 20 percent of the in-stream nutrient load. Intensive agriculture, wastewater discharges, and urban runoff from Piedmont areas contributed to particularly high concentrations in the Neuse and Tar-Pamlico river basins. A geologic source also contributes to naturally high phosphorus in the Neuse and Tar-Pamlico.

Although nutrient levels were relatively high, the NAWQA study found that nitrogen and phosphorus concentrations in streams had shown a general decline since 1980 in all four basins. The decrease in nutrient levels was thought to be due to improved agricultural practices, the phosphate detergent ban in 1988, and improved water treatment practices. Although nutrient levels declined, they remained high enough in the Tar-Pamlico and Neuse river basins to continue to cause algal blooms. In fact, the authors estimated that a 50% reduction of nitrogen and phosphorus concentrations in the Neuse River and a 30% reduction in the Tar River during summer months were needed to reach levels that will reduce the incidence of nuisance algal blooms and fish kills to more natural levels.

The National Oceanic and Atmospheric Administration's Estuarine Eutrophication Survey assessed the scale and scope of nutrient enrichment and eutrophication in the North Atlantic, South Atlantic and Gulf coasts. The report summarizes conditions in tidal freshwater, mixing, and seawater zones of Albemarle-Pamlico sounds, Pamlico-Pungo rivers, Neuse River, Bogue Sound, New River, and Cape Fear River. Medium or greater concentrations (≥5 ug/l) of chlorophyll *a* occurred in 19 of 21 South Atlantic estuaries, and were most frequent in estuarine mixing zones (66% of the areas sampled). High (>20 ug/l) concentrations were reported periodically in 11 of 21 estuaries. Nuisance and toxic algae events occurred throughout all salinity zones in the South Atlantic but were concentrated in North Carolina estuaries (NOAA 1996). The upper Pamlico River and the Neuse River had increasing chlorophyll *a* concentrations in the mixing zone, while most others showed no trend or a decreasing trend, especially in the tidal freshwater and mixing zones (NOAA 1996). The only systems that did not have a problem with nuisance or toxic algae at that time were Bogue Sound and the Cape Fear River. The remaining systems reported algal blooms at least once during the course of the year. Some of the Albemarle-Pamlico system estuarine waters experienced the most severe problems. Because the Albemarle-Pamlico estuaries are wind driven systems and do not directly drain into ocean waters, tidal flushing is limited and weak. Consequently, nutrients and detrital matter are stored in the sediments, maintaining eutrophic conditions (Luettich et al. 1999).

The Neuse River MODMON research has found that riverine discharge, nutrient loading, and circulation (flushing and stratification) are strongly related and primarily determined by weather patterns. Irregular weather patterns and lack of long-term data complicate trend analysis. In addition, because of the shallow depth of the estuary, the bottom sediments store and release nutrients and carbon that can fuel algal blooms or low-oxygen events, independent of new sources, making it difficult to evaluate the effectiveness of nutrient reductions and management actions (Luettich et al. 1999). Some important findings of the research pertinent to fish habitat include:

- Nitrogen loading has declined since 1999.

- Blooms in the upper system north of New Bern have declined. This is attributed to wastewater treatment plant improvements.

Priority research regarding nutrient enrichment, identified by the MODMON team, include:

- Obtain better information on rates of nutrient exchange, carbon processing and residence time in the estuarine system.
- Improve understanding of the transfer of nutrients and organic matter between primary producers, zooplankton, and benthic invertebrates; and fish to better assess the relationship among water quality, fish habitat and fish productivity.
- Develop a watershed model that tracks the fate and transformation of nitrogen through the watershed from the point of origin (i.e., outfall, stream edge, smoke stack) to the time it enters the estuary. The model should be used with water quality models to improve development and evaluation of management options.

A five-year study (1993-98) on nutrient loading and chlorophyll abundance in the Neuse River estuary by the NCSU Center for Applied Aquatic Ecology indicated a 14% reduction in phosphorus loading to the estuary, but increases in total nitrogen (+16%) and inorganic nitrogen (+38%) (Glasgow and Burkholder 2000). There was also a decrease in chlorophyll *a* concentrations over the period. Since that period and during the drought years 2000-2002, nitrogen loading stabilized but chlorophyll *a* increased by 25%. The authors recommended increased reduction of inorganic nitrogen inputs and co-management of phosphorus due to expanding swine production (285% increase observed from 1990-1999) and human population increase (17% increase observed from 1990-1999) in the watershed.

The Lower Cape Fear River Program (UNC-W) has monitored nutrients and other parameters since 1995. Total nitrogen was higher and more variable during 1996 and 1997 than in 1995, and leveled off between 1998 and 2001. This was thought to be due to flushing of accumulated organic matter from swamp waters into the channels during 1996 and 1997 hurricane seasons, reducing the excess organic nitrogen available during subsequent hurricanes (Mallin et al. 2001c). Total nitrogen loads were somewhat lower in blackwater rivers than in the mainstem Cape Fear River. In 2000-2001, nitrate levels, the main form of inorganic nitrogen in the lower Cape Fear River, were slightly lower than the five-year averages, except at three stations. Sources of high nitrate concentrations were nonpoint agriculture and animal waste drainage, and industrial and municipal wastewater discharges. Total phosphorus concentrations in 2000-2001 in riverine stations and the upper estuary were higher in 2000-2001 than the six-year average, while concentrations in the middle and lower estuary were lower. Like nitrogen, phosphorus was highest at upstream stations, declining in estuarine waters seaward to the ocean. At stations with high total phosphorus, industrial or municipal wastewater discharge was considered the primary source (Mallin et al. 2001c).

The Cape Fear Program's tidal creek monitoring found that nutrient loading was high enough in several of the creeks (Bradley and Hewlett creeks, both in southern estuaries MU) to support small algal blooms periodically. The high nutrient concentrations in Hewletts Creek were largely attributed to two golf courses that drain to the creek. Futch Creek has continued to maintain good water quality in terms of nutrients since the mouth of the channel was dredged in 1995–1996. Futch Creek and Pages Creek have the least development and impervious surfaces in their drainage area compared to the other creeks studied, and the least water quality degradation. *Areas like Futch or Pages Creek, that have relatively good water quality condition and are important nursery and shellfish producing areas, should be a high priority for water quality maintenance and protection through stormwater control BMPs, such as vegetative buffers and impervious surface limits and land conservation. Comprehensive sampling, similar to that done in the Tidal Creeks Program in New Hanover County, is needed for other tidal creeks in Brunswick, Pender and Onslow counties that are highly important nursery and shellfish areas.*

Oxygen depletion and fish kills

Low-oxygen conditions can occur naturally in a system from flushing of swamp waters, which characteristically have low DO, or from stratification of the water column due to wind, temperature, and salinity conditions. However, low-oxygen conditions can also be fueled by nutrients and oxygen-consuming wastes, which result in excessive oxygen demand in the water column or sediment. Algal blooms deplete the water column of DO as respiration from the dense concentrations of plants consumes oxygen at night (DWQ 2000b). Dissolved oxygen can be further depleted as bacteria use oxygen to decompose the algae's organic material. The algal blooms may occur naturally in coastal waters or occur with greater frequency or intensity upon inputs of nutrients. Dissolved oxygen depletion in the water column occurs most often in summer. Warmer water holds less DO and increases microbial decomposition. In addition, warmer water, calm winds, and reduced freshwater inflow in the summer reduce mixing and aeration of water. The stratified bottom layer of water is prevented from receiving oxygenated surface waters and rapidly becomes depleted of oxygen. Shallow water estuaries with less frequent flushing often develop persistent stratification and bottom-water hypoxia that can last for weeks to months (Tenore 1972).

Low-oxygen events frequently occur as a result of increased runoff and organic loading from heavy rainfall. The habitat and fishery impacts of weather events can be either positive or negative. For example, hurricanes can flush out large quantities of organic matter that has accumulated in estuarine systems, temporarily causing low dissolved oxygen, but reducing excessive nutrients that could otherwise fuel eutrophication over many years.

Prolonged periods of hypoxia or anoxia can cause stress or mortality of many aquatic organisms. One of the most visible effects of oxygen depletion is a fish kill event. According to NOAA, the leading cause of fish kill events in 22 coastal states from 1980 – 1989 was low DO (Lowe et al. 1991). Atlantic menhaden and other small schooling fish were noted as the most affected in estuarine waters. In North Carolina, this has also been the case; in 2001 DWQ attributed 34% of the fish kills to low DO and 4% to algal or dinoflagellate blooms. Other reported causes of fish kills included bycatch mortality, extreme temperatures, waste, chemical, and pesticide spills (DWQ 2001b). Although *Pfiesteria*-like cells were identified with some fish kill events, toxic *Pfiesteria* was not reported as a cause in any of the 2001 fish kills (DWQ 2001b). Low oxygen has been identified as a major water quality problem in Chesapeake Bay for blue crabs, and low DO has local impacts on menhaden, bay anchovy, spot, white perch, and striped bass (<http://www.chesapeakebay.net/>, 2003). Although fish can migrate away from hypoxic areas and seek refuge in shallower oxygenated waters, wind-driven circulation can rapidly transport the hypoxic bottom-water into shallow waters, trapping fish and causing large fish kills of estuarine fish (Paerl et al. 1998).

From 1996 to 2000, the annual number of reported fish kill events remained fairly consistent, ranging from 54 to 60 per year, but increased to 77 in 2001 (DWQ 2001b). Coastal river basins account for the majority of these fish kills (Table 2.27). Some of the fish kills in 1996 were associated with Hurricanes Fran and Bertha (L. Henry, DMF, pers. com., 2003). Total fish mortality has varied annually but generally increased, with total mortality ranging from 92,000 in 1997 to over 1.3 million in 2001. July and August are the peak months of fish kill occurrence (DWQ 2001b).

Table 2.27. Fish kill events reported in the coastal river basins, 1996-2001. *(Source: DWQ 2001b)*

River basin	Year						
	1996	1997	1998	1999	2000	2001	Total
Neuse	14	12	8	16	23	37	110
Cape Fear	21	16	23	14	12	5	91
Tar-Pamlico	3	6	5	11	14	23	62
Pasquotank	10	2	8	2	0	1	23
White Oak	3	3	1	3	3	3	16
Lumber	4	3	5	0	2	0	14
Chowan	2	2	1	1	0	1	7
Roanoke	2	0	1	0	0	0	3
Total	**59**	**44**	**52**	**47**	**54**	**70**	**326**

In 2001, fish kills were concentrated in the Neuse (37 fish kill events) and the Tar-Pamlico river basins (23 events). Fish kills in the Neuse River were clustered in the upper sub-basins near Wake County and the lower sub-basins between New Bern and Minnesott Beach. Fish kills in the Tar-Pamlico River were clustered downstream of Washington and around the Pungo River. Map 2.17 shows the location of fish kills within the CHPP MUs from 1999-2001. Although fish kills have been reported in all of the eight coastal river basins between 1996 and 2001, the majority of the fish mortality occurred in the Neuse, Tar-Pamlico, and Cape Fear river basins (DWQ 2001b). Since 1999, the number of fish kill events in the Cape Fear system has declined while the Neuse and Tar-Pamlico systems have increased. In the coastal river basins, fish kills have been least abundant in the Roanoke and Chowan river basins.

Over twenty different fish species were identified in fish kills in 2001 by DWQ (Table 2.28). The suspected causes of the fish kills included low DO, algal blooms, chemical spills, bycatch, and hog lagoon spills, as well as unknown factors. Low DO accounted for 34% of the fish kills, while algal blooms were only reported as a factor in 4% of the events (DWQ 2001b).

Table 2.28. Fish species observed during 2001 fish kill events, from most frequently occurring to least. *(Source: DWQ 2001b)*

Estuarine		Fresh water	
Species	Events	Species	Events
Menhaden	32	Sunfish	29
Flounder	11	Catfish	15
Shad	9	Largemouth Bass	12
Croaker	8	Perch	11
Spot	7	Crappie	8
Pinfish	7	Carp	4
Mullet	4	Mosquitofish	3
Minnow	3	Pickerel	2
Anchovy	2	Gar	2
Bluefish	2	Eel	2
Killifish	2	Sucker	1
Speckled trout	1	Darter	1
Drum	1		

In addition to suffocation, fish are impacted by low-oxygen conditions due to an associated increase in sulfide production in bottom sediments. This combination of conditions is lethal to many benthic organisms (Tenore 1972), which can have significant effects on the aquatic food chain (Peterson et al. 2000a; Taylor and Eggleston 2000). Mortality began to occur after species were exposed to 0.5-1.0 mg/l oxygen for five days (90% mortality of blue crabs after exposure for about 3 days), although many species, such as the mud crab *Neopanope sayi*, the serpulid polychaete *Hydroides dianthus*, the polychaete *Sabellaria vulgaris*, and the hydroid *Obelia bicuspidata* survived in hypoxic waters for more than one week (Sagasti et al. 2001). Taylor and Eggleston (2000) found that low DO concentrations hindered the foraging abilities of blue crabs, and increased clam vulnerability since they moved higher to the sediment surface and increased siphon extension in response to low-oxygen conditions. Benthic hypoxia and anoxia degrade fish habitat by altering the behavior, growth, production, and survival of both benthic invertebrates and mobile vertebrates (Breitburg 1992).[13]

Status and trends of fish kills and dissolved oxygen

In freshwater streams, DWQ use support data indicate low DO as a major cause of impairment in the Neuse River basin (132 mi), Chowan River basin (46 mi), Pasquotank River basin (40 mi), Roanoke River basin (24 mi), Tar-Pamlico River basin (13 mi), and White Oak River basin (8 mi) (Table 2.25). In estuarine waters, low DO was a major source of impairment in the Cape Fear (5,000 acres) and the Pasquotank river basins (1,125 acres) (Table 2.15). Although there is a direct relationship between eutrophication and low DO, use support data did not consistently show significant DO impairment where chlorophyll *a* impairment was high. This inconsistency may be due to highly variable and complex environmental conditions or DWQ monitoring limitations.

An analysis of DO data (<www.marine.unc.edu/neuse/modmon/results/results.htm>) from Neuse River MODMON stations indicated:

- Benthic and pelagic respiration are capable of fully depleting the oxygen pool in stratified bottom water in less than 5 days during summer months.
- Since the sediment oxygen demand (SOD) is much greater than biological oxygen demand (BOD) in the water column, the SOD and benthic fluxes will control how the estuary responds to long-term reductions in nutrient loads.
- Oxygen depletion is positively correlated with the accumulation of organic material in the sediments from water column production (algal blooms) or external organic matter loading and appropriate environmental conditions.
- Low-oxygen conditions occur more often and for longer duration in deeper portions of the water column. During the summer of 1997, these conditions caused lethal and sublethal stress of benthic infauna in the deeper sections of the estuary. The benthos affected included species that are important forage for demersal fish species, such as spot and croaker.

The Lower Cape Fear River Program (UNC-W) reported that low DO continues to be a major water quality problem in the river system, and an occasional problem in the tidal creeks system (Mallin et al. 2002). More than one-third of the sites sampled on the Cape Fear River and its tributaries were impacted by low DO, with lower DO in the blackwater rivers than in the mainstem of the Cape Fear. Low DO in the blackwater systems occurs naturally because decaying vegetation on the swamp floor elevates BOD and consumes oxygen from the water. Oxygen levels are generally lowest during the summer and during hurricane years. Biochemical oxygen demand loading appears to be highly dependent on stream flow. BOD at most sites in 2000-2001 averaged around 1.0 mg/l. However, because river water quality was affected by hurricanes in three of the five years, the data are not thought to be representative of "background conditions," but do provide understanding of the system's response to storm events. Recent

[13] Refer to the Soft Bottom Section for additional information on the impact of nutrient enrichment, low oxygen, and dinoflagellate blooms on clams. The Shell Bottom Section also contains information on the effects of eutrophication on fish habitat.

research in Coastal Plain systems has determined that nitrogen and phosphorus loading to blackwater streams can lead to increased BOD (Mallin et al. 2001a). Nitrogen loading can cause algal blooms, which die upon entering deeper rivers and become sources of BOD. Phosphorus loading directly stimulates bacterial growth, which increases the BOD load, thus leading to reduced DO and degraded fish habitat.

In conclusion, low-oxygen conditions have been documented to cause fish kills in multiple river basins in North Carolina. While hypoxic and anoxic events can occur naturally, eutrophication aggravates low-oxygen conditions. *Coastal research and monitoring needs to continue to improve our understanding of the processes of hypoxia and anoxia and the effect on fish populations. Efforts to reduce nutrient loading from point and nonpoint sources in the Neuse, Tar-Pamlico, and Cape Fear river systems, where the largest number of fish kills have occurred, should continue and be increased as necessary.* Of these river systems, the Cape Fear is the only river that does not have Nutrient Sensitive Waters classification and associated nutrient reduction strategies. *Implementation of mandatory riparian buffers along the Cape Fear, as well as other strategies, should be considered.*

Sediments

The dynamic process in which the physical energy of waves, tides, and currents is transferred to the shoreline ultimately results in the erosion, transport and deposition of sediment in aquatic systems. Shorelines will respond differently to wave and current energy, depending on the source and magnitude of energy, topography of land, substrate, and vegetative cover. Shoreline erosion and sediment transport are ongoing natural processes (Riggs 2001). However, erosion and sediment loading can be accelerated by human activities and sea level rise. Excessive sediment loading is considered a pollutant in aquatic habitats.

High sediment levels in the water column increase turbidity. Increased turbidity reduces water clarity, which in turn reduces primary production by phytoplankton and submerged aquatic vegetation (SAV) (North Carolina Sea Grant 1997). The reduction in light availability due to turbidity is the primary limiting factor of SAV distribution.[14]

Excessive suspended sediments can impact aquatic animals by clogging gills and pores of juvenile fish and invertebrates, which can result in mortality or reduced feeding (Ross and Lancaster 1996). Increases in the amount of nonfood particles ingested by shellfish and polychaetes lowers the nutrient value of their diet and their growth rates (SAFMC 1998). Excessive sediment loading from nonpoint sources can gradually fill in creeks and small waterbodies over time, reducing the depth and width of channels. This, in turn, alters currents and can bury benthic organisms, including entire oyster or mussel beds (P. Peterson, UNC-IMS, pers. com.; Schueler 1997). Successful recruitment of invertebrate larvae may also be reduced (SAFMC 1998; Reilly and Bellis 1983; Hackney et al. 1996; Peterson et al. 2000b; AFS 2003). Increased turbidity has been shown to lower feeding success and efficiency of adult and juvenile visually oriented predators such as bluefish, and pompano (Lindquist and Manning 2001), or to disrupt spawning migrations and social hierarchies (Reed et al. 1983).

Suspended sediment absorbs toxic chemicals, heavy metals, phosphorus, and bacteria, providing a mechanism for pollutants to be transported further downstream, where they may be ingested by filter feeding fish and invertebrates (Steel 1991). Fecal coliform and other pathogenic bacteria also survive longer in turbid water (Schueler 1999). Sedimentation removes these pollutants from the water column but stores them indefinitely. For example, results from the MODMON project have estimated that the amount of nitrogen and organic carbon stored in the upper 2 cm of bottom sediments is ten times more than the amount of total nitrogen content in the entire 3-4 m water column (Luettich et al. 1999). Once bottom sediments are resuspended, the contaminants can be released back into the water column. As the

[14] Refer to the SAV section for more information on the relationship between sediment loading and SAV, and their status and trends.

oxygen of the water near the sediment interface is reduced, the release of phosphorus, iron, and manganese increases markedly (Wetzel 1983).

Sources of turbidity and sedimentation

The primary human sources of increased sediment loading include most land disturbing activities such as building and road construction, post-construction stormwater runoff from urbanized areas, agriculture, timber harvesting, animal operations, mining, and removal of vegetated buffers (DWQ 2000b). Dredging, mining, and boating activities resuspend bottom sediments. Bottom disturbing fishing activities that generate turbidity in the water column include bottom trawling, clam kicking, and hydraulic clam dredging.[15] Hydromodifications to stream channels also increase sediment loading. Municipal and industrial wastewater treatment discharges (point sources) can be a minor source of sediment. Of all the sources of sediment loading, sedimentation from agriculture has been cited as one of the largest contributors to water pollution for the southeastern states (SAFMC 1998). The EPA concluded that siltation and nutrients impair more miles of assessed rivers and streams than any other pollutant, affecting 45% and 37% of impaired rivers and streams, respectively.

Streambank erosion can be accelerated by increased flow and velocity of stormwater runoff (Beach 2002) or from bank destabilization. In naturally forested systems of the southeast, there is very little surface runoff during and after a rainfall event, since the rainwater flows slowly over vegetated land, and infiltrates the soil (Beach 2002). Increasing impervious surfaces associated with urban/suburban development, recreational facilities, industrial/commercial activities, and land transportation result in higher volumes and rates of flow into receiving streams. Bank failures can occur when stream banks are subjected to high flows, intense or prolonged use by livestock, or vehicle crossings. Sediment inputs will generally be high where erosion rates are high and shorelines are unstable. Loss of buffer zones along streambanks can greatly contribute to bank erosion. Although shoreline stabilization with vertical structures may help retain sediments, erosion is often intensified adjacent to and in front of stabilized shorelines (Pilkey et al. 1998; Crowell 1998).

The rate of erosion and resulting sediment loading along North Carolina shorelines depends on shoreline orientation, fetch, water depth, bank height, sediment composition of bank, shoreline vegetation, presence of offshore vegetation, and boat wakes (Riggs 2001). In general, all of the Albemarle-Pamlico estuarine system is in a state of shoreline recession. South of Bogue Sound, erosion is severe only in portions of drowned river estuaries such as the Cape Fear, New, and White Oak rivers, and along the ICW and navigational channels. The remaining narrow, shallow estuaries are generally not eroding, as the marshes and flats vertically accrete sediment to keep up with rising sea level. Riggs (2001) mapped the shoreline types and shoreline areas where erosion was noticeable, and areas that had been significantly bulkheaded. Shoreline erosion rates have been estimated for portions of the coast by various studies including Hartness and Pearson (1977), Stirewalt and Ingram (1974), USDA Soil Conservation Service (1975), and Riggs et al. (1978), and Hardaway (1980). Their results are summarized and compared in Riggs (2001). These studies are helpful in indicating where major erosion problems are occurring. *Updated and accurate coastwide estuarine erosion rates are needed for the CRC and EMC in determining adequate development guidelines and regulations along the coast (DCM 2002).*

An important factor in sediment loading from shoreline erosion is the effect of global climate warming on sea level rise (IPCC 1990). According to Riggs (2001), sea level is rising at a rate of approximately 1.01-1.5 ft/100 yr in North Carolina. If sea level continues to rise at the current rate, there is a 50% chance that by the year 2200, with the influence of global climate warming, the rate of sea level rise could increase two to three times greater than its current rate. An accelerated rate of sea level rise could adversely impact the water column by accelerating the rate of coastal erosion and land loss, submerging portions of barrier islands, and increasing the loss of wetlands, which filter and trap sediment and other pollutants.

[15] The impact of these gears is dealt with in greater detail in the soft bottom section of this plan.

Status and trends in turbidity/sedimentation

North Carolina has no water quality standard for total suspended solids (TSS), but point source dischargers must meet minimum federal effluent guidelines of 30 mg/l for total suspended solids. Where effluent discharges to High Quality Waters (HQWs) that are primary nursery areas, the TSS limit is 10 mg/l; other HQWs have a TSS limit of 20 mg/l. Turbidity in streams is an indication of suspended sediment conditions and water clarity. The turbidity standard is 25 NTUs in estuaries and lakes/reservoirs not designated as trout waters, and 50 NTUs in other freshwater streams (DWQ 2000b). DWQ identified turbidity as a cause of use support impairment for the 1995 – 1999 period in portions of the Cape Fear and the Neuse River basins (Table 2.25).

Sediment impairment is also included in an evaluation of habitat degradation. The DWQ, in categorizing causes of use support impairment in freshwater streams, defines "habitat degradation" as a notable reduction in habitat diversity or change in habitat quality. Habitat degradation includes channelization, sedimentation, bank erosion, scour, loss of pools or riffles, and loss of woody habitat (DWQ 2000a). Habitat degradation was identified as a major cause of use support impairment in the Cape Fear, Neuse, Roanoke, and Chowan river basins for the 1995 – 1999 period (Table 2.25), with Cape Fear having the largest percentage of stream miles impaired by habitat degradation (284 mi., 70% of evaluated streams) and Chowan the least (4 mi., 3%). Of all major categories of use support impairment, habitat degradation accounts for the greatest overall cause of impairment in all coastal river basins combined (490 mi., 37%). Use support ratings for estuarine and coastal waters do not include habitat degradation or channelization, but urban runoff, agriculture, or forestry are cited as possible sources for over half of all estuarine waters (Table 2.23).

In addition to DWQ data, water quality information is available from federal and localized university monitoring programs. Results of the USGS NAWQA program stated that total suspended solids had decreased throughout the Albemarle-Pamlico drainage system from 1980 to 1995 (Spruill et al. 1998).

Decreases in sediment and solids concentrations are probably a result of:

- Construction of new lakes, ponds, and beaver ponds in the basin, which trap solids,
- Improved agricultural soil management, including use of conservation tillage, and
- Improved wastewater management.

For the lower Neuse River, MODMON data indicate there is generally sufficient light (lack of turbidity) to support phytoplankton photosynthesis in the upper three meters of the water column (<www.marine.unc.edu/neuse/modmon/results/results.htm>). Based on results from UNC-W's Cape Fear Program in the lower Cape Fear River, turbidity appeared to be associated most with rainfall in the Piedmont and upper Coastal Plain and generally declined moving downstream, except at the maximum turbidity-mixing zone in the middle of the estuary (Mallin 2001c). Water clarity in 2000-2001 was higher than the six-year average at most stations, probably due to low river flow. Water clarity was lowest during late winter and early spring. Low water clarity is the primary reason for low phytoplankton production in the lower Cape Fear River (Mallin 2001c). In the tidal creeks monitored by UNC-W, turbidity was generally not a problem.

Sediment loads into coastal waters can be reduced through agricultural and urban BMPs. Agricultural BMPs include (DWQ 2000b; <www.chesapeakebay.net>):

- Stream bank fencing to keep livestock out of streams;[16]
- Planting vegetated buffer strips at the edge of crop fields;
- Strip cropping (different crops are alternated in rows through one field);

[16] Reduced soil loss by 40% and average sediment concentration during stormflow events by 60% (Owens et al. 1996).

- Conservation tillage (leaving unused plant material on the field);
- Sloped and vegetated ditch banks; and
- Water control structures.

Since stormwater is a major source of sediment in urban areas, structural or nonstructural urban BMPs can be used to reduce sediment loading, including (DWQ 2000b; <www.chesapeakebay.net>):

- Slope and vegetate ditch banks;
- Use of tree roots in stormwater ditches for stabilization;
- Streamside buffer zones;
- Riparian wetland restoration;
- Reduction of impervious surfaces to allow greater infiltration on land; and
- Breakwater or riprap stabilization where erosion rates are very high.

More stringent sediment controls on construction projects are still needed to reduce sedimentation in coastal waters. Several improvements and recommendations for improvements have been made by the EMC, SCC, and associated staff committees. DWQ reported to the EMC in 2002 that actions should be taken to strengthen groundcover requirements in the erosion and sedimentation control plans and improve enforcement of the erosion and sedimentation control law and rules. These recommendations (SCC 2003; B. Devane, DWQ, pers. com., 2003) included:

- *More expeditious application of land cover on disturbed sites.* Reduce the time that developers have to get groundcover in place following completion of each project phase involving grading from 15 to 10 working days, and from 30 to 21 calendar days, whichever is shorter. Draft legislation was prepared but not introduced.
- An increase in the maximum penalty allowed for initial violations of the Sedimentation Pollution Control Act. Draft legislation was prepared but not introduced.
- An increase in the use of improved technologies to replace those now being used to control sedimentation and erosion.
- Support and encouragement by the EMC and SCC for issuing significant monetary penalties for all activities found to be in violation of their Stormwater Construction General Permit, Erosion and Sedimentation Control Plan, or the turbidity standard.

Vegetated buffers are another means of effectively trapping sediment before it reaches riverine and estuarine waters. Because buffers are beneficial in reducing not only sediment loading, but also nutrients and toxins, and benefit multiple coastal fish habitats, their use should be more widely practiced or required. Although definitions and characteristics of vegetated buffers vary, a buffer is generally a vegetated transitional zone, situated between upland land use and aquatic habitats, that functions as a filter of surface water runoff (Crowell 1998). Vegetated buffers are very effective in trapping sediment as well as other pollutants from stormwater runoff (Lee et al. 1989; Gilliam et al. 1994; Williams and Nicks 1988; DWQ 2000b; Lowrance 1997). Properly constructed vegetated buffers ranging from 5 - 185 m (15 - 600 ft) have been shown to remove as much as 90% of sediment and nitrate and up to 50% of phosphorus from stormwater runoff (Desbonnet et al. 1994). Relative effectiveness is dependent on buffer width, slope, soil type, vegetative cover, quality and flow of the runoff, and size of the drainage area. *Implementation of mandatory vegetated buffers along all coastal waters should be considered as a strategy for reducing sediment loading, the largest pollutant in N.C. coastal waters. Width of the buffers should be scientifically based and may need to be larger adjacent to strategic habitat areas.*

Fecal coliform bacteria

Fecal coliform bacteria occur in the digestive tract of, and are excreted in the solid waste from, warm-blooded animals including humans, wildlife and domesticated livestock. While these bacteria are not harmful to humans or other animals, their presence in water or in filter-feeding shellfish may indicate the presence of other bacteria that are detrimental to human health (DWQ 2000b). Moreover, elevated levels

of fecal coliform bacteria suggest that pollutants, such as nutrients, sediment, or toxins, may also be entering the water. Mallin et al. (2000; 2001), studying water quality in several tidal creeks in New Hanover County, found a positive correlation between fecal coliform abundance and turbidity, nitrate, and orthophosphate. The significant correlation between bacteria and sediment was most likely because fecal coliform bacteria tend to be associated with suspended particulate matter, and survive longer when in association with sediment particles (Mallin et al. 2000). The positive relationship between coliform bacteria and nutrients was attributed to both pollutants being derived from the same sources in some instances. Also, some studies suggest that nutrient loading can stimulate growth and survival of fecal bacteria indicators (Evison 1988). *Any steps taken to reduce nonpoint sources of bacteria loading will at the same time reduce loading of other pollutants into coastal waters and improve water quality and habitat conditions.*

Because consumption of shellfish containing high levels of fecal coliform bacteria and associated pathogens can cause serious illness in humans (FDA 1995), shellfish growing waters must be closed to shellfish harvest when fecal coliform counts increase above the standard 14 MFFCC/100ml (Commission for Health Services rule 15A NCAC 18A .0900). The DEH also closes waters where a high potential for bacterial contamination exists, such as around marinas and point source discharges. Shellfish harvest closures have continued to occur over time (DMF 2001a), which has led to a reduction in available shellfish harvest areas. While closures may protect shell bottom habitat from harvesting, water quality degradation associated with high bacterial contamination is generally not advantageous for other aquatic organisms and fish. However, because shellfish filter organisms from the water column, unharvested shellfish may provide an important water quality enhancement function to the water column. *The effect of shellfish filtering capacities on water quality parameters, such as bacteria, nutrients and sediments, should be determined.*

Sources of bacterial contamination in estuarine waters

Fecal coliform originates from both point and nonpoint sources. Point sources for the purposes of shellfish area protection include NPDES wastewater discharges and other sources with identifiable origins, such as pipes emptying directly into coastal waters. Although the wastewater discharges are treated, closures are required around all NPDES wastewater discharges due to the possibility that mechanical failure could allow inadequately treated sewage to reach shellfish waters. There are five minor and three major municipal NPDES discharges located within 0.5 mi of SA waters (Map 2.18). There are also 39 minor and 10 major non-municipal wastewater discharges near SA waters. These include discharges from water treatment plants (regular and reverse-osmosis), fish houses, sand and phosphate mines, and miscellaneous industrial activities.

Current EMC rules discourage creation of new direct discharges into shellfish waters [EMC rule 15A NCAC 2B .0224]. In fact, there has been a trend to remove some direct discharges, such as in the New River, and dispose of treated effluent on land. Most wastewater discharges meet their permit limits. However, when wastewater treatment plants are found to be out of compliance with their permitted discharge limits, waters can become degraded. Facilities that are out of compliance are subject to civil penalties. *Additional funds and process changes are needed to allow local communities to more rapidly address repairs and upgrades to all aspects of the municipal waste systems, including collection and treatment systems.*

Sanitary surveys conducted by DEH (Shellfish Sanitation and Recreational Water Quality Section) indicate nonpoint stormwater runoff is the primary cause of water quality contamination in more than 90% of the areas sampled (G. Gilbert, DEH, pers. com., 2002). Sources of bacteria and other contaminants carried into coastal waters via stormwater runoff and contributing to shellfish harvest closures identified by DEH and in numerous other studies (DMF 2001a; DEM 1994; Reilly and Kirby-Smith 1999; FRANKENBERG 1995; Schueler 1999) include:

- Residential and commercial development activities (urbanization);

- Construction of impervious structures (buildings);
- Roadways, parking lots, and driveways;
- Domestic pet waste;
- Unauthorized discharges of sewage effluent;
- Failing on-site sewage systems or subsurface flow from drainfields;
- Mechanical failure of centralized sewage treatment plants or lift stations;
- Marinas;
- Animal operations;
- Agricultural croplands;
- Forestry operations;
- Hydrologic alteration (e.g., channelization, ditching, bulkheading, canals) from multiple land uses;
- Wetland loss and degradation associated with multiple land uses; and
- Wildlife.

To prevent fecal coliform contamination from on-site sewage systems, periodic inspections of on-site systems should be conducted at frequencies recommended by DEH. In addition, siting of subsurface disposal systems in soils adjacent to coastal waters should be reevaluated and revised if necessary to protect water quality.

The primary way in which urban nonpoint runoff reaches coastal waters is from storm drain outlets, residential lawns, driveways, and streets (Schueler 1999). Bacterial concentrations in stormwater discharging from storm drains has been found to be at least an order of magnitude higher than any other individual source in a watershed, indicating that the storm drain system is the most concentrated bacterial source in the watershed (Schueler 1999). Therefore, bacterial contamination tends to come from local, rather than from upstream, sources. Once in the water, bacteria can be transported downstream, but are relatively short-lived. These bacteria die more quickly when exposed to sunlight or high salinity water. Elevated bacterial levels have been positively correlated with high rainfall (low salinity), increased turbidity and suspended solids, and low temperature (Schueler 1999). Bacterial life is extended under low temperature, low salinity, and low light conditions and may be transported with sediment (DEM 1994; White et al. 2000). Fecal coliform bacteria may also be transported to shellfish-growing waters through subsurface flow. Onsite wastewater disposal systems with less than 10 cm distance (about 4 in) between the water table and the drainage trench may contribute to bacterial contamination of the surrounding groundwater and transport to adjacent surface waters (Reilly and Kirby-Smith 1999).

A number of watershed studies have been conducted to identify specific sources of bacterial contamination in a watershed. The primary causes for bacterial contamination from studies in N.C. coastal waters are listed in Table 2.29. The cause of impairment varies and is often due to a combination of factors. When hydrological alterations (i.e., ditching and draining) occur, many wetland and stream functions are removed, increasing the delivery rate of nonpoint source runoff, and decreasing the time available for bacteria to be filtered out (DEM 1994; White et al. 2000). The forestry and agricultural BMPs that were in place during these studies did not prevent fecal coliform standards from being exceeded (DEM 1994; Mallin et al. 1997).

Table 2.29. Primary causes of fecal coliform impairment in localized North Carolina studies.

Waterbody, CHPP MU	Primary causes of impairment	Reference
South River, Neuse MU	Hydrologic modifications for logging, agriculture, and development; animal grazing at stream edge	DEM 1994
Jumping Run Creek, Core-Bogue MU	Channelization, ditching, bulkheading	White et al. 2000
North River, Core-Bogue MU	Hydrologic modifications; pet and wildlife waste	Reilly and Kirby-Smith 1999
Tidal creeks, Southern Estuaries MU	Increasing impervious surfaces and population	Mallin et al. 2001b
N.E. Cape Fear River, Cape Fear MU	Swine waste lagoon spills and ruptures	Mallin et al. 1997

Some recommendations from the above referenced bacteria tracking studies for reducing fecal coliform contamination include:

- Implement more effective BMPs for forestry and agriculture, particularly where extensive hydrological modifications exist.
- Enforce existing Forestry Practice Guidelines and BMPs.
- Require advance notice before any timber harvest in close proximity to coastal waters.
- Implement innovative wetland restoration and stormwater retention techniques (bioretention areas, peat and sand filters, and constructed wetlands) to slow, capture, and filter stormwater runoff.
- Work with owners of small animal farms to restrict livestock and their waste from direct access to stream waters.
- Educate homeowners on how and why to properly dispose of pet waste.

The control of fecal coliform bacteria sources before they reach shellfish waters is the simplest and most cost effective measure for restoring water quality (Reilly and Kirby-Smith 1999). However, to effectively reduce bacteria loading, the site-specific sources must be identified. Collaborative research is underway by NCSU and NOAA to determine accurate and cost effective methods of bacterial source tracking (M. Fulton, NOAA, pers. com., 2003). *DENR should support this research since it is needed for successful restoration of bacteria impaired waters.*

In urban areas, the percentage of impervious surfaces in a watershed has been found to be a strong indicator of fecal coliform abundance (Mallin et al. 2000). Removing vegetated areas reduces the natural filter and groundwater recharge capability of the land and forces water into areas of smaller pervious surfaces. These smaller surfaces are then overwhelmed by high volumes of water, leading to standing water and flooding. As the amount of impervious surface increases, so does the amount of runoff and flooding. Mallin et al. (1998; 2000) examined the effects of land-use practices on water quality in New Hanover County and found a statistically significant relationship between percent impervious surface cover and fecal coliform concentrations among several tidal creek systems ($r^2 = 0.95$) (Figure 2.8).

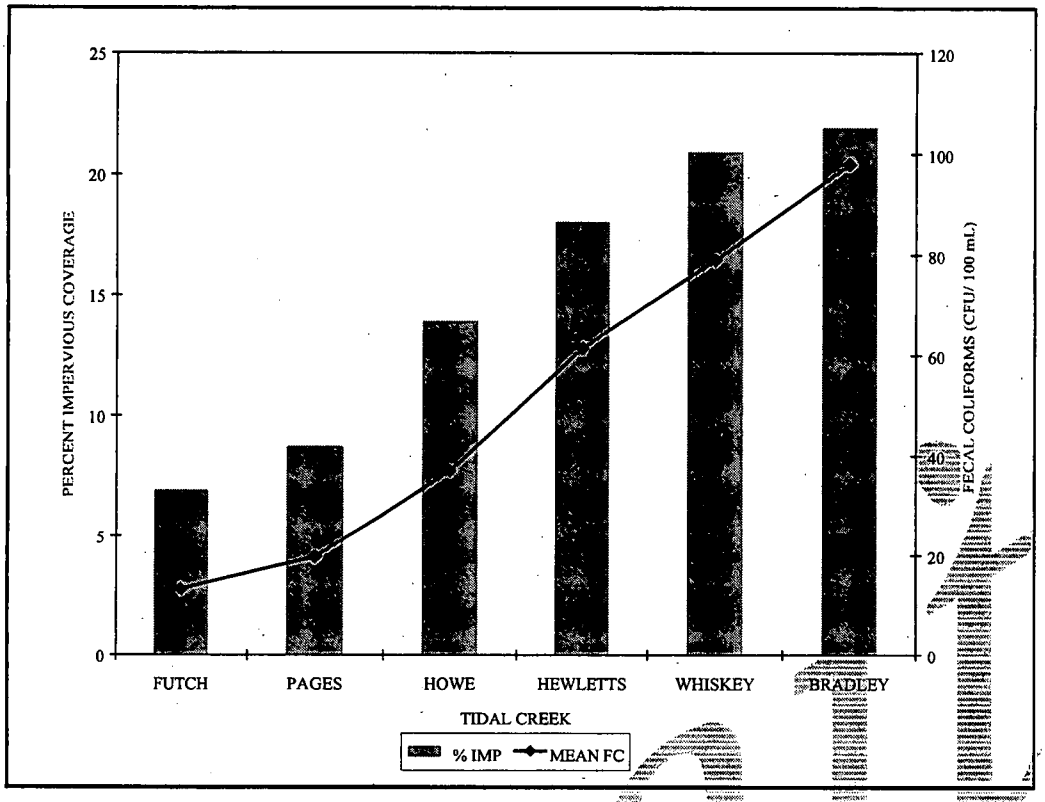

Figure 2.8. Percent watershed impervious surface coverage versus geometric mean fecal coliform bacteria counts for six New Hanover County tidal creeks. *(Source: modified from Mallin et al. 2001b)*

Several studies have found that acceptable water quality for shellfishing occurs when the proportion of impervious surface of a watershed is less than 10% (Mallin et al. 2000; Schueler 1994; Arnolds and Gibbons 1996; Barnes et al. 2001). Significant water quality and habitat degradation occurred where impervious surface exceeded 20%. A strong relationship has also been found between human population growth and closed shellfishing areas (Maiolo and Tschetter 1981; Mallin et al. 2000). *Modification of local or state stormwater rules limiting impervious surface cover adjacent to all coastal waters to approximately 12% (for the low density option) would be a scientifically based means of preventing additional water quality degradation.*

Status and trends in fecal contamination in estuarine waters

There has been a continual increase in fecal coliform contamination with increasing human population along the North Carolina coast (Maiolo and Tschetter 1981; Mallin et al. 2001b). As of 2002, 263 of 776 estuarine areas (SA waters) were on the 303(d) list because of fecal coliform contamination. The DWQ 305(b) report listed 28,435 acres (of approximately 2 million acres) of estuarine area impaired by fecal coliform contamination in coastal North Carolina (Tables 2.22 & 2.23). If the contamination is mostly from stormwater flow and other anthropogenic sources, the location of these impaired waters could indicate other nonpoint pollutants.

Trends in shellfish harvest closures reflect trends in fecal coliform contamination. Over 364,325 ac of coastal (salt and brackish) waters were closed to shellfish harvesting in North Carolina in 2002 due to high levels of fecal coliform or the potential risk of bacterial contamination (immediately around wastewater treatment plant discharges) (DEH, unpub. data). Of this total, approximately 56,446 ac of

closed shellfish waters are suitable for shellfish production. These closures have primarily affected the central and southern areas of the coast. In more recent years, additional closures have also been made in and around the Pamlico Sound (DMF 2001a). Fecal coliform abundance tends to be highest upstream and in shallow creeks and waterbodies; contamination decreases downstream and in larger open waterbodies. The areas prone to high fecal coliforms are also typically areas where shell bottom habitat is concentrated.

Between 1983 and 1985, there was a sharp decline in the acreage of estuarine SA waters that were permanently closed to shellfish harvesting (Figure 2.9). This decline was attributed to increased sampling efforts and refinements in growing area classifications by DEH (i.e., conditionally approved, open or closed), and to reductions in point source discharges in coastal waters. From 1985 through 1995 shellfish closures continually increased. Between 1995 and 2000, the total acreage of shellfish closures has fluctuated; since 2000, totals have changed only slightly.

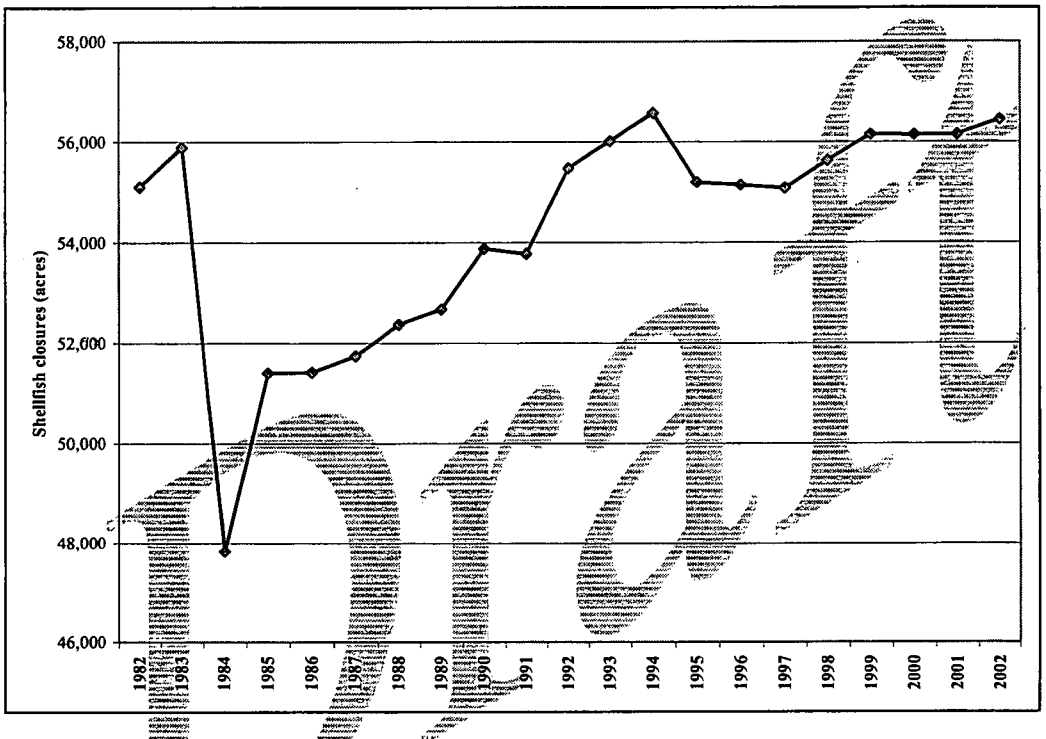

Figure 2.9. Acreage of North Carolina shellfish waters permanently closed to shellfish harvest during 1982-2002. *(Source: NC Division of Environmental Health, Shellfish Sanitation and Recreational Water Quality Section)*

In addition to the 56,446 ac that are permanently closed to shellfishing, other areas are temporarily closed during periods of high rainfall. For example, a rainfall of 1.5 inches in a 24-hour period can cause temporary shellfish harvest closures. Closures last from several days to more than a month. Large storms, such as hurricanes, result in harvest closures covering much larger areas, sometimes including all of North Carolina's estuarine waters. The conditionally approved areas are concentrated in the Core-Bogue, New-White Oak, and Southern Estuaries management units (Map 2.19a-c). Within these watersheds, permanent closures are most common in the upper reaches of tidal creeks and rivers, with conditionally approved areas occurring downstream of those areas or in the upper portions of less degraded creeks. As temporary closures have increased in frequency and duration, these closures have become an issue of great concern to the public, particularly in the southern area of the coast.

There are approximately 2,010 ac of shell bottom in the mapped areas that are currently unharvestable

most of the time due to outright prohibitions or restrictions based on bacterial concentrations (classified as "prohibited" or "conditionally approved closed"). On average, an additional 2,823 ac of shellfish waters are closed to harvest for some portion of the year ("conditionally approved open" areas), representing approximately 39% of the mapped shell bottom (12,502 acres). *Restoration efforts to reduce fecal coliform levels should target concentrated areas of shell bottom or other Strategic Habitat Area. Focusing on areas less degraded (conditionally approved areas, recently experiencing increased closures), rather than areas that have been permanently closed for many years, could also result in a greater success in habitat enhancement.*

Approximately 1,157 ac of ORW waters have been closed to shellfish since 1990. These closures have been in tributaries of Middle Sound, Stump Sound, and Topsail Sound in the Southern Estuaries MU; western Bogue, Core, and Back sounds in the Core-Bogue MU; and Swan Quarter and Juniper bays in the Pamlico Sound MU. As development activities continue, so will the number of shellfish area closures, unless changes are made to the manner in which land is developed and stormwater runoff is managed. *New or expanded stormwater outfalls to coastal shellfishing waters should be prohibited by the EMC and existing outfalls should be phased out.* Reclamation of closed areas will also become more difficult as population pressures increase. *Coordination and enhancement of rule enforcement and compliance review capabilities within DENR agencies is needed to fully enforce existing statutes and rules and minimize further water quality degradation.*

Water quality monitoring in tidal creeks in the southern portion of the coast indicates that bacterial contamination is widespread and chronic, from both point and nonpoint sources (Mallin et al. 2002). In 1995 and 1996, the mouth of Futch Creek, in New Hanover County, was dredged to increase flushing, lower bacteria levels, and improve water quality. Fecal coliform levels declined and additional acreage was opened to shellfish harvesting. The creek has continued to maintain good water quality, in terms of fecal coliform, since the mouth of the channel was dredged (Mallin et al. 2002). However, this type of water quality enhancement does not reduce the amount of pollutants entering the creeks. *Restoration of waters impaired by fecal coliform bacteria should be addressed through reductions in nonpoint source loading as well as enhancement of natural water flow conditions.*

Fecal coliform contamination in ocean waters

In the surf zone and nearshore ocean waters, fecal coliform contamination primarily comes from nonpoint runoff of stormwater. There are currently no direct discharges of treated or raw sewage to North Carolina's ocean waters. Wastewater in the coastal region is generally managed by septic systems or centralized collection and treatment facilities and package treatment plants that discharge on land or to estuarine waters. Systems that discharge into coastal rivers indirectly affect ocean waters by degrading estuarine waters that ultimately flow into the ocean. Centralized collection and treatment facilities treat their waste to kill fecal coliform prior to discharge. An important concern, however, is capacity of the collection and treatment systems to handle the rapid and expanding development in the coastal area. Collection and treatment systems are sometimes overloaded due to increasing development, heavy rainfall and infiltration and improper planning. Most problems occur during this overload period, when sewers overflow or sewage is inadequately treated. Septic systems also fail where they are not properly sited or constructed, the soil is not suitable, or they are improperly maintained (North Carolina Ocean Resources Task Force 1995).

As the coastal population continues to grow, there will be an increasing demand for local governments and the state to evaluate alternative wastewater treatment and disposal methods, including ocean outfalls. Currently, there are several studies underway in the central coastal region to recommend wastewater disposal strategies. A major concern regarding ocean outfalls, along with other sewage treatment alternatives that may remove constraints to development, is the cumulative and secondary impacts of increasing development (North Carolina Ocean Resources Task Force 1995). For example, the extent of onshore development could impact estuarine and ocean resources through associated nonpoint sources of

pollution, degrading coastal water quality. *Given the role of public infrastructure (i.e., sewage treatment capacity) in coastal development, the siting process for infrastructure should be restricted from areas that would impact sensitive fish habitats and supporting areas.*

Ocean dumping of sewage has led directly to incidents of beach pollution in several states, including New York, New Jersey, California, and Florida (Moore 1992). Adverse impacts to the fishing industry have also been documented to occur in association with dumping of sewage sludge and industrial wastes in ocean waters (Cross et al. 1985). *Offshore wastewater discharges should be prohibited in North Carolina to minimize water quality degradation to the water column.*

Stormwater runoff is currently the largest concern regarding bacterial contamination in ocean waters. The stormwater inputs are primarily a health concern due to bacterial contamination, but can also increase loading of nutrients and toxins into the surf zone. There are approximately 13 identified stormwater outfalls that discharge directly onto the beach near or lower than the mean high tide line; there are several others that discharge behind the primary dune (Maps 2.9a-c). Samples from the catch basins have found extremely high bacteria levels in the stormwater (J. Potts, DEH, pers. com.). Hanby Beach, Carolina Beach, Emerald Isle, Atlantic Beach, and Kill Devil Hills have had precautionary advisories posted due to discharge of stormwater. Hanby Beach has a permanent point source precautionary advisory because the opening of the pipe is in the water, making it impossible to see when the pipe is discharging. All of these communities, with the exception of Emerald Isle, are served by municipal or privately operated wastewater treatment systems. Centralized sewage systems have had secondary impacts to water quality and habitat by indirectly permitting denser development than would be allowed if using individual septic systems. Dense development results in increased impervious surface area and stormwater runoff.

Beach communities appear to be increasingly using "temporary" pumping of stormwater to the beach as a solution to flooding. The runoff during heavy rain events floods the streets; such flooding is largely the result of filling of wetlands, excessive impervious surface, and lack of upland stormwater retention areas. Until recently, there were no specific stormwater rules prohibiting or regulating pumping of stormwater onto the beach or into the surf zone. Any discharge into the ocean without a permit is prohibited (E. Beck, DWQ, pers. com., 2003) [NCGS 143-214.2] and any source of pollution that precludes using the waters for purposes identified in its water quality classification (i.e., swimming in SB waters) is prohibited [15A NCAC 2B.0222(2)]. In October 2003, DWQ implemented a stormwater flooding relief discharge policy. It states that, for chronic stormwater flooding, the Division staff will review proposals and work with the Shellfish Sanitation Section to ensure that water quality standards will not be impacted. Public entities are advised that non-discharge alternatives, such as pumping stormwater behind a foredune or to another land surface, are preferable to discharging directly to state waters. The town of Emerald Isle is in the process of developing such an alternative. After years of frequent emergency pumping of floodwater to the ocean, the Town recently decided to purchase a 40-acre wetland parcel that will remain undeveloped. Stormwater from flooded streets and yards will be pumped to this existing wetland site. The Town also plans to pump groundwater from the town to the wetland parcel to lower the groundwater table and increase the storage capacity around the developed portion of the town. In addition, Emerald Isle is developing a town ordinance for new development that would require the first two inches of rain to be retained on a lot, prohibit excessive removal of vegetation due to the development, and require retention of vegetated buffers along drainage ways where feasible (<www.emeraldisle-nc.org>). The Cape Fear Council of Governments has also developed a proposed alternative to the current practice of direct stormwater discharge onto beaches at Kure Beach. The Council is seeking funding through the Clean Water Management Trust Fund and other sources to construct a network of wetlands (totally approximately 20 acres) and reroute stormwater through it, eventually discharging to a canal that drains to the Cape Fear River (SC waters).

Water pollution in nearshore ocean waters is becoming increasingly problematic along the entire nation's coast. In 2000, there were reported to be nearly twice as many beach closings and advisories in the

United States as in 1999. The most frequent cause of closures or advisories was stormwater runoff (<http://www.nrdc.org/>, 2001). The apparent increase in closings, however, may be due to improved or expanded monitoring along the oceanfront. *Additional permits for stormwater outfalls on ocean beaches or nearshore waters should be prohibited by the EMC. Alternative stormwater management strategies should be implemented, similar to the efforts underway by Emerald Isle, to phase out existing stormwater outfalls and encourage land application.*

Potential sources of water quality degradation include leaching from failing or improperly functioning sewage systems or drainfields, or where septic systems become exposed or located below mean high water due to erosion. Storm-damaged septic tanks may cause contamination for a short but concentrated period in localized areas. Table 2.30 shows the number of septic tanks in need of repair, replacement, or relocation following Tropical Storm Dennis and Hurricane Floyd. In the past, the eastern ends of Ocean Isle and Holden Beach have had to relocate septic tanks and homes on a regular basis following large storm events. Leakage from systems either with inadequate setbacks from ocean waters due to erosion or not designed to handle heavy use by renters may cause gradual contamination to nearshore waters. Recent research has demonstrated that septic tank leakage in this area has caused elevated fecal coliform and nutrient loading to nearby streams and tidal creeks (Cahoon et al. submitted). *More detailed monitoring is needed to assess the extent oceanfront septic systems are causing degradation to nearshore coastal waters.*

Table 2.30. Number of known coastal septic tanks damaged by Hurricane Floyd or Tropical Storm Dennis in need of repair, replacement or relocation. *(Source: D. Moffitt, DCM, pers. com., 2002)*

Beach community	Number of septic tanks damaged	
	Post-Trop Storm Dennis	Post-Hurricane Floyd
Nags Head	35	
Rodanthe	6	
Buxton	1	
Atlantic Beach	2	
Pine Knoll Shores		3
Emerald Isle		31
Oak Island		114
Holden Beach		36
Total	44	184

The DEH Shellfish Sanitation and Recreational Water Quality Section of DENR has the responsibility for initiating a recreational water-quality-monitoring program in ocean and estuarine waters. The primary purpose of the program is to protect public health. In 2000, the Beaches Environment Assessment and Coastal Health (BEACH) Act was implemented for the purposes of improving the quality of beaches and coastal recreation water.

The Act allocates funding for states in the form of grants to:

- Develop or revise water quality criteria and standards;
- Implement studies to assess potential human health risk from exposure to pathogens;
- Develop appropriate and effective indicators and methods for improving detection in coastal recreational waters of the presence of harmful pathogens; and
- Improve monitoring and public notification programs.

Implementation of this act will provide much needed information on the water quality condition of North Carolina's coastal waters and the impact of coastal development and other activities on water quality. The Beaches Act provided additional funding to allow for more beach sampling in North Carolina. There

are currently 225 stations in ocean and estuarine waters that are sampled at different frequencies. Following EPA recommendations, *Enterococci* is used as the indicator organism for contamination. Sites are ranked as Tier I to III based on the level of swimming use, with specific standards at each tier for the acceptable level of *Enterococci.* If the swimming standard is exceeded, warning signs are posted temporarily at swimming sites.

Toxic chemicals

A toxic substance is defined in the North Carolina Administrative Code [15A NCAC 2B. 0202(36)] as "any substance or combination of substances ... which after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, has the potential to cause death, disease, behavioral abnormalities, cancer, generic mutations, physiological malfunctions (including malfunctions or suppression in reproduction or growth) or physical deformities in such organisms or their offspring or other adverse health effects." Potentially toxic chemicals found in the water column include heavy metals, pesticides, dioxins, petroleum hydrocarbons (e.g., oil), polycyclic aromatic hydrocarbons (PAHs), chlorine, polychlorinated biphenyls (PCBs), antifoulants, ammonia and pharmaceuticals. Many of these chemicals occur naturally (e.g., heavy metals), while others are created almost entirely by humans (e.g., pesticides). Below is a brief description of these chemicals:

- Heavy metals - Metals that have a density of at least five times that of water. These include mercury, nickel, lead, arsenic, cadmium, aluminum, iron, platinum and copper. Nonpoint sources of heavy metal inputs include municipal and agricultural runoff, contaminated groundwater and sediments, industrial shipping, recreational boating, and atmospheric deposition (Wilbur and Pentony 1999). Point sources of heavy metals include industrial discharges, power plants, ocean disposal of dredged material, and marine transportation (e.g., hull paints containing butylin compounds to hinder biofouling).
- Pesticides - Chemical compounds that are typically composed of chlorinated hydrocarbons and are used as herbicides, insecticides, and wood preservatives for agriculture, aquaculture, and urban/suburban development. Examples of pesticides are Aldrin, Atrazine, chlordane, fenvalerate, permethrin, toxaphene, and DDT.
- Dioxins - By-products of pesticide production, high temperature-combustion processes, and chemical bleaching of pulp in paper production (DWQ 1997a). Dioxins are also present as trace impurities in some commercial products.
- Petroleum hydrocarbons - Compounds found in fuel-related products such as gas, oil, and grease. There are over 100 hydrocarbon compounds in gasoline as well as numerous additives. Lubricant oil also contains elements such as zinc, sulfur, and phosphorus (Jackivicz and Kuzminski 1973).
- Polycyclic aromatic hydrocarbons (PAHs) - A group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. Compounds in the PAH group are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides (<http://www.atsdr.cdc.gov/tfacts69.html>, October 2002).
- Chlorine - Biocide and bleaching agent sometimes used to disinfect waste and pool water, clean clothes, and wash boats and other surfaces.
- Polychlorinated biphenyls (PCBs) - Organic chemicals containing chlorine that have properties that make them useful for many industrial and commercial applications like electrical, heat transfer, and hydraulic equipment; in paints, plastics and rubber products; in pigments, dyes and carbonless copy paper and many other areas.
- Antifoulant paints – Paints used on vessel hulls to prevent covering by marine organisms (i.e., barnacles) (Milliken and Lee 1990). Copper and organotin (e.g., Tributyltin or TBT) compounds are the most common ingredients in antifouling paints.
- Ammonia – Form of nitrogen that comes from concentrated animal operations, cleaning products, and point source dischargers. Ammonia is also a highly toxic waste product of living organisms.

- Pharmaceuticals – Chemical compounds used to treat human illnesses (e.g., Prozac, Paxil, Celexa).

Effects of toxic chemicals on fish

There are many factors affecting a chemical's toxicity to marine organisms. Some species or life stages are more sensitive than others. Eggs, and larvae in particular, are generally more sensitive to toxics than adult and juvenile life stages because they have more permeable membranes and less developed detoxifying systems (EPA 1985; Weis and Weis 1989; Funderburk et al. 1991; Gould et al. 1994). For example, larval striped bass are less tolerant of copper sulfate ($CuSO_4$) than juveniles (Kaumeyer and Setzlter-Hamilton 1982). Individuals of these early life stages often float in the water column, where toxic chemicals are more available for uptake. Because of their water column orientation, early life stages of fish are the primary focus of this section.

Regardless of the life stage affected, some chemicals are more inherently toxic to organisms than others. For example, some pesticides and metals (i.e., toxaphene, TBT, mercury) cause acute mortality to fish or shellfish at very low concentrations (approximately 1 part per billion or less), whereas others (i.e., chromium, atrazine) can cause toxic effects only at much higher concentrations (>10,000 parts per billion) (Funderburk et al. 1991). The effect on organisms also varies according to the physical and chemical properties of the water column in which they live; higher salinity water can neutralize more dissolved chemicals than fresh water, making these toxics less biologically available for uptake. There are other physiochemical conditions that can either increase or decrease toxicity of a given chemical. For example, copper is less toxic in the presence of dissolved organic matter. Cadmium toxicity, on the other hand, decreases as salinity increases due to binding to chloride.

Many toxic chemicals (especially heavy metals) are readily adsorbed on small sediment particles and eventually removed from the water column (Butler 1971; Wolfe and Rice 1972; Vandermeulen and Mossman 1996; <http://www.atsdr.cdc.gov/tfacts69.html>, October 2002). Adsorption on sediment particles allows some toxic chemicals to continue contaminating sediments of North Carolina until they degrade into less harmful substances. Bottom feeding fish may therefore be more affected by feeding on benthic organisms than from ambient chemical concentrations in the water column (Funderburk et al. 1991). However, the smaller fraction of highly soluble toxic chemicals present in the water is more bioavailable and therefore more toxic to aquatic life.

Toxic chemicals can also affect growth, reproduction, and behavior, resulting in a reduction of stock viability (Weis and Weis 1989; Wilbur and Pentony 1999; DeFur and Foersom 2000). These effects include abnormal cell division of embryos, reduced survival of embryos, malformation of larvae, and slowed development (Weis and Weis 1989). Some toxic chemicals may disrupt endocrine secretions (i.e., hormones) of aquatic organisms, which could have a corresponding effect on natural biological properties (Wilbur and Pentony 1999; <http://ca.water.usgs.gov/pnsp/rep/carp2/ abs.html>, 2002). In the Chesapeake Bay, male catfish exhibited arrested or indeterminate sexual development when their tissue contained significant concentrations of PCBs, organotins, mercury, DDT, and DDT metabolites (deFur and Foersom 2000). Small amounts of pharmaceuticals such as Prozac and birth-control drugs are also finding their way into U.S. rivers and streams. In mosquitofish, exposure to anti-depressant drugs caused delayed sexual maturation (<www.cnn.com/2003/TECH/science/11/14/coolsc.frogs.fish/index>, November 2003). The prevalence, sources and entire effects of hormone-altering chemicals in North Carolina are currently unknown. *More research is needed on the subject of hormone-altering chemicals in surface waters.*

Given all these factors, determining the effect of toxins on organisms and populations is a complex and difficult problem. The effects of toxic chemicals on oyster beds and bottom species are discussed later in the Shell Bottom and Soft Bottom chapters, respectively. This section primarily covers the effect of toxic chemicals on pelagic species of various life stages.

The acute and chronic toxicity of selected chemicals on a few pelagic species are listed in Table 2.31. The effects of environmental pollutants on early fish life stages are listed in Appendix I. Based on the limited number of chemicals for which data are available, the water quality standard is less than the acute and chronic toxicity level for the selected pelagic species and early fish life stages. However, these data are mostly from anadromous species and based on laboratory tests to determine acute levels of mortality, which are difficult to translate into ecosystem-level effects in very complex chemical and biological environments (Weis and Weis 1989; Funderburk et al. 1991).

Table 2.31. Literature values for measured toxicity of selected chemicals on selected pelagic species. *(Sources: DWQ water quality standard and Funderburk et al. 1991)*

Chemical	Freshwater quality standard[1]	Saltwater quality standard[1]	Acute/chronic or sublethal toxicity[1]		
			Atlantic menhaden	American shad	Striped bass
Heavy metals					
Arsenic	50	50			20,248[a]/ND
Cadmium	2	5			8.3[a], 38[b]/2
Chromium VI	50	20			16,370[a], 58,000[b]/ND
Copper	7 (AL)	3 (AL)	610/ND		54[a]/ND
Lead	25 (N)	25 (N)		<10/ND	
Mercury	0.012	0.025			90/5
Zinc	50 (AL)	86 (AL)		<30/ND	322[a]/430
Pesticides (Chlorinated hydrocarbons)					
Aldrin	0.000136	0.000136			8[b]/ND
Chlordane	0.000588	0.000588			12/ND
Dieldrin	0.00144	0.00144			20/ND
Toxaphene	0.0002	0.0002			5[a], 5.8[b]/ND
Other chemicals					
Trialkyltin	0.008	0.002	4.5/ND		<2.0/25

[1] micrograms/liter

[a] Toxicity tests conducted in freshwater

[b] Toxicity tests conducted in saline water

AL = Values represent action levels as specified in [2B .0211 & .0220]; N = There is also a narrative description of limits in [2B .0211]; ND = no data.

The values are meant to provide a relative indication of potential effect. End times and exposure times vary, and life stages were pooled for calculating means.

Because toxic contaminant concentrations (especially heavy metals) in the sediment far exceed concentrations in the water column (Steel 1991), resuspension can be a major problem in areas where fine-grained sediments predominate. These fine-grained sediments are common in sheltered creeks and small trunk estuaries, or in the deeper regions of larger estuaries. Heavy metal contamination in these areas is of particular concern because they cover the majority of designated nursery areas, where young fish gravitate in spring and summer. Heavy metals and other volatile chemicals are most toxic in freshwater systems. Therefore, anadromous and low-salinity nursery areas are probably the most sensitive to heavy metal contamination. Documented concentrations of toxic chemicals in the sediment were the highest in low-salinity areas with limited tidal flushing and high river discharge (Riggs et al. 1989; Riggs et al. 1991; Hackney et al. 1998). The problem is further intensified by the timing of most heavy metal inputs, which occur during the period of heaviest runoff and pollutant loading (during spring), and the arrival of many larvae and juvenile to the nursery areas.

The coincidence of heavy runoff, pollutant loading, and fish use of nursery habitat is also a potential problem for pesticides that are primarily dispersed in spring (predominantly herbicides). The concentration of atrazine and other herbicides in the Albemarle-Pamlico system was highest in late May

and early June and decreased gradually until September; a seasonal pattern of pesticide concentration coinciding with seasonal patterns of pesticide use (<http://nc.water.usgs.gov/albe/pubs/ALBEetroabs.htm>, 2002). However, toxic effects may be less significant if the arrival of larvae is preceded by a major flushing event. Considering the typically high freshwater flows that occur during spring, this pattern may also demonstrate the acute toxicity and rapid sedimentation of many pesticides.

Aside from the direct impact of toxins on aquatic organisms, there is also the ability of toxic chemicals (especially heavy metals and dioxins) to accumulate in the tissue of animals at higher trophic level (e.g., bioaccumulation), which can cause health problems in human consumers (Wilbur and Pentony 1999). Fish consumption advisories are often the result of chemical contamination. This primarily affects large fish occupying higher trophic levels, and the effect is not limited to freshwater species. There is currently fish consumption "advice" for mercury in sharks, swordfish, tilefish, king mackerel, bowfin, largemouth bass, and chain pickerel caught in waters south and east of Interstate 85 (<http://www.epi.state.nc.us/epi/fish/>, 2003). Site-specific advisories for dioxin have been given for Albemarle Sound, lower Roanoke River, and Welch Creek in Beaufort, Martin, and Washington Counties.

Sources of toxic chemical pollution

Due to the settling of suspended particles in estuaries, heavy metals, dioxin, and PAH contamination usually reflects localized impacts from point and nonpoint sources, although high flow events can result in resuspension and redeposition of metal-contaminated sediments far from their original sources (Steel 1991). Riggs et al. (1989) found the highest concentration of toxic chemicals in the sediment near point sources and on the surface sediment. The concentration of toxic chemicals in deeper sediment cores was as much as 100 times less than surface concentrations.

Upon entering the water column, many organic compounds will not persist for very long because of their inability to blend, volatility, biodegradability or the effects of weathering (Jackivicz and Kuzminski 1973). The organic molecules that do persist either remain suspended in the water column, concentrate on the surface, or settle to the bottom. The portion of oil that reaches the bottom may persist for several years (Olsen et al. 1982). Lead compounds from gasoline additives have a tendency to sink to the bottom (Chmura and Ross 1978). The degradation (half-life) of pesticides such as malathion, parathion, endosulfan, fenvalerate, chlorpyrifos-methyl, methanidathion, and diazinon in seawater ranges from 2.2-17 days (Walker 1977, Cotham and Bidleman 1989, and Lacorte et al. 1995). However, the toxicity and longevity of degradation products must also be considered in evaluating water quality.

Activities contributing to heavy metal contamination include urban/suburban sprawl, dock and marina development and operation, boating activity, dredge spoil disposal, automotive transportation, industrial shipping, industrial emissions, and pesticide use (Wilbur and Pentony 1999). Potential sources of heavy metals from these activities include anti-fouling paint, zinc plates on boats, fuel, runoff from parking lots or other road surfaces, and wood preservatives leached from dock structures (EPA 1985; Marcus and Stokes 1985; Sanger and Holland 2002). Mercury and arsenic are no longer used in antifouling paints due to their toxicity (Bellinger and Benham 1978 in Milliken and Lee 1990). Tributyltin (TBT), another toxic metal compound used in antifouling paints, was restricted on non-military vessels by the Organotin Antifouling Paint Control Act of 1988 (Milliken and Lee 1990). The use of TBT-containing paints for coating the hulls of military vessels has been either officially discontinued or is currently in the process of being phased out.[17] Ports are also a potential source of toxins. Increased boat traffic and transport of

[17] Currently, most Navy, MSC [Military Sealift Command], USCG [United States Coast Guard], and Army ships have steel hulls with copper-based antifouling paints. Paints containing tributyltin (TBT) are still found on some aluminum-hulled small craft because some copper-based paints are incompatible with aluminum hulls. Currently, TBT-based antifouling paints are found on approximately 10-20% of small boats and craft with aluminum hulls. The numbers of vessels from the respective Armed...

petroleum products and other toxic materials increase the chance of spillage into the water column.

Runoff from impervious surfaces such as roads and parking lots appears to be one of the major sources of heavy metals in estuaries and nearshore ocean waters. A study in the lower San Francisco Bay found that half of the cadmium and zinc in the bay came from tire wear (Beach 2002). Lead originated primarily from diesel-fueled vehicles and half the copper in the bay was derived from brake pad wear. An additional 25% of the copper came from atmospheric emissions. In Maryland, a study of suburban watersheds with little industrial activity found that metals from lawns, roads, and automobiles accumulated in sediments at levels toxic to aquatic life (Hartwell et al. 2000). In the Charleston, S.C. area, Lerberg and Holland (2000) found a strong correlation between increasing impervious surface coverage in tidal creek watersheds and the cumulative level of contaminants in tidal creek sediments. *Because pollutants associated with roads, parking lots, and associated transportation are a significant source of toxins and other pollutants to the water column, efforts should be taken by DOT to minimize impacts by 1) designing roads to retain stormwater runoff in natural and vegetated upland or wetland areas; 2) designing roads and parking lots to minimize impervious surfaces; 3) improving water flow through transportation structures; 4) monitoring of BMPs; and 5) incorporating BMP design criteria to enhance control of bacteria.*

Studies of heavy metal concentrations in the sediments of the Pamlico and Neuse Rivers found surface sediments in the vicinity of known point sources significantly more enriched than subsurface sediment in the Neuse River (Riggs et al. 1989; Riggs et al. 1991). In the Pamlico River, heavy metal enrichment was generally less severe than in the Neuse River. In the Pamlico and Neuse rivers, individual waste treatment plants, marinas, industrial plating facilities, and military facilities were identified as probable sources of heavy metal enrichment (Steel 1991). *Determining the distribution and concentration of heavy metals and other toxins in bottom sediments throughout the coast is needed to comprehensively assess potential threat to the water column.*

Copper, chromium and arsenic (known collectively as CCA) comprise the most common wood preservative in the U.S. (Weis and Weis 1994). CCA-treated wood preservative has been shown to leach copper, chromium-VI, and arsenic into adjacent sediments and to impact marine benthos (Weis and Weis 1994; Weis et al. 1998). Among CCA chemicals, copper appears to have the most toxic effect on marine organisms and also consistently appears to leach the greatest amount (Weis and Weis 1994). The area of significantly elevated heavy metal concentrations in the sediment can extend as much as 10 m beyond CCA-treated shoreline structures (Weis and Weis 1994; Weis et al. 1998). EPA is requiring new labeling on all CCA products specifying that no use of CCA be allowed after December 2003. The wood-treating industries had already made a voluntary decision to transition away from use of arsenic treated wood (CCA). The effect of toxic chemical leaching from wood is primarily a problem along poorly flushed, freshwater and low-salinity areas. *Ultimately, research is needed to determine if marina basins in freshwater and low-salinity areas actually produce enough toxic chemicals, at the right time, to impact fish populations.*

Marinas and multi-slip docking facilities

Marina basins and their associated facilities combine many sources of toxic contamination. There are typically CCA-treated boards on docking facilities and bulkheads, and antifouling paints on the boats moored in those docking facilities. Marinas are also a source of chronic, low-level oil and gas pollution from spills that sometimes occur at their pumping stations. Although there are permit requirements for oil spill containment in marinas, there are no requirements for chronic oil pollution. *The impact of chronic oil pollution on nursery areas is unknown and needs future research.* In addition, marina facilities

Forces branches estimated to have TBT coatings are: Navy-56, USCG-50, MSC-0, Air Force-50, Army-11 (U.S. Navy and EPA 1999). It is unknown how many of these vessels have operated or presently operate in North Carolina waters, or if the policy regarding TBT use has changed since the date of the reference's publication.

include boat workshops and parking lots located immediately adjacent to coastal waters. By themselves, marinas pose relatively little threat to coastal fish habitats. However, development pressures associated with them can be more threatening (i.e., increased boating, upland development, and shoreline stabilization).

The Coastal Resources Commission (CRC) defines a marina as "any publicly or privately owned dock, basin or wet boat storage facility built to accommodate more than 10 boats and providing permanent or temporary docking space, dry stack storage, haul-out facilities or repair services" (<http://dcm2.enr.state.nc.us/Handbook/section4.htm>, 2003).

Marinas have historically been most concentrated around high- and moderate-salinity estuarine areas (Maps 2.18a-d). According to permit records, there are approximately 440 existing marinas and community docking facilities along North Carolina's coastal waterways, with a total of 1,851 wet slips (DCM, unpub. data). Carteret county has the most marinas (approximately 100), followed by New Hanover county (80 marinas). Onslow, Beaufort, Dare and Brunswick counties have approximately 30 to 40 marinas each. The highest marina concentrations are found in the Southern Estuaries (4 mi. of shoreline/marina) and Core/Bogue (5 mi. of shoreline/marina) management units.

Specific CAMA regulations exist regarding marina siting to minimize impacts to estuarine resources, such as shell bottom and human health. DEH rules require that waters adjacent to marinas have a buffer of closed shellfishing areas, of varying distances, around them. For purposes of this rule, DEH defines "marina" as "any water area with a structure (dock, basin, floating dock, etc.) which is utilized for docking or otherwise mooring vessels and constructed to provide temporary or permanent docking space for more than 10 boats" [15A NCAC 18A.0901]. Development that results in new shellfish closures is generally not permitted. However, there are still marinas being developed in closed shellfishing waters, which may lead to further degradation in waters already closed to shellfishing or to increase the size of the area closed.

There are also CRC regulations that address marina siting in designated primary nursery areas (PNAs). Current CRC regulations prohibit construction of new marinas in designated PNAs if new dredging is required, but allow siting of marinas in PNAs if no new dredging is required [15A NCAC 07H .0208 (b)(5)(B)]]. However, upland basins requiring an access channel through a PNA are given a variance by CRC if the dredging will not result in significant degradation of existing fishery and wetland resources and basin design provides adequate flushing [CRC 07H .0208 (b)(5)(A)]. Maintenance dredging of existing channels is also allowed through PNAs [CRC 07H .0208 (b)(1)(J)]. Current marina development tends to be occurring in lower salinity areas because many areas adjacent to high-salinity estuarine waters are already developed. These low-salinity areas are often smaller waterbodies that are important but undesignated nursery areas for anadromous and other fish. *To protect anadromous fish spawning and nursery areas from marina impacts, dredging for new marina construction and other marina-related activities that negatively impacts these fish functions should be restricted.* Map 2.4 shows some freshwater areas that have been designated as Inland PNAs by the WRC. These include mainstem sections and tributaries of the Cape Fear, New, Neuse, Tar-Pamlico, Alligator, Roanoke, and North rivers, and Currituck Sound (15A NCAC 10C .0503). The WRC-designated nursery areas are given the same consideration as MFC-designated PNAs by the CRC. However, only a small portion of these is located within CAMA jurisdiction. These inland PNAs are currently not recognized as HQW in EMC regulations. *Waters designated as Inland PNAs by WRC should be considered for reclassification to HQW by EMC, as was done for MFC-designated PNAs. Formal criteria need to be developed to classify and protect anadromous fish spawning areas that will be recognized by DWQ.*

Considering the localized effect of many toxic pollutants, marinas and possibly "non-marinas" (small docking facilities) located near sensitive nursery areas pose a particular concern. Of the marinas in coastal waters, 51 are located within 100 m of a MFC-designated Primary Nursery Area. Few Primary

Nursery Areas in freshwater and low-salinity areas have been designated by DMF. Although anadromous fish use areas have been located by DMF, designation of anadromous fish spawning areas needs to be completed. Until these important freshwater and low-salinity areas are designated, they remain vulnerable to toxic chemical pollution and other habitat impacts associated with marina development. *Designation of specific anadromous fish spawning and nursery areas and possibly additional Inland PNAs needs to be completed along the entire coast to provide protection from marina development and other potential threats.*

The issue of marina siting is complex and design preferences may differ between agencies due to each agency's primary responsibilities. For example, DWQ tends to prefer marinas designed with open water basins to enhance flushing, while DCM tends to prefer marinas designed as upland basins with a dredged connecting channel to minimize impacts to shoreline vegetation and obstruction of navigational access. Open water basins may encourage use by juvenile freshwater and anadromous species [18], but also enhance flushing of heavy metal contaminants. If upland basins accumulate toxins and attract young fish and shellfish, they could have a more negative impact on fisheries than open water basins. *Studies are needed to compare use of both upland and open water basins by young fish. Development of a comprehensive marina policy to address appropriate design, siting, operation and maintenance procedures, and cumulative impacts is needed to thoroughly address these and other impacts of marinas. This should consider, among other things, requiring the use of oil-absorbing materials around fuel and docking stations and shoreline habitat (i.e., wetlands, soft bottom). Support of the Clean Marinas Program through additional staff resources and incentives would benefit coastal fish habitat. The cumulative impact of clustered marinas should also be assessed.* The DWQ is drafting a marina action plan that could address many of the issues involved in developing a comprehensive marina policy (G. Putnam, DWQ, pers. com., 2002).

An emerging problem is the proliferation of small docking facilities, also referred to as non-marina boating facilities (1-10 boat slips) in developing coastal subdivisions. DCM permit records indicate that from 1990 to 2002, DCM issued an average of 538 permits per year along the coast for individual piers; 67 permits/year issued for non-marinas; and 10 permits/year issued for new or expanding marinas (Figure 2.10). These numbers are only estimates since they include repairs and replacements and may slightly overstate new marina/dock construction (D. Huggett, DCM, pers. com., 2003). The total number of marinas permitted/year has declined since 1990 and 1991 (31 and 16 permits/year, respectively) to about 6-13 per year. This decline is in part due to stringent permitting regulations and an increase in smaller docking facilities. The greatest numbers of permitted boating facilities with fewer than 10 slips since 1990 are in Carteret (164 permits), New Hanover (139 permits), and Dare (116 permits) counties. While the number of new and expanding marinas has declined over the years (Figure 2.10), the number of smaller docking facilities increased in the late 1990s and has shown large annual fluctuation since. The Division of Environmental Health's Shellfish Sanitation Branch is in the process of making a database to improve tracking of small docking facilities (1-10 slips) (S. Murphey, DEH, pers. com., 2001). Given the potential for degradation of nursery area function, *DENR should consider a temporary moratorium on all new small docking facilities (1-10 slips) and marinas, excluding individual private docks, until a comprehensive marina management system for all counties is developed.*

Small docking facilities (1-10 slips) may result in cumulative impacts to coastal fish habitat. Development often concentrates adjacent to areas with water access and docking facilities. The combination of heavy metal contamination from shoreline structures, antifoulant paints, bilge water, marine sewage, and stormwater runoff from roads, driveways, ditches, and adjacent development, could lead to significant degradation of primary nursery area functions. However, there is little documented proof of such degradation. *There is a need to study the cumulative impact of these small docking facilities and associated development on toxic chemical concentrations in the water column. The study should also*

[18] (Refer to Nursery function section.)

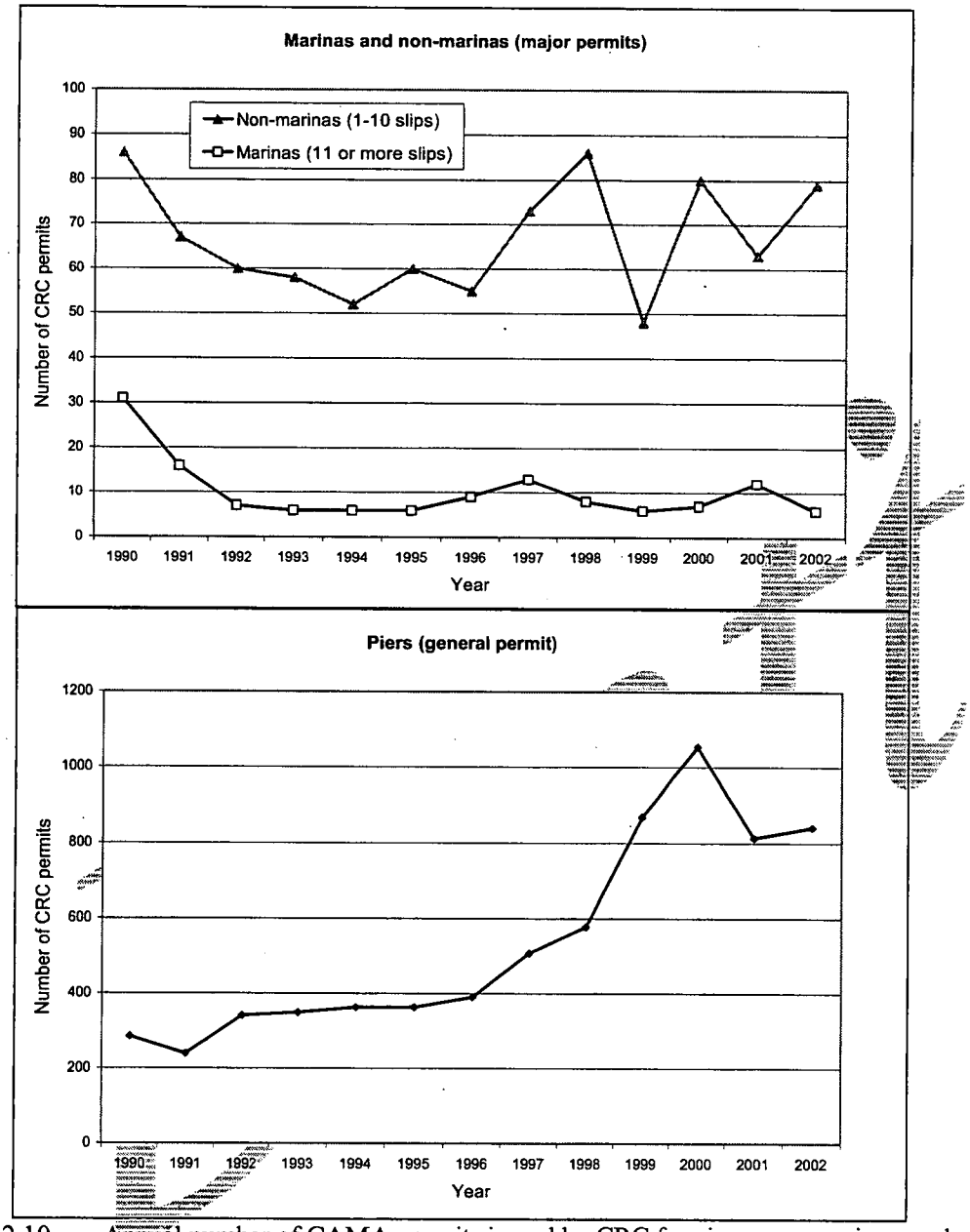

Figure 2.10. Annual number of CAMA permits issued by CRC for piers, non-marinas, and new or expanded marinas.

Piers=general permit;
Non-marinas=2-10 slips, major permit;
New or expanded marinas=11 or more slips, major permit.

compare higher and lower salinity nursery areas. The results could help in defining a rule limiting the ratio of developed public trust bottom to undeveloped shoreline near shallow, nursery habitats. There is already a CAMA rule affecting marina development by limiting the ratio of developed shoreline to undeveloped shoreline along the coastal shoreline AEC [15A NCAC 07H .0208(b)(5)], but its adequacy in preventing cumulative impacts is unverified.

Pesticide spraying

Cropland agriculture has been a consistent source of pesticides in streams, as cropland coverage has grown relatively little from 1982-1997 (Table 2.21). From 1992-1994, water samples from the Tar-Pamlico drainage basin were analyzed for 46 agricultural herbicides, insecticides, and pesticide metabolites as part of the NAWQA program (Woodside and Ruhl 2001). Although the pesticides with the highest estimated use were the compounds detected most frequently, there was not a strong correlation between estimated use and detection frequency (Woodside and Ruhl 2001). This was probably due to a number of pesticides whose estimated use was unknown (i.e., prometon). The concentration of many herbicides was greatest in spring and summer, during and immediately following application periods. The seasonal pattern of concentration was less evident for the insecticides prometon, diazinon, and chlorpyrifos (Woodside and Ruhl 2001).

Another potentially increasing threat is the effect of pesticide application over shallow water in and adjacent to wetlands to reduce mosquito levels. The Environmental Protection Agency, hoping to stem the rapid spread of West Nile virus, has recently modified pesticide use procedures to allow some spraying of pesticides over water (contrary to the pesticide label instructions) to kill mosquitoes, without having to get a permit under the Clean Water Act (<http://www.enn.com/news/wire-stories/2002/10/10112002/ap_48678.asp>, October 2002). However, these mosquito control agents can be non-selective, and are known to harm or kill larval aquatic invertebrates and fish (Weis and Weis 1989; Milam et al. 2000), which is the reason they are not labeled for use over open water. *Pesticides should always be applied according to label instruction, regardless of whether a permit is required or not.*

Milam et al. (2000) evaluated the toxicity of several popular mosquito control agents on non-target zooplankton and fish species (minnows and mosquitofish). Exposures required to kill mosquito larvae were as much as 31.4 µg/L for Dursban®, malathion, Permanone®, Abate®, Scourge®, B.T.I., and Biomist®, whereas ≥2 µg/l l of these chemicals resulted in substantial mortality (Milam and Wilhide 2000). Only malathion killed mosquito larvae before it killed mosquitofish (Milam et al. 2000). However, malathion was also identified as the cause of 64% of the pesticide-related fish kills in U.S. coastal areas between 1980 and 1989 (Key et al. 1998). The disparity between toxicity of malathion on moquitofish and pesticide-related fish kills could be the result of variable sensitivity among fish species. The toxicity of malathion was tested on grass shrimp in moderate salinity water (20 ppt) and found to be highest for newly hatched larvae (Key et al. 1998). However, the doses used to evaluate toxicity (up to 30 µg/l l) were much higher than was required to kill mosquito larvae in fresh water (1 µg/l). It may be that salinity has a buffering effect on the toxicity of malathion to both fish and mosquito larvae. *Research is needed to identify those pesticides safe for spraying over open waters and, for those pesticides whose toxicity is impacted by salinity, appropriate application rates for controlling mosquitoes.*

There are also natural pesticides and bacteria that can be used for mosquito control (Buchsbaum 1994). The bacteria *Bacillus thuringiensis israelensis* (B.T.I.) is more specific to mosquito larvae and less toxic than malathion. There is also the Integrated Pest Management approach that allows natural predators of mosquito larvae (i.e., mosquitofish, killifish) access to breeding areas. However, allowing fish access to breeding areas could disrupt or eliminate amphibians dependent on the exclusion of fish predators for their survival.

Pesticide spraying over agricultural crops is another source of pesticides in the water column. Some fish kills in coastal rivers have been found to be related to crop spraying. Pesticides can enter the water through runoff or directly due to drift from aerial applications. The North Carolina Department of Agriculture and Consumer Services administers and enforces the N.C. Pesticide Law of 1971 and N.C. Pesticide Board-adopted regulations, including crop spraying practices. The purpose of the N.C. Pesticide Program is to protect public health and safety and to promote continued environmental quality

by minimizing and managing risks associated with the legal use of pesticides. Policies on drift from aerial applications will affect the potential for toxin contamination in coastal waters and associated chronic and acute effects on fish populations.

The N.C. Pesticide Board has rules regarding aerial spraying that prohibit the application of pesticides under conditions that result in drift and adverse effects to non-target areas. Deposition of pesticides labeled toxic or harmful to aquatic life is not permitted in or near waterbodies if hazardous to aquatic life. Another aerial rule states that no pesticide shall be deposited onto any non-target area in such a manner that it is more likely than not to cause an adverse effect, unless such aquatic life is the intended target of the pesticide. An inspector will investigate whenever there is an allegation of pesticide drift to non-target sites to determine whether the pesticide was applied according to the label. *Although safeguards are in place, the N.C. Pesticide Board's policies on drift should be assessed and modified if necessary to ensure adequate protection of aquatic life and water quality.*

Recent research indicates that wetlands receiving drainage laden with toxic chemicals may indirectly impact estuarine food chains by accumulating toxic chemicals in the bacterial component of detritus, which is not affected by toxic chemicals (<http://es.epa.gov/ncer/ final/grants/96/ecoass/alberts.html>, May 2003). These toxic chemicals are then exported from the wetland to accumulate in the tissue of higher animals in the food chain. Therefore, toxic chemicals may not only accumulate through sediment pathways[19], but also through the water column in the form of floating detritus.

Status and trends in toxic chemical pollution

Several coastal studies have examined toxic chemical contamination in North Carolina's estuaries. One study of bottom sediments throughout coastal North Carolina waters found the following chemicals to be most abundant between 1994 and 1997 (in order of descending concentration): PAHs, nickel, arsenic, DDT, chromium, PCBs, and mercury. Over 1.5 billion pounds of PCBs were produced in the U.S. before they were banned in 1977. The presence of PCBs and DDT in the sediment therefore provides evidence of their persistence in the environment (Hackney et al. 1998). The study also found concentrations of other heavy metals such as antimony, copper, lead, cadmium, silver, and zinc. The sediment in 13.4% of estuarine sites sampled was nearly devoid of life during harsh summer conditions, according to the survey.

Although potentially toxic levels of trace chemicals were found in bottom sediments throughout North Carolina coastal waters, their presence also reflects the quality of the overlaying water column. Based on historical data (1950-1993), EPA's Storage and Retrieval System (STORET) the most common pesticides in surface water of the Albemarle-Pamlico system were atrazine and aldrin (<http://nc.water.usgs.gov/albe/pubs/ALBEetroabs.htm>, 2002). The Water Data Storage and Retrieval System maintained by USGS indicated relatively high concentrations of atrazine, alachlor, metalachlor, prometon, metribuzin, and metribuzin over the same time period. The herbicide atrazine is known to cause embryonic deformities in channel catfish exposed to 0.4 mg/l (Weis and Weis 1989). In total, there were 45 pesticides detected in waters of the Albemarle-Pamlico system, out of a total of 47 pesticides analyzed (<nc.water.usgs.gov/albe/pubs /circ1157/nawqa91.6.htm>, 2002).

The highest contamination levels were found in low-salinity areas with limited flushing and high river discharge (i.e., upper estuaries) (Hackney et al. (1998). This trend in toxic chemical pollution has been affected by severe weather striking the North Carolina coast. For example, after flooding accompanying Hurricane Floyd in 1999, pesticide concentrations in upper Pamlico River estuary declined by a factor of ten, while concentrations in the lower estuaries had increased slightly (D. Shay, NCSU, pers. com., 2002). One year following Floyd, however, the overall concentration of current-use pesticides was comparable to pre-hurricane levels (D. Shay, NCSU, pers. com., 2002).

[19] Refer to Soft bottom section.

Based on recent DWQ evaluations, heavy metals were a cause for impairment in 13 freshwater stream miles (DWQ 2000a). The DWQ also identified chlorine as the source of impairment in four freshwater stream miles (<1% of total rated) in coastal river basins and ammonia (NH_3) in 12 freshwater stream miles (Table 2.25). The EMC has established a water quality standard of 17 ug/L for Total Residual Chlorine, effective April 1, 2003. The Committee's move to adopt a freshwater standard for total residual chlorine (TRC) is driving the implementation of TRC effluent limitations for facilities that use chlorine or a chlorine derivative for disinfection. Such a limit may necessitate the use of a dechlorinating agent such as sulfur dioxide or a sulfite derivative. Alternative means of disinfection, such as an ultraviolet system, may be encouraged for new or expanding facilities to reduce the use of chlorine disinfection.

Toxic chemical contamination was not evaluated by DWQ in estuarine and nearshore ocean waters. However, based on a study in 1988, DWQ found concentrations of heavy metals within water quality standards in SA waters near marinas (DWQ 1990). This study also detected unidentified organic compounds (i.e., pesticides, PAHs, PCBs) at every marina examined, although the concentrations did not represent a violation of water quality standards. The current standards do not completely eliminate risk because: (1) values are not established for many toxic chemicals; (2) mixtures and breakdown products are not considered; (3) the effects of seasonal exposure to high concentrations have not been evaluated; and (4) some types of potential effects, such as endocrine disruption and unique responses of sensitive species, have not yet been assessed (<water.usgs.gov/pubs/circ/circ1225/html/human.htm> 2002). *These considerations should be a topic of future research.*

The precautionary principle regarding toxic chemical contamination should be used when data are lacking on their effects. Ideally, the fewer types and quantities of toxic chemicals to enter into the environment, the better (DeFur and Foersom 2000). Given time and normal ecological processing, some highly contaminated sites will be covered and no longer accessible, while biological agents will slowly process other sites. Lead and other heavy metals will not degrade, and dioxin only degrades slowly. *These factors should be considered when determining what chemical quantities should be allowed in the water.*

Other sources of water quality degradation

Desalination plants and marine debris are two other threats to the water column. Removal of brackish water for desalination and use as a municipal water supply is a more recent activity that has potential impacts to water quantity or quality (Copeland 1967). In rapidly developing coastal counties where wells are drawing deeper into saltier groundwater, desalination of surface waters provides another source of drinking water. There are several existing desalination facilities and some proposed facilities. The first desalination plants in North Carolina discharge wastewater into the Atlantic Ocean and sounds where the receiving area had equal or higher salinity than the effluent. Newer facilities are moving more inland to less saline waters. For example, the DWQ recently issued an NPDES permit for a proposed facility in Camden County that would discharge 430,000 gallons of salt water (~13 ppt) into the Pasquotank River where salinities range from 2-5 ppt. As of 2001, there were at least three proposed desalination plants for North Carolina in addition to 11 existing plants in the coastal area (L. Henry, DMF, pers. com., 2003). Two of these existing plants are located in freshwater areas (L. Henry, DMF, pers. com., 2003).

Effluent from desalination in freshwater areas could create isolated pockets of higher salinity water with very low diversity of species, the majority of which occupy lower trophic levels. The reduction in species diversity and isolation from the surrounding aquatic community would constitute a loss of habitat. Moreover, under natural circumstances, vertical stratification in the estuarine water column due to salinity differences creates conditions favorable to low DO, which serve to degrade bottom habitat, cause stress or mortality in benthic species and force mobile species to move (Stanley and Nixon 1992, Buzzelli et al. 2002). Similar conditions may occur artificially through effluent release in fresh water. *However, research is needed to determine if effluent from desalination plants could create the predicted effect.* Even if aquatic organisms were able to adjust to salinity changes, they may also face an imbalance of ions

that would make adjustment even more difficult (Copeland 1967; Florida DEP 1995; Goodfellow et al. 2000). Florida Department of Environmental Protection (1995) indicated that ionic imbalance could be toxic to mysid shrimp, which are an important food item in the diet of many freshwater fish species found in coastal North Carolina (Adams 1976; Whitehead 1985; Robins and Ray 1986; Page and Burr 1991; Bowman et al. 2000).

Aside from the stress of salinity change and ionic imbalance on organisms, other concerns (from Pantell 1993) include the effect of:

- Chlorine and other biocides used to clean pipes and other equipment and sometimes to pretreat the feedwater;
- Temperature of discharge waters above those of receiving waters;,
- Turbidity levels from discharge above those of receiving waters;
- Oxygen levels of discharge waters below those of receiving waters;
- Chemicals from pretreatment of the feedwater such as biocides, sulfur dioxide, coagulants-e.g., ferric chloride, carbon dioxide, polyelectrolytes, anti-scalants-e.g., polyacrylic acid, sodium bisulfite, antifoam agents, and polymers;
- Chemicals used in flushing the pipelines and cleaning the membranes in reverse osmosis plants (RO) such as sodium compounds, hydrochloric acid, citric acid, alkalines, polyphosphate, biocides, copper sulfate, and acrolein;
- Organics and metals contained in the feedwater and concentrated in the desalination process; and
- Metals that are picked up by the salty effluent touching facility components and pipelines.

The MFC has strongly objected to desalination plants in low-salinity areas due to the potential impacts and the lack of information on physical and chemical characteristics of the saline discharge. Recommendations for permitting desalination plants were presented in a draft report assembled by the Water Treatment Plant Workgroup (L. Henry, DMF, pers. com., 2002). The report identified specific information needed to evaluate the potential impact of the discharge:

- Gather more information from applicant;
- Location of project and discharge;
- Ambient water quality at discharge location;
- Proposed designed flow;
- Type of treatment process (e.g., reverse osmosis, cation exchange);
- Proposed water source;
- Dilution modeling;
- Chemical cleaning procedures; and
- Ratio of potable water to concentrate.

Using the above information and their own data/analysis, permit review agencies can evaluate the impacts on habitat and water quality. *Based on the results of dilution modeling, basic water quality parameters (flow, temperature, pH, and DO) should be identified for the applicant to monitor (Draft report, Water Treatment Plant Workgroup, 2001). If the data indicate the presence of pollutants in the discharge water, toxic chemical monitoring and toxicity testing should be required. Nutrients and ammonia should be monitored if a mass balance approach indicates excess nutrients. Finally, biological monitoring of the macrobenthic community should be required on facilities discharging more than 0.5 million gallons per day.* If the facility can demonstrate their discharge is not significantly impacting the physical, chemical, and biological environment, further monitoring could be discontinued.

Trash and other waste that is carried into the water (marine debris) accidentally or intentionally is a threat to fishery resources due to entanglement and ingestion. Entanglement can strangle or injure organisms, or impair mobility. Ingestion of plastic resin pellets, plastic bags, and other packaging by marine life can impede feeding and breathing. A 1997 study found that at least 267 species were affected by marine

debris, including numerous fish, invertebrates, sea turtles and marine mammals (Laist 1997). In 1998, the amount of trash dumped at sea was more than twice the weight of the total U.S. fishery catch (<http://www.cmc-ocean.org/mdio>, December 01, 2000). Plastics comprise about 90% of debris found floating in the water (<http://marine-litter.gpa.unep.org/facts/what-where.htm>, November 02, 2002). Surveys indicate that water based sources of trash include cruise ship operations, recreational boating, commercial fishing, offshore oil drilling, and military vessel operations. Land based sources include storm drains, sewer outfalls, and general littering. *Incentives are needed to encourage removal and proper disposal of derelict fishing gear. In addition, public education is needed to discourage littering from land or water based activities.*

Non-native/Nuisance species

There is widespread documentation that non-native/nuisance species can out-compete some native species, altering the established ecosystem, habitat, and eventually water quality (Mallin et al. 2001c). Foreign organisms in the discharge of ships' ballast water at or near ports have resulted in the introduction and spread of non-native invertebrates, such as zebra mussels and toxic dinoflagellates. Hallegraeff (1998) linked a global increase in the frequency, intensity, and geographic distribution of paralytic shellfish poisoning (a human illness resulting from consumption of shellfish contaminated with certain red tide toxins) with increased translocation of non-native dinoflagellate species via ships' ballast and import/export of shellfish products. In Australia, the sudden appearance of toxic dinoflagellate cysts was tied to exportation of woodchips (Hallegraeff 1998), an industry currently active in North Carolina. In the Chesapeake Bay and North Carolina, where the potent toxic dinoflagellate *Pfiesteria piscidia* has been reported, there is concern that the organism may disperse to unaffected areas via ballast water. Possible ballast water treatment options include chemical treatment with chlorine or hydrogen peroxide, electric shocking, ozonation, heat (35 – 45° C), deoxygenating, ballast water exchange, or reballasting. Of these alternatives, heating may be the most effective and environmentally friendly. Ballast water contamination is a worldwide maritime issue that must be addressed on an international scale, but may also be partially addressed on a regional scale. *Until treatment of ballast water is required and implemented, monitoring of port waters for algal blooms is recommended to minimize risks of introduction elsewhere (Hallegraeff 1998).* Currently the U.S. Coast Guard requires vessels to carry out an open ocean exchange of ballast water. However, this does not effectively remove or kill all organisms in the tanks (USCG 2003, unpub. doc). In 2003, the Coast Guard, under authority in the National Invasive Species Act of 1996, proposed requiring a mandatory national ballast water management program for all vessels having ballast water tanks that operate in U.S. waters and /or enter U.S. waters after operating beyond the exclusive economic zone (EEZ). Vessels entering U.S. waters after operating beyond the EEZ would be required to do one or more of the following:

- Perform complete ballast water exchange in an area no less than 200 nautical miles from any shore;
- Retain ballast water onboard the vessel;
- Use an alternative environmentally sound method of ballast water management approved by the Coast Guard; and/or
- Discharge ballast water to an approved reception facility.

DENR should work with the North Carolina Port Authority and the U.S. Coast Guard to ensure compliance with these proposed rules.

Existing management measures

There are many management initiatives that are already underway to improve conditions in the water column. Some of these programs, BMPs, and other management measures have already been mentioned. Appendix G contains a list of over 100 existing state and federal agency programs that may affect water quality. This list was compiled during the Estuarine Shoreline Protection Stakeholders Process in 1999 to identify various governmental programs that in some way affect water quality and to determine where

gaps exist or better coordination is needed. The scope of their authority, the pollutants they may affect, and a brief description are included. Some of the larger efforts are discussed below.

Stormwater Management Program

The State Stormwater Management Program was established in the late 1980s under the authority of the North Carolina Environmental Management Commission (EMC) and North Carolina General Statute 143-214.7. This program, codified in 15A NCAC 2H .1000, affects development activities that require either a Erosion and Sediment Control Plan (for disturbances of one or more acres) or a CAMA major permit within one of the following areas:

- The twenty coastal (CAMA) counties, and/or
- Development draining to Outstanding Resource Waters or High Quality Waters.

The State Stormwater Management Program requires developments to protect these sensitive waters by maintaining low- and high-density options for stormwater management, varying with water quality classification. Low-density options include limits on the maximum amount of built-upon area (or pervious surfaces), type of development (single-family residential rather than commercial), and requiring vegetative buffers and the transport of runoff through vegetative conveyances.

- Low-density built-upon area limits for High Quality Waters and freshwater ORWs are 12% or less or single family residential development on lots of one acre or more [EMC 15A NCAC 02H .1006 and .1007].
- Low-density built-upon area requirements for saltwater ORWs and areas within 0.5 mi of and draining to SA waters are 25% or less built-upon area or single-family residences on lots of 0.33 acre or more [EMC 15A NCAC 02H .1005].
- Low-density built-upon area requirements for coastal counties adjacent to waters that are not classified as ORW, SA, or HQW waters are 30% or less or single family residences on lots 0.33 acres or more [EMC 15 NCAC 02H .1005].

Development adjacent to HQW, ORW, and SA waters must also:

- Maintain a 30 ft wide vegetative buffer, and
- Transport stormwater runoff primarily by vegetated conveyances (i.e., vegetated swales are permitted, but direct pipes are not).

If low-density design criteria cannot be met, then high-density development requires the installation of structural best management practices (BMPs) to collect and treat stormwater runoff from the project. High-density BMPs must control the runoff (depending on the receiving stream classification) from the 1 in (HQW and freshwater ORWs) or 1.5 in (ORW and SA waters) storm event and remove 85% of the total suspended solids. However, within 575 ft of the shoreline adjacent to designated saltwater ORWs, development activities must comply with the low-density option.

New stormwater rules for Phase II communities have been approved by the EMC and are under final review by the Rules Review Commission. Under these rules, low-density projects in areas within 0.5 mi of and draining to SA waters can have no more than 12% built-upon area for all residential and non-residential development. All other Phase II areas can have no more than 24% built-upon area. High-density criteria require control and treatment of the first inch of stormwater runoff, an 85% average annual removal of Total Suspended Solids, and several other requirements. In addition, no new direct points of stormwater discharge or expansion of discharge to SA waters is allowed.

The Stormwater Management Program's goals are achieved through Phase I and II Stormwater permits. The Phase I permitting program for stormwater discharges was established in 1990. Phase I focuses on site and operations planning to reduce pollutant sources from certain industrial facilities, construction activities that disturb five or more acres of land, and municipal separate storm sewer systems (MS4s)

serving populations of 100,000 or more (based on 1990 census data). The large MS4s in North Carolina coastal drainages include the cities of Raleigh, Fayetteville, and Greensboro. Construction activities disturbing more than one acre require an Erosion and Sediment Control Plan approved by the Division of Land Resources.

Although Phase II of the NPDES Stormwater program was signed into law in December 1999, temporary and permanent rules to begin program implementation were not approved by the EMC until October 2002 and July 2003, respectively. Ultimately, the program will implement controls on stormwater discharges from smaller communities currently not regulated by Phase I. The Phase II program will require NPDES permits for smaller "municipal separate storm sewer systems" (MS4s) in urbanized areas, as well as construction sites between one and five acres in size. A small MS4 could be pulled into the Phase II program through automatic designation, state designation, or petitioning. Small MS4s have been automatically designated for local governments with a combined population of 50,000 or more and a density of 1,000 people per square mile. In North Carolina, there are 60 cities and 25 counties of this size that will be included automatically, based on population. The designated areas that are in eastern North Carolina include Brunswick, New Hanover, and Onslow counties; and the cities of Wilmington, Jacksonville, Greenville, Wrightsville Beach, and Leland. In addition, DWQ must develop designation criteria to determine which communities with populations of 10,000 or more, or with a density of 1,000 people per square mile, will also be put into the Phase II program, based on their potential to have an adverse impact on water quality. Other communities can be placed under the program as a rule-making petition to the EMC where there are significant water quality concerns (<http://www.epa.gov/owm/sw/phase2>, 2003). Regulated small MS4s were required to apply for stormwater permits by March 2003. Minimum requirements include:

- Public education and outreach on stormwater impacts;
- Public involvement and participation;
- Illicit discharge detection and elimination;
- Control of stormwater runoff at construction sites; and
- Post-construction stormwater management for new development and redevelopment pollution prevention for municipal operations.

To comply with the post-construction rules, local governments will have to adopt development ordinances and administer local programs that assure that new development does not cause unacceptable stormwater pollution. For example, local governments will be denied the required Phase II permit if they cannot demonstrate their stormwater programs are adequate in protection of shellfish harvesting. To be in compliance, local governments do not have to eliminate all pollutants, but must reduce the discharge of pollutants to the "maximum extent practical." The Phase II permit can require certain BMPs that are known to be effective in achieving Clean Water Act requirements in order to meet this minimum standard. As part of the Phase II stormwater regulations, local governments will have to map all stormwater outfalls in their communities. These outfalls are defined as any ditch or culvert that discharges stormwater pollution to surface waters such as creeks, sounds, or the ocean. The quality of the stormwater will have to comply with downstream water quality standards.

Neuse and Tar-Pamlico Nutrient Reduction Strategies

In response to the large number of fish kills in the Neuse River in the summer of 1995 and other concerns over deteriorating water quality, the General Assembly passed a bill that required a 30% reduction in the 1995 nutrient levels in the Neuse River basin by 2003. To meet this requirement, five "Nutrient Reduction Strategies" were developed and made effective as of 1997. Similar rules were implemented for the Tar-Pamlico river basin in 2000. The rules include:

- Riparian buffer protection rule,
- Wastewater discharge rule,
- Agriculture rule,

- Nutrient management rule, and
- Stormwater rule.

Agriculture and forestry are affected by the agriculture rule [15A NCAC 2B .0238] and the nutrient management rule [15A NCAC 2B .0232]. The agriculture rule gives farmers several options. They may participate in developing a Local Nitrogen Reduction Strategy where specific plans for each farm are developed, or implement standard BMPs such as buffers and water control structures. The nutrient management rule applies to anyone applying fertilizer on 50 or more acres of land, such as cropland, golf courses, recreational land, nurseries, or residential or commercial lawns. This rule requires training in nutrient management or development of a nutrient management plan. The wastewater discharge rule [15A NCAC 2B .0234] and stormwater rule [15A NCAC 2B .0235] will target reductions in nutrients from point and nonpoint urban development, respectively. The wastewater discharge rule allocates a total maximum discharge limit for the basin and divides that amount among different discharger groups. Dischargers also have the option to establish a nitrogen trading coalition, a group that collectively meets a nitrogen limit, determined by the EMC, equal to the combined nitrogen limits of its members (<http://h2o.enr.state.nc.us/nps/pt-sourc.htm>, 2003). The stormwater rule applies to certain large and rapidly growing communities in an effort to reduce urban stormwater runoff. Local governments are required to develop stormwater plans for new development, educate the public on stormwater issues, identify and remove illegal discharges, and identify existing development that could be retrofitted.

Although various concepts have been applied to riparian buffers, they are generally defined (Crowell 1998; <http://www.chesapeakebay.net/pol/interim.htm>, 2000) as permanently vegetated areas between a water body and upland land use that are designed to:

- Prevent upland sources of pollution from reaching surface waters by trapping, absorbing, and filtering sediments, nutrients, chemicals, and fecal bacteria.
- Maintain the natural morphology and ecosystem role of stream channels and shorelines (erosion and flood control).
- Protect fish and wildlife by supplying food, cover, and thermal protection.
- Protect other coastal habitats such as wetlands, SAV, and shell bottom through water quality and flow enhancement.

Ideally, no development is allowed in a buffer. Numerous scientific studies have documented that vegetated buffers are highly effective in removing sediment, nutrients, bacteria, heavy metals and other chemicals from stormwater runoff (Desbonnet et al. 1994; Lee et al. 1989; Gilliam et al. 1994; Zirschky et al. 1989; Groffman et al. 1991). However, the effectiveness is dependent on the width, slope, soil type, vegetative cover, quantity and quality of the stormwater runoff and size of the drainage area (Crowell 1998). In 1998, DCM staff compiled an extensive bibliography on reported pollutant removal effectiveness of various buffer widths and recommended buffer widths for various environmental objectives (Crowell 1998). The widths range from 2 to 178 m, depending on the objective and the desired amount of pollutant removal.

Forested riparian buffers are considered to deliver the greatest range of environmental benefits of any type of stream buffer (<www.chesapeakebay.net/pol/interim.htm>; Lowrance 1997). Unlike most other BMPs, riparian forest buffers accomplish multiple habitat benefits while also improving water quality. Since forested buffers are thought to remove some nutrients that grasses cannot, a three-zone riparian buffer concept was proposed for the Chesapeake Bay region to maximize buffer benefits (Lowrance 1997):

- **Zone 1** functions as an extension of the water body. Undisturbed woody vegetation remains to stabilize sediments, reduce flooding, provide woody debris, and remove some pollutants.
- **Zone 2** consists of a managed forest, where trees remain but can be managed. The primary function of this zone is removal of pollutants from surface and groundwater, while allowing some economic benefits.

- **Zone 3** may contain grass filter strips, level spreaders or other features. This zone is needed to slow runoff, infiltrate water, and filter sediment and other pollutants.

The Neuse and Tar-Pamlico riparian buffer rules were designed with this concept in mind. Zone 1 must be a 30 ft wide forested area, beginning at mean high water (MHW), where the first 10 ft remain completely undisturbed, and the other 20 ft may have limited thinning of trees. Landward of this, Zone 2 must be 20 ft wide and have dense plant cover where no fertilizer use or development is allowed. The rule applies to all perennial and intermittent streams, lakes, ponds, and estuaries. Some agriculture, forestry, and stormwater drainage activites are exempt from this rule [EMC rule 15A NCAC 02B .0233 (6)]. The EMC considers this rule to be critical to successfully reducing nitrogen. *Thorough evaluation of water quality conditions and effectiveness of the nutrient reduction strategies should be performed in the Neuse River in 2004 and the Tar-Pamlico River in 2005 and rules modified as necessary to achieve nutrient reduction goals.*

Although there are many unanswered questions regarding the effectiveness of the Nutrient Sensitive Waters (NSW) regulations in the Neuse and Tar river basins, including the 50 ft riparian buffer, nutrient reduction strategies in the Chowan River basin–which have been in place for over 20 years–have had some success. In 1979, the Chowan River basin was the first river basin to be designated as NSW. Since nutrient reduction strategies were implemented, reductions in nutrient loads have been achieved and algal blooms have been reduced in frequency and duration. The Chowan River basin met the goal of a 20% nitrogen reduction. Total phosphorus was reduced by 29% in the same time period, although the goal was 35% (DWQ 2001a). The following strategies were recommended to reduce point and nonpoint phosphorus and nitrogen inputs (DWQ 2001a):

- Convert point source discharges to land application systems.
- Require point source effluent limits of 1 mg/l for phosphorus and 3 mg/l for nitrogen in the North Carolina portion of the basin.
- Target funds from the Agriculture Cost Share Program to implement BMPs for agricultural nonpoint sources. From 1995 to 2000, over $1,942,634 of Agriculture Cost Share funds were directed to the Chowan basin.

Although a 50 ft buffer is not in place in the Chowan, this river basin has the lowest basin population (North Carolina portion only), second lowest population density, and lowest projected population increase relative to other coastal river basins (Table 2-2.1). This river basin also has extensive riparian wetland vegetation to filter pollutants from upland activities. In addition, net loss of wetlands from dredge and fill activities in the Chowan River basin, as determined from 401 permits issued, appears to have decreased since 1995. Additional information on wetland impacts and mitigation in all of the coastal river basins is provided in the Wetland Section of this plan. Although the Chowan River basin is very different from the other coastal river basins, it is an example that nutrient reduction strategies can successfully improve water quality.

Coastwide Buffer Rule

The CRC adopted a 30 ft buffer as part of the Coastal Shoreline AEC in August 2000 for all new development in the 20 coastal counties governed by CAMA. This buffer begins at the water's edge, and allows clearing of vegetation as long as no soil disturbance occurs. Although this buffer will certainly have positive environmental benefits throughout the coast, the science suggests it will be inadequate in significantly reducing pollutant loading from nonpoint runoff (Lee et al. 1989; Zirschky et al. 1989; Desbonnet et al. 1994; Gilliam et al. 1994; Groffman et al. 1991; Lowrance 1997).

Additional actions are needed to increase the preservation and establishment of riparian forest buffers in other river basins to maintain and improve the condition of coastal waters. Highest priority should be in coastal waters where fish kills are documented, shellfish harvesting is threatened or closed, where there

are primary nursery areas, and where the most pristine waters are located nearest to productive fisheries. The Neuse and Tar-Pamlico riparian buffer rule could be expanded to these areas. Additional incentive-based approaches, such as tax credits for preserving unmowed vegetated buffers should be developed and implemented. Another means of preserving highly sensitive undeveloped shoreline vegetation is through establishment or enhancement of state/local land acquisition programs.

Local initiatives

There are many local monitoring and management initiatives that have been implemented to protect sensitive resources. University and citizen water quality monitoring programs have already been discussed in the text. Other county programs are focusing on educating the public on the value of riparian buffers, developing watershed management plans, acquiring conservation easements, and restoring wetlands and riparian streams to improve water quality. *The successes of these local projects need to be well publicized to promote similar local and multiple agency projects in other areas. In addition, conservation easements need to be enforced to ensure effectiveness. Land use planning and implementation equivalent to that required by CRC in CAMA counties should be required in all coastal-draining river basins, as recommended by the Estuarine Shoreline Protection Stakeholders group in 1999.*

Needed management measures

In summary, there are many possible actions at state, local, and federal levels that could be taken to improve multiple water quality parameters. *Before implementing new measures, actions should focus on improving the effectiveness of existing regulations and water quality monitoring programs so that status and trends can be accurately assessed. Efforts should continue to reduce point source discharges and improve the quality of discharge effluent. To reduce nonpoint loading of nutrients, sediments, bacteria and toxins into the water column, a broad range of strategies should be implemented, including:*

- Accelerate land preservation and restoration activities;
- Improve and implement land use planning strategies;
- Reduce nonpoint runoff from agriculture and silviculture practices; and
- Expand or implement public outreach on coastal fish habitat, threats, and actions to reduce negative impacts.

2.5. SUMMARY OF WATER COLUMN CHAPTER

The water column habitat surrounds and supports all aquatic organisms and connects all coastal fish habitats. Consequently, clean and healthy waters are critical to the overall viability of coastal fish habitats and aquatic organisms. The general distribution of fish within the water column is determined by the physical and chemical properties of each unique water body (i.e., salinity, temperature), while the abundance, diversity, and health of coastal fish and invertebrates are strongly influenced by water quality conditions (i.e., oxygen, turbidity, nutrients). The water column provides the necessary medium for spawning and transport of eggs and larvae to habitats favorable for survival and growth. In addition, coastal waters are an important source of primary production, providing food for the survival of early life stages of aquatic organisms. Another critical function of the water column is to support other important food sources for pelagic species, such as river herring, bluefish, and Spanish mackerel, and to serve as a critical corridor for migration. Particularly important areas of the water column include inlets, shallow estuarine nursery areas, anadromous fish spawning and nursery areas, and the nearshore surf zone.

Well-documented occurrences of low oxygen events, fish kills, and harmful algal blooms during the 1980s and 1990s provided visible indicators that coastal waters were declining in quality. Although severe water quality problems are variable and appear to have diminished in recent years, many coastal waters remain impaired. The primary threats to the water column are hydrological modifications and water quality degradation.

The hydrology of North Carolina has been altered dramatically, with over 2,000 dams obstructing and modifying water flow to the coast, numerous surface water withdrawals, and extensive channelization of streams. Physical obstructions in streams from structures such as dams and road crossings (fill causeways, culverts), as well as alteration of flow conditions, are a major threat to anadromous fish species, some of which are classified as Overfished by Division of Marine Fisheries (American shad, the central/southern stock of striped bass, and the Albemarle Sound stock of river herring). Removing obstructions and restoring flow in streams and rivers have been highly successful in some areas for restoring striped bass and American shad populations and should continue to be a high priority.

Water quality degradation affects aquatic organisms in many ways. Excessive sediment loading increases turbidity and sedimentation, which can result in a decrease in biological productivity, clogging of fish gills, reduced recruitment of invertebrates, increased mortality, and filling in of rivers and creeks. Important fishery and prey species in North Carolina that are impacted by alterations or degradation of the water column include pelagic-oriented species such as blueback herring, American shad, striped bass, Atlantic menhaden, bluefish, and anchovies. The condition of the water column also influences other coastal fish habitats. For example, waters depleted of oxygen can result in extensive mortality of individuals inhabiting shell bottom and soft bottom communities. Moreover, excess sedimentation and turbidity can shade submerged vegetation, while the associated sediment can smother hard bottom communities.

Primary sources of sediment are nonpoint runoff from land disturbance associated with building and road construction, agriculture, forestry, mining, and removal of vegetated buffers. A predicted increase in the rate of sea level rise will accelerate coastal erosion and impact sedimentation-related issues. Division of Water Quality data show the greatest impairment to coastal freshwater streams is due to not only excessive sediment loading but also low dissolved oxygen.

Low dissolved oxygen has been responsible for many fish kills in coastal river basins, especially the Neuse, Cape Fear and Tar-Pamlico. The estuarine species most frequently affected by fish kills have been menhaden and flounder; the most frequently reported freshwater species have been sunfish and catfish. Such oxygen depletion can occur naturally, but is greatly aggravated and intensified by eutrophication. This excessive loading of nutrients can also contribute to toxic algal blooms and may contribute to *Pfiesteria* outbreaks. Primary sources of excessive nutrients in the water column include point source wastewater discharges, and nonpoint runoff from crop agriculture, animal operations, urban development, and air emissions from industries and vehicles. Another serious concern for estuarine and ocean water quality is bacterial contamination, both for habitat and health reasons. Fecal coliform contamination in estuarine waters is a major cause of water quality impairment, originating primarily from nonpoint sources. Bacterial contamination has resulted in consistent increases in shellfish harvest closures over time, including closures in Outstanding Resource Waters, North Carolina's highest quality waters (over 1,000 acres closed in ORW waters since 1990). When stormwater is discharged on ocean beaches, it contaminates the surf zone with not only bacteria, but also a variety of other toxins. Runoff from roads, agriculture, and marina-related activities are common sources of toxins in coastal waters. While toxins are a concern to the water column, these pollutants tend to settle and become incorporated into soft bottom habitat relatively quickly, where they can be resuspended or can adversely affect organisms in the bottom sediments.

Sediment, nutrient, bacteria, and toxin loading must be reduced by addressing multiple sources. These include improvement and continuation of urban and agricultural BMPs, more stringent sediment controls on construction projects, and additional buffers along coastal waters.

The water column is the most essential habitat required for the survival, growth and reproduction of fish and it greatly influences all other coastal fish habitats. Therefore, efforts are needed to minimize threats

and enhance water quality wherever possible, particularly within and adjacent to designated Strategic Habitat Areas.

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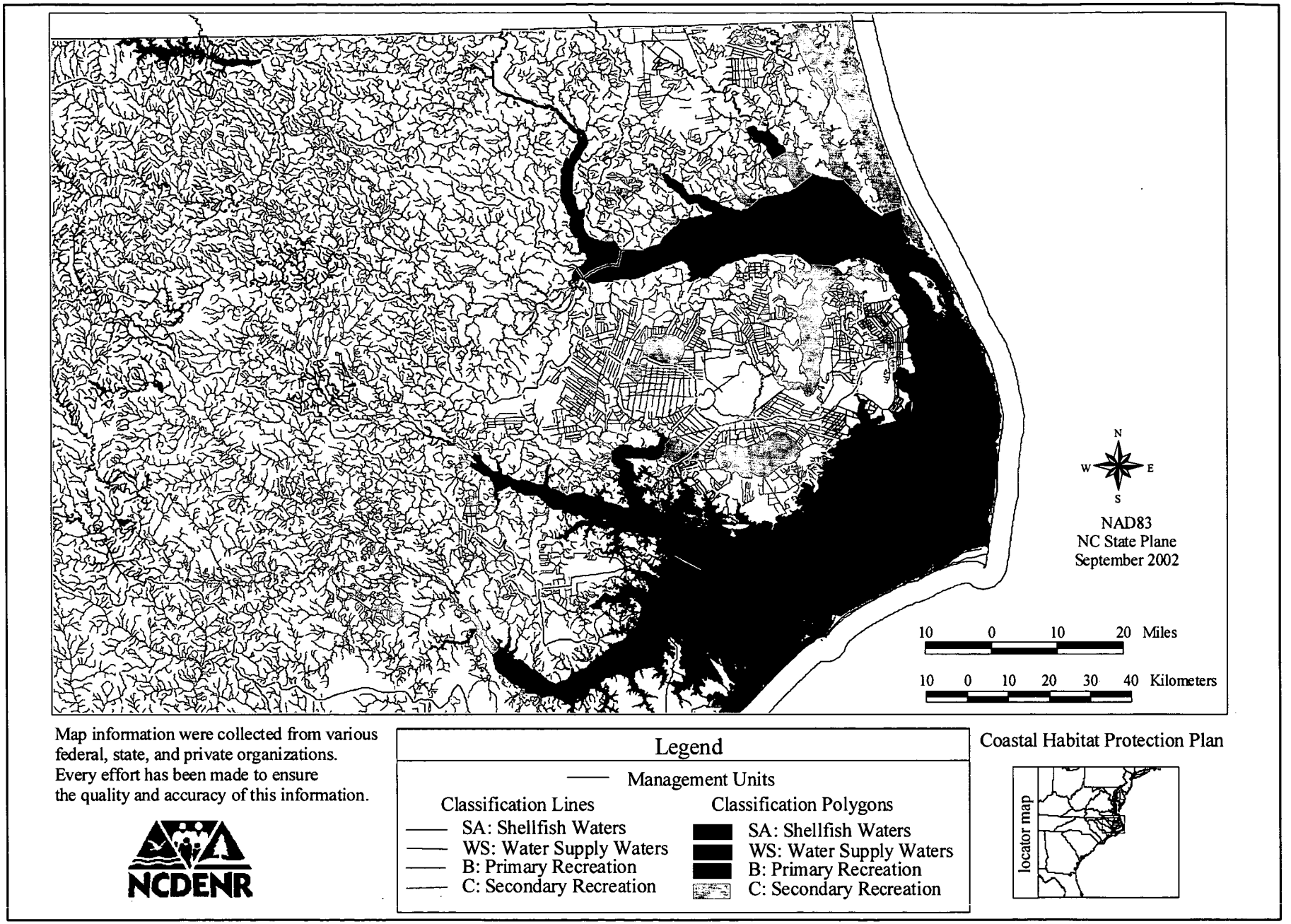
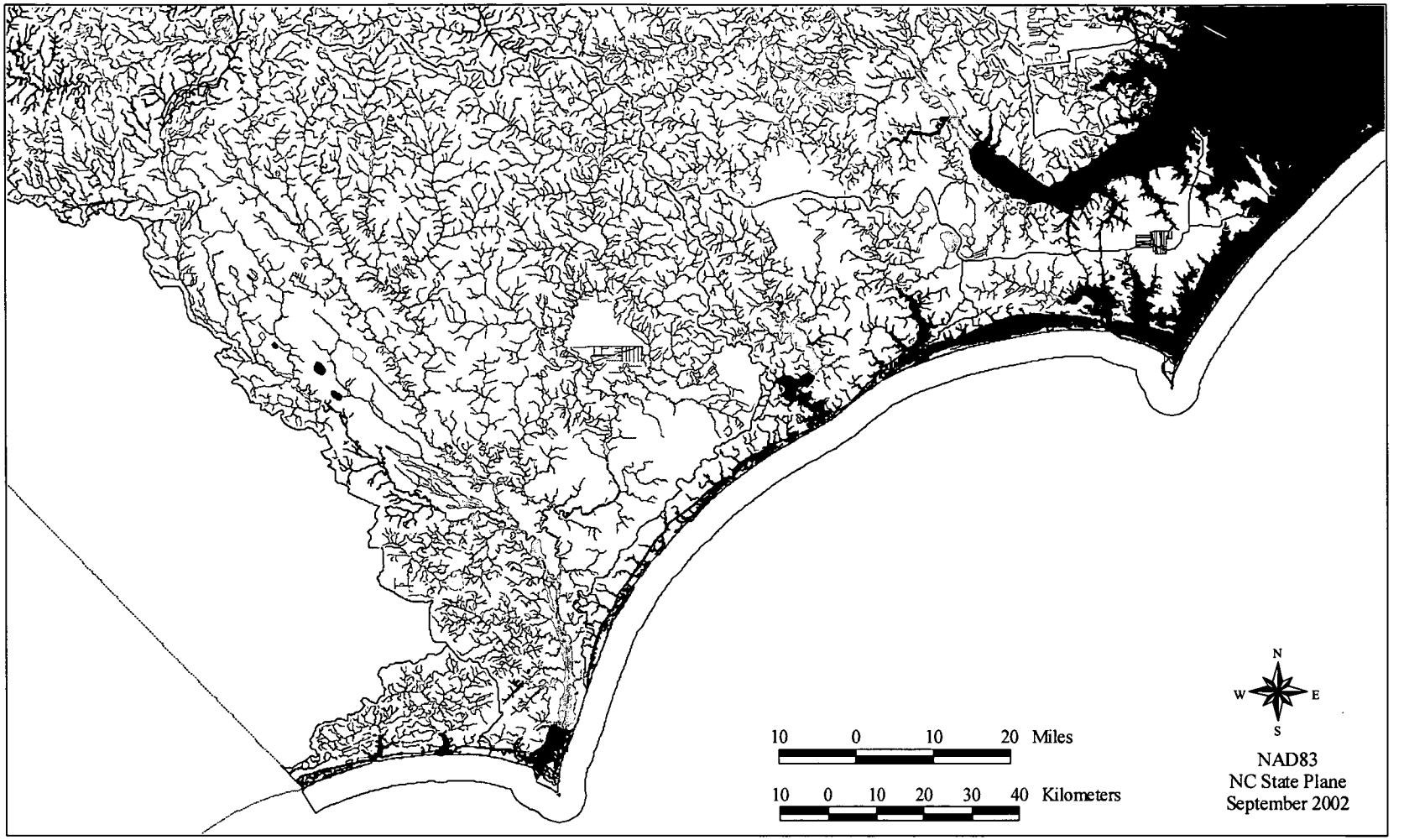


2.1a. Surface water classifications of the North Carolina Environmental Management Commission in eastern North Carolina (1997 classification).



Map information were collected from various federal, state, and private organizations. Every effort has been made to ensure the quality and accuracy of this information.

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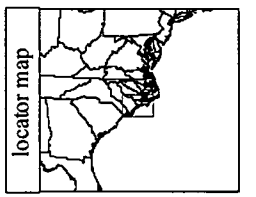
Legend

Management Units

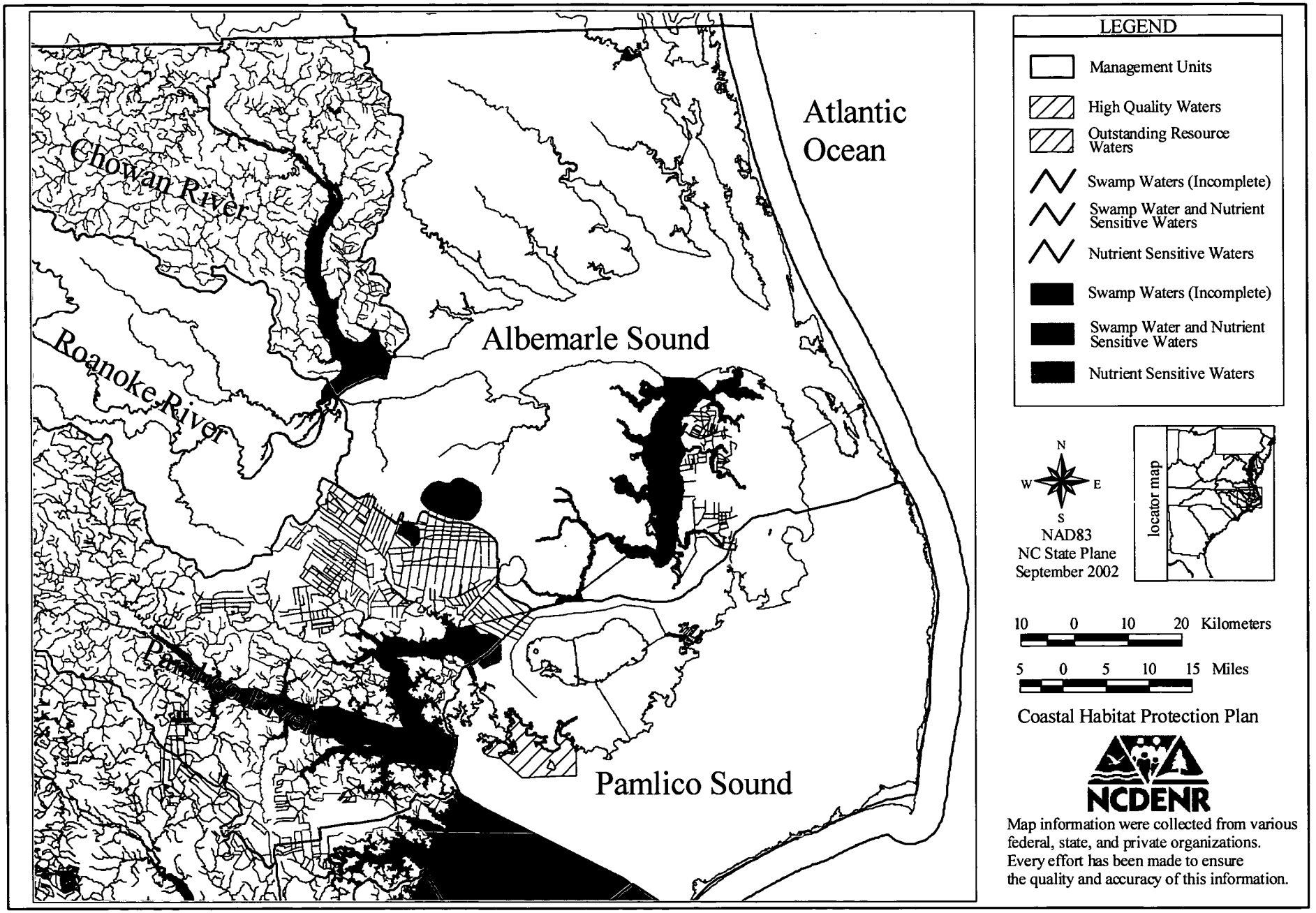
Classification Lines
- SA: Shellfish Waters
- WS: Water Supply Waters
- B: Primary Recreation
- C: Secondary Recreation

Classification Polygons
- SA: Shellfish Waters
- WS: Water Supply Waters
- B: Primary Recreation
- C: Secondary Recreation

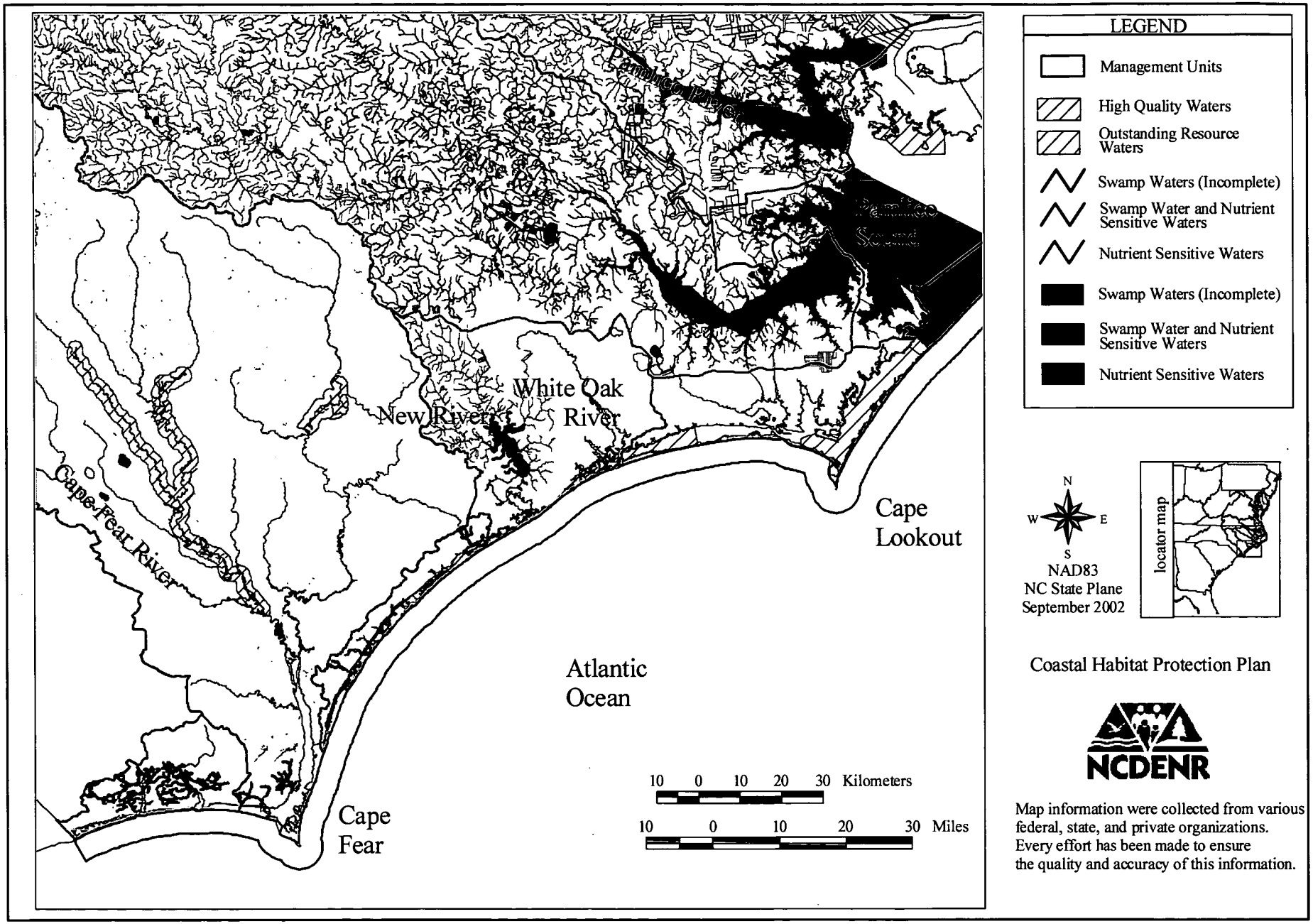
Coastal Habitat Protection Plan



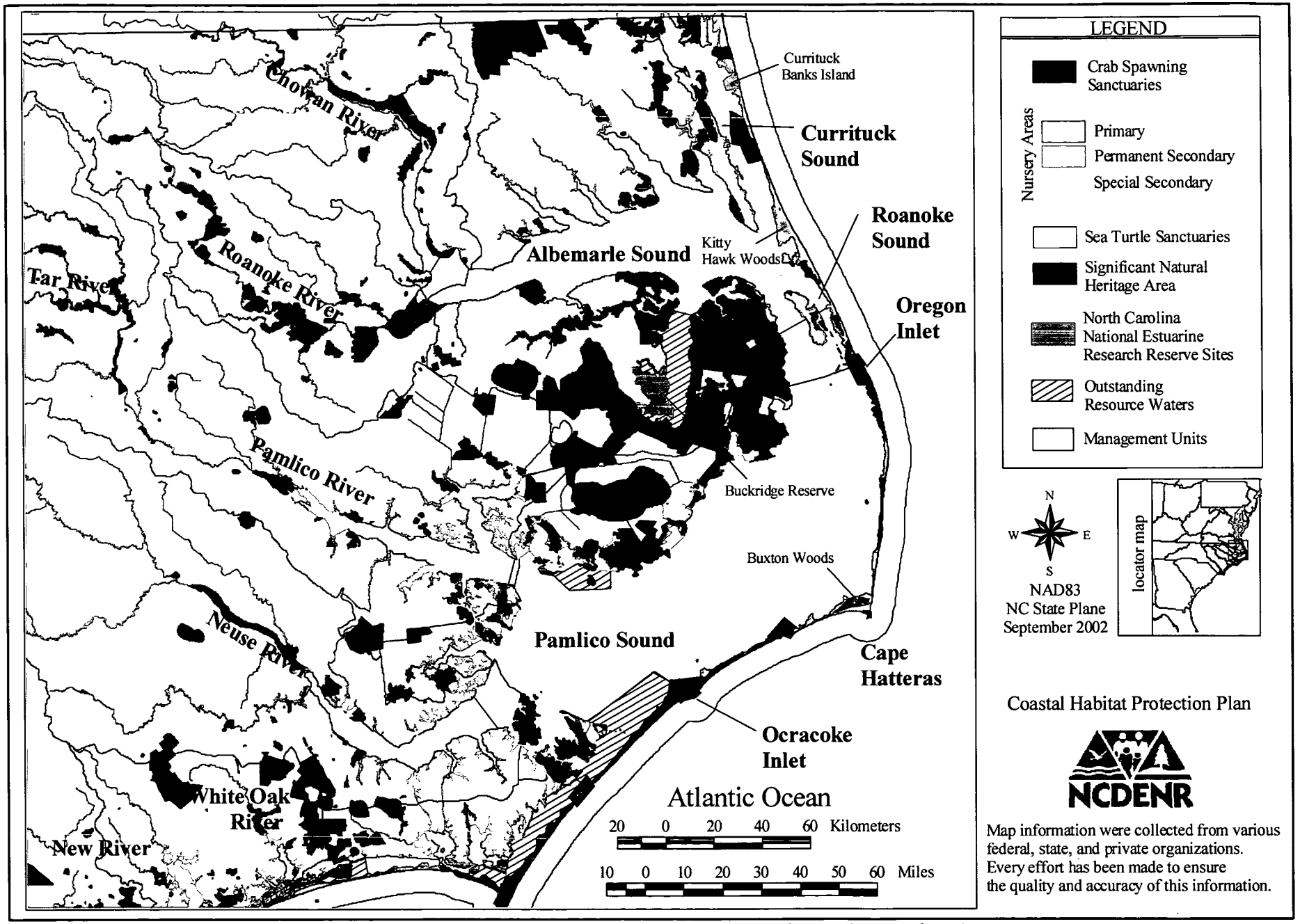
2.1b. Surface water classifications of the North Carolina Environmental Management Commission in eastern North Carolina (1997 classification).



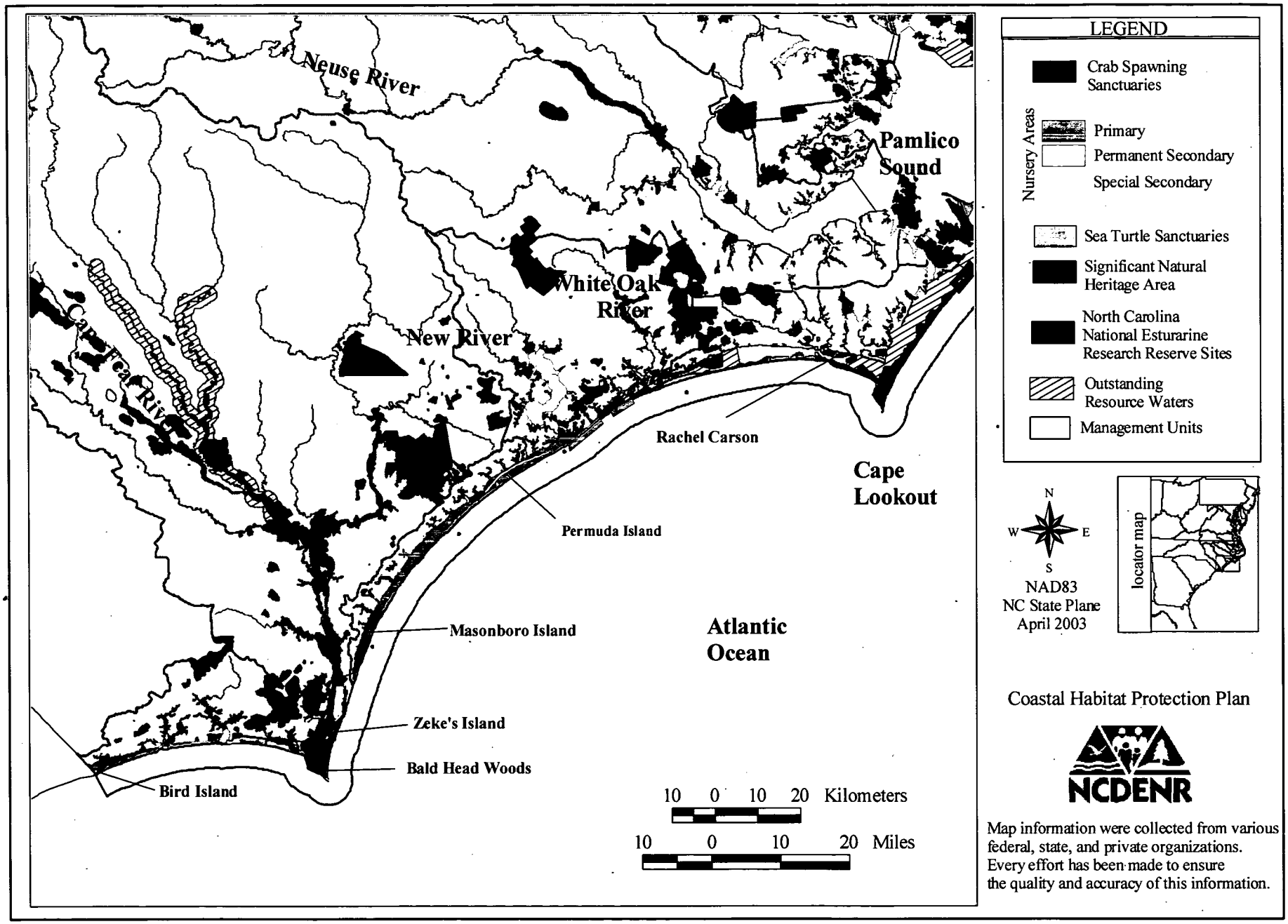
Map 2.2a. Supplemental surface water classifications of the NC Environmental Management Commission in eastern North Carolina (1997 classification)



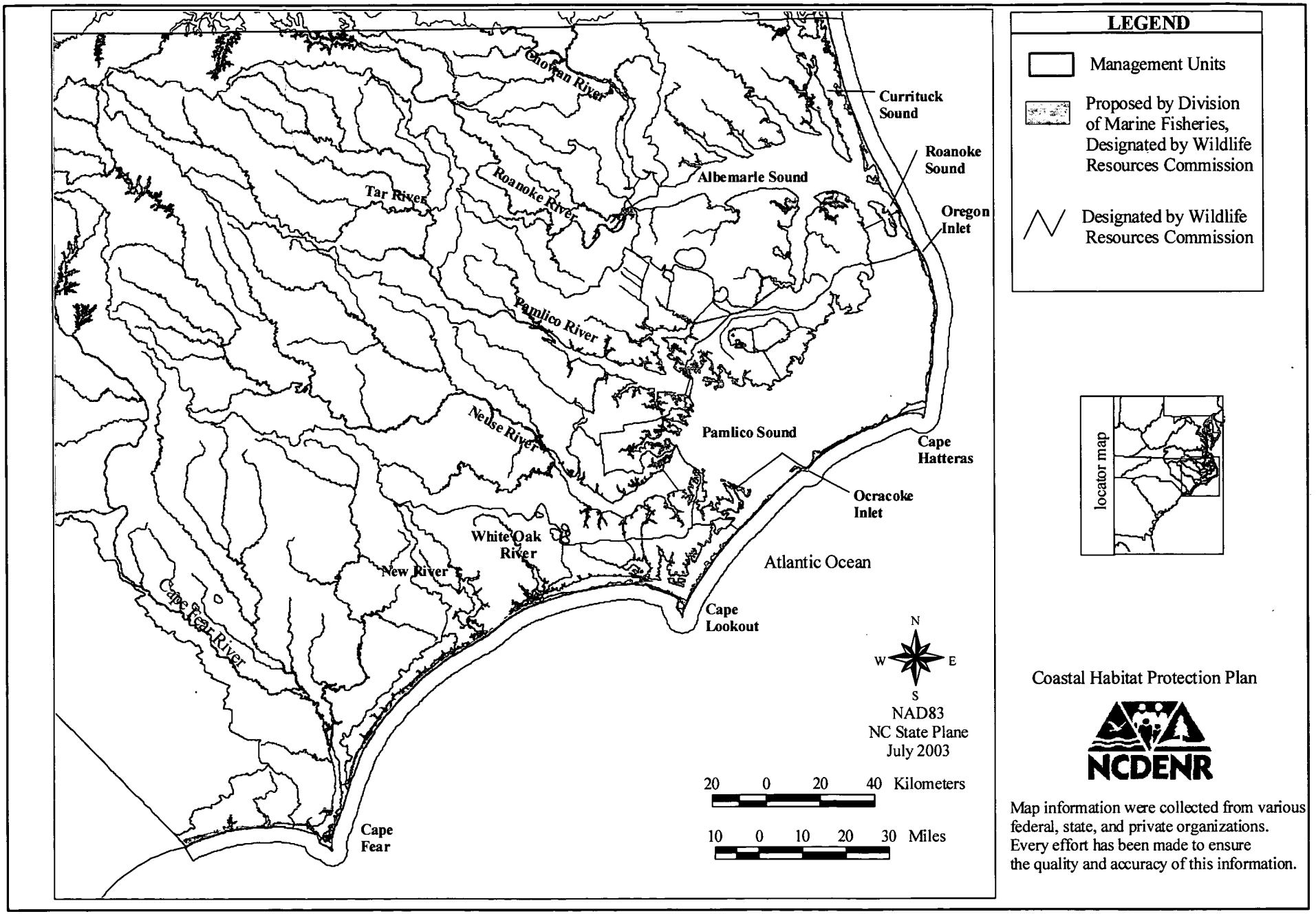
Map 2.2b. Supplemental surface water classifications of the NC Environmental Management Commission in eastern North Carolina (1997)



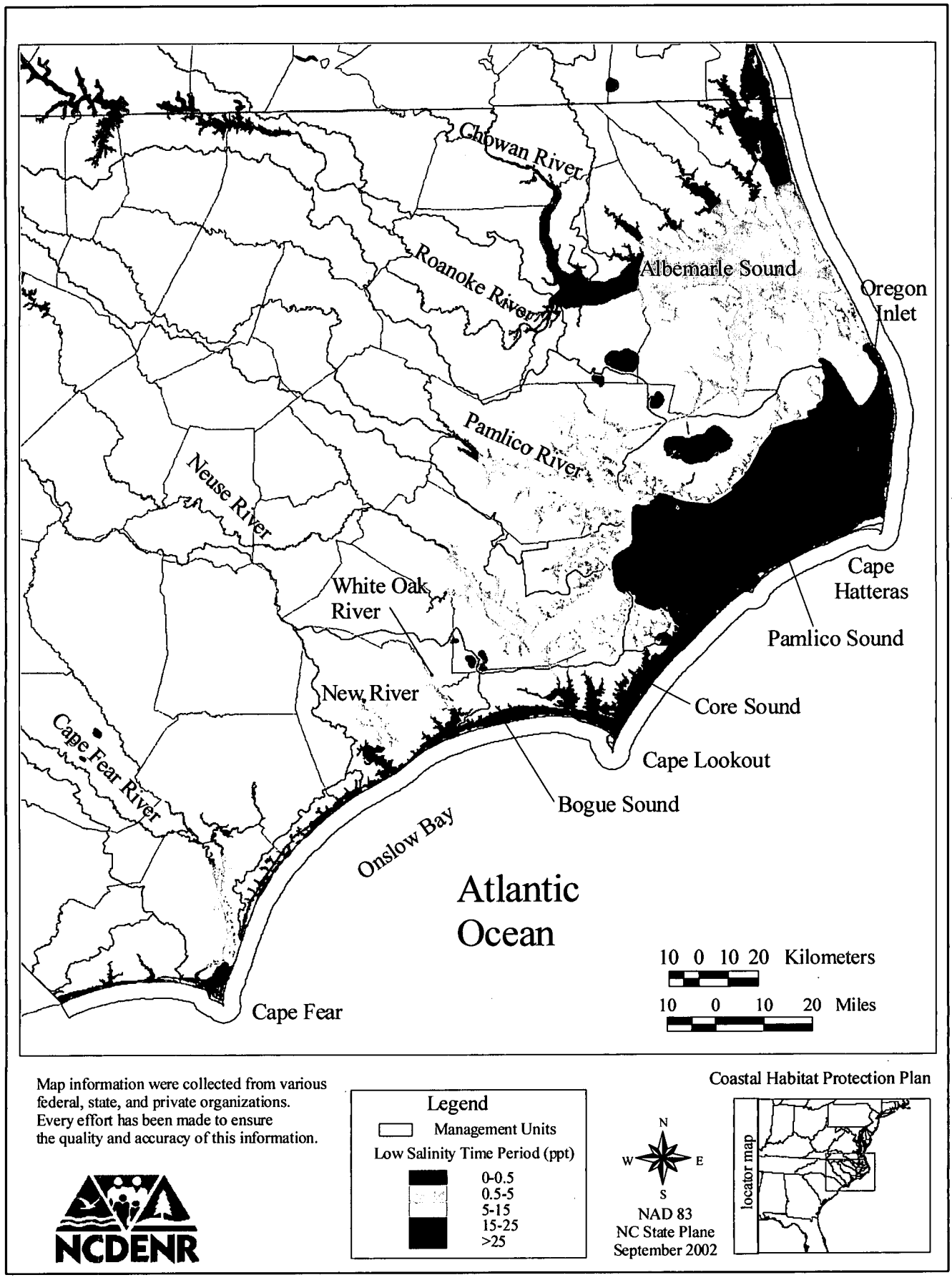
Map 2.3a. Designated protected habitat areas in eastern North Carolina north of Cape Lookout (map themes from BasinPro3 software).



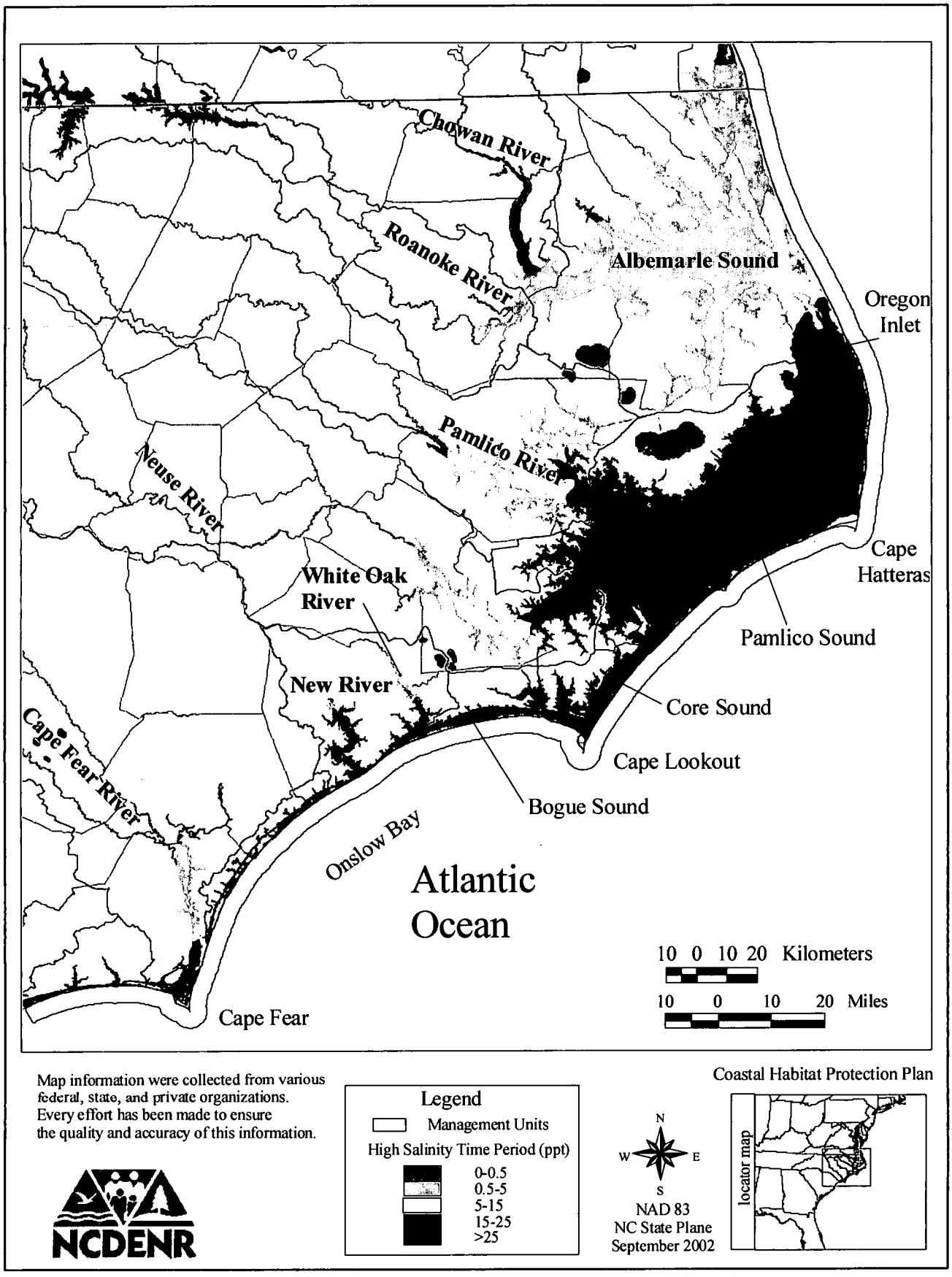
Map 2.3b. Designated protected habitat areas in eastern North Carolina south of Cape Lookout (map themes from BasinPro3 software).



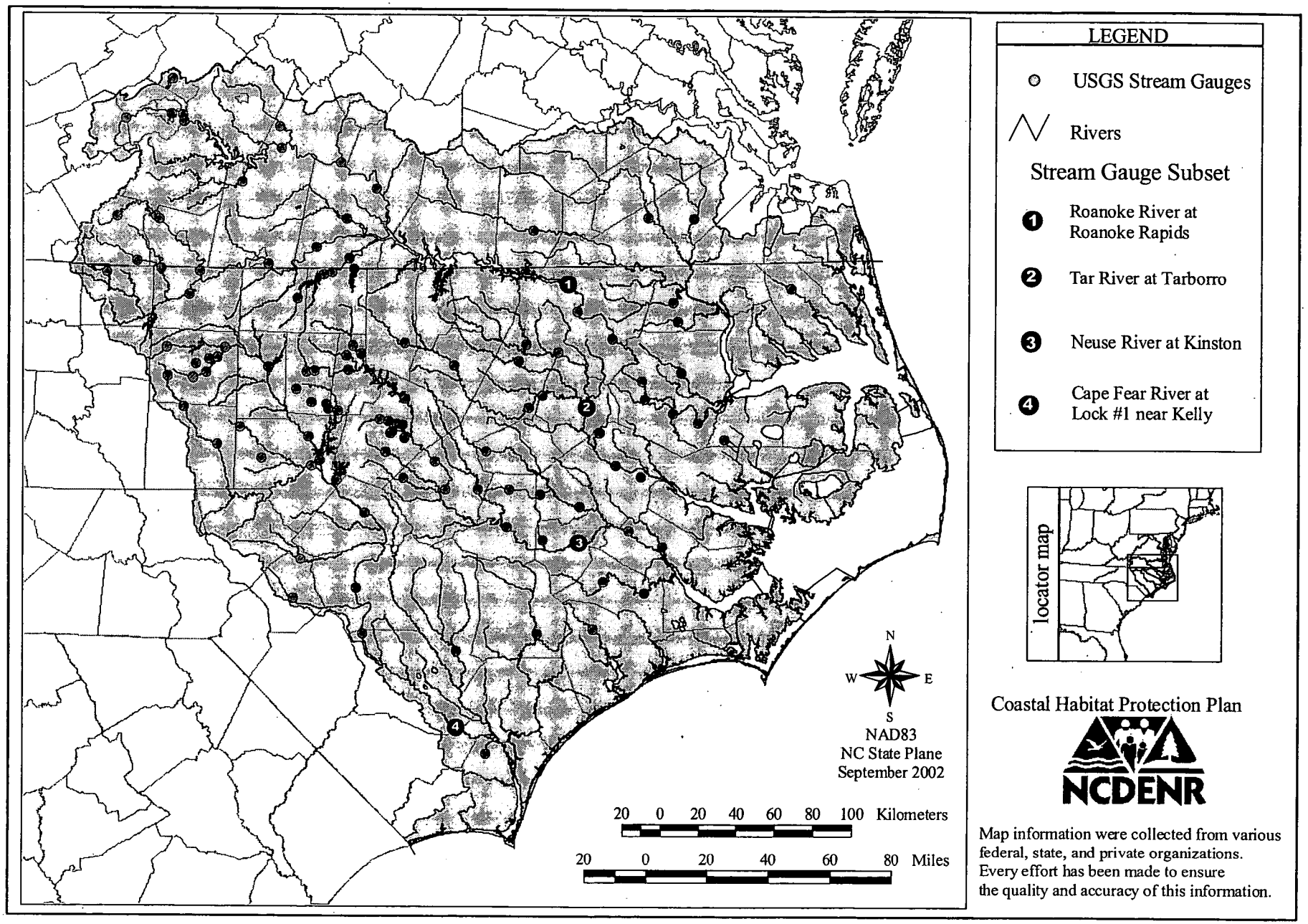
Map 2.4. Inland primary nursery areas designated by the Wildlife Resources Commission [WRC rule: 15A NCAC 10C .0503].



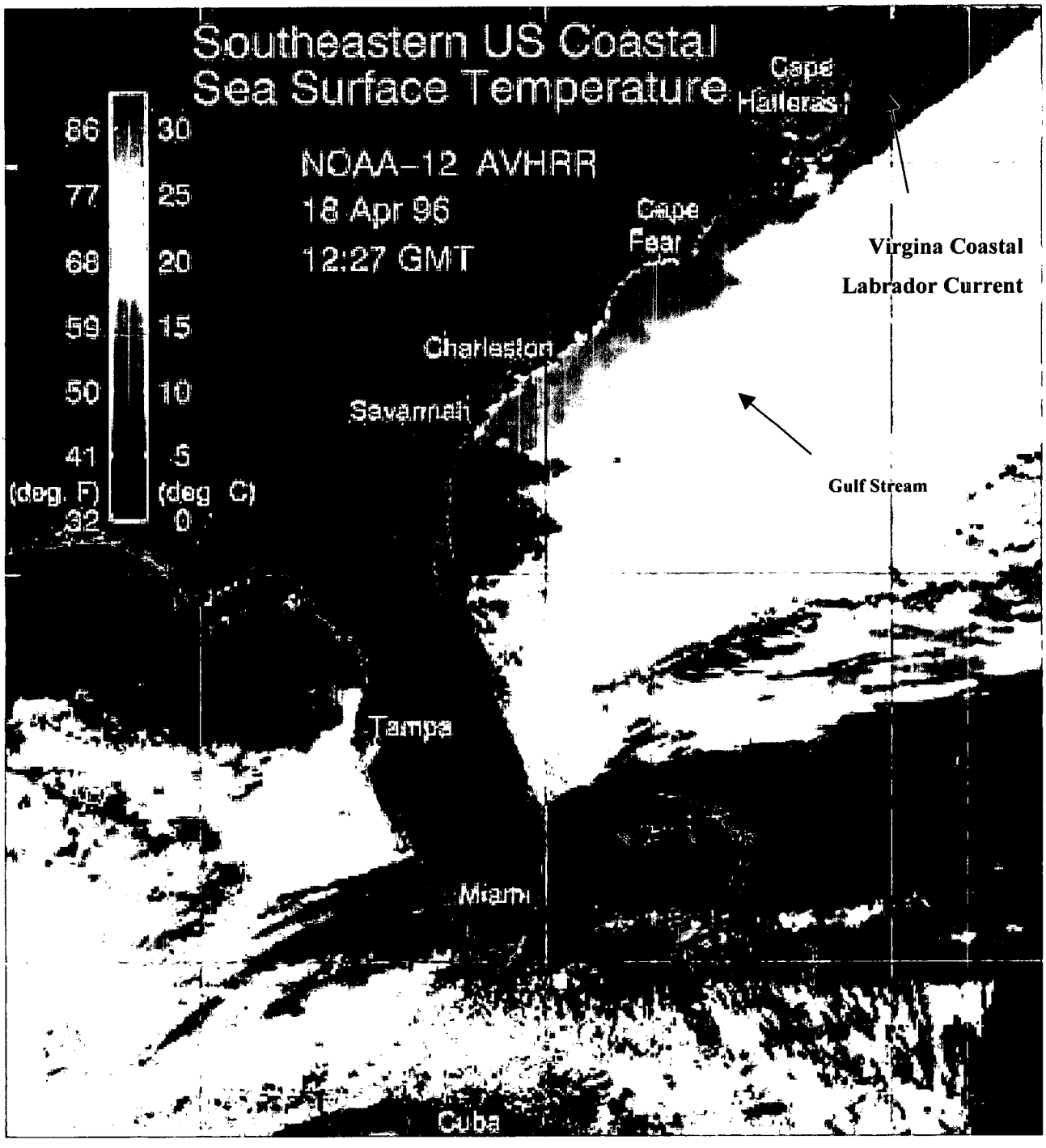
Map 2.5a. Winter and spring salinity zones in eastern North Carolina (derived from Orlando et al. 1994).



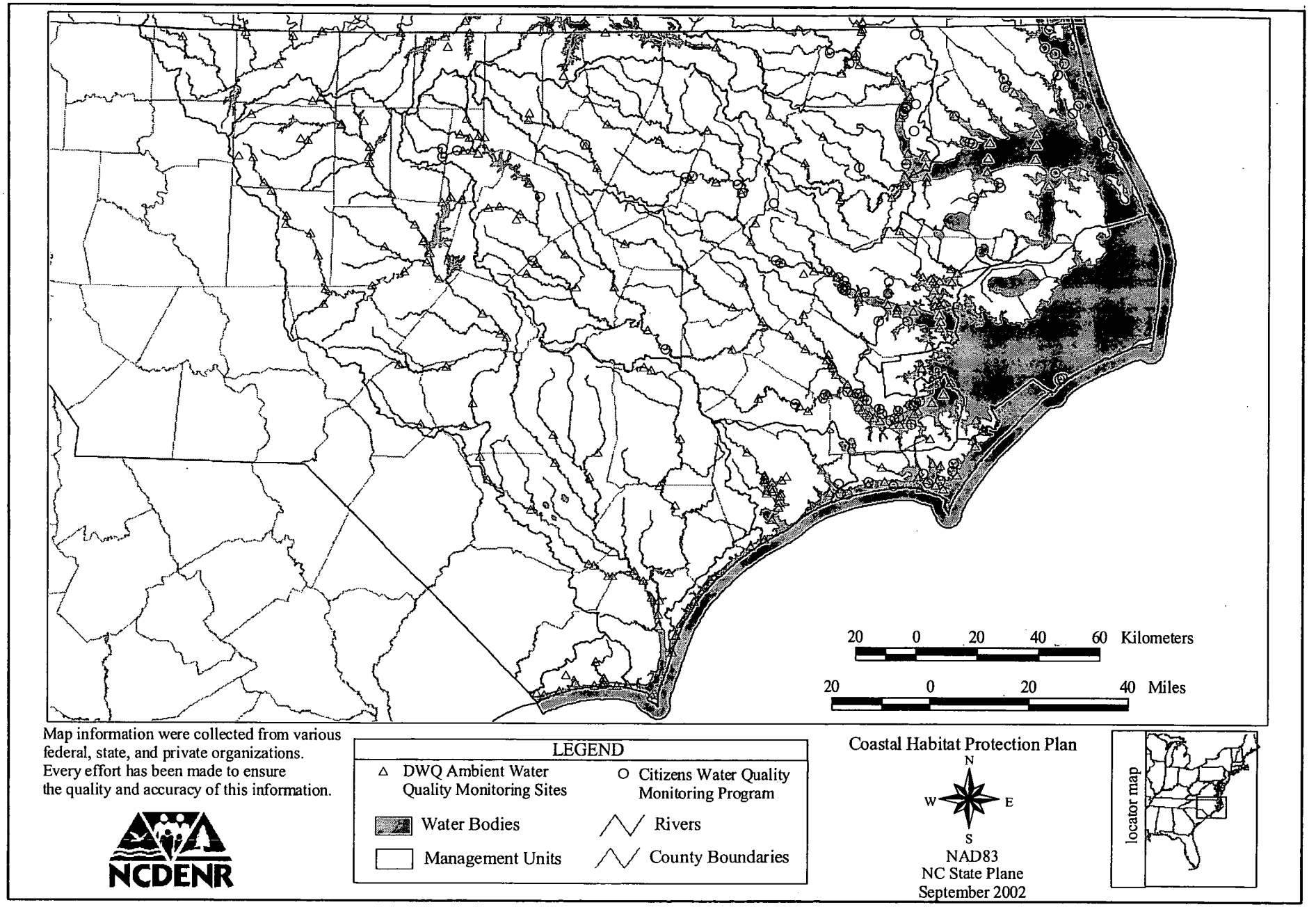
Map 2.5b. Summer and fall salinity zones in eastern North Carolina (derived from Orlando et al. 1994).



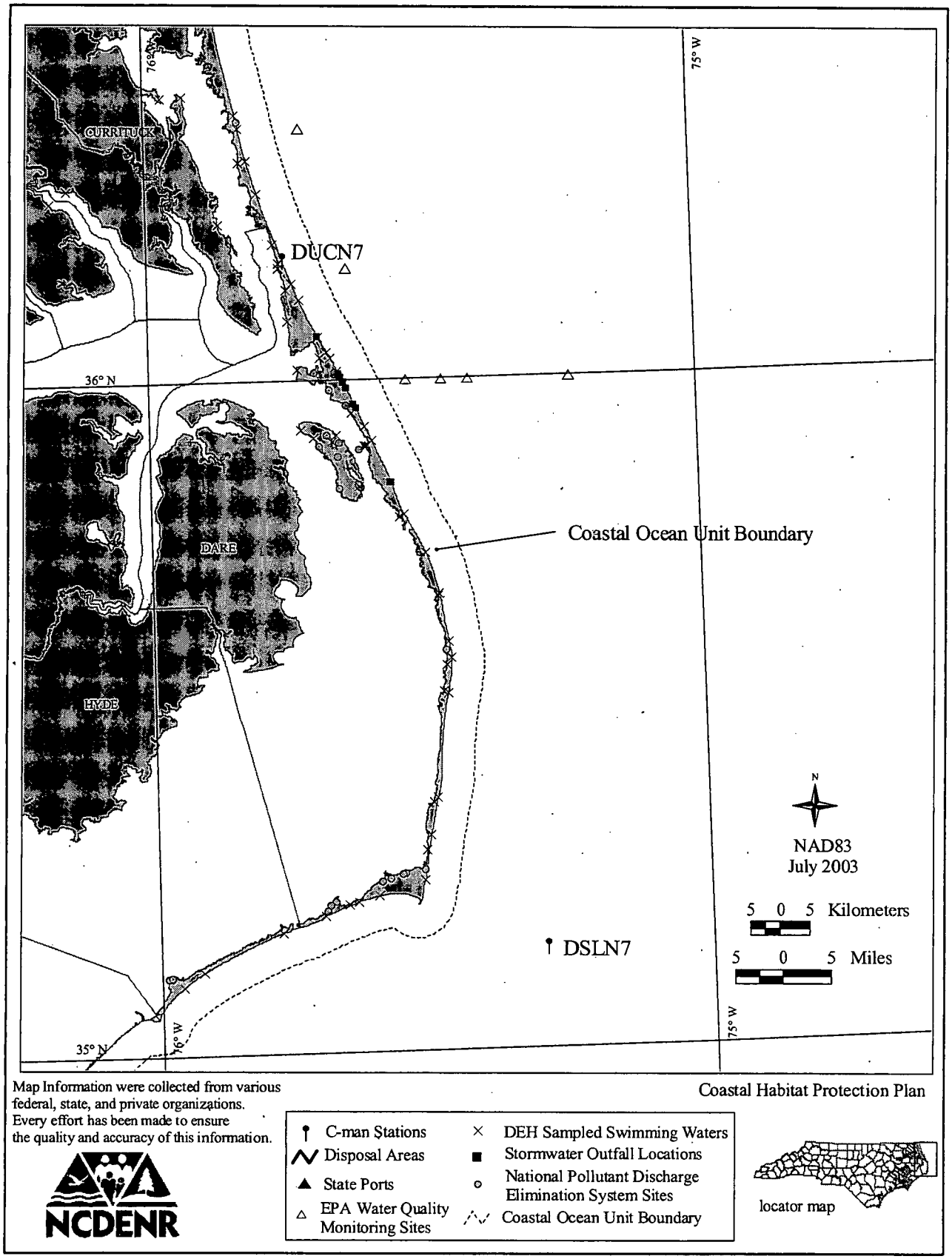
Map 2.6. Locations of US Geological Survey stream gauge stations in the area included in the NC Coastal Habitat Protection Plan (source: BasinPro3 software).



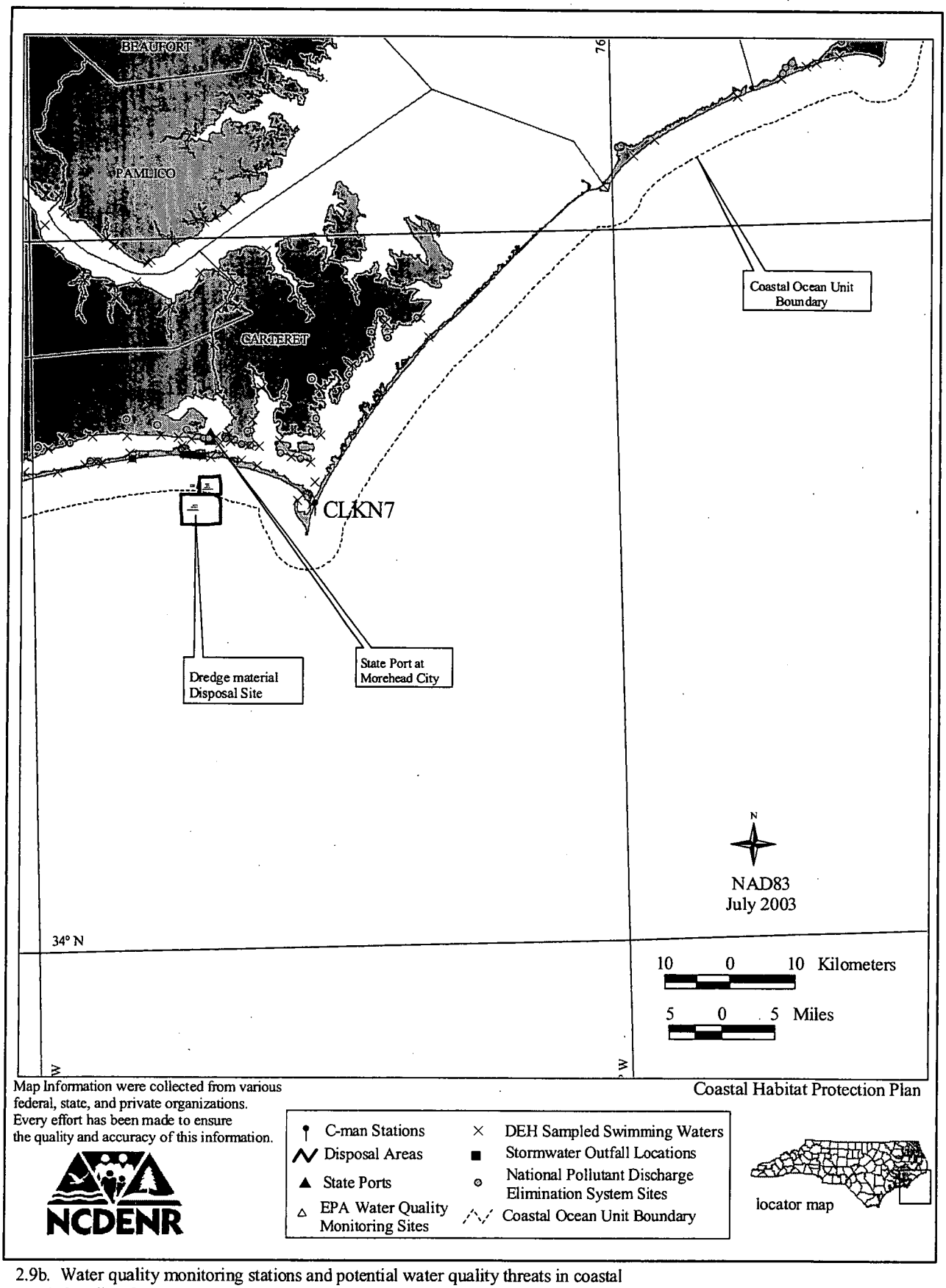
Map 2.7. Satellite imagery of sea surface temperature of North Carolina ocean waters, depicting position of the Virginia Current and Gulf Stream (Source: NOAA web site).



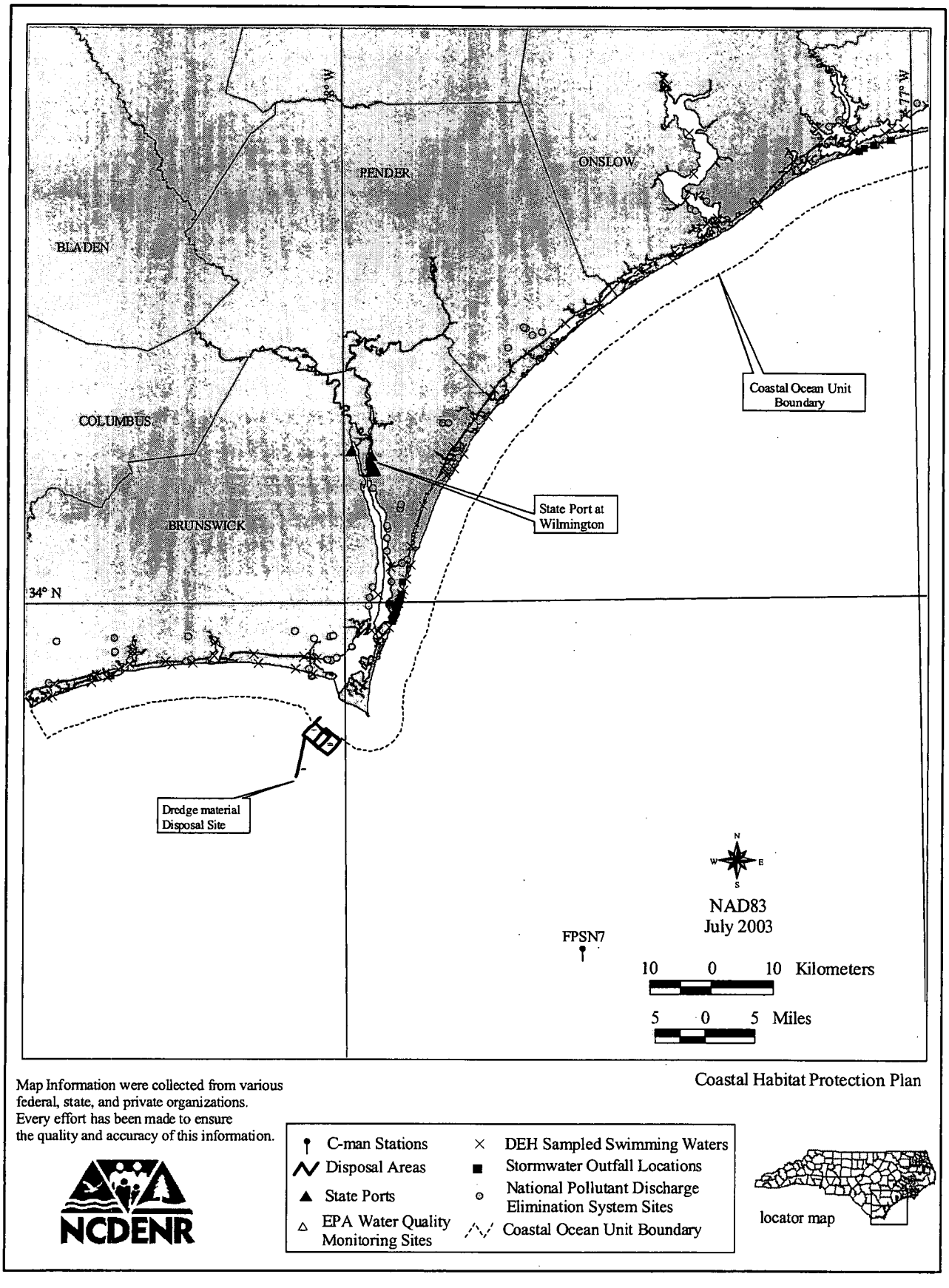
2.8. Water quality monitoring stations within NC Coastal Habitat Protection Plan area (source BasinPro3 software).



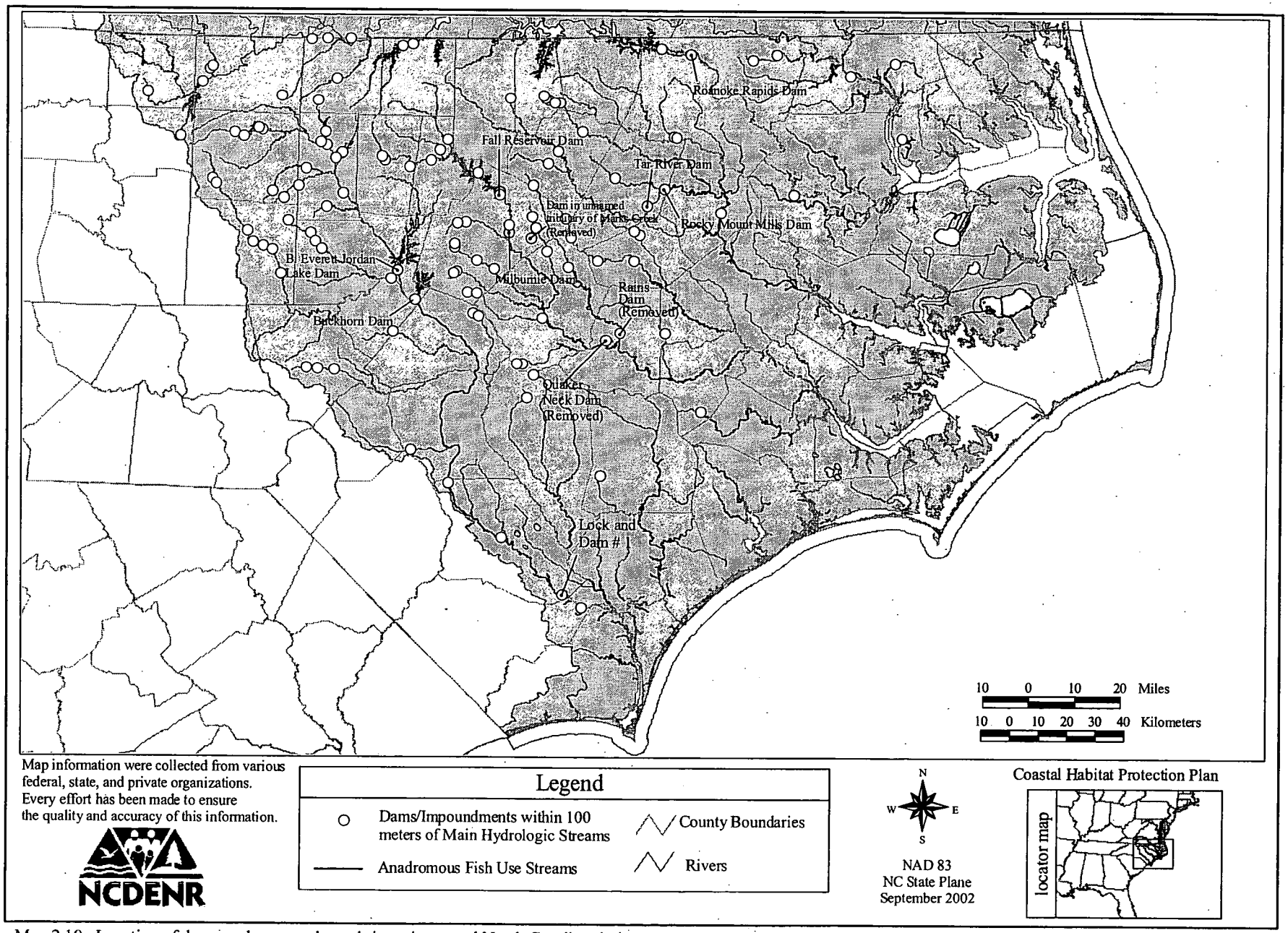
2.9a. Water quality monitoring stations and potential water quality threats in coastal North Carolina north of Ocracoke Inlet



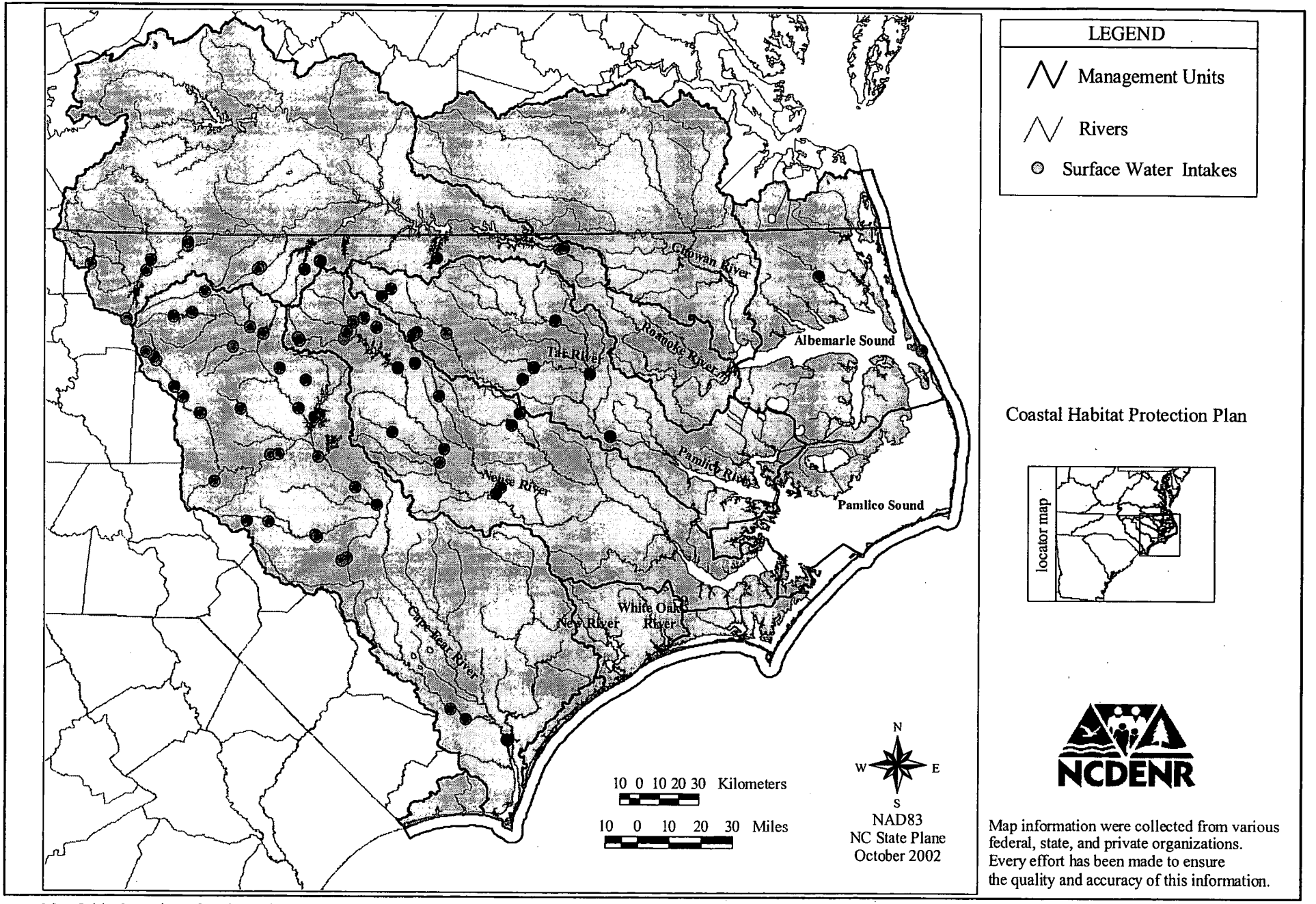
2.9b. Water quality monitoring stations and potential water quality threats in coastal North Carolina from Bogue Sound to Ocracoke.



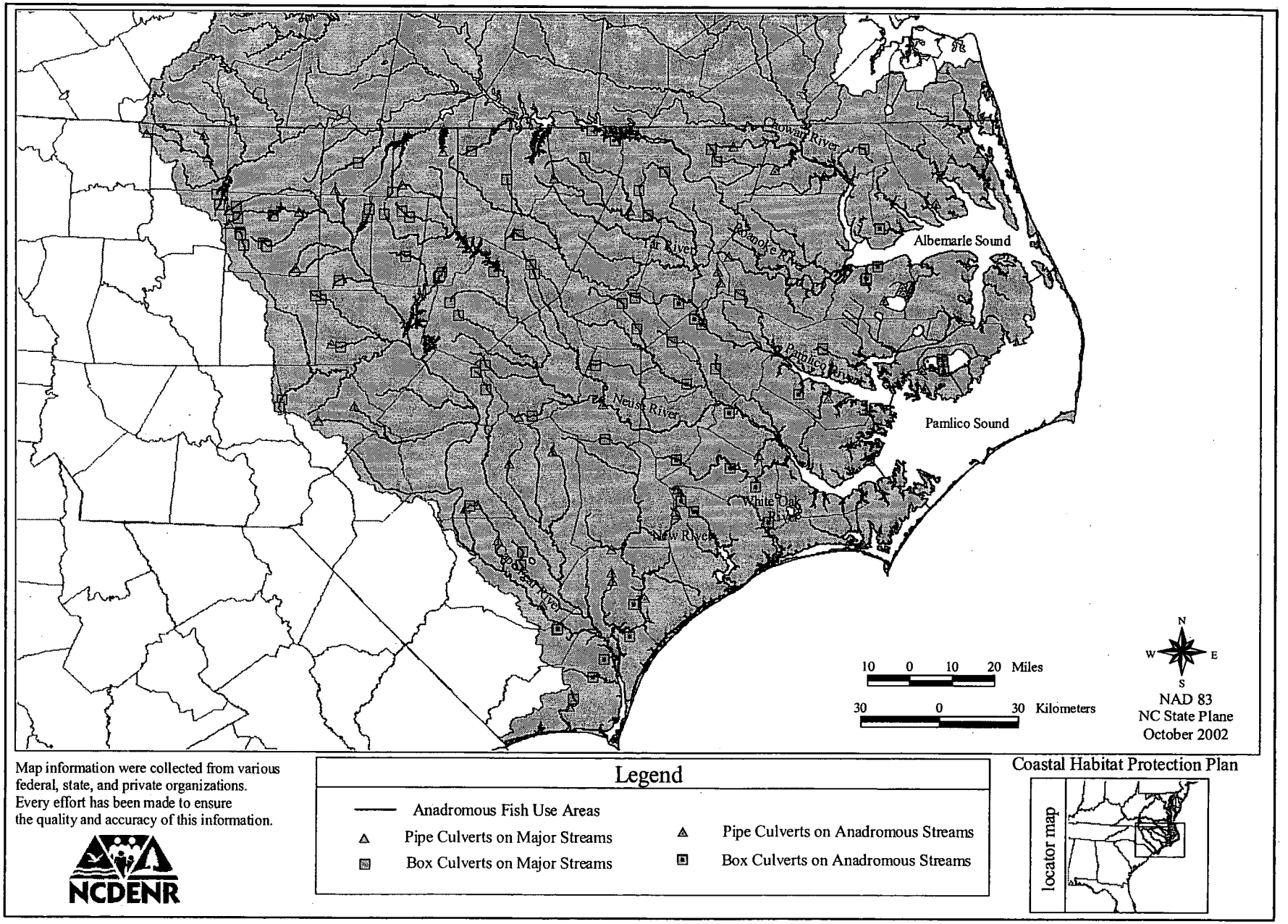
2.9c. Water quality monitoring stations and potential water quality threats in coastal North Carolina south of Bogue Sound



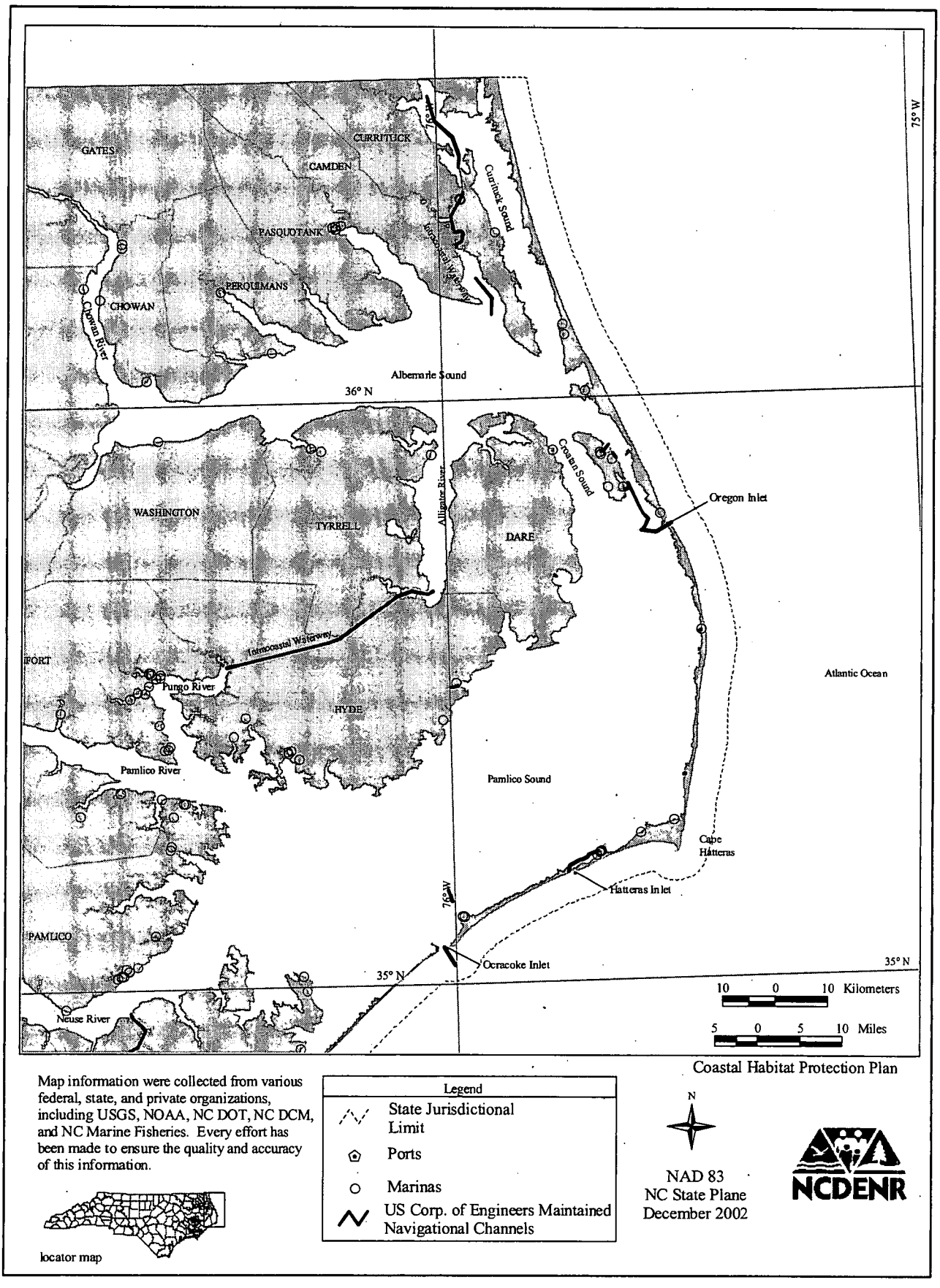
Map 2.10. Location of dams on large creeks and rivers in coastal North Carolina drainages (from BasinPro3 software).



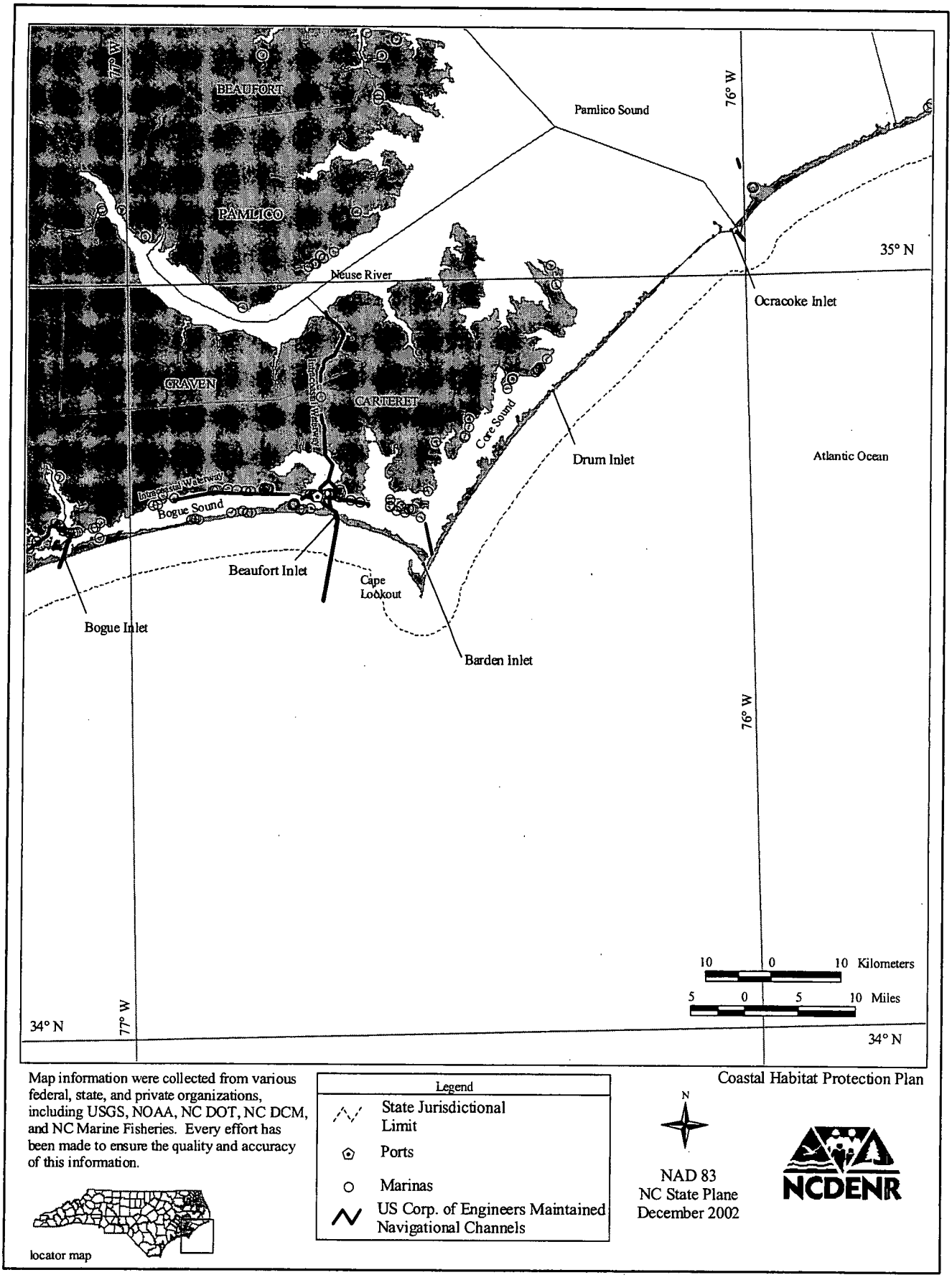
Map 2.11. Location of registered surface water intakes in North Carolina coastal river basins (from BasinPro3 software).



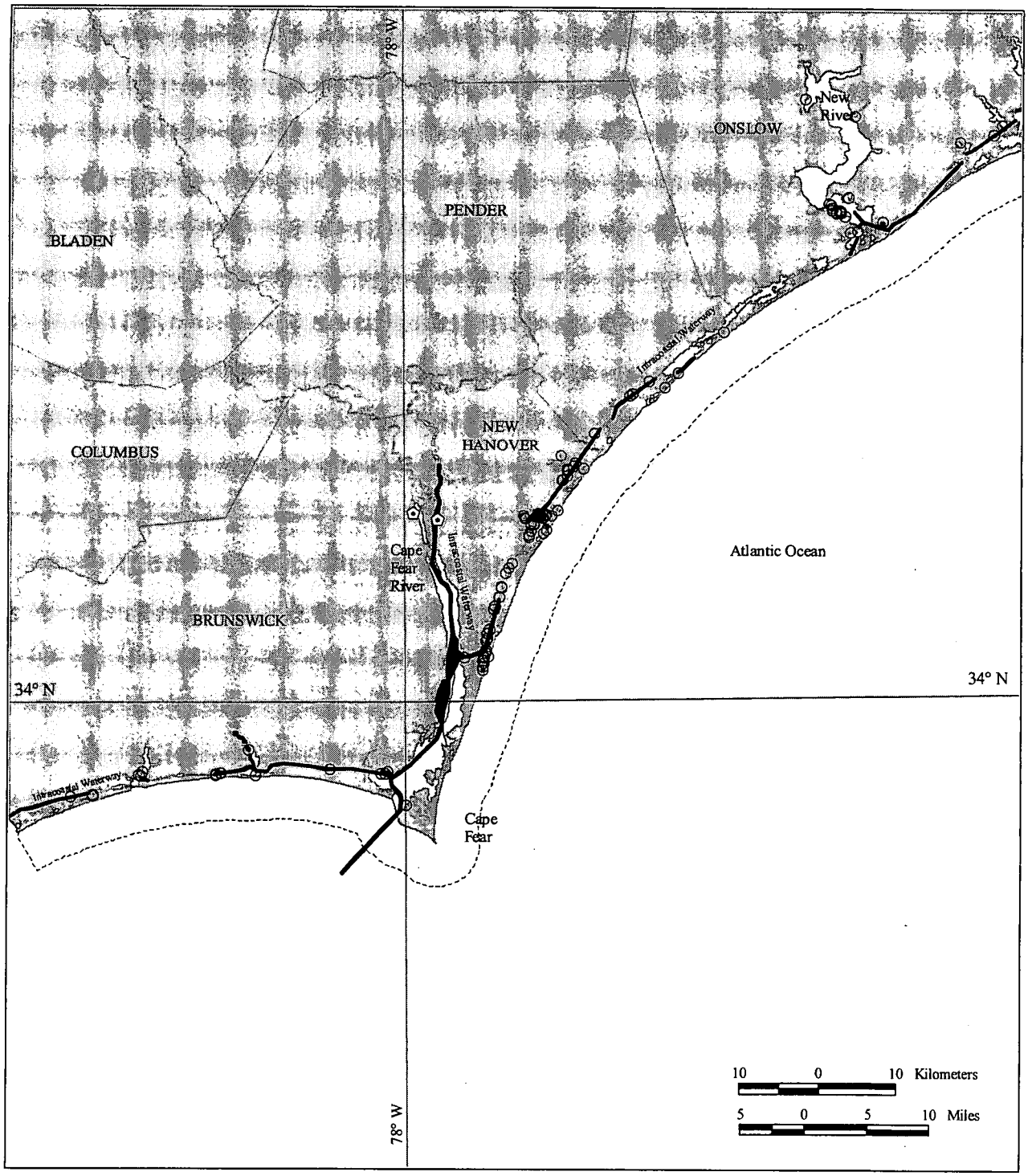
Map 2.12. Location of pipes and culverts on major streams in coastal North Carolina drainages.



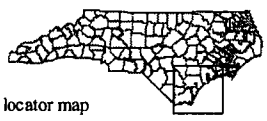
Map 2.13a. US Army Corps of Engineers maintained navigation channels in coastal North Carolina from Virginia to Ocracoke Inlet



Map 2.13b. US Army Corps of Engineers maintained navigation channels in coastal North Carolina from: Ocracoke Inlet to Bogue Inlet



Map information were collected from various federal, state, and private organizations, including USGS, NOAA, NC DOT, NC DCM, and NC Marine Fisheries. Every effort has been made to ensure the quality and accuracy of this information.



Legend

- State Jurisdictional Limit
- Ports
- Marinas
- US Corp. of Engineers Maintained Navigational Channels

Coastal Habitat Protection Plan

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NC State Plane
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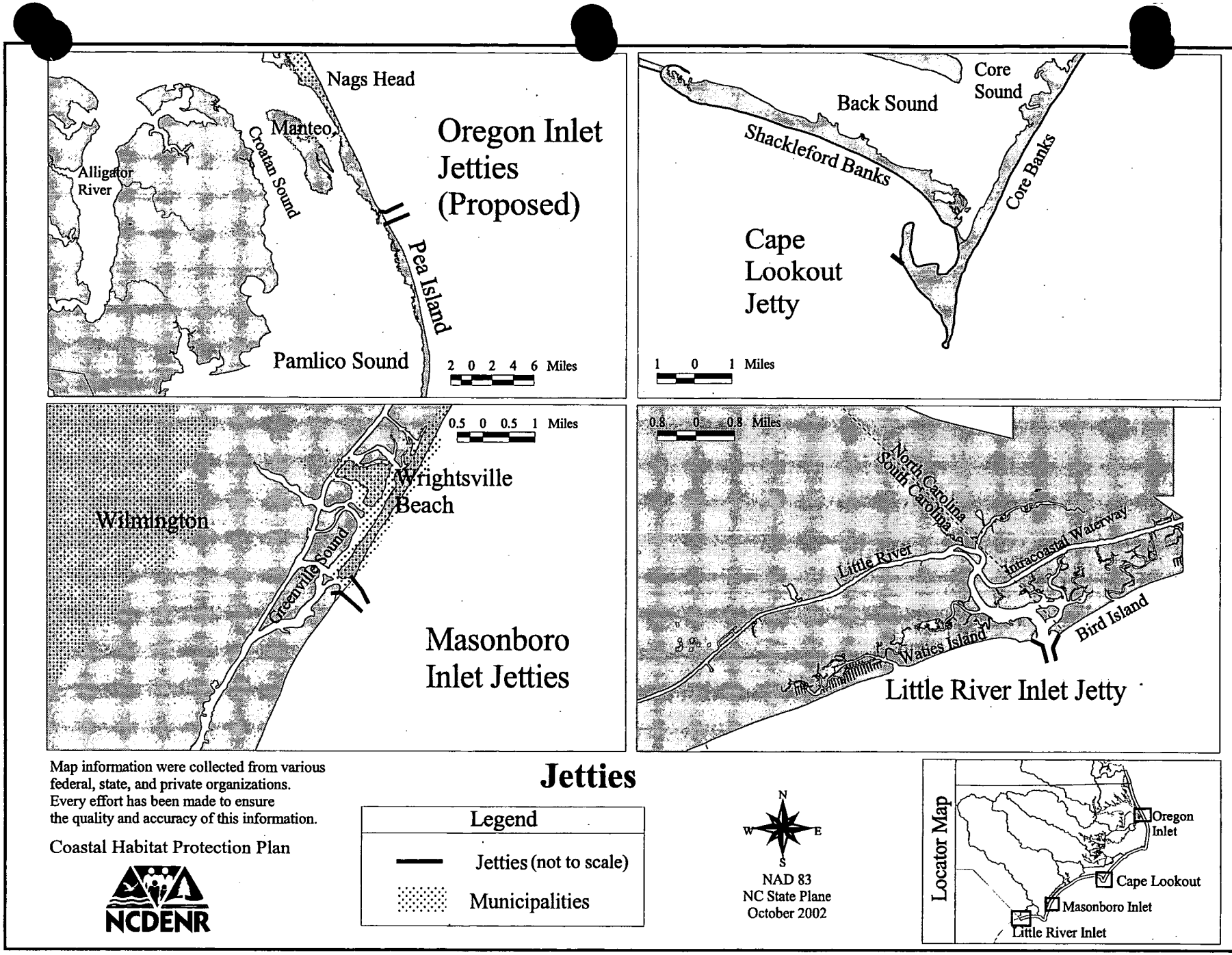
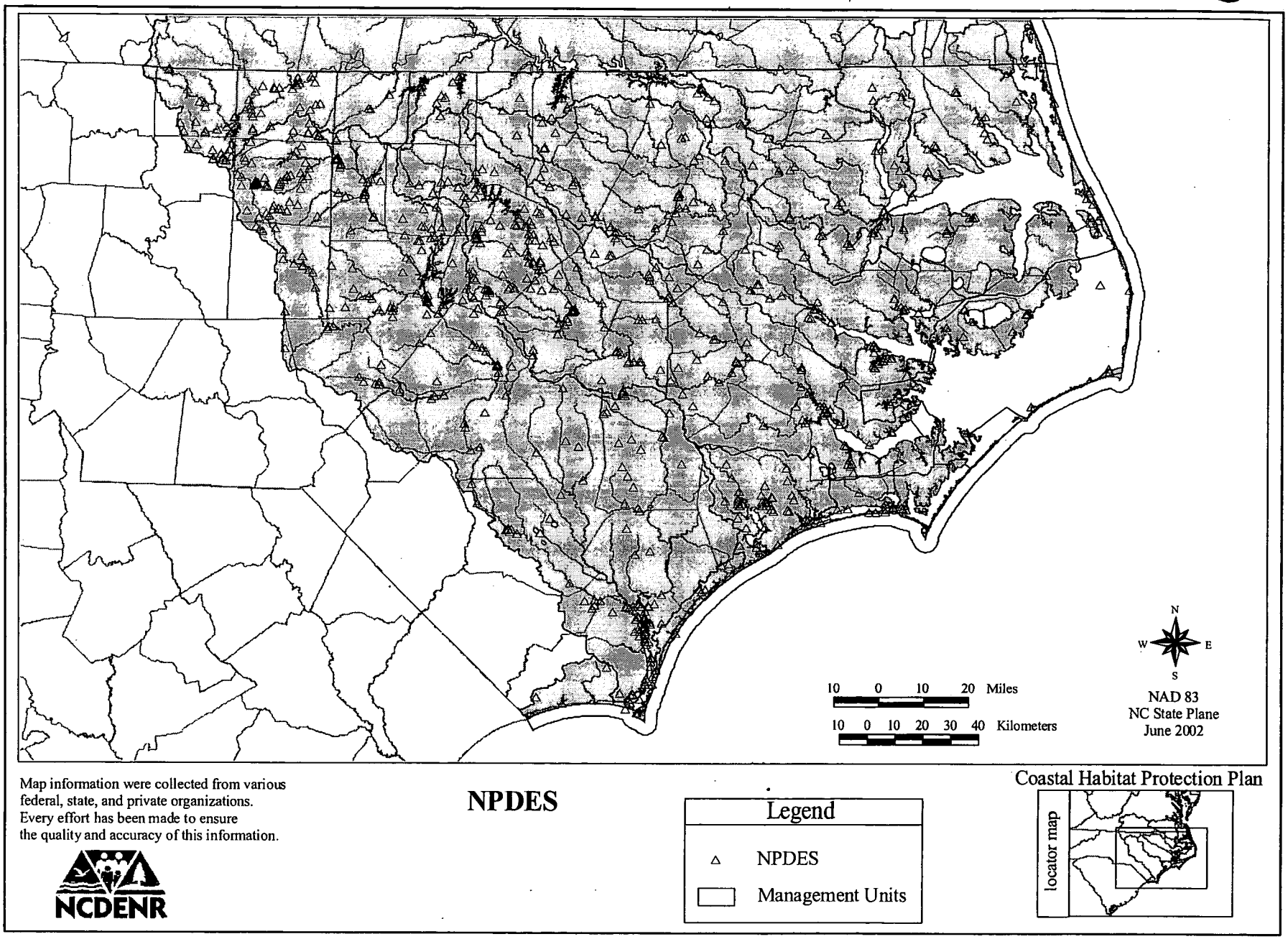
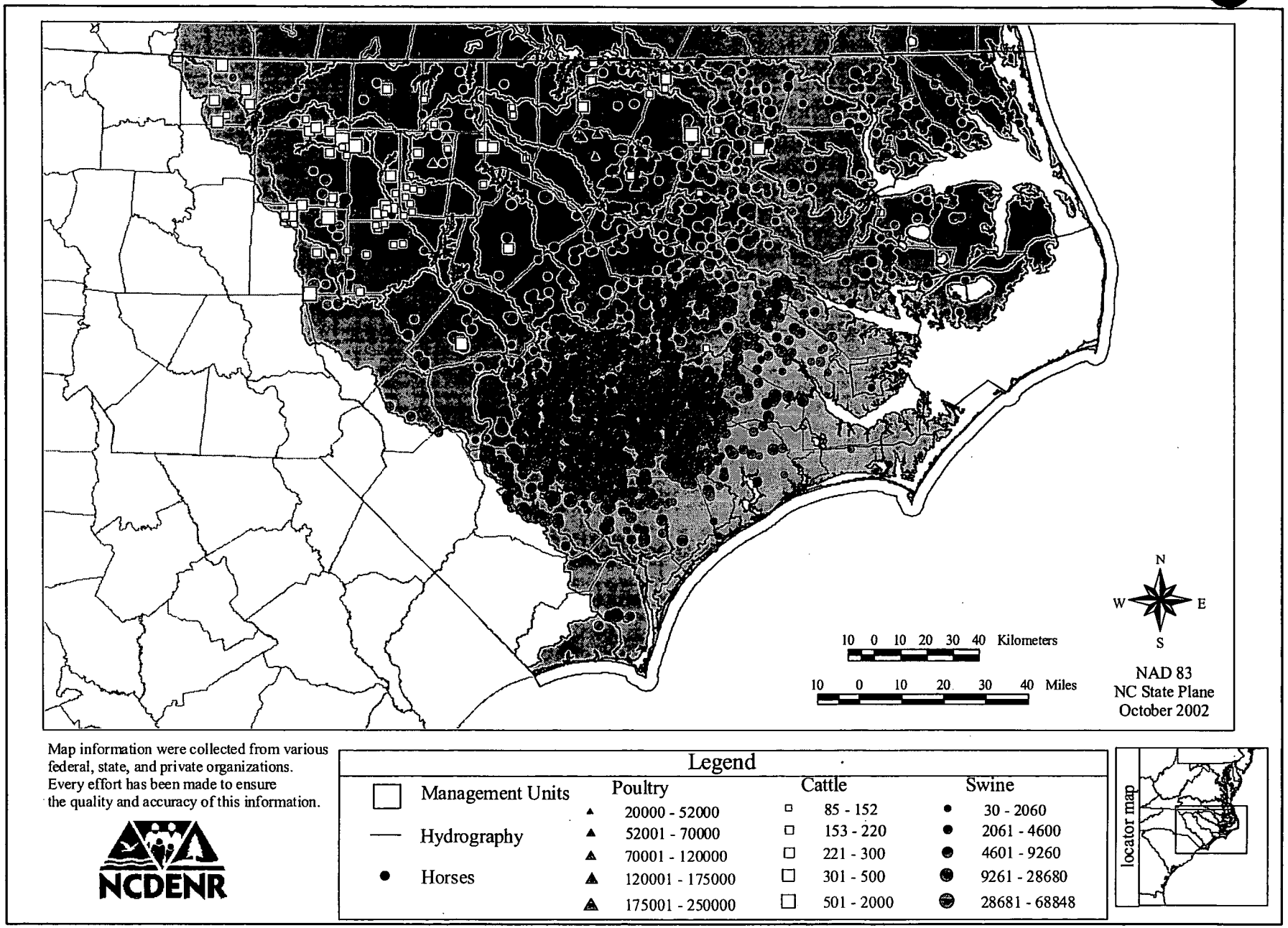
Map 2.13c. US Army Corps of Engineers maintained navigation channels in coastal North Carolina from Bogue Inlet to South Carolina



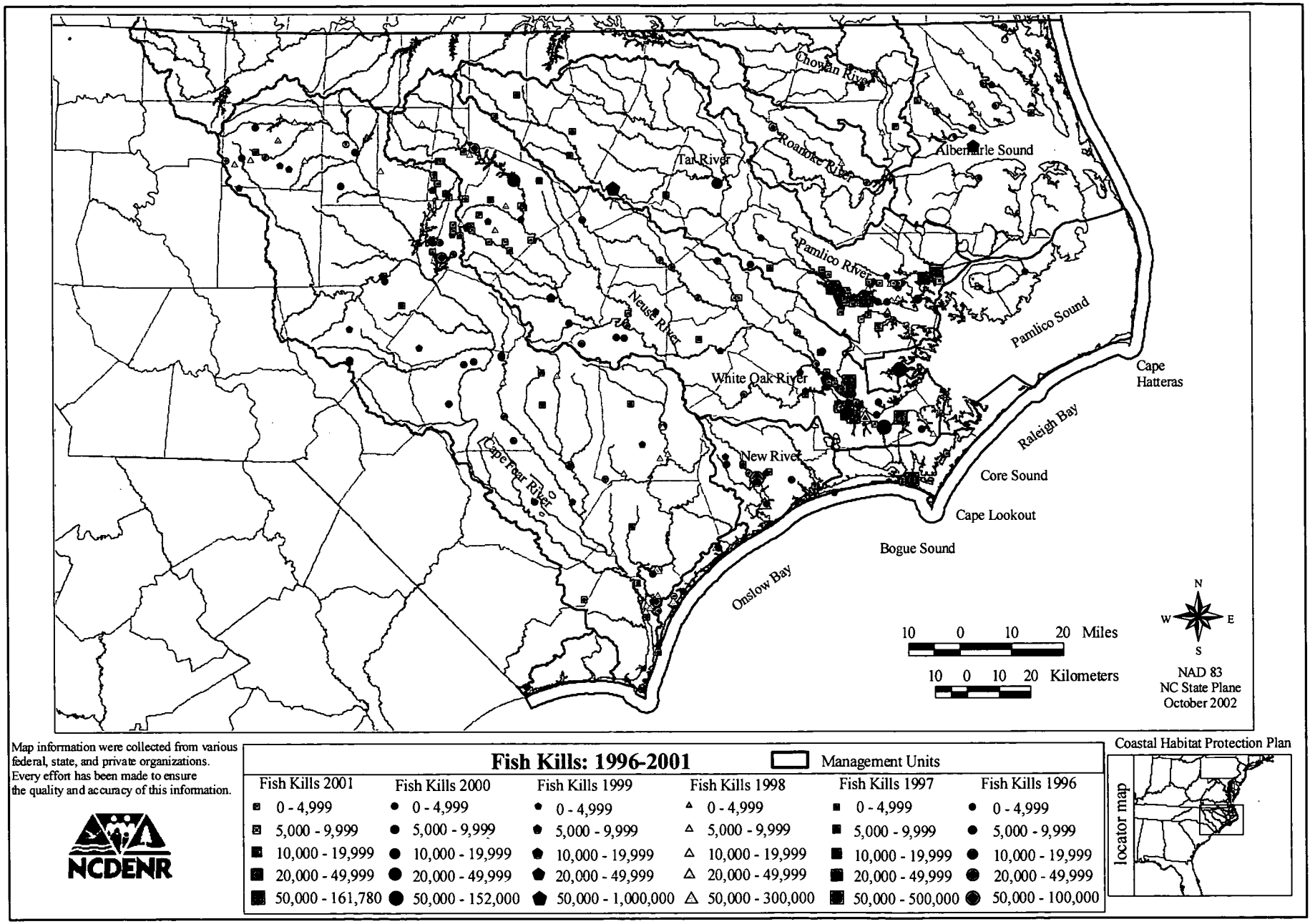
Map 2.14. Location of major jetties along the North Carolina coast.



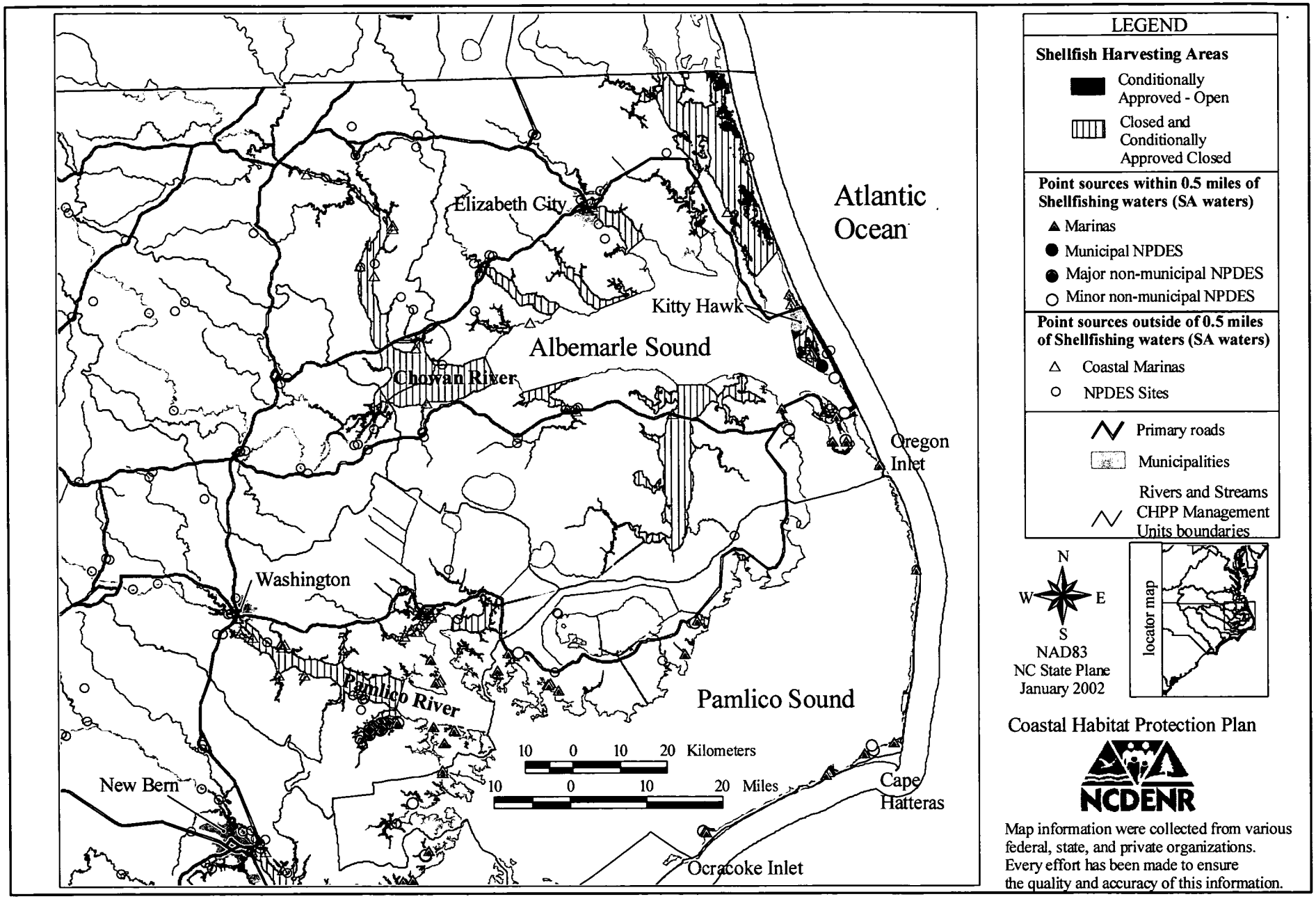
Map 2.15. Location of point source discharges permitted by the North Carolina Division of Water Quality (from BasinPro3 software).



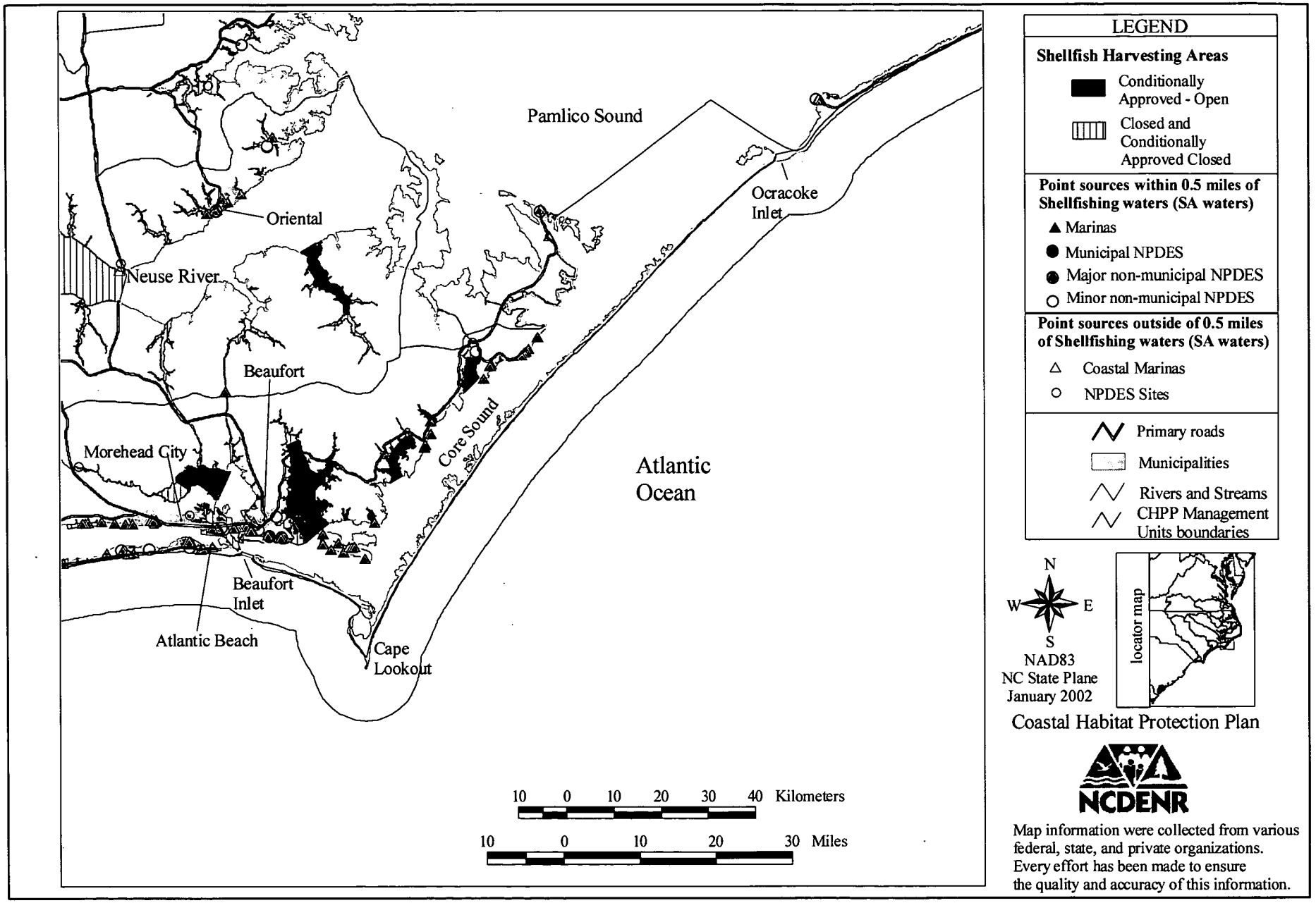
Map 2.16. Location of registered animal operations in coastal North Carolina watersheds (from BasinPro3 software).



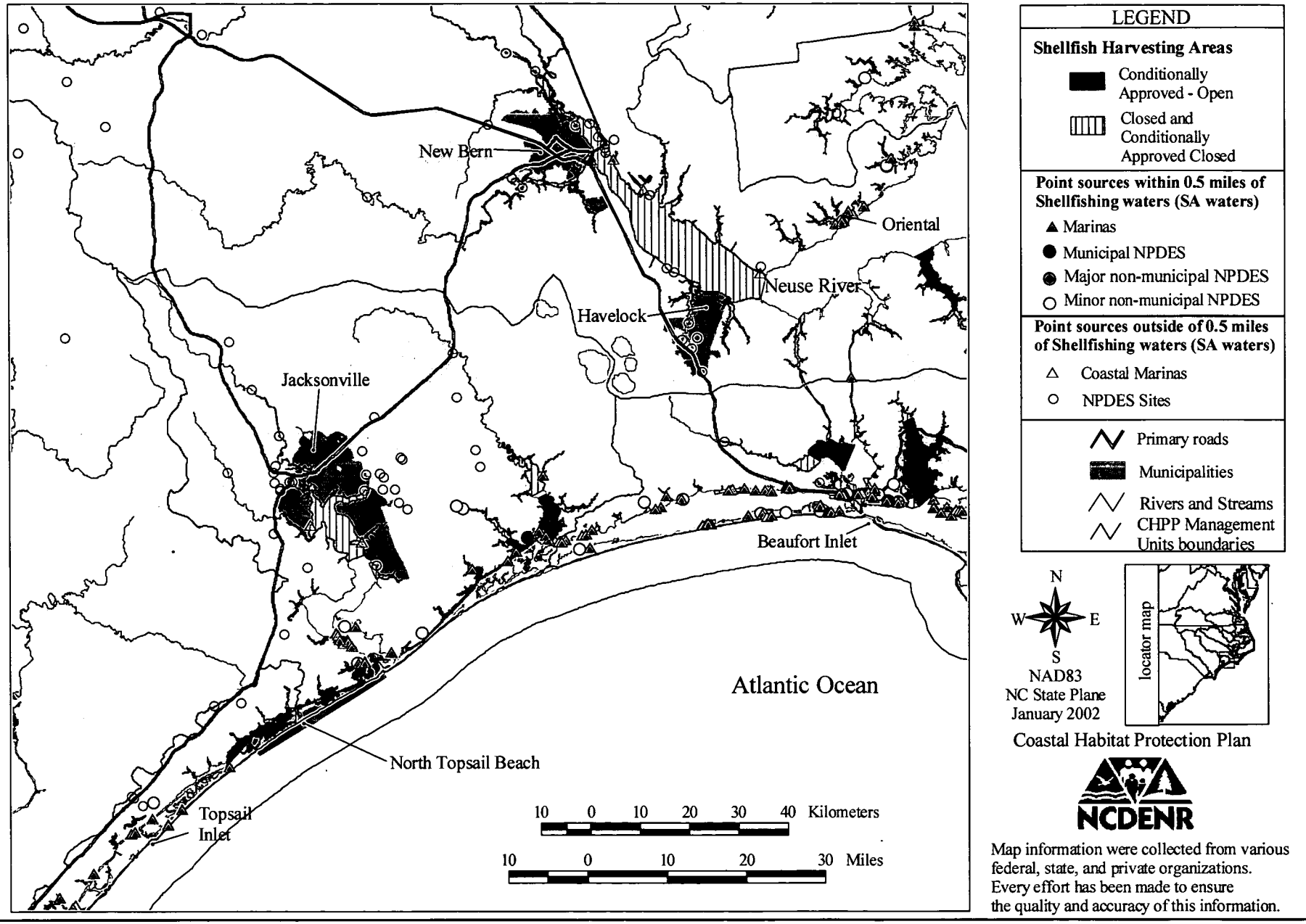
Map 2.17 Location of reported fish kills (1996-2001) (source: DENR-DWQ Environmental Sciences Branch)



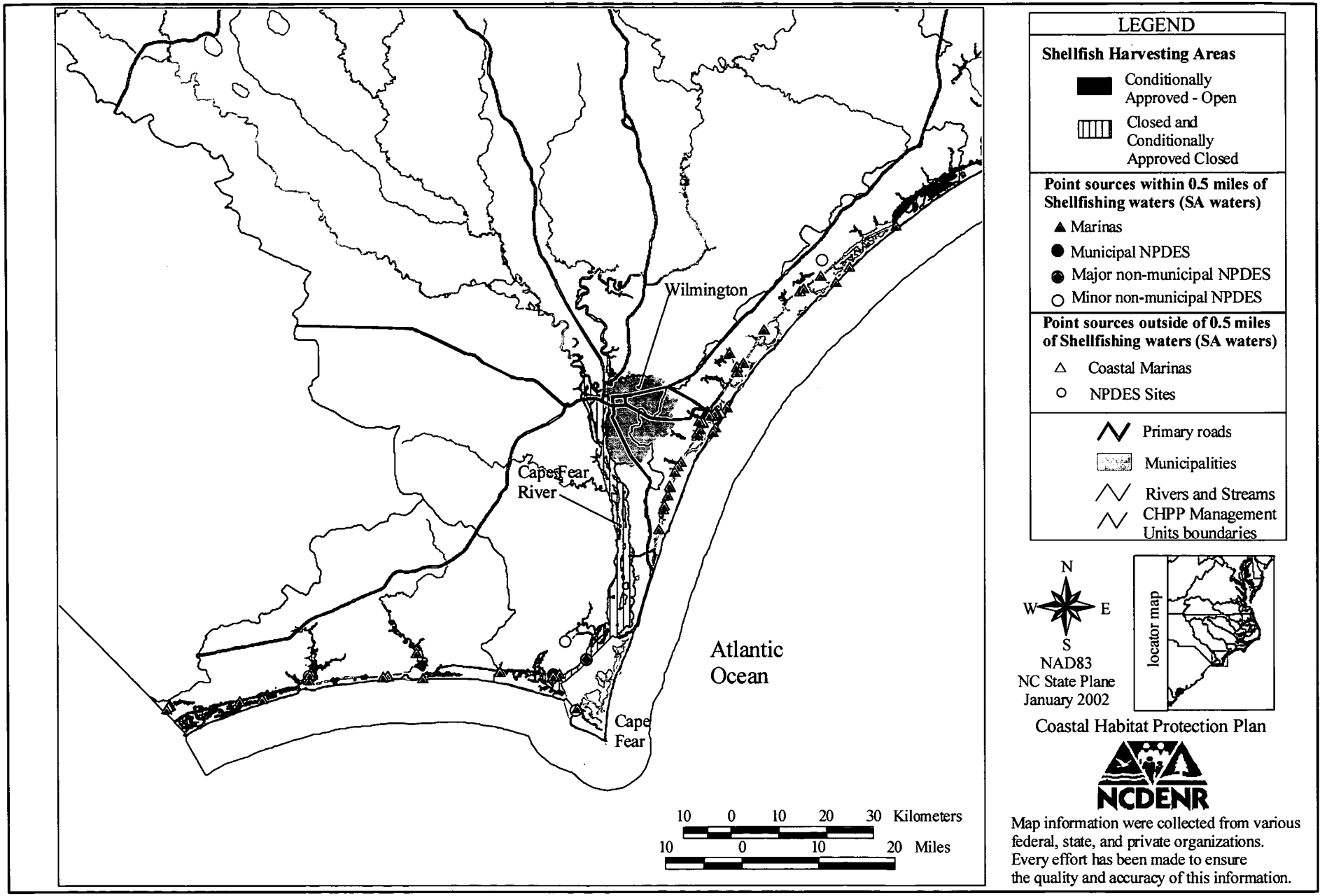
Map 2.18a--Locations of marinas and National Pollution Discharge Elimination System discharges in relation to North Carolina Division of Environmental Health shellfish harvesting areas - Virginia state line to Ocracoke Inlet



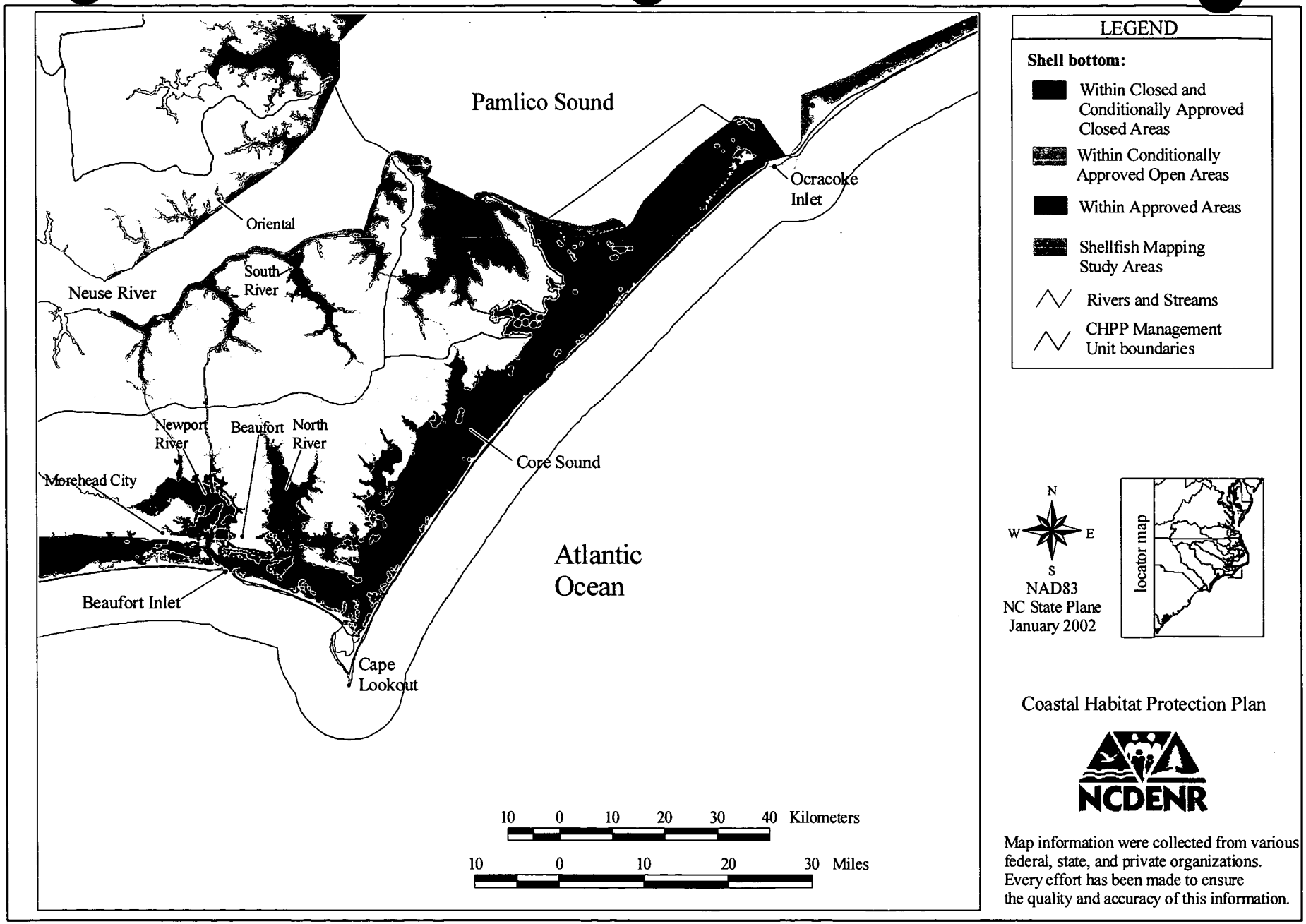
Map 2.18b ---Location of National Pollution Discharge Elimination System marinas and discharges in relation to North Carolina Division of Environmental Health shellfish harvesting areas - Ocracoke Inlet to Beaufort Inlet



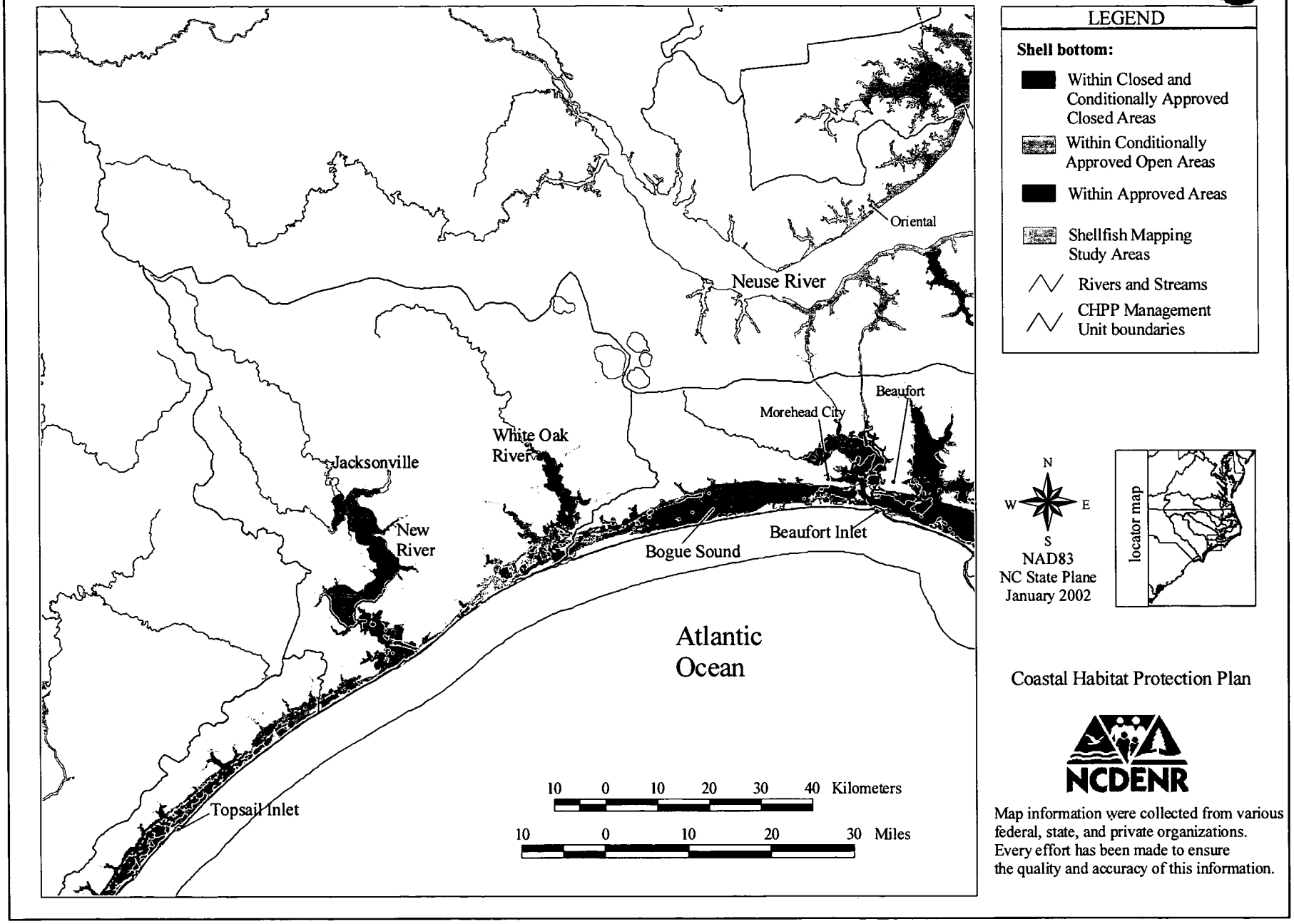
Map 2.18c--Location of National Pollution Discharge Elimination System marinas and discharges in relation to North Carolina Division of Environmental Health shellfish harvesting areas - Beaufort Inlet to Topsail Inlet



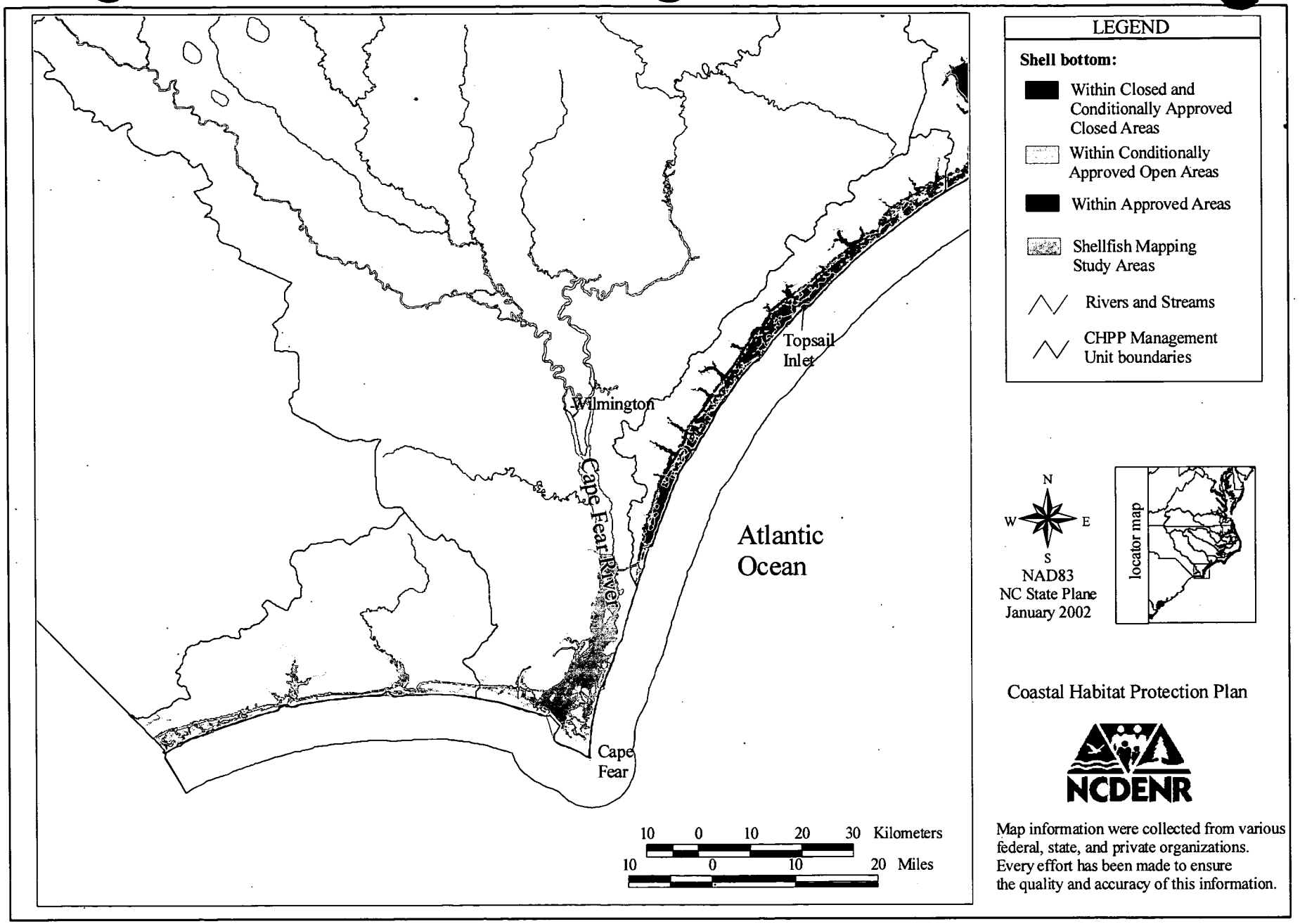
Map 2.18d --Location of National Pollution Discharge Elimination System marinas and discharges in relation to North Carolina Division of Environmental Health shellfish harvesting areas - Topsail Inlet to South Carolina state line



Map 2.19a--Extent of shell bottom within North Carolina Division of Environmental Health Shellfish Area Designations - Ocracoke to Beaufort Inlet



Map 2.19b-- Extent of shell bottom within North Carolina Division of Environmental Health Shellfish Area Designations - Beaufort Inlet to Topsail Inlet



Map 2.19c ---Extent of shell bottom within North Carolina Department of Environmental Health Shellfish Area Designations - Topsail Inlet to South Carolina

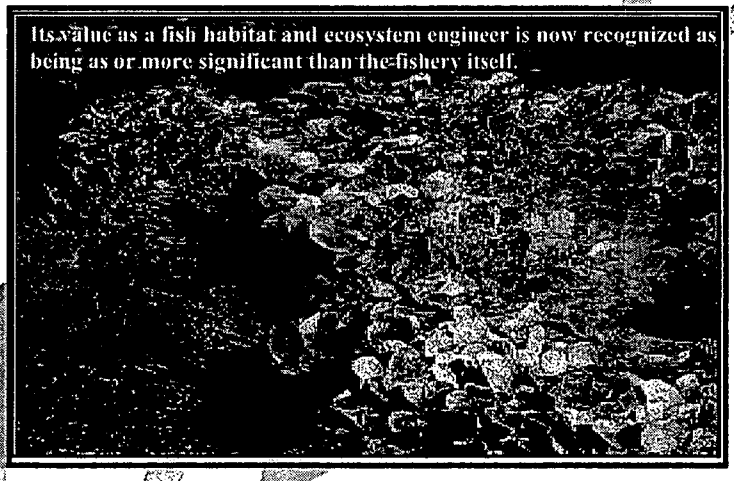
CHAPTER 3. SHELL BOTTOM

3.1. DESCRIPTION AND DISTRIBUTION

Definition

For the purposes of this plan, shell bottom is defined as "estuarine intertidal or subtidal bottom composed of surface shell concentrations of living or dead oysters (*Crassostrea virginica*), hard clams (*Merceneria merceneria*), and other shellfish." The definition is limited to estuarine waters and habitats because North Carolina's economically significant shellfish resources and their fisheries are entirely estuarine, although many species of molluscan shellfish live in fresh water and nearshore ocean waters.

In the 1990s, fisheries management agencies began to formally recognize shell bottom habitat as critical to fisheries production. The North Carolina Marine Fisheries Commission (MFC), South Atlantic Fishery Management Council (SAFMC), and Atlantic States Marine Fisheries Commission (ASMFC) all recognize the importance of shell bottom. Some define shell bottom largely by reference to the economic value of living shellfish, while others include the ecological functions of all shell bottom.


Its value as a fish habitat and ecosystem engineer is now recognized as being as or more significant than the fishery itself.

Description

Common terms used to describe shell bottom habitats in North Carolina are "oyster beds," "oyster rocks," "oyster reefs," "oyster bars," and "shell hash." Shell hash is a mixture of sand or mud with gravel and/or unconsolidated broken shell (clam, oyster, scallop, and/or other shellfish). Shell bottom can be natural or man-made. Cultch material (hard material to which oysters attach) can consist of oyster, clam, or scallop shells; gravel or marl; or other hard materials. Cultch exists naturally, as shell hash and oyster rocks. It is also planted by DMF's Shellfish Rehabilitation Program to enhance and restore estuarine shell bottom in order to increase oyster spat settlement and growth, and to promote settlement and survival of hard clams. Participants in the shellfish lease program often use cultch in their aquaculture operations.

The horizontal area of shell bottom habitat ranges in size from a few square yards of scattered shell clumps to acres of living oysters and dead shells. The habitat can also consist of many square miles of shell hash more than a yard deep. A good example of shell hash bottom habitat is present in New River, North Carolina.

Shell bottom is both intertidal and subtidal and can consist of fringing or patch reefs (Coen et al. 1999). In North Carolina, oysters accumulate on existing oyster beds, outcroppings of fossil shell beds, as well as on wedge rangia, hard clam, and bay scallop shell beds (DMF 2001a). Oysters attach to exposed roots at the margin of salt marsh, pilings, seawalls, and rip-rap. Intertidal oyster reefs in North Carolina were

characterized into three "landscapes" or combinations of adjacent habitats (Bahr and Lanier 1981; Grabowski et al. 2000). These were:

- Salt marsh landscape – on the edges and points of salt marsh away from seagrass beds
- Seagrass landscape – nestled between seagrass beds and salt marshes
- Mud flat landscape – on mud flats isolated from vegetative structure

Intertidal oyster reefs in the central and southern estuarine systems may only be a few oysters thick. However, subtidal oyster mounds in Pamlico Sound may have been several meters tall (Lenihan and Peterson 1998).

Habitat requirements

Oysters are the principal builders of natural shell bottom in North Carolina's estuaries. Marshall (1995) identified the most critical habitat for oyster populations as oyster beds and rocks, which the oysters themselves form by the accumulation of shells and oysters over time. The North Carolina Oyster Fishery Management Plan also recognized that the condition of oyster beds or rocks is the most important factor affecting oyster stock abundance because the shell material on those rocks is the most abundant and preferred substrate for the settlement of larval oysters (DMF 2001a).

The oyster's reproductive, morphological, physiological and behavioral adaptations have, in the past, allowed it to persist in immense numbers throughout the estuary (Kennedy 1991). The normal growing temperatures for eastern oyster range from 10 to 30°C (Burrell 1986). Their optimum salinity ranges from 14 to 30 ppt (Castagna and Chanley 1973). The optimum salinity for oyster larvae is somewhat lower than normal growing salinities for spat and adults (Loosanoff 1953; Chanley 1958; Davis 1958). Studies have shown that lower salinities combined with higher temperatures increases oyster mortality (Loosanoff 1953; Funderburk et al. 1991). Oyster distribution and abundance in low salinity waters is therefore limited by salinity and high temperature. However, predation by boring sponges, oyster drills, whelks, annelid worms, and starfish is also reduced in low salinity waters (Gunter 1955; Bahr and Lanier 1981). Increased mortality in the upper and lower regions of the estuary leaves moderate salinity areas with the highest abundance of subtidal oysters in North Carolina. Oyster growth in the intertidal waters varies significantly with temperature, tidal flows, and food quality and availability.

Oxygen levels and suspended sediment can affect survival and viability of oysters. Dissolved oxygen (DO) less than 1 to 2 mg/l is generally lethal or harmful to oysters, depending on the time of exposure and life stage of the oyster. Oyster eggs are affected most by suspended sediment, while larvae are slightly more turbidity tolerant, and adult oysters have significantly greater tolerance for suspended matter.[1]

Although oysters can tolerate extremes in salinity, temperature, turbidity and low dissolved oxygen, spawning success requires optimum salinities, temperatures and good water currents to disperse the larvae. Successful spat settlement and survival requires refuge from predators (Bartol and Mann 1999, Coen et al. 1999); clean, firm surfaces, preferably oyster shell (Kennedy et al. 1996); and good water circulation (Burrell 1986). Adult oysters also require adequate water circulation to deliver food and oxygen and to remove wastes and sediment.

For subtidal oyster reefs, vertical height affects growth and survival rates for individual oysters by maximizing circulation benefits (Lenihan and Peterson 1998; Lenihan et al. 1999; Peterson et al. 2000a). The vertical structure of oyster reefs physically locates the oysters off the bottom to avoid anoxic water

[1] Studies have found that suspended sediment concentrations of 250 mg/L resulted in 27% mortality in oyster eggs, 500 mg/L resulted in 69% mortality, and 1000 mg/L caused 97-100% mortality (Davis and Hidu 1969a). Larvae were slightly more turbidity tolerant, with 50% mortality occurring at 1000 to 1500 mg/L after 12 days of exposure. These researchers also documented growth reductions in oyster larvae at suspended sediment concentrations of 750 mg/L. Concentrations above 750 mg/L are representative of the amount of turbidity caused by storms or dredging activities (Davis and Hidu 1969a). Adult oysters are able to feed in water containing up to 0.4 g/l of suspended matter (Nelson 1938; Nelson 1960).

(Lenihan and Peterson 1998) or smothering by sediment (Coen et al. 1999). Lower reefs may be exposed to higher sedimentation rates and increased exposure to anoxia resulting in higher mortality rates.

Distribution

The primary shell-building organism in North Carolina estuaries, the eastern oyster, ranges from the Gulf of St. Lawrence in Canada through the Gulf of Mexico to the Bay of Campeche, Mexico and to the West Indies (Bahr and Lanier 1981). To the degree commercial fishery landings may indicate abundance, the highest documented oyster abundance along the Atlantic coast is in the Chesapeake Bay (DMF 2001a). Historically, Maryland's landings of 15 million bushels dwarfed North Carolina's highest annual oyster landings of 1.8 million bushels in 1902 (DMF 2001a).

Oysters are found along a majority of the North Carolina coast from extreme southeastern Albemarle to the estuaries of the southern part of the state to the South Carolina border (DMF 2001a). Oyster reefs occur at varying distances up North Carolina's estuaries, depending upon salinity, substrate, and flow regimes. In the wind-driven Pamlico Sound system north of Cape Lookout, oyster reefs consist overwhelmingly of subtidal beds. South of Cape Lookout, subtidal rocks also occur in the New, Newport, and White Oak Rivers (DMF 2001a). Extensive intertidal oyster rocks occur in North Carolina's southern estuaries, where the lunar tidal ranges are higher. Substantial shell hash is present in New River, eastern Bogue Sound, and along the edges of many streams and channels, such as portions of the Atlantic Intracoastal Waterway (ICW) in the southern coastal area.

In the Albemarle-Pamlico estuary, oysters were concentrated in the lower portion of Pamlico Sound tributaries, along the western shore of Pamlico Sound, and to a lesser extent behind the Outer Banks. (Epperly and Ross 1986) (Map 3.1).

Shellfish habitat and abundance mapping

The DMF Shellfish Habitat and Abundance Mapping Program began creating detailed bottom type maps in 1988. These maps are being compiled using standardized surveys from the South Carolina border north through Core Sound, along the perimeter of Pamlico Sound, and in Croatan/Roanoke sounds (Map 3.2). The program delineates all bottom habitats, including shell bottom, and samples the density of oysters, clams, and bay scallops in these habitats. This program has differentiated 24 different bottom types based on combinations of depth, bottom firmness, vegetation density, and density of surface shells. This program defines shell habitat (shell bottom) as significant cover (>30% of bottom) of living or dead shells. Some of the other fish habitats mapped by the program include salt marsh, submerged aquatic vegetation, and soft bottom. A stratified random sampling design is used to provide statistically sound shellfish density estimates by area and habitat.

As of January 2003, mapping has been completed from Carolina Beach to Ocracoke Inlet, including Core Sound. The following specific areas have also been mapped: Shallowbag Bay, portions of Pamlico Sound in the vicinity of Oregon Inlet, and South River (Carteret County) (Map 3.2). This area represents approximately 42% (222,643 acres) of the total area (about 530,000 acres) intended for mapping (Map 3.2). As of 2003, West Bay in southwestern Pamlico Sound has also been completed.

Of the entire area mapped by January 2003 (222,643 acres), approximately 6% (12,502 acres) of the bottom was classified as shell bottom (Table 3.1). The Southern Estuaries have the greatest proportion of shell bottom (17%) of the areas mapped to date. Private shellfish leases were delineated but not included in these estimates. Shellfish leases cover additional shell bottom areas in the Core/Bogue (357 acres) and New/White Oak (498 acres) of the shellfish mapping study area. As of January 2003, there were 281 shellfish leases in coastal North Carolina occupying 2,079 ac, which comprises less than 1% of the

shellfish mapping study area.[2]

Table 3.1. Shell bottom habitat mapped within Coastal Habitat Protection Management Units by the North Carolina Division of Marine Fisheries' Shellfish Habitat and Abundance Mapping Program (January 2003).

Management unit	Total area mapped		Shell bottom (intertidal)		Shell bottom (subtidal)		Total shell bottom
	acres	% complete	acres	% complete	acres	% complete	acres
Albemarle	1,687	2.8	0	0.0	33	1.9	32.8
Core/Bogue	148,994	94.7	1,875	1.3	5,420	3.6	7,294.6
Neuse	3,120	13.3	0	0.0	26	0.8	25.9
New/W. Oak	34,495	94.4	346	1.0	333	1.0	679.5
Pamlico	8,498	3.8	22	0.3	93	1.1	114.7
Southern Estuaries	25,603	82.6	2,577	10.1	1,775	6.9	4,352.1
Coastal Ocean	246	56.2	0	0.2	2	0.8	2.3
Total *	**222,643**	**41.9**	**4,820**	**2.2**	**7,681**	**3.5**	**12,501.8**

Percent (%) is the amount of shell bottom/total area mapped within each MU.
Total mapping study area is shown on Map 3.2.

The highest average shellfish density (45.5 shellfish/m^2) within the mapped area was in the Core/Bogue MU. Maps 3.3a-c show the spatial distribution of shellfish density on shell bottom.[3]

3.2. ECOLOGICAL ROLE AND FUNCTIONS

Ecosystem enhancement

Water Quality Enhancement

The direct and indirect ecosystem services of the oyster reef, such as filtering capacity, transfer of production between bottom and water column, nutrient dynamics and sediment stabilization, have been largely ignored or underestimated (Coen and Luckenbach 1998). The ASMFC reports that shell bottom provides food, refuge and nursery grounds for coastal fisheries. Shell bottom also indirectly benefits the fisheries by providing water filtration. Kennedy (1991) suggested that the filtering activities of the massive concentrations of oysters historically present in the Chesapeake Bay might have resulted in different assemblages of plankton, with fewer sea nettles, microplankton and bacterioplankton. Before the end of the 19th century, oysters in the Chesapeake Bay could filter the entire volume of the Bay in a little more than three days (Newell 1988). Newell's estimate of the filtering capacity of Chesapeake Bay oyster populations in 1988 was 325 days. Other researchers agree that the loss of oyster populations removes one potentially important means of controlling nuisance phytoplankton blooms and other negative impacts of nutrient enrichment and coastal eutrophication (Officer et al. 1982; Dame et al. 1984; Lenihan and Peterson 1998; Coen et al. 1999; Jackson et al. 2001). Jackson et al. (2001) attributed much of the decline in water quality in Pamlico Sound and Chesapeake Bay to loss of bio-filtration capacity attributable to the drastic decline (>90%) in oyster biomass.

Shell bottom enhances water quality by transferring phytoplankton production to benthic production

[2] However, the contribution of shellfish leases to overall shell bottom is unknown because they contain areas that do not meet the definition of shell bottom. So the estimates for overall shell bottom coverage are somewhat underestimated.
[3] More information on the distribution of shell bottom is provided in the Status and trends section (3.3).

through filter feeding (Officer et al. 1982; Cloern 2001; DMF 2001a; Newell et al. 2002). Increased shell bottom and oyster biomass reduce the impacts of eutrophication. After being recycled by oysters, nutrients are deposited around the base of oyster beds where nitrogen is removed (Newell et al. 2002). The organic deposits from oyster filtering can be released by erosion, sediment reworking by animals, or resuspension with possible uptake by adjacent SAV (Peterson and Peterson 1979). With more nutrients denitrified or stored in the sediment, the frequency of hypoxia (<2 mg/l of dissolved oxygen) and anoxia (no dissolved oxygen) events in the water column should decrease. The oyster shells themselves also store carbon in the form of calcium carbonate (Hargis and Haven 1999). The sequestered carbon is thus taken out of atmospheric circulation, counteracting global warming.

Habitat Modification

The oyster's structural modification of habitat is important to the estuarine system. As shell bottom increases, wave energy decreases, stabilizing sediment and decreasing erosion (Lowery and Paynter 2002). High-relief shell bottom alters currents and water flows, influencing patterns of fish settlement, predation and predator feeding success (Breitburg et al. 1995; Coen et al. 1999). On the down-current side of the reef, flow velocity is reduced and larval fish species can maintain their positions during the high-flow portions of the tidal cycle (Breitburg et al. 1995). Oyster reefs can also constrict tidal flow to certain areas, resulting in island formation (Bahr and Lanier 1981). By reducing wave energy along the shoreline, shell bottom aids in stabilizing creek banks and reducing salt marsh erosion (Bahr and Lanier 1981; Dame and Patten 1981; Marshall 1995; Breitburg et al. 2000).

The presence of shell bottom reduces turbidity by filtering water and physically trapping and stabilizing large quantities of suspended sediment and organic matter with the shell structure (Haven and Morales-Alamo 1970; Dame et al. 1989; Coen et al. 1999; Grabowski et al. 2000). This, in turn, improves water clarity, which increases productivity of the water column and SAV. The reduction in turbidity has a positive effect on SAV by increasing light penetration to the plants, creating more suitable conditions for SAV growth, survival, and expansion (Meyer and Townsend 2000). As an example, prior to large-scale losses of shell bottom in the Chesapeake Bay, bay waters were reported to be much less turbid than current conditions, which allowed submerged aquatic vegetation to thrive (Coen et al. 1999; Jackson et al. 2001). Because of these ecosystem benefits provided by oysters to other habitats, Lenihan and Peterson (1998) proposed that oysters might now be more economically valuable as a habitat than a fishery.

Productivity

Primary producers on shell bottom include algae (epiphytic microalgae, attached macroalgae) and organic films of bacteria and fungi. These organisms provide food for resident secondary consumers. Many crab species (including the mud crabs and pea crab), barnacles, soft-shelled clams, hard clams, mussels, anemones, polychaetes, amphipods, hydroids, bryozoans, flatworms, mussels, and sponges make up the oyster reef community. All of these species recycle nutrients and organic matter and many become prey for finfish, shrimps and blue crab (Bahr and Lanier 1981). Grass shrimp (*Palaemonetes* spp.), an important link in food webs, prefer oyster reefs to other surfaces when avoiding predators (Posey et al. 1999). Resident species (e.g., gobies) are significant zooplankton predators.

Live oyster shell bottom also enhances secondary productivity in the estuary by providing hard, complex substrate, allowing colonization by an abundance of plants and animals on the shell substrate. This in turn supports many resident and transient fish and invertebrates that are ecologically and economically important.

Fish Utilization

There has been an increased understanding that shell bottom provides critical fisheries habitat not only for oysters, but also for recreationally and commercially important finfish, other mollusks, and crustaceans. The ecological functions of oyster reefs related to oyster production are well known and accepted (Coen

et al. 1999). These functions include aggregation of spawning stock, chemical cues for successful spat settlement, and refuge from predators and siltation. Oysters have also been described as "ecosystem engineers that create biogenic reef habitat important to estuarine biodiversity, benthic-pelagic coupling, and fishery production."[4] (Lenihan and Peterson 1998).

Data quantifying fish use of habitats vary from presence/absence and numerical abundance, to actual fish production value. In North Carolina, 18 fishery species have been documented utilizing both natural and restored oyster reefs in Pamlico Sound, including Atlantic croaker, southern flounder, Spanish mackerel, spotted seatrout, weakfish, American eel, and black sea bass (Lenihan et al. 2001). Numerical abundance and production compared to other habitats provides additional information on the importance of habitat for fish. The species found most abundantly on oyster reefs compared to adjacent soft bottom were silver perch, sheepshead, pigfish, pinfish, toadfish, and Atlantic croaker. Southern flounder was collected on both oyster reefs and adjacent soft bottom areas, while bluefish and Atlantic menhaden were not collected near oyster reefs (Lenihan et al. 2001).

Several studies have found higher abundance and diversity of fish on shell bottom than adjacent soft bottom, particularly pinfish, blue crabs, and grass shrimp (Harding and Mann 1999; Posey et al. 1999; Lenihan et al. 2001). A study in Back Sound also found that crabs were more abundant on shell bottom than restored SAV beds (Elis et al. 1996). Breitburg (1998) concluded that the importance of shell bottom to highly mobile species is very likely underestimated, partially due to the difficulty in sampling oyster beds.

Peterson et al. (2003) estimated the amount of fish production that shell bottom provides in addition to adjacent soft bottom habitats. Using results from numerous studies, they compared the density of fish at different life stages on oyster reefs and adjacent soft bottom habitats. The published growth rates of species were then used to determine the amount of production gained from shell bottom. The species were separated into recruitment-enhanced, growth-enhanced, and not enhanced groups. Recruitment-enhanced species are those having early life stages showing almost exclusive association with shell bottom. For other species with higher abundance in shell bottom, diet and life history studies were used to determine the fraction of their production associated with the consumption of shell bottom-enhanced species. Species consuming relatively more shell bottom-enhanced species were classified as growth-enhanced. Analysis of the studies revealed that every $10m^2$ of newly constructed oyster reef in the southeast United States is expected to yield a benefit of an additional 2.6 kg of fish production per year for the lifetime of the reef (Peterson et al. 2003).[5]

Fish that utilize shell bottom can be classified into three categories: resident, transient, and facultative (Lowery and Paynter 2002; Coen et al. 1999). Resident species live on shell bottom and depend on it as their primary habitat. Transient species are wide-ranging species that use shell bottom for refuge and forage along with other habitats. Facultative species depend on shell bottom for food, but utilize other habitats with vertical relief or shelter sites.

At least seven fish species have been identified as resident species—naked goby, striped blenny, feather blenny, freckled blenny, skilletfish, and oyster toadfish (Coen et al. 1999, Lowery and Paynter 2002). These species were also considered recruitment-enhanced by Peterson et al. (2003). Resident fish are

[4] Benthic-pelagic coupling refers to the transfer of production from the oyster beds to the mobile species foraging on the beds (Lenihan and Peterson 1998), benefiting both estuarine and ocean fisheries. It also refers to the transfer of phytoplankton production and other fine particulates to the bottom.

[5] For individual species, the amount of additional production ranged from 0.08 (spottail pinfish) - 158.80 (bay anchovy) fish/$10m^2$. Of the 53 species of fish and shellfish for which data was available, ten were recruitment-enhanced and ten were growth-enhanced. About half of the twenty shell bottom-enhanced species were fishery species (sheepshead, black sea bass, gray snapper, white perch, gag, pigfish, southern flounder, and tautog). The recruitment-enhanced species included stone crabs, sheepshead, blennies/gobies, skilletfish, gray snapper, gag, toadfish, and tautog. Growth enhanced species included bay anchovies, black sea bass, sheepshead minnow, spottail pinfish, silversides, white perch, pigfish, and southern flounder.

important prey for transient and facultative predator species (Coen et al. 1999). For example, Breitburg (1998) found high densities of juvenile striped bass (15.4 individuals/m^2 of reef surface) aggregating near the reef surface feeding on naked goby larvae congregated on the down-current side of the reef. Other common predator species sampled on oyster reefs in North Carolina are red and black drum, Atlantic croaker, sheepshead, weakfish, spotted seatrout, summer and southern flounder, blue crab, and oyster toadfish. Of these species however, only sheepshead, southern flounder, and oyster toadfish were considered shell bottom-enhanced by Peterson et al. (2003). Production of black drum, Atlantic croaker, blue crab, and summer flounder were classified as not enhanced by shell bottom. Oyster reefs in higher salinity waters are critical habitat for predators such as juvenile gag, snappers (*Lutjanus* spp.) and stone crab (Wenner et al. 1996; Peterson et al. 2003).

There is some variation in fish use among salinity gradients as well. Oyster reefs in higher salinity waters tend to support a greater number of associated species than reefs in lower salinity waters (Sandifer et al. 1980). Studies summarized by Coen et al. (1999), which included work in North Carolina, identified 72 facultative, resident and transient fish species in close proximity to oyster reefs. The ASMFC-managed species categorized as transient and also important to North Carolina's coastal fisheries are American eel, Atlantic croaker, Atlantic menhaden, black sea bass, bluefish, red drum, spot, striped bass, summer flounder, tautog, and weakfish. Only black sea bass and tautog were considered shell-bottom enhanced by Peterson et al. (2003).

A partial list of macrofaunal species observed in collections from oyster habitat is provided in Table 3.2. Those species that use shell bottom as spawning and/or nursery areas are identified, as are those species that forage on shell bottom habitat and/or use it as a refuge (SAFMC 1998a; Lenihan et al. 1998; Coen et al. 1999; Grabowski et al. 2000). More than 30 species are listed in Table 3.2, and there are many more not listed, emphasizing the importance of shell bottom as fisheries habitat.

Refuge

The complex three-dimensional shell habitats provide food, refuge, and attachment areas for larval, juvenile, adult, and spawning finfish, crustaceans and mollusks (Arve 1960; Wells 1961; MacKenzie 1983; Meyer et al. 1996; Zimmerman et al. 1989; Breitburg 1998; Lenihan et al. 1998; Coen et al. 1999; Harding and Mann 1999). Oyster reefs provide more area for attachment of oysters and other sessile organisms. More habitat niches occur in oyster reefs than on the surrounding flat or soft bottom habitats. Bartol and Mann (1999) found the quality and quantity of interstitial spaces (spaces between the shells within the shell matrix) to be critical to recruiting oysters, as well as to the survival of other oyster reef species. Survival was greater in the interstitial spaces than at the reef surface.

The crevices in shell bottom provide refuge for small, slow-moving macrofauna, such as polychaete worms, blue crabs, hard clams, amphipods and other species (Zimmerman et al. 1989; SAFMC 1998a). Mud crabs utilize shell bottom as refuge from oyster toadfish, blue crabs and wading birds (Meyer 1994). While crabs utilize the shell structure to hide from predators in the day, sampling found that they migrate to the open mud flats at night to feed (Grabowski et al. 2000). Competition for shell bottom habitat as refuge is greatest within similar size categories of fauna (Coen et al. 1999).

Since shell bottom substrates provide significant protection from predators for adult and juvenile hard clams, it has been designated an Essential Fish Habitat by the SAFMC for that species (SAFMC 1998a). Peterson et al. (1995) reported that young clams survived better in shell bottom than open soft bottom areas. The DMF specifically manages some intertidal oyster cultch planting sites in the southern coastal area to take advantage of this hard clam–oyster shell relationship. After oysters are harvested off the planted site, the areas are opened specifically for clam harvest by hand gears. Fishermen dig under the cultch to take high concentrations of hard clams that recruited under the oyster shell. Once the clam harvest is over, the areas are re-planted with cultch, and the two-year cycle begins again.

Table 3.2. Partial listing of finfish and shellfish species observed in collections from shell bottom in North Carolina, and ecological functions provided by the habitat.

SPAWNING GUILD	Shell Bottom Functions[1]					Fishery[2]	Stock Status (DMF 2003a)
Species	Refuge	Spawning	Nursery	Foraging	Corridor		
ANADROMOUS & CATADROMOUS FISH							
American eel	X		X	X	X	X	Unknown
Striped bass			X	X		X	V-Albemarle Sound, Atlantic Ocean, O-central/southern
ESTUARINE (0.5-30 ppt) SPAWNING AND NURSERY							
Anchovies (striped, bay)		X	RE	X			
Blennies	X	X	RE	X			
Oyster	X	X	X	X		X	Concern
Gobies	X	X	RE	X			
Grass shrimp	X	X	X	X			
Hard clam	X	X	X	X		X	Unknown
Mummichog	X	X	NE	NE	X		
Oyster toadfish	X	X	RE	X		X	
Sheepshead minnow		X		GE			
Silversides				GE			
Skilletfish	X		RE	X			
Stone crab	X		RE	X		X	
INLET & ESTUARINE CHANNEL SPAWNING, ESTUARINE NURSERY							
Black drum			NE	X(NE)		X	
Blue crab	X	X	X(NE)	X(NE)	X	X	Concern
Red drum	X		X	X	X	X	Recovering
Spotted seatrout				X		X	Viable
Weakfish	X		X	X	X	X	Viable
MARINE SPAWNING, LOW-HIGH SALINITY NURSERY							
Atlantic croaker			NE	X(NE)		X	Concern
Brown shrimp	X		X(NE)	X(NE)	X	X	Viable
Southern flounder				GE		X	Overfished
Spot	X		X	X	X	X	Viable
Striped mullet			NE	X(NE)		X	Concern
MARINE SPAWNING, HIGH SALINITY NURSERY							
Atlantic spadefish						X	Unknown*
Black sea bass	X		X	GE	X	X	Viable-south of Cape Hatteras, Concern-south of Cape Hatteras
Gag	X		RE	X	X	X	Viable
Gulf flounder			NE	NE		X	
Pigfish				GE		X	
Pinfish	X		X(NE)	X(NE)	X	X	
Pink shrimp	X		X(NE)	X(NE)	X	X	Viable
Sheephead	X		RE	X	X	X	Overfished*
Spanish mackerel						X	Viable
Summer flounder	X		NE	X(NE)	X	X	Viable

[1] Sources: Pattilo et al. 1997; SAFMC 1998; Lenihan et al. 1998, 2001; Coen et al. 1999; Grabowski et al. 2000; Peterson et al. 2003

[2] Existing commercial or recreational fishery. Fishery and non-fishery species are also important as prey

* Status from unpublished SAFMC document ("Briefing Material for SAFMC, December 2002 meeting")

Where assigned functions are not listed for a species, this does not mean there are none, only that documentation for that specific function is unavailable. **Bolded** species indicate some preference for shell bottom habitat over other habitats documented in the text. **RE**=recruitment enhanced; **GE**=growth enhanced; **NE**=Not enhanced. Peterson et al. (2003).

Subtidal oyster reefs may be relatively more important to commercially important finfish than intertidal reefs, because subtidal reefs often provide the only structured habitat in submerged areas (Grabowski et al. 2000). In contrast, intertidal reefs are often surrounded by other structured habitats, such as salt marshes and SAV beds. From southeastern North Carolina to northern Florida, where SAV does not

occur, shell bottom represents the dominant structural habitat in the mid-intertidal to shallow subtidal waters (Posey et al. 1999). In other intertidal estuaries in North Carolina where little or no SAV is present, shell bottom also provides critical structural refuge, along with salt marsh (Eggleston et al. 1998).

Spawning

Resident species, such as gobies (seaboard and green), the longhorn sculpin, Atlantic midshipman, and northern pipefish depend on shell bottom as breeding habitat (Hardy 1978a 1978b; Johnson 1978; Coen et al. 1999). Other species documented to spawn on shell bottom include the oyster toadfish, mummichog, sheepshead minnow, eastern oyster, pink shrimp, grass shrimp, and hard clams (NOAA 2001). Toadfish attach their eggs to the underside of oyster shells, whereas gobies, blennies, and skilletfish place their eggs in recently dead oyster shell (Coen et al. 1999). Well-developed oyster reefs with clean oyster shells in a variety of sizes were shown to accommodate reproduction by the greatest densities of all resident species (Breitburg 1998).

Nursery

Shell bottom protects oyster spat and other juvenile bivalves, finfish and crustaceans from predators. Juvenile clams, in particular, settle in shell substrate for the protection it provides (Wells 1957; MacKenzie 1977; Peterson 1982; DMF 2001b). The nursery area function of shell bottom was demonstrated by Eggleston et al. (1998) who found that juvenile blue crabs and grass shrimp were equally abundant on shell bottom and SAV in Back Sound, North Carolina. Twelve of the eighteen mobile and economically important coastal fisheries species sampled by Lenihan et al. (2001) on natural and restored oyster reefs in Pamlico Sound were juveniles.

In a study where shell structure was added to mud flat reefs, juvenile fish abundance increased on the augmented reefs compared to surrounding soft bottom (Grabowski et al. 2000). The study also found that this initial increase was higher than increases that occurred when SAV and/or salt marsh were added in the same area. The ASMFC considers shell bottom as important nursery habitat for juvenile fish such as sheepshead, gag, snappers, stone and blue crabs, and penaeid shrimps (Lowery and Paynter 2002). An analysis by Peterson et al. (2003) confirmed that sheepshead, gag, and stone crab were recruitment enhanced, as well as many non-fishery species, including anchovies, blennies, gobies, oyster toadfish, skilletfish.

Foraging

Shell bottom provides important foraging area for a variety of aquatic organisms. Fish, shrimp and crabs forage on the worms, algae, crustaceans, mollusks, and other invertebrates present on and in shell bottom habitat. Concentrations of prey organisms among the shell attract both specialized and opportunistic predators. Eggs from oysters and other organisms, and larvae from the oyster shell bottom community are eaten by protozoans, jellyfishes, ctenophores, hydroids, worms, mollusks, adult and larval crustaceans, and fishes (Loosanoff 1965). Blue crabs forage heavily on oyster reefs (Menzel and Hopkins 1955; Krantz and Chamberlin 1978; Mann and Harding 1997). Stomach contents of common finfish predators sampled near shell bottom in Middle Marsh, North Carolina, included fish, shrimp, tanaids, amphipods, isopods, polychaetes, bivalves, gastropods, and tunicates, as well as plant, algal and detrital material (Grabowski et al. 2000).

Grabowski et al. (2000) calculated an index of reef affinity (association) for fish species and analyzed the relative proportion of stomach contents originating from oyster reef verses non-reef habitats. Results showed:

- Pigfish and pinfish foraged more on reefs (amphipods, bivalves, gastropods and polychaetes).
- The ubiquitous spot foraged on both reef and non-reef habitats.
- Gulf and southern flounder foraged on species slightly more common on reefs.

- Blacktip sharks, spotted seatrout, and bluefish exhibited a feeding preference for oyster reef prey (fish, shrimp and crabs).
- Red drum foraged slightly more off reefs.
- Blacknose sharks rarely foraged on reef habitats.

The growth-enhanced species/groups identified in Peterson et al. (2003) included sheepshead minnow, silversides, pigfish, southern flounder, and black sea bass. These results differ somewhat from those of Grabowski et al. (2000). The discrepancies between Peterson et al. (2003) and Grabowski et al. (2000) could be due to regional differences in fish habitat use, or other unknown factors. Sheepshead also have an affinity for slow or sessile invertebrates found abundantly on shell bottom (Pattilo et al. 1997).

Corridor and Connectivity

Shell bottom serves as a nearshore corridor to other fish habitats, such as salt marsh and SAV for finfish and crustaceans; therefore, it plays a significant ecological role in landscape-level processes (Coen et al. 1999; Micheli and Peterson 1999). Vicinity (isolation) and connectivity of intertidal oyster reefs to other fish habitats, especially SAV, are two factors that affect fish utilization of shell bottom. For example, connectivity of oyster reefs to SAV enhanced blue crab predation, whereas isolation of oyster reefs enhanced hard clam survivorship (Micheli and Peterson 1999). In Middle Marsh, North Carolina, gag, gray snapper, and spottail pinfish preferred shell bottom habitat adjacent to SAV beds (Grabowski et al. 2000), allowing access to both refuge and prey.

3.3. STATUS AND TRENDS

Status of shell bottom habitat

During the colonial period in the mid-Atlantic, oyster reefs grew so extensively that they were considered to be a hazard to navigation (Newell 1988). U.S. Navy Lieutenant Francis Winslow documented the historical distribution of oyster beds in North Carolina in 1886-1887. Winslow (1889) surveyed 1,325,419 acres in 17 areas extending from Croatan and Roanoke sounds west to the lower Pamlico and south to the eastern edge of Bogue Sound, and located 8,328 acres of public and private oyster beds (0.6% of the bottom). Allowing for expansion of oyster beds, Winslow et al. (1889) also located 20,554 acres of "public oyster grounds." In the North River estuary of Carteret County, Winslow (1889) found 243 acres of natural oyster beds, 310 acres of private beds, and about 600 acres of additional public oyster grounds. In the same general area during the 1990s, the DMF Shellfish Habitat and Abundance Mapping Program estimated there were 445 acres of shell bottom. The DMF mapping program includes scattered, individual shellfish and shellfish clusters as shell bottom, while Winslow (1889) only counted shellfish clusters, making comparisons difficult. DMF's Shellfish Mapping data on shellfish cluster abundance are therefore more inclusive than the Winslow data. However, DMF mapping data could be analyzed by shellfish density to approximate changes in abundance.

Other studies suggest that viable oyster beds have been displaced downstream roughly 10-15 miles in the Pungo, Pamlico, and Neuse rivers since the late 1940s (Jones and Sholar 1981; Steel 1991). The DMF's Shellfish Habitat and Abundance Mapping Program has not yet mapped these estuarine systems, as mapping existing shell bottom for protection is prioritized. Current priority for the Shellfish Mapping Program is the lower Neuse River, followed by areas to the north. Because this detailed mapping process is time consuming, *change analysis would need to be limited to a subset of priority areas. Priorities should be based on a combination of functional significance, economic value, and the magnitude of growth and development threatening the area.*

The status of shell bottom can also be evaluated using area-specific oyster harvest and effort data, fishery-independent sampling data, or site-specific studies on reproduction, growth, and recruitment. Based on harvest data, North Carolina oyster stocks were in a state of decline for most of the 20th century (DMF

2001a). North Carolina's oyster landings have generally declined from a peak coinciding with the introduction of the oyster dredge in 1889 to today's low harvest (Figure 3.1). Data on landings by gear type indicate that, between 1887 and 1960, most oysters were harvested by dredge when compared to all hand methods (DMF 2001a). Chestnut (1955) reported that 90% of the oysters landed in North Carolina came from dredging operations in the Pamlico Sound. These harvesting practices were the primary cause of initial degradation and loss of shell bottom habitat in the Pamlico Sound area (DMF 2001a; Jackson et al. 2001).

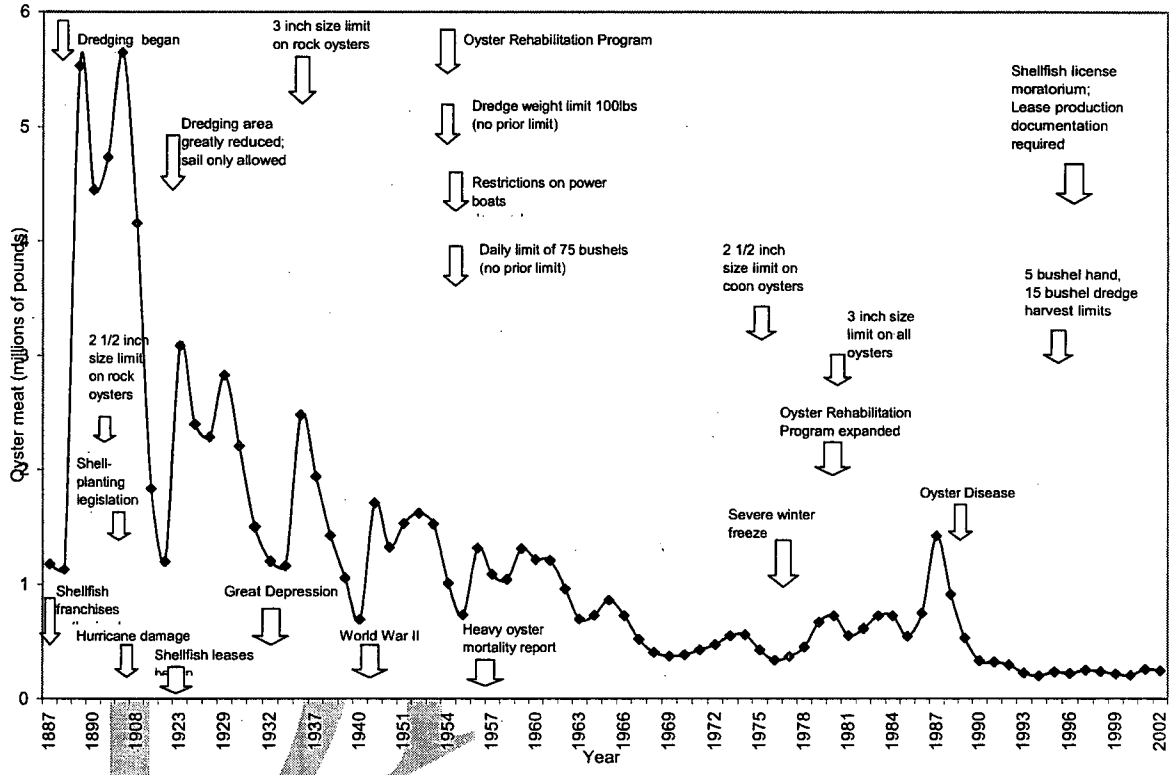


Figure 3.1. Factors affecting the North Carolina oyster fishery 1887-1999. *[Source: DMF 2001a]*

Since 1991, oyster stocks and harvests from Pamlico Sound have collapsed due to high mortalities from disease and low spawning stock biomass (DMF 2001a). Oyster dredges are still used in the fishery in Pamlico Sound and its tributaries, but are not permitted in the southern portion of the state. Since 1994, oyster dredge fishery landings have accounted for only 1% to about 21% of the annual oyster catch. Landings data indicate that, since 1997, oyster harvest has remained fairly constant at around 50 pounds of oyster meat landed per oyster dredging trip, while the number of trips, although generally increasing, has fluctuated between 3 and 943 (Figure 3.2).

Oyster populations in the southern portion of the coast have suffered only moderately from disease and, due to a prohibition on the use of mechanical oyster harvest methods south of Pamlico Sound, these populations have not been impacted by those methods (DMF, unpub. data). The harvest of oysters in this area is primarily limited by availability of open areas, since harvest closures have increased over time due to pollution, fishing effort is high, and oyster beds are easily accessible. In North Carolina coastal waters overall, cumulative and secondary effects from severe disease infestations, coupled with continued

decline in suitable habitat, have seriously impacted oyster stocks.[6]

Average oyster spatfall in the Pamlico Sound area for the 1989–1999 period was less than half the value for the 1979–1988 period (DMF 2001a) (Figure 3.3). Unpublished DMF spatfall data for cultch planting sites over the past 24 years indicate a decline in maximum spatfall relative to similar surveys reported by Chestnut (1955). Some researchers suspect that oysters are becoming spawner-limited, while others attribute the decline to stress and mortality from infectious diseases that affect primarily larger, more fecund (egg-producing) adults (Choi et al. 1994; DMF 2001a; Lenihan et al. 1999), or to physical damage from dredging (Marshall et al. 1999). However, there has been no reported decline in spatfall in the southern coastal area of North Carolina (R. Carpenter, DMF, pers. com., 2002).

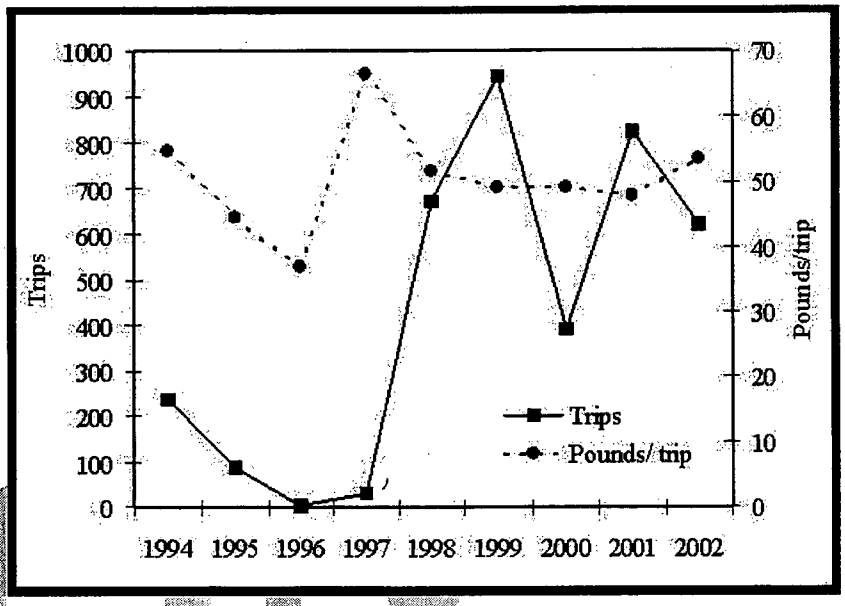


Figure 3.2. Oyster dredge effort by trips in North Carolina and pounds of oyster meat landed per trip during 1994-2000 (DMF, unpub. data).

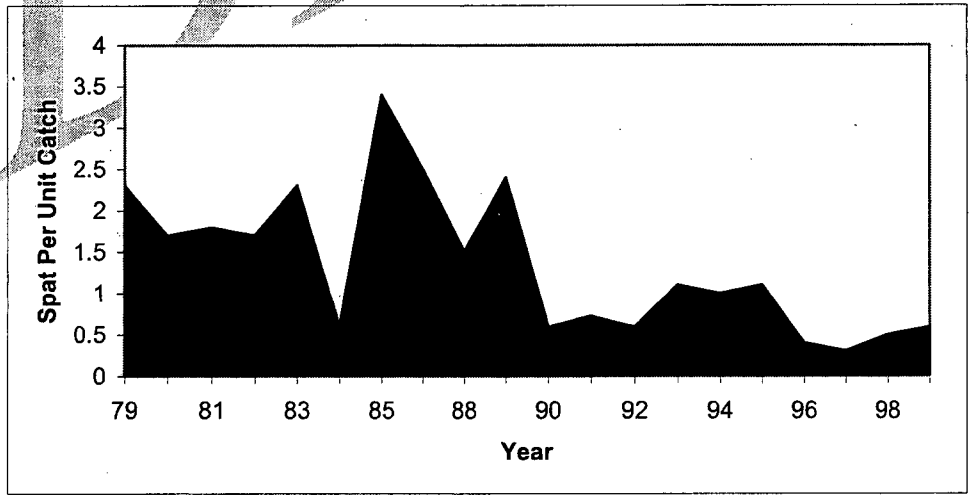


Figure 3.3. Pamlico Sound area average oyster spatfall per unit catch, 1978–1999 (DMF, unpub. data).

[6] Fishing gear and disease impacts are given a more thorough discussion in the Section 3.4 (Threats and Management Needs).

Status of associated fishery stocks

Based on the link between fishery species and shell bottom established in Section 3.2, some inferences can be made using the status and trends of fishery species that are highly dependent on shell bottom habitat (bolded species in Table 3.2). However, utility of the inferences is severely limited because the majority of shell bottom loss occurred before detailed fishery statistics were collected (prior to 1972). Recent fishery statistics provide a benchmark for future analysis, especially trip ticket data collected since 1994.

Of at least twenty-eight species (other than oysters) showing some preference for shell bottom (Table 3.2) habitat, ten species, comprising at least thirteen stocks, were evaluated for fishery status. Of the eleven stocks whose status was known, three were designated Overfished (25%), two were Concern (17%), one was recovering (8%), and five were viable (50%) (Figure 3.4). Specifically, the central-southern stock of striped bass, southern flounder, and sheepshead are classified as Overfished; blue crab and black sea bass south of Cape Hatteras are classified as Concern, and red drum is classified as Recovering (DMF 2003a; SAFMC 2002). Viable species include ocean and Albemarle Sound stocks of striped bass, black sea bass north of Cape Hatteras, spotted seatrout, shrimp, and gag. The stock status of hard clams, stone crabs, black drum and other shell bottom-associated fishery species is unknown.

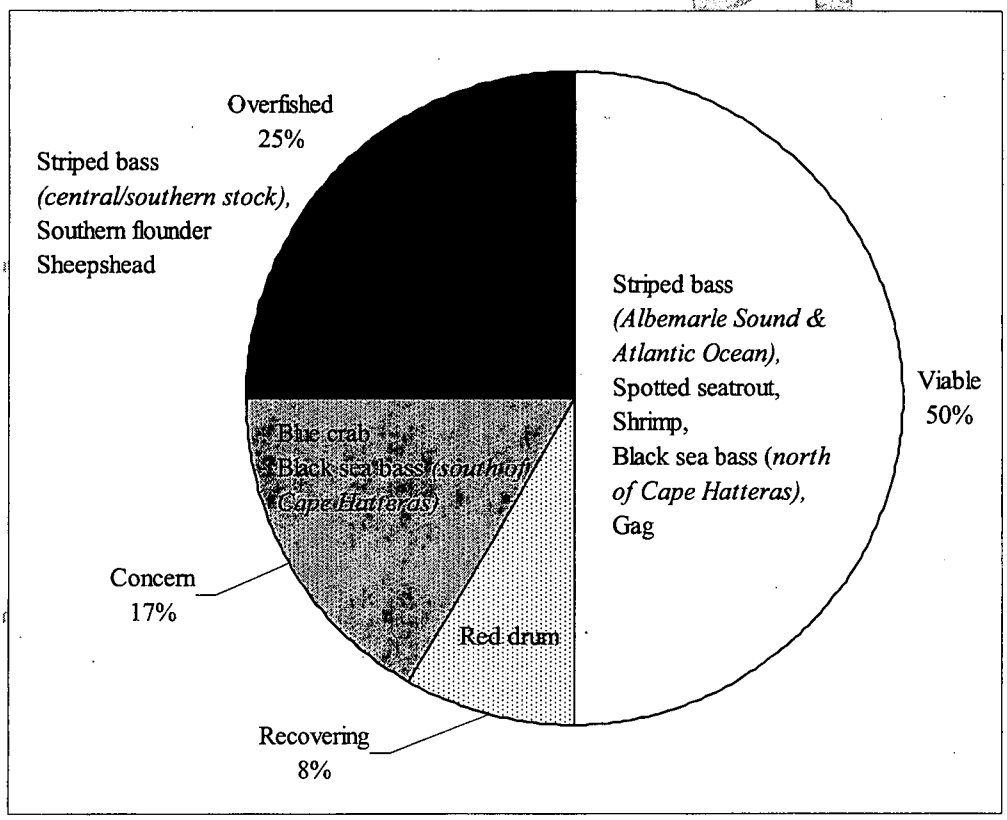


Figure 3.4. Percent of fish stocks showing some preference for shell bottom habitat that were classified as Overfished, Concern, Recovering, or Viable in the 2003 DMF Stock Status Report.

Unviable stock status could be attributed to a variety of causes ranging from habit loss, disease, and overfishing, to annual variation in climatic conditions. Compounding this uncertainty is the fact that

status of shell bottom-associated species, such as hard clams, sheepshead, and black drum, is currently unknown. *More information is needed on the status of hard clams, sheepshead, black drum, and resident non-fishery species (i.e., oyster toadfish) as indicators of shell bottom conditions. Due to the limitations of using fisheries-dependent data (landings data) to indicate stock trends, fisheries independent-data should be collected for these species to develop independent indices.* Status and trends of hard clams are currently being evaluated by DMF. The capacity of shell bottom habitat to affect water quality and overall community structure would probably be the best indicator of status and trends in shell bottom habitat. *However, before this function could be used as an indicator, research is needed on the critical amount and quality of living and dead shell bottom in a water body below which significant changes in biotic community structure occur.*

Shell bottom restoration

State efforts to restore oyster habitat and enhance oyster fishery production began around the turn of the century (Marshall et al. 1999). These efforts relied mostly on planting a variety of natural cultch, including oyster, clam, and scallop shells, and more recently, limestone marl. Experimental oyster cultch plantings began in 1900, and state-sponsored cultch planting began in 1915 (Marshall et al. 1999). Between 1915 and 1934, a total of 1,856,379 bushels of shells and seed oysters were planted in North Carolina's estuaries. The Oyster Rehabilitation Program officially began in 1947 and resulted in planting 838,088 bushels of shell and 350,734 bushels of seed oysters over its first 10 years. Since 1970, North Carolina has relied almost exclusively on cultch planting as a means of enhancing oyster production (Figure 3.5). From 1958 to 1994, 12,475,000 bushels of shell material were planted, for an annual average of 337,162 bushels (Marshall et al. 1999). Over the entire period of cultch planting from 1915-1994, there has been a total of about 15 million bushels of oysters planted in North Carolina waters. This volume of shells would contain the equivalent of 4.5 billion 2-inch oyster shells. Using a minimum 30% area coverage (100 2-inch shells/m^2) as defining shell bottom, the volume of shell cultch planted from 1915-1994 could cover as much as 11,120 acres (45,000,000 m^2). However, this is an overestimate of actual shell bottom area gained, because the shell plantings consist of piles of variable thickness rather than a single uniform layer. Also, many of the cultch areas are replanted due to flattening by waves and/or commercial harvesting. Despite these planting efforts, the oyster harvest continued to decline (Marshall et al. 1999).

Similar to natural shell bottom, restored oyster reefs provide bottom habitat for economically important species (Lenihan et al. 1998; Breitburg 1998; Coen et al. 1999; Harding and Mann 1999; Grabowski et al. 2000; Lenihan et al. 2001; Peterson et al. 2003). Recent studies have examined the habitat value of constructed oyster reefs compared to natural oyster reefs. The researchers found that landscape characteristics seemed to influence fish species' relative abundance (i.e., connectivity with SAV and/or salt marsh). Fish abundance was significantly greater on restored oyster reefs adjacent to SAV than on mud flat and/or salt marsh restored reefs (Grabowski et al. 2000). Restored intertidal oyster reefs produced significantly more economically valuable oysters ($95.68/10 m^2) than estimates of oyster production on subtidal reefs ($11.61/10 m^2). The value of legal oysters present on mud flat reefs ($129.38/10 m^2) exceeded that for oysters on salt marsh ($50.50/10 m^2) or SAV restored reefs ($24.25/10 m^2). They estimated that the long-term value of commercial fisheries landings from restored reefs was greater than the oyster harvest for both intertidal and subtidal shell bottoms.

The habitat benefits of cultch plantings may only be limited or temporary if the shell bottom is removed or damaged by towed fishing gears or other harvesting gears (Marshall et al. 1999). Cultch plantings in the southern areas (Onslow, Pender and New Hanover counties) are frequently replanted after harvesting to replenish cultch material for recruitment (Marshall et al. 1999). It generally takes about 3-4 years before oysters on planted sites reach harvestable size in the Pamlico Sound system, while oysters reach the minimum legal size of 3 inches in about two years in the southern coastal area. Faster growth in this area is due to higher rates of water exchange caused by greater tidal flow than in most of Pamlico Sound. The increased flow brings in more food and prevents oxygen depletion problems.

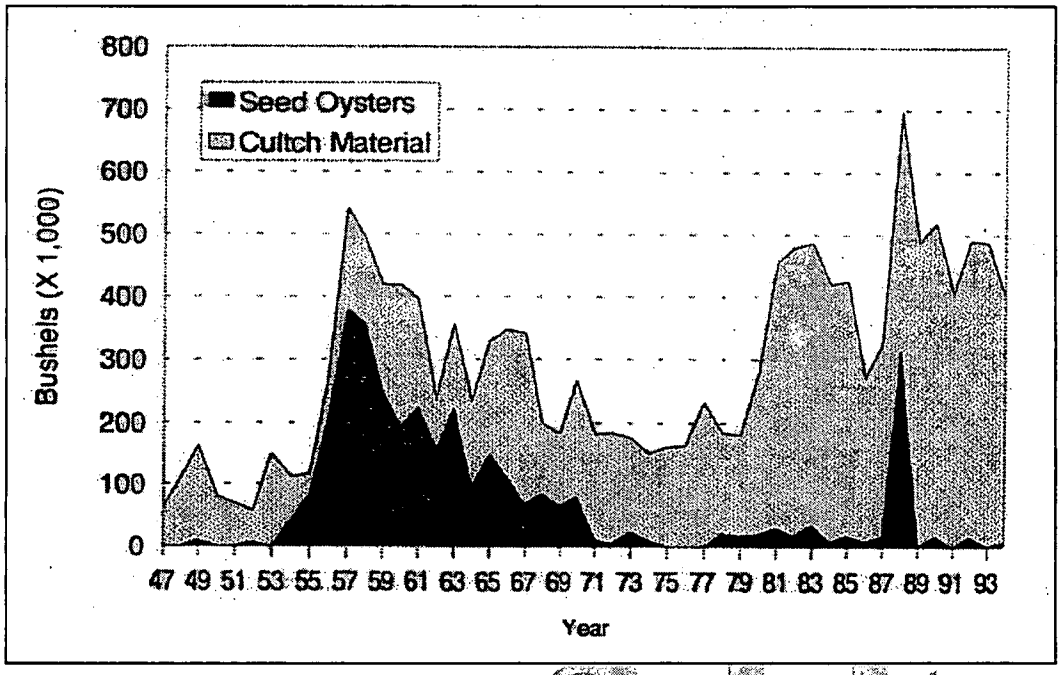


Figure 3.5. North Carolina oyster rehabilitation activities for 1947 – 1994. (from Marshall et al. 1999. The peak in 1988 was due to special state disaster funding during the red tide of 1987-88. Data are stacked to show cumulative total.)

The majority of cultch planting sites during 1990-1994 were in Pamlico Sound, lower Neuse River and lower Pamlico River (Marshall et al. 1999). The same general areas were also planted in 2001 and 2002 (Maps 3.4a-b). Most of the recent (2001-2002) oyster restoration effort has been conducted in large bays around Pamlico Sound and in smaller tributaries of other estuaries (Maps 3.4a-b). The majority of these sites are "new" plantings on basically barren sediment (Marshall et al. 1999). Criteria for site selection include suitable sediment types, currents, protection from storm damage, historical productivity, salinity patterns, and existing shellfish concentrations. The presence of bottom disturbing fisheries, such as trawling, hydraulic clamming, and long haul seining is also considered. Recommended sites for cultch plantings are often narrow bands of mixed sand and mud sediment between shallow, hard, nearshore sediment and soft offshore sediment. In deep water, large oyster mounds are constructed to increase recruitment and reduce effects of low oxygen on the bottom. The planting sites are monitored for oyster recruitment and survival over a period of three years (DMF 2001a). Using vessels currently in operation, cultch can be planted in water as shallow as two feet (Marshall et al. 1999). Since the early 1980s, the DMF has concentrated primarily on cultch plantings and small-scale, high quality seed transplanting activities, also referred to as the "relay program." In the relay program, oysters are removed from dense oyster populations in prohibited areas and relocated to open harvest areas with depleted resources. The Relay Program is very small and concentrated in the south, where there is very little effect on the seed source areas (M. Street, DMF, pers. com., 2003).

The primary purpose of the DMF cultch-planting program since it began has been oyster fishery enhancement. The DMF enhancement efforts have also been directed at providing stable long-term oyster habitat because research in recent years shows that oyster reefs have important ecological and economic value as coastal fisheries habitat. This broadening of focus for the protection/restoration program has occurred since the late 1990s. As of 2001, there were five constructed/artificial reef sanctuaries in North Carolina located in Bogue Sound, West Bay (Tump Island), Deep Cove (Swan

Quarter), Croatan Sound, and behind Hatteras Village (DMF 2001a). Work is currently underway to enhance several existing restoration sites and create additional sites. These areas are no-take, no-disturbance sanctuaries (C. Hardy, DMF, pers. com., 2002). In other states, sanctuaries are a major component of restoration efforts (CBP 2000). *Creation of additional "no take" subtidal oyster sanctuaries has been recommended by Frankenberg (1995), the Chesapeake Research Consortium (1999), and Lenihan et al. (1998).*

There are multiple ecological benefits of constructed and natural oyster sanctuaries, including the following (Breitburg et al. 2000):

- Protection of brood stock,
- Enhancement of oyster populations in surrounding harvested areas through larval dispersion,
- Protection of disease-resistant oysters, improving the genetic pool for disease resistance, and
- Protection of associated fisheries and other organisms from predation through development and maintenance of maximum vertical relief and structural complexity.

The first true oyster reef restoration project in North Carolina occurred in 1992-1993 when 13 acres of oyster producing habitat were created as mitigation for the loss of 16 acres of estuarine bottoms and 1.5 acres of wetlands in Roanoke Sound (Marshall et al. 1999). The DMF is monitoring the site as part of a mitigation agreement with the U.S. Army Corps of Engineers (COE). More recently, the DMF has performed mitigation projects for the North Carolina Department of Transportation, and additional projects creating more than 70 acres of shell bottom are planned with the COE (Marshall et al. 1999). Research is continuing on how to better construct these sites to provide effective oyster habitat. *However, in the Pamlico Sound region where spatfall continues to decline (Marshall et al. 1999), more planting and longer protection of sites may be required to achieve the same results as previous restoration efforts. Restoration efforts must use knowledge of larval availability in order to be most effective.* In southern waters, the amount of shell habitat is generally stable, but the amount of harvestable area is decreasing as closures increase because of contamination from storm water runoff (R. Carpenter, DMF, pers. com., 2002).

Restoration of shell bottom is also undertaken by non-profit groups. One such project has been initiated in Pamlico Sound by The Nature Conservancy, in cooperation with NOAA's Community-Based Restoration Program and several partners. The goal of the Project is to enhance the biological diversity of Pamlico Sound by establishing a self-sustaining complex of living oyster reefs throughout the estuary. The Conservancy has enlisted the cooperation of marine scientists to ensure the most up-to-date techniques for siting, construction, and management are used. Some criteria for site selection include depth, salinity, shellfishing-prohibited status, disease-resistant salinities, reef footprints, presence of larvae, and proximity to SAV, salt marsh, fish nursery areas, or Military Protected Areas. States and territories containing anadromous, estuarine, and marine species are eligible to compete for Community-Based Restoration grants typically ranging from $25,000 to $75,000.[7] *As the number of oyster restoration projects grows, the need for an overall strategy for shell bottom restoration also increases.*

Any expansions of the current restoration/enhancement effort will require additional sources and funding for oyster cultch or limestone marl. Funding for the acquisition of cultch material was drastically cut in DMF's 1990 budget. As a result, the DMF currently has more planting capability than available cultch material. *Funding for acquisition of cultch material must be increased to more efficiently use the existing planting capabilities of DMF.* The DMF began a voluntary shell-recycling program in 2004 using local coordinators to collect discarded shells from individuals and businesses. The shells are later transferred to stockpile facilities before being planted in new or expanding oyster sanctuaries. The amount of cultch volunteered could somewhat offset the amount of funding needed for additional cultch material.

[7] For information on guidelines and requirements for the grants, visit <http://www.conserveonline.org>, or the NOAA Fisheries Restoration Center at <http://www.nmfs.noaa.gov/habitat/restoration>.

However, the amount of cultch volunteered is probably secondary to the public awareness gained from a shell-recycling program.

3.4. THREATS AND MANAGEMENT NEEDS

Although shell bottom consists of both living and non-living shell material, annual recruitment of live shellfish is needed to sustain the supply of shell material and three-dimensional structure of oyster reefs. Therefore, any activities that directly remove or destroy live shellfish, or indirectly prevent or slow growth and survival, are threats to shell bottom habitat. Mollusks that contribute shell material include oysters, hard clams, bay scallops, as well as many non-fishery species. Since oysters are the dominant contributor to shell bottom, the threats discussed below focus primarily on oyster reefs.

Physical threats

Mobile bottom disturbing fishing gear

Mechanical fishing gear includes any gear that is towed or run by engine power including dredges, hydraulic clam dredges, clam kicker, bottom trawls, or patent tongs. Over-harvesting and habitat destruction from oyster dredging was the initial cause for the large-scale decline in oyster resources from approximately the late 1800s to the mid-1900s, particularly in the northern portion of North Carolina. Although other factors had contributed to the decline in the oyster fishery, tonging and dredging had the greatest impact on the physical structure of the reefs (Hargis and Haven 1988; Rothschild et al. 1994). One full season of oyster dredge harvesting effort reduced the mean height of restored subtidal oyster reefs by 30% (DeAlteris et al. 1999; Lenihan and Peterson 1998). Because of this high removal rate, DMF has added shell to heavily fished subtidal areas approximately every 3 to 4 years to maintain the fishery (Frankenberg 1995).

Oyster dredges reduce the vertical relief of subtidal oyster reefs resulting in several negative habitat impacts (Lenihan and Peterson 1998; Lenihan et al. 1999):

- Scattering of shell and oysters into less suitable substrates.
- Destabilization of the reef structure, which increases vulnerability to damage by future storms.
- Removal of live and dead oysters and portions of the upper layers of the shell which:
  - Decreases potential number of spawning adults (spawning stock biomass).
  - Decreases area available for settlement by oyster larvae.
  - Subjects newly settled oysters to lower oxygen and increased sediment due to lower depth in water column.
- Reduction in the small spaces within the oyster reef that function as refuge and foraging areas for juvenile fish.
- Decreased resistance to disease [8].

Between the 1970s-1990s, the negative impact of the oyster dredge on shell habitat was recognized, and areas were designated where all mechanical methods for shellfish harvest were prohibited (Maps 3.5a-c). These mechanical methods include towed dredges, hydraulic dredges, patent tongs, rakes powered by engine, and clam trawling ("kicking" clams with vessel propellers so they are caught in a small trawl).

Trawling and dredging, and all mechanical shellfish harvest methods are prohibited in MFC designated Primary Nursery Areas (PNAs), and trawling is prohibited in permanent Secondary Nursery Areas and Shellfish Management Areas [MFC rules 15A NCAC 03N .0104 and .0105, 03J .0103], protecting shell bottom in these shallow water areas. The rules defining nursery areas has been in effect since 1977. Maps 3.5a-c depict the areas where trawling and dredging are not allowed by MFC rules (including PNAs, mechanical harvest prohibited areas, SAV beds). However, trawling over bottom in tributaries of

[8] see discussion under "Disease"

Pamlico Sound, where productive oyster beds once existed, continues, possibly preventing oysters from reestablishing in part of their historic range (Frankenberg 1995). *Construction of oyster sanctuaries in locations of historic abundance and restriction of trawling over restored shell bottom is necessary to restore shell bottom in these northern subtidal areas.* There are also areas where trawling is prohibited, but oyster dredging is not. *Oyster dredging in these areas should also be prohibited.*

Use of oyster dredges has been severely limited by the MFC in recent years due to habitat impacts. However, the historic subtidal oyster beds have not recovered (Lenihan and Peterson 1998). Degraded water quality, partially due to reduced filtering by oysters after stocks were greatly reduced, and increased disease occurrence from environmental stress is thought to have prevented full recovery (Jackson et al. 2001; Lenihan and Micheli 2000). Approximately 222,224 acres of shellfish bottom in the Neuse, Pamlico, Tar-Pamlico, and Albemarle MUs are open to oyster dredging at least temporarily. Forty-five percent of this area is within the Pamlico Sound MU. Oyster dredging is prohibited in the southern portion of the state's estuarine waters because the majority of shell bottom resources south of Pamlico Sound are intertidal.

Considering the average number of oyster dredge trips reported from 1994 through 2000, there has been approximately 1 trip/year for every 380 acres of the shellfish mapping study area open to dredging. The total amount of damage to shell bottom depends on the effect of each trip and the relative amount of shell bottom within the mapping area. *One of the recommendations of the North Carolina Oyster Management Plan is the adoption of criteria to designate additional areas where mechanical harvest methods are prohibited (DMF 2001a).* The new additions are intended to protect shellfish beds in potential hand harvest areas.

Trawling for shrimp, crabs, and finfish, and long haul seining and dredging for crabs have similar types of habitat impacts as oyster dredges, but at reduced levels of disturbance (DMF 2001a). The weight and movement of trawl doors or chain towed across the seafloor can disrupt the structure of the oyster mound, removing the upper layers of shells or scattering oysters (DMF 2001a). Long haul seines dragged through shell bottom can also damage oyster mound structures by entangling, uprooting, and scattering shell. Frankenberg (1995) studied the state of the oyster fishery and concluded that, because of its intensity, trawling had a significant negative impact on live shell bottom habitat. Illegal trawling in prohibited areas can also be a problem, and the penalties for getting caught are minimal. *Stronger penalties are needed for trawling over oyster rocks, where prohibited by the MFC.*

There are approximately 16,000 trips annually with these gears, primarily (>70%) shrimp trawling (DMF, unpub. data). About 75% of the trips occur in estuarine waters, and the rest are mainly within the Territorial Sea. Virtually all shrimp and crab trawling occurs on sand/mud bottoms. Shell bottom is protected from bottom trawling in trawl net prohibited areas [MFC rule 15A NCAC 3J .0104]. Furthermore, it is illegal to use trawls on shell bottom designated as Shellfish/Seed Management Areas [MFC rule 15A NCAC 03K .0103(b)]. These areas are designated by proclamation and must be marked with signs or buoys. The DMF lacks the resources to mark, maintain, and enforce restrictions on all shell bottoms. *Additional marking of productive shell bottom would provide increased protection of this habitat from destructive fishing gears. However, additional law enforcement resources are necessary to mark and enforce increased closed areas.*

Hand harvest

The harvest of clams or oysters by tonging or raking on intertidal oyster beds causes damage to not only living oysters but also the cohesive shell structure of the reef (Lenihan and Peterson 1998). This destruction has been an issue where oysters and hard clams co-exist, primarily around the inlets in the northern part of the state and on intertidal oyster beds in the south (DMF 2001a). Studies by Lenihan and Micheli (2000) and Noble (1996) quantified the effects of oyster and clam harvest on oyster rocks. The former study found that the density of live adult oysters was significantly reduced where clam harvesting

occurred. Mortality was attributed to oysters being cracked or punctured and subsequently dying or being eaten by predators, or by being smothered beneath sediments associated with clam digging. Conversely, oyster harvesting had little effect on clam populations. DMF conducted field investigations of the status of oyster rocks in Ward Creek, Carteret County, to assess the destruction of oyster rocks by individuals taking clams by legal hand harvest methods (Noble 1996). The 1995 survey determined that the oyster rocks had been impacted and, subsequently, the affected portion of Ward Creek was designated a shellfish management area and was temporarily closed to clamming from December 1995 to March 1996. Oysters could only be harvested by hand in the Ward Creek shellfish management area during the 1995–1996 oyster season. Based on visual inspection and field sampling in 1996, the structural integrity and oyster abundance on six of the eight oyster rocks surveyed was good and, in most cases, had improved following the implementation of the shellfish management area restrictions. Because the restrictions were successful in curbing the destruction and deterioration of Ward Creek oyster rocks, it was recommended that the shellfish management area designation be continued to protect oyster rock habitat in Ward Creek. The investigators concluded that by preventing the destruction of oyster rocks, optimum substrate for oyster-spat settlement and critical habitat for other estuarine species would be preserved.

The MFC has recognized that clamming can have a negative impact on oyster habitat and has adopted rules that prohibit the harvest of clams on posted oyster beds and restrict the areas and gear that can be used to take clams and oysters (DMF 2001a). The posting of all natural oyster beds has never been attempted, because of the large number of areas that would have to be posted and the lack of sufficient resources and enforcement to keep them marked. The DMF has designated some areas as Shellfish Management Areas where enhancement activities are conducted (shell is added and/or oysters are transplanted), and clamming is restricted or prohibited. Existing Shellfish Management Areas, about 752 acres of shell bottom, are shown in Map 3.4a-b. *Creation of additional Shellfish Management Areas would reduce habitat damage and enhance spatfall of oysters and clams in areas where hand-harvesting activity is intense. More enforcement would also be needed to enforce the restrictions associated with Shellfish Management Areas.*

Water-dependent development

Water-dependent development includes any permanent, man-made structures that are designed for access to the water (Kelty and Bliven 2003). These include marinas, docks, piers, and bulkheads. Although the construction of water-dependent structures may actually increase substrate for oysters, activities associated with water-dependent development can harm shell bottom. Dredging of channels for navigational purposes can remove, damage, or degrade existing shell bottom. Dredging creates turbidity that can clog oyster gills or cover the oysters completely. Even low levels of siltation affect growth of oyster beds by reducing larvae attachment. Although there are no major new channels being constructed at this time in North Carolina's estuarine waters, maintenance dredging, construction of new marinas and docking facilities, and new dredging for deep water access continue to be potential problems. Primary Nursery Areas are currently protected from dredging projects for deep-water access. However, there are other areas with shallow oyster beds that are not protected from such dredging. Oyster beds in closed shellfishing waters are particularly vulnerable to loss and degradation from marina dredging. *These areas should be evaluated for protection as Strategic Habitat Areas.*

Turbidity and siltation over shell bottom can also occur from increased boating activity near the marina or dock. Boats running in shallow water cause resuspension of fine sediments, which is similar to the effect of dredging on nearby oyster beds. However, the impact of both dredging and boating activity on oysters has been difficult to quantify (Kelty and Bliven 2003). Current (January 2003) CRC marina siting rules discourage significant degradation of existing shellfish resources [CRC rule 15A NCAC 07H .0208]. Marina siting data collected by DCM during 1994-1995 indicate that 44% of the 182 coastal marinas adjacent to mapped bottom areas were located within 100 m (328 ft) of shell bottom (DCM, unpub. data), indicating the potential for shell bottom to be affected by marina-related activities.

Marinas can also negatively impact shell bottom through water quality degradation due to increased runoff and erosion from adjacent developed areas and discharges from boats.[9] Due to the potential for physical and water quality impacts, a variety of rules apply to development of new marinas. The DCM is responsible for permitting marinas under the CAMA. The CAMA permitting process requires coordination with DEH, DMF, DWQ, and other state and federal agencies. If the marina is located in waters that would be classified as shellfishing waters (SA) by the EMC, then a review of the status of the waters is required. If the waters are currently classified as open to shellfishing, then DWQ would recommend denying the permit to protect the designated use of those waters. However, if the waters are closed to shellfishing or not classified as SA, then the marina may be allowed. This policy can unintentionally result in degraded areas being targeted for additional development and further degradation, rather than restoration. *A variety of working groups have recommended the development of a coastal marina policy that encompasses all associated regulatory activities conducted within the DENR (NC Coastal Futures Committee 1994, Waite et al. 1994). Development of this policy continues to be a management need.*

Scouring of the bottom by frequent boat traffic associated with dock concentrations can have an effect similar to dredging. Unlike marinas, individual docks and piers can be built in open shellfish waters. Dock proliferation in coastal waters is a growing concern for resource managers. Concerns raised at a NOAA workshop regarding environmental impacts of boating associated with small docks and piers included erosion of marsh edge and tidal flats, and resuspension of sediment and resulting turbidity (Kelty and Bliven 2003). The workshop participants agreed that boating traffic associated with docks is far from a benign influence on aquatic and marine environments. *Evaluation of the impact of dock-associated boating on shell bottom habitat is therefore a research need. Prohibiting construction of docks or replacement of severely damaged docks (>50%) in documented shellfish beds may be required to minimize degradation and loss of habitat.*

Water quality degradation

Sediment

In addition to direct physical damage to the shell mound structure, bottom disturbing fishing gear, including hydraulic clam dredges, clam trawls (kickers), and shrimp and crab trawls can impact oyster reefs indirectly by re-suspending sediment. As sediment disperses away from the disturbance and settles to the bottom, it can bury oyster larvae, adults, or shell, deterring successful recruitment of larvae due to lack of an exposed hard substrate (Coen et al. 1999). Excessive sedimentation can also harm shellfish by clogging gills, increasing survival time of pathogenic bacteria, or increasing ingestion of non-food particles (SAFMC 1998a). Oyster eggs and larvae are most sensitive to suspended sediment loading (Davis and Hidu 1969a). Sediment was listed by DWQ as a problem parameter for 964 miles of North Carolina waterways in 125 water bodies, including 25 water bodies in the Cape Fear River basin, 18 in the Neuse River basin, and 11 in the Tar- Pamlico River basin in 1998-1999 (DWQ 2000a). All of these river basins contain shell bottom habitat.

There are many other sources of human-induced turbidity and sediment pollution. Any activity that involves clearing of vegetation, grading, and ditching of land can potentially increase erosion and sediment loading in stormwater runoff. These activities include, but are not limited to, construction of residential, commercial, or transportation structures; forestry planting, grading, or harvesting; and agricultural activities. Increased sedimentation in headwaters from upland development has caused environmental stress and possibly some mortality to upstream oyster stocks (Ulanowicz and Tuttle 1992; Mallin et al. 1998). There is anecdotal evidence that sedimentation from upstream development (primarily road construction) has silted over numerous oyster beds in trunk estuaries such as the Newport River, where Cross Rock (a large oyster rock) has been buried under 1-2 feet of soft sediment (P. Pate,

[9] Water quality impacts are discussed under "Water quality degradation."

DMF, pers. com., 2004; C. Peterson, UNC-CH, pers. com., 2004). *Improved voluntary and regulatory land use strategies must be implemented to reduce nonpoint source pollution in coastal waters and subsequent habitat degradation. Mitigation should be required from upstream development projects that result in habitat loss downstream.* Shoreline erosion increases the amount of sediment transported into the estuarine system. While bulkheads can retain some upland sediment, such structures can increase erosion at the base of and downstream from the hardened structures, causing chronic increased turbidity in those areas.[10]

Sediment in excessive amounts is also a problem because it transports fecal coliform in stormwater further downstream and allows the bacteria to persist longer in the water column than such bacteria would live in clear waters (Schueler 1999). While fecal coliform bacteria do not affect the viability of oysters, pathogenic bacteria can make oysters unfit for human consumption. Sediment was the largest cause of water quality degradation in the Albemarle-Pamlico estuarine area (DEM 1989).

The North Carolina Division of Forest Resources (DFR) developed Forest Practice Guidelines and Best Management Practices (BMPs) related to water quality in 1989 to minimize water quality degradation from silvicultural practices. To remain exempt from the requirements associated with the Sedimentation Pollution Control Act, timber-harvesting activities must follow certain performance standards, including establishment of Streamside Management Zones (SMZ). These zones are areas covered with vegetation on both sides of natural intermittent and perennial streams, rivers, ponds, and other water bodies where extra precautions are used during forestry operations to protect stream banks and water quality. In low slope areas (0-5%), the minimum recommended SMZ is 50 feet. Along steeply sloping shorelines of public water supplies, the recommended SMZ is 200 feet [Forest Practice Guidelines Related to Water Quality; EMC rule 15A NCAC 01I .0201-.0209]. Roads are to be placed outside of the SMZ, and harvesting is limited so that the vegetation will trap and filter sediment and other pollutants before reaching the stream, maintain water quality, and provide riparian habitat and shade for fish.

In 1995, the DFR conducted a statewide survey of forestry BMP implementation and compliance. The results found overall compliance was 92% (Henson 1995). The lowest level of BMP compliance was on small non-industrial private forests. Compliance was significantly greater on sites having a professional forester involved with the operation. Although there was very high compliance with having a SMZ, some zones did not have adequate buffer widths, nor tree and/or ground cover, and thus, were not effective. The Division of Forest Resources inspects about 50% of all harvested sites for compliance with Forest Practice Guidelines Related to Water Quality (FPGs) (<http://www.dfr.state.nc.us/water_quality/wq_2000fpgreport.htm>, June 2004). The DFR assert that complaints and observations of harvest operations catch the majority of violators. In FY 1998-1999, the compliance rate statewide for all sites inspected was 95.5%. Of those 4.5% that were out of compliance, the vast majority were brought into compliance. The remainder were referred to the appropriate agency for enforcement action. *Requiring professional foresters to be involved with the implementation of logging BMPs, even on small private forests, would enhance proper use of BMPs. In addition, notifying the Division of Forest Resources prior to initiating logging operations would facilitate BMP inspections and, hopefully, improve overall compliance. Educating owners of small non-industrial forests would also improve BMP implementation and success.*

Nutrients

Increased nutrient loading can indirectly damage live shell bottom by increasing the occurrence of plankton blooms and low oxygen events. Research indicates that the spatial occurrence and frequency of eutrophication in coastal waters has increased (Paerl et al. 1995). Increasing eutrophication, in turn, has caused the frequency, duration, and spatial scale of low or no oxygen events (hypoxia and anoxia, respectively) to intensify over time in many estuaries (Lenihan and Peterson 1998). Prolonged periods of

[10] The Water Column chapter contains a more thorough discussion of sedimentation and turbidity.

low oxygen conditions in the water column can cause mass mortality of fishery-disturbed oyster beds or the non-mobile organisms attached to them. Dissolved oxygen concentrations less than 2 mg/l are fatal to sessile biota and stressful to most motile finfish and shellfish species (Paerl et al. 2001; Sparks et al. 1958; Funderburk et al. 1991). Low dissolved oxygen can occur naturally when the water column becomes stratified (not wind mixed) and biological processes deplete oxygen.

In the Neuse River estuary in 1993, Lenihan and Peterson (1998) found that protracted hypoxia/anoxia caused mass mortality of oysters, other invertebrates, and fishes on a low profile oyster reef at all water depths greater than 5 m. Occupancy of crab burrows on an oyster reef decreased from 100% at all depths prior to hypoxia to 0% at 6 m from the water's surface, 75% at 4 m, and 80% at 3 m immediately after a hypoxic event. Mobile invertebrates such as mud crabs (*Panopeus herbstii*) avoided oxygen depletion by moving upward on the reef where possible. As the frequency of hypoxic events increases, food availability for species that forage on oyster reefs, such as red drum, weakfish, summer flounder, spot, Atlantic croaker, striped bass, and black sea bass will decrease, particularly in deeper habitats and where oyster reef height has been reduced by fishing efforts.

Data have shown that eutrophication, as indicated by nutrient concentrations and high chlorophyll *a* concentrations, is a concern in North Carolina coastal waters. According to the DWQ 305(b) report (DWQ 2000a), there are approximately 35,410 acres of waters impaired by excessive chlorophyll *a* levels. In an EPA sponsored four-year study in North Carolina, low dissolved oxygen (DO) (potentially related to eutrophication) and low infaunal communities within shellfish waters were most frequently reported in Pamlico River and the lower portion of Neuse River (Hackney et al. 1998). One site in Alligator Bay and another at the mouth of Cape Fear River also had moderate contamination and low DO.

There are multiple sources and activities that contribute to excessive nutrient loading of surface waters, including fertilizer use, discharge of animal and human waste, filling of wetlands, loss of riparian buffers, increased stormwater runoff from developed areas, ditching and channelization, and atmospheric nitrogen deposition from animal operations, internal combustion engines, and industrial burning (Paerl et al. 1995; Cooper and Brush 1991). Catastrophic weather events, such as hurricanes, can also greatly increase delivery of nutrients to coastal waters. The Neuse and Tar rivers carried the equivalent of over half their normal nitrogen and phosphorus loads during one month of flooding following Hurricane Floyd during September–October 1999 (Bales et al. 2000). High volumes of floodwater discharge following the hurricanes and other tropical storms in North Carolina in the 1990s resulted in large-scale events of hypoxia in estuarine waters. In the estuaries of the Cape Fear River, hypoxia (0–2 mg/L) persisted for several weeks following Hurricane Fran and Bertha in 1996 (Mallin et al. 1999b).

Similarly, bottom water hypoxia, followed by increased algal blooms and fish disease, occurred in Pamlico Sound following Hurricanes Dennis, Floyd, and Irene in 1999 (Paerl et al. 2001). Salinity and light penetration also decreased temporarily in both areas. These effects often occur naturally following hurricanes because of the large quantities of swamp water flooding and heavy precipitation. However, environmental damage was considerably increased due to failure of municipal and private waste treatment systems and subsequent sewage diversions into rivers, as well as breaching, overtopping, or flooding of swine waste lagoons by river water, allowing large quantities of swine waste to enter coastal waters (Mallin et al. 1999b). *Nitrogen, phosphorus and sediment loading from waste treatment facilities, animal operations and other sources must be reduced upstream of shell bottom habitat to minimize mortality to shellfish and associated organisms. Construction of high profile oyster reefs in deeper waters is needed to serve as refuge areas during low oxygen events.*

Several initiatives have already been taken to reduce nutrient levels in some areas of the coast. The EMC has designated several coastal river basins as "Nutrient Sensitive Waters," requiring removal of wastewater discharges and other management actions to reduce nutrient inputs (Maps 2.2a-b). The EMC initiated a 50-ft streamside buffer and mandated a 30% reduction in nitrogen loading in the Neuse and

Tar-Pamlico river basins. Several mitigation and restoration projects have been constructed in these river basins, as well. A 12.4 acre tidal wetland was constructed at a large row crop farm in 1999 adjacent to the South River. This stream drains to the lower Neuse River in the vicinity of past algal blooms, anoxia and hypoxia events, and fish kills. Results from 2000 and 2001 indicate that the wetland area effectively reduced nitrogen in runoff by approximately 30% (Poe et al. 2002). *Efforts in wetland restoration, shoreline conservation (vegetative buffers, setbacks), and stormwater management should be a priority in watersheds draining to shell bottom habitat, particularly where oxygen and nutrient problems have been documented. Nutrient loading from point sources must also be reduced through increased inspections and maintenance of sewage treatment facilities, collection infrastructure, and on-site wastewater systems. In systems with an abundance of "black waters" (or swamp water), such as the lower Cape Fear River, investigations should focus on separating nutrient impacts on DO from impacts due to inflow of low DO swamp waters.*[11]

Toxic chemicals

Toxic chemicals can enter estuarine waters and accumulate in the sediment or in filter-feeding shellfish at concentrations that are reported to cause biological effects to oysters and other organisms. Under some conditions, such as spills, toxic chemicals may occur in acutely toxic concentrations. Heavy metals, petroleum products, chlorinated hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), and pesticides (organophosphates) can enter estuarine waters from stormwater runoff in developed areas (Dauer et al. 2000; Williamson and Morrisey 2000). Heavy metals and PAHs may be of particular concern with regard to oyster resources due to bioaccumulation and human health concerns (Sanger and Holland 2002).

Oyster embryos and larvae are more sensitive to toxic chemical effects than adults and juveniles, which are generally more tolerant of contaminants than other estuarine species (Funderburk et al. 1991). Oyster larvae are very sensitive to mercury and silver, and moderately sensitive to copper and zinc. Oyster larvae are relatively insensitive to other heavy metals and most of the pesticides tested (Funderburk et al. 1991). The substances having the most chronic effect on oysters include tributyltin, a few heavy metals, and petroleum hydrocarbons. For acute toxicity and sublethal effects on juvenile oysters, chlorinated pesticides and PCB (Arochlor 1016) are thought to be most damaging. Acute toxicity and chronic or sublethal effects of certain toxic chemicals to oysters and clams, as well as the current North Carolina saltwater surface water quality standards [EMC rule15A NCAC 02B .0200], are listed in Table 3.3. In most cases, existing surface water quality standards are sufficiently stringent to protect these species. There are a couple of pesticides listed in the table for which there is no standard. However, EMC rule 15A NCAC 02B .0208 allows for the calculation of criteria to prevent chronic toxicity due to any toxicant not listed in the rules.

Several studies have documented the effects of toxins associated with marinas on the estuarine environment (Wendt et al. 1990; Sanger and Holland 2002; Steel 1991). Heavy metals and PAHs can cause acute toxicity (mortality) and sublethal stress on oysters (all life stages) and other benthos and fish prey organisms. These toxic chemicals can inhibit reproductive development, release of gametes, fertilization, larval development, and growth of juvenile oysters.

The primary biological effect on oysters from marinas examined in South Carolina was a significant reduction in the density of recruited oyster spat at the marina sites compared to control sites (Wendt et al. 1990). No effect was observed on reproduction (reproductive cycle and gonadal index) or the condition of adult oysters. Three PAHs were detected in marina sediments at concentrations known to be carcinogenic. During the summer months, with increased activity at the marina, several PAHs were detected in oyster tissue at greater levels than occurred at control sites. Copper concentrations in oysters were considerably higher at the marina than at control sites. Other data from South Carolina showed concentrations of copper and zinc in oysters were elevated above statewide averages around a large

[11] See the Water Column chapter for more information on water quality degradation affecting shell bottom.

shipyard and boat repair complex (SC DHEC 1987).

Table 3.3. Comparison of acute toxicity and chronic or sublethal toxicity (µg/l) for oyster and clams with North Carolina's saltwater surface water quality standards of the North Carolina.

Contaminant	Eastern oyster (µg/l)[1]		Hard clam (µg/l)[1]		N.C. surface saltwater standards
	Acute	Chronic	Acute	Chronic	(ug/L)
Aldrin (insecticide)	15	0.1	-	202.5	0.003
Arsenic (metaloid)	7500	-	-	-	10
Atrazine (herbicide)	>30,000	>10,000	-	-	[2]
Cadmium (heavy metal)	2579/39	39	-	-	5
Chlordane (insecticide)	8	6	-	-	0.004
Chromium VI (heavy metal)	10,300	-	-	-	50 (as total)
Copper (heavy metal)	38	50	22	25	3
Dieldrin (insecticide)	67	13	-	-	0.0002
Lead (heavy metal)	2450	-	780	-	25
Mercury (heavy metal)	8	12	20	14	0.025
PCB (polychlorinatedbiphenyl)	10	13.9	-	-	0.000079
Permethrin (insecticide)	>1,000	-	-	-	[2]
Toxaphene (insecticide)	23	40	<250	1,120	0.0002
Tributyltin (antifoulant)	1.5	0.7	0.05	0.08	0.002 (as trialkyltin includes tributyltin)
Zinc (heavy metal)	263	200	190	-	86

[1] Geometric means of literature values from Funderburk et al. 1991.

[2] No numeric standard in rules at this time (2002), but currently use "no toxics in toxic amounts" Environmental Management Commission rule 15A NCAC 2B .0208 to control for substances not listed in the rules.

Leaching of wood preservatives from dock and bulkhead structures may also contaminate live oysters. Chromated copper arsenate (CCA), the most common wood preservative in the United States, consists of copper, chromium, and arsenic. This wood preservative has been shown to leach those heavy metals into adjacent sediments and impact marine benthos (Weis and Weis 1994; Weis et al. 1998). The toxicity of copper, chromium, and arsenic to aquatic organisms is well known (Weis et al. 1998) and all three metals are listed as priority pollutants by the EPA (Hingston et al. 2001). Copper appears to have the most toxic effect on marine organisms and also consistently appears to leach the greatest amount (Weis and Weis 1994).

Weis et al. (1995) found that oysters living on CCA-treated wood in a residential canal had fifteen times more copper (~ 200 µg/g wet weight) and 2-3 times more arsenic than reference oysters, and significantly more digestive system malfunctions. Copper is known to cause this pathology (Weis et al. 1995). Sediment contaminated with CCA has caused toxicity and some mortality to oysters, amphipods, polychaetes, fiddler crabs, mud snails, fish embryos, and sea urchin (Weis et al. 1998). Elevated concentrations of metals and reduced abundance and diversity of the benthic community were found to extend approximately 10 meters from CCA treated bulkheads and one meter from docks, decreasing with distance from the structure (Weis and Weis 1994; Weis et al. 1998). Sediment contamination was higher

in a residential bulkheaded canal than adjacent to bulkheaded open water.

The extent of sediment contamination from CCA could be significant considering the magnitude of preserved timber used in the marine environment for bulkheads, docks, and marinas (Weis and Weis 1994). A pilot study conducted by DMF along approximately seven miles of estuarine shoreline in the southern portion of the coast (Pages Creek and Intracoastal Waterway) found that approximately 21% of the shoreline within the study area was hardened in 1984. By 2000, 37% of the shoreline in the same area was hardened. The most affected area of shoreline was along the waterway, where boat wakes and greater fetch increase erosion problems. In this area, 54% of the project area was hardened. However, even along a protected creek with a wide marsh fringe and little obvious erosion problems, 38% of the shoreline has been hardened. Along Yeopim Creek, a tributary of Albemarle Sound, approximately 1% of the shoreline was hardened in 2000. *This methodology for assessing shoreline hardening could be used for a larger portion of the coast to spatially delineate and quantify where and how much of the shoreline is hardened.*

Toxicity of wood decreases with time, about 50% each day after immersion, with most leaching occurring in the first five to six days (Sanger and Holland 2002), and 99% of the leaching completed in three months. However, dock pilings and bulkheads are replaced periodically, providing a continual source of newly treated wood in coastal waters. The EPA is requiring new labeling on all CCA products specifying that no use of CCA will be allowed after December 2003. In February 2002, the wood-treating industries made a voluntary decision to transition away from use of arsenic-treated wood (CCA) by the end of 2003. Alternative wood preservatives containing copper or other chemicals may have similar toxicity to marine organisms. *Any new wood preservative products should be evaluated for impacts to marine benthos, including oysters*[12].

Fecal coliform bacteria

Elevated levels of fecal coliform bacteria in shellfish and adjacent waters do not kill oysters or clams. Such levels indicate contamination of waters, shellfish, and sediments from warm-blooded animal waste. Because of the sources and pathways of fecal coliforms, high bacteria levels are an indication that other water quality problems may also exist that could impact growth, survival, reproduction, or recruitment of fisheries resources and potentially impact human health through harvest and consumption of contaminated shellfish. Water quality monitoring in several tidal creeks in New Hanover County, found a positive correlation between fecal coliform abundance and turbidity, nitrates, and orthophosphates (Mallin et al. 2000b; 2001b). There was also a correlation between levels of fecal coliform and levels of other pollutants such as toxins and sediment. Similar spatial patterns of increased fecal coliform as well as increased nitrates, chlorophyll *a*, and to some extent, turbidity, were observed at upstream locations in the same study. Highest concentrations at upstream areas were attributed to proximity to development sources and reduced flushing and dilution compared to higher salinity waters near the ICW (Mallin et al. 1998). The majority of fecal coliform contamination has been attributed to non-point stormwater runoff (DEM 1994; Frankenberg 1995; Schueler 1999; Reilly and Kirby-Smith 1999; DMF 2001a).

The relative importance of other non-point sources of fecal coliform pollution has also been investigated. For example, Mallin and Wheeler (2000) found that runoff from golf courses was not a significant source of fecal coliform bacteria to tidal creeks in southeastern North Carolina, although they did contribute to elevated nutrient levels in the water.[13]

Disease

When oysters suffer physiological stress induced by extreme environmental conditions, such as low

[12] See Water Column chapter for management needs concerning toxic contaminants affecting shell bottom.

[13] A more in-depth discussion of fecal coliform is provided in the Water Column chapter.

dissolved oxygen or poor water quality, they become more susceptible to parasitism and disease, such as Dermo and MSX (Lenihan et al. 1999). The parasites *Perkinus marinus* (Dermo) and *Haplosporidium nelsoni* (MSX) have caused significant oyster mortality (Andrews 1988; Hargis and Haven 1988; Kennedy 1996; Lenihan et al. 1999). Disproportionate infection of larger, more fecund (egg producing) oysters (Mackin 1951; Ray 1954; Andrews and Hewatt 1957) may at least partially explain the decline in reproduction and subsequent spatfall that has occurred since 1988 (Marshall et al. 1999), prompting major concerns for oysters as a natural and economic resource.

Dermo has been responsible for the majority of adult oyster mortalities in North Carolina in recent years. Although reported to occur in this state in the 1950s (Chestnut 1955), disease assessments were not attempted until large-scale oyster mortalities occurred during late 1988. Dermo was found at nine of eleven sampling sites, while MSX was found at the other two. While both MSX and Dermo have been documented, Dermo was the major cause of adult mortalities (DMF 2001a). Oysters typically begin suffering Dermo-related mortality at the age of 2 years or approximately 2.5 inches in shell height (DMF 2001a). Rates of Dermo infection in oysters generally increase with water temperature and salinity (Paynter and Burreson 1991). The highest rates of infection occur where salinity ranges from 16 – 20 ppt (Lenihan et al. 1999). The MSX dies when salinities are below 10 ppt for at least two weeks. Heavy rainfall from the several hurricanes in North Carolina during 1996-1999 reduced Pamlico Sound salinities, and consequently, the occurrence of MSX in that area (DMF 2001a).

Location and severity of Dermo infection has varied over the years, but was as high as 98 – 100% through much of the 1990s. It became evident that oysters in the smaller, saltier southern estuaries had higher survival rates at infection rates similar to those occurring in Pamlico Sound oysters. Conditions in these small, high salinity areas with high tidal flow may inhibit mortality by flushing out parasites at a high rate and/or having salinities too high for the Dermo parasite (DMF 2001a). A possible link among low DO, increased availability of iron, and increased parasite activity supports this concept, because these estuaries rarely experience low DO events (DMF 2001a).

Research on experimental oyster reefs in the Neuse River and Pamlico Sound (Lenihan et al. 1999) found that oysters at the base of the reefs, where currents were slowest, food quality lowest, and sedimentation rates highest, had the highest prevalence and intensity of infection with Dermo. In the areas studied, adequate height of the shell bottom structures was necessary for the oysters to grow well and survive disease and pollution. The upper portions of taller structures also allowed a safe refuge for mobile invertebrates and fish when low oxygen events occurred. *Maintenance of high-profile oyster rocks is critical for subtidal oysters to perform their ecological functions, as well as provide resources for harvest.*

Human activities that artificially increase salinity can also indirectly cause additional mortality of oysters from Dermo. Such activities include inlet deepening for navigational channels (SAFMC 1998a) and extensive withdrawal of groundwater and surface water during drought conditions. Cape Fear and Beaufort inlets have been extensively deepened for access to the state ports. Shellfish waters in these areas are the most vulnerable to increases in salinity. *The relative contribution of channel deepening to saltwater intrusion and subsequent oyster mortality must be evaluated in order to determine appropriate management action.*

To protect and restore the oyster resource of the Chesapeake Bay by minimizing the spread of Dermo, a group of scientists from North Carolina, Virginia, and Maryland recommended that a policy be established whereby infected oysters would not be moved into salinities lower than where they set or into areas where disease levels were low, and optimally, infected oysters would not be moved at all (Chesapeake Research Consortium 1999). However, other scientists feel that Dermo is now so widespread that relocation of oysters is not a problem.

Some oysters, although exposed to disease, are able to survive. These "disease resistant" individuals are important to the survival and recovery of oyster populations in North Carolina (Breitburg et al. 2000). Harvesting of large oysters or relaying of large oysters from closed to open harvest areas selectively eliminates this disease-resistant genetic pool from the populations. *Establishment of oyster sanctuaries seeded with disease-resistant brood stock or allowed to naturally develop disease-resistant oysters would enhance the oyster's ability to survive and provide disease-resistant broodstock for repopulating highly impacted areas.*

Introduced and nuisance species

Nuisance and non-native aquatic species are becoming more of a problem throughout the United States. North Carolina shell bottom is at risk from the accidental or intentional introduction of these species. Non-native species enter North Carolina waters through river systems, created waterways such as the ICW, ships discharging ballast water of foreign origin, boats entering North Carolina waters from other areas, and the sale of live fish and shellfish for bait or aquaculture (North Carolina Sea Grant 2000). Oysters have already been impacted by the introduction of the parasites Dermo and MSX. It is suspected that the MSX parasite was introduced with Pacific oysters (*Crassostrea gigas*) (DMF 2001a). Intentional introductions of non-native species are covered under state laws and rules of several commissions. Proposals to introduce organisms not native to North Carolina into the coastal waters of North Carolina, or organisms native to North Carolina when the individuals in question originate outside North Carolina, are subject to MFC rule 15A NCAC 3I .0104. An applicant must submit a written application to the Fisheries Director with sufficient information for the Director to "determine that the action will not pose a significant danger to any native marine resource or the environment." The Director can require an applicant to conduct analyses to aid in evaluation of the application, and hold public meetings concerning the proposal. The Fisheries Director determines whether or not to issue the requested permit.

Zebra mussels (*Dreissena polymorpha*) have not been reported in North Carolina, but have been found in northern Virginia and 20 other states (<http://nas.er.usgs.gov/zebra_mussel/>, 2004). Due the rapid rate that this non-native has spread in the United States since first found in 1986, researchers feel that zebra mussels are likely to infest all southeastern states eventually, with negative impacts to the native freshwater and low salinity mollusks (Neves et al. 1987). Zebra mussels frequently clog intake pipes and smother native mussels and large crustaceans (i.e., crayfish). Most estuarine shell bottom (oyster beds) would not be affected, however, since the upper salinity tolerance limit of zebra mussels is <10 ppt (North Carolina Sea Grant 2000). Although the spread of zebra mussels in Lake Erie has improved water clarity, the effect on most fish populations is still largely unknown (<http://nas.er.usgs.gov/zebra.mussel/docs/sp_account.html>, January 2004). Planktivorous species and life stages would most likely be affected due to competition with the mussel. North Carolina Sea Grant has pursued multi-state and regional efforts to address the issue of aquatic nuisance species introduction and dispersal, primarily through education on the ecological impacts and methods to prevent or control dispersion (North Carolina Sea Grant 2000). It is estimated that 13 species of freshwater mussel could be extirpated from North Carolina streams and rivers if zebra mussels were to invade (North Carolina Sea Grant 2000). Among those native mussel species, four species could become extinct.

As North Carolina's oyster populations have declined, interest in establishing a non-native oyster population has grown. While some oyster introductions have revived or expanded oyster fisheries in some parts of the world (especially in Europe), others have failed or caused problems, such as the destruction of native species by exotic diseases (Andrews 1980; DMF 2001a). If the native oyster stocks cannot recover naturally, establishment of non-native oyster populations could provide complex structure for fish habitat (if the introduced species were reef-builders - some oysters are not), water filtration functions, and preserve a traditional North Carolina fishery.

The Pacific oyster (*Crassostrea gigas*) and Suminoe oyster (*Crassostrea ariakensis*) have been the leading candidates for non-native introductions. Researchers have conducted overboard tests in North

Carolina with Pacific oysters and work is underway with the Suminoe oyster (C. Peterson, UNC-CH, pers. com., 2002). The shells of Pacific oyster were found to be too thin to resist predation by native oyster drills (Debrosse et al. 1996). The Suminoe oyster has proven more promising. Laboratory and field studies conducted on *C. ariakensis* in Chesapeake Bay indicate rapid growth and survival under a wide range of coastal and estuarine conditions (Richards and Ticco 2002). *C. ariakensis* also shows greater disease resistance than native oysters.

There is currently much debate and uncertainty regarding the introduction of non-native oysters (Richards and Ticco 2002). Concerns include long-term survival of introduced species, competition with native oysters, unknown reef-building attributes, cross-fertilization with native species (reducing viability of spat and decrease reproductive success), and introduction of non-native pests with the introduced oysters (DMF 2001a). Policy makers are being faced with a dilemma of incomplete knowledge of the species' life history, lack of consensus among scientists regarding the impact of non-native oysters on Atlantic coastal ecosystems, and pressure from commercial and economic interest to revive a once prosperous oyster industry (Richards and Ticco 2002). *The DMF Fishery Management Plan for Oysters (DMF 2001a) recommended that testing continue on aquaculture use of non-spawning, non-native oysters before decisions are made opposing or supporting introduction.*

A comprehensive study of non-native oyster introductions was completed by the National Research Council of the National Academy of Science in 2003 (NRC 2003). The study identified concerns that should be addressed by decision-makers when the introduction of a non-native oyster is under consideration. The concerns included:

- Viability of introduced stocks in Atlantic coast waters
- Co-introduction of new pathogens and parasites
- Economic and social impacts of a non-native oyster introduction
- Adequacy of regulatory and institutional structure for monitoring and overseeing the interjustisdictional aspects of open water aquaculture

The study concluded that *C. ariakensis* is probably well suited for growth and reproduction in the Chesapeake Bay and similar estuarine habitats on the Atlantic coast. The risk of introducing non-native pathogens and parasites could be reduced by following International Council for Exploration of the Seas protocols. However, it will not be easy for the oyster industry to adapt to dependence on hatchery production of Asian oysters. Furthermore, the existing regulatory and institutional framework was found inadequate for handling interjurisdictional issues. Based on this evaluation, limited aquaculture of triploid oysters was considered the most defensible management option. Other options included prohibition of non-native oyster introduction and introduction of reproductive diploid oysters. The principal recommendation from NRC (2003) was to establish standards and protocols for non-native oyster aquaculture that minimize and monitor the unintentional release of reproductive *C. ariakensis*. *The recommendations provided in NRC (2003) should be considered in developing a comprehensive oyster restoration plan.*

Existing management measures

No amount of oyster restoration will erase the effect of continuing pollution of aquatic systems (Boesch et al. 2001). *Therefore, both restoration efforts and water quality management actions reducing direct and indirect shell bottom loss and degradation are necessary to enhance coastal fish habitat.* Several existing management actions provide some protection or enhancement of shell bottom habitat, including shellfish size and harvest limits, habitat restoration, and closure of areas to harvest or use of certain fishing gears. By EMC rules, all shellfish waters with significant resources are classified as SA waters and are, by definition, High Quality Waters (HQW). In addition, some waters that are classified SA also carry the Outstanding Resource Waters (ORW) classification based on recreational or environmental special uses. These waters are afforded additional protection from construction and runoff under EMC, CRC and Soil

and Water Conservation Commission rules. Maps 2.3a-b show HQW and ORW areas for the CHPP area. The HQW and ORW areas cover 8% and 24% of the shellfish mapping study area, respectively. A total of 142,017 acres out of 362,450 acres of ORW in the CHPP MUs are within the DMF shellfish mapping study area. Of the total bottom area mapped by DMF to date (January 2003), 55% (126,583 acres) is classified ORW.

Under MFC rules, oyster reefs are protected from early harvest by size limit and culling tolerance rules [MFC rule 15A NCAC 03K .0202]. By rule, the minimum size at which oysters can be harvested is based on shell lengths not less than 2.5 in. The Fisheries Director has, by proclamation (an administrative order authorized by the MFC), further restricted harvest to oysters of at least 3 inches in length. The intent of the size limit is to allow oysters to spawn before they are removed from the population, as well as protect sublegals as fecundity increases (C. Hardy, DMF, pers. com., 2002). Oysters reach sexual maturity in their first year and harvestable size in about 3-4 years in Pamlico Sound (Ortega et al. 1990). This size limit provides some protection for young oysters throughout their range in North Carolina and for beds of stunted oysters along the boundary of their range. Stunted oyster beds occur where the salinity range is only marginally suitable for larval survival and growth.

Some planted areas can be designated by proclamation of the Fisheries Director as "Shellfish/Seed Management Areas" (SSMAs) [MFC rule 15A NCAC 03K .0103]. These areas include shellfish populations or shellfish enhancement projects that may produce commercial quantities of shellfish or shellfish suitable for transplanting as seed [MFC rule 15A NCAC 03K .0103a]. Use of trawl nets, long haul seines, and swipe nets is prohibited in SSMAs and, unless open to oyster harvest by proclamation, they are closed to all oyster harvest. There are currently 628 acres of SSMA in the Southern Estuaries and New/White Oak MUs that are part of the DMF shellfish mapping study area (Table 3.4). Cultch planting sites in the Pamlico Sound have not been designated as SSMAs because of the difficulties in enforcing the prohibition of shellfish harvesting on these areas (i.e., small numbers of Marine Patrol Officers patrolling large water bodies (M. Marshall, DMF, pers. com., 2002).

In addition to protection from certain fishing gears in Shellfish/Seed Management Areas, shell bottom is also protected from shellfish harvest in military restricted areas. These areas have served as target and bombing ranges since the World War II period. Military restricted areas cover 24,051 acres of the shellfish mapping study area, and all of these areas have been mapped (Table 3.4). Other area designations protecting shell bottom from specific fishing gear impacts include nursery areas, mechanical oyster harvest prohibited areas, trawl net-prohibited areas, and crab spawning sanctuaries. These areas cover more than half of the shellfish bottom mapping area, leaving the largest unrestricted areas in west and northwest Pamlico Sound, the lower Pamlico and Neuse Rivers, and around Roanoke Island (Maps 3.5a-c). A number of cultch planting sites in the Pamlico Sound area are also closed to mechanical harvest by proclamation annually (Map 3.4a), although none have been designated shellfish management areas (DMF 2001a). *Given adequate enforcement capabilities, additional cultch enhanced and naturally occurring shell bottom (intertidal and subtidal) should be designated as DMF Shellfish Management Areas to protect them from fishing gear impacts.*

Another designation that indirectly provides protection from harvesting in North Carolina is the Division of Environmental Health's (DEH) shellfish harvest closure areas. Based on surveys and bacterial sampling, the DEH may designate waters as closed to shellfish harvesting, on either a full-time basis (permanent closure) or rainfall-dependent basis (conditionally approved). Maps 2.19a-c show the extent of shell bottom within the various DEH shellfish area designations. It should be noted that significant portions of closed shellfish waters are located in areas not suitable for shellfish propagation and maintenance due to low salinity levels or other conditions. There are also some closed areas that have robust oyster populations (C. Peterson, UNC-CH, pers. com., 2003). *The value of closed shellfishing*

waters as oyster sanctuaries should be evaluated.[14]

Table 3.4. Amount of bottom habitat mapped (acres) by the North Carolina Division of Marine Fisheries Shellfish Habitat and Mapping Program within areas receiving specific North Carolina Marine Fisheries Commission designations that restrict fishing activities (as of January 2003).

Marine Fisheries Commission restricted fishing area designation	Amount within the shellfish bottom mapping area	Currently mapped area	% complete
Crab spawning sanctuaries	17,673	12,831	73%
Mechanical clam harvest areas	39,446	29,878	76%
Mechanical oyster harvest prohibited	289,617	169,925	59%
Military restricted areas	24,051	24,051	100%
Permanent Secondary nursery areas	34,825	243	1%
Primary nursery areas	46,941	31,045	66%
Shellfish/seed management areas (SSMA)	628	489	78%
Special secondary nursery areas	30,686	21,889	71%
Taking crabs with dredges	43,318	2,044	1%
Trawl nets prohibited	138,812	37,959	27%

3.5. SUMMARY OF SHELL BOTTOM CHAPTER

Shell bottom habitat is unique because it is the only coastal fish habitat that is also a fishery species (oysters). The ecological value of shell bottom has only recently been recognized to be as or more significant than the fishery itself, since it provides numerous habitat and water quality functions that are vital for fishery and non-fishery species. The ability of shell bottom to withstand moderate turbidity levels allows oysters to clear the water column, encouraging growth of SAV and benthic microalgae. Oysters, SAV, and benthic microalgae quickly process dissolved and suspended material from the water column, thus facilitating the estuaries' role in storage and cycling of nutrients. This process reduces the likelihood of coastal eutrophication and its detrimental effects on fish and fisheries. Oyster beds also increase shoreline complexity, can alter circulation patterns, and enhance fish use of marsh edge habitat. Shell bottom also provides hard structure for attachment of diverse invertebrate species and protective cover for small mobile finfish and invertebrates. Gobies, blennies, hard clams, mud crabs, blue crabs, anchovies, oyster toadfish, and sheepshead are a few of the typical residents of oyster reefs. Research has shown that abundance and production of numerous fishery and prey species are enhanced more by shell bottom than by the surrounding soft bottom. Some of the important fishery species whose production is enhanced by shell bottom include hard clam, black sea bass, gag, tautog, and southern flounder. Shell bottom is federally designated as a Habitat Area of Particular Concern for estuarine dependent snapper-grouper species. The restoration of living oyster beds is therefore critical to the proper functioning and protection of surrounding coastal fish habitats and numerous fishery species.

Shell bottom habitat declined for most of the 20th century. The current distribution of shell bottom has shrunk to a mere fraction of its historical range, when oyster rocks were so abundant that they were considered a hazard to navigation. Anecdotal information suggests that oyster beds have been displaced roughly 10-15 miles (16-24 kilometers) downstream in the Pamlico and Neuse estuaries and completely covered by sediment in other areas. Furthermore, North Carolina's commercial oyster landings have declined about 90% from 1889 to today's low harvest. Most shell bottom losses have been subtidal beds

[14] More discussion of trends related to the DEH areas is provided in the Water Column chapter.

in Pamlico Sound, where DMF has also found declines in spatfall. Although mechanical harvesting of oysters has been greatly restricted, reefs have not recovered, possibly due to stress from water quality degradation and increased occurrence of disease (Dermo, MSX). The loss of habitat could be particularly damaging to fishery stocks associated with shell bottom that are classified as Overfished by DMF, such as tautog, black sea bass south of Hatteras, or the central/southern stock of striped bass.

Oyster dredging, beginning in 1889, is believed to be the major cause of the initial decline in shell bottom. Today the dredge harvest has greatly diminished in North Carolina, although about 42% of shallow estuarine bottom (where oysters could live) is still open to mechanical harvest methods, all in Pamlico Sound. Dredging removes oysters and reduces the vertical profile of oyster rocks, increasing the susceptibility of remaining shell bottom at that location to low dissolved oxygen and possible mortality. Hand harvest methods for oysters and clams can also be destructive, but on a much smaller scale. Other bottom disturbing fishing gears, such as trawls, prevent the establishment of oyster reefs in areas within their historic range. Dredging for navigation channels or marina basins also impacts shell bottom. The downstream displacement of oysters in the Neuse and Pamlico rivers is probably the result of extensive drainage networks designed to increase the flow of stormwater (fresh water) into coastal waterways, decreasing salinity in the downstream portions of those rivers. While drainage for agriculture has changed little, drainage for urban/suburban development is increasing steadily. Runoff from agriculture, urban/suburban development, and transportation infrastructure carries sediment, nutrient, and toxic chemical pollutants. Sediment, the number one pollutant of waterways in the United States, clogs oyster gills and buries shells. Excess nutrients can fuel algal blooms and low dissolved oxygen events, and in turn, cause mortality of benthic organisms on deep, subtidal shell bottom. Heavy metals, petroleum products, pesticides, and other toxic chemicals in the runoff can kill sensitive oyster larvae.

To offset the decline in oyster habitat, restoration efforts were begun in 1958, and some protected areas have been established. While almost all work in the past has focused on restoring oysters for harvest, some recent efforts have been designed to restore or enhance shell bottom for habitat purposes. However, the magnitude of losses still greatly exceeds gains from restoration. Large areas of shell bottom habitat are still unprotected from direct physical removal or damage via human-related activities, as well as from indirect damage from water quality degradation. In order to restore shell bottom habitat, the destruction of oyster beds from fishing practices, channel or marina dredging, and pollutant loading must be reduced and oyster habitat restoration must increase significantly.

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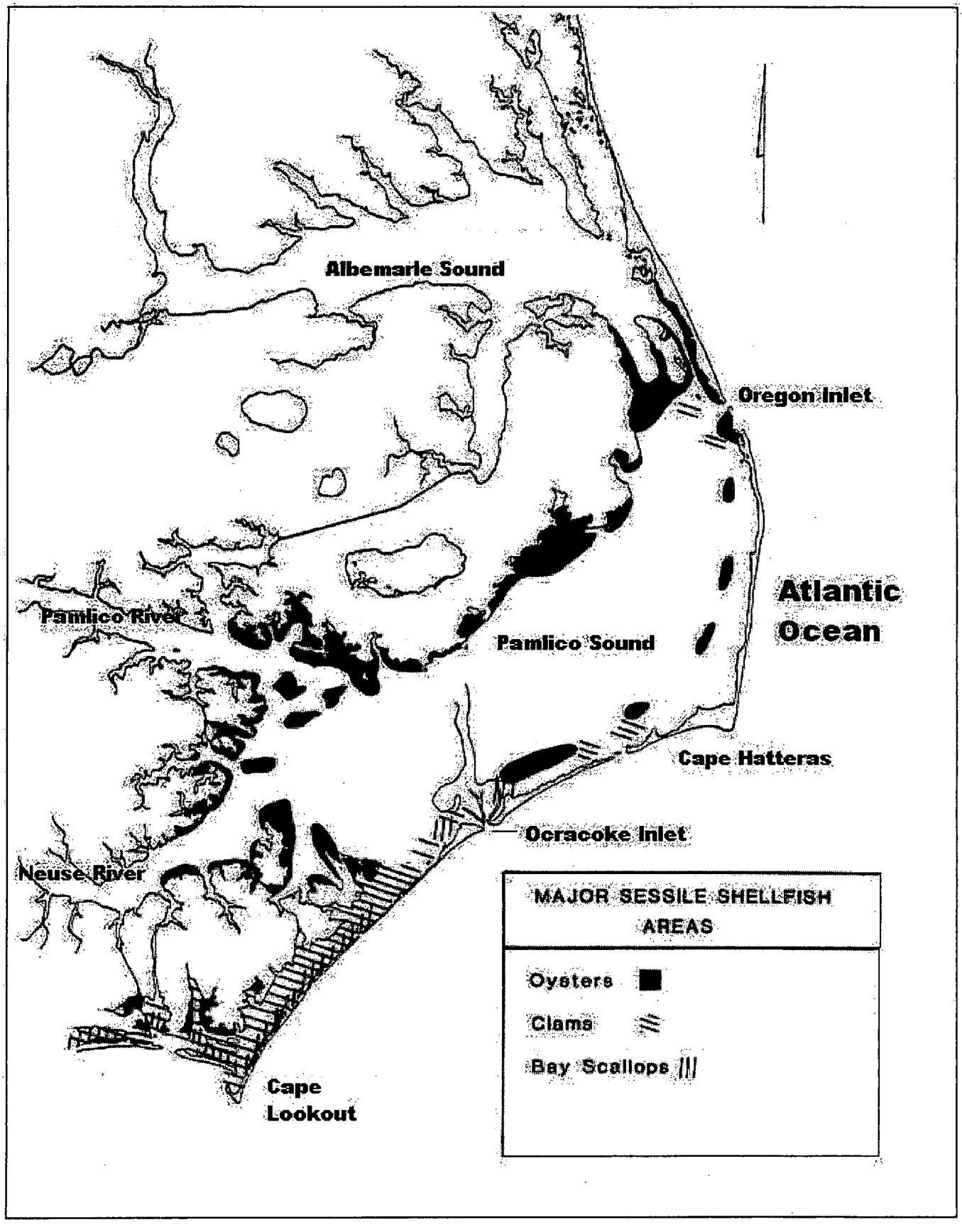
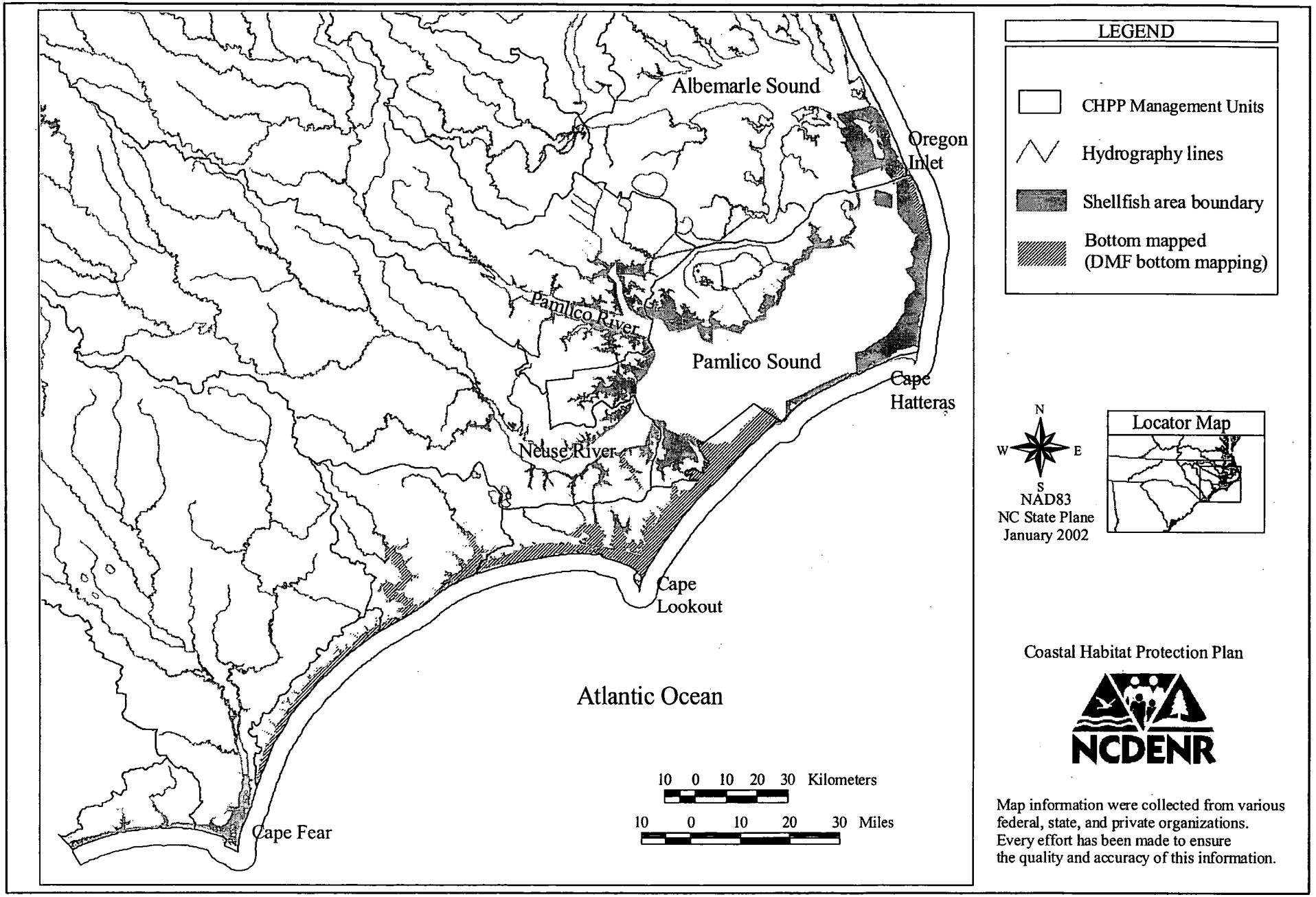
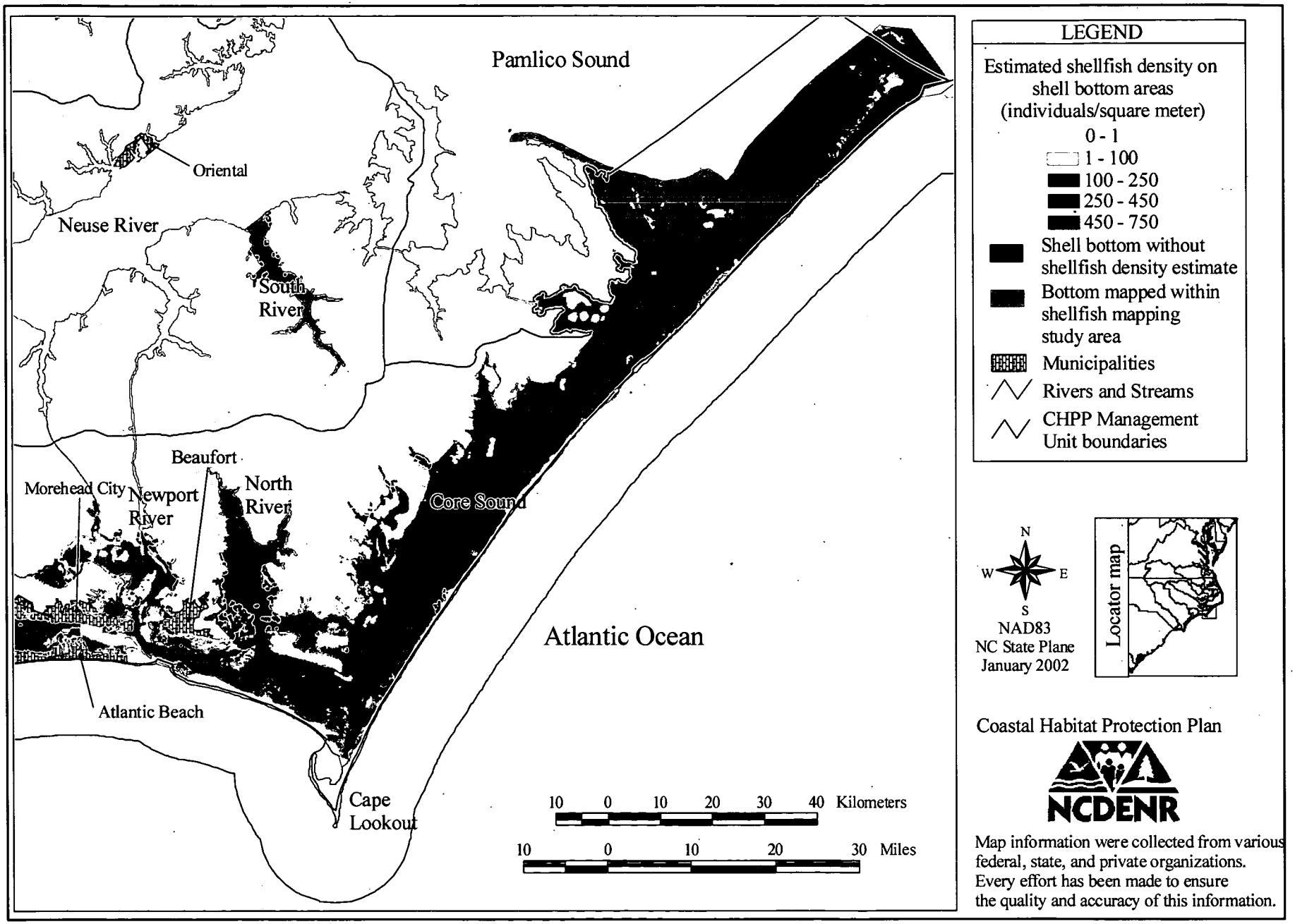


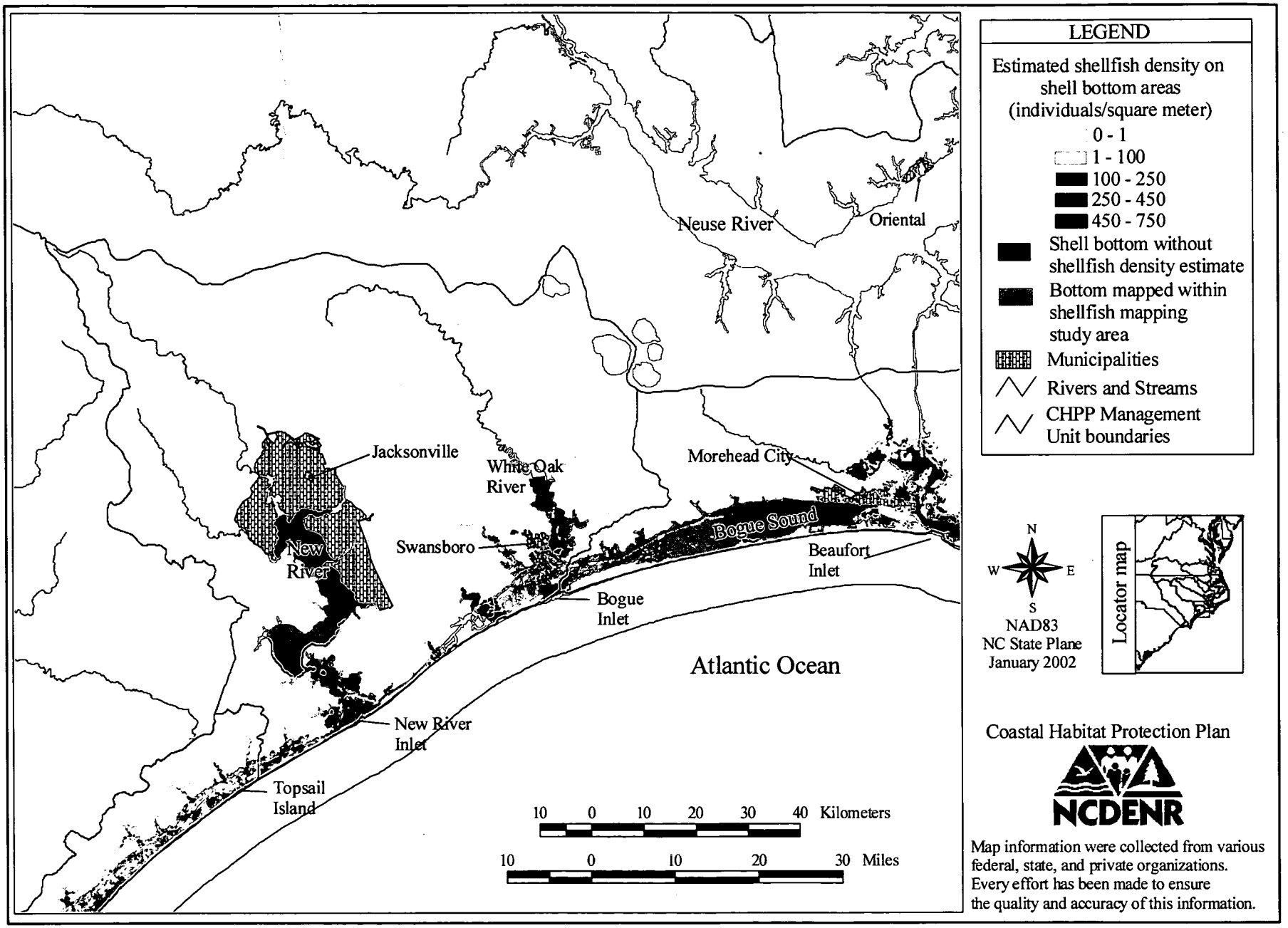
Map 3.1—Distribution of eastern oysters, hard clams, and bay scallops in the Albemarle-Pamlico estuarine system (from Ross and Epperly 1986)



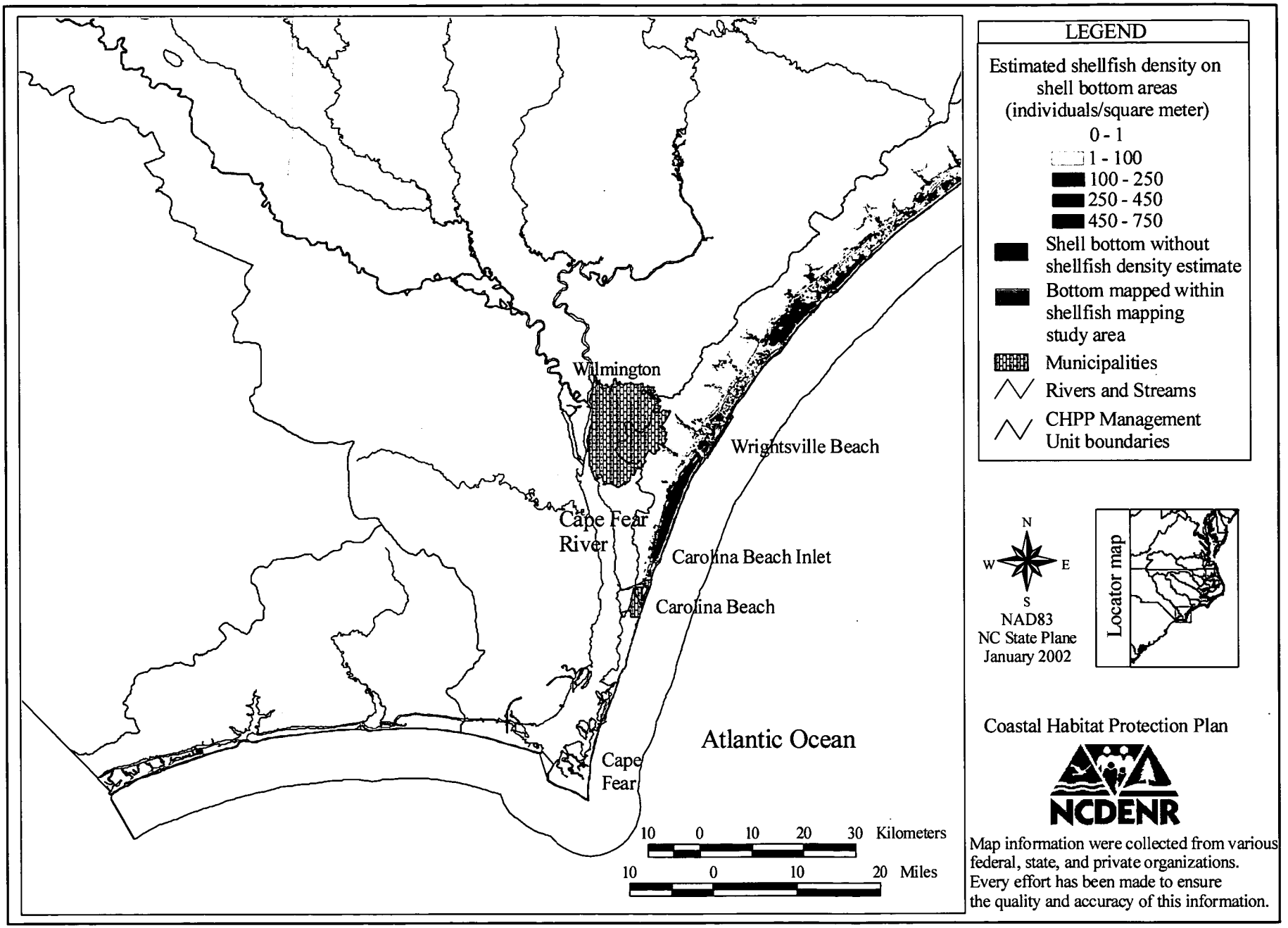
Map 3.2-Areas for which the bottom type has been mapped or will be mapped by the North Carolina Division of Marine Fisheries' Shellfish Habitat and Abundance Mapping Program.



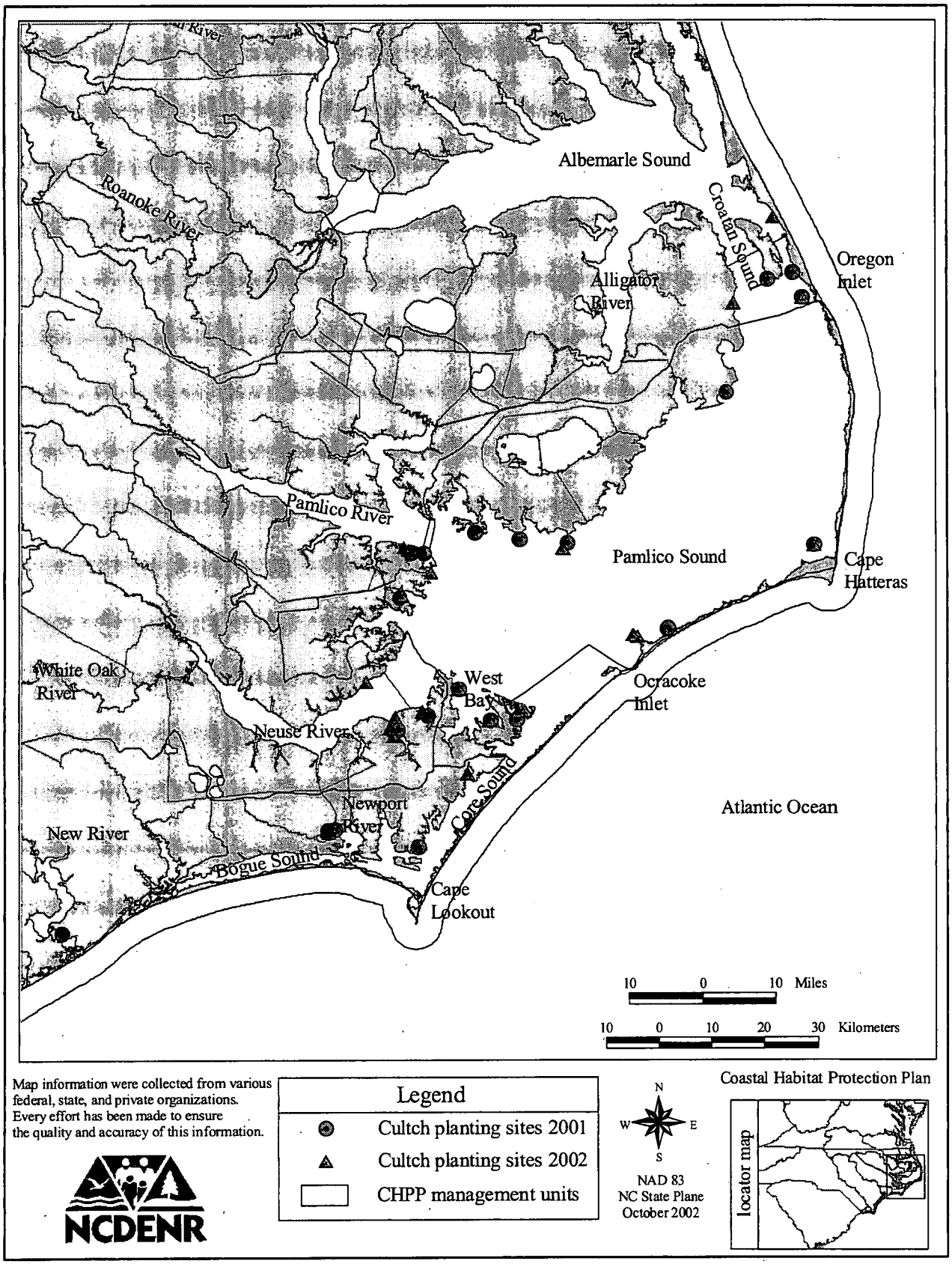
Map 3.3a. Estimated density of shellfish in estuarine waters from Ocracoke Inlet to Salter Path, North Carolina



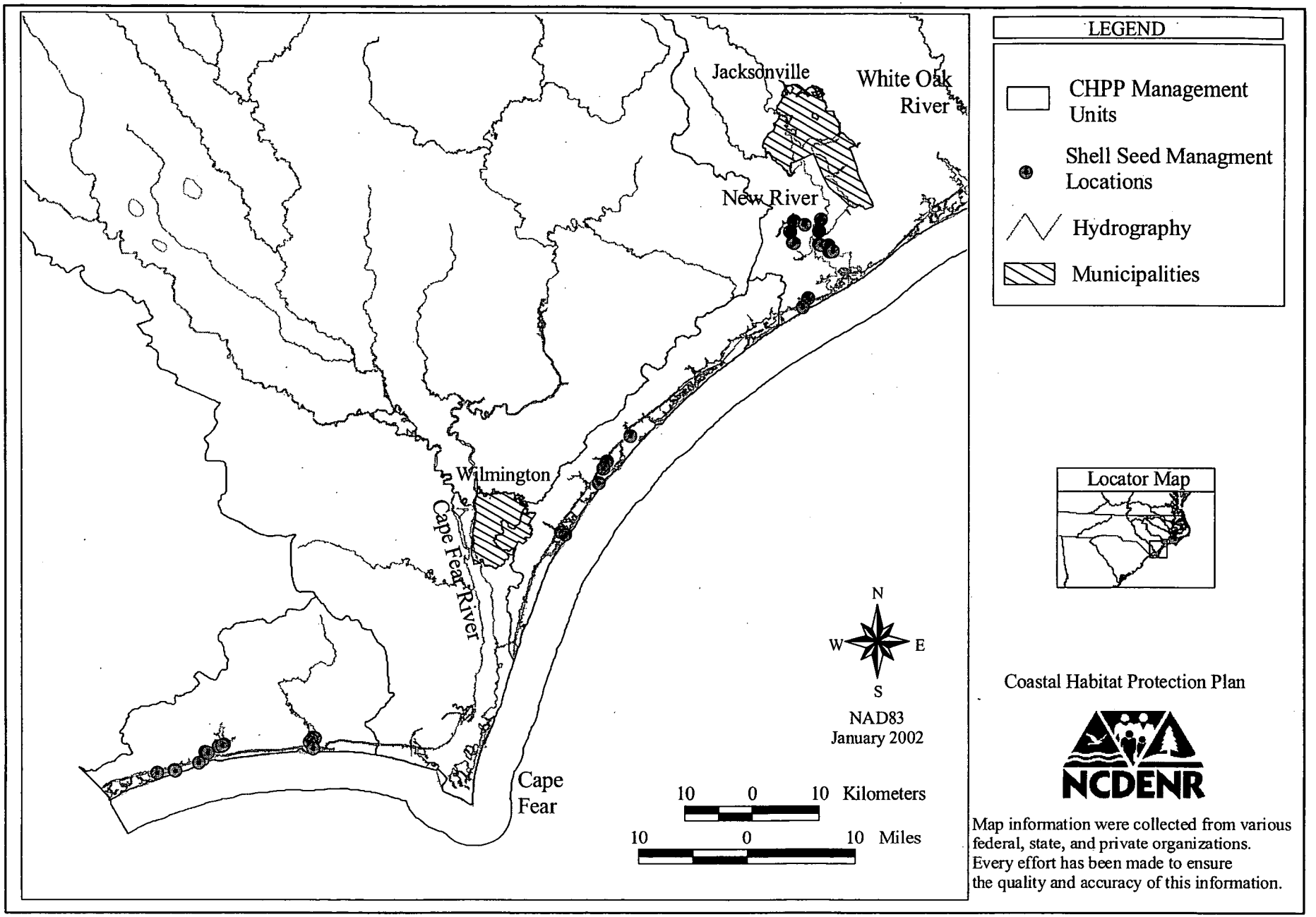
Map 3.3b. Estimated density of shellfish in estuarine waters from Beaufort Inlet to Topsail Island, North Carolina



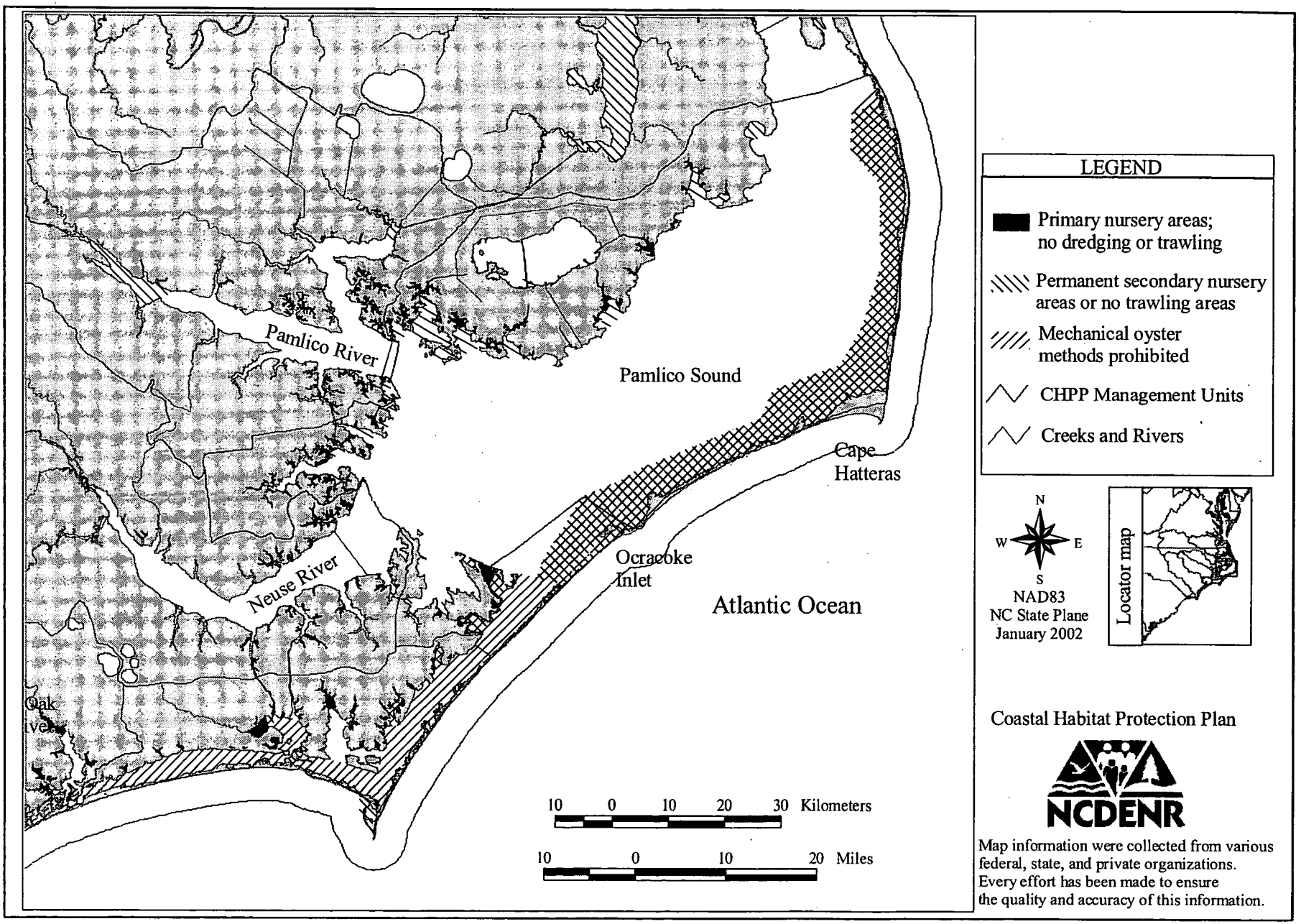
Map 3.3c. Estimated density of shellfish in estuarine waters from Topsail Island, North Carolina to the South Carolina border



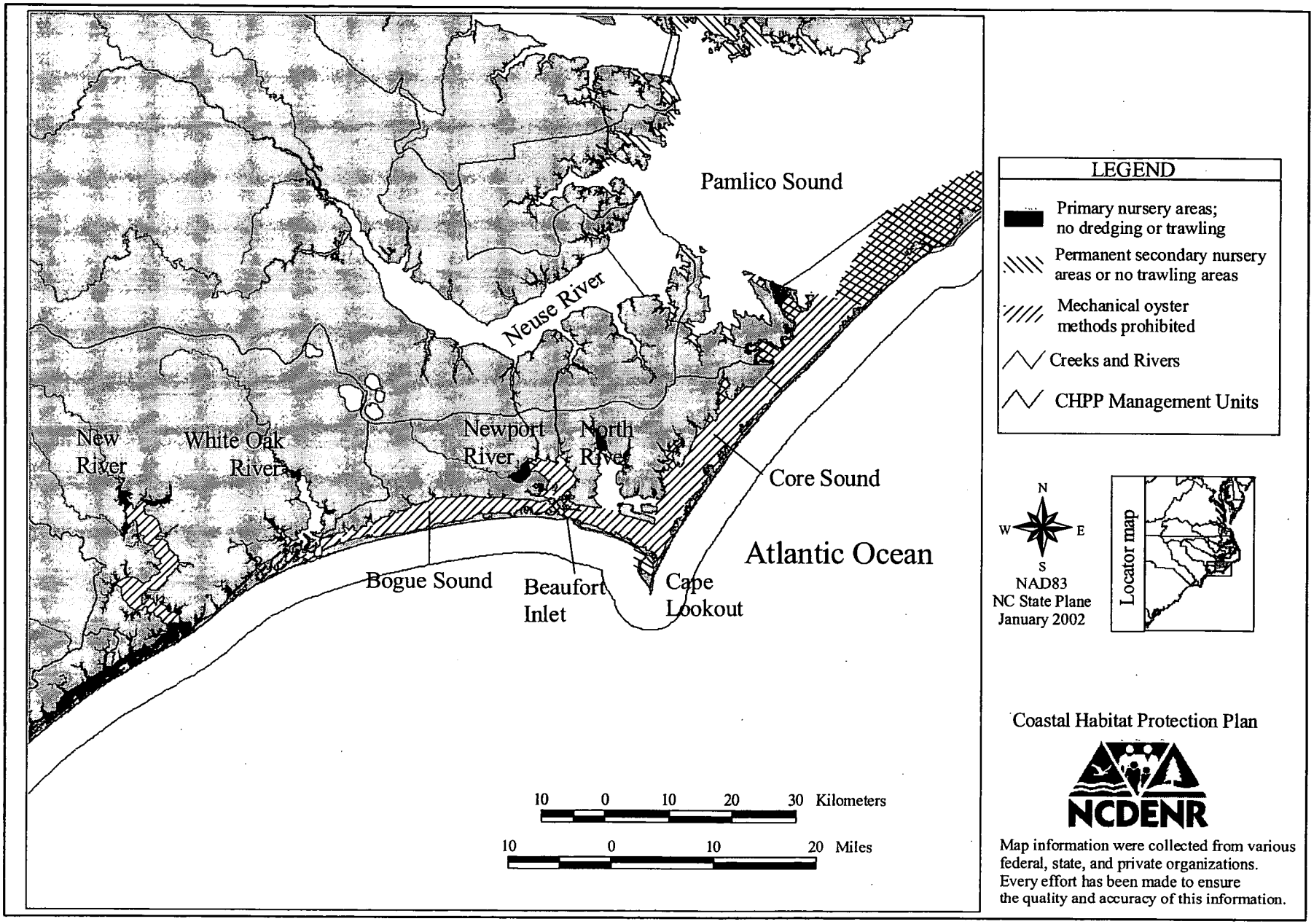
Map 3.4a—Locations where the North Carolina Division of Marine Fisheries planted oyster cultch during 2001 and 2002 in estuarine waters from New River northward



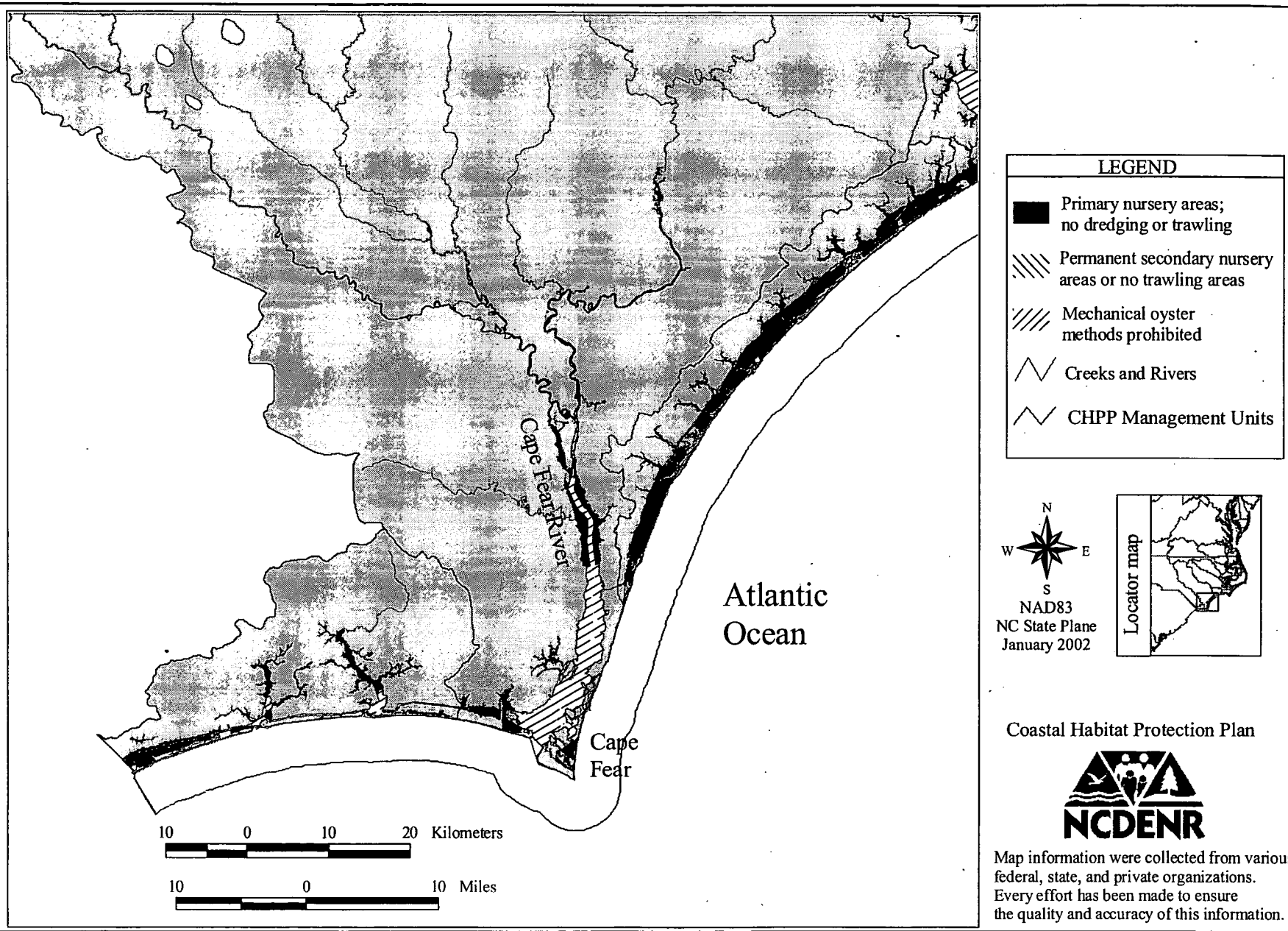
Map 3.4b---Existing North Carolina Division of Marine Fisheries Shell Seed Management areas (also cultch planting sites)



Map 3.5a---Areas where mechanical oyster harvesting and bottom trawling are prohibited in the Pamlico Sound system, North Carolina



Map 3.5b---Areas where mechanical oyster harvesting and bottom trawling are prohibited in the central coastal area of North Carolina



Map 3.5c---Areas where mechanical oyster harvesting and bottom trawling are prohibited in the southern coastal area of North Carolina

CHAPTER 4. SUBMERGED AQUATIC VEGETATION

4.1. DESCRIPTION AND DISTRIBUTION

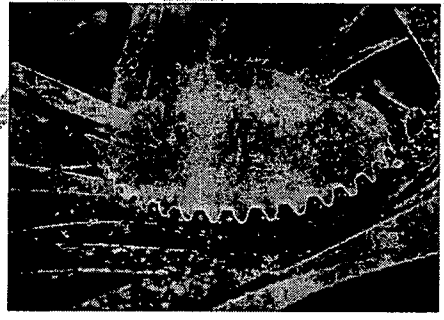
Definition

Submerged aquatic vegetation (SAV) is a fish habitat dominated by one or more species of underwater vascular plants. The North Carolina Marine Fisheries Commission (MFC) and Coastal Resources Commission (CRC) define SAV as:

"...those habitats in public trust and estuarine waters vegetated with one or more species of submerged vegetation such as eelgrass (*Zostera marina*), shoalgrass (*Halodule wrightii*), and widgeon grass (*Ruppia maritima*). These vegetation beds occur in both subtidal and intertidal zones and may occur in isolated patches or cover extensive areas. In either case, the bed is defined by the presence of above-ground leaves or the below-ground rhizomes and propagules together with the sediment on which the plants grow. In defining beds of submerged aquatic vegetation, the Marine Fisheries Commission recognizes the Aquatic Weed Control Act of 1991 (G.S. 113A-220 et. seq.) and does not intend the submerged aquatic vegetation definition and its implementing rules to apply to or conflict with the non-development control activities authorized by that Act" [MFC rule 15A NCAC 03I .0101 (20)(A) and CRC rule 15A NCAC 07H .0208 (6)].

Although not specifically listed in the definitions, SAV beds may also be vegetated with freshwater species such as native wild celery (*Vallisneria americana*) and sago pondweed (*Potamogeton pectinatus*). Submerged aquatic vegetation is included as a Critical Habitat Area under MFC rules [MFC rule 15A NCAC 03I .0100 (b)(20)]. The SAFMC classifies SAV as Essential Fish Habitat for penaeid shrimp, red drum, and snapper/grouper species. Although the MFC and CRC definitions may include areas with only SAV roots or propagules, SAV habitat could also occur on bottom temporarily lacking any SAV structures between patchy SAV beds or where conditions are currently unfavorable for growth, but have historically supported SAV. Therefore, for purposes of this plan, SAV habitat is defined as "bottom recurrently vegetated by living structures of submerged, rooted vascular plants, (i.e., roots, rhizomes, leaves, stems, propagules), as well as temporarily unvegetated areas between vegetated patches."

SAV is an underwater forest for juvenile fish and small invertebrates and a barometer of water quality.



Description

Submerged aquatic vegetation habitat includes marine, estuarine and riverine vascular plants that are rooted in sediment. Although SAV sometimes occurs intertidally or extends to the water's surface, these plants are generally submerged and cannot survive if removed from the water for any length of time (Hurley 1990). Leaves and stems have specialized thin-walled cells (aerenchyma) with large intercellular air spaces to provide buoyancy and support in an aquatic environment. Leaves and stems are generally

thin and lack the waxy cuticle found in terrestrial plants. The lack of a waxy cuticle increases the exchange of water, nutrients, and gases between the plant and the water (Hurley 1990). The extensive root and rhizome system anchors the plants, and also absorbs nutrients (Thayer et al. 1984). Reproduction occurs both sexually and asexually (i.e., vegetatively).

Habitat for SAV in North Carolina consists of two types of SAV communities, both of which are important to coastal fisheries – one in higher salinity estuarine waters and another in lower salinity to freshwater systems (Table 4.1). Estuarine species that occur in North Carolina include eelgrass (*Z. marina*), shoalgrass (*H. wrightii*), and widgeon grass (*R. maritima*). Eelgrass is a temperate species at the southern limit of its Atlantic coast range in North Carolina. In contrast, shoalgrass is a tropical species that reaches its northernmost extent in the state. Widgeon grass has a wide salinity range and grows in both fresh water and high salinity environments, although it occurs most commonly in moderate salinities (about 15 ppt). The co-occurrence of these three SAV species is unique to North Carolina, resulting in high coverage of shallow bottoms in North Carolina's estuaries (Ferguson and Wood 1994). These three species form biological and physical assemblages referred to as seagrass meadows (SAFMC 1998). Seagrass meadows are often defined by a visible boundary marking unvegetated and vegetated bottom varying in size from small isolated patches of plants less than a meter (<3 ft) in diameter to continuous meadows covering many acres. Low salinity species that occur in North Carolina include native wild celery (*V. americana*), non-native Eurasian milfoil (*Myriophyllum spicatum*), bushy pondweed (*Najas guadalupensis*), redhead grass (*P. perfoliatus*), and sago pondweed (*P. pectinatus*) (Ferguson and Wood 1994). There is slightly greater SAV species diversity in coastal riverine systems than marine systems in North Carolina (Odum et al. 1984).

Seagrass habitat supports other types of aquatic plants in addition to submerged grasses. Macroalgae (benthic, drift, and floating forms) often co-occur with SAV and provide similar ecological services, but the plant taxa have distinctly different growth forms and contrasting life requirements (SAFMC 1998). Macroalgae grow faster than SAV and do not require unconsolidated substrate for anchoring extensive root systems. Because of this growth pattern, macroalgae do not provide as much sediment stabilization as submerged rooted vascular plants. Their leaves are also less rigid than those of submerged rooted vascular plants, thus reducing their function as substrate for attachment and as a source of friction for sediment deposition. Macroalgal genera include salt/brackish (*Ulva, Codium, Gracilaria, Enteromorpha*) and freshwater (*Chara* and *Nitella*) species. Macroalgae common to the rivers of the Albemarle Sound system include the charophytes (*Chara* spp.). In addition, the macroalgae *Ectocarpus* and *Cladomorpha* grow on salt marsh flats (Mallin et al. 2000) and in association with SAV beds (Thayer et al. 1984).

Epibiota are another important component of SAV habitat. Epibiota are organisms that attach or grow on the surface of a living plant and may or may not derive nutrition from the plant itself. Micro- and macroalgae (i.e., seaweed) can grow on the leaves of SAV. Invertebrates attached to the SAV leaves include protozoans, nematodes, polychaetes, hydroids, bryozoans, sponges, mollusks, barnacles, shrimps and crabs.

Table 4.1. Average environmental conditions at locations where submerged aquatic vegetation occurred in coastal North Carolina, 1988-1991. *[Source: Ferguson and Wood 1994]*

SAV species	Environmental parameter					
	Salinity (ppt)		Secchi depth m (ft)		Water depth m (ft)	
	Range	Average	Range	Average	Range	Average
HIGH SALINITY SEAGRASS						
Eel Grass	10 - >36	26	0.3 - 2.0 (1.0 - 6.6)	1.0 (3.3)	0.4 - 1.7 (1.3 - 5.6)	1.2 (3.9)
Shoal Grass	8 - >36	25	0.4 - 2.0 (1.3 - 6.6)	1.0 (3.3)	0.1 - 2.1 (0.3 - 6.9)	0.8 (2.6)
Widgeon Grass	0-36	15	0.2 - 1.8 (0.7 - 5.9)	0.7 (2.3)	0.1 - 2.5 (0.3 - 8.2)	0.8 (2.6)
LOW SALINITY SEAGRASS						
Redhead Grass	0-20	1	0.4 - 1.4 (1.3 - 4.6)	0.9 (3.0)	0.4 - 2.4 (1.3 - 7.9)	0.9 (3.0)
Wild Celery	0-10	2	0.2 - 2.0 (0.7 - 6.6)	0.6 (2.0)	0.2 - 2.3 (0.7 - 7.6)	1.0 (3.3)
Eurasian Watermilfoil	0-10	2	0.2 - 1.4 (0.7 - 4.6)	0.6 (2.0)	0.5 - 2.4 (1.6 - 7.9)	1.1 (3.6)
Bushy Pondweed	0-10	1	0.2 - 2.0 (0.7 - 6.6)	0.7 (2.3)	0.5 - 1.7 (1.6 - 5.6)	1.0 (3.3)
Sago Pondweed	0-9	2	0.2 - 0.4 (0.7 - 1.3)	0.3 (1.0)	0.6 - 0.9 (2.0 - 3.0)	0.8 (2.6)

The three-dimensional shape of SAV habitat can be quite variable, ranging from highly mounded, patchy beds several yards wide, to more contiguous, low-relief beds (Fonseca et al. 1998). Leaf canopies formed by the seagrasses range in size from a few inches to more than three feet (0.91 m) tall. The structural complexity of an SAV bed also varies somewhat because of the growth form of the species present (SAFMC 1998). While leaf density tends to be higher in contiguous beds than in patchy SAV habitat, below-ground root-mass is often higher in patchy beds (Fonseca et al. 1998). Patchiness in seagrass bed distribution can result from new beds sprouting from seed or from existing beds that are fragmented by high wave energy or currents (Thayer et al. 1984). The rate that an area of unvegetated bottom can become vegetated may vary on the scale of days or decades, depending on the species and the physical conditions (Fonseca et al. 1998). Consequently, to maintain patchy seagrass beds, an area of shallow soft bottom must be maintained that is at least two times greater than the area of actual SAV coverage (Fonseca et al. 1998). Despite the difficulty of defining the boundaries of seagrass beds, unvegetated bottom between nearby adjacent patches is included as a component of patchy SAV habitat since rhizomes may be present and the beds "move" around with patterns of sediment erosion and deposition (Fonseca et al. 1998). Patchy habitats provide many ecological functions similar to continuous beds (Murphey and Fonseca 1995; Fonseca 1996b).

The dynamic nature of seagrass beds has important implications for fisheries habitat. Seagrass habitat can change at a scale of hours to decades (Fonseca et al. 1998; SAFMC 1998). Therefore, one should

consider historical as well as current SAV occurrence to determine locations of viable seagrass habitat (SAFMC 1998). Seagrass abundance and biomass fluctuate seasonally (Dawes et al. 1995). In North Carolina, annual meadows of eelgrass are common in shallow, protected estuarine waters in the winter and spring when water temperatures are cooler. However, in the summer when water temperatures are above 25 – 30°C (77 – 86°F), shoalgrass is more abundant, and eelgrass thrives only where water temperatures are lower (i.e., deeper areas and tidal flats with continuous water flow (SAFMC 1998).

Habitat requirements

Beds of SAV occur in North Carolina in subtidal, and occasionally intertidal, areas of sheltered estuarine and riverine waters where there is unconsolidated substrate (loose sediment), adequate light exposure on the bottom, and moderate to negligible current velocities or turbulence (Thayer et al. 1984; Ferguson and Wood 1994). The factors generally considered to limit the success of SAV are light, salinity, wave energy, and nutrients. Specific habitat requirements for individual species are presented in Table 4.1.

The primary factor controlling distribution of SAV is the penetration of light through the water column (Duarte 1991; Kenworthy and Haunert 1991; Goldsborough and Kemp 1988; Stevenson et al. 1993; Dennison et al. 1993; Virnstein and Morris 1996). Availability of light to SAV is determined by water clarity, also known as "transparency." Water clarity can be quantified indirectly by measuring turbidity (nephelometric turbidity units or NTU) or secchi depth (maximum depth where a standard object can be seen by the human eye), or directly by measuring the amount of sunlight that penetrates through the water and reaches the leaves of underwater grasses. At a minimum, seagrasses require 15-25% of the light that is available on the water's surface to reach them (Dennison and Alberte 1986; Kenworthy and Haunert 1991; Bulthius 1994; Fonseca et al. 1998). If less light is available, photosynthesis is limited, reproduction may be inhibited, and growth and survival of the submerged vegetation can not be sustained.

Water clarity can be reduced by natural substances in the water column, such as dissolved organic matter (e.g., humics), suspended particulate matter (e.g., sediment and minerals), detritus, and algae. As the water column becomes more turbid and less transparent, light attenuation (absorption and scattering of light by particles in the water column) increases. Water color also affects light penetration. For example, dissolved organic matter such as tannic acid (produced naturally in swamp waters via breakdown of detritus) and lignins (produced artificially as a byproduct of wood pulp mill processing) strongly absorbs blue light. Seagrasses generally cannot survive below a certain depth because of light limitations. Therefore, as water clarity declines, SAV beds in deeper waters are lost first. In coastal North Carolina, SAV can grow in water up to 2.5 m (8.20 ft) deep and secchi depths averaging approximately one meter (3.28 ft) (Ferguson and Wood 1994) (Map 4-1).

Light and water quality requirements for SAV in Chesapeake Bay were reevaluated and revised in 2000 by the Chesapeake Bay Program in a technical synthesis (EPA 2000). These requirements are listed in Table 4.2 by salinity regime. The primary limiting factor is light; sufficient light must reach the SAV so that photosynthesis can occur. The EPA partitions available light into two categories. The "water column light requirement" refers to the amount of light penetrating through the water column. The "light at leaf requirement" refers to the amount of light that can penetrate the leaf surface due to epibiotic coverage. Environmental conditions that allow adequate light penetration for SAV survival are total suspended solids (TSS) less than 15 mg/l and chlorophyll *a* less than 15*ug*/l. No secchi depth or turbidity values were recommended. In contrast, preliminary bio-optical modeling suggests that the water conditions required for seagrass survival may be less stringent in North Carolina's North River relative to conditions in the Chesapeake Bay (P. Biber, NMFS, pers. com., 2003). Specifically, the maximum values of TSS and chlorophyll *a* that can occur at any given depth and still allow SAV survival may be somewhat higher than that needed in Chesapeake Bay. Greater tidal current magnitude (causing the prolonged suspension of relatively larger particles) and decreased absorption/scattering capacity of phytoplankton species and sediment types specific to North Carolina may be responsible for the observed regional differences (P.

Biber, NMFS, pers. com., 2003). Given certain combinations of turbidity and nutrients, North Carolina's current standards may not be adequate to sustain SAV (P. Biber, NMFS, pers. com., 2003). *Additional estuaries should be modeled to determine environmental requirements for SAV over a broader scale and to determine if changes in EMC water quality standards are needed.*

Table 4.2. Recommended primary and secondary submerged aquatic vegetation habitat requirements for the Chesapeake Bay and its tidal tributaries classified by salinity regimes. *[Source: Funderburk et al. 1991; EPA 2000]*

		Primary Requirements[1]		Secondary Requirements[2]			
Salinity regime (ppt)	SAV growing season	"Light at leaf" requirement	Water column light requirement	Total Suspended Solids (mg/l)	Chlorophyll a (ug/l)	Dissolved inorganic phosphorus (mg/l)	Dissolved inorganic nitrogen (mg/l)
Tidal fresh	April-October	>9%	>13%	<15	<15	<0.02	none
0 .5 - 5.0	April-October	>9%	>13%	<15	<15	<0.02	none
5.0 - 18.0	April-October	>15%	>22%	<15	<15	<0.01	<0.15
18.0 - 30+	March-May, Sept.-Nov.	>15%	>22%	<15	<15	<0.02	<0.15

[1] Assessed with percent light at the leaf and percent light through the water parameters. All habitat requirements are independent of restoration depth.

[2] Secondary requirements are used to determine possible reason for non-attainment of the primary requirement.

Field sampling of SAV beds in North Carolina between 1988 and 1991 found that occurrence of SAV in the study area was related to water depth, water clarity as measured by secchi depth, and salinity. This study did not measure light attenuation or percent light availability (Ferguson and Wood 1994). Environmental conditions where SAV species occurred are listed in Table 4.1. In the area sampled, average depth of SAV occurrence ranged from 2.63–3.94 ft (0.8–1.2 m), depending on the species. The maximum depth of observed presence, regardless of species, was 7.87 ft (2.4 m) (Ferguson and Wood 1994). Data indicated that freshwater SAV had a somewhat greater tolerance to turbidity than salt and brackish seagrasses, since they were found in areas of similar water depths to high salinity grasses, but secchi depths were less (Ferguson and Wood 1994). This feature supports other research (Funderburk et al. 1991) showing that salt/brackish seagrasses require slightly greater water clarity (secchi depth >1.0 m, or 3.28 ft) than freshwater SAV (secchi depth >2.63 ft or 0.8 m).

Other physical and chemical factors that impact SAV include salinity, nutrients, and wave exposure. The average salinity for freshwater SAV is between 1 and 2 ppt, while the average salinity for salt/brackish SAV ranges from 15 to 26 ppt (Ferguson and Wood 1994) (Table 4.1). Widgeon grass occurs in both high and low salinity waters, with an average salinity of 15 ppt. Salt/brackish SAV requires less than 0.15 mg/l of dissolved inorganic nitrogen and less than 0.01 mg/l of dissolved inorganic phosphorus (Funderburk et al. 1991). The majority of nitrate used by SAV is derived from the sediment, rather than the water column (Thayer et al. 1984). Contiguous beds of eelgrass or other species of SAV rarely occur in windswept areas or where currents are strong (>20-40 cm/s) (Thayer et al. 1984; Fonseca et al. 1998). Work was done in Core Sound by Fonseca et al. (1998) to analyze the effect of wave exposure and currents on SAV coverage. They found significant relationships, with percent cover of SAV decreasing with increasing relative wave exposure indices or current speed. *This information could be used to determine habitat suitability for SAV restoration in Core Sound. A similar process could be conducted in other areas, particularly low salinity areas, where large losses of SAV have historically occurred. Alternative measures of restoration site suitability could be investigated in areas where the Fonseca wave exposure model has yet to be tested (P. Biber, NMFS, pers. com., 2003; <http://www.marine.unc.edu/Paerllab/research/seagrass/field_experiments.htm>, 2003).*

Below is a brief description of the habitat and plant characteristics of the five submerged grasses common

to North Carolina's brackish to freshwater systems and the three submerged grasses common to high salinity estuarine waters (Hurley 1990). Widgeon grass is included with high salinity grasses, but it can tolerate low salinity as well.

High salinity grasses

- Eelgrass (*Zostera marina*): Grows in fine muds, silts, and loose sand in high salinity waters and can tolerate high energy waters (Thayer et al. 1984). Reproduces vegetatively from October to June, and sexually from December to April. Present primarily as a seed-bank from July to November (P. Biber, NMFS, pers. com., 2003). Rhizomes rarely deeper than 5 cm (1.97 inches). Can spatially coexist in beds with *Halodule* in North Carolina, but is dominant from winter to summer, with lower densities during summer months relative to that of *Halodule* (Thayer et al. 1984).
- Widgeon grass (*Ruppia maritima*): Tolerates a wide range of salinity regimes. Slightly brackish to moderately brackish and high salinity. Found growing with eelgrass. Widgeon grass is more common in shallow areas, with eelgrass in deeper waters. Spreads vegetatively from creeping rhizome during April - October. Rare occurrence reported in fresh water. While more common on sandy substrates, is also found on soft, muddy sediments. High wave action damaging to slender stems and leaves.
- Shoalgrass (*Halodule wrightii*): Forms dense beds and can occur in very shallow water. Known for its relative tolerance to desiccation (drying out) once rooted. Rhizomes situated fairly shallow in sediment and may extend into the water column with attached shoots. Almost exclusively vegetative (asexual) reproduction from April through October and sexually on a very rare basis in spring and summer (J. Kenworthy and P. Biber, NMFS, pers. com., 2003). Due to its clonal reproductive strategy, genetic diversity may be quite limited and, as such, populations may be at particular risk to changing estuarine conditions (P. Biber, NMFS, pers. com., 2003). May co-occur with *Zostera* and dominates mid-summer through fall in North Carolina, after which *Zostera* becomes relatively more predominant (Thayer et al. 1984).

Low salinity grasses

- Bushy Pondweed or Southern Niad (*Najas quadalupensis*): Present in small freshwater streams. Also tolerates slightly brackish waters. Sand substrates preferred. Can grow in muddy soils. *Najas* spp. requires less light than other SAV species.
- Wild celery (*Vallisneria americana*): Primarily a freshwater species occasionally found in moderately brackish waters. Coarse silt to slightly sandy soil. Tolerant of murky waters and high nutrient loading. Can tolerate some wave action and currents compared to more delicately leaved and rooted species. Similar in appearance to eelgrass.
- Sago pondweed (*Potamogeton pectinatus*): Fresh to moderately brackish. Tolerates waters with high alkalinity. Associated with silt-mud sediments. Long rhizomes and runners provide strong anchorage to the substrate. Capable of enduring stronger currents and greater wave action than most other SAV.
- Redhead grass (*Potamogeton perfoliatus*): Found in fresh to moderately brackish and alkaline waters. Grows best on firm muddy soils and in quiet waters with slow-moving currents. Because of its wide leaves more susceptible to being covered with epibiotic growth then the more narrow leaved species. Securely anchored in the substrate by its extensive root and rhizome system.
- Eurasian watermilfoil (*Myriophyllum spicatum*): This species inhabits fresh to moderately brackish waters. Affinity for water with high alkalinity and moderate nutrient loading. Grows on soft mud to sandy mud substrates in slow moving stream or protected waters. Not tolerant of strong tidal currents and wave action. Over-wintering lower stems provide early spring cover for fish fry before other SAV species become established. *M. spicatum* is a non-native, invasive species, estimated to cover over 4000 acres in Currituck and Albermarle Sounds during the 1990s (DWR 1996), and is classified by the North Carolina Board of Agriculture as a Class B noxious

weed [02 NCAC 48A .1702].

Distribution

Seagrasses occur along the entire east coast of the United States, with the exception of South Carolina and Georgia, where high freshwater input, high turbidity, and large tidal amplitude (vertical tide range) inhibit their occurrence. The most recent estimate for estuarine SAV in North Carolina is approximately 200,000 acres (80,937 hectares(ha)) (Ferguson and Wood 1994), or about 7% of the estuarine bottom in North Carolina. Along the Atlantic coast, North Carolina supports more SAV than any other state, except for Florida (Table 4.3). Based on interpretation and ground-truthing by NOAA of remotely-sensed imagery taken during 1985-1990 (Ferguson and Wood 1994), areas of visible SAV were mapped as follows:

SAV Distribution in North Carolina	
Eastern Pamlico Sound	90,000 acres (36,421.71 ha)
Core Sound	19,938 acres (8,068.62 ha)
Albemarle Sound	4,439 acres (1,796.39 ha)
Croatan/Roanoke Sounds	926 acres (374.74 ha)
Neuse River estuary	91 acres (36.83 ha)
Pamlico River estuary	378 acres (152.97 ha)
Western Pamlico Sound	83 acres (33.58 ha)

Table 4.3. Estimated spatial coverage of submerged aquatic vegetation in coastal waters of mid- and south Atlantic states.

State	SAV		Source
	acres	hectares	
Florida	2,658,290	1,075,772	Sargent et al. (1995)
North Carolina	200,000	80,937	Ferguson and Wood (1994)
Chesapeake (Va and Md)	59,300	23,998	Funderburk et al. (1991)

In 1981, visible SAV in Core and Bogue sounds covered 19,458 acres (7,874.37 ha) within a total water area of 104,840 acres (42,427.24 ha) (19% SAV coverage; Carraway and Priddy 1983). However, acreage for these areas may be underestimated, particularly in low salinity riverine areas, since aerial photography at the scale utilized (1:24,000) may not be able to detect some SAV due to the relatively small patch size and high turbidity of the water.

Physical and chemical conditions of the Albemarle-Pamlico estuarine system provide suitable habitat conditions for SAV growth. The extensive barrier islands of the Outer Banks protect the east side of Pamlico Sound and other smaller sounds within the Albemarle-Pamlico estuary. Tides and currents are primarily wind-driven. The western shorelines of the sounds are less protected from the wind, but because of the reduced currents and tidal amplitude, they also support SAV growth where water depth is shallow enough and water quality conditions allow. Aside from physical and chemical limitations, survival of SAV can be affected by excessive covering of drifting macroalgae or epiphytes, and disease outbreaks like eelgrass wasting disease (Stephan and Bigford 1997). In Florida Bay, uncommon yet large-scale grazing events by urchins (Rose et al. 1999) restricted seagrass distribution. It is unknown if similar overgrazing incidents by these or other organisms have affected seagrasses, recently or historically, in North Carolina.

At present, SAV habitat in coastal North Carolina occurs mostly in sandy and muddy sediment and high salinity waters along the estuarine shoreline of the Outer Banks, with sparse cover along much of the

mainland shores of the estuarine system (Ferguson et al. 1989). Within the Coastal Plain, freshwater SAV is locally abundant in some larger blackwater streams and rivers, but is rare in small blackwater streams (Smock and Gilinsky 1992) due to shading from forested wetlands and irregular flows typical of low order streams. Freshwater SAV can be extensive in some low-salinity back bays and lagoons (Moore 1992), and may also occur in coastal lakes such as Lake Mattamuskeet.

Limited SAV distribution and lower species diversity of SAV have been associated with areas of low salinity (5–18 ppt) (Ferguson and Wood 1994). Seagrasses in these regions may be limited by long wind fetch (the horizontal distance over which wind blows, creating waves), lack of protected shallow bottom, extreme currents, reduced light availability, and excessive nutrient enrichment. Shoalgrass or eelgrass were not observed in western Pamlico Sound or the Pamlico or Neuse estuaries despite acceptable salinity ranges. The presence of SAV in low salinity waters (<5 ppt) of Albemarle and Currituck sounds and their tributaries was relatively low (Ferguson and Wood 1994). Map 4.2 shows SAV areas mapped by Carraway and Priddy (1983) and Ferguson and Wood (1994). The area of SAV habitat within CHPP management units is presented in Table 4.4.

Table 4.4. Submerged aquatic vegetation (SAV) coverage within Coastal Habitat Protection Plan management units (MU) based on mapping work of Carraway and Priddy (1983) and Ferguson and Wood (1994).

	SAV		Total Water*		
MU	acres	hectares	acres	hectares	% SAV
Albemarle	13,638.37	5,519.25	604,416.92	244,598.85	2.26
Core/Bogue	36,188.68	14,645.04	167,946.49	67,965.53	21.55
Neuse	95.72	38.74	112,816.70	45,655.30	0.08
Pamlico	83,403.19	33,752.07	1,020,521.96	412,990.59	8.17
Tar/Pamlico	392.14	158.69	117,122.97	47,397.98	0.33
Total	133,718.09	54,113.79	2,022,825.04	818,608.26	6.61

*Water area includes broad open waters detected on 1:100,000 scale USGS topographic maps

Estuarine SAV occurs sporadically west of Bogue Inlet to the border with South Carolina, but these areas have not been suitably photographed (Ferguson and Wood 1990). Small areas of SAV habitat have been observed in the past few years by DMF biologists in the New River, Alligator and Chadwick bays, Topsail Sound and inside Rich's Inlet (M. Allison, DMF, pers. com., 2002). Other studies reporting distribution of salt/brackish SAV include Davis and Brinson (1983) for Currituck Sound, Brinson and Davis (1976) for the Chowan River, and DWQ (1998) for the Neuse River. The U.S. Fish and Wildlife Service's National Wetland Inventory (NWI) Program has mapped some SAV in inland fresh waters. However, this information has not been summarized by CHPP management unit or region.

4.2. ECOLOGICAL ROLE AND FUNCTIONS

Submerged aquatic vegetation provides important structural fish habitat and other important ecosystem functions in estuarine and riverine systems in coastal North Carolina. The SAFMC (1998) recognized SAV as an essential fish habitat because of five interrelated features of seagrass meadows – primary production, structural complexity, modification of energy regimes, sediment and shoreline stabilization, and nutrient cycling. Water quality enhancement and fish utilization are especially important functions of SAV relevant to the enhancement of coastal fisheries.

Productivity

Seagrass habitat is dominated by dense stands of primary producers – underwater grasses. These grasses produce large quantities of organic matter. Estimates of daily production for eelgrass beds rank among the most productive of marine plant habitats (Thayer et al. 1984). The typical biomass of growing SAV beds (leaves + rhizomes) in North Carolina was reported as 57–391 g (dry weight)/m^2 (Thayer et al. 1984; Twilley et al. 1985). Primary productivity is derived approximately equally from above ground and below ground growth.

Because of their high rates of primary production and particle deposition, SAV beds are important nutrient sources (nutrients are exported from the bed to other users) and sinks (nutrients are retained within the bed by the plant structure (leaves and roots), especially during high growth periods (SAFMC 1998). Thayer et al. (1984) concluded that SAV beds in high velocity areas are sources of organic matter, while SAV in low current areas are sinks of organic matter (detritus). Important sources of organic matter produced by SAV habitat include the SAV plant tissue, epibiotic organisms attached to SAV leaves, microalgae and macroalgae present on sediments among SAV plants, and dissolved organic matter released during metabolism (SAFMC 1998). Ultimately, large amounts of nutrients, originally retained by SAV, are exported via secondary production and trophic interactions by animals as they depart nursery areas following larval and juvenile development (Thayer et al. 1984).

Attached epibiota contribute substantially to the total productivity of SAV beds (Thayer et al. 1984) and are an important food source for fish and invertebrates. Approximately 25% of the average annual above-ground biomass of an eelgrass bed in the Newport River was attributable to epiphytes (Penhale 1977). In certain instances, total biomass of epibiota can actually exceed that of the SAV leaves to which the epibiota are attached. While they may increase primary productivity of the habitat, epibiota may also significantly reduce productivity of individual plants if coverage is too extensive (Thayer et al. 1984). Dillon (1971) estimated that epiphytic macroalgae constitute 10% of the total SAV biomass in a North Carolina estuary, although seasonal variability in macroalgal abundance corresponds to seasonal fluctuations in eelgrass biomass (Penhale 1977; Thayer et al. 1975).

Exported matter represents a large portion of total SAV production in salt/brackish SAV beds in North Carolina (Thayer et al. 1984). When grasses die and decompose, the detrital material is broken down by invertebrates, zooplankton and bacteria, and energy is transferred through the estuarine detrital food web. Because it breaks down much slower than algae, SAV decomposition generally does not cause anoxic conditions (Hurley 1990). Decomposed SAV matter and its associated bacteria are actually of greater importance as a food source for fish than the living SAV leaves (Thayer et al. 1984).

Ecosystem enhancement

System enhancement includes any positive effect on other habitats provided by proximity to SAV. Because seagrasses are rooted in the substrate and provide long-term submerged structure in estuaries and coastal rivers, system enhancement is one of their more important ecological functions. Some of these functions include (SAFMC 1998):

- Modification of water flow and reduction in wave turbulence,
- Accelerated deposition of sediment and organic matter,
- Physical binding of sediments beneath the canopy, and
- Nutrient cycling between the water column and sediments.

The network of leaves, stems, and roots of an SAV bed oxygenate the surrounding water, filter and trap sediments, and utilize excess nutrients (nitrogen and phosphorus) dissolved in the water (Thayer et al. 1984). These processes increase water clarity and improve conditions for further SAV growth. The absorption of excess nitrogen and phosphorus by SAV can reduce the frequency of nuisance algal blooms and resultant anoxic waters when the blooms die off and decay (Thayer et al. 1984). During active

periods of growth and leaf turnover, nutrients cycle rapidly between plant tissues and the organisms that feed upon them. This retention and controlled release of nutrients improves water quality down current and also provides a stable foraging base for herbivores, detritivores, and secondary consumers (Thayer et al. 1984).

Suspended sediment is removed from the water column when the frictional drag of water flowing over the leaves and stems reduces water velocity and wave energy, allowing sediment to settle out of the water column. Roots bind and stabilize the substrate, partially inhibiting bottom sediments from being resuspended (Thayer et al. 1984; SAFMC 1998). This deposition enhances the productivity, stability, and biodiversity of SAV. The rhizomes and roots of SAV stabilize the substrate and form large pools of organic matter and structural matrices supporting many species that live in the sediment (Kenworthy and Thayer 1984). Particle deposition and burial, as well as formation of organic matter in the sediment, facilitate temporary and permanent retention of nutrients within SAV beds by the roots and rhizomes (Thayer et al. 1984; SAFMC 1998). These functions improve water quality down-current of the bed by removing suspended solids from the water column, improving water clarity, and adding dissolved oxygen. The presence of SAV is both a maintainer and indicator of good water quality (Virnstein and Morris 1996; R. Ferguson, NMFS, pers. com., 2000). *However, the exact relationship between the extent of SAV coverage and water quality is unknown and requires research.*

Seagrasses have a stabilizing effect on substrate and nearby shorelines by absorbing wave energy (Fonseca 1996a). By buffering nearshore turbulence, SAV beds reduce erosion along adjacent shorelines, which also helps stabilize marsh edge habitat (Stephan and Bigford 1997). Where water turbulence is too great for SAV to persist, its buffering capacity over time may be limited (Thayer et al. 1984). Although oyster reefs are relatively more resilient to turbulence than SAV beds, both oyster reefs and SAV beds provide, among other ecosystem functions, shoreline protection (Fonseca 1996a; Day et al. 1989).

Fish utilization

Many species occupy SAV at some point in their life cycle (Thayer et al. 1984). However, the importance of SAV depends on its relative contribution to a particular species' refuge, spawning, nursery, foraging, and corridor needs. For instance, some species use SAV directly as a food source (consumption of living plant material) while other species rely on SAV indirectly, by hunting for prey along the edge of the beds, or finding refuge from predation while foraging within the beds.

Submerged aquatic vegetation was classified as "Essential Fish Habitat" (EFH)[1] by the SAFMC (1998) due to its habitat heterogeneity, plant biomass, and surface area, all of which enhance animal abundances. Because of the different temporal abundance patterns in SAV species, feeding habitat and refuge for fish and shellfish are provided almost year-round for estuarine-dependent species (Steel 1991). In North Carolina, the species for which SAV is considered EFH include red drum; brown, white, and pink shrimp; and species in the snapper-grouper complex. While bay scallops are not managed by the SAFMC, the SAV habitat that bay scallops share with federally managed species is technically considered EFH (K. Abrams, NOAA, pers. com., 2003). Several important forage species also depend on SAV habitat. The two EFH categories for SAFMC-managed species are salt/brackish and freshwater SAV.

Salt/brackish grasses

In brackish and high salinity estuaries, fish and invertebrates use SAV, to varying extents, as nursery, refuge, foraging, and spawning locations. Studies in eelgrass beds in the Newport River estuary and vicinity reported between 39 and 56 fish species during regular monitoring conducted in the 1970s (Thayer et al. 1975; Adams 1976; Thayer et al. 1984). Results from DMF's juvenile fish sampling in

[1] EFH is defined by SAFMC as those waters and substrate necessary to fish for spawning breeding, feeding, or growth to maturity.

seagrass beds in eastern Pamlico and Core sounds found over 150 species of fish and invertebrates from 1984 to 1989, of which 34 fish and six invertebrate species were important commercial species (DMF 1990). Adult fish as well as juveniles utilize grass beds. Composition of long haul seine catches sampled by DMF reported at least 49 adult fish species collected over seagrass beds in eastern Pamlico Sound (DMF 1990). In addition to fish, over 70 benthic invertebrate species have been reported from eelgrass beds along the east coast (Thayer et al. 1984). Bay scallops occur almost exclusively in SAV beds (Thayer et al. 1984), and spotted seatrout (*Cynoscion nebulosus*), an important recreational and commercial species in North Carolina, is also highly dependent on the quantity and quality of SAV habitat (Vetter 1977). Species whose relative abundances at some life stage are generally higher in SAV than in other habitats, or otherwise show some preference for SAV, are referred to as "SAV-enhanced." A partial list of species utilizing SAV habitat in North Carolina is compiled in Table 4.5.

Several studies along the coasts of the Atlantic Ocean and the Gulf of Mexico have demonstrated significantly greater species richness and numerical abundance of organisms in seagrass beds compared to unvegetated bottom (Thayer et al. 1975; Summerson and Peterson 1984; Heck et al. 1989; Ross and Stevens 1992; Irlandi 1994; ASMFC 1997a; Wyda et al. 2002). In Back Sound, N.C., a study found that fish and shrimp were more abundant on artificial SAV beds than on shell bottom (Elis et al. 1996). In the Newport River estuary (Core/Bogue MU), rough silverside (*Membras martinica*) and smooth dogfish (*Mustelus canis*) were classified as abundant in SAV beds, but were rare or absent in marsh channel and intertidal flats (Thayer et al. 1984). Blue crabs and pink shrimp were significantly more abundant in SAV beds than in adjacent shallow non-vegetated estuarine bottoms in North Carolina, Alabama, and Florida (Williams et al. 1990; Murphey and Fonseca 1995). In the Chesapeake Bay region, juvenile crabs grow faster, occur more densely, and have higher survival rates in SAV beds (Heck and Orth 1980; Chesapeake Bay Commission 1997). In addition to natural fluctuations in SAV coverage and density, the utilization of SAV by fish and invertebrates differs spatially and temporally due to species distribution ranges, time of recruitment, and life histories (Nelson et al. 1991).

Some studies have shown a linkage between the abundance and species composition of fish and the quantity and quality of SAV. Abundance, biomass, and species richness of fish assemblages in two spatially distant areas of the Mid-Atlantic Bight (Buzzards Bay and Chesapeake Bay) were significantly higher at sites with higher levels of seagrass complexity (biomass >100 wet g/m^2; density >100 shoots/m^2) compared to sites with reduced seagrass complexity (Wyda et al. 2002).

Abundance, biomass, and species diversity at sites with reduced seagrass complexity were more variable than at sites with high seagrass complexity. Sites with lower SAV complexity also had a greater proportion of pelagic species than bottom, structure-oriented species. In Florida Bay, changes in animal abundances were compared between the 1980s and 1990s when significant changes in SAV coverage also occurred (Matheson et al. 1999). The major change observed was a decrease in abundance of small fish and invertebrates that live within the seagrass canopy (such as crustaceans and pipefish) with decreases in SAV coverage, while larger demersal predatory fish (such as toadfish and sharks) increased. Similarly, increases in SAV density were characterized by significant increases in crustaceans. In another study in Florida Bay, greater reductions in pink shrimp abundance occurred in seagrass die-off areas relative to adjacent undamaged or recovering areas (Roblee and DiDomenico 1992). In North Carolina, comparison of pink shrimp densities in continuous and patchy seagrass beds found significantly greater shrimp densities in continuous beds than in patchy grass beds (Murphey and Fonseca 1995). Although patchy seagrass beds did not support as great a density of shrimp, they still functioned as important habitat for pink shrimp (Murphey and Fonseca 1995). The presence of SAV may be the reason pink shrimp can overwinter and survive, supporting a spring pink shrimp fishery in North Carolina (T. Murphey, DMF, pers. com., 2003). The pink shrimp fishery comprises a large portion of North Carolina's annual shrimp landings. In contrast, in South Carolina and Georgia, where no SAV is present, pink shrimp comprise an extremely small portion of the shrimp landings. Similarly, survival of blue crabs in a New Jersey estuary was attributed to the ability of the species to overwinter in SAV (Wilson et al. 1990).

Table 4.5. Partial list of species documented to use submerged aquatic vegetation habitat[5].

SPAWNING GUILD	SAV Functions[1]						
Species	Refuge	Spawning	Nursery	Foraging	Corridor	Fishery[2]	Stock status (DMF 2003)
ANADROMOUS & CATADROMOUS FISH							
River herring (blueback herring and alewife)	X	X	X	X	X	X	Overfished-Albemarle Sound, Unknown-Central/Southern
Sturgeon spp.				X		X[3]	Overfished
Striped bass				X		X	Viable-Albemarle Sound, Atlantic Ocean, Overfished-Central / Southern
American eel	X		X	X	X	X	Unknown
ESTUARINE SPAWNING AND NURSERY							
Bay scallop	X	X	X	X		X	Concern
Grass shrimp	X	X	X	X			
Hard clam	X		X	X		X	Unknown
Rough silverside	X	X	X	X			
INLET & ESTUARINE CHANNEL SPAWNING, ESTUARINE NURSERY							
Blue crab	X		X	X	X	X	Concern
Red drum	X		X	X	X	X	Recovering
Spotted seatrout	X		X	X	X	X	Viable
Weakfish	X		X	X	X	X	Viable
MARINE SPAWNING, LOW-HIGH SALINITY NURSERY AREA							
Atlantic croaker	X		X	X	X	X	Concern
Atlantic menhaden	X		X	X	X	X	Viable
Brown shrimp	X		X	X	X	X	Viable
Southern flounder			X	X		X	Overfished
Spot	X		X	X	X	X	Viable
Striped mullet	X		X	X	X	X	Concern
White shrimp	X		X	X	X	X	Viable
MARINE SPAWNING, HIGH SALINITY NURSERY							
Black sea bass	X		X	X	X	X	Viable-south of Cape Hatteras, Overfished-south of Cape Hatteras
Bluefish			X	X		X	Recovering
Gag	X		X	X	X	X	Viable
Gray snapper	X		X	X	X	X	Concern*
Tautog	X		X	X	X	X	Overfished
Kingfish spp.	X		X	X	X	X	Unknown
Pinfish	X		X	X	X	X	
Pink shrimp	X		X	X	X	X	Viable
Sheepshead	X		X	X	X	X	Overfished*
Smooth dogfish				X		X	Overfished
Spanish mackerel			X	X		X	Viable
Summer flounder			X	X		X	Viable

[1] *Sources: Peterson and Peterson (1979), Thayer et al. (1984), Laney (1997), SAFMC (1998), NOAA (2001), NMFS (2002)*

[2] Existing commercial or recreational fishery. Fishery and non-fishery species are also important as prey

[3] Species under harvest moratorium

* Status from unpublished SAFMC document ("Briefing Material for SAFMC, December 2002 meeting")

[5] Names in bold font are species whose relative abundances have been reported in the literature as being generally higher in SAV than in other habitats. Note that lack of bolding does not imply non-selective use of the habitat, just a lack of information.

Freshwater grasses

In coastal riverine systems, such as the Chowan River, finfish, shellfish, and crustaceans utilize SAV as nursery areas for refuge and protection, particularly minnows, killifish, juvenile striped bass, largemouth bass, and molting/soft shelled blue crabs (Hurley 1990). Floating leaf aquatic vegetation is particularly important in freshwater systems such as the Roanoke River (Cooper et al. 1994). Freshwater SAV is also an important habitat for estuarine species, in streams and some lakes, such as Lake Mattamuskeet. Common species using freshwater SAV is shown below and in Table 4.5. *More research is needed to improve scientific understanding of the relationship of SAV to fresh and brackish water fish species.*

COMMON FISH SPECIES THAT UTILIZE FRESHWATER SAV
(Source: Rozas and Odum 1987; SAFMC 1998; NOAA 2001)

Freshwater species

In freshwater streams and lakes
sunfish
minnows
white perch
juvenile American eel
pirate perch
inland silversides
yellow perch
largemouth bass
bluegill sunfish

Estuarine species

In freshwater streams
juvenile menhaden
spot
blue crab
grass shrimp
bay anchovy

In freshwater lakes
striped mullet
tidewater silverside
white perch

Anadromous Species
striped bass
shad
river herring

Specific biological function

Refuge

The physical structure of SAV conceals prey from visual detection, restricts the pursuit and capture of prey by predators and protects small organisms from adverse weather conditions (Rooker et al. 1998, Savino and Stein 1989, SAFMC 1998). High densities of seagrass shoots and increased plant surface area inhibit predator efficiency and provide shelter to prey (Coen et al. 1981 for grass shrimp; Prescott 1990 for bay scallops; Orth 1992 for blue crabs). Moreover, the predation mortality rate of red drum in unvegetated habitat was up to four times greater than that observed in SAV habitat (Rooker et al. 1998). Light levels are reduced within the canopy as well, further concealing small prey (SAFMC 1998). In addition, cryptic species that have the ability to change color use camouflage to decrease their visibility within the SAV habitat.

Since beds of SAV can be as tall as one meter (3.28 ft), their leaf canopies provide a three-dimensional structure containing a large volume of sheltered water. The blades of SAV can increase the available surface area for colonization by an order of magnitude when compared to adjacent unvegetated habitats (SAFMC 1998). In the sediment, the roots and rhizomes of SAV also provide a matrix for meiofauna[2] and macrofauna [3](Kenworthy and Thayer 1984). Organisms utilize the leaves, roots, and rhizomes, as

[2] Very small benthic animal, 0.1 – 0.5 mm in size, about the size of a sand grain, important food source for larval fish
[3] Small benthic animal larger than 0.5 mm in size; ie., mole crabs, amphipods

well as the space between shoots, for refuge from predators and adverse environmental conditions (SAFMC 1998). Hard clams are significantly more abundant in SAV beds than in adjacent unvegetated bottom due to changes in food supply, predation, and sediment stability (Peterson and Peterson 1979; Peterson 1982; Irlandi 1994, 1996).

The refuge value of SAV also depends on its corresponding value for predators. For example, benthic macroinvertebrates can be more vulnerable to crab predation in SAV because crabs use SAV for refuge from avian predators (Skilleter 1994; Micheli and Peterson 1999; Beal 2000). Summerson and Peterson (1984) hypothesized that nocturnal bottom predators living on sand flats use SAV during the day to avoid their own predators. Predator–prey interactions in SAV habitat are a function of canopy structure, shoot and blade density, and surface area (SAFMC 1998).
Moreover, the relative value of SAV as refuge is also likely to change over time, not only with seasonal patterns of SAV abundance (Prescott 1990) but also during the course of the day. As previously mentioned, mobile epibenthic[4] organisms that typically hide from predators in seagrass beds during daylight may later feed and successfully avoid visually-searching predators on unvegetated flats under the cover of darkness (Summerson and Peterson 1984).

Spawning

Coastal aquatic species that spawn in SAV include blueback herring, mummichog, bay scallop, grass shrimp, and rough silversides (Stephan and Bigford 1997; NOAA 2001). The roots and stems of SAV also provide substrate for attachment of eggs and invertebrates (such as barnacles, sea squirts, and bryozoans). Seasonal patterns of reproduction and development of many temperate fishery species coincide with seasonal abundance of seagrass (Stephan and Bigford 1997). Estuarine-dependent spring-summer spawners utilize SAV habitat in the spring and summer for forage and refuge, residing there prior to emigrating to the mouths of bays and rivers, inlets, or coastal ocean shelf waters to spawn (SAFMC 1998; Luczkovich et al. 1999). Some of these species include red drum, weakfish, spotted sea trout, silver perch, and southern kingfish. *Additional research is needed on how SAV affects spawning success of these or other species.*

Nursery

Submerged aquatic vegetation is a primary nursery habitat for numerous species of fish and invertebrates along the Atlantic coast (Thayer et al. 1984). Important commercial and recreational species present in SAV as juveniles in the spring and early summer include gag, black sea bass, snappers, weakfish, bluefish, mullet, spot, Atlantic croaker, red drum, flounders, and herrings (SAFMC 1998). The roots and stems of SAV provide ideal protection and food for developing fish and invertebrate larvae (Ambrose and Irlandi 1992; SAFMC 1998). Larvae of spring-summer spawning fish (such as anchovies, gobies, pipefish, spotted seatrout, weakfish, hard clams and southern kingfish) use SAV habitat (SAFMC 1998). In North Carolina, where SAV is present year-round, some larval and early juvenile finfish, molluscan, and crustacean species are also present much of the year (SAFMC 1998). Both bay scallops and hard clams attach to seagrass blades temporarily before settling on the bottom (Thayer et al. 1984; SAFMC 1998). While hard clams also utilize other substrates, such as oysters and shell hash, bay scallops almost exclusively utilize seagrass, and are therefore highly dependent on its existence for successful recruitment[5] (Thayer et al. 1984; Stephan and Bigford 1997). Juvenile blue crabs prefer shallow water areas with structure, including SAV, tidal marsh, shell bottom and detritus (Etherington and Eggleston 2000). In the Albemarle – Pamlico system, the majority of initial recruitment occurs in seagrass beds around inlets behind the Outer Banks, unless there is a major storm event. In years with large storm events, crabs are dispersed into additional lower salinity habitats (Etherington and Eggleston 2000). At

[4] Organism that lives at the surface of the bottom, as opposed to burrowed below bottom; ie., starfish, flounder
[5] Successful settlement, and in some cases metamorphosis, of pelagic larvae into their juvenile habitat. Also refers to successful movement of juveniles into adult habitat or fishery.

sites near Ocracoke and Hatteras Inlets, the density of juvenile blue crabs increased significantly with increasing seagrass blade length, but not with biomass or shoot abundance (Etherington and Eggleston 2000). *More research is needed on the use of SAV for larval fish and invertebrate settlement and as a nursery; by determining optimal conditions for such species, additional success criteria may be developed for seagrass restoration projects.*

Several groups of fish use SAV as nursery habitat. Spot, croaker, shrimp, and pinfish are estuarine-dependent offshore spawners that inhabit SAV habitat as early juveniles in winter and early spring. Submerged aquatic vegetation has been recognized as critical nursery habitat for pink shrimp in North Carolina (Murphey and Fonseca 1995). Silver perch, spotted seatrout, and red drum are estuarine spawners, and their juveniles are present later in the spring and in the summer. Estuarine-dependent reef fish use seagrass meadows as juveniles, prior to moving offshore. For example, juvenile gag (*Mycteroperca microlepis*) use SAV habitat for refuge and foraging on crustaceans before moving to offshore hard bottom as a secondary nursery area (Ross and Moser 1995). Juvenile sheepshead (<50 mm or <2.17 in) and juvenile gray snapper also utilize SAV beds (Pattilo et al. 1997). However, juvenile gray snapper are rare in most interior waters of North Carolina, and they are common only in Pamlico Sound from July to November (Nelson et al. 1991).

Some studies have found that juvenile red drum, as well as pink shrimp and sand seatrout (*Cynoscion arenarius*) were more abundant in SAV beds compared to marsh edge, inner marsh, shell bottom, or shallow non-vegetated bottoms (Minello 1999); other studies disagree (Stunz et al. 2002). The degree of preference by red drum for SAV is somewhat uncertain since they also utilize estuaries lacking SAV, such as in the southern portion of North Carolina and South Carolina. However red drum eggs, larvae, postlarvae, and juveniles have been documented in SAV beds in North Carolina which is particularly important as a foraging area for young (1-2 year old) red drum (Mercer 1984; Reagan 1985; Ross and Stevens 1992). Abundance of juvenile red drum in SAV beds varies seasonally and spatially, being more common in grass beds during summer months and in grass beds that are close to spawning areas (Zieman 1982; DMF, unpub. data). Also, juvenile red drum were more abundant in edge habitat with patchy grass coverage than in homogeneously vegetated sites (Mercer 1984; Reagan 1985; Ross and Stevens 1992). Data from DMF red drum seine surveys and tagging studies indicate high abundance of late young of year red drum in shallow high salinity grass beds behind the Outer Banks (DMF 2001c). Rooker et al. (1998) also examined post-settlement patterns by several species in SAV habitat and found densities of red drum, spotted seatrout and silver perch were highest for very small individuals (4-8mm or 0.1 – 0.3 in). These fish utilized SAV habitat at smaller sizes and remained in SAV longer than spot and croaker. Spot and croaker seemed to utilize SAV habitat more as temporary residents, migrating to alternate habitats shortly after their arrival (Rooker et al. 1998).

Studies have shown that recruitment of small juvenile fishes corresponded to periods of greatest SAV coverage (SAFMC 1998). In freshwater SAV beds, Paller (1987) determined that the standing stock of larval fish was 160 times higher than in adjacent open waters, and that larvae would concentrate in the interior of aquatic beds rather than in the transition zones between habitats. This difference suggests that large SAV beds provide better refuge for larvae than an equivalent area of patchy SAV. Several studies in estuarine SAV beds also found that juvenile hard clams, pink shrimp, and blue crabs were more abundant in large or continuous SAV beds than in small or patchy SAV beds, whereas the opposite was found for adult pink shrimp and grass shrimp (Murphey and Fonseca 1995; Irlandi 1997; Eggleston 1998). This finding suggests that habitat fragmentation could have a significant impact on recruitment of some species.

Noble and Monroe (1991) analyzed environmental variables associated with relative abundance and diversity of juvenile finfish and crustacean from the DMF nursery area database for the Albemarle-Pamlico estuarine area. Critical habitat criteria, based on core group characterizations, were developed to better define and protect critical fishery habitats functioning as nursery areas for economically important

finfish and crustaceans. The study recommended classifying a "new type" of nursery area characterized by higher salinities, SAV presence, and a somewhat different species composition than the typical Albemarle-Pamlico Peninsula nursery areas (such as Rose Bay). *Criteria should be developed and implemented to assist with designation of SAV beds as Strategic Habitat Areas by the MFC.*

Foraging

Submerged aquatic vegetation supports numerous complex food webs and serves as a foraging area for fish and invertebrate species. Nutrient sources associated with SAV include, but are not limited to, dissolved organic matter, epibiota, plants and animals living on and in the sediment surrounding SAV rhizomes, and living SAV tissues (Adams and Angelovic 1970; Thayer et al. 1975; SAFMC 1998). The majority of organisms in SAV habitat utilize secondary production from epibiotic communities, benthic algae, organic detritus, and bacteria rather than direct consumption of SAV (Day 1967; Adams and Angelovic 1970; SAFMC 1998).

Benthic invertebrates (i.e., worms, snails) and fish graze on other benthic animals that live in the sediment among SAV roots and stems. These small invertebrates and fish, in turn, provide food for larger fish and shellfish adapted to feed upon them. Benthic algae are important forage items for pelagic-feeding planktivorous fishes (such as silversides) that inhabit the grass beds at night (Meyer 1982). Eelgrass and shoalgrass are highly productive (Thayer et al. 1984), and their stems and leaves provide an important substrate for attachment by small organisms that contribute to the overall productivity of the system and serve as forage for larger organisms (Carr and Adams 1973).

Only a few fish species are known to consume submerged grasses directly. These include pinfish (*Lagodon rhomboides*), spot (*Leiostomus zanthurus*), filefish (*Monocanthus hispidus*), and toadfish (*Opsanus tau*). However, SAV comprised only 1 – 12% of their diet (Thayer et al. 1984). Rather than direct grazing, most fish and invertebrates benefit from SAV indirectly by foraging on small plants and animals associated with the vegetation. In contrast, many species of birds (e.g., black brant, *Branta bernicla;* Canada goose, *Branta canadensis,* and widgeon, *Anas penelope*) graze directly on freshwater SAV. The green sea turtle and West Indian manatee consume salt/brackish SAV (SAFMC 1998). Green turtles appear to be more abundant in seagrass than in unvegetated areas in North Carolina, based on data from incidental occurrence in pound nets (SAFMC 1998). Abundant green turtles closely crop seagrass and greatly reduce the input of organic matter and nutrients to sediments (Jackson et al. 2001). An absence of SAV grazers can result in excessive growth and accumulation of substrate suitable for proliferation of slime mold, which is largely responsible for SAV wasting disease (see Threats section, below) (Jackson et al. 2001).

Fisheries production by SAV results primarily from predator consumption of the plants and animals that live on the seagrass (leaves and roots/rhizomes), benthic algae, and organic detritus (SAFMC 1998). Large predatory fish such as Atlantic stingrays, flounders, bluefish, sandbar and other sharks, weakfish, red drum, spotted seatrout, and blue crabs eat small fish, crustaceans and invertebrates that live in seagrass beds (Thayer et al. 1984). Although large finfish predators represent only a small proportion of the fish biomass in SAV habitat, they can be important in structuring seagrass communities and, at times, can uproot grasses or alter the substrate (e.g., cownose ray; Orth 1975).

Corridor and connectivity

For some species, such as blue crabs, SAV can function as a safe corridor between habitats reducing predation (Micheli and Peterson 1999). In marshes where adjacent SAV was removed, the abundance of grass shrimp declined 27% and was significantly higher where SAV was not removed (Rozas and Odum 1987). Submerged aquatic vegetation adjacent to marshes also provides a refuge at low tide for organisms associated with marsh edge habitat at high tide (Rozas and Odum 1987). Consequently, the catch of fish was also higher at sites with both marsh and SAV, rather than just marsh. In a North

Carolina estuary where SAV occurred adjacent to intertidal marsh, pinfish showed more movement, were more abundant, and weighed more than those in areas where SAV was not present adjacent to the marsh edge, indicating that SAV provided a safe passage and offered additional food resources (Irlandi and Crawford 1997). Similarly, another study in North Carolina found that adult fish abundances were greater where marsh, seagrass, and oyster reefs co-occurred, rather than areas with shell bottom alone or shell bottom with marsh (Grabowski et al. 2000). The corridor function of SAV may also apply to other small predators that are more susceptible to predation in open water. Although red drum have a strong association with marsh edge habitat in Gulf coast estuaries (Minello 1999; Stunz et al. 2002), information is lacking for North Carolina. *Examination of the relationship between juvenile red drum abundance in SAV and marsh edge habitat and the effect of spatial connectivity on habitat use should be conducted to support management of this important species.*

4.3. STATUS AND TRENDS

Status of submerged aquatic vegetation habitat

When SAV beds are subjected to human-induced impacts in addition to natural stressors, large-scale losses of SAV may occur (Fonseca et al. 1998). Such losses of seagrass beds have been as high as 50% in Tampa Bay, 43% in northern Biscayne Bay, and 30% in the northern portion of Indian River Lagoon (all in Florida), and as much as 90% in Galveston Bay, Texas, and Chesapeake Bay (Taylor and Saloman 1968; Kemp et al. 1983; Pulich and White 1991; Smith 1998). In North Carolina, SAV loss has not been quantified, but anecdotal reports indicate that the extent of SAV may have been reduced by as much as 50%, primarily from the mainland side of the coastal sounds (J. Hawkins, DME, pers. com., 2003; B.J. Copeland, MFC, pers. com., 2003; North Carolina Sea Grant 1997). However, since low-salinity SAV tends to exhibit large fluctuations from year to year, and because no mapping has been conducted to quantify the reported SAV changes, the extent of loss is uncertain.

In North Carolina, data on trends in SAV distribution are limited to qualitative information or only certain areas of the coast. For example, while SAV currently is concentrated along the sound side of the Outer Banks (Ferguson et al. 1989), elderly fishermen and fishermen's journal accounts from the late 1800s describe extensive beds of SAV in many coves along the mainland where it is absent today (Mallin et al. 2000). Seagrass wasting disease devastated eelgrass populations throughout the North Atlantic, including North Carolina, between 1930 and 1933, dramatically disrupting estuarine systems. Higher water temperatures apparently stressed the seagrasses, making them more susceptible to the slime mold protist *Labryinthula* (Steel 1991). Healthy eelgrass beds were generally re-established by the 1960s. Some specific information on SAV changes in Currituck Sound and the Tar-Pamlico and Neuse rivers is given below and is depicted in Table 4-6.

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Table 4.6. Timeline of major trends in abundance of submerged aquatic vegetation (SAV) in North Carolina estuaries. *[Source: Davis and Brinson 1983; Steel 1991]*

Year	Changes in submerged aquatic vegetation in coastal North Carolina
1918 - 1919	Major decline in Currituck Sound due to turbidity from opening Albemarle and Chesapeake Canal
1930	Major decline in eelgrass in Pamlico, Core, and Bogue sounds from seagrass wasting disease
1952	Full recovery in Currituck Sound from improved management of canal locks
1955	Four hurricanes cause major loss to SAV in Currituck Sound but it recovers within two years
1960	Eelgrass in Pamlico, Core, and Bogue sounds mostly recovered from seagrass wasting disease
1962	Decline in native freshwater species in Currituck Sound due to saltwater intrusion and displacement by non-native Eurasian watermilfoil
1975	SAV common in upper Pamlico River estuary
1985	Significant declines in SAV in upper Pamlico River estuary (1% of pre-1970s levels), western Pamlico Sound, and Neuse River estuary due to excessive sediment loading
1990	Improved erosion control methods and/or weather patterns result in slight recovery of SAV in Neuse and Pamlico estuaries
2002	Reports of increased SAV in Albemarle Sound, possibly due to drought conditions improving water clarity

Currituck Sound has a significant historical record of observations and/or biomass of brackish water SAV (Davis and Brinson 1983). Studies have documented the status of SAV in Currituck Sound since 1909, including a major decline around 1918 attributed principally to increased turbidity (Bourn 1932; Davis and Brinson 1983). The locks of the Albemarle and Chesapeake Canal were opened during this period (Davis and Brinson 1983). This canal connects the Norfolk (Virginia) Harbor at the mouth of the Chesapeake Bay with Currituck Sound by way of the North Landing River. From 1914 to 1918 the canal was deepened and widened, and the North Landing River was dredged extensively. In 1932, operation of the canal locks was modified, improving the situation, and the SAV began to recover. Submerged vegetation had fully recovered by 1951, with the highest production of submerged aquatic plants in the Currituck-Back Bay system since 1918 (Davis and Brinson 1983). During 1954 and 1955, the occurrence of four hurricanes along the North Carolina coast increased turbidities via sediment suspension and resulted in widespread destruction of plant beds (Dickson 1958). Submerged vegetation in other hurricane-impacted areas of North Carolina may have been similarly affected. However, the SAV community recovered rapidly, as growth was considered good in 1957 (Davis and Brinson 1983). After a severe nor'easter storm in 1962, saltwater intrusion in the sound raised the average salinity slightly (4.4 ppt) and caused major reductions in freshwater SAV biomass (Davis and Brinson 1983). Another factor contributing to reductions in northern Currituck Sound was likely the accumulation of silty, semiliquid dredge spoil in the North Landing River and the resulting turbidity (Davis and Brinson 1983).

As the native SAV beds recovered after 1962, Eurasian watermilfoil (a non-native species) began to spread across Currituck Sound from its northern extremities (Davis and Brinson 1983). The spread of the exotic plant was probably encouraged by improved water clarity caused by dry conditions and higher salinities after 1962 (Davis and Brinson 1983). Before 1962, native sago pondweed and wild celery were the dominant and subdominant SAV species (Davis and Brinson 1983). By 1973, Eurasian watermilfoil had replaced sago pondweed as the dominated aquatic plant species, followed by bushy pondweed (Davis and Brinson 1983). After a severe storm in 1978, bushy pondweed was virtually eliminated, and total

macrophyte biomass was 42% less than in 1973 (Davis and Brinson 1983). Again, the reductions in SAV biomass were associated with extreme turbidity and turbulence associated with the severe weather during the early growing season in 1978. It is apparent from this historical record that SAV coverage and biomass are greatly affected by weather events, site conditions, and human activities that affect turbidity and salinity. This relationship is true not only for Currituck Sound, but also for other coastal water bodies containing SAV.

In the upstream half of the Pamlico River estuary, SAV was common until the mid-1970s (Davis and Brinson 1976; Davis and Brinson 1989). By 1985, SAV biomass had been reduced to about 1% of its pre-1970s biomass (Davis and Brinson 1989). Tidal freshwater SAV (primarily wild celery) was historically abundant in western Pamlico Sound (Copeland et al. 1984), and to a lesser extent, the Neuse River, with pondweeds (*Potamogeton* spp.) and widgeon grass also common (Steel 1991). Submerged aquatic vegetation in these areas declined significantly during the mid-1980s, under excessive sediment loading, and then experienced a resurgence as modest improvements in erosion control promoted an increase in water clarity (Mallin et al. 2000). This information is derived mostly from many recent complaints about abundant SAV around dock areas (Neuse) and from visual observations and fishermen's anecdotal accounts (Pamlico) (Mallin et al. 2000). *The status of SAV in western Pamlico Sound and its tributaries should be confirmed by regular mapping efforts, ideally with an experimental design that will allow inference regarding the cause of any observed changes.*

In 1998 presence and distribution of SAV in the Neuse River estuary was assessed by DWQ, in coordination with NMFS and EPA using aerial photography and field ground-truthing (DWQ 1998). The study area extended from the N.C. Highway 43 bridge north of New Bern downstream to Rattan Bay where the river opens to Pamlico Sound, about 48 river miles (77.25 km). Distribution of SAV in the Neuse River estuary is shown in Maps 4.3a and 4.3b. Eleven species of SAV were documented at the sample sites. The SAV occurred in multiple small patches along both the north and south shorelines of the Neuse River and its tributaries in water depths ranging from 0.5 to 1.4 m (1.64 – 4.59 ft). Roughly 514 acres (208.01 ha) of SAV were delineated. North of New Bern, *Nuphar lutea* was the prevalent species found. In the middle of the river, where most SAV occurred, coontail or hornwort (*Ceratophyllum* sp.) was the most common species, followed by wild celery. The largest patch of SAV occurred on the south shore of the river, downstream of the mouth of the Trent River. This large patch was dominated by wild celery. In the lower portion of the river, widgeon grass was most common. Results showed that SAV was present at four of five areas that had supported SAV in 1991, indicating there has not been a major decline in SAV abundance over the seven-year period on the Neuse. More SAV was identified in 1998 than in 1991. However, because of the different methodologies used, change in coverage can not be accurately assessed.

Some recent, unquantified changes have been noted in SAV distribution and abundance in the Albemarle Sound area and Bogue Sound. Several large eelgrass beds have disappeared in the Intracoastal Waterway in the Morehead City area (Core/Bogue MU) following intensive use of herbicides to control macroalgal growth over the last ten years (Mallin et al. 2000). Over that same time period, large SAV beds near Harkers Island (Core/Bogue MU) have also disappeared following construction activity (unpub. data cited in Mallin et al. 2000). In 1988, the shallow waters of Perquimans River were overgrown with dense stands of Eurasian watermilfoil and other species (Steel 1991) (Map 4.2). After Hurricane Floyd in 1999, those dense stands of milfoil had disappeared. Local commercial fishermen reported that the blue crabs had disappeared along with the grass. In 2002, DMF biologists noted high abundance of SAV throughout many shallow water areas of Albemarle Sound and its tributaries, especially in Perquimans River (S. Winslow, DMF, pers. com., 2002). The SAV was reportedly spreading upstream from the lower reaches of the rivers, near the main body of Albemarle Sound. *Research is needed to verify if a recovery of SAV has occurred and to determine if there is a spatial pattern of that recovery. If there is a pattern, special monitoring and protection should be afforded to those core areas from which SAV begins its recolonization.*

Coast wide aerial photography of SAV combined with on-site sampling is the standard method for mapping SAV in coastal North Carolina and Chesapeake Bay. The method was last used in North Carolina in the late 1980s to early 1990s (Ferguson and Wood 1994). Regular aerial photography and mapping of the coastal area would provide the necessary information to determine status and trends in SAV distribution, coverage, and health over the long-term. *Coast-wide mapping should be repeated at regular intervals using similar methodology to the early 1990s mapping to determine the current location and quantity of SAV coverage and compare changes over time. In addition to maps of current SAV coverage, a comprehensive map of all potential SAV habitat should also be developed.*

A process to calculate relative wave exposure indices has been completed by NMFS for Core and Back sounds. This process allows identification of areas that have physical characteristics, such as water depth, wave exposure, and currents, that are suitable for SAV colonization; which could include SAV habitat. *This process should be conducted in other areas of the coast to identify potential restoration sites for SAV.*

Status of associated fishery stocks

Inadequate data are available to assess if trends in SAV-enhanced fishery species are related to changes in SAV coverage. Of the species identified in Table 4.5 with a preference for SAV habitat, fourteen species were evaluated for fishery status. The hard clam was given an "unknown" status. Of the remaining thirteen stocks with a designated status, two were designated Overfished (15%), four were Concern (31%), one was Recovering (8%), and six were Viable (46%) (SAFMC 2002; DMF 2003; Figure 4.1). Specifically, sheepshead and tautog were listed as "overfished." The SAV-enhanced stocks given a Concern status included bay scallop, blue crab, Atlantic croaker, and striped mullet. Viable and Recovering stocks included red drum, spotted seatrout, weakfish, shrimp, gag, summer flounder, and gray snapper. Whereas much of the cause of declining stock status is attributed to overfishing, habitat loss and degradation can make a stock more susceptible to overfishing. Therefore, protection or enhancement of SAV habitat can be especially beneficial to SAV-enhanced species classified as Overfished or Concern, by maximizing recruitment and productivity.

Trends in fishery data indicate a decline in catch and effort for some prominent SAV-enhanced species. Landings data for bay scallops indicate a long-term decline in catch and effort (Figure 4.2). However, landings and fishery independent sampling indicated that this annual stock showed improved recruitment in Core and Bogue sounds in 2002 (DMF, unpub. data). Blue crabs also appear to be experiencing long-term declines in catch and effort, and possibly reduced abundance in some regions. More fishery-independent information and habitat change analysis are needed to determine the effect of SAV-coverage on the abundance of fish and invertebrates. *To obtain needed information on use and trends of fish utilization in SAV habitat, DMF staff should assess where additional juvenile fish sampling stations are needed and add these to existing sampling programs. Research should be conducted to better assess the relationships of bay scallop and blue crab to SAV and to investigate if long-term declining trends in these fisheries are related to declines in or degradation of SAV.*[6]

[6] Relationships can be generally inferred from habitat studies, which are covered in the Ecological role and function section.

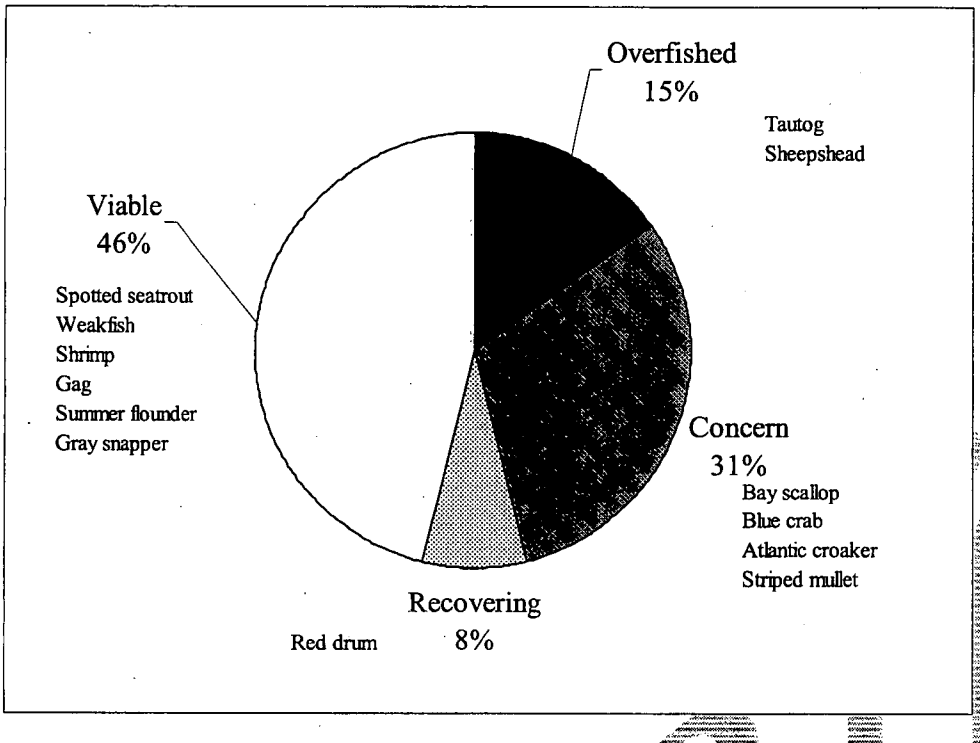

Figure 4.1. Percent of SAV-enhanced fishery stocks classified as overfished, concern, viable, or recovering in the 2003 stock status report.* *[Source: DMF 2003]*

* Refer to Table 4-5 for list of SAV-enhanced fishery species.

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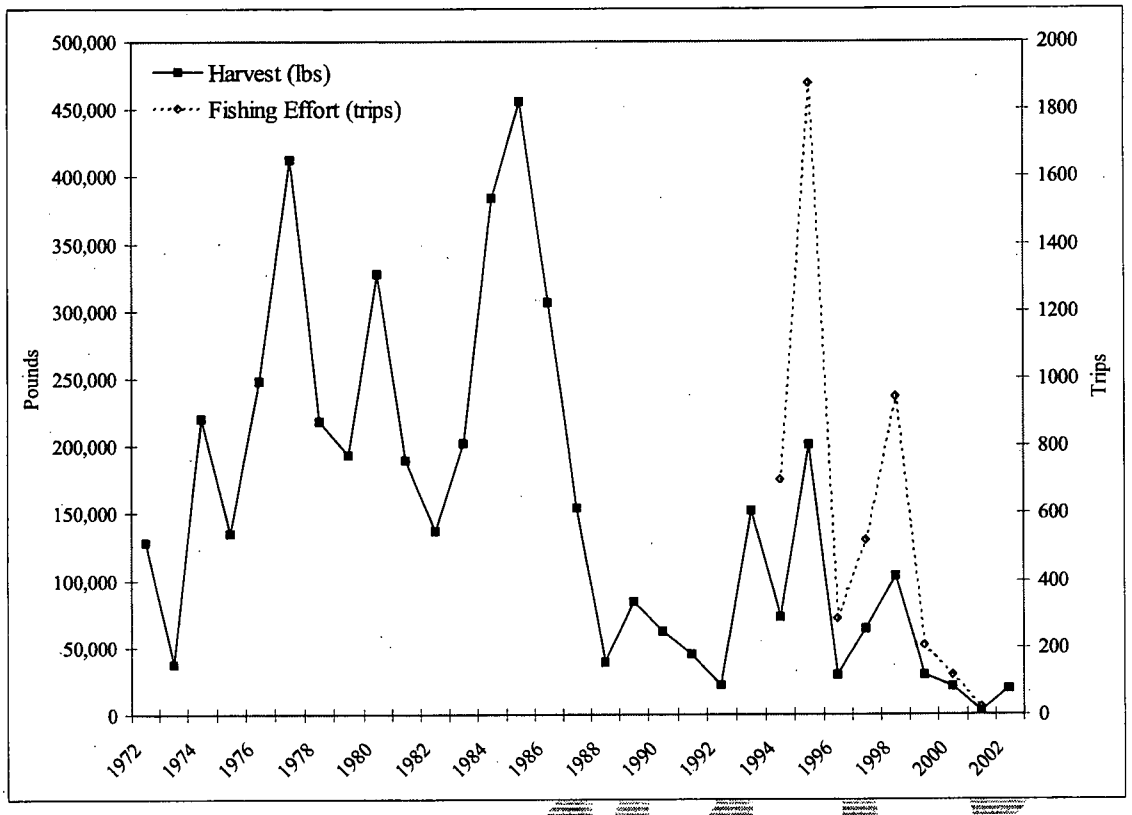

Figure 4.2. Annual commercial landings and fishing effort for bay scallops, 1972 – 2002. *[Source: DMF, unpub. data]*

Submerged aquatic vegetation restoration

Although protection, rather than mitigation or restoration, is the more environmentally sound and less costly management approach for long-term enhancement of SAV fisheries habitat (SAFMC 1998), restoration of SAV beds in areas that historically supported this habitat is possible to offset past losses. Seagrass restoration techniques have been developed and evaluated by the NMFS. Depending on environmental variables, a similar faunal community can return, at the earliest, within two years (Fonseca et al. 1998). The success of replanting efforts is often gauged by an evaluation of "functional equivalency." As defined by Fonseca et al. (1998), an area has achieved functional equivalency when "a restored or mitigated system attains [ecological] functions the same as those of an unimpacted system in a similar setting." According to the authors, an impacted seagrass bed has the potential to become functionally equivalent, but not identical, to an undisturbed seagrass bed if, a) it is at least equal in space to that of the original area prior to disturbance and b) the seagrass species composition is unchanged and persists after the disturbance. Based on review by Fonseca et al. (1998), the time needed to attain functional equivalency for seagrasses ranges dramatically, from less than 2 to more than 31 years. Seagrass shoot densities and canopy height can be used to determine when a restoration project has reached functional equivalency (Fonseca et al. 1998). Studies in Florida have found that SAV shoot densities approximately one third as dense as a natural bed supported similar animal densities (Fonseca 1996a; Fonseca 1996b). In North Carolina, beds having 30-40% SAV coverage had penaeid shrimp densities virtually indistinguishable from beds with continuous cover (Murphey and Fonseca 1995). The size of the restored SAV bed can also affect fish utilization. Some organisms, such as larval fish, juvenile blue crabs, and juvenile hard clams were more abundant in large, contiguous beds than in smaller, patchy beds (Paller 1987; Irlandi 1997; Eggleston et al. 1998). However, even SAV habitats as small as 1-2 m^2

have significantly greater numbers of fish, shrimp, and crabs than found in adjacent sand areas (Fonseca et al. 1998).

Reference materials discussing planting techniques emerged prior to and during the 1970s, but major attention and financial support to study seagrass restoration did not develop until the early 1990s (Fonseca et al. 1998). Prior to that time, the variable track records of SAV mitigation projects, many of which were unpublished or not subject to peer review, discouraged its establishment as a management tool, even though suitable planting methods were available (Fonseca et al. 1998). There have been both failures and successes in seagrass planting (Stein 1984; Thayer et al. 1985). If SAV is not present in an area because of water quality conditions (e.g., insufficient light, excess nutrients), establishment of planted submerged grasses, without improving water quality, is likely to be unsuccessful. Furthermore, EPA (2000) stated that water quality conditions needed to restore underwater grasses are likely to be more stringent than conditions needed to support existing healthy SAV beds. Maintenance of existing beds should, therefore, be a higher priority than restoration. In order to maintain existing SAV habitat, more stringent water quality standards need to be established in those areas. [7]

Restoration of submerged aquatic vegetation is generally conducted for compensatory mitigation, mitigation banking, or research purposes. Benefits of SAV restoration include fish habitat enhancement, sediment and shoreline stabilization, and water quality enhancement. Compensatory mitigation is the replacement of a natural resource, such as a bed of SAV destroyed or severely degraded by a permitted action. Such replacement is often required by the enforcement of Section 404 of the Clean Water Act by the U.S. Army Corps of Engineers (COE) or by State regulations enforced by other regulatory agencies (DCM, DWQ). The intent is replacement of ecological functions such as water quality, habitat, and hydrology. Mitigation is usually also meant to replace an acreage equal to or greater than that which was lost or impacted (<http://dcm2.enr.state.nc.us >, May 2002). Based on data available through the Internet on SAV restoration and mitigation (<http://dcm2.enr.state.nc.us/ims/restsites/srchall.htm>, May 2002), there were 12 SAV restoration projects in Carteret and two in Onslow counties between 1978 and 1991. Of these 14 sites, 11 were considered "successful".

Specifically, "success criteria" are identified by DCM as "those conditions which must be met for a mitigation site to be considered successful in order to receive a permit to impact those wetlands…[and the criteria] may include any combination of the following and often include all of the following: vegetation establishment, wildlife use and a hydrologic regime that is characteristic of the target wetland type" (<http://dcm2.enr.state.nc.us/Wetlands/defs.htm#habitat type>, Spring 2004). Three projects were done as North Carolina Department of Transportation (DOT) mitigation, and the remainder were research projects conducted by NMFS. A total of 1.95 acres (0.79 ha) of bottom were restored to SAV by these projects. This area is relatively small compared to restored shell bottom areas. Seagrass restoration projects tend to be more limited due to the relatively high water quality conditions needed for survival of the plants. *Restoration goals for SAV habitat should be established, including goals for SAV acreage, abundance, and species diversity, considering historical distribution and estimates of potential habitat. However, protection of existing SAV beds should be given a high priority.*

4.4. THREATS AND MANAGEMENT NEEDS

The distribution and quality of submerged aquatic vegetation may be negatively impacted by natural events and anthropogenic activities. Natural events may include regional shifts in salinity because of drought or excessive rainfall, animal foraging, storm events, cold temperatures or disease.[8] Anthropogenic activities can be broken into two basic categories: physical and water quality. Submerged aquatic vegetation is extremely susceptible to physical disturbance because of its vulnerable location in

[7] This approach is discussed in the water quality threats section.
[8] Changes in SAV coverage due to changing salinity patterns were discussed in the Status and Trends section.

shallow nearshore waters. Physical threats can negatively affect SAV by inflicting damage or mortality directly, as well as by indirectly influencing future survival, reproduction or establishment through alteration of preferred conditions (e.g., increased turbidity via bottom sediment resuspension). SAV is vulnerable to water quality degradation, and in particular to sedimentation, primarily because of its relatively high light requirements (Fonseca et al. 1998). Moreover, the timing of anthropogenic impacts can have important ramifications for SAV. For example, disturbances that remove eelgrass and their surrounding sediment during the summer and fall months may have the added consequences of eliminating the seed bank that will produce future season's plants and of reducing genetic diversity (P. Biber, NMFS, pers. com., 2003). Anthropogenic impacts to SAV habitat have been documented and summarized by the ASMFC (ASMFC 1997a), the Chesapeake Bay Program (1995), NMFS (Thayer et al. 1984; Fonseca et al. 1998), and others. Much of the information on threats is from these sources.

Physical threats

Channel dredging

Dredging and filling activities were at one time considered to have the greatest detrimental impact on SAV (Thayer et al. 1984). Dredging for creation or maintenance of navigational channels and inlets resulted in removal or destruction of existing grass beds. The change in bottom depth, bottom sediment characteristics, and water clarity that accompanies dredged channels prevents or discourages future growth or establishment of SAV (Stevenson and Confer 1978; Funderburk et al. 1991). SAV habitat can be destroyed if dredged material is placed directly on existing SAV. Potential SAV habitat can also be eliminated if unvegetated soft bottom is filled and converted to an upland spoil island, or dredged to an excessive water depth. The increased water depth in dredged channels reduces light penetration to the bottom, limiting the ability of SAV to colonize the area. In addition, dredged channels tend to refill with finer sediments (Thayer et al. 1984; Bishof and Kent 1990), which are easily resuspended by currents or boat wakes. The resulting chronic elevated turbidity and sedimentation can reduce light penetration to levels that reduce or eliminate productivity of adjacent grass beds and make colonization of unvegetated areas difficult (Thayer et al. 1984). Turbidity from dredging of fine sediments, such as mud bottom, is usually more severe and persistent than dredging of coarse sand bottom.[9]

Loss of SAV habitat from dredge and fill activities has been particularly severe in bays with major ports or metropolitan areas, such as Tampa Bay, Galveston Bay, and Chesapeake Bay (Taylor and Saloman 1968; Thayer et al. 1984). North Carolina's ports in Wilmington and Morehead City are small in comparison. No SAV occurs in the vicinity of the Wilmington port. In contrast, considerable SAV loss may have occurred in Morehead City when the port's turning basins and access channels were originally dredged, given that nearby, similar yet undredged areas within Bogue sound support SAV. Maps 4.5a-b show the location of the ports, navigational channels and marinas in coastal North Carolina and their proximity to SAV. Because almost all of the eastern shoreline of Core Sound and the southern shoreline of Back Sound are undeveloped (Shackleford and Core banks), the grass beds in that area have not been highly impacted by channel dredging, marinas, or docks.

Current state and federal regulations minimize impacts to SAV from permitted dredge and fill activities, particularly those associated with private development, and have reduced the severity of this threat (SAFMC 1998). Although dredging is currently prohibited in SAV beds, maintenance excavation "essential to maintain a traditional and established use" is approved if four criteria are met [15A NCAC 07H .0208]: "(i) the applicant demonstrates and documents that a water-dependent need exists for the excavation; (ii) there exists a previously permitted channel which was constructed or maintained under permits issued by the State or Federal government (if a natural channel was in use, or if a human-made channel was constructed before permitting was necessary, there shall be clear evidence that the channel was continuously used for a specific purpose); (iii) excavated material can be removed and placed in an

[9] Refer to the "Habitat Requirements" section for the light and sediment conditions needed for SAV colonization)

approved disposal area without significantly impacting adjacent nursery areas and beds of submerged aquatic vegetation; (iv) the original depth and width of a human-made or natural channel will not be increased to allow a new or expanded use of the channel."

The COE maintains 6,992 acres (2,829.56 ha) of navigation channels in coastal North Carolina (COE, unpub. data). Some of these channels may be adjacent to or bisect SAV occurrence (Maps 4.5a-b). New public dredging projects that could potentially impact SAV continue to be proposed. For example, relocation of a ferry landing at the north end of Ocracoke Island might require dredging a new access channel through seagrass. Realignment of an existing navigational channel through Bogue Inlet as part of the Emerald Isle beach nourishment project could destroy existing SAV habitat directly and indirectly through changes in scouring patterns of inlet currents. Alternative proposals often require weighing the impact of one habitat versus another. As the coast becomes more developed, additional projects involving SAV impacts are likely to occur. *The DMF and MFC should use existing permit review authorities and CRC and EMC should provide more protection to SAV within existing permitting authority to prevent or limit as much as possible direct or indirect impacts to SAV from all dredge and fill projects.*

Infrastructure

Other public works projects that can impact SAV include placement of infrastructure, such as bridge supports and fiber optic cables, on submerged lands. Bridge construction and replacement have resulted in SAV loss in several areas of Florida (Fonseca et al. 1998). In North Carolina two bridge projects on the Outer Banks could result in SAV loss. Replacement of the Oregon Inlet bridge with a new bridge and extended causeway behind Pea Island could cause direct impacts to the grass beds west and south of the current bridge, as well as indirect impacts from changing current patterns and scouring. Also, a new bridge is proposed to cross the middle of Currituck Sound. The proposed location is in the vicinity of the largest concentration of SAV in Currituck Sound, but the project is in the early stages of development and could change substantially. Laying of fiber optic cables across submerged bottom can also damage SAV where trench excavation is used (Nero 2001).[10] Impacts to SAV can be minimized by use of directional drilling technology. This method involves drilling a small tunnel under the seafloor instead of dredging a trench from the seafloor surface. *Infrastructure projects that require SAV impacts should be avoided. Where impacts are unavoidable, SAV losses should be minimized and adequately compensated through mitigation, using methods recommended by NMFS for SAV restoration or creation. Such projects should be monitored over time to determine persistence of restored SAV beds.*

Boating activity

Direct physical impacts from propeller scarring, vessel wakes, and mooring scars have recently been identified nationally as a major and growing source of SAV loss (Sargent et al. 1995; Fonseca et al. 1998; ASMFC 1997a). Propeller scarring of SAV occurs when outboard vessels travel through water that is shallower than the draft of the boat. The propeller cuts the plants' leaves, roots, and stems, as well as creates a narrow trench through the sediment. The damaged area is referred to as a "prop scar" (Sargent et al. 1995). A "blow hole" may also be excavated where boaters attempt to rapidly power off the shallow bottom (Kenworthy et al. 2000). Mechanical disturbance to sediments damages the plant's rhizomes, which reduces plant abundance and cover for extensive periods of time, sometimes for many years. Recovery of SAV can take anywhere from 2 to 10 years, depending on the SAV species and local conditions, or in some cases, the habitat may never recover (Zieman 1976; ASMFC 2000). Once started, SAV damage can increase beyond the initial footprint of the prop scar due to physical scouring by tidal currents, storms, or biological disturbance such as crab and ray burrowing (Patriquin 1975; Townsend and Fonseca 1998). As long as the affected areas are unvegetated, their ecological value is reduced (Fonseca et al. 1998).

[10] More information on the use of fiber optic cables in fish habitats is included in the hard bottom chapter of the CHPP

In some areas, particularly in Florida, watercraft have severely scarred seagrass beds (Sargent et al. 1995). Prop scarring was identified as an increasing problem in some areas of Chesapeake Bay as well (Funderburk et al. 1991). In both locations, increasing occurrence of prop scarring was associated with an increasing human population, as well as an increasing number of registered vessels (Hurley 1990; Sargent et al. 1995). Preliminary aerial observations of high salinity grass flats in North Carolina indicate that damage to SAV from propeller scarring is currently not a significant problem. However, as the human population along North Carolina's coast increases, so will the number of boats. From 1990 to 2000, the permanent population of Dare County, which borders most of the high salinity SAV in Pamlico Sound, increased by 31%, while the population of Carteret County, bordering Core and Bogue sounds, increased by 13% (Table 1.2). In addition, the seasonal (summer) population in barrier island municipalities jumped three to as much as 53 times more than the permanent population in 2000 (Table 1.3). Many of the seasonal visitors are also recreational boaters. The permanent population adjacent to waters with low salinity SAV has also increased at varying rates. Along the western shore of Pamlico Sound, population increased 12% in Craven County, 14% in Pamlico County, and 6% in Beaufort County. In northeastern North Carolina, the permanent population of Currituck County grew by 32%, while the counties along tributaries of Albemarle Sound increased by 7-16%. During this same time period, the number of registered boats in North Carolina increased by about 40% (Figure 4.3). As the number of boaters in North Carolina continues to increase, the potential for damage to SAV via prop scarring is likely to increase, as has happened in Florida and Virginia. *Educational outreach is needed to increase awareness by the boating public of the ecological value of SAV and the damaging effects of boat propellers to SAV habitat. The level of damage to SAV from prop scarring should be assessed periodically. In areas where boating activity is found to cause significant SAV impacts, navigational markers should be installed to clearly delineate navigational channels to be used or SAV beds to avoid.*

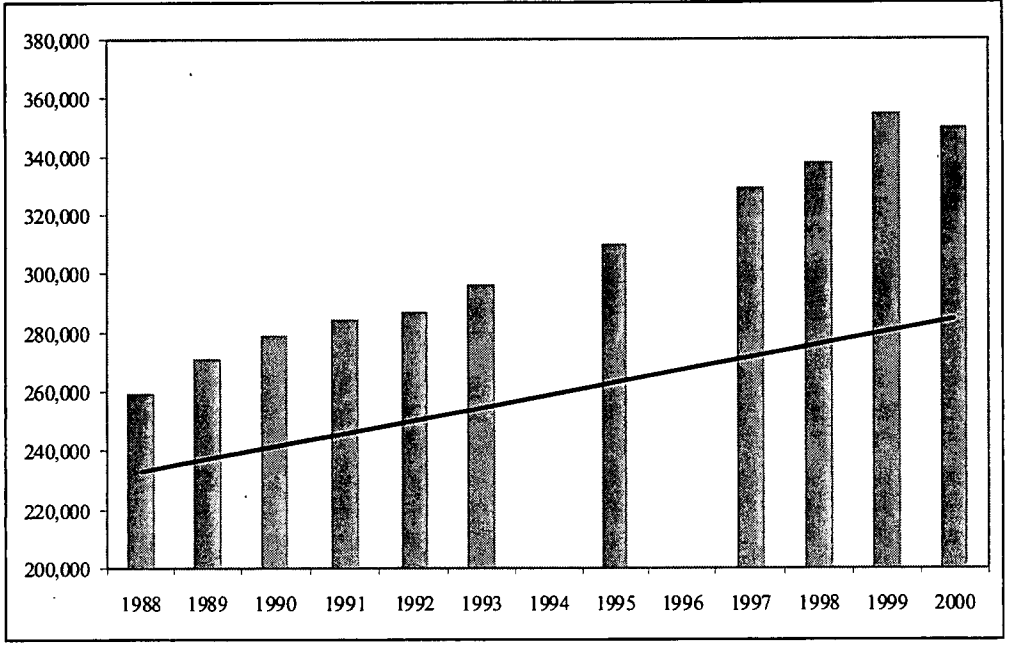

Figure 4.3. Total number of registered boats in North Carolina. *[Source: C. Murphey, North Carolina WRC, 2001]*

Marinas and docks

Marinas and docks impact SAV in several ways. During construction, placement of pilings or dredging of basins may destroy SAV. Once dredged, boat basins, like navigational channels, reduce light availability at the seafloor because of the increased depth, or change the sediment composition so that SAV cannot survive or recruit into the area (Stevenson and Confer 1978). Shoreline hardening structures associated with docking facilities (bulkheads) impact SAV by increasing wave energy and scour along the shoreline where SAV may occur, and by reducing shallow water habitat where SAV exists or could potentially colonize (Funderburk et al. 1991).

Shading from docks also results in loss of SAV beneath the dock structures. In a study in the Indian River Lagoon, Florida, light availability was reduced under docks that were 3 ft (0.91 m) and 5 ft (1.52 m) high to 11 and 14% of ambient light, which is less than the minimum amount needed (15-25%) for growth and survival of seagrass (Beal and Schmit 1998). Light availability increased with increasing dock elevation, and was significantly greater under the higher dock (5 ft or 1.52 m). The Florida Department of Environmental Protection (unpub. data) assessed the impact of dock shading to SAV in Palm Beach County, Florida, and found that 45% of surveyed docks had SAV around them but no SAV under them. Shading effects extended 1–3 m (3.28 - 9.84 ft) to either side of the docks. Seagrass presence was strongly correlated with dock height for docks ranging from 0–5.5 ft (1.68 m) above mean high water (MHW). Other studies in Florida found significantly less SAV under docks than in adjacent unshaded areas (Loflin 1995), and no seagrasses under docks having light levels less than 14% of surface irradiance (Shafer 1995). Offshore mooring of boats for extended periods of time in one location has also been shown to result in SAV loss in a circular area beneath the boat due to shading or damage from anchor and chain movement (Fonseca et al. 1998). These small individual losses of SAV may seem insignificant, but they can have significant cumulative impacts. The location of marinas and public boat access areas relative to SAV is depicted in Maps 4.5a-b.

In addition to direct damage from docks and marinas, indirect damage to SAV can result from boating activity associated with these structures. Shoals and other shallow bottoms supporting SAV may become scarred as boating activity to and from the docking areas increases. Boat wakes can destabilize and erode SAV beds, or resuspend sediment, reducing light penetration. As additional docks and marinas are constructed along the coast, the potential for boating-related damage increases. Based on marina records from DCM and SAV distribution maps, there are at least 104 marinas within 0.5 mi (0.81 km) of mapped SAV beds (Maps 4.5a-b). *Direct, indirect, and cumulative impacts to SAV and other habitats from marina and dock siting should be minimized. Development of a comprehensive state marina policy is needed to achieve this objective.*

Along the southeast coast of Florida, there are stringent standards for dock construction to minimize impacts to SAV. In John Pennekamp Coral Reef State Park in the Florida Keys, docks are prohibited over park bottom because of the documented impacts to SAV from construction, shading, and boating activity associated with the docks (R. Skinner, F.L. Park Service, pers. com., 2002). In other areas, the total square footage, width, or minimum height is limited. In aquatic preserves, guidelines for dock construction at one time required that access piers be five feet (1.52 m) above MHW with half inch (1.27 cm) deck spacing to allow more light to reach beneath the structure (Beal 1999). A minimum water depth of four feet (1.22 m) Mean low water (MLW) at the dock end is required in most areas, and in some areas, a dock may not be permitted if deep water access is not available (minimum of 4 ft [1.22 m] water depth MLW from dock to offshore waters).

In North Carolina, the depth of water at the dock end is not considered in CRC rules. With some exceptions, dock length is limited to no more than 25% of a water body's width, and cannot extend into navigation channels and should not extend beyond the length of other piers along the same shoreline. To minimize shading effects to wetland plants, CRC rules require a dock height of at least three feet (0.91 m)

above the wetland substrate, and a pier width of no greater than six feet (1.83 m) (CRC rule 15A NCAC 07H.0208 (6)). However, there is no requirement for height above the water surface. Total shading of the bottom by piers and docks is limited by a requirement that pier surface area associated with a given waterfront lot may not exceed a combined total area of four square feet per linear foot of adjacent shoreline. *Research is needed to determine if adequate light is available beneath North Carolina docks, given the current CRC dock siting criteria. These criteria should be evaluated to determine if existing requirements are adequate for SAV survival and growth and what changes would be needed to allow at least the minimum amount of light beneath docks. The permit requirements for docks and piers may need to be changed accordingly.*

The cumulative impacts from dock structures in rapidly developing coastal subdivisions must also be considered. The DCM has the authority to deny coastal development permits based on cumulative impacts. However, the research and modeling tools necessary to determine criteria for denial are lacking. *Any research and modeling effort conducted on dock impacts should address the cumulative impact of shading, turbidity, boater access, and other impacts on the quality and quantity of SAV beds.*

Fishing gear impacts

Several bottom disturbing fishing gears have the potential to destroy or damage SAV. The ASMFC SAV policy (ASMFC 1997b) urged development of technical guidelines and standards to objectively determine fishing gear impacts and develop standard mitigation strategies, in cooperation with NMFS and FWS. In North Carolina, the Fisheries Moratorium Steering Committee's Habitat Subcommittee identified specific habitat impacts from various commercial and recreational fishing gears used in North Carolina waters, and made recommendations to minimize such impacts (MFC 1996). The Fisheries Moratorium Steering Committee presented the summary of findings to the Joint Legislative Commission on Seafood and Aquaculture of the North Carolina General Assembly. Fishing gear found to be potentially damaging to SAV is listed in Table 4.7.

Table 4.7. Fishing gears used in North Carolina identified as potentially damaging to submerged aquatic vegetation habitat. *[Source: MFC 1996]*

Severe damage	Moderate damage	Low damage or unsure
Oyster dredge	Crab trawl	Long haul seine
Crab dredge	Clam Tongs	Otter trawl
Hydraulic clam dredge		Clam hand rake
Clam trawl (kicking)		Bay scallop dredge(very little)
Bull rake		

Damage from fishing gear varies in severity. Shearing or cutting of the leaves, flowers, or seeds, and uprooting of the plant without major disruption of the sediment, are most often caused by dragging or snagging of gear, such as long haul seines or bottom trawls (ASMFC 2000). Bull rakes and large oyster tongs can uproot SAV and cause substantial damage, while hand rakes are more selective and cause less damage (Thayer et al. 1984). Shearing of above ground plant biomass does not necessarily result in mortality of SAV, but productivity is reduced since energy is diverted to replace the damaged plant tissue, and the nursery and refuge functions are reduced in the absence of structure. Some fishing practices can cause severe disruption of the sediment and damage the roots of SAV. The ASMFC (2000) discussed several impacts of fishing gears on SAV. Below-ground effects, such as those from toothed dredges, heavy trawls, and boat propellers, may cause total loss of SAV in the affected area, requiring months to years to recover. SAV can be buried by excessive sedimentation associated with trawling, dredging, and propeller wash. High turbidity from use of bottom-disturbing fishing gear can reduce water clarity, affecting SAV growth, productivity, and in some cases, survival.

All toothed dredges can cause severe damage when pulled through SAV. Dredges, like trawls, are dragged across the bottom and organisms are caught in a net or cage. Oyster and crab dredges are essentially the same gears, although a few fishermen may use longer teeth to take blue crabs. Both oyster and crab dredges are limited to a weight of 45.36 kg (100 lb) in North Carolina (MFC rule 15A NCAC 03J .0303 (a)). Oyster and crab dredges have a metal frame less than 1.52 m (5 ft) wide to hold the net open and a blade at the bottom of the frame to which teeth are attached for digging the target species out of the bottom (crabs) or breaking them off from adjoining material (oysters). Qualitatively, damage to eelgrass meadows caused from unspecified dredges used to harvest shellfish was surpassed only by damage associated with propellers (Thayer et al. 1984). Because oyster and crab dredges affect bottom structure, there are strict limits on their use in North Carolina.

Use of crab dredges is restricted to an area in northern Pamlico Sound west of Oregon Inlet [MFC rule 15A NCAC 03R.0109]. In recent years, crabs have not been dredged from areas where SAV was present. However, the designated area overlaps with SAV habitat and could become a problem. Based on SAV data from the late 1980s and early 1990s (Ferguson and Wood 1994), there are 15,560 acres (6,296.91 ha) of SAV within the designated crab dredging area. Crab dredge effort is very low, with roughly 10 crab dredge trips annually in recent years. Use of oyster dredges is currently restricted to parts of Pamlico Sound and its tributaries. The majority of high salinity SAV occurs in areas where the mechanical methods for oyster harvesting are prohibited. However, brackish and freshwater SAV in western Pamlico Sound is generally unprotected from dredging, except in PNAs and SNAs.[11] However, there has been relatively little oyster dredging in the Neuse or Pamlico Rivers in recent years, indicating that most potential problems are in Pamlico Sound. Submerged aquatic vegetation will not be able to recolonize areas that historically supported SAV if they continue to be dredged. *Research is needed to determine where there is suitable potential SAV habitat along the mainland shorelines of the Albemarle-Pamlico system for the purpose of establishing defined SAV restoration goals. Once determined, oyster dredging should be prohibited from areas targeted for SAV restoration.*

Bay scallop dredges, in contrast to oyster and crab dredges, cause less severe damage to SAV because they are smaller (not over 50 lb (22.68 kg)) and have no teeth. They are intended to glide along the substrate surface, taking bay scallops lying on the surface within SAV beds. Bay scallops depend on SAV for initial post-larval setting, so they are strongly associated with SAV beds. An evaluation of impacts to eelgrass (*Zostera marina*) from bay scallop dredging in North Carolina found that scallop dredging over grass beds significantly reduced the biomass, surface area, and shoot density of eelgrass (Fonseca et al. 1984). The impacts were more severe in soft bottom compared to harder bottom. Full recovery was estimated to take up to two years. Because bay scallop populations in North Carolina typically spawn between August and December (Fay et al. 1983), eelgrass leaves are most needed for attachment of juveniles (the next season's scallop crop) during the winter, which is also the time of maximum fishing effort (Fonseca et al. 1984). However, most damage observed by DMF staff has not been from the dredge, but from propeller scarring while pulling the dredge, particularly when the season opening coincides with low tide (T. Murphey, DMF, pers. com., 2002).

The area fished with bay scallop dredges in the Albemarle-Pamlico region (Cunningham et al. 1992) encompasses approximately 46,000 acres (18,615.54 ha) of mapped SAV in eastern Pamlico, Core, Back, and Bogue sounds. Bay scallop landings have been quite variable in recent years, ranging from about 201,000 lb (91,172.07 kg) in 1995 to only 19,000 lb (8,618.26 kg) in 2002. Bay scallops are an annual crop with availability dependent on the previous year's spawning success and survival. Therefore, fishing effort is also quite variable. Reported scallop dredging trips in Core and Bogue Sound have generally declined from 1994 to 2000, peaking at around 1,800 trips in 1995 and falling to fewer than 15 trips annually by 2002 (DMF, unpub. data). Bay scallop dredges accounted for 62-92% of the harvest during

[11] The cumulative number of oyster dredge trips reported in Pamlico Sound varies annually: 224 trips (1997), 1,298 trips (1998), 239 trips (1999) and 691 trips (2000) (DMF, unpub. data).

1994-1998, but only 38% in 1999, and 3% in 2000. Most of the catch is now taken by various hand methods. The low dredge effort is due to very short periods of time open for dredging and reduced bay scallop stocks in recent years. To reduce SAV impacts, DMF allows hand harvest methods for bay scallops early in the season, followed by proclamations to open scallop dredging later in the season, starting on a high tide. This management practice is based on the presumption that the majority of the scallops have been hand harvested in the shallow beds prior to allowing dredging. By opening the first day of dredging on a rising or high tide, damage to SAV by propeller scarring from dredging vessels is minimized because the water depth is approaching or at its maximum (T. Murphey, DMF, pers. com., 2002). At that time, dredgers can harvest the few scallops hypothetically remaining in the shallow beds and then, during the course of the day, move out to the deeper water. *Research should be conducted to determine whether gear impacts or other factors are causing the decline observed in bay scallop landings that was discussed in "Status and Trends." If current bay scallop harvesting methods are found to negatively impact SAV and bay scallop populations, the DMF and MFC should consider rotation of fishing areas, as recommended in Fonseca et al. (1984), or other fishery management techniques.*

Hydraulic clam dredging can cause severe impacts to SAV. This gear directs high-pressure water jets into the bottom to blow surface sediment away and expose clams. The clams are then captured by the dredge head and brought to the surface on a conveyor belt. Hydraulic dredges dig trenches in the bottom, create mounds of discarded material, and redistribute bottom material (Adkins et al. 1983). When hydraulic clam dredging occurs in SAV beds, it digs up all vegetation in a swath approximately three feet (0.91 m) wide (ASMFC 2000). Hydraulic clam dredging can also significantly increase local turbidity (ASMFC 2000). Because of the severe impacts on the bottom, the MFC and DMF restrict use of this gear to open sand and mud bottoms, including areas frequently dredged as navigation channels such as sections of the Atlantic Intracoastal Waterway. This gear is not allowed in SAV or oyster beds and the restrictions are strictly enforced. On average, about 38 vessels make more than 600 hydraulic clam dredge trips to harvest about 72,000 lb (32,658.65 kg) of clam meats annually (DMF, unpub. data).

Another method of mechanical clamming is clam kicking. Several kicking techniques have been developed over time (e.g., anchor, bedstead, oyster drag, clam trawl); each technique uses different gear but all rely on propeller backwash to expose clams buried in the sediment to facilitate their harvest (Guthrie and Lewis 1982). The most prevalent technique currently employed in North Carolina is the clam trawl, in which a small, heavily weighted trawl is towed approximately 15 feet (4.6 meters) behind a kicking vessel (Guthrie and Lewis 1982). These vessels are modified or weighted so that the stern is low in the water, to achieve a more efficient angle and depth at which to force or deflect the propeller backwash into the bottom, thereby displacing the substrate so that the buried clams are collected in the trawl (Guthrie and Lewis 1982). Although the size of associated nets and trawl boards vary according to boat size and water depth, most kicking activities are restricted to depths below about 10 feet (3 m) (Guthrie and Lewis 1982). Some areas where this method is used (open waters of Core Sound, southeast Pamlico Sound) contain clams that otherwise might not be harvested because the areas are exposed to the wind, making it difficult for fishermen to use clam tongs. The methods and gears associated with kicking can also cause severe damage to SAV. Peterson et al. (1987) found that clam kicking reduced plant biomass in eelgrass and shoalgrass beds. Loss of SAV biomass and time needed for recovery increased as intensity of clam kicking increased (Peterson et al. 1987). The probability of historic damage to SAV via kicking seems likely to be high, given that kicking techniques were first experimented with in eastern North Carolina during the 1940s, that almost 150 kicking vessels operated in 1980 in Carteret County alone, and that kicking vessels tend to operate in shallow waters (Guthrie and Lewis 1982).

Because of the severe disturbance to the bottom, clam kicking is restricted to open sand areas in Core and Pamlico sounds, and Newport, North, New, and White Oak rivers (Maps 4.4a-b). The fishery is managed intensively, with strong enforcement to prevent clam kicking outside the designated areas. Much of the designated mechanical clamming areas have SAV in close proximity to them, so vessels that fish illegally outside the open areas may severely impact SAV. Turbidity generated by clam kicking may also affect

adjacent SAV beds. Annual effort in this fishery varies.[12] During 1994 - 2000, clam kicking accounted for about 6-12% of the annual commercial hard clam harvest in North Carolina. Mechanical clamming, including kicking and dredging, accounts for about 21% of annual hard clam landings. High salinity SAV species are more likely to be impacted by mechanical clamming practices due to the location of the fishery.

The Fisheries Moratorium Steering Committee (MFC 1996) recommended that existing areas for mechanical harvest remain, but not be expanded. However, opening a new mechanical harvest area in southeast Pamlico Sound was raised as an issue during development of DMF Hard Clam FMP. The area selected contained SAV, particularly in the shallower water. The final DMF Hard Clam FMP (2001b), added this location as a new mechanical clam harvest area, but restricted harvest to deeper waters where SAV was not present. This new area in southeast Pamlico Sound will be rotated with existing mechanical harvest areas in Core Sound to allow recovery of clam populations in each area. Turbidity and non-compliance with area restrictions could potentially damage surrounding SAV. *Turbidity impacts to SAV at this new location and other existing mechanical harvest areas should be assessed through water quality monitoring.*

Hand gears can also cause varying amounts of damage, but generally to smaller areas than mechanical gears. A hand clam rake looks similar to a garden rake, usually with nine teeth or less. Clam rakes are pulled through the sediment to obtain clams; different techniques are associated with different types of rakes, which reach different depths (Peterson et al. 1983). A bull rake is a large heavy clam rake having 18 to 24 teeth and a basket attached behind the teeth to catch the harvested clams. The length and spacing of the teeth are designed to prevent harvest of undersized clams. Clam tongs, similar to oyster tongs, are a pair of rakes attached to the end of two long poles which are fastened together like a pair of scissors. Bull rakes and large clam tongs can uproot SAV and cause substantial damage to grass beds, while hand rakes are smaller and lighter in weight, and cause less damage. (Thayer et al. 1984). A comparison of the impact of bull rakes and hand rakes on SAV found that a bull rake removed over 80% of the shoots, roots, and rhizomes in a completely raked area, while a hand rake removed 55% of shoots and 37% of roots and rhizomes (Peterson et al. 1983).

Hand clam rakes are used to take intertidal clams during all tidal stages, but are used mostly by recreational clammers during low tide (Cunningham et al. 1992). Clamming with hand rakes occurs in areas around Ocracoke Inlet in eastern Pamlico Sound and in the higher salinity sounds, rivers, and creeks from Core Sound south through Brunswick County. Bull rakes are used by commercial clam fishermen in the same general area, primarily in deeper water (such as New, White Oak, Newport, and North rivers) or during colder months. Many of the bull rake areas are in close proximity to significant SAV beds. Clam tonging occurs primarily in limited areas where there is very little known SAV. Current MFC rules prohibit use of bull rakes and clam tongs in SAV (MFC rule 15A NCAC 03K.03049 (a) (2)). Use of hand rakes and clamming by hand are allowed.

Long haul seines have been reported to cause little or no damage to SAV. A long haul seine is a long (more than 1,000 yd or 914.4 m) net that hangs in the water from the surface to the bottom. The top of the net is suspended at the surface with floats, and the bottom line ("leadline") is weighted so that it will skim the estuarine bottom. Both ends are pulled slowly through the water by boats until the end of the "haul" (Guthrie et al. 1973; DeVries 1981). The extent of damage from haul seining is dependent upon seine length, weight, and the density and height of the SAV. Possible damage includes shearing of the leaves or reproductive structures.

Long haul seine fishing is used in Croatan and Roanoke Sounds; northern and eastern portions of Pamlico

[12] Clam kicking effort: 640 trips (1994), 824 trips (1995), 1095 trips (1996), 1116 trips (1997), 1083 trips (1998), 1162 trips (1999) and 364 trips (2000) (DMF, unpub. data).

Sound along the Outer Banks; portions of the Pamlico River estuary, including the Pungo River and adjacent areas of western Pamlico Sound; and also in portions of the Neuse River estuary, West Bay, Core and Back sounds, and North River (Cunningham et al. 1992). These areas include approximately 78,148 acres (31,625.37 ha) of mapped SAV. The Fisheries Moratorium Steering Committee (MFC 1996) recommended that research be conducted to assess bottom damage associated with long haul seines. A study conducted in Chesapeake Bay found no detectable effect from this gear on plant height, density, or species composition of brackish SAV (wild celery and *Hydrilla*) in Chesapeake Bay (Sadzinski et al. 1996), indicating no need for further restrictions to protect SAV. However, use of the gear differs between North Carolina and Chesapeake Bay, with much larger nets used in North Carolina. Peak use of long haul seines occurred during the 1970s and 1980s, with far less effort in recent years (about 50–60 crews active during the peak, down to 20–25 crews by the early 1990s (DMF 1993). Trip ticket data indicate that the number of seine trips has fallen by more than half from the 1994–1996 period to the 2000–2002 period (DMF, unpub. data).

An otter trawl is another gear that may impact SAV. A trawl consists of a conical net towed behind a fishing vessel at various locations in the water column. Most types of trawls used in North Carolina are held open by water pressure against a pair of "otter boards" or "doors" attached to the front of the net. Bottom trawls used to catch shrimp, crabs, and finfish are towed along the bottom, and both the bottom weighted line ("leadline") at the opening of the net and part of the doors dig into the bottom. Many shrimp trawl fishermen attach a "tickler" chain in front of the leadline to cause shrimp to jump off the bottom in front of the net. The tickler chain also digs into the bottom to some degree.

Many studies have shown that trawling can have severe impacts to sensitive bottom habitats (Auster and Langton 1999, Collie et al. 2000). Because almost all shrimp and crab trawling occurs on sand/mud bottoms, the least complex bottom types, habitat impacts may be relatively low (Auster and Langton 1999). Where trawling does occur over SAV, impacts may occur from the dragging of the net across the seafloor and the digging of the trawl doors into the sediment (ASMFC 2000). It is estimated that the maximum cutting depth for otter trawl doors ranges between about an inch and a foot (2.54–30.48 cm) when used in depths over about 100 ft (30.48 m) (ASMFC 2000), although such deep water does not occur in North Carolina's estuaries. The variation is due to differences in gear weight, bottom hardness, and towing warp to depth ratio (a measure of the force of the gear). Trawl doors were found to penetrate the bottom more than the rest of the gear (ASMFC 2000). Crab trawling impacts to SAV are expected to be more severe than shrimp trawling because of the heavy chain used on the bottom line. However, far fewer crab trawl trips (about 2,000) occur annually than estuarine shrimp trawl trips (about 10,000).

The greatest use of trawls in North Carolina is in the shrimp fishery, with about 13,000 trips annually during 2000–2002. About 75% of the trips occur in estuarine waters, and the rest are mainly within the U.S. Territorial Sea (0-12 nautical miles or 22.22 km). Shrimp trawls are used primarily in Croatan, Roanoke, and Pamlico sounds; the Pamlico, Pungo, Bay and Neuse rivers; and in Core, Back, and Bogue sounds, including the New, White Oak, Newport, and North rivers (Cunningham et al. 1992). The areas open to trawling cover approximately 20,035 acres (8,107.88 ha) of mapped SAV. Trawling is not allowed in designated Primary or Secondary Nursery Areas (PNA, SNA) or No Trawl Areas (NTA) (Maps 3.5a-c). Low-salinity SAV beds occurring along the western shoreline of Pamlico Sound and its tributaries are protected from trawling primarily by the PNA and SNA regulations. The No Trawl Areas primarily protect high salinity SAV located along the eastern edge of Pamlico Sound, and a few areas along the western shoreline of Pamlico Sound, as well. Trawling is also prohibited in Currituck and Albemarle sounds. Core Sound and a large portion of Bogue Sound, which both contain significant amounts of SAV, are open to trawling. The average annual harvest of shrimp in Core and Bogue sounds is about 893,000 and 338,000 pounds (405,057.99 and 153,314.22 kg), respectively. The harvest indicates a substantial trawl fishery in these areas.

Fishery restrictions already exist for most of the gears used in North Carolina that are potentially

damaging to SAV. Based solely on numbers of trips and SAV acres covered, trawling in Core and Bogue sounds has the greatest potential for significant fishing gear impacts on SAV. However, without knowing the specific areas affected per fishing trip, it is difficult to evaluate the impact of these fishing gears on SAV habitat. *Field studies are needed to assess the effect of shrimp and crab trawling on SAV in North Carolina, particularly in Core and Bogue sounds. In addition, the boundaries of No Trawl Areas should be evaluated and adjusted, if necessary, to adequately protect all high salinity SAV beds and provide a buffer of unvegetated area to reduce turbidity impacts. Additional law enforcement may be needed to enforce buffers around SAV.*

In identifying potentially damaging fishing gear, the ASMFC recognized that varying physiological and habitat requirements of the different species of marine, fresh, and brackish water SAV affects their susceptibility to damage and their ability to recover (ASMFC 2000). Characteristics of concern include light requirements, location of asexual and sexual reproductive structures, dependence on sexual or asexual reproduction for maintenance and growth of beds, and ability to recover from plant damage. Species having higher light requirements (i.e., eelgrass) or whose growth and vegetative reproduction are primarily above ground or just below the sediment surface (i.e., pondweed) are more vulnerable to above-ground disturbance (ASMFC 2000). Seagrass beds composed of species that rely primarily on vegetative spreading (asexual reproduction) recover more slowly (many years) than those with species that rely more heavily on seed set and sexual reproduction (1–2 growing seasons) (Fonseca et al. 1998).

Many factors affect recovery, including the magnitude of the injury, the amount of stored energy reserves in the plant, seed or tuber set before disturbance, and local environmental conditions. Taking as many factors as possible into account, the SAV workgroup of the ASMFC estimated the relative ability of different SAV species to recover from physical impacts. The overall recovery potential of species occurring in North Carolina are listed in Table 4.8. Species having moderate potential for recovery are more sensitive to disturbance than those with high potential for recovery. No species occurring in North Carolina were listed as having a low potential for recovery.

Table 4.8. Estimated recovery potential of selected species of submerged aquatic vegetation occurring in North Carolina. *[Source: ASMFC 2000]*

Moderate Recovery Potential	High Recovery Potential
Eelgrass	Shoalgrass
Wild celery	Widgeon grass
Redhead grass	Horned pondweed
Sago pondweed	Common elodea

Water quality degradation

Nutrients and sediment

While physical damage to SAV beds generally occurs in a discrete area and within discrete time periods, water quality degradation can cause SAV loss over less defined and much larger areas and time periods. The majority of SAV loss is now considered to result from large-scale nutrient enrichment (causing enhanced epiphytic and phytoplanktonic growth) and sedimentation, which result in reductions in water transparency and light penetration (Goldsborough and Kemp 1988; Kenworthy and Haunert 1991; Funderburk et al. 1991; Stevenson et al. 1993; Dennison et al. 1993). Catastrophic losses of seagrass beds have been correlated with these water quality problems in Virginia and Florida waters (Twilley et al. 1985; Orth et al. 1986; Durako 1994). Nutrient enrichment and/or increased sediment loads impact SAV growth, survival, and productivity by:

- Increasing chronic turbidity in the water column from suspended sediment or phytoplankton associated with algal blooms,

- Increasing epiphytic loads, sedimentation, or covering by drift algae on the SAV blades, and
- Diminishing dissolved oxygen concentrations as photosynthesis decreases, coupled with increasing concentrations of hydrogen sulfide resulting in toxicity (Dennison et al. 1993; SAFMC 1998; Fonseca et al. 1998).

The effects of human-related eutrophication on seagrass survival are dependent on the growth periods and environmental requirements of the dominant species, and the timing and duration of the water quality problem (Burkholder et al. 1994). Eutrophication effects are generally most severe in sheltered habitats with reduced tidal flushing where nutrient loadings are concentrated and frequent, and where temperature fluctuations may be greater (Burkholder et al. 1994). Therefore, optimal criteria for preventing eutrophication vary by salinity, species, time of year, and specific location of SAV beds.

Decreased water clarity due to dissolved organic matter, suspended particulate matter, detritus, or algae that is suspended in the water column has a major effect on SAV distribution[13]. In addition to light attenuation in the water column, sedimentation and algal growth on the surface of grass blades (epiphytes) also reduce light reaching the surface of SAV (Virnstein and Morris 1996). Because algal growth is directly related to dissolved nutrient concentrations, epiphyte loads are considered to be caused by excessive nutrients in the water column.

Loss of SAV habitat, whether from physical impacts or water quality degradation, leads to a "snowball effect" of additional habitat and water quality degradation (Durako 1994; Fonseca et al. 1998). In the absence of SAV, the ability of the rooted grasses to bind sediment and baffle wave action is reduced, which results in sediment destabilization and increased turbidity. The destabilized bottom can result in accelerated shoreline erosion, putting more sediment into the water, decreasing water clarity further. These effects, in turn, can lead to additional SAV loss above and beyond the initial impact area or reduce the rate of recolonization (Durako 1994; Fonseca 1996). Large-scale losses of SAV are particularly problematic because the rate of recovery (measured in the scale of years) often cannot keep up with the rapid rate of losses (occurring within weeks or months) (Fonseca et al. 1998). Furthermore, future seagrass restoration may be confounded by the loss of existing seagrass beds, which increases sediment resuspension and turbidity (P. Biber, NMFS, pers. com., 2003). *Therefore, management efforts should focus on protecting existing SAV habitat and preventing any additional direct or indirect losses.*

Several water quality variables can be used as indicators of light conditions, including turbidity, total suspended solids, chlorophyll levels, and color (EPA 2000). Turbidity is a measure of the reduced transparency of water due to suspended or dissolved substances, while total suspended solids is a measure of the density of suspended solids in the water column. Chlorophyll *a* is a measure of the abundance and variety of phytoplankton in the water column. Chlorophyll levels may have the greatest impact on SAV in spring and summer (EPA 2000). Color is an indication of the amount of dissolved organic matter in the water.

In North Carolina, there is no official standard for light attenuation or light availability. There are EMC standards for other light associated parameters including turbidity, total suspended solids, and chlorophyll *a*. The standards for water clarity parameters are listed in Table 4.9 for the different water quality classifications. Waters classified as Nutrient Sensitive Waters (NSW) in the CHPPs area include the Neuse, Tar-Pamlico, and Chowan river basins, and the New River watershed within the White Oak river basin. In general, no increase in background nutrient levels is allowed within NSW waters unless preventing the increase would result in serious economic hardship, would not endanger human health and safety, or is due to natural variations. In both the Tar-Pamlico and Neuse basins, nitrogen limits were placed on point source discharges, and BMPs were established with the goal of reducing annual nitrogen loading by 30% of the amount occurring during a selected past year (DWQ 2000b). In the Chowan River

[13] see Habitat requirements section.

basin, the updated 1990 NSW strategies called for reducing nitrogen inputs from all sources by 20%, as well as targeting BMP implementation. In the New River, nitrogen limits were placed on point source discharges, no new discharges were permitted, and expansions of existing facilities were allowed only if there was no increase in permitted loading of oxygen-consuming waste.

High Quality Waters include all waters designated SA for harvesting of shellfish, as well as, Primary Nursery Areas designated by the MFC. Standards for those waters are shown in Table 4.8. For Outstanding Resource Waters, standards are based on the primary classification of those waters or if the standards are found to be insufficient to protect the ORW resource(s), then site-specific standards may be developed as part of the management strategy and rule-making process.

In the Chesapeake Bay, a multi-state and federal effort is underway to restore Chesapeake Bay water quality and SAV, in part by defining specific water quality criteria for water clarity, chlorophyll *a*, and dissolved oxygen as part of the process of maintaining and restoring SAV and other habitat. These parameters were considered the best and most direct measure of the effects of excessive nutrient and sediment pollution on SAV and other resources (<http://www.chesapeakebay.net/>, 2002).

In comparing current North Carolina water quality standards to those proposed for the Chesapeake Bay, North Carolina's chlorophyll *a* standard is higher (40 µg/l vs. <15 µg/l), while the TSS standard is very similar (10-20 mg/l vs. <15 mg/l) (Tables 4.2 and 4.9). The EPA did not list a standard for turbidity for the Chesapeake Bay (EPA 2000). Historically, water clarity standards have been based on phytoplankton requirements, which are much lower than that required for submerged grasses–only approximately one percent of incident light, compared to 15–25% (Kenworthy and Haunert 1991). Research is currently being conducted at NMFS in Beaufort to determine specific light requirements for SAV in North Carolina's estuaries and the relationship between light attenuation and other water quality parameters (P. Biber, NMFS, pers. com., 2004). Preliminary results indicate that, given certain combinations of turbidity and nutrients, North Carolina's current standards may not be adequate to sustain SAV (P. Biber, NMFS, pers. com., 2004). *Modifications may be needed to regulations and monitoring programs to improve their effectiveness for SAV protection. A review of current chlorophyll, TSS, and turbidity standards should be conducted to determine if they are appropriate for the protection of SAV in North Carolina waters. DENR should work with NMFS to determine what levels of TSS, chlorophyll a and other parameters are needed to achieve desired water clarity. The need and feasibility (scientific defensibility and "implementability") for a water quality standard for light attenuation should be investigated to provide a pro-active target or standard for protection and restoration of SAV.*

Minimal water quality monitoring is conducted in Pamlico and Core Sounds by DWQ, where the vast majority of SAV coverage occurs. The North Carolina light-associated water quality standards adopted by the EMC that apply directly to SAV are shown in Table 4.9. *Once the appropriate water quality conditions for protection of SAV are determined, DWQ should evaluate whether current sampling locations and methods are sufficient in estuarine waters to monitor the suitability of water quality conditions for SAV survival and growth. Monitoring should be conducted in waters with SAV habitat to ensure that the standards and conditions are being met. If additional monitoring is needed, establishment of continuous monitoring stations should be considered. In either case, priority should be given to those areas already classified NSW.*

Table 4.9. North Carolina Environmental Management Commission standards for light-associated parameters by North Carolina surface water quality classifications.

Parameter	Supplemental Classifications			Salt water			Fresh water
	ORW	HQW (salt or fresh)	NSW	SA	SB	SC	Aquatic life
Turbidity (NTU)	**	25	**	25	25	25	50
TSS (mg/l)*	**	10 – in PNAs; 20 – other	**	10 – in PNAs; 20 – other	30	30	20
Chlorophyll *a*	**	40	**	40	40	40	40

* Applies to discharges only

** Determined by primary classifications (SA – SC and C) or site-specific management strategies developed by EMC through rule-making.

In North Carolina, between 1995 and 1999, chlorophyll *a* concentrations at or above the state surface water quality standard of 40 µg/L were identified as one of the major causes of impairment in the freshwater portions of the Neuse and White Oak River basins (Table 4.10) and in the saltwater portions of the Neuse, Tar-Pamlico, and White Oak River basins. During calendar year 2000, 183 algal bloom samples were received from the basins included in the CHPPs area [14]. The Neuse (Maps 4.3a-b), Tar-Pamlico, and White Oak river basins support SAV habitat, and at one time supported larger grass bed areas. Since some SAV is present in the shallow portions of the Neuse and portions of the White Oak river basins, and water quality data indicate some level of eutrophication exists, nutrient levels may be limiting survival or expansion of SAV in these areas. *These areas should be a high priority for monitoring of SAV and water clarity.*

Research has shown that elevated nitrogen concentrations not only affect SAV through light reduction, but may actually be toxic to eelgrass. In laboratory experiments, long-term exposure of eelgrass to enriched nitrate concentrations was lethal at enrichment levels ranging from 3.5 – 35 µM water column NO_3^- - Nd^{-1} (Burkholder et al. 1992). In another experiment with eelgrass, nitrogen enrichment (10 µM water column NO_3^- - Nd^{-1} for 14 wk) significantly lowered shoot production compared to control plants without nitrogen enrichment (<2 µM water column NO_3^- - Nd^{-1}) (Burkholder et al. 1994). In contrast, growth in shoalgrass and widgeon grass was stimulated by similar nutrient enrichment conditions (Burkholder et al. 1994). Widgeon grass shoot production actually increased by 300%. These results indicate that of the three species studied, eelgrass would be most impacted by eutrophication. The results also suggest that shoalgrass or widgeon grass might be successfully established by transplanting efforts in areas where eelgrass beds have been lost (Burkholder et al. 1994). More research is needed on the effect of nutrient enrichment on other brackish and freshwater species of SAV.

[14] 50 samples from the Tar-Pamlico River Basin, 79 from the Neuse River Basin.

Table 4.10. Major causes of use support impairment in freshwater streams by river basin, 1995-1999[1] *[Source: DWQ 2000a]*

Major Causes		DWQ River Basin							
		Cape Fear	Chowan	Neuse	Pasquotank	Roanoke	Tar-Pamlico	White Oak	Totals
Ammonia (NH_3)	Miles	12	0	0	0	0	0	0	12
	%	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
Fecal coliform	Miles	130	0	3	0	0	13	0	146
	%	32.2	0.0	0.7	0.0	0.0	16.3	0.0	11.1
Habitat Degradation[1]	Miles	284	4	164	0	38	0	0	490
	%	70.3	3.1	35.8	0.0	20.5	0.0	0.0	37.3
Low DO	Miles	0	46	132	40	24	13	8	263
	%	0.0	35.7	28.8	83.3	13.0	16.3	72.7	20.0
Chlorine	Miles	4	0	0	0	0	0	0	4
	%	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
pH	Miles	0	51	7	28	0	0	0	86
	%	0.0	39.5	1.5	58.3	0.0	0.0	0.0	6.5
Turbidity	Miles	26	0	5	0	0	0	0	31
	%	6.4	0.0	1.1	0.0	0.0	0.0	0.0	2.4
Metals	Miles	0	0	0	0	13	0	0	13
	%	0.0	0.0	0.0	0.0	7.0	0.0	0.0	1.0
Chlorophyll a	Miles	1	0	7	0	0	0	11	19
	%	0.2	0.0	1.5	0.0	0.0	0.0	100.0	1.4
Total impaired miles		**404**	**129**	**458**	**48**	**185**	**80**	**11**	**1315**

[1] Habitat degradation is identified where there is a notable reduction in habitat diversity or change in habitat quality. This term includes sedimentation, bank erosion, channelization, scour, loss of pools or riffles, and loss of woody habitat.

Over the past several decades, there have been some nutrient reductions in waters supporting SAV due to improvements in wastewater treatment systems (Glasgow and Burkholder 2000), the 1988 ban on phosphorus-detergents (<http:www.water.usgs.gov/pubs/circ/circ1157/nawqa91.5.html>, June 2002) and more stringent water quality and management strategies in NSW areas (DWQ 1997). Despite efforts to reduce nutrient loading, nutrient concentrations will continue to fluctuate as bottom sediments containing nutrients are resuspended into the water column and stormwater runoff introduces additional nutrients, varying with rainfall and runoff patterns. In addition, increasing population along the coast potentially increases nutrient loading into wastewater systems and nonpoint runoff. Nutrient and sediment levels may be preventing recovery of SAV in areas that historically supported SAV. The edges of existing SAV beds mark the general transitional area where water quality conditions become adequate to support SAV (Virnstein and Morris 1996). *To restore SAV habitat in fresh and estuarine systems where it historically occurred, management strategies should focus on water quality improvements at the edges and upstream of SAV occurrence.*

Suspended sediment, suspended solids, and dissolved solids concentrations have decreased throughout the Albemarle-Pamlico watershed from 1980 to 1995 (<http://water.usgs.gov/pubs/circ/circ1157 /nawqa91.9.html>, June 2002). Decreasing concentrations of suspended solids in the sounds and estuaries may not adequately improve water clarity for SAV growth if nutrient levels remain high. As a

result, reduction of nutrients will be even more important in controlling water clarity conditions for SAV.

Increased sediment and nutrient loading in the water column can enter coastal waters from point source discharges, nonpoint stormwater runoff, or resuspension of bottom sediments. Specific sources that contribute to increased sediment loading include construction activities, unpaved roads, road construction, golf courses, uncontrolled urban runoff, mining, silviculture, row crop agriculture, and livestock operations (DWQ 2000b). Urbanization can increase the flow and velocity of stormwater runoff, which in turn leads to increased stream bank erosion. Stream bank erosion is a significant source of sediment loading (DWQ 2000b). Specific sources that contribute to increased nutrient loading include agricultural and urban runoff, wastewater treatment plants, forestry activities, and atmospheric deposition. Nutrients in point source discharges are from human waste, food residues, cleaning agents, and industrial processes. The primary contributors of nutrients from nonpoint sources are fertilizer and animal wastes (DWQ 2000b).

Addressing wetland and riparian restoration and management can reduce the effects of nonpoint pollution on water quality. Reductions in sediment or nutrient loading, particularly in river basins draining to the northern two-thirds of the coast (Albemarle Sound south through Topsail Sound), would help maintain or improve water clarity and light conditions needed for SAV growth and survival. *Nonpoint source loading of nutrients and sediment could be reduced through multiple strategies, including preservation and restoration of upland and wetland riparian habitats, modifications in land use regulations, agricultural BMPs, and forestry management activities. Conservation priorities should be set for land acquisition programs which will aid in protecting Strategic Habitat Areas.*[15] *Nutrient and sediment reduction goals should be established by the EMC to achieve the minimum of 15-25% light availability at depth requirement for SAV growth. An increase in staffing to fully implement and enforce existing stormwater and other nonpoint source-related regulations is needed to achieve this goal.*

Implementation of NSW rules for the Neuse, Tar-Pamlico, Chowan, and New rivers by the EMC are positive steps needed for nutrient and sediment reductions from both point and nonpoint sources. Goals and strategies vary, but in general aim to obtain nutrient reductions ranging from 20 to 40 % of a targeted previous year, depending on the river basin. In addition, implementation of the CRC's coastwide 30 ft (9.14 m) buffer rule [CRC rule 15A NCAC 07H .0209 (d)(10)], and EMC's 50 ft (15.24 m) buffer [16] in the Neuse and Tar-Pamlico river basins [EMC rule 15A NCAC 02B.0232 and 2B.0229] should aid in reducing nonpoint pollution. *The New River nutrient management strategy (EMC rule 15A NCAC 02B.0223) was heavily focused on point sources and should be revisited to determine what additional controls, such as buffers, might be necessary to achieve continued water quality improvements.*

The presence of SAV can, in itself, be valuable as a sensitive indicator of water quality (Smith et al. 1981; Valiela et al. 1990). In the Indian River Lagoon, Florida, where stormwater runoff has caused large SAV losses, SAV is used as a barometer of overall water quality conditions because of its sensitivity to water quality, the ecological value and functions it provides, and its importance as a keystone species for numerous other species (Virnstein and Morris 1996). To manage the Lagoon, light attenuation models have been developed that link water quality to seagrass health. From the information obtained, pollution load reduction goals were developed to maintain and extend SAV coverage to historically occurring depths. Seagrass acreage and density were used as the measures of success. The conceptual model was based on the following relationship, which is supported in the scientific literature (Virnstein et al. 1983; Thayer et al. 1984; Gilmore 1995):

[15] Because nonpoint source pollution also affects other habitats as well, including oyster reefs, soft bottom, tidal marsh, and the water column, this topic is discussed in more detail in the Water Column habitat section of this plan.

[16] First 30 ft (9.14 m) from water must remain forested and undisturbed and the next 20 ft (6.10 m) must have at least grass vegetation.

Proper watershed management → Adequate water quality → Healthy SAV coverage → High biological productivity and diversity → Healthy fish populations

The SAMFC SAV policy (1998) encourages long-term trend analyses to monitor distribution and abundance of SAV. An approach similar to that used in Indian River Lagoon and the Chesapeake Bay, where the condition of water quality, SAV, and fish populations are linked in monitoring and management, would be useful for protection of SAV habitat in North Carolina.

Toxic chemicals

Herbicides are the primary toxic chemical known to have negative impacts to SAV (Funderburk et al. 1991). Herbicides enter riverine and estuarine waters from agricultural runoff and other sources. The most common agricultural herbicides used in Chesapeake Bay were atrizine, simazine, diquat, paraquat, and linuron. Research in Chesapeake Bay found that concentrations of the toxins in the water column were seldom high enough to damage SAV beds. In addition, SAV recovery was rapid following exposure to low concentrations of herbicides (Funderburk et al. 1991). However, impacts to SAV from sporadic or localized pulses of higher concentrations are not known, and could potentially cause problems.

While most agricultural herbicides come in contact with SAV indirectly through runoff, there are other chemicals specifically developed for aquatic weed control in freshwater and brackish systems. These chemicals are designed to be short-lived and should not persist in the water for long periods of time. Aquatic herbicides are at times used to intentionally kill SAV that is considered a nuisance. The Division of Water Resources, under the Aquatic Weed Control Act of 1991, manages the North Carolina Aquatic Weed Control Program, under direction from the Aquatic Weed Control Council. This program primarily focuses on non-native invasive species in freshwater lakes, ponds, and rivers. Some of the annual control activities occur in fresh and low salinity waters used by anadromous fishes and blue crabs, including the Albemarle Sound system.

The non-native European watermilfoil is the most troublesome SAV species in low salinity waters. It sometimes forms dense beds that can interfere with boating in local areas. Native submerged grasses may be impacted indirectly where occurring near treated areas or directly when herbicides are used by the general public. There is a general perception by some of the public that SAV is a nuisance. Grass blades may get in boat propellers, or entangle or weigh down fishing gear. Aesthetically, swimmers may prefer a sand bottom to a grass bottom. *Permitting for chemical removal of European watermilfoil and other non-native vegetation should be carefully restricted where native species co-occur to prevent non-target impacts. More education on the value of SAV to the health of North Carolina's estuaries and fisheries is needed to modify attitudes toward this habitat and improve individual and community stewardship of SAV.*

Introduced and nuisance species

The North Carolina Aquatic Weed Control Program is mandated by the North Carolina Aquatic Weed Control Act of 1991 [General Statute 113A-220 *ff; DENR rules 15A NCAC 02G .0600*] to assist local governments with aquatic weed problems affecting public waters. (<http://www.ncwater.org/Education_and_Technical_Assistance/Aquatic_Weed_Control/>, May 2002). Primary species targeted for control under the Act include:

- Giant salvinia (*Salvinia molesta*)
- Hydrilla (*Hydrilla verticellata*)
- Alligator weed (*Alternantherea philoxeroides*)
- Parrot feather (*Myriophyllum aquaticum*)
- Eurasian watermilfoil (*Myriophyllum spicatum*)

These highly invasive non-native species form dense beds in the water, which can make swimming, fishing, and boating difficult; clog water intake systems for municipalities and industries; and impede water flow in drainage canals (<http://www.ncwater.org/Education_and_Technical_Assistance/Aquatic_Weed_Control/>, May 2002). Because of the dense mass of vegetation, beds of Eurasian watermilfoil can cause the water column to go anoxic at night, which can stress fish or cause fish to leave the area (T. West, ECU, pers. com., 2003). Of the targeted species, parrot feather and Eurasian watermilfoil are submerged rooted grasses. These nuisance species do provide some beneficial fish functions, such as refuge and sediment stabilization. They can also negatively impact SAV habitat by shading or out-competing other native species, which may have greater value to fish as a food source or refuge area (DWR 2002). *Long-term management and restoration of SAV habitat should include replacement of Eurasian watermilfoil with native species. The DENR should coordinate with the Division of Water Resources to ensure that native species are not targeted for removal. Research is also needed to determine the relative fishery value of Eurasian watermilfoil compared to native vegetation.*

While most introductions of non-native fish have little noticeable effect on habitat, grass carp can have a significant of submerged grass beds. Grass carp is a non-native species that has escaped from stocked ponds and reservoirs into some river systems. North Carolina requires that only sterile triploid grass carp be used for stocking because of their potential damage to submerged vegetation. However, a recent study in the Chesapeake Bay found that although stocking of sterile grass carp has been required for over 20 years, 18% of the non-native grass carp were not sterile (Schultz et al. 2001). Non-native species may also be introduced through unintentional releases from aquaculture and live bait facilities. *Policies should be developed by state agencies overseeing aquaculture and bait facilities to prevent such releases into coastal waters.*

Other threats

Seagrass wasting disease is a natural event that has affected SAV in North Carolina and may occur when SAV is stressed. Historic population losses of large vertebrate grazers may have, among other consequences, increased seagrass vulnerability to infection by pathogens (Jackson et al. 2001). It was suspected, but never proven, that the slime mold protist, *Labryinthula*, was the cause of the wasting disease event that devastated eelgrass populations throughout the North Atlantic between 1930 and 1933, dramatically disrupting estuarine systems (Steel 1991). Higher water temperatures apparently stressed the seagrasses, making them more susceptible to *Labryinthula*. Healthy eelgrass beds were generally reestablished by the 1960s. More recently, similar large-scale die-offs of eelgrass from Nova Scotia to Connecticut, and turtle grass in Florida Bay have been attributed to *Labryinthula* (Short et al. 1987). Eelgrass infected with *Labryinthula* was also found near Beaufort, North Carolina in the 1980s (Short et al. 1987). Recent studies indicate that characteristics of wasting disease are appearing in some eelgrass beds in southern Core Sound, Back Sound and Bogue Sound (SAFMC 1998). Submerged aquatic vegetation is less susceptible to infection by the pathogen in low salinity waters (Short et al. 1987). Potential impacts in North Carolina include reductions in bay scallops and other fisheries resources, and large reductions in migratory waterfowl populations. Although the current infections have not caused catastrophic declines in eelgrass populations such as occurred in the 1930s, the disease is a potential threat to coastal fisheries should large-scale mortalities occur. *Submerged grasses need to be monitored on a regular basis to assess the status of wasting disease and its association with human-induced stresses.*

Existing management measures

Regulatory designations of coastal waters can either protect or potentially allow degradation of SAV habitat. The MFC-designated crab spawning sanctuaries, mechanical oyster harvest prohibited areas, military restricted areas, fish nursery areas, and trawl net prohibited areas protect SAV in those areas from potential physical disturbance associated with bottom fishing gear (Maps 3.5a-c). The great majority of SAV beds along the eastern perimeter of the Albemarle-Pamlico system are protected within these areas. However, SAV occurring in the western portion of the Albemarle-Pamlico system is generally not within

these gear-restricted areas. Moreover, the likelihood of sedimentation and eutrophication are relatively greater on the sounds' western perimeter due to the closer proximity of river discharge. Although SAV functions as a nursery for many economically important species, SAV is predominantly absent from designated fish nursery areas. In particular, most of the high salinity SAV beds are not designated Primary Nursery Areas. The *DMF should develop criteria for designating Strategic Habitat Areas and designate SAV areas that meet those criteria.*

The largest spatial gap in SAV protection from fishing gear impacts is in northern Pamlico Sound where dredging for crabs is allowed. This area includes SAV beds in the Sound immediately west of Pea Island National Wildlife Refuge. There are smaller areas of unprotected SAV along both the eastern and western sides of Roanoke Sound and along the shoreline of West Bay in the southern Pamlico Sound area. The extensive SAV beds of Core and Bogue sounds are protected from mechanical oyster methods, but not from trawling or from bay scallop dredging. Area designations that could result in SAV impacts include mechanical clam harvest areas and areas where trawling and bay scallop dredging occur. Most of the designated mechanical clam harvest areas are not located where SAV is found (Maps 4.4a-b). Areas open to trawling generally do not support SAV, since SAV is limited in occurrence to shallow water. However, SAV does occur in Core and Bogue sounds where trawling and bay scallop dredging are allowed. *The DMF should assess the effect of trawling and dredging activities in Core and Bogue sounds on SAV. The DMF should also assess where additional protective distances are needed between SAV and bottom disturbing fishing methods, including clam trawling (kicking), oyster dredging, crab dredging, bay scallop dredging, and bottom trawling.*

There are several regulations and designations that provide some direct and indirect protection of SAV beds. Area designations that provide water quality protection for SAV include Primary Nursery Areas (PNAs), High Quality Waters (HQWs), and Outstanding Resource Waters (ORWs). The CRC prohibits new dredge and fill activities in areas with SAV, but maintenance dredging of existing permitted navigation channels is allowed. Rules of the CRC do not allow authorization of projects that can violate water quality standards of estuarine resources, including SAV and PNAs [CRC rule 15A NCAC 07H .0207]. CRC rules state that activities directly impacting SAV, such as dredging or construction of docking facilities, should be avoided (CRC rule 15A NCAC 07H .0209(d)(4). Waters designated as PNAs by the MFC, or that have a special water quality classification by the EMC, such as ORW, are given additional consideration for impacts by DCM prior to issuing development permits. Despite these additional considerations, permits that result in cumulative impacts to SAV, particularly from dock construction, continue to be authorized, (T. Murphey, DMF, pers. com., 2002).

Several Outstanding Resource Waters (classified by the EMC) have significant SAV coverage. The ORW designation carries with it more site-specific management strategies based on the resources to be protected, as well as some minimum requirements for discharges and development. For example, new development adjacent to ORW waters must comply with specified stormwater provisions [EMC rule 15A NCAC 2H .1007] and non-discharge permits are required to meet reduced loading rates and increased buffer zones. Outstanding Resource Waters and their more stringent water quality standards, as adopted by the EMC, cover approximately 25% of the mapped SAV habitat in coastal North Carolina. Submerged aquatic vegetation habitat within ORWs is located in Core Sound, western Bogue Sound, and the lower White Oak River (Maps 2.4a-b). *The remaining 75% of mapped SAV should be evaluated for designation as Outstanding Resource Waters or Strategic Habitat Areas to invoke adequate protective measures.*

Because development and associated impacts occur in areas adjacent to existing ORWs, such as in the Bogue Sound area, the designation of waters alone will not effectively protect habitats unless the rules associated with those designations are adequate and enforced. *The effectiveness of ORW and HQW rules in protecting SAV and other habitats should be examined and strengthened as necessary. The EMC, CRC, and MFC should develop appropriate management strategies that maintain water quality at a level that adequately protects SAV.*

In 2003 the MFC adopted a policy statement for protection of SAV habitat. The document summarizes the habitat value of SAV and provides management guidelines for protection of SAV, to aid in development of habitat protection and fishery management plans. These management needs are listed below.

- *In order to delineate and assess the distribution and health of SAV habitat, SAV beds need to be mapped and monitored. The saltwater end of coastal waters supports eelgrass, widgeon grass and shoalgrass, and the freshwater end supports several species of freshwater SAV.*
- *Minimize nutrient and sediment loading to coastal waters that support existing SAV to protect adequate water quality as defined by water-column clarity in standard measurement units.*
- *All SAV needs to be protected from all bottom-disturbing fishing and recreational gear. Sufficient buffer zones surrounding SAV beds should also be protected from disturbance to prevent impacts of sediments on growing SAV.*
- *Provide adequate safeguards to prevent direct (or indirect) impacts from development projects adjacent to or connected to SAV.*
- *Assess cumulative impacts of land use and development changes in the watershed affecting SAV to identify the potential impact. Require identification of cumulative impacts as a condition of development of permit applications.*
- *Require compensatory mitigation where impacts are unavoidable. Initiate restoration programs to recoup an/or enhance lost SAV habitat.*
- *Educate landowners adjacent to SAV, boaters, and other potential interested parties about the value of SAV as a habitat for many coastal fishes and invertebrates.*

Commission actions (MFC, CRC, and EMC) should be consistent with this policy.

4.5 SUMMARY OF SUBMERGED AQUATIC VEGETATION CHAPTER

Submerged aquatic vegetation is an extremely valuable fish habitat that occurs in North Carolina's coastal estuarine and freshwater systems. Because light is the primary limiting factor affecting its distribution, SAV is restricted to relatively shallow waters. Submerged aquatic vegetation provides ecosystem functions similar to shell bottom, such as enhancing water quality through stabilizing and trapping sediment, reducing wave energy, cycling nutrients within the system, and providing structure for invertebrate attachment and refuge from predators. Seagrasses also produce large quantities of organic matter, which supports a complex food base for coastal fishes and other organisms. This habitat is especially valuable as a nursery and refuge from larger predators for the young of many important commercial and recreational fishery species. Bay scallops, pink shrimp, hard clams, gag, black sea bass, summer flounder, and others are typically associated with high salinity SAV. Juvenile striped bass, striped mullet, brown and white shrimp, Atlantic croaker, and others frequently use low salinity grasses. Red drum and blue crabs are among several species that rely upon both low and high salinity grasses at different stages of their life cycles. The high fisheries value of this habitat has been well established by the scientific community, and SAV is federally designated as a Habitat Area of Particular Concern for penaeid shrimp, blue crab, and red drum.

Historical accounts indicate that there have been large-scale losses of SAV in North Carolina's low salinity tributaries on the mainland side of Pamlico Sound and along much of the shoreline of western Albemarle Sound, while the high salinity grass beds to the east appear relatively stable. Loss of low salinity SAV habitat could be particularly detrimental to the southern/central stock of striped bass, which is currently classified as Overfished by DMF in 2003, as well as stocks of striped mullet, Atlantic croaker, and blue crab, which were listed as Concern. Impacts to high salinity SAV beds could be especially detrimental to bay scallops and black sea bass (south of Hatteras), which are currently listed as Overfished. Protection, enhancement, and restoration of this habitat are high priorities for recovery of those species and for sustained health of many others.

The major threat to SAV is large-scale nutrient enrichment and sediment loading, which increases turbidity, reduces light penetration, and subsequently impacts SAV growth, survival, and productivity. In North Carolina, most of the low salinity areas that have experienced large reductions in SAV coverage are also designated Nutrient Sensitive Waters. Major contributors of nutrients and sediments include point source discharges, nonpoint runoff (from crop agriculture, animal operations, urban and road construction, and impervious surfaces) and resuspended sediments (from bottom disturbing fishing gear and channel dredging). There are also activities that threaten the physical structure of SAV. Dredging for navigational channels, marinas, or infrastructure such as bridges or cables can result in large, direct losses of SAV. Docks constructed over SAV can cause immediate loss during construction or gradual loss due to shading effects. Boating activity in shallow vegetated waters can damage SAV from propeller damage to SAV. Bottom disturbing fishing gears used within or near SAV habitat, such as oyster and crab dredges, hydraulic clam dredges, clam trawls, and bull rakes, may cause significant damage to SAV habitat. As human population, boating activity, fishing pressure, and shoreline development increase, losses of SAV are likely to continue if steps are not actively taken to protect SAV and maintain suitable water quality conditions. State and local managers need to ensure that 1) SAV habitat is not physically impacted by water-dependent activities and 2) water quality (especially clarity) is enhanced to allow persistence of existing SAV and re-colonization of former habitat.

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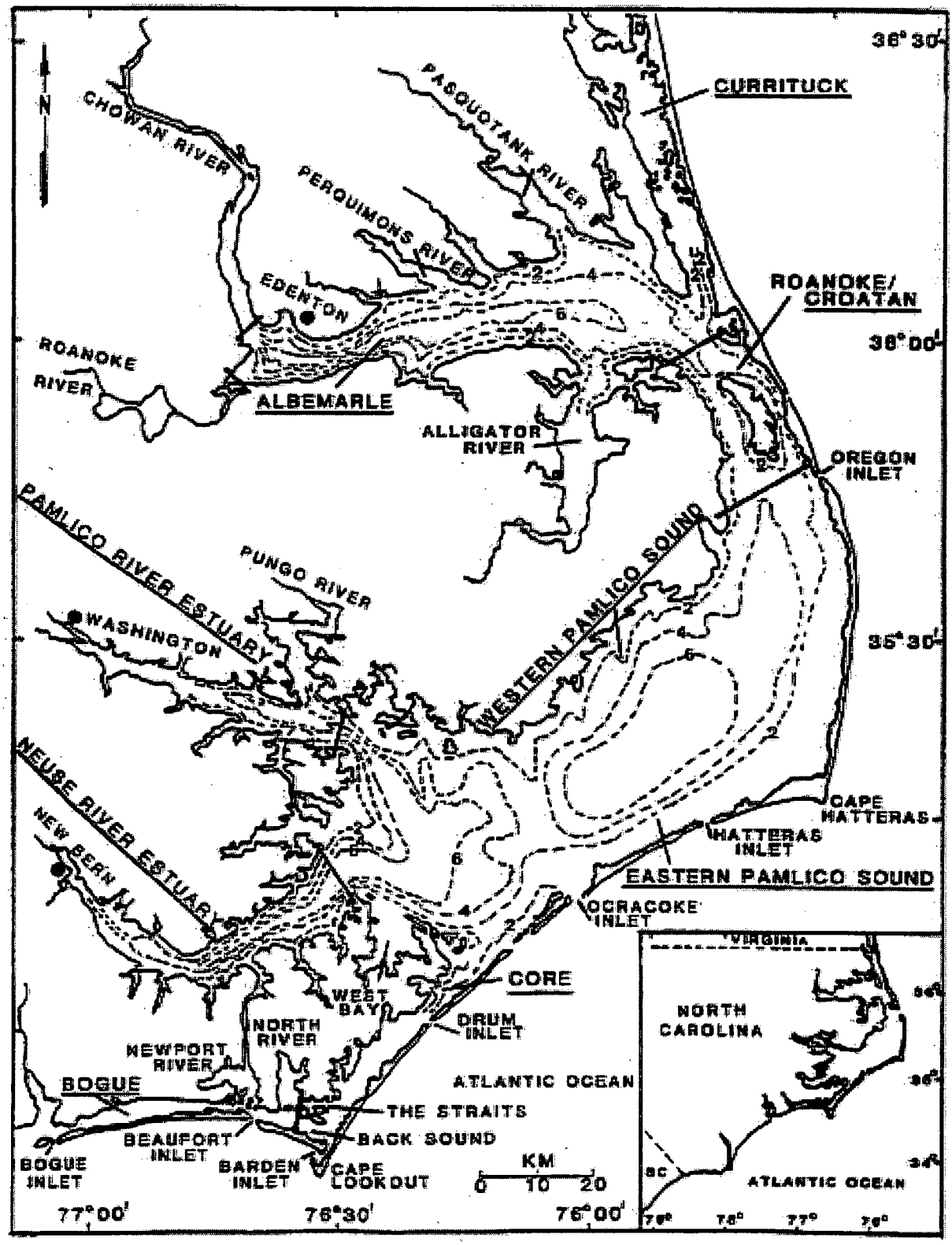
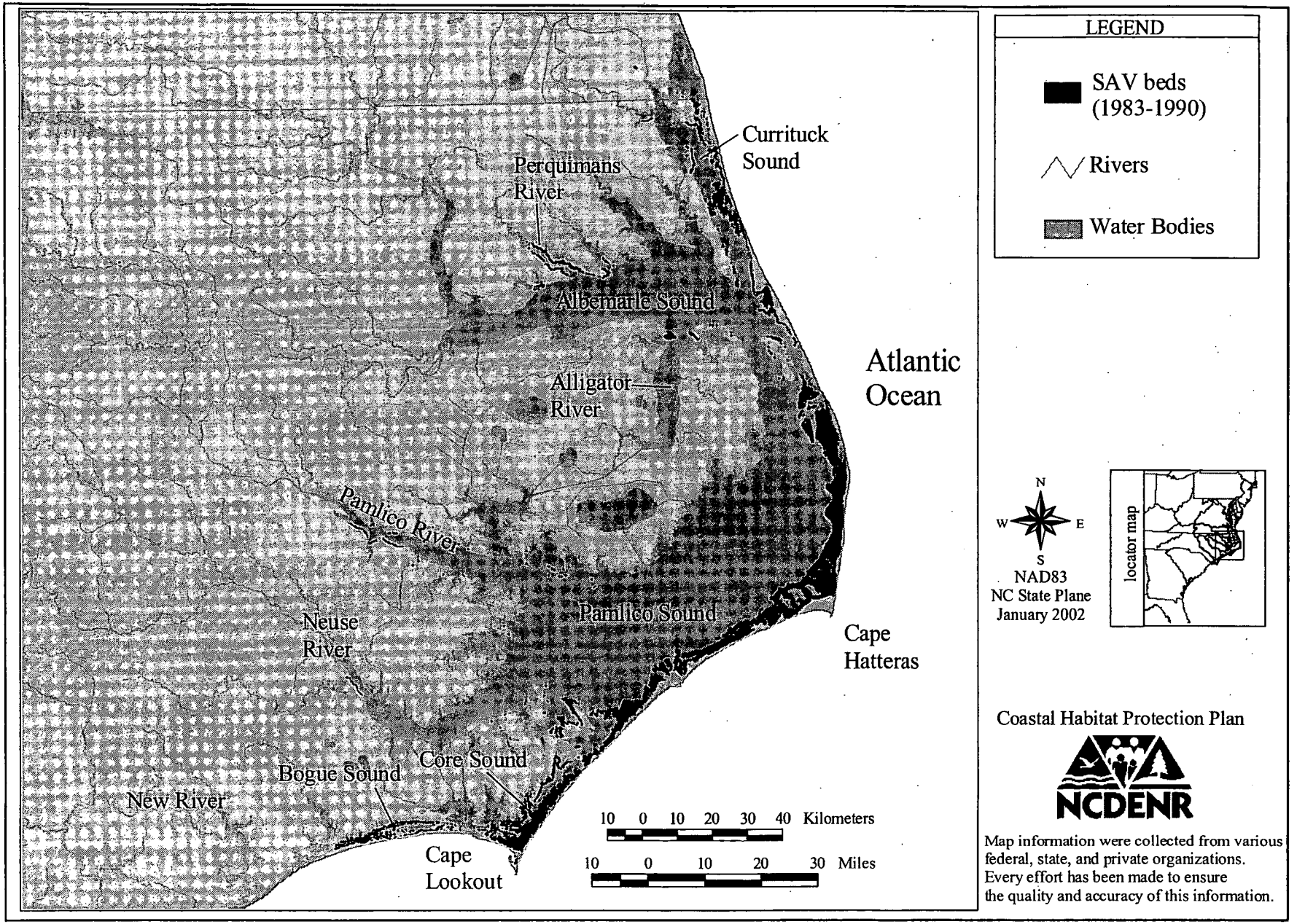


Map 4.1. Depth contours (meters) of the Albemarle-Pamlico Sound system, North Carolina (from Ferguson and Wood 1994).



Map 4.2. Location of known of submerged aquatic vegetation (SAV) habitat in coastal North Carolina (from Ferguson and Wood 1994; Carraway and Priddy 1983). Note: absence of SAV beds on the map does not suggest actual presence/absence of SAV.

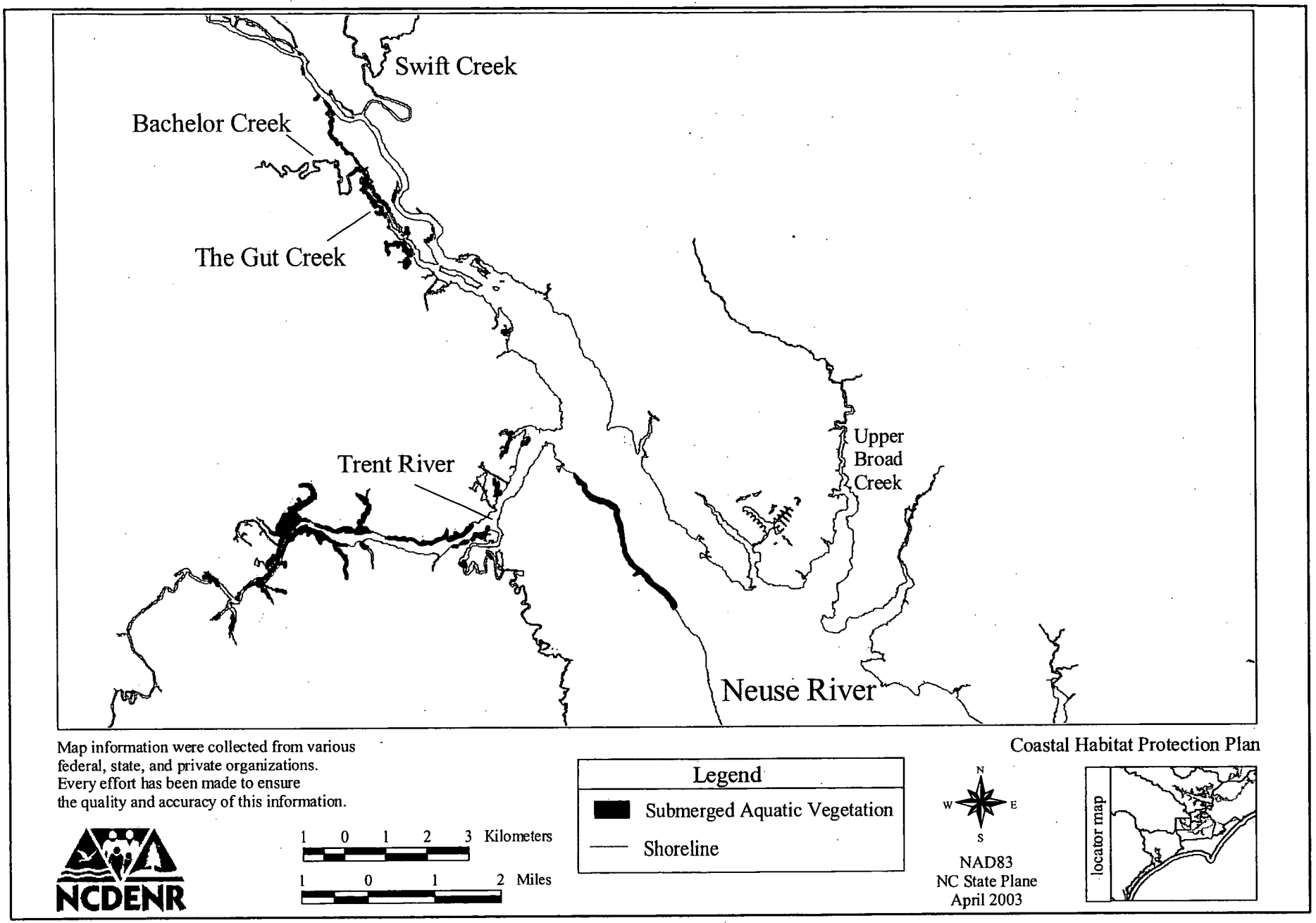


Figure 4.3a. Distribution of submerged aquatic vegetation in the Neuse River estuary in 1998 (From DWQ 1998).

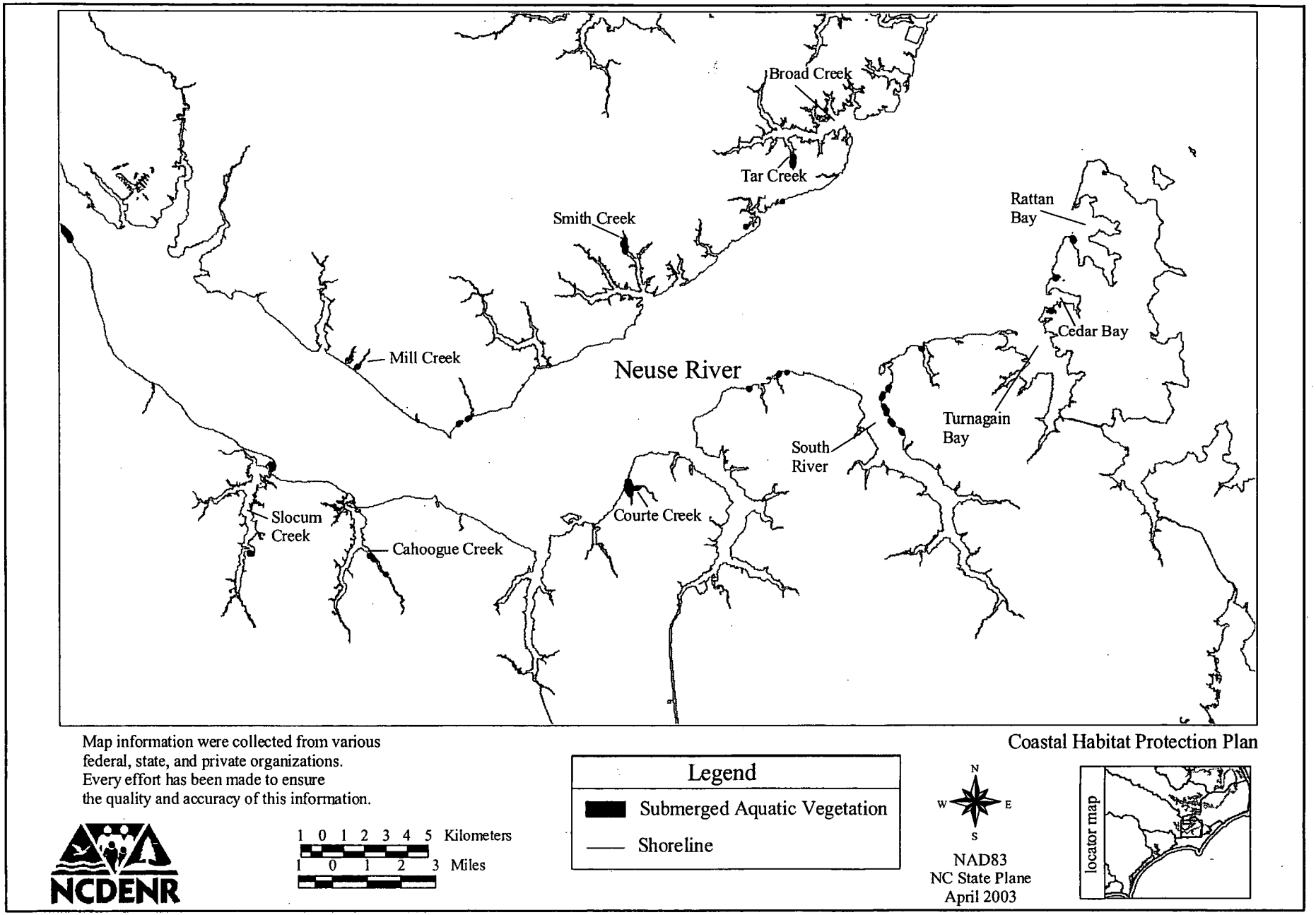
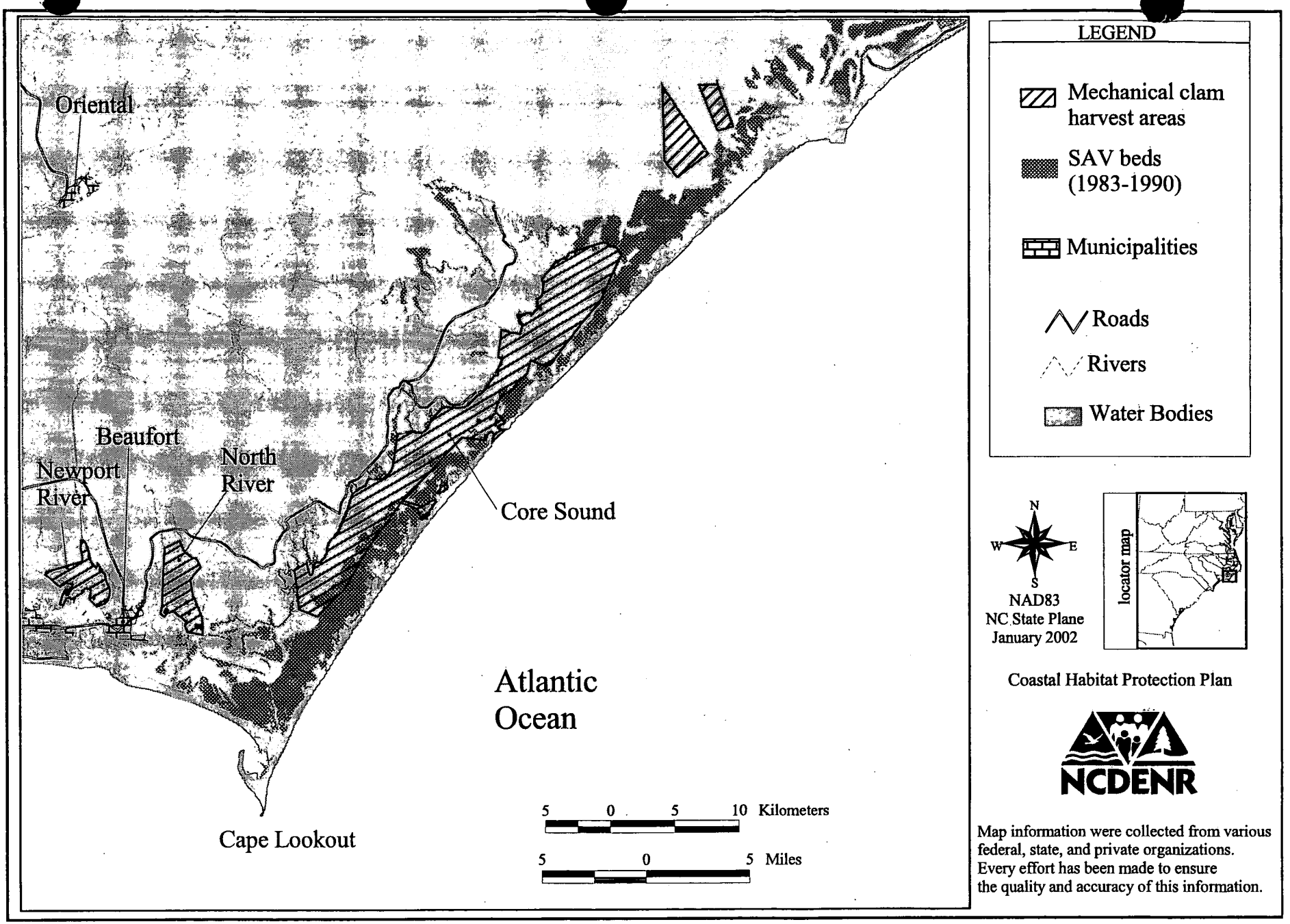
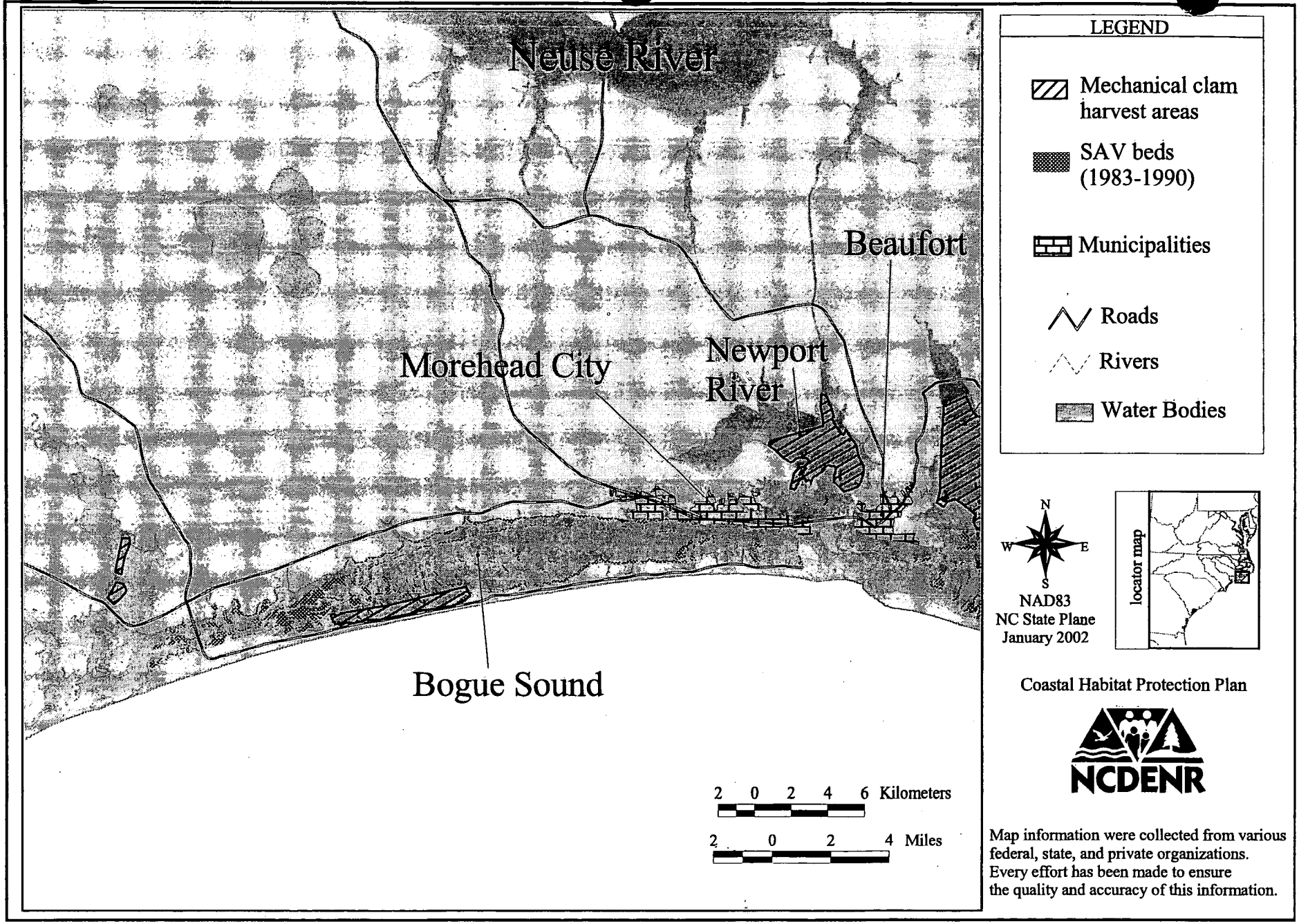


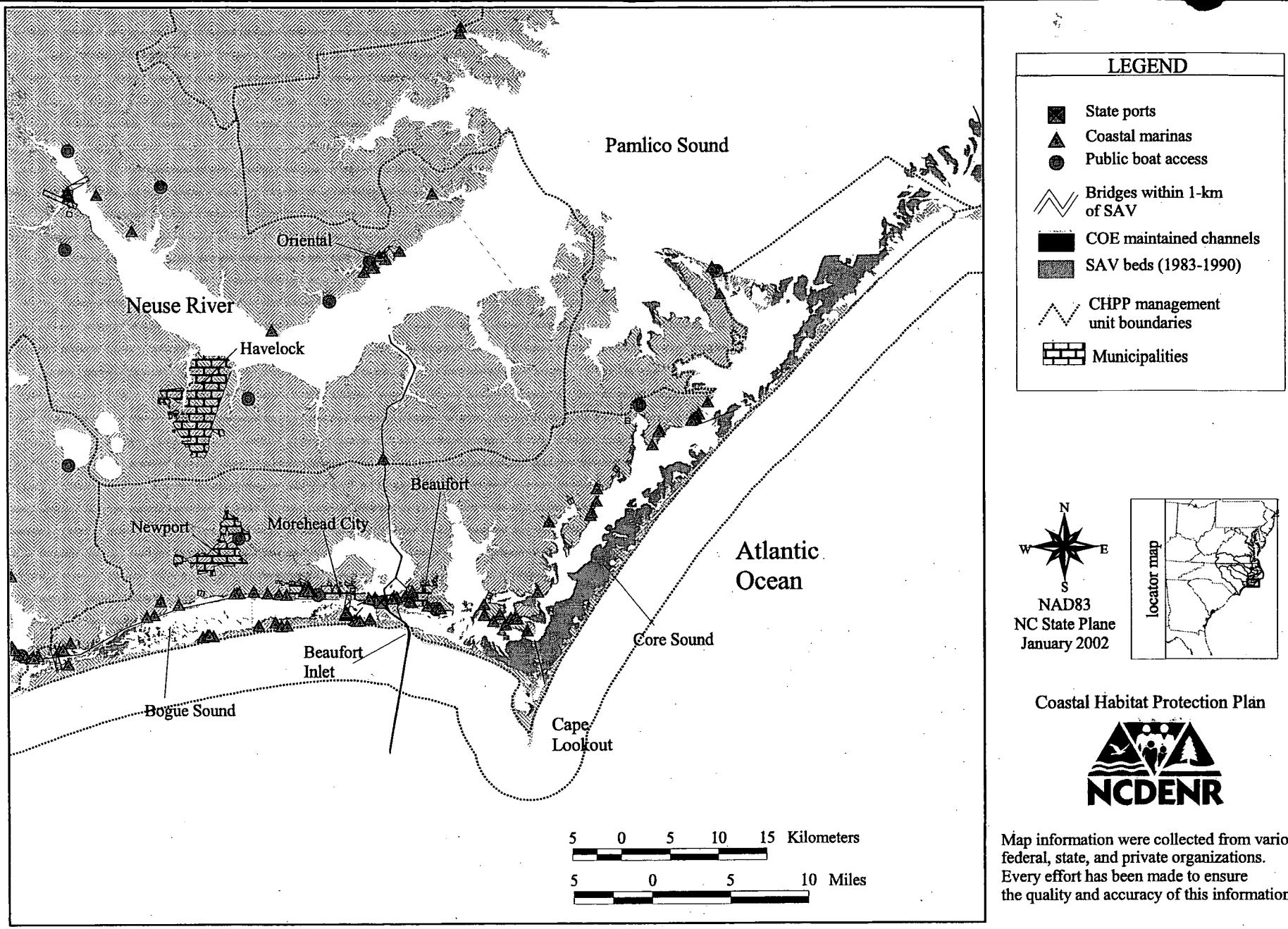
Figure 4.3b. Distribution of submerged aquatic vegetation in the Neuse River estuary in 1998 (From DWQ 1998).



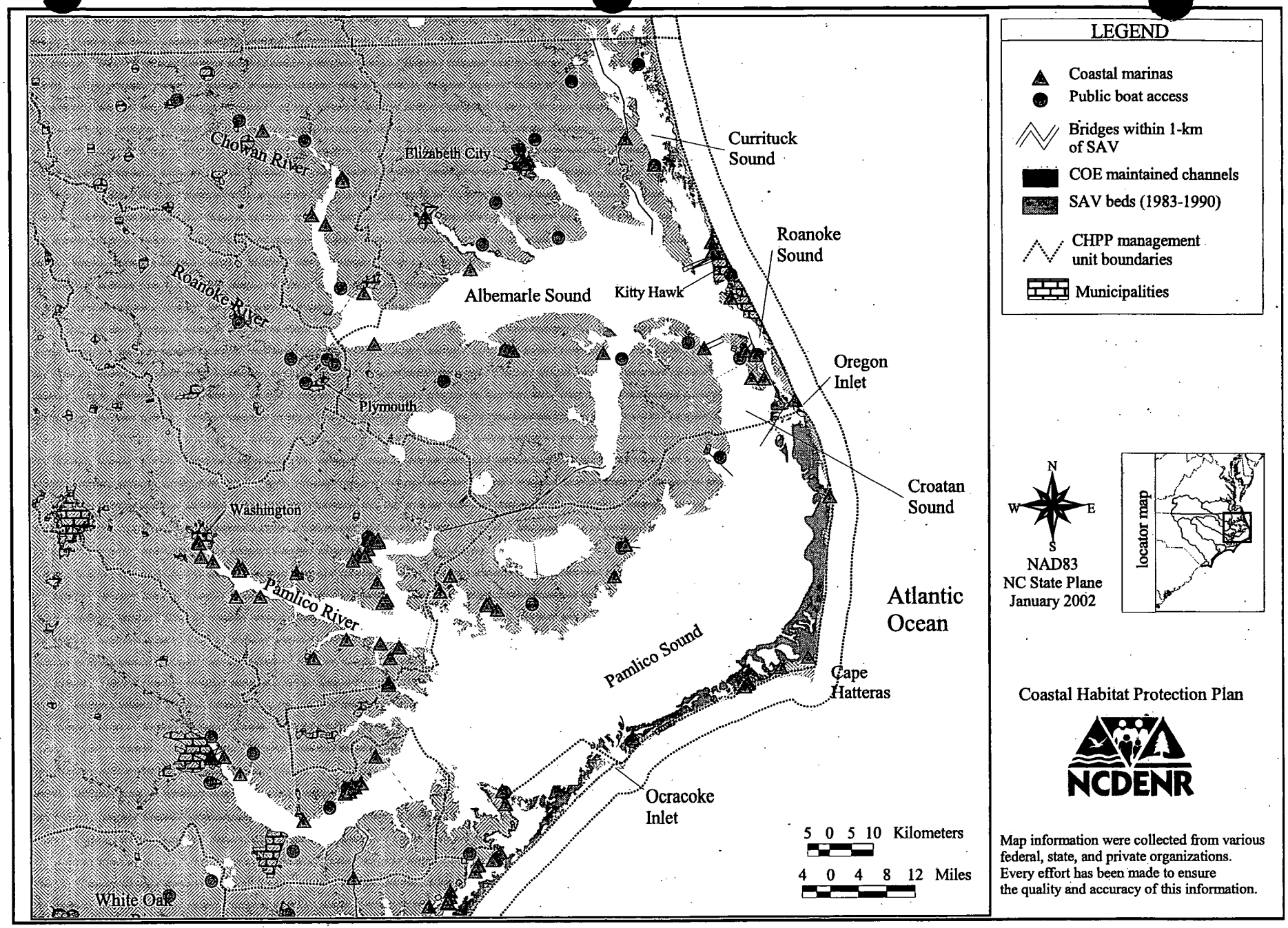
Map 4.4a. Location of mechanical clam harvesting areas relative to submerged aquatic vegetation habitat in the Core Sound area of North Carolina.



Map 4.4b. Location of mechanical clam harvesting areas relative to submerged aquatic vegetation habitat in the Bogue Sound area of North Carolina.



Map 4.5a. Locations of marinas, boating access sites and other man-made facilities relative to beds of submerged aquatic vegetation in the Core-Bogue sounds and lower Neuse River areas of North Carolina

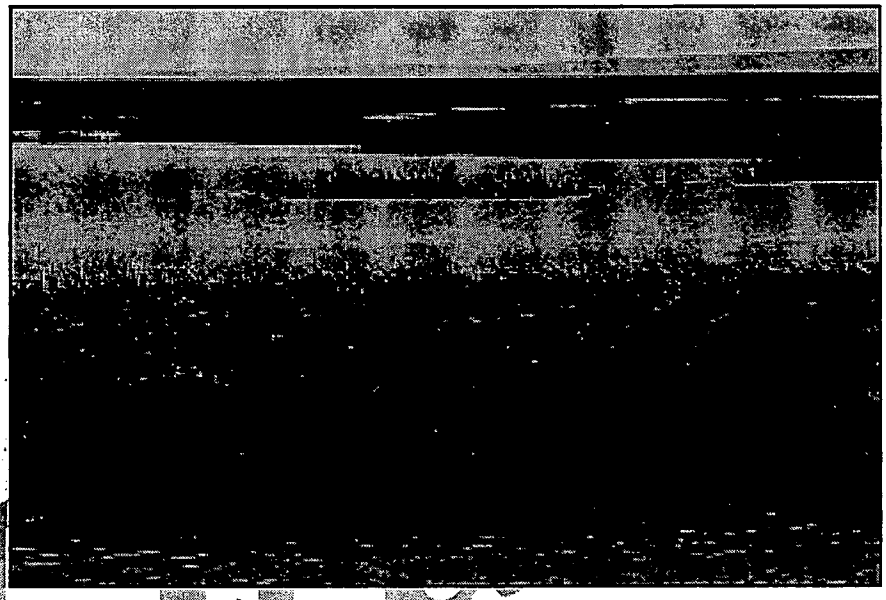


Map 4.5b. Locations of marinas, boating access sites and other man-made facilities relative to beds of submerged aquatic vegetation in the Albemarle-Pamlico sound systems of North Carolina

CHAPTER 5. WETLANDS

Wetlands are widely recognized as habitats vital to fisheries production in North Carolina and elsewhere (Mitsch and Gosselink 1993; Graff and Middleton 2003). This chapter defines and describes wetland habitats found in coastal North Carolina and documents their current distribution, ecological role, biological function, current status, trends, threats, and management needs.

Coastal wetlands border vital nursery areas and serve as the primary buffer between land and water-based impacts.



5.1. DESCRIPTION AND DISTRIBUTION

Definition

Wetlands are wet areas commonly referred to as swamps, marshes, bogs, or similar terminology. Wetlands, as defined by federal regulations [40 CFR 230.3(t)] and EMC rules [15A NCAC 2B .0202(71)], are "...areas that are inundated or saturated by an accumulation of surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." The boundary between wetlands and deepwater habitat (i.e., submerged aquatic vegetation) is defined as the maximum depth where rooted emergent vegetation (i.e., marsh grasses) can be found - generally <6ft (2m) below mean low water during the growing season (Figure 5.1). The EMC and federal regulatory definitions include nontidal freshwater wetlands not subject to CRC rules. The CRC refers to coastal wetlands as "marshlands," defined as "any salt marsh or other marsh subject to regular or occasional flooding by tides, including wind tides (whether or not the tide waters reach the marshland areas through natural or artificial watercourses), provided this shall not include hurricane or tropical storm tides" [G.S. 113-229(n)(3)]. The CHPP will focus primarily on wetlands that are connected to coastal water bodies by surface water of sufficient depth to allow fish utilization. These "connected" wetlands are hereby termed "riparian wetlands" because they border streams and other water bodies.

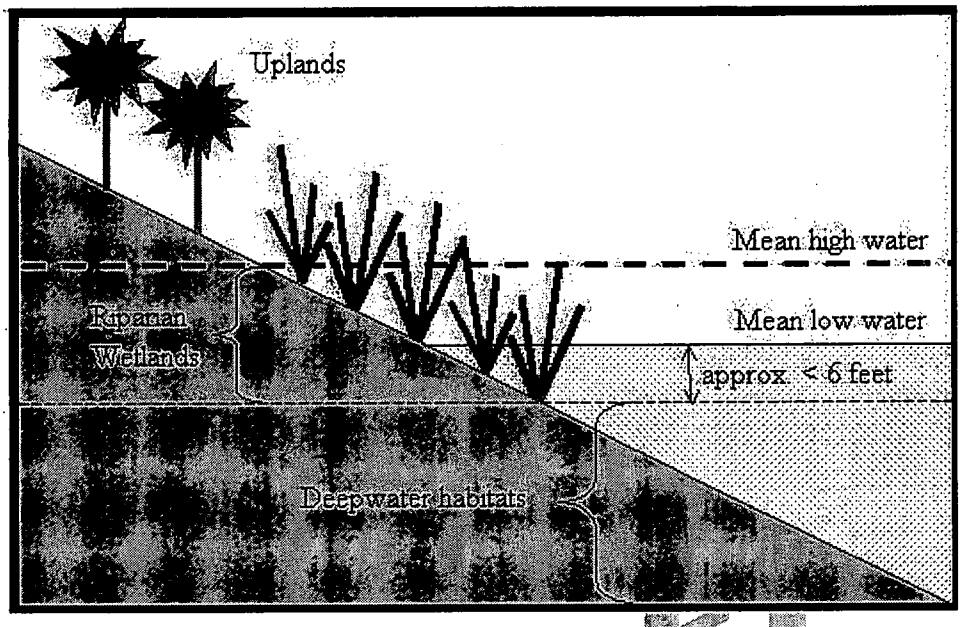


Figure 5.1. Graphic depiction of the conceptual boundaries among riparian wetlands, uplands, and deepwater habitats.

Description

Riparian wetlands can be differentiated into four broad wetland classes based on their landscape position within drainage networks (hydrogeomorphology): estuarine, riverine, headwater, and flat/depressional (Sutter 1999).

- **Estuarine wetlands** are generally found along the margins of estuaries and sounds. Estuarine wetlands include salt/brackish marsh, estuarine shrub scrub and estuarine forests.
- **Riverine wetlands** are those in which hydrology is determined or heavily influenced by proximity to a perennial stream of any size. Overbank flow from the stream exerts considerable influence on the hydrology of larger streams. Riverine wetlands include freshwater marshes, bottomland hardwood forest, and riverine swamp forest.
- **Headwater wetlands** exist in the uppermost reaches of local watersheds upstream of perennial streams. Headwater systems may contain channels with intermittent flow, but the primary sources of water input are precipitation, overland runoff, and groundwater discharge rather than overbank flow from a stream.
- **Flat/depressional wetlands** are generally not in direct proximity to surface water. While they are isolated from or hydrologically disconnected from surface water, the hydrology of depressional wetlands is primarily determined by groundwater discharge, overland runoff, and precipitation. Flat/depressional wetlands include pocosins, pine flats, depressional swamp forest, hardwood flats, maritime swamp forests, and some managed pinelands. They are also referred to as non-riparian wetlands.

While fish occupy riverine and estuarine wetlands (Map 5.1a-d) during periods of regular inundation, headwater and flat/depressional wetlands (Map 5.2) are generally not directly utilized by fish. However, there are some exceptions. The pocosins adjacent to the Alligator and Northeast Cape Fear rivers have surface drainage to coastal waters (Brinson 1991). However, the primary focus of this chapter is the riparian wetlands found in estuarine, riverine, and headwater systems.

Estuarine wetlands

- **Salt/brackish marsh** is defined by DCM using the CAMA definition for coastal wetlands. Salt/brackish marsh is therefore defined by the plant species it contains: smooth cordgrass, black needlerush, glasswort, salt grass, sea lavender, bulrush, saw grass, cattail, salt-meadow grass, and salt reed-grass [G.S. 113-229(n)(3)].
- **Estuarine forested wetlands** are subject to occasional flooding by tides, including wind tides (whether or not the tide waters reach the marshland areas through natural or artificial watercourses). Examples include pine-dominated communities with rushes in the understory or fringe swamp communities, such as those that occur along large back barrier estuaries like Albemarle and Pamlico sounds. Estuarine forested wetlands are common in upper estuarine sections of coastal rivers.
- **Estuarine shrub/scrub** is any shrub/scrub dominated community subject to occasional flooding by tides, including wind tides (whether or not the tide waters reach the marshland areas through natural or artificial watercourses). Typical species include wax myrtle and eastern red cedar. Examples include areas along the sound shorelines of barrier islands.

Riverine wetlands

- **Freshwater marshes** are defined by DCM as herbaceous areas that are flooded for extended periods during the growing season. Included are marshes within lake systems, managed impoundments, some Carolina Bays, and other non-tidal marshes (i.e., marshes which do not fall into the salt/brackish marsh category). Typical communities include species of sedges, millets, rushes and grasses that are not specified in the coastal wetlands regulations. Also included are giant cane, arrowhead, pickerelweed, arrow arum, and smartweed. Such marshes occur in the coastal waters of the Trent River near New Bern and along parts of the Cape Fear and Northeast Cape Fear rivers.
- **Bottomland hardwood forests** and **riverine swamp forests** are generally forested, or occasionally scrub/shrub, communities usually occurring in floodplains, that are semi-permanently to seasonally flooded. Bottomland hardwood forests contain mostly oaks (overcup, water, laurel, swamp, chestnut), sweet gum, green ash, cottonwoods, willows, river birch, and occasionally pines, while riverine swamp forests contain generally cypress, black gum, water tupelo, green ash and red maple. These swamps occur throughout the shoreline areas of coastal rivers.

Headwater wetlands

- **Headwater swamps** are wooded, riverine systems along small, intermittent tributary streams. Headwater swamps include hardwood-dominated communities with soil that is moist most of the year. Channels receive their water from overland flow and rarely overflow their banks.

Flat/depressional wetlands

- **Non-riverine swamp forests** are very poorly drained, non-riverine forested, or occasionally scrub/shrub, communities which are semi-permanently to temporarily flooded. Typical species include cypress, black gum, water tupelo, green ash and red maple (Sutter 1999).
- **Pocosins** are palustrine scrub/scrub communities (i.e., non-estuarine scrub/shrub) dominated by evergreen shrubs, often mixed with pond or loblolly pines. Pocosins typically occur on saturated, acid, nutrient poor, sandy or peaty soils; usually removed from large streams, and subject to periodic burning.
- **Wet forested flats** are poorly drained interstream flats not associated with rivers or estuaries. They are seasonally saturated by high water table or poor drainage. Species vary greatly but often include sweet gum and red maple. This category includes hardwood flats, pine flats, and certain managed pinelands.
- **Maritime Swamp Forests** are forested communities characterized by stunted growth due to the stresses imposed by its proximity to salt spray from the ocean. Typical vegetation includes live oak, red cedar, red maple, and swamp tupelo.

Habitat requirements

Estuarine wetlands

Salt/brackish marsh plants grow at salinities from 0.5 to >35 ppt (Wiegart and Freeman 1990). Within this salinity range, salt marsh plants persist in low-energy protected areas where the rate of sediment building (accretion) exceeds the rate of sediment loss (through erosion) or subsidence (Mitsch and Gosselink 1993). Inorganic sediments are deposited by river currents, tidal creeks and ocean overwash on and adjacent to the marsh platform (Weigert and Freeman 1990; Mitsch and Gosselink 1993). Deposition from sediment-laden creek water causes side levees of higher elevation (low marsh) and coarser particle size than the sediments in the marsh interior (high marsh).

Erosion and sedimentation are natural processes that can result in changing distributions of marsh vegetation. The rate of erosion is dependent on shoreline orientation, fetch, water depth, bank height, sediment composition of bank, shoreline vegetation, presence of offshore vegetation, and boat wakes (Riggs 2001). In general, all of the Albemarle-Pamlico estuarine system, which is a drowned river system, is in a state of shoreline recession (Riggs and Ames 2003). South of Bogue Sound, estuarine erosion is severe only in portions of drowned river estuaries such as the Cape Fear, New, and White Oak rivers, and along the ICW and navigational channels. The remaining narrow, shallow estuaries are generally not eroding, as the marshes and flats vertically accrete sediment to keep up with rising sea level. Riggs (2001) mapped the shoreline types and shoreline areas where erosion was noticeable. Shoreline erosion rates have been estimated for portions of the coast by various studies including Hartness and Stirewalt and Ingram (1974), USDA Soil Conservation Service (1975), Pearson (1977), Riggs et al. (1978), and Hardaway (1980). Their results are summarized and compared in Riggs (2001). These studies are helpful in indicating where major erosion problems are occurring.

The zonation of vegetation in salt/brackish marsh is largely determined by variations of salinity and drainage of sediment porewater (Weigert and Freeman 1990). Porewater salinity in the levees tends to remain similar to that of adjacent estuarine waters because of the frequent exchange of water and better internal drainage (due to coarser sediment) than the more isolated high marsh. Porewaters of the short cordgrass zone often are hypersaline during times of warm, dry weather, high rates of evapotranspiration, and minimal water exchange. In the high marsh, precipitation (and groundwater occasionally) creates salinities that may be low enough to support shrubs and other plants intolerant of high salinities (wax myrtle, groundsel-tree, and marsh elder). Some species are restricted in the low marsh because of high porewater salinity, frequent inundation, and high-sulfide porewaters associated with frequent inundation. Consequently, there is greater species richness in the high marsh because of the less stressful conditions.

Riverine wetlands

The development of tidal freshwater marshes is similar to that of salt/brackish marsh. Freshwater marshes have a higher number of plant species than their salt/brackish counterpart due to lower salinity in freshwater areas (Mitsch and Gosselink 1993; SAFMC 1998). Tidal freshwater marshes can also be divided into low and high zones. Species in low marshes are more fleshy and succulent (e.g., arrowheads, pickerel weed, wild rice) than those in the high marsh (e.g., cattails, reeds). Competition and inundation frequency and duration are among the most important factors determining the presence and zonation of tidal freshwater marsh, although variation in salinity along stream margins reduces the number of species (Odum et al. 1984). Tidal freshwater marsh plants are usually more sensitive to toxic levels of soluble iron, manganese, or sulfide compounds that can accumulate in tidal freshwater marsh soils and can be excluded by levels of these substances that have little effect on typical salt/brackish marsh species (Odum et al. 1984).

The plant community in nontidal (inland) freshwater marshes is very similar to its tidal counterpart. However, the hydrology of nontidal wetlands is more variable than tidal wetlands that receive regular

inundation. Water levels in inland marshes are determined by the type of water body in which they occur. Water levels in isolated marshes with a small watershed are controlled more by the balance of precipitation and evapotranspiration than anything else (Mitsch and Gosselink 1993).

Riverine swamp forests typically occur along low lying margins of rivers and lakes where they receive seasonal flooding (Wharton et al. 1982). Fish use of flooded riverine forested wetlands depends on the timing and duration of inundation. The frequency and magnitude of flooding in swamp forests depends on the land use characteristics of the watershed, bank height, the degree of stream channelization, and tidal influence. Depth and duration of flooding determine whether an area is bottomland hardwood forest or swamp forest. Swamp forests are more frequently inundated than bottomland hardwoods (DEHNR 1996), thus they are more frequently used by fish. Bottomland hardwood wetlands are generally irregularly to seasonally flooded. Overbank flooding and surface and groundwater discharge are likely sources of inundation in riverine swamp forests (Wharton et al. 1982; DEHNR 1996). The source of inundation varies with the type of river or stream. Wetlands adjacent to large rivers receive overbank flow from flood pulses or tidal flows, whereas water level in small blackwater tributaries is influenced more by groundwater discharge and local precipitation (Wharton et al. 1982). For example, the water budget of a small blackwater stream (Creeping Swamp) in coastal North Carolina showed that water loss consisted of 61% evapotranspiration, followed by baseflow (20%), overland runoff (17%) and seepage to groundwater (2%) (Winner and Simmons 1977). The relatively low input from overland flow allows the mainstem river to have more influence on small blackwater streams at high river flows. When the mainstem channel is low, water level in blackwater streams is controlled more by local precipitation. The sporadic inundation of swamps bordering blackwater streams allows temporary use by opportunistic fish at high mainstem river flows.

Headwater swamps

The requirements of headwater swamps are similar to small tributary streams referenced above. The main difference between riverine forested wetlands and headwater wetlands is their position in the watershed: headwater wetlands are the highest hydrologic points in the watershed.

Distribution

By 1994, the DCM had used GIS technology to map and classify wetlands in the 20 coastal counties using National Wetland Inventory (NWI) maps, Natural Resource Conservation Service digital soils maps, satellite imagery (1988, 1994), and hydrography maps as source data (Sutter 1999). Analyses showed there were a total of 1.3 and 2.2 million acres of riparian and non-riparian wetlands, respectively, in the CHPP management area of those counties. The classification error for wetlands was approximately 11% (Shull 1999), making the total figure for wetlands acreage in coastal North Carolina between 3.1 and 3.9 million acres.

Riparian wetlands covered 7% of the land area in coastal river basins of North Carolina in 1994, and riverine forested wetlands was the most abundant class of the three riparian wetland classes (Table 5.1). Riparian wetlands are not distributed evenly among CHPP management units (MUs) (Map 5.1a-d). The Cape Fear MU contained the largest area of riparian wetlands, followed by the Neuse and Albemarle (Figure 5.2). The greatest proportions of estuarine wetlands were in Core-Bogue, Southern Estuaries, and Pamlico MUs, whereas the Roanoke, Cape Fear, and Neuse had the highest proportion of riverine wetlands (Figure 5.2). The greatest percentage of total land cover in riparian wetlands was in the Southern Estuaries MU (13%), where the dominant wetland type was salt/brackish marsh (Table 5.1).

Salt/brackish marsh

- The total area of salt/brackish marsh in coastal North Carolina was 198,168 acres in 1994, which comprised 17% of all riparian wetland types.
- The greatest acreage (63,601 acres) of salt/brackish marsh was in the Pamlico MU.

- Salt/brackish marsh occurs in all the CHPP management units except the Chowan, Roanoke, and Coastal Ocean.

Table 5.1. Total acreage of riparian wetland types by CHPP management unit. *[Source: DCM wetland mapping (current as of 1994).]*

Management Unit	Riparian Wetlands							% of total land area
	Estuarine			Riverine			Head-water wetlands	
	Salt/Brackish Marsh	Estuarine Forest	Estuarine Shrub/Scrub	Freshwater Marsh	Bottomland Hardwood	Riverine Swamp Forest	Headwater Swamp	
Albemarle	44,758	231	8,279	4,897	8,890	140,501	2,200	**11.3**
Cape Fear	9,640	18	363	13,443	40,018	211,888	5,606	**4.9**
Chowan	0	0	0	1,028	24,868	74,974	2,143	**11.8**
Core-Bogue	22,274	57	4,048	325	941	3,768	1,696	**9.7**
Neuse	14,386	26	1,367	3,878	68,175	146,400	9,283	**7.0**
New/ White Oak	9,143	71	2,242	665	7,134	22,229	1,530	**8.5**
Pamlico	63,601	303	8,802	4,105	254	616	611	**5.5**
Roanoke	0	0	0	1,888	37,788	123,045	2,477	**7.4**
S. estuaries	21,996	66	1,115	302	1,387	9,002	824	**13.2**
Tar/ Pamlico	12,370	193	1,658	2,272	38,127	97,258	4,789	**5.8**
Total	**198,168**	**965**	**27,874**	**32,803**	**227,582**	**829,681**	**31,159**	**6.9**
% of wetland types	**14.7**	**0.1**	**2.1**	**2.4**	**16.9**	**61.5**	**2.3**	**na**

Estuarine shrub/scrub

- There was a total of 27,874 acres of estuarine shrub/scrub habitat in North Carolina in 1994, which comprised 2% of riparian wetland areas (Table 5.1).
- The greatest acreage (8,279) of estuarine shrub/scrub habitat was in the Albemarle MU.
- Estuarine shrub/scrub habitat is not present in the Chowan and Roanoke MUs.

Estuarine forests

- There was a total of 965 acres of estuarine forest in the CHPP management area, comprising less than 1% of the riparian wetlands (Table 5.1).
- The greatest acreage of estuarine forested wetlands was in the Albemarle and Pamlico MUs (231 and
- 303 acres, respectively).
- Estuarine forest wetlands are not present in the Chowan and Roanoke MUs.

Freshwater marsh

- Freshwater marsh covered a total area of 32,803 acres in 1994 and comprised 2% of these riparian

wetlands (Table 5.1).

- The greatest acreage (13,443) of freshwater marsh was in the Cape Fear MU.
- Freshwater marsh occurred in all CHPP MUs except the Coastal Ocean.

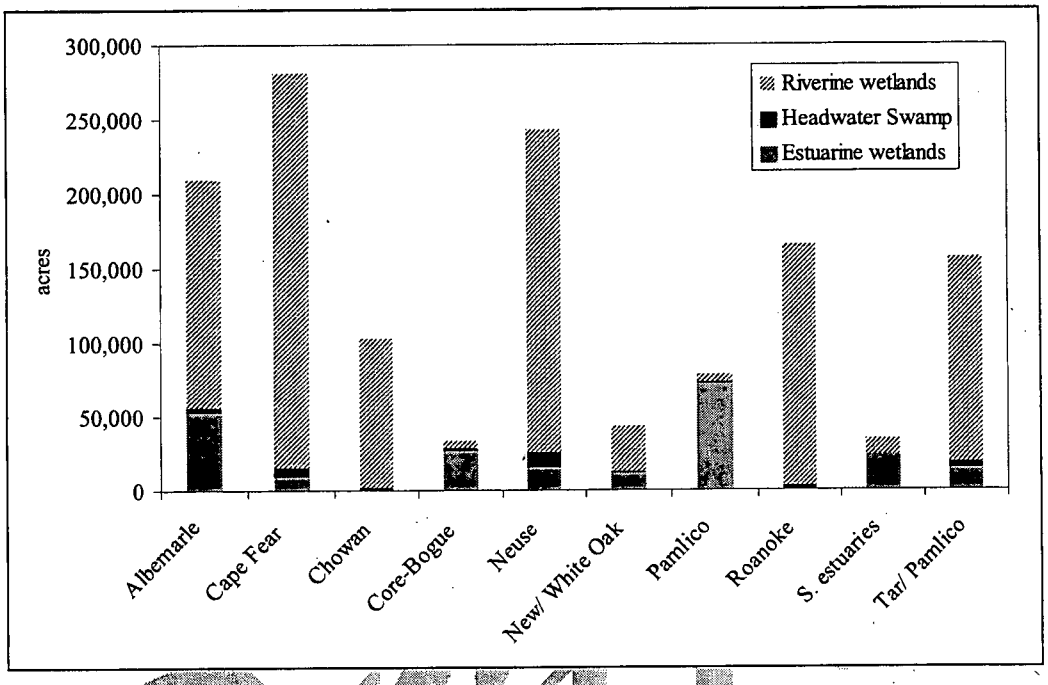


Figure 5.2. Relative amount and proportion of these riparian wetland classes among CHPP management units. *[Source: DCM wetland mapping (current as of 1994).]*

Bottomland hardwood and riverine swamp forests

- The combined total acreage of bottomland hardwood forest and riverine swamp forest in 1994 was 1,057,263, which comprised 78% of all riparian wetlands in the CHPP management area (Table 5.1).
- The greatest area (251,906 acres) of bottomland hardwood and riverine swamp forest was in the Cape Fear MU (Table 5.1).
- Bottomland hardwood forests occur in all MUs except the Coastal Ocean.

Headwater swamps

- The total area of headwater swamps in the CHPP management area in 1994 was 31,159 acres, which comprised 2% of all riparian wetlands (Table 5.1).
- The greatest acreage of headwater swamps was in the Neuse (9,283 acres), Cape Fear (5,606 acres), and Tar/Pamlico MUs (4,789 acres).
- Headwater wetlands occur in all CHPP MUs except the Coastal Ocean.

5.2. ECOLOGICAL ROLE AND FUNCTIONS

Wetlands are well known for the ecological services they provide. Wetland services improve the quality of adjacent habitats with their capacity for water control and filtration. They can also protect upland habitats from erosion. Wetlands play a vital role in providing abundant food and cover for juvenile and adult finfish and shellfish. Support and documentation of these important functions is provided in this section.

Ecosystem enhancement

The flood control and water quality benefits of wetlands have been extensively studied (Mitsch and Gosselink 1993). By spreading and slowing flood waters, wetlands decrease flooding in adjacent upland areas and downstream areas. Some wetlands can store flood waters and slowly release it to surface and groundwater systems during periods of low flow (Mitsch and Gosselink 1993). Bottomland hardwood forest along the Mississippi River before European settlement stored floodwater equivalent to about 60 days of river discharge. The storage capacity of these wetlands today has been reduced to about 12 days (Mitsch and Gosselink 1993). Consequently, flooding has increased along the lower Mississippi River. Mitsch and Gosselink (1993) concluded that wetlands reduce downstream flooding most effectively with (1) increasing wetland area, (2) increasing distance of wetland downstream, (3) increasing size of flood, (4) increasing proximity to upstream wetlands, and (5) decreasing upstream storage such as reservoirs.

An important water quality benefit of wetlands is their ability to foster settlement from sediment-laden water, resulting in deposition of suspended solids (inorganic sediment and organic matter) among the vegetation (Mitsch and Gosselink 1993). Under favorable conditions, toxic chemicals and nutrients (especially phosphorus) are also retained in some wetlands due to adsorption to sediment particles (Wolfe and Rice 1972; Mitsch and Gosselink 1993). Rooted vegetation stabilizes unconsolidated sediment, reducing erosion and turbidity in adjacent aquatic habitats. Along eroding estuarine shorelines, wetlands also provide an important buffer against wave-induced turbulence (Riggs et al. 2001). The buffering effect of wetland vegetation improves water clarity for submerged vegetation and benthic algae (Mitsch and Gosselink 1993) while also reducing sediment additions necessary for creation of new shallow water habitat (Rogers and Skrabal 2001). Consequently, both wetland and non-wetland shorelines play an important role in maintaining the function of the estuarine system. *Maintaining a natural proportion and relative position of wetland and non-wetland shorelines will be a vital component of habitat restoration and management.*

Another water quality benefit of wetlands stems from their low-oxygen soil (anaerobic or reducing). Anaerobic soils play a vital role in the nitrogen cycle by transforming ammonia and nitrate (organic waste product or fertilizer) into nitrogen gas (denitrification; Mitsch and Gosselink 1993). In agricultural watersheds receiving fertilizer-enriched runoff, denitrification plays a important role in the world's nitrogen balance (Mitsch and Gosselink 1993). Nitrogen cycling is important to fisheries because high concentrations of nitrate can be toxic to fish, and nitrogen over-enrichment can result in algal blooms and hypoxia that contribute to stress and fish kills. Even moderate hypoxia can result in death of benthic invertebrates (Diaz and Rosenburg 1995; Taylor and Eggleston 2000; Sagasti et al. 2001), a major food source for crabs and demersal fish (Taylor and Eggleston 2000). Temporary and permanent retention of nutrients, such as phosphorus, is facilitated by particle deposition and burial as well as formation of organic matter in the sediment by roots and rhizomes (Mitsch and Gosselink 1993). Forested (streamside) wetlands in agricultural drainages have been shown to remove approximately 80% of the phosphorus and 90% of the nitrogen from the water (<http://www.epa.gov/owow/wetlands/facts/fact3.html>, July 2001). Stream headwaters are the site of most active uptake and retention of nutrients in riverine systems (Peterson et al. 2001). A study of denitrification in a headwater creek (Culvert Creek, North Carolina) found that marsh vegetation had the greatest potential for denitrification, compared to marsh sediment and flashboard risers (water control structures) (<http://www2.ncsu.edu/ncsu/CIL/WRRI/reports/report317.html>, 2003). The combination of nutrient uptake and retention makes headwater wetlands very important in controlling nutrient enrichment downstream.

Mitsch and Gosselink (1993) concluded that nutrients are probably stored in salt/brackish marshes fringing estuaries with limited water circulation (i.e., back barrier sounds), whereas wetlands in funnel-shaped (trunk) estuaries export more nutrients. There is also evidence that salt/brackish marshes act as a source of nutrients during the growing season and a sink in winter and spring (Woodwell et al. 1979).

Compared to plant uptake, however, leakage of nitrogen from a Georgia salt marsh was small (Haines et al. 1979). Nitrogen uptake in salt/brackish marsh is, on average, somewhat less than in freshwater marshes (Mitsch and Gosselink 1993). The nutrients are also released by erosion and decomposition of wetland vegetation. Retention and controlled release of particles, toxic chemicals and nutrients can improve water quality downstream. Therefore, if bottomland hardwood forests or headwater swamps are lost upstream, the potential for erosion, flooding, sedimentation, algal blooms, and fish kills increases downstream (DEHNR 1996).

Productivity

Because of the abundant supply of water, nutrients, and sunlight, wetland plant communities can be one of the most biologically productive ecosystems in the world (Teal 1962; Teal and Teal 1969; Mitsch and Gosselink 1993; SAFMC 1998). Some of the high primary production (creation of organic compounds through photosynthesis) of wetland vegetation is transferred to adjacent aquatic habitats via detritus and microalgae (Peterson and Howarth 1987; Weigert and Freeman 1990; Mitsch and Gosselink 1993). However, wetland plant species vary in their rate of decomposition, with leafy, succulent, low vegetation decomposing the quickest and woody, high vegetation the slowest (Mitsch and Gosselink 1993). Therefore, production from vegetation in woody, forested wetlands is converted more slowly into detritus than vegetation in marsh wetlands with leafy, succulent vegetation. Inundated wetland plants also exude dissolved organic substances contributing to epiphytic growth on their stems and leaves (Mitsch and Gosselink 1993).

Salt/brackish marsh growth in the low marsh is limited by self-shading, where other habitat requirements are met, whereas growth in the high marsh can be affected by a number of factors, including high salinity, sulfides, scarcity of iron, and lack of nitrogen (Weigert and Freeman 1990). Accounting for phytoplankton in the water column and algae on the sediment surface, productivity of low marsh (*Spartina alterniflora*) in a Georgia tidal creek was 1,539 g carbon/m^2/yr, while production in the high marsh was somewhat lower (about 1,350 g carbon/m^2/yr) (Weigert and Freeman 1990). In North Carolina, Stroud (1976) reported somewhat higher salt/brackish marsh production in low marsh (1660 g carbon/m^2/yr), but much lower production in the high marsh (750 g carbon/m^2/yr). In both North Carolina and Georgia, above ground production was about 20% greater than below-ground production (Mitsch and Gosselink 1993).

Primary production in salt/brackish marshes is converted into fish production through several pathways. Using sulfur, carbon, and nitrogen isotopes to trace organic matter flow in the salt marsh estuaries of Sapelo Island, Georgia, Peterson and Howarth (1987) found two major sources of organic matter used in fish production: *Spartina* (detritus) and algae. The relative importance of each source is determined by the feeding mode, size, location, and trophic position of the marsh and estuarine consumers (Peterson and Howarth 1987). For example, benthic microalgae probably support herbivorous snails, whereas detritus supports sheepshead minnows, mummichogs, and their prey. Attached algae can be found on the marsh grass itself, the intertidal mudflats, and the shallow subtidal bottom near the marsh. Pinckney and Zingmark (1993) compared production rates of benthic microalgae in various bottom types in an estuarine system (North Inlet, South Carolina). Short *Spartina* marsh accounted for the greatest amount of microalgal productivity (44.6%) in the system, followed by intertidal mudflats (22%), tall *Spartina* marsh (18%), and shallow subtidal bottom (<1 m mean low water) (13%). Sand flats accounted for only 3% of the total annual microalgal production (Pinckney and Zingmark 1993).

Productivity in riverine forested wetlands in North Carolina has been reported to be much lower than in salt/brackish marsh, representing about 523-677 g carbon/m^2/yr of leaf and twig litter (Brinson 1977; Mulholland 1979). However, the total production of forested wetlands may be similar to that of salt/brackish marsh when stem growth and below ground production are taken into account. The export of detritus from these riverine forested wetlands can be significant (Mitsch and Gosselink 1993). Mulholland and Kuenzler (1979) found that organic export was higher from river basins containing more

deepwater swamps than other riparian habitats. From a Louisiana swamp forest, Day et al. (1977) measured an export rate of 10.4 g carbon/m^2/yr. By contrast, salt/brackish marshes can have an organic export rate as high as 100 g carbon/m^2/yr (Wiegert et al. 1981). However, export rates in swamp forest can vary greatly with submersion regime and temperature. For example, higher temperatures (allowing faster decomposition) and frequent inundation increase the export rate of tidal swamp forests in tidal fresh waters of the Cape Fear River.

Fish utilization

It is estimated that over 95% of the finfish and shellfish species commercially harvested in the United States are wetland-dependent (Feierabend and Zelanzy 1987). Wetlands provide numerous ecological services to coastal fishes (Table 5.2). For example, one of the most important characteristics of riparian wetlands is their combination of shallow water and thick vegetation, which provides nursery habitat for young fish. The use of wetlands by finfish and shellfish is presented first, followed by documentation of specific functions for selected species.

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Table 5.2. Partial listing of wetland-enhanced fishery and forage species and stocks in coastal North Carolina. **Bolded** species show some preference for wetland habitat over other habitats documented in the text.

SPAWNING GUILD	Wetland Functions[1]					Fishery[2]	Stock Status[3]
Common name	Nursery	Foraging	Refuge	Spawning	Corridor		
ANADROMOUS & CATADROMOUS FISH							
American eel		X	X		X	X	
Sturgeon spp.	X	X	X		X	X[4]	O
River herring (alewife & blueback herring)	X	X	X	X	X	X	O-Albemarle Sound, U-central/southern
Striped bass	X	X	X		X	X	V-Albemarle Sound, Atlantic Ocean, O-central/southern
ESTUARINE SPAWNING & NURSERY							
Atlantic rangia clam	X	X	X	X			
Banded killifish	X	X	X	X			
Bay anchovy	X	X		X			
Grass shrimp	X	X	X	X			
Mummichog	X	X	X	X			
Naked goby	X	X	X	X			
Sheepshead minnow	X	X	X	X			
Silversides	X	X		X			
INLET & ESTUARINE CHANNEL SPAWNING/ESTUARINE NURSERY							
Blue crab	X	X	X		X	X	C
Cobia	X	X			X	X	
Red drum	X	X	X		X	X	C
Spotted seatrout	X	X	X		X	X	V
MARINE SPAWNING/LOW-HIGH SALINITY NURSERY							
Atlantic croaker	X	X	X		X	X	C
Atlantic menhaden	X	X			X	X	V
Shrimp	X	X	X		X	X	V
Pinfish	X	X	X		X	X	
Southern flounder	X	X	X		X	X	O
Spot	X	X	X		X	X	V
Striped mullet	X	X	X		X	X	C
MARINE SPAWNING/HIGH SALINITY NURSERY							
Black sea bass	X	X	X		X	X	V-south of Cape Hatteras, C-south of Cape Hatteras
Summer flounder	X	X	X		X	X	V

[1]Sources: Odum et al. 1981; Wharton et al. 1982; Weigert and Freeman 1990; NOAA 2001, Micheli and Peterson 1999, Mitsch and Gosselink 1993, Minello 1999.

[2] Existing commercial or recreational fishery. Fishery and non-fishery species are also important as prey.

[3] V=viable, R=recovering, C=Concern, O=overfished, U=unknown (DMF 2003 - Stock Status Reports)

[4] Fishery species under harvest moratorium

Salt/brackish marsh

Finfish and shellfish using salt/brackish marsh fall into several categories based on location and timing of use. Year-round residents of the marsh include small forage species such as killifish, mummichogs, sheepshead minnows, gobies, grass shrimp, bay anchovies, and silversides (SAFMC 1998). Transient species include those spawning near the marsh, but inhabiting deeper channels (i.e., river herring), and those spawned in deeper waters using marsh habitat as nursery or foraging areas. Among transient species, some prefer the edge of salt/brackish marsh (i.e., red drum, flounder) while others are found near marsh edge on unvegetated bottom (i.e., spot, croaker). Some species are not found in the marsh, but derive substantial food resources from the marsh plants as detritus (i.e., menhaden; Lewis and Peters 1994) or from microalgae produced on the marsh surface. Of fishery species in North Carolina, penaeid shrimp and red drum are considered critically linked to marsh edge habitat (SAFMC 1998)[1].

Freshwater marsh

Fishery and forage fish inhabiting tidal and non-tidal freshwater marshes include largemouth bass, bluegill, warmouth, black crappie, chain pickerel, southern flounder, white perch, mummichog, bay anchovy, inland silversides, river herrings, striped bass, and sturgeon (Mitsch and Gosselink 1993). The nature and degree of association with freshwater marsh habitat depends on the species. For example, striped bass and river herring are not only abundant along marsh edge, but also in open water areas adjacent to the marsh edge. Bluegill, black crappie, largemouth bass, and warmouth are found almost exclusively near shoreline structures such as marsh grass. Mosquitofish are an important forage species and a "mosquito control agent" closely associated with freshwater marsh habitat (Odum et al. 1984).

Bottomland hardwood and riverine swamp forest

There is a strong relationship between fishery yields and forested river floodplains (Mitsch and Gosselink 1993). A study on the Suwanee River floodplain (Florida/Georgia) found that fish production was much greater in floodplain sloughs than in the main river (Holder et al. 1970). A similar study of fish standing stock on river floodplains in North Carolina has not been conducted. Fish use of riverine forested wetlands is generally restricted to periods of seasonal inundation, which occurs mostly during winter and spring. By contrast, riverine wetlands below Lock and Dam #1 on the Cape Fear River receive regular tidal inundation (C. Hackney, UNC-W, pers. com., 2003). Seasonal flooding in riparian forested wetlands also increases the productivity of riverine systems by connecting the mainstem river with the abundant organic material found on forested floodplains (Wharton 1982; Junk et al. 1989). For example, numerous studies have shown a correlation between sunfish and largemouth bass spawning success and the timing and extent of floodplain inundation (Wharton et al. 1982). In North Carolina, seasonal high water in riverine systems generally occurs from winter to spring. Summer conditions (falling water levels, increasing temperatures, and low dissolved oxygen) exclude most fish from forested wetlands areas. Only fish adapted to low oxygen conditions continue to inhabitat wetland areas as long as they contain water (i.e., bowfin, gar, mudminnows, killifish; Wharton et al. 1982). A study on fish use of creek floodplains in North Carolina documented several common species using channels in the floodplain (Walker 1984). Those species included several small sunfish species, redfin pickerel, bowfin, brown bullheads, redear sunfish, pumpkinseed, bluegill sunfish, green sunfish, and small forage species (i.e., shiners, darters, killifish, and crayfish). Estuarine-dependent species found on river floodplains include hickory shad, blueback herring (Wharton et al. 1982), and alewife (SAFMC 1998). The tidal swamp forests in the Cape Fear estuary are also inhabited by blue crabs and other transient estuarine species (C. Hackney, UNC-W, pers. com., 2003).

Flat/depressional wetlands

Fish use of normally isolated wetlands (i.e., pocosins along the Alligator and Northeast Cape Fear rivers)

[1] More information on salt/brackish marsh can be found in the Nursery function section of this chapter.

depends on many factors. A study conducted on the Savannah River floodplain found that fish use was limited to wetlands that dried infrequently, were most connected to intermittent water bodies, and had an elevation closest to the nearest permanent water body (Snodgrass et al. 1996). Pocosins that are located directly adjacent to salt/brackish marsh or other riparian wetlands are potential fish habitat. Biotic interactions and characteristics of the wetlands had relatively less influence on fish community structure than the wetland's landscape position. The study also noted that only widespread, colonizing species were correlated with landscape position, suggesting more complicating factors controlling colonization rates (i.e., variation in water level more related to local rainfall than overflow). *As sea level continues to rise and low-lying pocosins near coastal North Carolina waters transition to marshes, they will become more important as primary nursery areas for estuarine-dependent fish (Brinson 1991). Therefore, a similar study should be conducted in North Carolina to determine what pocosin areas are actually used by fish, and the contribution of those fish to overall production in the estuary.*

Specific biological functions

Nursery

The large expanses of shallow water and thick vegetation found in riparian wetlands provide abundant food and cover for larval, juvenile and small organisms (Graff and Middleton 2003). Nursery habitat is not only provided by the dense structures, but also by the shallow depth of water itself, which provides refuge from aquatic fish predators (review in Rozas and Odum 1987). The aversion to shallow water among large, deep-bodied aquatic predators is a common behavior, which indirectly protects smaller fish.

Salt/brackish marsh

Along with the shallow soft bottom areas they border, salt/brackish marshes along the North Carolina coast are probably the most recognizable nursery habitat for estuarine-dependent species. The majority of Primary and Secondary Nursery Areas designated by the MFC are located in soft bottom areas surrounded by salt/brackish marsh. Even though salinity and transport mechanisms are the key physical factors affecting the species composition in nursery habitats in Pamlico Sound and its tributaries (Ross and Epperly 1985; Noble and Monroe 1991; Ross 2003), marsh wetlands are a vital component of estuarine nursery habitat. Minello et al. (2003) concluded that the relative nursery value of salt marshes in Atlantic coast estuaries appears to be higher than open water, but lower than submerged aquatic vegetation.

Most of the juvenile fishes found in salt/brackish marsh nurseries are comprised of species spawned offshore during winter. The larvae are subsequently transported through inlets and into estuarine waters where they settle in the upper (low salinity) or lowermost (high salinity) reaches of estuarine creek systems (Ross 2003). The peak of juvenile settlement generally occurs in spring through early summer, although the peak is correlated more with water temperature (Ross and Epperly 1985). Settlement in upper reaches is particulary beneficial to spot and croaker, where growth and survivorship are enhanced compared to lower reaches (Ross 2003). If movement to general regions of the estuary is largely passive (Pietrafesa et al. 1986; Pietrafesa and Janowitz 1988), the viability of spot and croaker stocks could be reduced by hydrodynamic conditions resulting in more settlement to lower regions of the estuary (Ross 2003). This settlement pattern could also occur in other estuarine-dependent species.

According to DMF's juvenile abundance survey data, the dominant species in high salinity marshes behind the Outer Banks and Core Sound include pinfish, pink shrimp, black sea bass, gag, pigfish, red drum, gulf flounder, and summer flounder (Noble and Monroe 1991). However, the primary nursery habitat in these areas is submerged aquatic vegetation. Juvenile spot, brown shrimp, striped mullet, and southern flounder are abundant along the western shores of Pamlico and Core sounds and their tributaries (Epperly and Ross 1986; Noble and Monroe 1991). In the Newport River estuary, juvenile southern flounder showed a distinct preference for marsh edge habitat over other habitats, but only during fall (Walsh et al. 1999). The juvenile southern flounder were most abundant in more turbid, upper regions of

the estuary.

During spring through fall, brackish marshes in the Albemarle/Pamlico estuary are dominated by juvenile Atlantic menhaden, striped mullet (Epperly and Ross 1986), silversides, anchovies (Nelson et al. 1991) and more demersal species such as Atlantic croaker, brown shrimp, blue crab, and southern flounder (Noble and Monroe 1991). In higher salinity marshes of the Pamlico Sound, spotted seatrout, weakfish, silver perch, and red drum are also abundant (Noble and Monroe 1991). Juvenile red drum reach their highest abundance in brackish marsh (Tagatz and Dudley 1961; Nelson et al. 1991; C. Peterson, UNC-CH, pers. com., 2003). Fish use of low salinity (brackish) marsh habitat in estuaries of North Carolina was studied by Rozas and Hackney (1984), who found a combination of freshwater and estuarine species in low-salinity, intertidal creeks. The most abundant species were spot, grass shrimp, bay anchovy, and Atlantic menhaden. They also reported three seasonal peaks in abundance in low salinity marshes: (1) spring peak with influx of juvenile spot, Atlantic menhaden, Atlantic croaker, and southern flounder; (2) summer peak of grass shrimp; and (3) fall peak of bay anchovies and grass shrimp.

A study in Galveston Bay, Texas, found that juvenile brown shrimp, white shrimp, blue crab, spotted seatrout, and southern flounder were most abundant along salt/brackish marsh edge habitat compared to inner marsh, shell bottom, SAV, and shallow, non-vegetated bottom (Minello 1999). In another Texas estuary, low marsh supported higher abundances of brown shrimp, blue crabs, daggerblade grass shrimp, white shrimp, and striped mullet, although there was little difference between low and high marsh for white shrimp and striped mullet (Rozas and Zimmerman 2000). Resident estuarine species, such as gulf killifish and sheepshead minnow, were most abundant in high marsh.

Habitat types derived from salt/brackish marsh (i.e., peat blocks) can also provide important nursery habitat for certain species. Peat blocks are generally found along eroding marsh shorelines, where they serve as firm substrate for the attachment of sessile invertebrates and refuge for juvenile blue crabs in western Pamlico Sound (D. Eggleston, NCSU, pers. com., 2001). Szedlmayer and Able (1996) found that, in a New Jersey estuary, juvenile black seabass were more abundant in sponge-peat habitats (associated with eroding marsh) compared to eelgrass beds, upper estuary, subtidal creeks, marsh channels, and open bay areas.

Freshwater marsh

Studies documenting the use and significance of freshwater marsh for larval and juvenile fish in North Carolina are lacking. Freshwater marshes comprise only a very small portion of riparian wetlands in coastal North Carolina. A study conducted in Virginia found that larvae and juvenile fish represented 79% and 59% of the total number of fish collected at tidal freshwater and salt marsh sites, respectively (Yozzo and Smith 1997). McIvor (1987) found reduced predation by large carnivorous fish in the shallow water (<3ft or <1m) of freshwater tidal creeks, possibly due to unfavorable water quality, the physical constraints of shallow water, and/or increased predation from predatory birds (i.e., herons).

Bottomland hardwood and riverine swamp forest

Forested wetlands are important nursery areas for anadromous and resident freshwater species along coastal rivers and creeks in North Carolina (Wharton et al. 1982; DMF 2000c). Forested wetlands are also important for some transient estuarine species (i.e., spot, croaker, southern flounder, blue crab) in the lower Cape Fear River (Mallin et al. 2001c; C. Hackney, UNC-W, pers. com., 2003). The timing and extent of flooding are critical to fish use of bottomland hardwood and riverine swamp forest. Larval and juvenile river herring have been collected near flooded riverine wetlands in North Carolina (DMF 2000c). Studies of larval fish abundance and diversity on Mississippi River floodplains suggested that nearly 50% of fish species inhabiting the river used the floodplain as a nursery (Gallagher 1979). Unchannelized sections of the Missouri River produced 2 to 2.5 times more fish than channelized sections (Groen and Schmulbach 1978). In general, vegetated shoreline inundation during spring and early summer has been

correlated with increased year-class strength of largemouth bass, sunfish, and yellow perch (Nelson and Walberg 1977; Strange et al. 1982; Ploskey 1986).

Foraging

Salt/brackish marsh

Few aquatic species feed directly on living plant tissue in salt/brackish marsh (i.e., periwinkle), and their productivity is very low compared to that of detritivores and consumers of microalgae (Weigert and Freeman 1990; Steel 1991; SAFMC 1998). However, biotic interactions with primary consumers can result in degradation or loss of wetlands. Recent study results from the southeastern United States suggest that blue crab predation on plant-eating snails may prevent the snail from overgrazing the marsh grass (Silliman and Bertness 2002).

Detrital and bacterial production from salt/brackish marsh is one of the highest per unit area of any ecosystem in the world (Wiegert and Evans 1967). Slow-moving or sessile species residing in salt/brackish marsh and contributing to secondary production include fiddler crabs, mud snails, amphipods, oysters, clams, and ribbed mussels (Weigert and Freeman 1990). Based on data from Georgia marshes, biomass of these resident species exceeded 15 g carbon/m^2, and consisted of 80-200 fiddler crabs, 400-700 periwinkle snails or mud snails, and 7-8 mussels (Weigert and Freeman 1990). The resident estuarine fishes (i.e., killifish, grass shrimp, sheepshead minnow) are an important link between estuarine production and transient predatory fish populations (Weigert and Freeman 1990; Kneib 1997). Salt-brackish marsh edge also provides important feeding areas for blue crabs, red drum, flounder, seatrout and other large predators searching the edge of complex structure near deeper water, as illustrated by greater predation on grass shrimp with increasing depth in shallow estuarine water (Clark et al. 2003).

It has been estimated that 45% of salt marsh production is exported to the estuarine system in the form of detritus, dissolved organic matter, and transient nekton (i.e., grass shrimp and killifish; Teal 1962). The biomass of secondary production going in and out with the tide (fish, shrimp) is less well known than resident species biomass (Kneib and Wagner 1994). The exported production of brown and white shrimp is probably the best known and most significant to coastal fisheries (Turner 1977; Weigert and Freeman 1990). The estimated yield of shrimp from North Carolina was 107 lb per acre of intertidal vegetated bottom (Turner 1977), where intertidal vegetation included "salt marsh macrophytes, *Spartina* spp. [and] *Juncus* spp." However, recent research suggests that wetlands vary greatly in their role as exporters or importers of organic matter (Weigert and Freeman 1990). This variation could be the result of variable erosion or deposition rates among seasons or wetland areas.

Freshwater marsh

Compared to salt/brackish marsh, most living vegetation in freshwater marshes can be more readily consumed by insects, crayfish, muskrats, waterfowl, and carp (Mitsch and Gosselink 1993; SAFMC 1998). However, herbivory is still minor in freshwater marshes (Mitsch and Gosselink 1993). Together with phytoplankton and benthic algae, organic matter from the emergent vegetation is the source of primary production in freshwater marshes. The export of this production (in the form of particulate detritus) to other systems is less understood than that of salt marshes (Mitsch and Gosselink 1993), but is probably similarly affected by the rates of erosion and water exchange between wetlands and open water systems. Because many freshwater marshes in North Carolina generally occur in slow-moving, backwater areas, export of detritus is probably less significant compared to salt marshes.

The detritus that remains in the marsh provides food for meio- and macrobenthic communities consisting of nematode worms, chironomid fly larvae, mysids, snails, and amphipods (Odum et al. 1981; Mitsch and Gosselink 1993; SAFMC 1998). The macrobenthic community, in turn, provides abundant food for small fish, grass shrimp, crayfish, crabs, and waterfowl. Large fish feeding within the marsh include chain pickerel, bowfin, and gars (Odum et al. 1981). Many other large, aquatic predators (i.e., largemouth bass,

crappie) feed along the edge of freshwater marshes where there is deep water nearby for refuge (Odum et al. 1981).

Bottomland hardwood and riverine swamp forest

Although riverine forests contain vast stores of organic matter, much of it is not rapidly converted into particulate organic matter for secondary production (Mitsch and Gosselink 1993) because woody material and leaves break down more slowly than succulent vegetation in marshes. In spite of this, riverine forested wetlands still produce abundant invertebrate food, such as copepods, ostracods, amphipods, isopods, oligochaetes, flatworms, crayfish, and terrestrial insects (Wharton et al. 1982; Mitsch and Gosselink 1993). Fish species and life stages adapted for feeding in riverine swamp forests include adult mosquitofish, gar, bowfin, carp and chain pickerel, along with early life stages of many other species (Wharton et al. 1982; Mitsch and Gosselink 1993). Other species, such as largemouth bass and catfish, are opportunistic predators within the flooded forest.

Refuge

Adult or small aquatic organisms find refuge from predators and adverse weather conditions on and among the dense leaf canopies found in salt/brackish and freshwater marshes (Mitsch and Gosselink 1993; SAFMC 1998; Graff and Middleton 2003). Many small resident species, such as grass shrimp and killifish, reside within emergent stands of vegetation (Pattilo et al. 1997; SAFMC 1998; Minello 1999; Rozas and Zimmerman 2000). A recent study on predation risk and prey distribution in shallow-water estuarine habitats found that predation on grass shrimp increased with increasing depth during the day, and decreased across all depths at night (Clark et al. 2003). The study results highlight the importance of a refuge from predation during the daytime and a relaxation of predation at night. Large, somewhat less mobile organisms also find refuge in the vegetation. For example, Micheli and Peterson (1999) found that adult blue crabs utilized marsh edge habitat in preference to unvegetated, open water habitat in a North Carolina estuary, presumably as refuge from predation.[2]

The structure provided by freshwater marsh vegetation and forested wetland margins provides excellent refuge for sunfish, crappie, largemouth bass, and other ambush predators, as well as slow-moving benthic invertebrates (e.g., crayfish). Numerous studies have documented the vegetated habitat preference of largemouth bass, bluegill, and other freshwater ambush predators (review in Savino and Stein 1989).

Spawning

The stems and leaves of wetland vegetation provide a surface for attachment of eggs. The combination of egg-laying structures, abundant food and relative scarcity of predators (Power et al. 1995) in seasonally flooded wetlands makes them an ideal spawning area. River herring are an important coastal species that spawn adhesive eggs in flooded swamps, oxbows, and along stream edges (Wharton et al. 1982; DMF 2000c). Spawning of river herring in North Carolina occurs during elevated spring flows from March through May in small tributaries (DMF 2000c).

The structural complexity of marsh vegetation and intertidal submersion regime in salt/brackish marsh provides spawning habitat for forage species such as killifish (including mummichogs), silversides, gobies, and grass shrimp (Anderson 1985; Pattilo et al. 1997). The number of species spawning in salt marsh habitat is low compared to the number of estuarine species spawning offshore and in deep channel habitat (Table 2.3). Nevertheless, many of the species spawning in wetlands are also important food items for transient fishery species.

[2] The refuge function of marshes for juvenile species is discussed in the nursery function section.

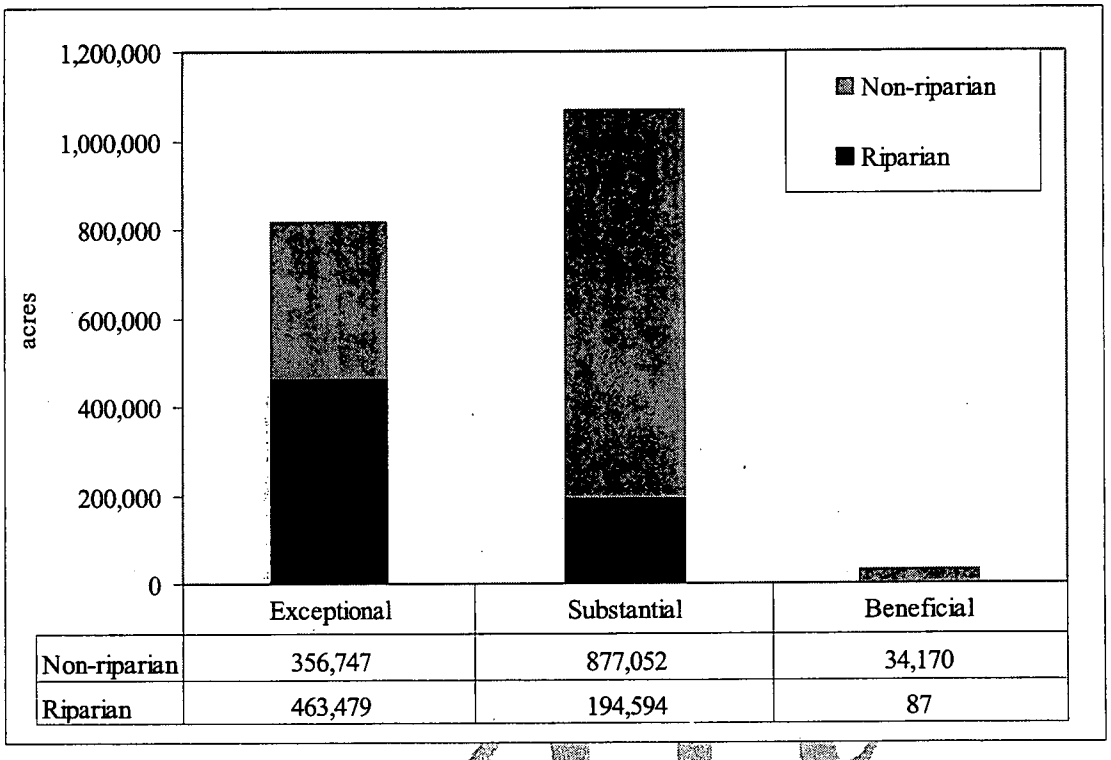
Corridor and connectivity

Within the marsh, elevation and proximity to open water are important influences on the distribution of fish. Rozas and Odum (1987) found that shallow water and greater distance from deep water typically meant lower abundance of large predatory fish (Rozas and Odum 1987). Marsh edge is also more utilized when adjacent to SAV or shell beds where small organisms can take refuge at low tide (Rozas and Odum 1987; Irlandi and Crawford 1997; Micheli and Peterson 1998). Increased utilization is possible because small organisms need to move only a short distance to return to the marsh at high tide. Rozas and Odum (1987) compared fish and shellfish densities in tidal creeks with and without adjacent SAV beds. They found that grass shrimp numbers greatly declined when artificial SAV was removed from a tidal creek. However, fish numbers (mostly mummichogs and banded killifish) were not significantly reduced. The results suggest a higher relative importance of wetland vegetation near SAV beds for grass shrimp. Irlandi and Crawford (1997) found that pinfish were more than twice as abundant in intertidal marshes adjacent to SAV beds than in marshes adjacent to completely unvegetated bottom. The movement of pinfish between the intertidal marsh and subtidal grass beds could provide an important link in the transfer of secondary production from the marsh to adjacent aquatic habitats, and visa versa. Micheli and Peterson (1998) found that marsh edge provides corridor function by facilitating the access of blue crabs to oyster reefs and enhancing the intensity of predation on smaller macroinvertebrates. Isolated oyster reefs had higher densities of those smaller macroinvertebrates. *These studies show the importance of considering optimal locations for SAV and wetland restoration/creation projects.*

Functional significance

Functional value of wetlands was incorporated into DCM's North Carolina Coastal Region Evaluation of Wetland Significance (NC-CREWS), which is a GIS wetland functional assessment model. The primary objective of the NC-CREWS wetland functional assessment is to provide users with information about the relative ecological importance of wetlands for use in planning and the overall management of wetlands. Thirty-eight separate wetland functions were used to evaluate each mapped wetland area within the 20 coastal counties. Each wetland is given a rating of either "Exceptional", "Substantial", or "Beneficial" Functional Significance. The overall rating was based on individual ratings for non-point source function, floodwater cleansing, landscape and watershed attributes, surface runoff storage, floodwater storage, shoreline stabilization, terrestrial wildlife habitat functions, and aquatic life habitat functions (Sutter et al. 1999). NC-CREWS provides an excellent rating system, but it was not specifically developed to locate the best habitat for coastal fisheries. Wetland properties such as primary production, structural complexity, depth and submersion regime were not included in this particular model. However, the 'aquatic life habitat functions' component of CREWS provides an area within which coastal fish habitat can be found. The aquatic life habitat function of NC-CREWS include anadromous fish, other fish species, and amphibian/invertebrate habitat (Sutter et al. 1999).

The NC-CREWS categories corresponded fairly well to riparian and non-riparian habitat categories used in CHPPs. Riparian wetlands included the following DCM wetland types: salt/brackish marsh, freshwater marsh, estuarine shrub/scrub, bottomland hardwood, riverine swamp forest, headwater swamp, and estuarine forest. Most intact riparian wetlands were rated "Exceptional" in function (Figure 5.3). The majority of non-riparian wetlands were rated as "Substantial." There were virtually no riparian wetlands in the "Beneficial" significance category. *The significance of riparian wetlands further justifies the need to enhance their protection.*



	Exceptional	Substantial	Beneficial
Non-riparian	356,747	877,052	34,170
Riparian	463,479	194,594	87

Figure 5.3. Results from North Carolina Coastal Region Evaluation of Wetland Significance (NC-CREWS) in CAMA counties grouped by CHPP riparian and non-riparian wetland categories.

5.3. STATUS AND TRENDS

Status of wetland habitat

Various estimates have been made of the original extent of North Carolina's wetlands. The DWQ and North Carolina Water Resources Research Institute staff have examined hydric soils from the published and draft county soil surveys (DWQ 2000a). These studies estimate that North Carolina had about 7.2 million acres of wetlands prior to colonization. Of that original extent, 95% was in the Coastal Plains. In another study, Dahl (1990) estimated that by the mid-1980s, only about one-half of North Carolina's original wetlands remained. The trend in wetland loss for North Carolina mirrors national trends (Dahl 1990).

According to DWQ (2000a), approximately 66% of North Carolina's original wetland extent remain and 83% of its original salt marsh, bottomland hardwood, and swamp forest (Table 5.3). However, the 83% figure is only a rough estimate because the DWQ study did not distinguish between depressional and riverine swamp forest. Pocosins have suffered even greater losses (48% remaining from the 1950s). The figures also do not account for wetland losses after 1993. The amount for remaining wetlands in North Carolina will be updated later in this chapter with more recent permit statistics.

Table 5.3. North Carolina wetland acreage estimates. *[Source: NC Division of Water Quality 305(b) report (DWQ 2000a)]*

Wetland type		Wetland Acreage				
		Original Extent[1]	1990's	Change	% remaining	Reference[2]
Non-riparian	Pine savannah	3,643,000	28,000	-3,615,000	1%	Leonard, pers. com.
	Pocosin	1,366,000	655,000	-711,000	48%	DWQ 1993
	Wet pine flatwood	0	2,212,000[3]	2,212,000		DWQ 1993
Riparian	Bottomland hardwood	1,481,000	1,207,000	-274,000	81%	DWQ 1993
	Salt marsh	209,000	183,000	-26,000	88%	Cashin 1992
	Swamp forest	476,000	413,000	-63,000	87%	DWQ 1993
TOTAL		7,175,000	4,706,000	-2,469,000	66%	DWQ 1993

[1] Based on descriptions of native vegetation found on hydric soils from SCS county soil surveys from the 1950s.

[2] These reference did not use the same methods and are not directly comparable.

[3] Based on original extent of pine savannahs.

The DCM wetlands types use three modifiers to indicate human disturbance: 1) partially drained, 2) cutover, or 3) cleared. These modifiers were not meant to account for all wetlands modified or "lost." The inclusion of modifiers was simply a way to show how some of the wetlands remaining today have been degraded or modified (M. Lopazanski, DCM, pers. com., 2003). According to U.S. Fish and Wildlife Service's National Wetlands Inventory maps, partially drained wetlands are, or have been, partially ditched/drained. Cutover wetlands are wetland areas in which satellite imagery from 1994 indicates a lack of vegetation where it was present in 1988. Cleared wetlands are areas containing hydric soils for which satellite imagery indicated a lack of vegetation in both 1988 and 1994. Cutover wetlands have likely retained wetland hydrology and soil characteristics, while cleared and drained wetlands are probably no longer functional wetlands.

Using the DCM modifiers for human disturbance, more non-riparian wetlands have been lost than riparian wetlands. As of 1994, 98,773 and 387,498 acres of riparian and non-riparian wetlands, respectively, were mapped as degraded or modified (Tables 5.4 and 5.5). Among riparian wetland types, riverine swamp forests were most often mapped as modifed by drainage, followed by salt/brackish marshes, and bottomland hardwood forests (Table 5.4 and Maps 5.1a-d). A quantifiable trend in wetland degradation is apparent for cutover wetlands. During 1988-1994, the rates of cutover for riparian and non-riparian wetlands were 2,919 and 6,719 acres/year, respectively (DCM, unpub. data). Although wetland hydrology and soil are maintained in these areas, the trees will take years to recover.

Table 5.4. Acres of modified riparian wetland types. *[Source: DCM wetland mapping (current as of 1994).]*

Riparian wetlands	Bottomland Hardwood	Estuarine Forest	Estuarine Shrub/Scrub	Freshwater Marsh	Headwater Swamp	Riverine Swamp Forest	Salt/Brackish Marsh	Total area
Cleared[1]	4,183	0	318		822	2,985		**8,308**
Cutover[2]	7,840	5	535		2,853	6,280		**17,513**
Drained[1]	13,548	19	2,195	2,550	2,583	22,715	29,242	**72,852**
TOTAL	**25,571**	**24**	**3,048**	**2,550**	**6,258**	**31,980**	**29,242**	**98,673**

[1] Unknown time period of impact; current as of 1994

[2] Impacted from 1988-1994

Table 5.5. Acres of non-riparian wetland types impacted in 1994. *[Source: DCM wetland mapping (current as of 1994).]*

Non-riparian wetlands	Depressional Swamp Forest	Hardwood Flat	Maritime Forest	Pine Flat	Pocosin	Total area
Cleared[1]	3,755	8,091	142	4,610	1,986	**18,584**
Cutover[2]	5,686	13,388	138	15,748	5,356	**40,316**
Drained[1]	61,830	70,536	17	95,933	100,282	**328,598**
TOTAL	**71,271**	**92,015**	**297**	**116,291**	**107,624**	**387,498**

[1] Unknown time period of impact; current as of 1994

[2] Impacted from 1988-1994

Within DWQ coastal river basins, Clean Water Act section 401-permitted wetland impacts over a period of four fiscal years (1997-2001) indicate a potential conversion of 3,817 wetland acres to non-wetland uses (Figure 5.4). Losses in fiscal years 1999/2000 and 2000/2001 were relatively small compared to 1997/1998 and 1998/1999. The relatively large losses in those earlier years resulted from two large projects (Buckhorn Reservoir in Wilson County and Global Transpark in Lenoir County). However, it should be noted that section 401 water quality certifications (from DWQ) precede section 404 permits (from the U.S. Army Corps of Engineers or COE) that may never be issued. In addition, some permitted impacts never occur. There were an additional 11,580 acres of pocosin wetland (non-riparian) lost after repeal of the federal Tulloch Rule[3]. However, most of this acreage had its hydrology restored through an intensive state and federal enforcement effort. There are also an unknown number of wetland acres lost

[3] See "Land use and wetland conversion" section for more information

each year from unauthorized projects and small projects not requiring confirmation by DWQ. Thus, the amount of impacted wetland acres may be underestimated. The DWQ is working to resolve the issue of tracking unauthorized and cumulative, small impacts (DWQ 2000a).

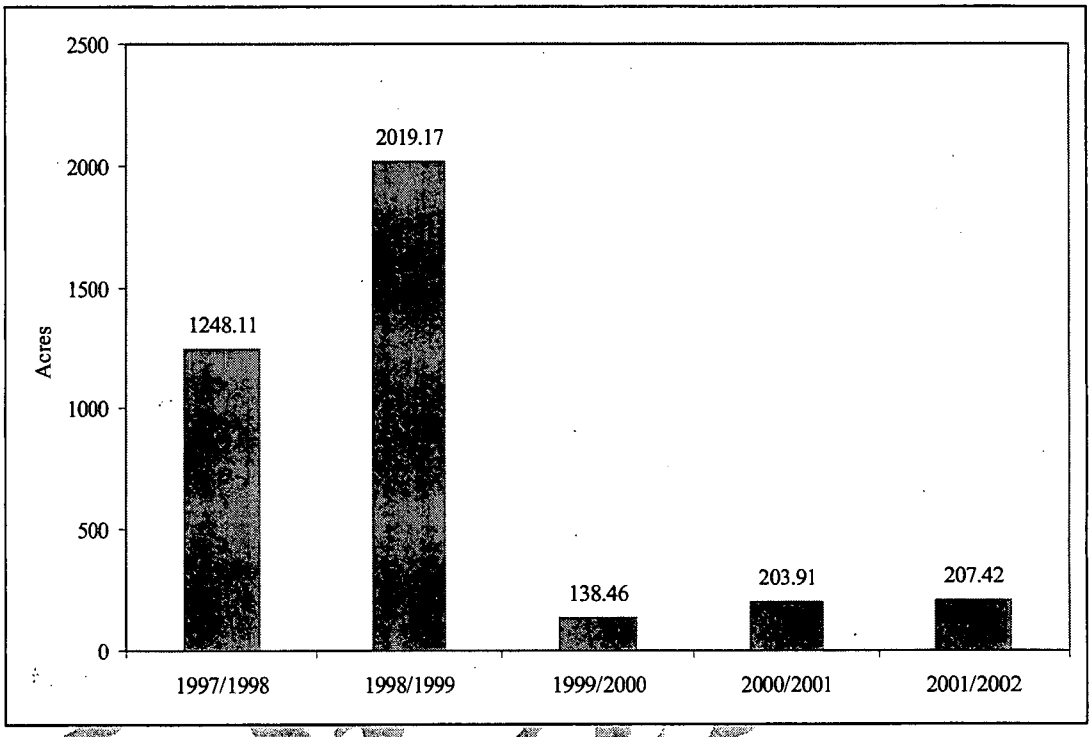


Figure 5.4: Total DWQ 401 Permitted Wetland Impacts (acres) during 1997-2002 in the seven Coastal river basins (excluding the Lumber riverbasin).*

* These data are for permanent wetland loss and do not include impacts from CAMA, Corps of Engineers Nationwide Permits 12 and 33, and Corps of Engineers Regional General Permit 030 since these impacts are temporary or are impacts to water (e.g., drainage).

In addition to conversion caused directly by humans, wetlands are also being lost to erosion resulting from sea level rise and shoreline hardening (Riggs 2001). Based on a recent study of 21 field sites and then extrapolated to the entire length of estuarine shoreline in northeastern North Carolina, annual wetland losses are approximately 802 acres/year, most of which are mainland brackish marsh habitat (Riggs and Ames 2003). When the cumulative effects of permitted wetlands impacts from 1997 to 2001, unpermitted wetland impacts (after repeal of Tulloch Rule), estimated coastal erosion loss from 1993 to 2001, and total estimated wetland losses prior to 1993 (DWQ 2000a) are added together, the total loss of wetlands in DWQ coastal river basins could be as much as 2,491,515 acres (1993-2002). This total estimated wetland loss still leaves 65% of the estimated original extent of wetlands in North Carolina (DWQ 2000a). However, this figure does not account for wetlands gained through restoration or creation, either by natural processes or restoration/creation effort. It also does not account for losses between 1993 and 1997 that were not attributable to erosion.

Status of associated fishery stocks

Of the partial list of 20 fishery species and at least 23 fish stocks in Table 5.2, the status of four species is unknown (DMF 2003). Of the 18 stocks whose status is known, four (22%) are Overfished, six (33%) are Concern, and eight (44%) are Viable. Of the nine fishery stocks with higher relative abundance in wetlands, two are Overfished, three are Concern, and four are Viable. Based on Figure 5.5, there are an

approximately equal number of Viable and Concern-Overfished stocks. However, there are a large number of additional species within the unknown category. The two wetland-enhanced[4] stocks listed as Overfished are river herring (alewife and blueback herring in Albemarle Sound) and southern flounder. Wetland-enhanced species of concern include blue crab, striped mullet, and red drum.[5]

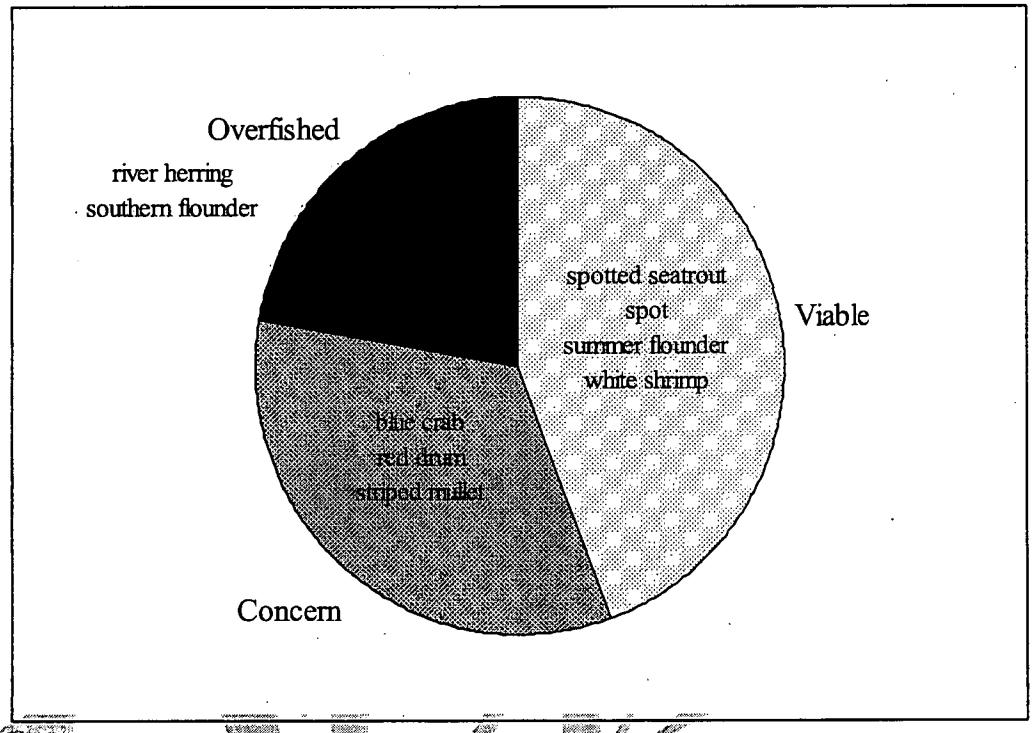


Figure 5.5 Percent of wetland-enhanced fish stocks classified as Overfished, Concern, or Viable in the 2003 North Carolina Division of Marine Fisheries stock status report (DMF 2003a).*

* Refer to Table 5.2 for list of wetland-enhanced fishery species)

While most of the concern over declining fish stocks has focused on overfishing, habitat loss and degradation can also prevent recovery or make a stock more susceptible to overfishing. For example, impassable obstructions of migratory corridors to spawning grounds can prevent stock recovery despite fishing restrictions. In other cases, regional reductions or loss of one habitat can make a stock more susceptible to overfishing by reducing the diversity or total amount of suitable habitat available. *A strategy for enhancing fisheries, as required by the Fisheries Reform Act of 1997, must therefore involve both habitat protection/enhancement and prevention/reduction of overfishing.*

Wetland restoration

The loss of wetlands and need for alternative pollution control methods prompted restoration/creation efforts beginning in the late 1980s and early 1990s (Mitsch and Gosselink 1993). Actual restoration of wetlands is accomplished through compensatory mitigation and voluntary initiatives. The purpose of compensatory mitigation is to replace wetland functions that are lost through permitted impacts to wetlands (WRP 2002). Many wetland restoration projects involve simply restoring the natural hydrologic condition, while others include greater design considerations. Depending on the purpose of restoration/creation, design considerations include hydroperiod, nutrient/pollutant loading rates, seasonal

[4] Wetland-enhanced species are those showing some documented preference for wetland habitat.

[5] A more detailed evaluation of wetland-enhanced species and their status can be found in the Chapter 6 (i.e., nursery area statistics).

flood pulses, flow patterns, water retention times (Mitsch and Gosselink 1993), and/or soil type.

While there have been many successful projects implemented nationwide, there have been failures attributed to lack of proper hydrology (Mitsch and Gosselink 1993). More recent studies in North Carolina found that mitigation sites restored by the North Carolina Department of Transportation (DOT) relied too much on hydrologic criteria, leading to reduced survivorship of planted seedlings in some excavated areas with non-wetland soil (Rheinhardt and Brinson 2002). They also found that reference sites were rarely utilized in measuring the success of restoration. Presently, all DOT monitoring is stopped after permit conditions are satisfied. With these considerations in mind, it will be difficult to determine gains in wetland acreage. *Rheinhardt and Brinson (2002) encourage long-term monitoring of restoration projects using success criteria based on hydrology, soil, and vegetation characteristics at established reference sites.*

North Carolina Wetlands Restoration Program

The North Carolina Wetlands Restoration Program (WRP) is part of state's Ecosystem Enhancement Program[6]. The WRP's mission is to restore, enhance, preserve and create wetlands, streams, and riparian buffer areas throughout North Carolina's 17 river basins. To accomplish this mission, the WRP works closely with the DWQ and other resource agencies to identify watersheds (14-digit hydrologic units) in each river basin that exhibit both the need and opportunity for restoration. These areas are called "Targeted Local Watersheds" and receive priority for WRP planning and restoration project funds. Based primarily on water quality, habitat, land cover, and public comment, staff identify Targeted Local Watersheds that are believed to be the best areas for the program to implement wetland, stream, and riparian restoration projects, and nutrient reduction projects. The goal is to concentrate multiple projects within small watersheds to address real watershed degradation symptoms instead of isolated problem areas scattered more broadly across a basin or larger watershed. This focus works toward implementing long-term watershed restoration and protection benefits. The WRP encourages other government entities and funding organizations to consider implementing watershed and habitat improvement projects within these areas as well as maximize state, federal and local funding sources based on multiple watershed planning objectives. Multiple complementary projects focused in small watersheds will provide the greatest ecological benefit to North Carolina's streams, rivers, lakes, estuaries, and wetlands. This approach also helps maximize program funds and programmatic benefits, creating an environment for partnership and collaboration among various state, federal and local programs.

Compensatory mitigation is often required with the issuance of a 401 Water Quality Certification and/or Section 404 permit to impact wetlands. However, not all project impacts are mitigated with the creation or restoration of wetlands. Based on compensatory mitigation requirements, permittees may choose to conduct the compensatory mitigation themselves, request to make a payment to the DENR Wetlands Trust Fund for Compensatory Mitigation, or purchase credits from private mitigation banks (if the impacts occur within their mitigation service area). Donation of land for wetlands restoration or creation also satisfies wetland mitigation requirements [EMC rule 15A NCAC 02R .0403 (e)(1-2)]. Land donations preserving wetlands do not satisfy the rule. *Land acquisition for preservation should also be an option for wetlands mitigation. However, the amount of land preserved should be more than the area*

[6] See "Recent trends" subsection under "Land use and wetland alteration" for more information on North Carolina's Ecosystem Enhancement Program.

[7] The data presented in this section are based on the Division of Water Quality's Wetlands/401 Unit's Water Quality Certification Database. This database tracks wetland and streams losses that are authorized through the issuance of a 401 Water Quality Certification. Issuance of a 401 Water Quality Certification is required before the Corps of Engineers can issue a Section 404 Permit authorizing the fill or alteration of wetlands and/or streams. Although in the majority of cases the impacts authorized by the 401 Water Quality Certification are consistent with the impacts authorized by the Section 404 Permit, the amount of impact authorized by the Section 404 Permit may be less than that authorized by the 401 Water Quality Certification and, in some cases, a Section 404 Permit may never be issued. In addition, the authorized impacts may not occur during this fiscal year and in some cases may never occur. The DWQ is increasing its efforts to monitor and track the impacts that actually occur.

impacted because the preservation will not offset the adverse impact. Land preservation is already an option for Department of Transportation projects under the new Ecosystem Enhancement Program.[8]

The WRP is required by statute to report on both compensatory and non-compensatory (i.e., non-regulatory) restoration work accomplished in North Carolina annually. In fiscal year 2001-2002, eighty-one 401 Water Quality Certifications issued statewide required wetland or stream mitigation. Of those, 69% were satisfied through payment to the Wetlands Trust Fund. Compensatory mitigation requirements for 7% were satisfied through payment to private mitigation banks, while the remaining 23% conducted compensatory mitigation on-site. The amount of compensatory mitigation in North Carolina coastal river basins during fiscal years 1999-2002 was approximately 650 acres (WRP 2000, 2001, 2002) (Table 5.6). During that same time period, there were 550 acres of wetlands impacted in coastal river basins[9]. There is also some voluntary creation or restoration of wetlands. During fiscal years 1999-2002, 17.25 acres of wetlands were voluntarily restored or created in coastal river basins through non-regulatory restoration practices (i.e., North Carolina Coastal Federation projects funded by Clean Water Management Trust Fund).

Table 5.6. The amount (acres) of compensatory mitigation and non-regulatory gains (voluntary restoration/enhancement) in coastal river basins from 1999-2002. *(Sources: WRP 2000, 2001, and 2002)*

Fiscal year	Non-regulatory Gains-Restoration/Creation	Compensatory mitigation	Total
1999/2000	9.25	150.40	159.65
2000/2001	2.00	288.60	290.60
2001/2002	6.00	195.65	201.65
TOTAL	17.25	634.65	651.90

The WRP evaluates the costs of restoration projects on an annual basis. These costs can vary based on site conditions and restoration methods. Based on two riparian wetland projects in fiscal year 2001-2002, the cost of restoration in 2002 was $20,000-25,000/acre (WRP 2002). The cost includes site identification, site acquisition, project design, construction management, site restoration, post monitoring, and long-term management. The cost of restoring 4.11 acres of coastal wetlands in 2002 was even higher at $101,148/acre.[10]

The rate of wetland loss documented by 401 permit records does not account for functional equivalency, which is the replacement of full ecological functions specific to a wetland type. Currently, wetlands losses and gains are tracked on an acre-for-acre basis. The wetland type lost is not always mitigated by the creation of a similar wetland type. In fact, there is little consideration for maintaining a natural mix of wetland types on the landscape. *Rheinhardt and Brinson (2002) recommended the tracking of restoration efforts by river basin and hydrogeomorphic class so that restoration can maintain a balanced distribution of classes on the landscape.* For example, the loss of riverine wetlands in the Neuse River basin should be mitigated by the creation or restoration of riverine wetlands in the Neuse River basin. The new Ecosystem Enhancement Program is tracking restoration efforts associated with Department of

[8] See "Recent trends" subsection under "Land use and wetland conversion" later in this chapter for more information.

[9] The total number of wetlands impacted includes impacts of less than one acre. Impacts of less than one acre do not require compensatory mitigation as a condition of the 401 Water Quality Certification, though they may result in a substantial loss of wetland resources (WRP 2002).

[10] For additional information regarding 401/404 compensatory mitigation requirements, please visit DWQ's website at <http://h2o.enr.state.nc.us/ncwetlands/>. For additional information concerning the WRP, please visit <http://h2o.enr.state.nc.us/wrp/>.

Transportation projects.[11]

Other initiatives

Federal, state, local, and private organizations and individuals conduct voluntary initiatives. The Wetlands Reserve Program of the Food, Agriculture, Conservation, and Trade Act of 1990 authorized the U.S. Department of Agriculture (USDA) to purchase easements from landowners who agree to protect or restore wetlands. The goal of USDA's Pilot Wetlands Reserve Program was to restore one million acres of cultivated crops to wetlands by 1995 (Bales and Newcomb 1996). The USDA pays 75% of the restoration cost to landowners, and NRCS and FWS assist in completing the restoration plans. As of 2001, there were more than 6,500 restoration projects nationwide that encompassed nearly 1,075,000 acres (NRCS 2002). By 1992, there were about 15,000 acres of cultivated land enrolled in the North Carolina program (Bales and Newcomb 1996). By 2002, total program enrollment in North Carolina had exceeded 26,000 acres (NRCS 2003). Project costs vary throughout the country. In 2001, the average cost of purchasing and restoring a permanent easement was approximately $1,200 per acre. The average cost of purchasing and restoring a 30-year easement was around $770 per acre. Restoration cost-share agreements, which do not include easement acquisition costs, averaged around $450 per acre (NRCS 2003).

The Conservation Reserve Enhancement Program (CREP) is another state/federal program intended to improve not only wetlands, but also other riparian habitats in North Carolina. The program is focused on impaired water bodies in the Chowan, Neuse, and Tar-Pamlico river basins, and the Jordan Lake area (all Nutrient Sensitive Waters). The program can pay up to $50,000 per person, per fiscal year to replace marginal agricultural land with forested riparian buffers, grassed filter strips or wetlands. For the enrollment of 100,000 acres in North Carolina, federal and state obligations over a 15-year period are approximately $275 and $54 million, respectively (<http://www.fsa.usda.gov/crpstorpt/CREP/default .htm> , April 2003). During 1999-2003, 19,081 acres were enrolled in this program in North Carolina (calculated from USDA website, April 2003). However, the proportion of this acreage in wetland restoration or creation was not reported.[12]

In addition to the programs discussed above, other state programs involved in the restoration of wetlands include DWQ's 319 Program, Clean Water Management Trust Fund, and the Division of Water Resources' Grant Program (WRP 2002).[13]

Existing management measures

Legislation and regulatory programs

Alteration or destruction of wetlands is currently regulated by federal and state agencies. Numerous federal regulations and incentives affecting wetlands were included in the River and Harbors Act of 1899; the Clean Water Act of 1972 (and its amendments); the Food Security Act of 1985; the Food, Agriculture, Conservation, and Trade Act of 1990; the Emergency Wetlands Resources Act of 1986; and the Coastal Zone Management Act of 1972 (Bales and Newcomb 1996).

The River and Harbors Act gives the COE the authority to regulate certain activities in navigable waters. These activities include some that can damage or destroy wetlands such as diking, deepening, filling, excavating, and placement of structures. Section 404 of the Clean Water Act requires that the COE regulate the discharge of dredge or fill material into wetland areas. Permit applications are reviewed by the U.S. Environmental Protection Agency (EPA) and U.S. Fish and Wildlife Service (FWS). The Corps

[11] See "Recent trends" subsection under "Land use and wetland conversion" below for more information.
[12] More information on the CREP program can be found on the USDA's website (<http://www.fsa.usda.gov/dafp/cepd/crpinfo.htm>).
[13] Information on these programs is provided on the WRP website (<http://h2o.enr.state. nc.us/wrp/index.htm>).

can deny the permit based on FWS or NMFS recommendation. States were given the authority to approve, apply conditions to, or deny 404 permits by Section 401 of the Clean Water Act. The authority is applied in North Carolina by DWQ with the 401 Water Quality Certification program.

While issuance or denial of Section 404 permits are the most widely used federal management tool protecting wetlands, most farming, ranching, and silviculture activities are exempt from such permits (Bales and Newcomb 1996). These exemptions were reduced by the "Swampbuster" provisions of the Food Security Act of 1985 and its amendments. "Swampbuster" provisions discourage (through financial disincentives) the draining, filling, or other alterations of wetlands for agricultural use. However, there are exemptions from the disincentives if the farmer agrees to restore the altered wetland or some other wetland area converted to agriculture. Cutover wetlands impacts between 1988 and 1994 are likely the result of silviculture operations.

There are also section 404 and 401 general permits issued for projects causing minimal individual and cumulative environmental impacts. These permits are important because the activities they cover do not require wetland restoration. The most frequently used, but no longer issued, 404 general permit is Nationwide Permit 26, which applied to wetland fills less than 10 acres in size. This permit had the following general conditions: (1) the wetland must be located adjacent to a stream and above headwaters, or (2) the wetland must be isolated (equivalent to flat/depressional hydrogeomorphic class). Nationwide Permit 26 probably contributed primarily to loss of flat/depressional wetlands noted earlier in the Status and Trends section. Some other activities covered under federal general permits include:

- Fish and wildlife harvesting,
- Survey activities,
- Minor road crossings,
- Modifications of existing marinas,
- Maintenance dredging of existing basins,
- Boat ramps with no discharge to wetlands, and
- Cleanup of hazardous and toxic waste.

The Emergency Wetlands Resources Act of 1986 required states to address wetland protection in their Comprehensive Outdoor Recreation Plans in order to qualify for federal funding. Other wetland protection incentives were provided by the Coastal Zone Management Act, which required coastal states to adopt coastal zone management programs in order to be eligible for federal funding and technical assistance. As a result, the Coastal Resources Commission (CRC) was subsequently established in North Carolina. The DCM was later established as the operational arm of the CRC. Rules promulgated by the CRC apply to North Carolina's 20 coastal counties.

Within coastal counties, the CRC forbids projects that can violate water quality standards of estuarine resources, including coastal wetlands [CRC rule 15A NCAC 07H .0207]. The CRC rules also state that activities directly impacting wetlands shall not have significant adverse impacts. The CRC prohibits disposal of fill in coastal wetlands and dredging activities in all but the most narrow fringing wetlands [CRC rule 15A NCAC 07H .0208 (b) (1) (A, C)]. Furthermore, CRC rules require that bulkheads and riprap to be constructed landward of coastal wetland areas (Clark 2002). However, CRC and EMC rules allow bulkhead backfilling of small, freshwater wetlands landward of coastal wetlands following the size threshold criteria for permitting wetland impacts[14], resulting in a cumulative loss of wetlands that might provide for marsh migration with sea level rise. *To minimize these losses, all but the most miniscule of*

[14] Projects impacting less than 1/3 acre of wetland within 50 feet of the high water line are exempt from 401 water quality certifications, as well as projects impacting less than 1 acre within 150 feet of the high water line [EMC rule 15A NCAC 02H .0506 (c)(2)]. There is no minimum area criteria for mitigation when dealing with designated unique wetlands [EMC rule 15A NCAC 02H .0506(e)]. However, unique wetlands will likely not be designated on private lands without the approval of the land owner.

wetland impacts should be subject to permitting.

Encouraged by the progress of wetland regulations, "No Net Loss" policies were developed by the federal government in the late 1980s (Wiebe and Heimlich 1995). But despite their achievements, wetland regulations are still considered by the public a "taking" of property that should be discontinued or the landowner financially compensated. The central problem of wetland protection remains how to protect wetlands for public benefit when the majority of converted or remaining wetlands are privately owned. These factors have led to increasing reliance on land acquisition and direct incentives for protecting remaining wetlands. Increasing public awareness of wetlands benefits (i.e., reducing flood levels, velocities, and damage) encourages greater acceptance of wetland regulations, as well as voluntary actions.

State and federal regulatory designations

Several state regulatory designations provide additional protection of wetlands, such as area designations estuarine Areas of Environmental Concern [CRC rule 15A NCAC 07H .0205-207]; Nutrient Sensitive Waters [EMC rule 15A NCAC 02B .0101(e)(3)]; Primary Nursery Areas [MFC rule 15A NCAC 03N .0102(a)]; Shellfishing Waters [EMC rule 15A NCAC 02B .0101(d)(3)]; High Quality Waters [EMC rule 15A NCAC 02B .0101(e)(5)]; and Outstanding Resource Waters [EMC rule 15A NCAC 02B .0101(e)(4)].

The CRC-designated Estuarine Shoreline Area of Environmental Concern (AECs) extends landward 75 feet from the high water mark along estuarine shorelines upstream to the line separating Coastal and Inland Fishing Waters (Figure 2.7 in Chapter 2). The Estuarine Shoreline AEC increases to 575 feet along shorelines of EMC-designated Outstanding Resource Waters. Any development planned within this area must obtain a Coastal Area Management Act (CAMA) permit. Hard surfaces, such as buildings, paved parking lots and roads, must cover no more than 30% (25% along ORWs) of the project area within the Area of Environmental Concern, unless the development incorporates an innovative design that provides stormwater protection equal to or exceeding the protection of the 30% limitation. However, certain activities (i.e., agriculture and silviculture) not involving excavation or filling of coastal wetlands are exempt from a CAMA permit. The Coastal Shoreline AEC, which includes estuarine and public trust shorelines to the upstream extent of navigable waters, also includes a 30-foot buffer from high tide elevation in which only water-dependent uses are allowed. However, the vegetation in this buffer does not have to be natural, and it can be mowed. There are exemptions allowing non-water dependent structures within 30 feet of the high water mark. For example, the full buffer is not required if it would preclude the placement of residential structures on a lot, parcel, or tract that was platted before June 1, 1999 (if certain criteria are met) [CRC rule 15A NCAC 7H .0209 (e)(1)]. There are also exemptions for lots platted before June 1, 1999 or surrounded by existing development [CRC rule 15A NCAC 07H .0209 (e)(2)(A)].

Along Nutrient Sensitive Waters in the Tar-Pamlico and Neuse river basins, the EMC has established a buffer width of 50 feet directly adjacent to intermittent streams, perennial streams, lakes, ponds, and estuaries, excluding wetlands [EMC rule 15A NCAC 02B .0233 (3)]. The first 30 feet of the buffer (Zone 1) must be virtually undisturbed natural vegetation. However, within the 20 CAMA counties, Zone 1 is measured from the landward edge of coastal wetlands [EMC rule 15A NCAC 02B .0233 (4)(a)(iii)]. The zone of undisturbed natural vegetation could therefore include some freshwater wetlands not covered under CRC rules. The second 20 feet of the buffer (Zone 2) can be mowed grass and/or harvestable trees. While the buffer rules for Nutrient Sensitive Waters provide more protection for wetlands than CRC buffer rules, there are many exemptions [EMC rule 15A NCAC 02B .0233 (6)]. Most of the exemptions (over 35 in all) are for infrastructure associated with development (e.g., utility lines, drainage ditches, roads/bridges).

Waters designated as PNAs by the MFC are given additional consideration of impacts by DCM prior to

issuing development permits. Only maintenance dredging is allowed, and only within existing basins and channels. There are no other special requirements on water-dependent, development-related activities in wetlands surrounding PNAs (i.e., bulkheads, piers). However, all designated PNAs and SA waters are classified HQW and receive additional protection from discharge and development under EMC and CRC rules. Rules dealing with approved Shellfishing Waters protect wetlands by prohibiting new marina construction that could result in loss of some fringing wetlands and increased boat traffic and associated impacts [CRC rule 15A NCAC 07H .0208 (b) (5) (E)].

All coastal areas classified as Outstanding Resource Waters also have significant wetland coverage. Outstanding Resource Waters and their more stringent regulations [EMC rule 15A NCAC 02B .0225 (e)] encompass approximately 6% of the riparian wetland habitat in coastal North Carolina, the majority of which is salt/brackish marsh and riverine swamp forest. Those areas also cover 2% of non-riparian wetlands. There is also a larger Area of Environmental Concern (extending 575 feet from mean high water) adjacent to ORW waters, within which there is a built-upon area limit of 25% [CRC rule 15A NCAC 07H .209 (g)]. The limit on impervious surfaces could help prevent loss of wetlands within the AEC. *The effectiveness of ORW-related rules in protecting wetlands and other habitats should be examined and changed as necessary. Appropriate management strategies should be developed by the EMC, MFC and CRC to protect wetland areas designated as Strategic Habitat Areas by the MFC.*

The federal government protects wetlands by designating them Essential Fish Habitat (EFH). The designation of EFH for coastal wetlands means several things. First, the regional fishery management councils must identify measures to conserve, restore, or enhance Essential Fish Habitat. They must also recommend actions that will minimize the adverse effects of fishing on habitat. Most recommendations target federal agencies (i.e., Corps of Engineers or Environmental Protection Agency) whose projects may affect fish habitat. Basically, any state or federal activity that could harm habitat for federally managed fish stocks is subject to review by NMFS (NOAA Fisheries). Federally managed fish stocks include those occurring in federal waters as either permanent residents (i.e., tuna, sharks) or migratory transients (i.e., panaeid shrimp, red drum). Coastal wetlands are designated EFH for red drum and shrimp. Areas of EFH requiring the most protection are termed Habitat Areas of Particular Concern (for more information see Chapter 8).

Land ownership and management

In addition to regulatory designations, wetlands also receive protection by virtue of ownership and management. Protected lands are owned and managed by federal, state, county, and municipal governments, as well as conservation organizations, other nonprofit organizations and land trust properties. These protected lands cover 217,289 ac of riparian wetlands and 434,746 ac of non-riparian wetlands, representing approximately 16 and 26% of all riparian and non-riparian wetlands, respectively, in coastal North Carolina.[15] Based on the amount of 1994 wetlands within protected areas, 74% of wetlands are not protected by land ownership, although this amount does not account for regulatory restrictions and area designations on lands not managed for conservation. It also does not include lands with restoration cost-share agreements in the Wetland Reserve Program.

Within areas protected by conservation ownership and management, some wetlands types are more represented than others. Of the riparian wetland types, estuarine shrub/scrub, salt/brackish marsh, and estuarine forests are the most protected (28-52%; see Table 5.7). The riparian freshwater wetlands are relatively less protected (7-28%). Among hydrogeomorphic categories, headwater wetlands receive the least protection (6%). Most headwater wetlands are outside of estuarine shoreline AECs, and thus are not protected by CRC use standards. Projects impacting these small wetlands may often require only a

[15] This information was obtained by overlaying DCM wetlands data with "Land Managed for Conservation" coverage from BasinPro3 (software developed by the North Carolina Center for Geographic Information and Analysis).

Table 5.7. The amount and percentage of each wetlands type in eastern North Carolina within protected lands. Only undisturbed wetlands indicated on DCM GIS mapping of the Coastal Plains are included. *(Source: CGIA's BasinPro3 coverage, "Land Managed for Conservation")*

Wetland class	Wetland type	Protected (ac)	Total (ac)	% Protected
Riparian	Salt/Brackish Marsh	74,038	198,168	37.36
	Estuarine Shrub/Scrub	14,417	27,874	51.72
	Estuarine Forest	274	965	28.38
	Freshwater Marsh	9,091	32,803	27.71
	Bottomland Hardwood	16,301	227,582	7.16
	Riverine Swamp Forest	101,400	829,681	12.22
	Headwater Swamp	1,769	31,159	5.68
	TOTAL RIPARIAN	*217,289*	*1,348,232*	*16.12*
Non-riparian	Pocosin	299,225	507,117	59.01
	Maritime Swamp Forest	1,666	3,438	48.46
	Non-riverine Swamp Forest	101,154	215,305	46.98
	Pine Flat	74,912	296,591	25.26
	Hardwood Flat	15,041	165,077	9.11
	Managed Pineland	58,943	954,336	6.18
	TOTAL NON-RIPARIAN	*550,941*	*2,141,864*	*25.72*
TOTAL		**768,230**	**3,490,096**	**22.01**

general permit and no mitigation, or they may be exempt from a permit due to small size. Although there are no accurate records on the type of wetlands impacted by 401 Water Quality Certifications, headwater wetlands are believed to be one of the most heavily impacted wetland types (J. Dorney, DWQ, pers. com., 2003). *Due to the relative threat to, and ecological importance of, headwater wetlands, they should receive higher priority in wetland preservation/restoration efforts.*[16]

Statewide Wetland and Streams Management Strategy

In 1997, DENR received a grant from the EPA to develop a comprehensive, statewide plan to improve and simplify North Carolina's wetland and stream protection policies. The EPA provides financial, technical, and planning assistance to states interested in developing statewide wetland conservation plans. The EPA strongly supports development of statewide wetland conservation plans because these plans give states a framework to protect, restore, and create wetlands in an effective and efficient manner.

The objective of this strategy was to identify opportunities to make wetland, stream, and riparian buffer protection programs and conservation approaches work more efficiently and effectively in North Carolina. In 1999, a stakeholder Advisory Committee was convened to develop the strategy. The major stakeholder groups represented on the Advisory Committee include: agriculture, forestry, environmental groups, academics, industry, development, private consulting, local government, the COE, EPA, the Natural Resources Conservation Service, and North Carolina departments of Environment and Natural Resources, Transportation, Agriculture, and Commerce. Through a series of both private and public meetings, the committee identified eight priority issues that were further investigated by a smaller Technical Work Group in May 2000. These priority issues have been published in the Statewide Wetland and Stream Management Strategy (DWQ 2003) and are shown below:

- Unique wetlands – Examine the regulatory authority of the EMC and DWQ for unique wetlands, develop policy interpretations for definitions, and develop a list of candidate sites or a process to

[16] Wetland acquisition and conservation programs are listed in Appendix J.

determine potential sites.

- Wetland and stream mitigation – Develop flexible wetland and stream mitigation options.
- Local government roles – Examine the involvement of local governments in wetland management/protection and develop potential mechanisms to encourage involvement.
- Wetland preservation – Inventory existing wetland preservation activities in North Carolina, develop wetland preservation goals, and examine mechanisms to encourage involvement.
- Wetland mapping – Examine existing and planned wetland mapping efforts, determine need for additional and improved mapping, explore mechanisms to carry out new mapping efforts, and examine the role of Geographic Information Systems in wetland and stream management.
- Environmental education – Examine existing wetland and stream education programs and activities, determine need for additional education opportunities, and recommend new and improved education activities.
- Regulatory structure and process – Examine the 401 Water Quality Certification Program's strengths and weaknesses, develop options to address weaknesses, and develop options for clarification.

Net loss

During 1999-2002, 651.90 ac of wetlands were created or restored in coastal river basins. Over that same time period, there have been 549.79 acres of permitted wetlands impacts (Figure 5.4) and an estimated 2,406 acres of coastal wetland lost to erosion (802 ac/yr x 3 yr). So the rate of wetland creation/restoration would appear to surpass the rate of loss from direct human causes. However, the total permitted impacts do not include the cumulative impact of very small losses that go untracked by permit authorities. *A study should be conducted to determine the cumulative impact of small wetland losses on the distribution and abundance of wetland types in a watershed. The cumulative loss could then be related to the nature and extent of development pressure in the watershed in order to formulate a model predicting untracked losses in other watersheds. But regardless of empirical evidence, small cumulative impacts may have a negative impact on fish habitat. Rules should be modified to reduce net loss of riparian wetlands from small cumulative dredge and fill projects (i.e., lower size threshold of wetland impacts that require permit or mitigation).*

5.4. THREATS AND MANAGEMENT NEEDS

Physical threats

Because physical alterations primarily impact wetlands, land use changes associated with population growth are the primary cause of wetland habitat loss today (Dahl 2000). Large-scale draining and ditching are prevalent agricultural impacts, whereas deforestation and fill are associated with silviculture activities and upland development. Shoreline stabilization is primarily a coastal phenomenon. Dredging access channels for upland boat basins can destroy wetlands, while bulkheading can increase erosion along adjacent wetland shorelines. The direct effects of land use changes and hydrologic modifications on riparian wetlands are discussed in the following sections.

Land use and wetland alteration

Historical conversions

The major cause of wetland loss and degradation has been conversion to agriculture, silviculture and upland development (including road construction). In the late 1800s and early 1900s, the greatest losses resulted from ditching and draining for agriculture. Several large agricultural drainage projects occurred during that period (Heath 1975), resulting in an estimated 1 million miles of drainage ditches and canals throughout the Coastal Plains of North Carolina (Wilson 1962). Much of the land around the Albemarle-Pamlico estuary was drained and must remain drained to accommodate existing agriculture and forestry. About one-third of the loss of wetlands has occurred since 1950 (Bales and Newcomb 1996). After 1950,

conversion to managed forest and agriculture accounted for 53% and 42%, respectively, of wetland losses (Bales and Newcomb 1996). Many of the roads on the Albemarle-Pamlico Peninsula were constructed on top of spoil piles between canals to prevent flooding on the roads. Ditching of wetlands or uplands is also common in other areas of the coast for flood control and drainage. In many urbanized coastal areas, ditches and swales are typically constructed along neighborhood streets. The ditches often connect and drain into headwaters, which alters the natural hydrology of downstream systems (Pate and Jones 1981).

Many government policies restrict ditching and draining of wetlands. Drainage of low-lying farmland funded by the USDA's Natural Resources Conservation Service (NRCS) and mosquito ditching are no longer common practices. Swampbuster provisions of the 1985 Farm Bill discouraged the practice of draining wetlands for conversion to cropland. However, drainage channels for croplands are still maintained by drainage districts (DEHNR 1995). Except for a short period from 1998 to 2000, there have been no new large-scale wetland drainage projects since the mid-1970s (Chicod Creek, Pitt and Beaufort counties, Tar-Pamlico MU). Prior to 1998, ditching/draining of wetlands was regulated by the COE. At that time, ditching required a federal 404 permit with a DWQ 401 certification, to ensure that water quality standards were not violated. When the federal court overturned the federal Tulloch rule in June 1998, the COE lost authority to issue permits for wetland ditching unless spoil was placed on adjacent wetlands. As a result, thousands of acres of wetlands were drained, primarily in Brunswick, New Hanover, and Pender counties (J. Steenhuis, DWQ, pers. com., 2002). Approximately 9,500 acres of wetlands were impacted in Brunswick County alone (DWQ 1999), and a total of approximately 11,580 acres of wetlands were impacted in the Coastal Plain. These losses are in addition to 401 Water Quality certification records. In Brunswick, New Hanover, Pender, and Onslow counties, 24% of the ditching was reported as forestry-related, 6% as agriculture-related, and 70% was done for development or other purposes (J. Steenhuis, DWQ, pers. com., 2002).

In 1999, the State of North Carolina determined that wetlands ditching and draining activities fall under its authority, constituting an illegal activity if proper approval is not obtained. In 1999, EMC adopted a wetland draining policy to ensure that required wetland conditions are maintained (<http://h2o.enr.state.nc.us/ncwetlands/ditch.html>, 1999). In addition, inspections were made of previously ditched wetlands to determine if the ditching was conducted in a manner that violated wetland standards. Where violations occurred, property owners were required to restore the natural hydrology through the filling of the ditches. Approximately 50% of the ditched wetlands have been restored, 22% are likely not to be restored, and the status of the remainder is undetermined (J. Steenhuis, DWQ, pers. com., 2002). Many of the remaining ditches, although not appearing to be violating water quality standards, continue to transport stormwater into coastal waters. *Additional monitoring is needed to better assess impacts where extensive areas of wetlands were drained. More DWQ staff are needed to inspect for compliance with water quality standards, including wetland draining.*

In addition to conversion to upland development, agriculture, and silviculture, many wetlands were also converted to deepwater habitat. Based on national trends during the mid-1970s, the major source of coastal wetland loss was conversion to deep water habitat (e.g., boat basins, navigation channels), followed by upland development (Hefner and Brown 1985). The CRC currently prohibits dredging through all but the most narrow fringing marshes [CRC rule 15A NCAC 07H .0208 (b)(1)(A)]. Many acres of wetlands were dredged for the Intracoastal Waterway (1930s), boat basins, and connecting channels before dredge and fill and CRC rules were implemented. The primary dredging activities still occurring within North Carolina's coastal waters are maintenance or improvement dredging of existing navigation channels (DEHNR 1995). These projects have relatively little affect on existing wetlands. However, small non-coastal wetlands, contiguous to coastal wetlands, are still lost to the backfilling of bulkheads.

Forestry operations do not require a 401 or CAMA permit when the hydrology of the wetland area is maintained. A violation of the Clean Water Act occurs if any wetland area benefiting water quality was

converted to uplands, without a permit. The forestry exemption can be an issue when there is dispute concerning how forestry operations alter different wetlands types. Altering some wetland types would have a negative impact on downstream water quality, while altering other types would have little affect on water quality. If a forestry operation is allowed the exemption to alter a wetland benefiting water quality, and later sold the property to someone claiming the site had become an upland, the development is exempt from water quality permits and mitigation requirements. The Corps of Engineers and EPA signed a Memorandum of Agreement describing the types of wetlands in which mechanical forestry site preparation activities required a permit (<http://www.epa.gov/owow/wetlands/guidance/silv2.html>, June 2004). The resulting list included all riparian wetlands. Therefore, no mechanical forestry operation can legally alter a riparian wetland without obtaining a 404 permit or 401 Water Quality certification.

In a recent court case related to the drainage activities during 1998-2000, a development company tried to claim the forestry exemption when it ditched and drained over 200 acres of wetlands in Onslow county (N.C. Shellfish Growers Association and NCCF vs. Holly Ridge Associates; The U.S. District Court for the Eastern District of North Carolina, Eastern Division, No. 02cv0053). The judge said the ditches and the site itself were all "point sources" of stormwater and sediment pollution, and therefore required discharge permits under the Act – even if the activities were for forestry purposes. In a related state case, an administrative judge ruled there was no credible evidence that the ditching and drainage were for the purpose of forestry. Holly Ridge Associates was found in violation of the Clean Water Act for not obtaining a CAMA permit, a 401 Water Quality Certification, and an NPDES discharge permit. These two cases should prevent other land development and forestry companies from ditching or draining riparian wetlands without obtaining water quality and discharge permits. *Any ditching activity resulting in nonpoint source pollution in North Carolina's rivers and sounds should require an NPDES permit. The EMC's constraints on discharges in SA waters could then be extended to drainage projects, in addition to wastewater treatment plants.*

The cutover wetland acreage from 1988 to 1994, noted in the Status and Trends section (above), was likely the result of silviculture operations. The alterations occurred in both forested riparian and non-riparian wetlands (17,513 and 40,316 acres, respectively; Tables 5.4 and 5.5). The majority of alterations were to non-riparian forested wetlands. Using the rate of cutover impacts from 1988 to 1994, approximately 21,000 more acres of riverine forested wetland may have been impacted from 1994 to 2003. As long as wetland hydrology is maintained, this is a relatively minor issue. If upland development replaces these cutover woodlands, there could have been a violation of the Clean Water Act.

Recent trends

To examine recent trends in wetland conversion, an analysis of wetland impact sources was performed on approximately 6% of the total number of 401 certification records from the DWQ database, covering a time period from 1997 to 2003 (1,213 of 18,700 total records). The data were filtered to include only those records within CHPP management units (based on geographic coordinates) having a date, project type (excluding wetland restoration/creation), and area impacted (DWQ, unpub. data). The analysis is unbiased toward certain impact types assuming the data represent a random subsample. Impact source categories for analysis of 401 permit records:

- *Water control* includes the construction of impoundments, reservoirs, ditches, canals, water intakes, storm drains, stormwater ponds, and other activities designed to alter water flows. Some water control projects are related to transportation.
- *Upland development* includes isolated ponds, residential lots, commercial facilities, utility cables/pipelines, wastewater treatment plants, schools, churches, and other activities converting wetland habitat to uplands or supporting upland development.
- *Mining* includes quarry and sand pit construction or expansion, and other mining sources.
- *Agriculture/aquaculture* activities include irrigation ponds, farm construction, clearing land for animal operations, fish hatcheries, fish farms, spray fields, and similar activities that disturb wetland hydrology.

- *Transportation* includes construction of roads, highways, bridges, and culverts.
- *Water-dependent development* includes piers, docks, marinas, navigation channels, boat ramps, shoreline stabilization structures, channel relocation, and similar activities and structures associated with waterways.

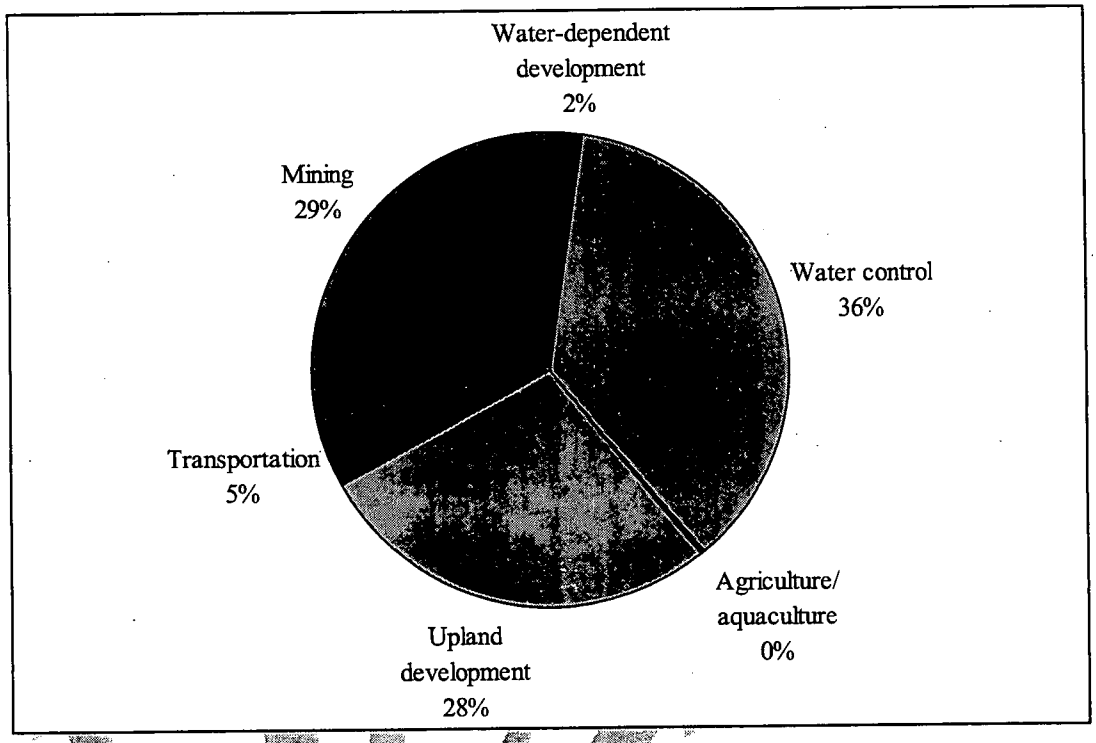


Figure 5.6. Sources of wetland impact in eastern North Carolina. *[Source: subset of DWQ Section 401 certification records (1997-2003), with location coordinates within CHPP management units.]*

The most recent trends (1997-2003) in wetland loss show water control projects as the major source of wetland impacts (36% of impacted acres) (Figure 5.6), followed by mining (29%) and upland development (28%). The vast majority of mining impacts occurred during a single project in 1997 when PCS Phosphate was issued a permit to destroy 1,268 acres of wetlands in Beaufort County (The U.S. District Court for the Eastern District of North Carolina, Eastern Division, No. 02cv0053). Activities least impacting wetlands included agriculture/aquaculture (<1%), transportation (5%), and water-dependent development (2%) (Figure 5.6).

North Carolina Department of Transportation projects accounted for 23% of permitted wetlands impacts during 1997-2003, based on 11% of 18,700 permit records (DWQ, unpub. data). The DOT spends more than $80 million each year mitigating the impact of bridges and other road crossings on wetlands (*Water Resources Research Institute News*, March/April 2003), causing considerable delays in road construction. In recognition of the problems resulting from these delays, DOT, DENR, and COE have developed a program to improve efficiency and provide sufficient mitigation, the Ecosystem Enhancement Program (EEP). The new program, established through an agreement among agencies, brings together mitigation staff from the WRP and DOT under DENR's umbrella. The EEP will estimate potential wetland impacts very early in the roadway planning process (*Water Resources Research Institute News*, March/April 2003). Prior to mitigation, potential impacts will be evaluated in a watershed context, having targeted priority areas for mitigation efforts. Functional assessment will be conducted prior to the permitting

process for the transportation project. Priorities will be consistent with DWQ basinwide planning reports, Coastal Habitat Protection Plans, and Wetland Restoration Plans. Once in place, mitigation projects will be monitored to determine their effectiveness in replicating wetland functions. *Eventually, the EEP should include mitigation planning for upland development and other approaches to habitat enhancement, restoration, and preservation..*

Shoreline stabilization

Shoreline stabilization is modification of the natural shoreline to prevent or reduce landward migration of the shoreline. The purpose of shoreline stabilization is protection of man-made structures and property, including natural features. As shoreline development increases in conjunction with rising sea level, waterfront structures will be threatened more often and property owners will likely have greater interest to protect their property. Shoreline stabilization in estuarine areas generally utilizes hard stabilization techniques. Bulkheads are the primary hard stabilization structure.

Construction of seawalls and jetties are primarily oceanfront practices; they are discussed in the Soft Bottom and Water Column chapters (Chapter 2 and 6). Soft stabilization includes beach bulldozing or beach nourishment, which are also discussed in the Soft bottom chapter (Chapter 6). This section will discuss the extent of estuarine shoreline stabilization that has already occurred in North Carolina, impacts of this activity on riparian wetlands, and management needs to reduce or minimize such impacts.

Physical and biological effects

Hard stabilization techniques have fairly severe impacts on coastal habitat, including accelerated erosion, loss of shallow intertidal bottom, loss of fringing marshes, increased scouring and turbidity in nearshore waters, and obstruction to fish migration where structures are perpendicular to the shoreline (Walton and Sensabaugh 1979; Pilkey and Wright 1989; Pilkey et al. 1998; Peterson et al. 2000). Two managed fishery species strongly linked to fringing marsh are penaeid shrimp and red drum (SAFMC 1998). Other important estuarine-dependent fish species that utilize wetlands during larval and juvenile life stages include gag, snapper, Spanish mackerel, striped bass, and river herring (SAFMC 1998). Degradation and loss of wetland habitat from shoreline hardening impacts these species, as well as many others.

Bulkheads impact wetlands in several ways. During construction, heavy equipment and backfilling may destroy vegetation above the high water line (wetland and transitional wetland plants), where bulkhead construction is allowed. Along the CRC's Estuarine Shoreline AEC, a 30 foot buffer above the high water line is established in which only water-dependent uses are allowed [CRC rule 15A NCAC .07H .0209] provides exceptions to the buffer requirement). Rather than allowing natural vegetation to recolonize the area, property owners generally plant landscape scrubs and lawn grasses. These plants are not as effective at deterring erosion or reducing and cleansing stormwater as natural vegetation. Increased nutrients and toxins from fertilizers and pesticides used on the lawn enter the water with the runoff (Watts 1987). Bulkheads also prevent shoreward migration of fringing wetlands as sea level rises, resulting in eventual drowning and loss of existing wetlands (Titus 1988).

McDougal et al. (1987) found that nearshore wave impact increases as the horizontal length of the structure increases. Therefore, the cumulative effect of multiple, contiguous bulkheads has a greater impact on adjacent natural shoreline habitat than the effect of individual structures that are spatially distinct. Scouring action at the toe of bulkheads results in deepening of the adjacent water, thus reducing or eliminating intertidal habitat. Shallow water habitat is also reduced because the bulkhead structure prevents transport of sediment to other areas (Riggs 2001). The added turbulence at the base of bulkheads prevents vegetation from reestablishing after construction (Knutson 1977). Garbisch et al. (1973) showed that marsh vegetation waterward of bulkheads experienced a 63% mortality post-construction due to stress from increased turbulence and scour. This loss of habitat reduces benthic food resources for juvenile, anadromous, estuarine-dependent, and surf fish, as well as shore birds, which are highly

dependent on shallow intertidal habitat for feeding (Peterson et al. 2000; Byrne 1995; DMF 2000). The deepening also increases the feeding efficiency of large piscivorous fish on small and juvenile fish that occupy the shallow waters adjacent to the structure (Rozas 1987).

Several studies have documented lower relative abundance and diversity of invertebrates and juvenile fish adjacent to bulkheaded shorelines compared to unaltered marsh, beach, or forested wetland habitats:

- Peterson et al. (2000): On the Gulf coast, the most abundant species groups along unaltered marsh and beach shorelines (including habitat for penaeid shrimp, crabs, gobies, grass shrimp, drums species, and shad/herring species) were least abundant along bulkhead or rubble shorelines. In addition, diversity was lowest adjacent to bulkheads.
- Byrne (1995): In a Barnegat Bay lagoon, New Jersey, littoral fish and shrimp abundance was consistently and significantly lower at bulkheaded sites. The differences were attributed to lower levels of structural complexity, since SAV, macrophytic algae, snags, overhanging and submerged branches, and woody debris were absent from the bulkheaded sites, but present at the unaltered sites.
- Ellifrit et al. (1972): Fewer clams (*Venerupis japonica*) were present near bulkheaded areas compared to natural areas. The difference was attributed to less favorable conditions for settling and survival of clam larvae.
- Gilmore and Trent (1974): For all groups combined, benthic organisms were numerically and volumetrically less abundant in bulkheaded canals than in natural marshes. Crustaceans were over three times less abundant.
- Mock (1966): Brown and white shrimp abundance was 80% less in front of a bulkheaded shoreline compared to naturally vegetated shoreline. The difference was attributed to lower abundance of organic detritus and benthic macroinvertebrates, deeper water, and less intertidal vegetation.
- Bulkheads reduce or degrade spawning and nursery habitat for anadromous fish (SAFMC 1998; DMF 2000). Cumulative impacts of bulkheads have been specifically cited as a contributing factor to the decline of chinook salmon on the Pacific coast (Taylor 1999).
- O'Rear (1983) found that early larval river herring in the tributaries of the Chowan system were highly associated with the stream edge and waters with minimum flow. Shoreline hardening impacts the stream edge on which these larvae depend, and can accelerate flow, thereby making areas adjacent to bulkheads less suitable for use by larval or juvenile anadromous fish.

Most of the studies on the biological impact of bulkheads on fish and their habitat were not conducted in North Carolina. However, a recent study by the WRC (Water and Thomas 2001) examined impacts of bulkheads and other hardened shorelines (i.e., rock revetments) on fish utilization in northeastern North Carolina waters, particularly spawning success and juvenile recruitment of anadromous fish species. They found significantly lower abundance and species diversity of fish adjacent to bulkheads, compared to forested wetland shoreline and rip rap. The study also found higher abundances of juvenile fish along rip-rap and natural shoreline than along bulkheads, and a comparable number of quality size gamefish. The difference in juvenile abundance was attributed to both greater complexity of rip-rap and natural shoreline, and their location near shallower water. These results indicate a reduction in nursery function along bulkheaded shorelines.

Vertical hardened structures are also problematic for marine species that move between water and land during their life cycle. Along the estuarine shoreline, bulkheads are a physical barrier to animals such as the eastern mud turtle, yellow-bellied turtle, and northern diamondback terrapin (a species of "concern" in North Carolina) that live and feed in the marsh, but nest above the high tide line (Ernst and Barbour 1972).

Cumulative effects

North Carolina's policies and rules for estuarine erosion management allow landowners to protect their property from erosion, while attempting to minimize the impacts of erosion control structures. Past and current CRC rules have greatly reduced losses of wetlands and shallow bottom by restricting placement of vertical structures in or seaward of coastal wetlands, and restricting backfilling of the associated landward wetlands. Although currently used techniques may effectively protect waterfront property, immediate and long-term impacts to wetlands often occur, and alteration of sediment supply affects natural shoreline processes and wetland migration. In addition, bulkheads are sometimes permitted and constructed where an erosion problem is not evident. The DCM is working towards permitting stabilization methods only where an identifiable erosion problem occurs. *Better criteria to define an "erosion problem" and aid in proper utilization of erosion control structures are needed and should be developed by the DCM and CRC.*

While a single bulkhead may have little effect on adjacent habitat, the cumulative impact of multiple bulkheads along estuaries can result in significant habitat degradation. Between 1984 and 2000, DCM issued permits to bulkhead approximately 457 miles of shoreline (11.7% of the estimated 3,900 miles of estuarine shoreline). During this time period, the amount of bulkheading permitted annually along the coast has ranged from eight to 91 miles (Figure 5.7). These numbers must be considered with caution since there may be data entry errors. In addition, the CAMA permits include repairs, replacements, or projects that may not have been done or completed. Numbers appear to increase sharply from 1997 to 2000, probably due to the large number of repairs following a series of damaging hurricanes during 1996 – 1999, and strong economy in the mid-1990s. The highest number of bulkhead permits issued annually occurred in 1999. The total amount of bulkheading per county has ranged from less than one mile in Gates County to 109 miles in Beaufort County and 79 miles in Dare County (Figure 5.8). Beaufort, Dare, Carteret, and Currituck counties have the greatest total lengths of permitted bulkheads. In these counties, the percent of hardened shoreline along major waterbodies ranges from roughly 8% to 32%. Because of the limitations of the current database on bulkheading, and the potential impacts to habitat, particularly nursery areas, *there is a need to more accurately assess where and how much of the estuarine shoreline is hardened. With more accurate information, the level of impact to marine resources can be assessed.*

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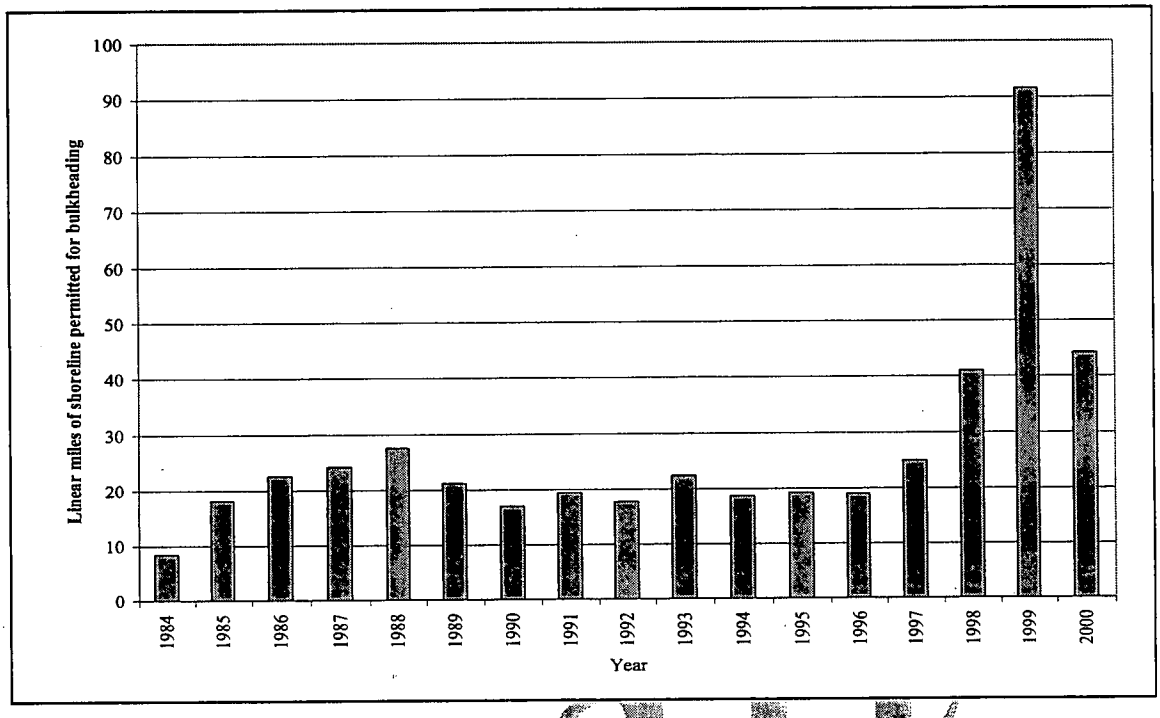

Figure 5.7. Linear miles of bulkheading permitted by year, 1986-2000. *(Source: DCM, unpub. data)*

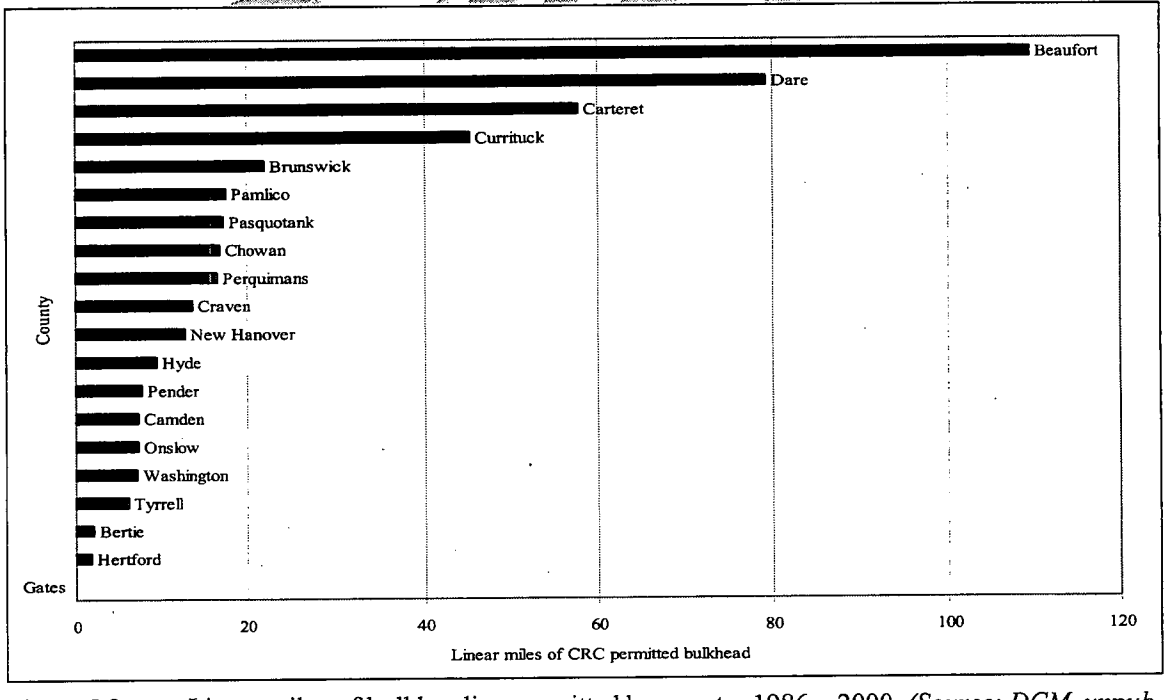

Figure 5.8. Linear miles of bulkheading permitted by county, 1986 – 2000. *(Source: DCM, unpub. data)*

A pilot study conducted by DMF along approximately seven miles of estuarine shoreline in the southern portion of the coast (Pages Creek and Intracoastal Waterway in New Hanover County) found that approximately 21% of the shoreline within the study area was hardened in 1984. By 2000, 37% of the

shoreline in the same area was hardened. The most affected area of shoreline was along the ICW, where boat wakes and greater fetch increase erosion problems; 54% of the area examined was hardened. However, even along a protected creek (Pages Creek) with a wide marsh fringe and little obvious erosion, 38% of the shoreline has been hardened. Along Yeopim Creek, a tributary of Albemarle Sound, approximately 1% of the shoreline was hardened in 2000. *The methodology used for assessing shoreline hardening (examination of aerial photographs) could be used for a larger portion of the coast to spatially delineate and quantify where and how much of the shoreline is hardened.*

Although CRC rules state that sloping riprap or vegetation, rather than vertical seawalls/bulkheads, should be used where possible [CRC rule 15A NCAC 07H .0200 (7)(E)], bulkheads continue to be constructed at a greater rate than alternative shoreline protective methods. Recognizing the extensive, and at times inappropriate, use of bulkheads in North Carolina's estuaries, DCM modified the permitting process in 2001, requiring a General Permit for bulkhead construction less than 500 linear ft (rather than an exemption) and a Major Permit for those greater than 500 linear ft. Also, in 2000, the Estuarine Shoreline Stabilization Subcommittee was established by the CRC to review the estuarine shoreline rule development process. The Subcommittee developed a set of principles and concepts to guide further development of any shoreline stabilization rule changes (Figure 5.9).

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1) The State of North Carolina has the authority under CAMA and the Dredge and Fill Act to regulate placement and installation of shoreline stabilization measures.
2) Only property owners with demonstrable erosion problems* may be eligible to obtain a permit to stabilize the shoreline. * CRC will define "erosion problem".
3) Stabilization techniques should be appropriate for site and erosion forces present.
4) Measures with the least adverse environmental effects are preferred (General preference for soft structures).
5) The goals of establishing standards for estuarine and public trust shorelines are:
   a) To safeguard and perpetuate the natural productivity and biological, economic and esthetic values of natural ecological conditions of the estuarine system (Protection of Habitat and Water Quality).
   b) To Insure that the development or preservation of the land and water resources of the coastal area proceed in a manner consistent with the capability of the eland and water for development, use, and preservation based on ecological considerations (Appropriate Development For Site).
   c) To insure the orderly and balanced use and preservation of our coastal resources on behalf of the people of North Carolina and the nation (Protection of Public Trust and Private Property Rights).
6) CRC will create development standards for stabilization technique/measures.
   a) Soft Measures
      i) Grading and Planting
      ii) Wetland Planting
   b) Hard Measures
      i) Bulkheads
      ii) Groins and Jetties
      iii) Breakwaters
      iv) Sills
      v) Revetments
      vi) Wave-boards (wooden breakwaters)
   c) Combinations
7) Stabilization measures shall be located as far landward as feasible.
8) CRC will set standards for existing stabilization projects:
   a) Allowing for tying with existing stabilization projects and adjoining lots
   b) Allowing for hardened structures on constructed canals and basins
   c) Allowing in kind/in place repair
   d) Allowing for in kind/in place replacement
9) Allow for larger footprint for riprap for achieved desired slope (1: 1 ½).
10) CRC will attempt to keep criteria and standards simple to understand and implement.
11) CRC will gather public input on the above principles and provide guidance on the concepts prior to DCM developing draft rule text.

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Figure 5.9. CRC concepts/principles for estuarine shoreline stabilization policy assessment and development (DCM 2002).

In addition, a science-based panel, the Estuarine Biological and Physical Processes Work Group, was formed by DCM to develop recommendations for shoreline stabilization rules that adequately take into account and reflect the dynamic nature of the estuarine system (DCM 2002). The approach the group took was to evaluate which erosion control methods would be effective on various shoreline types, considering the ecological functions of each shoreline type. Wetland shoreline categories included swamp forest and marsh shorelines, and sediment banks with a marsh or swamp forest fringe. Erosion control options included vegetative planting, beach fill, marsh toe revetment, rock sill, wood or rock breakwater, gabions, groins, riprap, and bulkheads. Non-vertical structures, such as rock sills, oyster reefs or marsh toe revetments, where suitable for erosion control, can have more habitat advantages than

vertical structures, since they provide three dimensional structure and areas of refuge for fish and invertebrates. A channel left between sills allows juvenile fish access to the inner marsh. However, even this structure can increase erosion on adjacent shorelines, albeit much less than on shorelines next to bulkheads. Marsh grass planting creates the least erosion along adjacent shorelines, but offers the least protection of property. Advantages and disadvantages of each effective erosion control method were discussed and the preferred methods that minimize impacts to the hydrological, biogeochemical, and ecological functions of each specific shoreline type were ranked. For example, adjacent to a high bluff with a sand fringe, a bulkhead structure may be preferred over a rip-rap rock structure. However, along a low-lying upland with a marsh fringe, a wood or rock structure on the waterward edge of the marsh would be preferred over a wood or rock structure on the upland edge of the marsh, and bulkheads would not be an appropriate option. This effort is still underway and needs review by the Estuarine Shoreline Stabilization Subcommittee once complete (DCM 2002).

The CRC should revise estuarine shoreline management rules using best available scientific information, including the recommendations from the Estuarine Shoreline Biological and Physical Processes Work Group to minimize impacts to natural shoreline and nearshore fish habitat functions. As part of the process of modifying shoreline management rules, accurate estuarine shoreline erosion rates are needed to aid in identifying "erosion problems," determining adequate shoreline setbacks, and determining appropriate erosion control methods where necessary. Wherever possible, sections of estuarine, non-vegetated shoreline with very little hard stabilization should remain unaltered to provide "new" sediment for shallow water habitats (Riggs 2001). Some consideration should also be given to the type of material used in rock structures because oysters more readily colonize oyster cultch material or limestone marl, than granite.

Impervious surfaces

The increase of impervious surface in coastal North Carolina causes loss and degradation of both riparian and non-riparian wetlands. Impervious surfaces affect wetlands indirectly by preventing infiltration into the soil and shallow groundwater tables, thus reducing discharge to certain groundwater-dependent wetlands (EPA 1993c). There can also be greater bank erosion and channel incision in riparian wetlands located near impervious surfaces and their associated drainage networks (EPA 1993a; EPA 1993c).[17]

Channelization and ditching

Channelization is the deepening and straightening of a natural stream or dredging of a new channel for the primary purpose of improving drainage of adjacent lands (UNC Sea Grant 1999). These activities can affect the slope, depth, width and roughness of the channel, thus changing the dynamic equilibrium of the stream (including associated wetlands). Channelized streams are deeper, more variable in flow, and less variable in depth than natural streams (Orth and White 1993). These differences affect primarily smaller species and life stages using wetlands and shallow stream margins, habitats that are reduced by channelization. In many channelized streams in the middle and lower Coastal Plain, storm flows are confined primarily to the main channel rather than passing through wetlands. This change greatly reduces the natural beneficial functions of wetlands to filter pollutants and regulate water flow between uplands and coastal waters. In addition, the riparian zone (including the natural woody vegetation along the sides of the stream) is often removed in the process of channelization (NRC 2002). Consequently, loading and movement of sediment and other nonpoint source pollutants are often greater in channelized streams than in natural streams, which can have negative effects on water quality and fish habitat (EPA 2001; White 1996). Channelization also increases channel cross-section and flow capacity, thus reducing the frequency of overbank flow events that allow fish access to the wetlands. The remaining wetlands exist with an altered hydrology; relying more on overland flow from upland areas and groundwater discharge, and/or overbank flow from unchannelized stream segments nearby.

[17] Refer to Chapter 2 for more information on impervious surfaces.

Although new channelization for flood control and drainage has greatly decreased, the existing alterations continue to alter flow and salinity patterns.[18] *Dechannelization of streams, restoration of wetland hydrology, use of alternative drainage techniques, and on-site BMPs are therefore needed to maintain and restore wetlands, flows and salinity patterns in downstream areas. In addition, increased funding and educational outreach to farmers and other landowners are needed for projects that restore natural stream and wetland functions.*

Dredging for navigation

Dredging impacts wetlands indirectly by limiting the amount of shallow water habitat available for colonization. The spoil from dredging can also be used to create shallow water habitat. At a number of sites, the COE has established wetlands as part of their management of dredge spoil islands; the spoil islands in Pamlico Sound west of Oregon Inlet are good examples. However, CRC rules generally require confining all dredging material to an upland area landward of regularly or irregularly flooded marsh [15A NCAC 07H .0208]. In recent years, cooperative interagency projects have resulted in some beneficial uses of dredge materials, such as creation of marsh and water bird nest sites.

Boating

The most detrimental effect of boating on wetlands is probably loss of vegetation from wave action. The actual impact of boat wakes on wetlands has not been quantified (SAFMC 1998; Riggs 2001). Erosion from boat traffic along the Intracoastal Waterway and elsewhere is readily observable and is likely responsible for substantial (or just localized) loss of fringing wetland habitat (Riggs 2001). The loss of fringing wetland can result in increased erosion of waterfront property along the Intracoastal Waterway. As the human population of coastal North Carolina increases, so will the impact of boater-induced wave turbulence. The number of registered boats in North Carolina increased by 26% from 1990 to 2000 (see Figure 4.3 in Chapter 4). *There is a need to amend WRC no wake zone authority to include consideration for erosion in strategic wetland areas.* Currently, the issue of human safety is the only issue driving the WRC's authority (habitat protection is not a consideration). *There should also be increased public awareness of the impact of boat wakes on wetland shorelines.*

Marinas, docks, and piers

Direct impacts to wetlands through marina construction are minimized since current CRC rules encourage marina construction in upland basins. Marinas, docks, and piers can impact wetlands indirectly by shading and associated boat traffic. Shading results in the loss of plant growth and vigor beneath the dock structures. A study in South Carolina compared stem densities of *Spartina* under docks with stem densities five meters away from docks (Sanger and Holland 2002). The results of the study indicated an average reduction in stem density of 71% under the docks. The study concluded that although shading of *Spartina* by docks reduces stem density, the total impact on wetland habitat was minor. It was estimated that by the year 2010, only 0.02 to 0.24% of the total salt marsh area in South Carolina would be affected by dock shading. However, local effects in areas with many docks could be significant.

The number of pier general permits issued in coastal North Carolina has risen from about 250 in 1990, to about 800 in 2002 (DCM, unpub. data; Figure 5.10). Additional numbers of large piers are also constructed every year throughout the coastal area. To minimize shading effects in North Carolina, CRC rules require a dock height of three feet above wetland substrate, and a pier width of no greater than six feet. As in South Carolina, the impact of dock and pier shading on wetland vegetation on a coastwide basis may be minor at present, but the impact will likely increase over time as more piers are constructed.

[18] See Chapter 2 section on channelization and ditching.

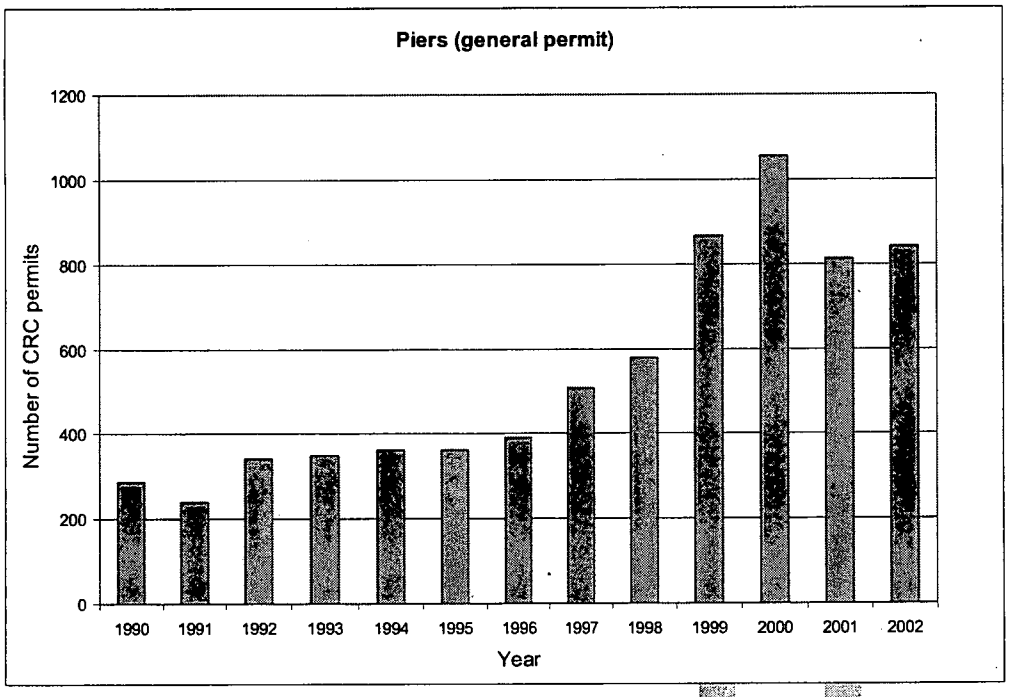


Figure 5.10. Annual number of CAMA general permits issued by the North Carolina Division of Coastal Management for piers. *(Source: DCM, unpub. data)*

Water quality degradation

Excess nutrients can result in undesirable changes in the wetland plant community (Lamers et al. 2002). The effect of changes in the plant community on fish use of wetlands is unknown. However, the effect of excess nutrients on fish use of wetlands could be more problematic. Algal blooms in and around emergent vegetation can cause very low dissolved oxygen levels at night, resulting in fish kills (see Chapter 2).

Another potential issue regarding the water quality of wetlands (especially freshwater marsh) is sulfate (SO_4^{-2}), a water-soluble, abundant form of sulfur that commonly occurs in nature (e.g., soil and minerals). Elevated sulfate concentrations can enter surface waters and eventually reach wetlands from a number of man-made sources, including: runoff from mining and agriculture, industrial waste discharge and atmospheric deposition (Lamers et al. 2001; Lamers et al. 2002; EPA 2002). Sulfates are used in a variety of industries, including, but not limited to, mining, processing (e.g., wood pulp, metal finishing, leather), sewage treatment, and manufacturing (e.g., chemical, dye, glass, textile, soap, insecticide, fungicide) (Greenwood and Earnshaw 1984 cited in EPA 2002). Approximately 30% of sulfate in groundwater may be from the atmosphere, while the remaining 70% is from organic processes (EPA 2002). In contrast, Moore (1991) reported that greater than 45% of sulfates detected in rivers originated from human activities. Dissolved or free sulfide (HS^-) can be highly toxic to rooted plants in freshwater wetlands where there is an insufficient amount of iron (Fe). Typically, sulfate-reducing bacteria convert sulfate to hydrogen sulfide (H_2S), pyrite (FeS_2), or iron sulfide (FeS). Sulfate over-enrichment may cause HS^- to accumulate in sediments, and the subsequent toxicity leads to rooted plant communities composed of a few highly sulfur-tolerant species. The effect of these changes in plant community structure on fish use of marsh wetlands is unknown. Lamers et al. (2002) demonstrated that FeS_x oxidation during desiccation, FeS_x oxidation due to nitrate pollution, and atmospheric sulfur (S) pollution threatened the water quality of freshwater wetlands via eutrophication and HS^- accumulation. The degree of HS^- accumulation did not vary among wetland soil types with different humus profiles (Lamers et al. 2001).

The susceptibility of freshwater wetlands to sulfate pollution should be evaluated in coastal North Carolina. Results should provide the measure of iron concentrations in wetland sediment necessary to evaluate susceptibility.

Introduced and nuisance species

A major non-native species issue concerning wetlands is the spread of *Phragmites* species (common reed) into salt/brackish marsh areas (Weinstein and Balletto 1999). Since the early 1900s, *Phragmites australis* has been replacing other salt/brackish marsh vegetation along the Atlantic coast at a rate of about 1% to 6% of the marsh surface per year (Weinstein and Balletto 1999). *Phragmites* forms dense, monotypic stands of vegetation that could alter fish use of the marsh. Recent research comparing fish use of *Phragmites* and *Spartina* marsh in New Jersey found no distinct habitat preference among large fish and decapod crustaceans (i.e., shrimp) (Able and Hagan 2000). On the other hand, *Phragmites* did have a negative effect on larval and juvenile fish abundance (Able and Hagan 2000; Able et al. 2003). A study in Connecticut salt marshes found no difference between use of reed-dominated tidal marshes and typical tidal marsh vegetation by mummichogs (Fell et al. 1998).

Sea level rise and storm events

Rising sea level is a major threat to coastal wetlands in North Carolina. Analysis of data from tide gauge stations in Hampton, Virginia, and Charleston, South Carolina, from 1921 to 2000 (Riggs 2001), show sea level rising along the Atlantic coast by about 3.35 mm per year (1.1 ft per 100 years). Gauge data specific to North Carolina are available only for 20 years, but suggest a slightly greater rate of approximately 4.57 mm per year (1.5 ft per 100 years). The combination of sea level rise and storm events causes erosion of wetlands at a rate of approximately 802 acres/year (Riggs 2001). The importance of coastal erosion is further emphasized by the relatively low amount of permitted coastal wetland impacts from 1999 to 2002 (WRP 2001), compared to estimated erosion losses. Compared to sea level rise, the rate of wetland building or accretion is slightly less, but of the same order of magnitude: approximately 1.20 mm per year (Hackney and Cleary 1987). Loss of wetlands from sea level rise is exacerbated along steeply sloping shorelines or where wetland migration is otherwise restricted (i.e., where bulkheads are present). A recent study of salt marsh response to sea level rise in New England found that low marsh vegetation (*Spartina alternaflora*) was replacing high marsh vegetation (*Spartina patens*, *Distichlis spicata*, and *Juncus gerardi*) (Donnelly and Bertness 2001). If the rate of sea level rise increases significantly over the next century, many low marsh areas in New England and elsewhere will likely drown (Donnelly and Bertness 2001). *Buyers and owners of coastal property should be aware of sea level rise and the potential for loss of wetlands and property. Updated and accurate coastwide estuarine erosion rates are needed for the CRC and EMC to determine adequate development guidelines and rules along the coast (CRC Estuarine Biological and Physical Processes Workgroup 2003). Priorities for coastal wetland protection should also acknowledge sea level rise, and protect gently sloping areas upland of coastal wetlands to allow for landward migration of coastal wetlands with sea level rise.*

Tropical storm surge events can degrade or erode low salinity wetlands by bringing in high salinity water, as well as flooding from rainfall. Freshwater species cannot tolerate high salinity, while salt/brackish species cannot tolerate the freshwater flooding, resulting in a total loss of wetland vegetation in some areas (Baldwin and Mendelssohn 1998). With rising sea level, the impact of storm events on dieback of coastal wetlands can be substantial (Riggs 2001). Loss of wetlands due to increasing salinity and flooding has been documented in Louisiana estuaries (Webb 1997). Loss of wetlands from storm surge events and erosion in North Carolina (Riggs 2001) did not distinguish losses due to vegetation dieback from overall erosion. Vegetation dieback is important because it could actually accelerate erosion of coastal wetlands. *Research is needed on site-specific erosion and accretion rates and their relationship with sea level rise and storm events (Brinson and Moorhead 1989). Specific research is also needed to determine processes that control the upper limits of peat accumulation, which is the foundation of coastal*

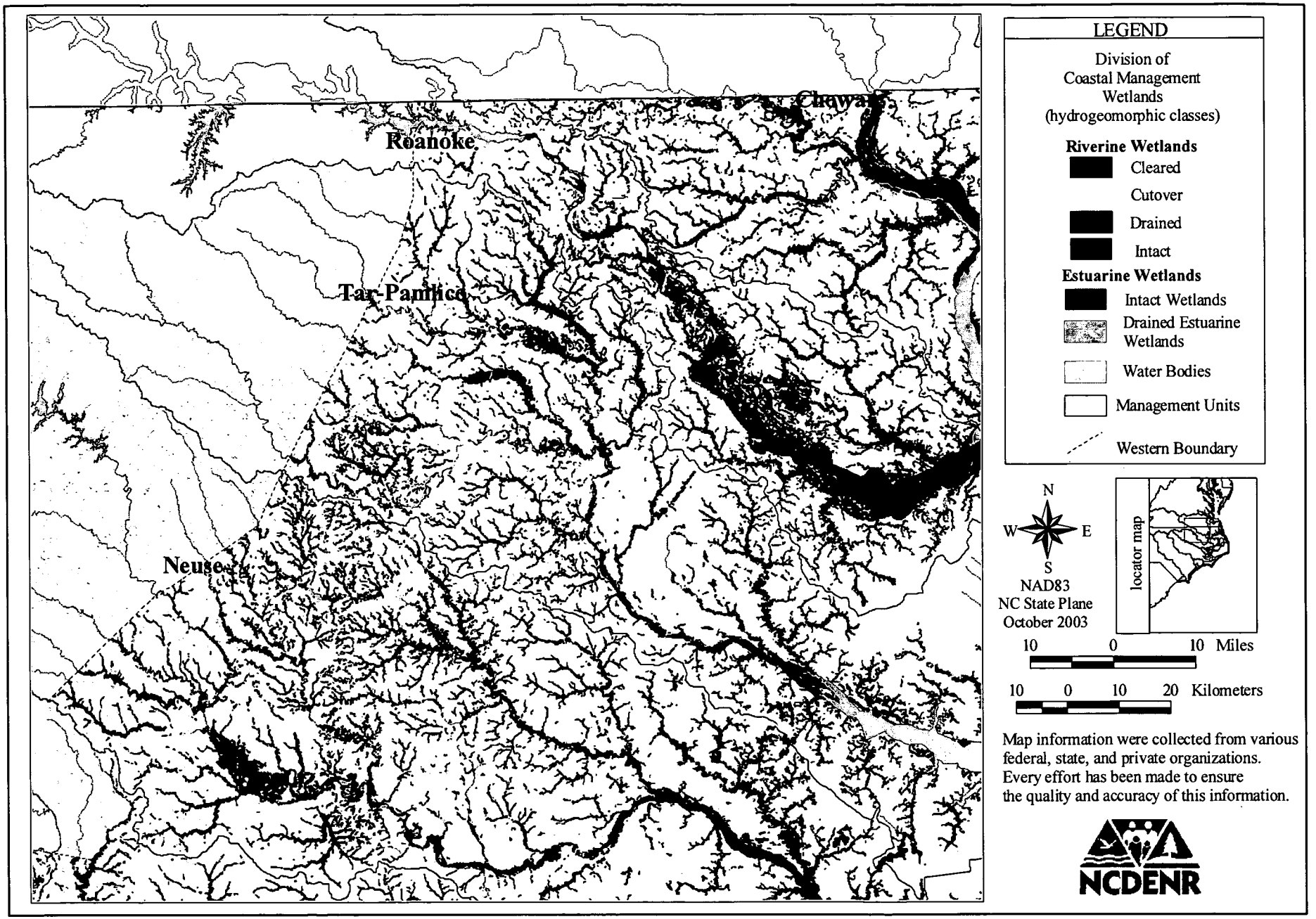
wetland development in the Albemarle-Pamlico system (Moorhead and Brinson 1995).

5.5. SUMMARY OF WETLAND CHAPTER

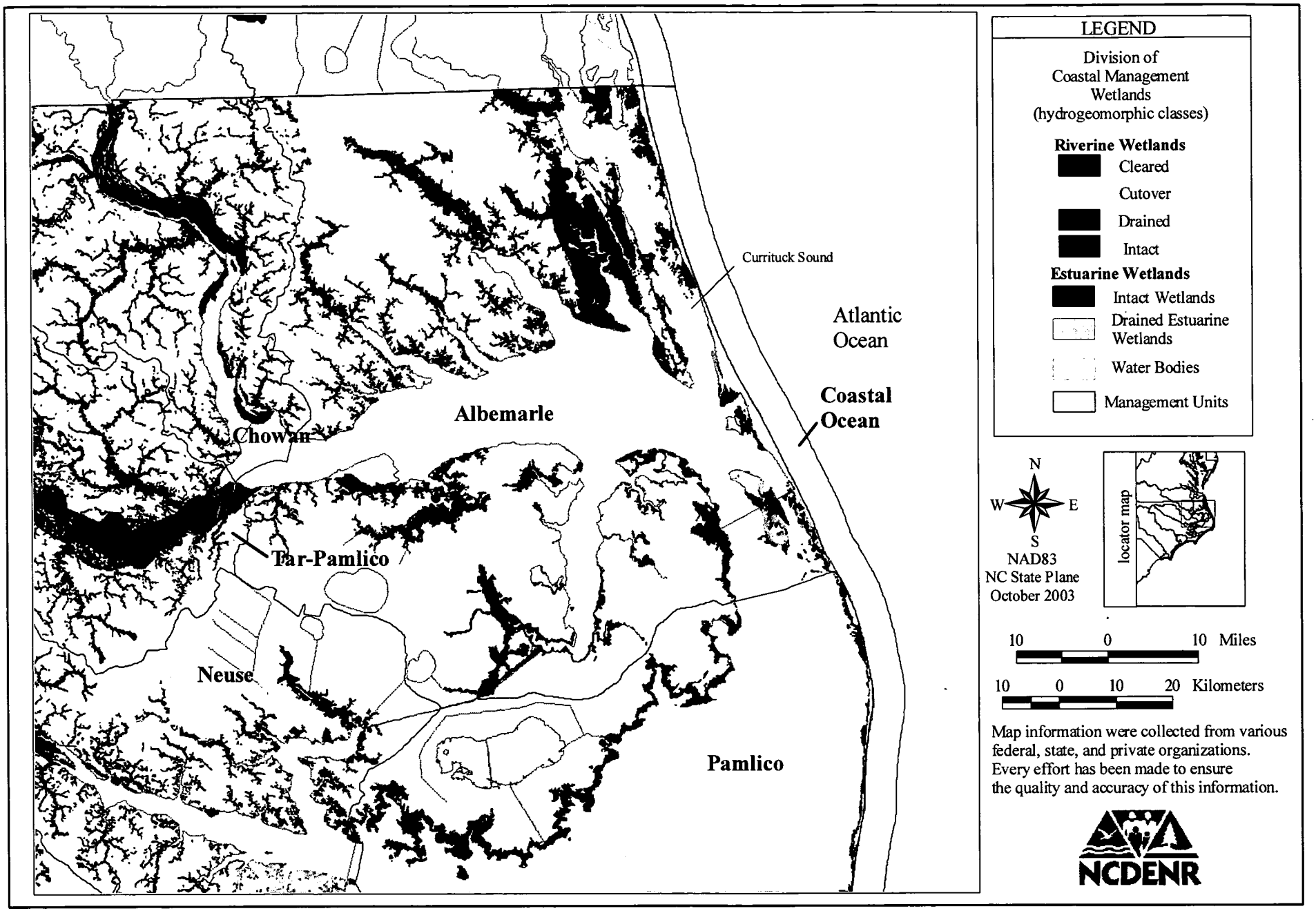
Wetland habitat is unique among the coastal fish habitats because it is not entirely submerged but occurs in and above the water. There are many different types of wetlands throughout the coast, many bordering the rivers and sounds, while others are hydrologically isolated. While each wetland type is unique, these different types provide similar ecological functions. Wetlands are highly effective and well recognized for their value as a natural filter, trapping and filtering pollutants from upland runoff; as well as serving to buffer the effects of floods by storing, spreading, and slowing stormwater runoff. Like SAV, wetlands are highly productive biologically, but because of their expansive coverage and biomass, produce much more organic matter, which is broken down and utilized by multiple species adjacent to wetlands and elsewhere. It has been estimated that over 95% of the United States' commercially harvested finfish and shellfish are wetland dependent. The combination of shallow water and thick vegetation provides excellent nursery habitat for juvenile fish. The majority of MFC-designated Primary Nursery Areas consists of wetlands and adjacent shallow water and soft bottom. Fish found commonly in or near freshwater marshes and swamps include bluegill, largemouth bass, river herring, and striped bass. In and adjacent to estuarine wetlands, killifish, spot, red drum, flounder, penaeid shrimp, striped mullet, pinfish, blue crab, and other species are abundant. In addition to supplying food and acting as nursery habitat for numerous species, riparian wetlands also provide a relatively safe corridor for fish moving among the other nearshore habitats.

It is estimated that as much as 40-50% of North Carolina's original wetland coverage has been lost, primarily due to ditching, channelization, and filling for agriculture and development. From the early 1800s to the early 1900s, agriculture accounted for the majority of wetland losses. From about 1950 to the 1990s, development accounted for two-thirds of wetland impacts, with forestry and agriculture associated with the remainder. Although the rate of wetland loss has slowed, losses continue to occur. Mitigation for permitted losses and voluntary restoration efforts in some areas have partially offset some recent losses, but the type of wetland gained is often not equivalent to what was lost. Degradation and loss of wetlands can impact many species, including overfished stocks of river herring, Atlantic sturgeon, and southern flounder, as well as blue crab and striped mullet stocks, which currently have a status of "Concern."

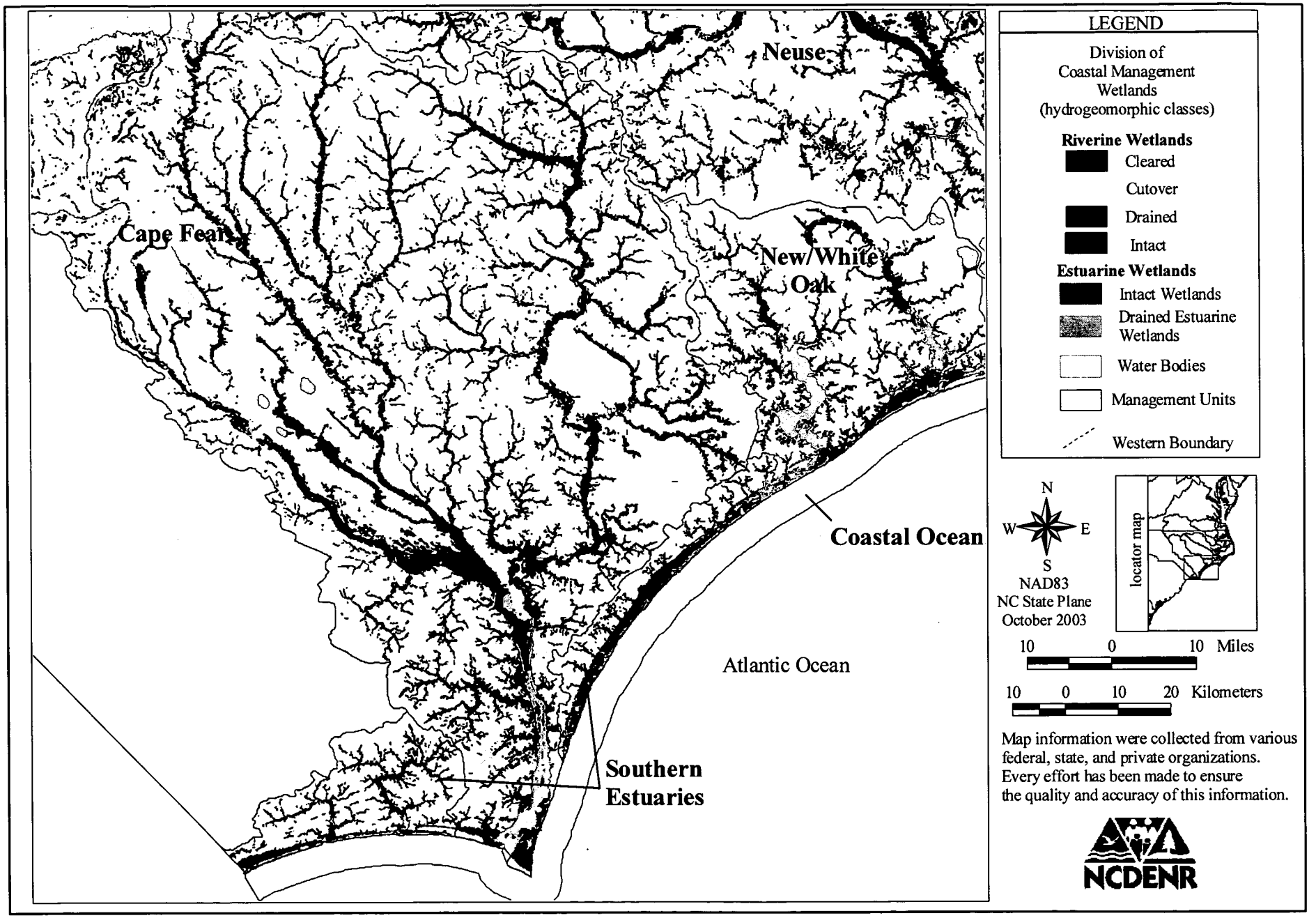
There are multiple threats to wetland habitat today, primarily due to physical destruction and hydrological alteration. Ditching and draining for forestry and development, construction of new dams, mining activity, and filling for new development accounted for the majority of permitted wetland losses in recent years. Construction of roads, infrastructure, and water dependent-development, including dredging for marinas and navigation channels, also results in smaller, site-specific losses and contributes to cumulatively large wetland losses. Estuarine shoreline stabilization causes gradual, long-term wetland loss by limiting sediment inputs needed for maintenance and expansion of wetlands, and by blocking landward migration as sea level rises. Forestry and agriculture also impact wetlands through hydrologic alterations, which are not tracked in the permitting database. Because wetlands are critical to a large number of fishery species, but have been greatly reduced in spatial coverage from their original extent, ongoing initiatives such as wetland restoration, land acquisition and preservation, and agricultural cost-share BMPs need to be enhanced. There should also be additional initiatives implemented to protect and enhance wetland habitat. The many fishery and water quality functions provided by wetlands make their preservation and restoration along North Carolina's coast a high priority for protection of all coastal fish habitats.



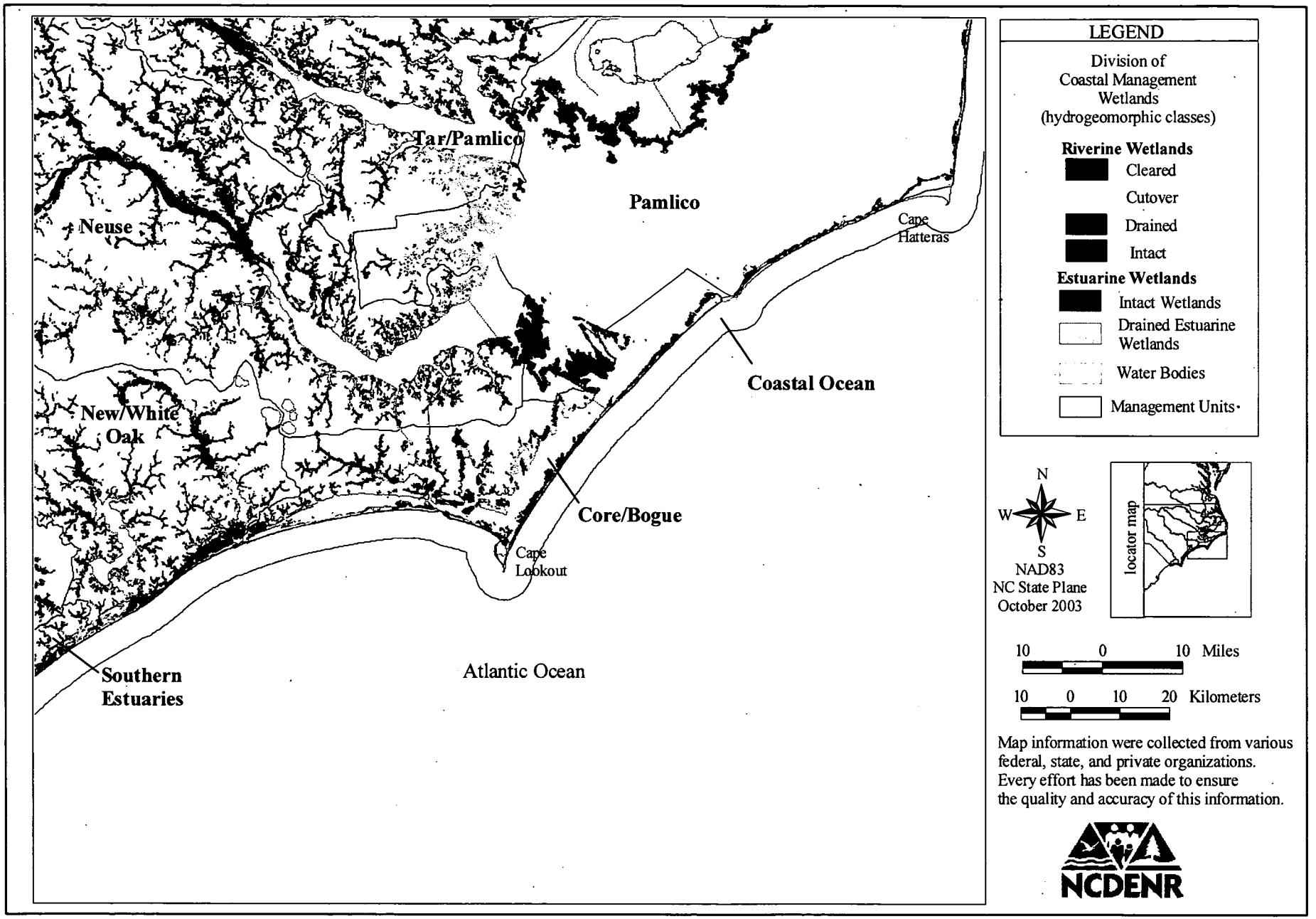
Map 5.1a. Location of riparian wetland areas derived from maps produced by DCM using photography from 1994.



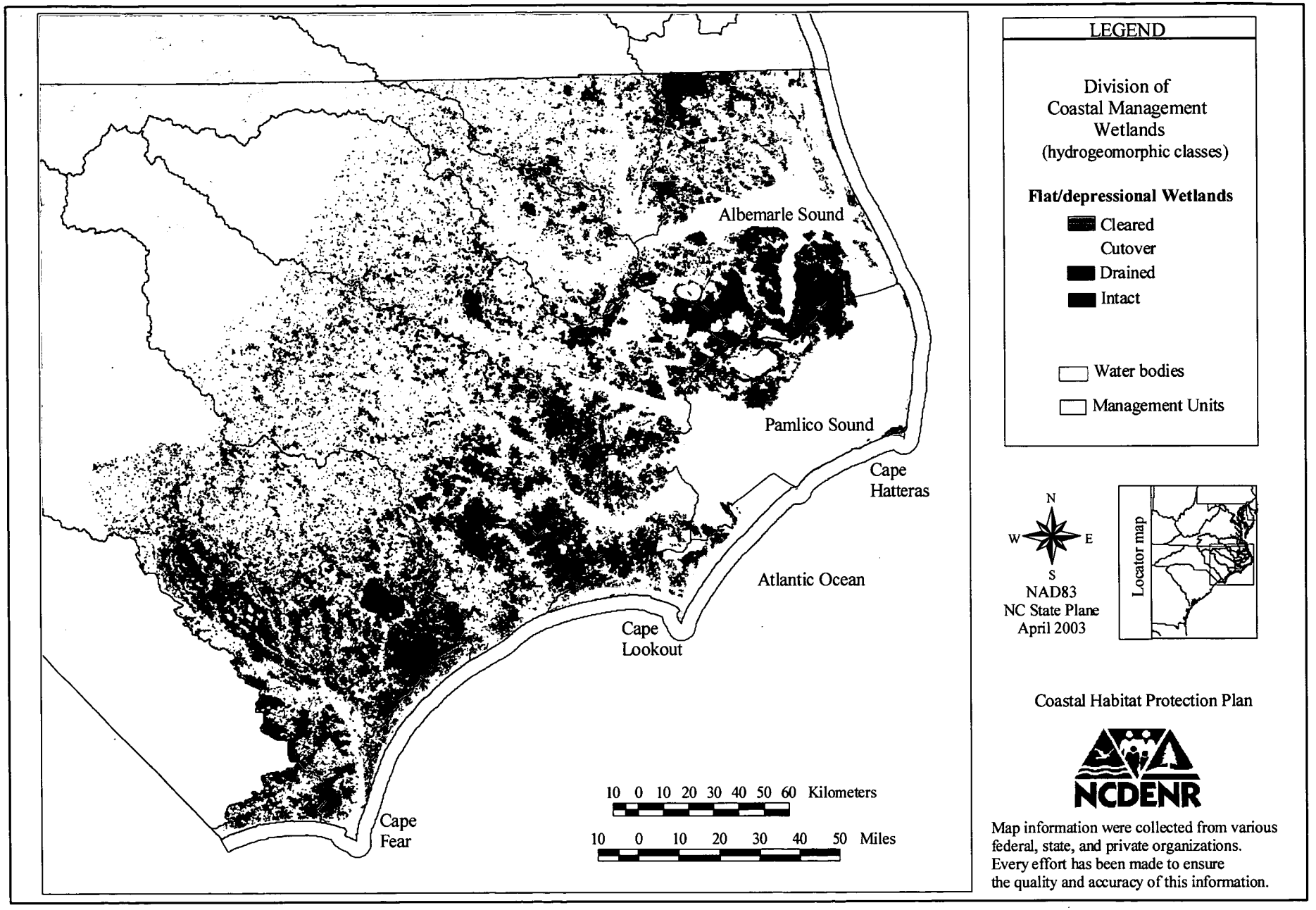
Map 5.1b. Location of riparian wetland areas derived from maps produced by DCM using photography from 1994.



Map 5.1c. Location of riparian wetland areas derived from maps produced by DCM using photography from 1994.



Map 5.1d. Location of riparian wetland areas derived from maps produced by DCM using photography from 1994.



Map 5.2. Location of flat/depressional wetland areas derived from maps produced by DCM using photography from 1994.

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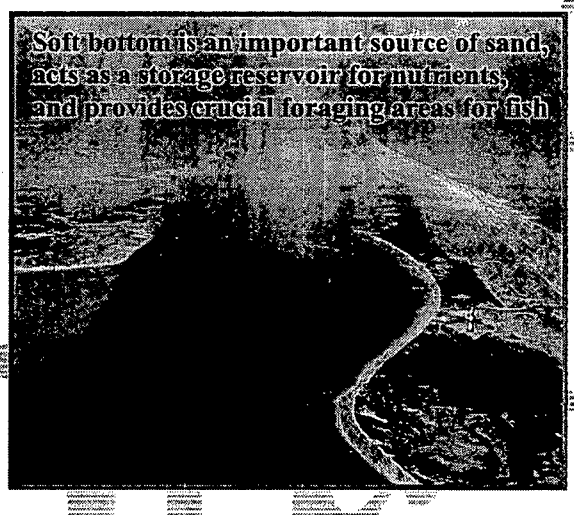
CHAPTER 6. SOFT BOTTOM

6.1 DESCRIPTION AND DISTRIBUTION

Definition

Soft bottom habitat is unconsolidated, unvegetated sediment that occurs in freshwater, estuarine, and marine systems. The MFC, CRC, or EMC do not specifically define soft bottom or unvegetated bottom in their regulations. The SAFMC defines one type of soft bottom, tidal flats, as "dynamic features of coastal landscapes whose distribution and character may change with shifting patterns of sediment erosion and deposition." This definition could in fact apply to all soft bottom. However, the CHPP definition of soft bottom includes deeper subtidal bottom as well as shallow bottom areas. Although soft bottom as a habitat type is not specifically designated or protected by any of North Carolina's regulatory commissions, it is an important component of MFC designated Primary Nursery Areas (PNAs), Anadromous Fish Spawning Areas, and Anadromous Nursery Areas.



Habitat requirements

Soft bottom has only one habitat requirement – sediment supply. Environmental characteristics, such as distribution of sediment grain size and distribution, salinity, dissolved oxygen, and flow conditions will affect the condition of the soft bottom habitat and the type of organisms that utilize it. Nevertheless, the habitat itself will persist regardless of its condition unless it becomes starved for sediment or is colonized by other organisms, transforming it into another habitat such as SAV or shell bottom. Refer to the threats section for more information on alterations to soft bottom habitat.

Description and distribution

Although soft bottom habitat is defined as "unvegetated" and lacks visible structural habitat, the surface sediments support an abundance of microscopic plants; numerous burrowing animals are hidden below the surface (Peterson and Peterson 1979). The characteristic common to all soft bottom types is the mobility of unconsolidated, uncemented soft sediment (Peterson and Peterson 1979). Soft bottom habitat can be characterized by geomorphology (the shape and size of the system), sediment type, water depth, hydrography (riverine, intertidal or subtidal), and/or salinity regime (DENR 2000a). Soft bottom habitat types in North Carolina's coastal waters can be categorized as the following:

Freshwater

- unvegetated shoreline

- river, creek, and lake bottom

Estuarine

- intertidal flats and unvegetated shoreline
- subtidal bottom in rivers, creeks, and sounds

Marine

- intertidal beach
- subtidal bottom

It is important to understand the physical and chemical properties of soft bottom habitat since this affects the benthic organisms that inhabit these areas and in turn, their value as fish habitat. The physical and chemical character of all soft bottom is determined by the underlying geology, basin morphology, and associated physical processes (Riggs 1996). Geologically, North Carolina's coast can be divided into distinct northern and southern provinces that are approximately separated by Cape Lookout (Riggs 1996; Pilkey et al. 1998). In the northern province, sediment formations generally consist of a thick layer of unconsolidated muds, muddy sands, sands, and peat sediments. A gently sloping depositional basin formed north of Cape Lookout. The low slopes of the northern province are characterized by an extensive system of drowned river estuaries (i.e., Albemarle Sound, Neuse River), long barrier islands, and few inlets (Map 6.1 a-e). In contrast, the southern coastal province has only a thin and variable layer of surface sands and muds, with many areas of exposed rock outcrops in marine waters. The southern province also has a steeper sloping shoreline, resulting in narrow estuaries (i.e., Topsail Sound, Batts Mill Creek), short barrier islands, and numerous inlets (Map 6.1 a-e). These geomorphic features, in turn, affect sediment deposition and the character of soft bottom habitat.

Freshwater bottom

Freshwater bottom includes the bottom sediments of freshwater rivers, creeks, and lakes. These areas were described in the Water Column chapter and are shown in Map 2.6a-b. Properties of the soft bottoms within a river system depend primarily on the origin of sediment inputs but also on elevation gradient, flow conditions, riparian cover, local geology, and water column characteristics. Upstream sources of sediment inputs into riverine systems include erosion of sediment bank shorelines, flushing of swamp forests and other wetlands, and transport of suspended sediment from upstream riverine flood waters (Riggs 1996). Bottom composition generally ranges from more consolidated material upstream (bedrock, boulders) to less consolidated material downstream (gravel, sand). Because freshwater rivers and creeks are eroding through older sediment banks, there tends to be a deep main channel dominated by medium-to-coarse grained sand with varying amounts of detritus. Shallow flats may exist on one or both sides of the channel. Sediment on these flats tends to consist of a layer of fine sandy mud on top of older sediments (Riggs 1996). Where the channel bed is relatively deep or wide, pools form and water velocity slows, allowing finer particles to settle (sand, silt). Where the channel bed is relatively narrow or shallow, riffles and runs occur and water velocity increases, leaving only the heaviest particles on the bottom (boulder, cobble). Dissolved oxygen in flowing waters is generally high, leading to aerobic surface sediments.

In freshwater lakes, like Lake Mattamuskeet, the shallow bottom around the shoreline is often unvegetated due to shoreline erosion, high wind exposure, or low water clarity (from turbidity or organic staining). In sheltered areas, however, the bottom may be covered by submerged aquatic vegetation. In deeper areas of lakes, the bottom is unvegetated because of low light availability. These deeper waters may become stratified during summer, causing anoxia or hypoxia on the bottom (Mitsch and Gosselink 1993).

Estuaries and sounds - intertidal flats, unvegetated shoreline and subtidal bottom

Sediment composition of soft bottoms in estuaries and sounds varies with geomorphology and position within the estuary. The basin morphology of most northern estuaries in North Carolina is similar to a

shallow, flat-bottomed dish with a small lip around the perimeter (Pilkey et al. 1998). The estuarine shoreline is a cut bank with a narrow and shallow perimeter platform (the lip) that slopes gradually away from the shoreline to approximately 3-7 ft (1.5-2 m) deep, and then more abruptly to the floor of the central basin. The central basins deepen gradually from the inner estuary to the outer estuary from about 12 – 23 ft deep (4 to 7 m). The central basins become shallow near the mouths of the estuaries due to formation of sandy bars, and behind the barrier islands due to storm overwash and transport of sand from the inlets. Coarse sands are concentrated on the shallow perimeter platforms, shoals, and inlet mouths, while fine sediments such as organic rich mud (ORM) are concentrated in the deeper central basins and downstream channels (Wells 1989; Riggs 1996; Pilkey et al. 1998) (Map 6.2). General bottom topography of estuarine water bodies is shown in Map 4.1. The relationship between sediment composition and water depth is evident when comparing Map 5.1 and Map 6.2. The width and thickness of ORM increase as the estuary widens and deepens in the downstream direction, since the fine sediments are easily suspended and transported away from high energy waters (Riggs 1996).

Soft bottoms in the northern geologic province, including the Albemarle-Pamlico Estuarine System, consist of four general types of sediment: sand, peat, inorganic mud, and ORM (Wells 1989; Riggs 1996). Sands are derived from erosion of the sediment bank shorelines and shallow perimeter platform throughout the estuaries. Sand is also transported into the lower portion of the estuaries from barrier island overwash and transport through the inlets. Peats (sediments with more than 40% organic matter) are derived from flushing of organic matter from wetlands and erosion of wetland shorelines. Inorganic muds consist of several clay minerals, primarily derived from suspended sediment transported from riverine flood waters to the estuarine system. Organic rich mud is the most extensive sediment type in North Carolina's estuaries. It is composed of 5 to 40% organic matter (most commonly about 10%), mixed with inorganic clay (approximately 76%) and quartz sand (approximately 13%). Organic rich mud comprises approximately 70% of the sediment in North Carolina's estuarine system and is primarily concentrated in the central basins of the sounds.

Soft bottom in the southern estuarine system is dominated by sloped mudflats on the perimeter and interior of the smaller estuaries (i.e., White Oak River, Pages Creek) (Pilkey et al. 1998). The mudflats are riddled with tidal channels and support extensive salt marshes. In the lower estuary, sand is transported into the estuaries from the numerous inlets and barrier island overwash. In the upper estuary, small blackwater streams carry relatively low sediment loads into these estuaries, but the water contains large quantities of dissolved organic matter that give it a brown tea color. The Cape Fear River, unlike the other smaller river systems in the Southern Province, transports large sediment loads from eroding clay sediments of the Piedmont to the lower estuary.

Unvegetated shorelines occur where wave energy prevents colonization by plants and there is a gently sloping area for sand to build upon (Riggs 2001). The shoreline provides an area to absorb the physical energy from waves, tides, and currents, protecting upland areas. Although unvegetated nontidal shorelines are ordinarily exposed from water, and therefore not used by fish, the dynamic processes of erosion and sediment deposition affect the composition and supply of sediment in adjacent shallow water habitats. This in turn affects the type and productivity of the benthic invertebrate community. For example, unvegetated sediment bank shorelines are generally eroding and sandy, providing a source of sand to adjacent waters (Riggs 2001). Sand deposits from inlet flood tide deltas and overwash events on back barrier islands form shallow sand flats behind the islands. In contrast, marsh or swamp forest shorelines are generally not eroding and have a high organic content, thus providing fine organic sediments to adjacent waters. Several shoreline erosion studies have been conducted along North Carolina's coast that provide information on the character and condition of intertidal, shoreline, and shallow subtidal soft bottom and were compiled and summarized in Riggs (2001).

Intertidal flats are the unvegetated bottoms of estuaries and sounds that lie between the high and low tide lines. These flats occur along mainland or barrier island shorelines or can emerge in areas unconnected

to dry land. Intertidal flats are most extensive where tidal range is greatest, such as near inlets and in the southern portion of the coast. Because the influence of lunar tides is minimal in the large sounds (e.g., Pamlico, Albemarle, and Currituck), true intertidal flats are not extensive, except for the area immediately adjacent to inlets (Peterson and Peterson 1979). Sediment composition on intertidal shorelines tends to shift from coarser, sandy sediment on higher portions of the shoreline, with greater wave energy, to finer, muddier sediments in the lower portion of the shoreline, with relatively less wave energy (Peterson and Peterson 1979). Conditions on intertidal flats are physically stressful for associated marine organisms. Drastic fluctuations in salinity, water and air temperature (in addition to air and wind exposure) occur during each tidal cycle. Due to physiological restraints and limited water depth, some mobile organisms are restricted to deeper waters or adjacent habitats to avoid the stressful extremes associated with low tide. However, the sediment provides a buffer from changes in temperature and salinity in the water column for benthic infauna (Peterson and Peterson 1979).

The inlets separating North Carolina's barrier islands are part of a sand-sharing system among the islands, estuaries, and nearshore ocean. Intertidal flats or deltas form on the ebb and flood sides of inlets as sediments shift with tides and waves. Sediments in the vicinity of inlets are typically composed of coarse sands and shell fragments (Peterson and Peterson 1979). Ebb-tidal and flood-tidal deltas (i.e., the seaward and estuarine shoals of an inlet, respectively) are formed by waves and currents, and may contain large volumes of sand. Intense wave and current energy cause the flats to continually change, erode, and reform. The high instability of the ebb and flood tide deltas makes colonization by benthic invertebrates difficult (Peterson and Peterson 1979). Inlets are classified as stable, migrating, or ebb-tidal delta breaching (Fitzgerald et al. 1978). Unstable inlets may form extensive spits, tidal deltas, and sand bars, creating bathymetric complexity (or differences in water depth) in nearshore waters, that attract some fish species. The process of channel realignment and abandonment provides a mechanism for large sandbar complexes to move onto the adjacent barrier islands, supporting productive intertidal beach communities (Cleary and Marden 1999).

There are currently 20 inlets in North Carolina that connect estuarine waters to the sea (Map 6.3 a-c). Ten of these inlets originated as a result of storm breaches across barrier spits or islands and remain spatially unstable, including Oregon and Mason inlets (Cleary and Marden 1999). Mason Inlet, which has been migrating south rapidly, was artificially relocated in the winter of 2002. Mad and New (Corncake) inlets closed following the hurricanes of the last few years, and Old Drum Inlet reopened. A new inlet breached between Hatteras and Frisco during Hurricane Isabel in 2003, but was refilled by the United States Army Corps of Engineers (COE). There are nine larger inlet systems, including Ocracoke, Bogue, and the Cape Fear River inlets, which occupy ancient river channels. Two other inlets were artificially created: Drum and Carolina Beach inlets. Although originating as a storm-related breach, Tubbs Inlet was artificially relocated in 1970.

Ocean intertidal beaches and subtidal bottom

The locations of major marine intertidal and subtidal topographic features, such as beaches, inlets, inlet-associated ebb-tidal deltas, and shoals, are indicated in Map 6.1 a-e. The seafloor off the North Carolina coast is part of the Atlantic continental shelf, which slopes gradually from the coastline before dropping off steeply at approximately the 50 – 75 m isobath where the continental slope begins. In North Carolina, the continental shelf is relatively narrow, approximately 30 km off Cape Hatteras, 60 km off Cape Lookout, and about 90 km off Cape Fear. Water depth at the seaward limit of state territorial waters ranges from 50 to 70 feet (Map 6.1 a-e). Because North Carolina is located at a transition between two major physiographic and zoogeographic zones, the marine subtidal bottom supports a high diversity of invertebrates.

North of Cape Hatteras, the shoreline and adjacent shoals tend to be linear, the shelf is relatively steep, and the bottom consists of a regional depositional basin known as the Albemarle Embayment, resulting in few exposed rock outcrops. Several prominent shoals, such as Wimble, Kinnekeet, and Platt shoals also

occur in this region, as well as a series of prominent ridges and swales that are spaced about 400 – 600 m apart, with mean relief of 1 to 7 m, averaging 2 to 3 m in height (Inman and Dolan 1989; Rice et al. 1998). Shoals closest to shore, such as Wimble and Kinnekeet shoals, tend to be oriented at a 20 – 30° angle from the coastline, while those further offshore run more parallel to the coast (MMS 1993).

The coastline south of Cape Hatteras consists of a series of arcs, dominated by three major capes (Hatteras, Lookout, and Fear) and three associated bays (Raleigh, Onslow, and Long) (Map 6.1 a-e). Long Bay continues into South Carolina to Cape Romain. Large shoals extend across the shelf from each cape (Diamond, Lookout, and Frying Pan shoals) for more than 20 km. South of Cape Hatteras, the Continental Shelf has a greater amount of exposed rock outcroppings and is intersected with younger sediments originating from filled ancient river valleys (Riggs et al. 1995). The rock outcroppings are discussed in the hard bottom section of this plan.

The continental shelf off North Carolina has a relatively low supply of incoming sand due to low direct river input, entrapment of most river-borne sediment in the upper estuaries and sounds, and minimal sediment exchange between adjacent shelf embayments (Riggs et al. 1998). The shoreface is the generally concave, upward surface extending from the surf zone to the point where the slope matches that of the continental shelf (Thieler et al. 1995). The base of the shoreface off North Carolina occurs at approximately 10 – 12 m water depth. The shoreface represents the area of active beach sand movement. Six classes of shoreface systems were recognized by Riggs et al. (1995) based on differences in the underlying geology. The nature of these shorefaces affect the geologic composition of the surface and underlying substrate of the subtidal bottom and shoreline and partially explain the patterns of localized erosion or deposition.

The intertidal zone of oceanfront barrier island beaches is the area periodically exposed and submerged by waves, varying with frequency and with lunar tide cycles. In this high energy area, waves continually rework and sort sediment by grain size. The uprush of water carries sediment onto the beach, with larger sediments deposited first and finer-grained sediment carried farther landward. The backwash carries some sediment back into the water. Because of this regular high wave energy, as well as occasional storm events associated with extreme wave action, the intertidal beach and surf zone typically have rapid scour and fill events. The sediments are generally much coarser, more highly sorted, and contain less organic matter than in protected estuarine intertidal flats (Donoghue 1999).

The surf zone is the shallow subtidal area of breaking waves seaward of the intertidal beach. Within the surf zone, longshore sandbars frequently develop and shift seasonally in response to wave energy. Seaward of the surf zone, the subtidal bottom consists of a series of minor ridges and swales. Ripple scour depressions, ranging from 40 to 100 m in width and up to 1 m in depth, occur along the southern portion of the coast and are perpendicularly oriented to the beach, extending to the base of the shoreface (Thieler et al. 1995; Reed and Wells 2000). These features are located adjacent to areas experiencing chronic severe beach erosion, and may be indicative of rapid offshore transport of sand during storms (Thieler et al. 1995).

Three major shoals extend perpendicular to Cape Hatteras, Cape Lookout, and Cape Fear: Diamond Shoals, Cape Lookout Shoals, and Frying Pan Shoals, respectively. Water depth on the shoals ranges from 2 – 18 ft, in contrast to adjacent waters that are 20 – 40 ft deep. Due to an interest in beach nourishment projects for Dare County, Boss and Hoffman (2000) collected detailed information on the sand resources of North Carolina's Outer Banks, including specific data about Diamond Shoals. Diamond Shoals extend approximately 20 km (11 nautical miles or nm) and are about 11 km (5.5 nm) wide. The estimated total volume of sand on the shoal was at least 1.66 billion cu yd, with approximately 256 million cu yd within state waters (Boss and Hoffman 2000). As such, cape shoals are major sand resources for coastal processes. Detailed mapping of the bottom has been done in other areas of the coast to varying extent with different techniques. *The results of these studies need to be compiled in a*

comprehensive and comparable manner to evaluate changes and trends in substrate character, as well as feasibility of beach nourishment projects.

6.2 ECOLOGICAL ROLE AND FUNCTIONS

Community structure

Freshwater

The freshwater benthic community varies greatly from extreme headwaters to mainstem rivers and may be more similar to that found in inland lake bottoms than in estuaries. Green algae and diatoms are more common than dinoflagellates (Rulifson et al. 1986). In headwater streams, algal production is negligible where there is complete tree canopy cover and the benthic community consists largely of organisms that break down and collect detritus. As the canopy opens up downstream, algae grazers and detritivores increase in abundance (Vannote et al. 1980). Mussels are an important component of the invertebrate community in freshwater soft bottom. There are over 60 species of freshwater mussels in North Carolina. The distribution and diversity of native freshwater mussels has been in a state of decline in North Carolina as well as in other southeastern states. The freshwater Asiatic clam (*Corbicula fluminea*), introduced about 50 years ago, has become a prominent component of many rivers (Lauritsen and Moxley 1983). Ecological problems associated with this non-native species include alteration of the benthic substrate, and competition with native mussels and other mollusks (Devick 1991). Zebra mussels (*Dreissena polymorpha*) have not been reported in North Carolina, but have been found in Virginia and 20 other states. Due the rapid rate that this non-native has spread in the United States since first found in 1986, researchers feel that zebra mussels are likely to infest all southeastern states eventually, with negative impacts to the native mollusks (Neves et al. 1987). Freshwater benthic sampling, conducted by DWQ in all of North Carolina's river basins, provides detailed information on the abundance and diversity of benthic species present in the freshwater portion of North Carolina's coastal rivers.

Estuarine

Benthic microalgae are a key part of the food chain in estuarine soft bottom habitat. Benthic microalgae are microscopic photosynthetic algae that live in the top few millimeters of the surface of soft bottom (Miller et al. 1996). Because the unvegetated bottom appears barren, but is actually rich in photosynthetic algae, MacIntyre et al. (1996) referred to benthic microalgae as "The Secret Garden." Benthic microalgae on sand, mud flats, and subtidal bottom are composed primarily of benthic diatoms and blue green algae, with benthic dinoflagellates and filamentous green algae also present (Peterson and Peterson 1979). Dense mats of blue green algae sometimes form in protected higher portions of intertidal flats, giving the sediment surface a dark brown or blue-green appearance, which can form a crusty mat when dry at low tides (Peterson and Peterson 1979). Diatom mats are more abundant in the lower intertidal zone (Peterson and Peterson 1979). Benthic microalgae can either be attached to sediment particles or be mobile, migrating vertically through the sediment. Productivity depends on photosynthesis by these microalgae, which can only occur in sediments having adequate light penetration (MacIntyre et al. 1996). Photosynthetically active light generally penetrates only about 2-3 mm into the sediment, but can reach 5-20 mm in sandy, high energy environments.

Most benthic invertebrates inhabiting soft bottom live in the sediment (infauna), as opposed to the bottom's surface (epifauna), because of the high mobility of sediments (Peterson and Peterson 1979). These animals are classified by size and feeding mode. Microfauna are the very small protozoans (< 0.06 mm). Meiofauna are about 0.06 – 0.40 mm in size (the size of a sand grain), and include nematodes and copepods. Both microfauna and meiofauna are important grazers on benthic microalgae and bacteria. Macrofauna (>0.5 mm) contribute the most to infaunal biomass and include organisms such as amphipods, polychaetes, mollusks, echinoderms and crustaceans (Peterson and Peterson 1979). These macrofauna may be deposit feeders or suspension feeders (Peterson and Peterson 1979; Miller et al. 1996). Deposit feeders ingest sediment and detrital deposits and assimilate bacteria, fungi, and

microalgae from them. Compared to detritus and larger plants, microalgae may be a nutritionally richer food source for benthic invertebrates (Miller et al. 1996). Deposit feeders include mud snails, many polychaete worms, and certain bivalve clams and crustaceans.

Suspension feeders capture particles suspended in the water column. Common suspension feeders are bivalves such as the hard clam (*Mercenaria mercenaria*) and razor clam (*Tagelus plebeius*), and some polychaete worms (Miller et al. 1996). When sediment is resuspended, the benthic microalgae become available to the suspension feeders (Miller et al. 1996). A large proportion of intertidal bivalves' diet has been shown to consist of suspended benthic microalgae, particularly when chlorophyll concentrations in the water column are low (Page and Lastra 2003). While resuspended benthic microalgae can be beneficial to the invertebrate community as an additional food source, excessive suspended sediment and associated algae have been found to reduce growth rates and survival of macrofauna, such as hard clams (Bock and Miller 1994). Although the abundance of food sources affects invertebrate populations, benthic predators (such as spot and pinfish) were found to have a larger influence on soft bottom community composition and biomass relative to that of nutrient availability (Posey et al. 1995).

Larger, mobile invertebrates live on the surface of soft bottom. Fiddler crabs (*Uca* spp.) congregate on intertidal flats foraging for microalgae and detritus, and amphipods and insects also graze on the flats. On submerged flats and shallow bottom, blue crab (*Callinectes sapidus*) is an important predator. Other mobile invertebrates include horseshoe crab (*Limulus polyphemus*), whelks (*Busycon* spp.), tulip snails (*Fasciolaria* spp.), moon snails (*Polinices duplicatus*), penaeid shrimp (*Penaeus* spp.), hermit crabs (*Pagurus* spp., *Petrochirus* spp., and *Clibanarius vittatus*), sand dollars (*Mellita quinquiesperforata*), and spider crabs (*Libinia* spp.). Overall, estuarine soft bottom supports a high diversity of benthic invertebrates, with over 300 species documented in the southern portion of North Carolina (Hackney et al. 1996).

Marine

On oceanfront beaches, most benthic animals in the intertidal zone consist of infaunal burrowing forms. A diverse assemblage of meiofauna (0.06 – 0.4 mm in size) occurs in the lower beach community and acts as an important food source for many juvenile fish (Levinton 1982; Hackney et al. 1996). A relatively low diversity of macrofauna (>0.5 mm in size) (~ 20 – 50 species) exists in the intertidal beach compared to estuarine intertidal flats (~ 300 – 400 species) (Hackney et al. 1996). The dominant macrofauna by biomass in North Carolina's oceanfront intertidal beaches are mole crabs (*Emerita talpoida*) and coquina clams (*Donax variablis, D. parvula*) (Hackney et al. 1996; Donoghue 1999; Peterson et al. 2000). Several species of amphipods and the spionid polychaete (*Scolelepis squamata*) have been reported as highly abundant on some beaches as well (Lindquist and Manning 2001).

Polychaete worms, isopods, mollusks, echinoderms, amphipods, and other crustaceans occur in sediments in the oceanfront intertidal beaches, cape and ebb tide shoals, surf zone and other subtidal bottom (Jutte 1999; Peterson et al. 1999). Three general groups of polychaetes occur in intertidal beaches (Hackney et al. 1996): a) burrowing deposit feeders, including thread worms (*Lumbrineris* sp., *Scolelepsis* sp.), and red-lined worms (*Nepthys* sp.); b) suspension feeders; and c) tube building burrow dwellers, such as plumed worms (*Diopatra* sp.) and lugworms (*Arenicola* sp.). Offshore sand bottom communities along the North Carolina coast are relatively diverse habitats containing over a hundred polychaete taxa (Posey and Ambrose 1994; Lindquist et al. 1994). Tube dwellers and permanent burrow dwellers are important benthic prey for fish and epibenthic invertebrates. These species are also most susceptible to sediment deposition, turbidity, erosion, or changes in sediment structure associated with sand mining activities, compared to other more mobile polychaetes (Hackney et al. 1996). In South Carolina, 243 species of benthic invertebrates were documented in the nearshore subtidal bottom (Van Dolah et al. 1994). Polychaetes and amphipods were the most abundant, although oligochaetes, bivalves, and crabs were also highly represented (Van Dolah et al. 1994). On ebb tide deltas, polychaetes, crustaceans (primarily amphipods), and mollusks (primarily bivalves) were the most abundant infauna, while decapod

crustaceans and echinoderms (sand dollars) dominated the epifauna. Many faunal species documented on the ebb tide delta are important food sources for demersal predatory fishes and mobile crustaceans, including spot, croaker, weakfish, red drum, and penaeid shrimp. These fish species congregate in and around inlets during various times of the year (Peterson and Peterson 1979), presumably to enhance successful prey acquisition and reproduction.

Productivity

Freshwater and estuarine

Production of organic matter in North Carolina's estuarine system is derived from several primary producers, including phytoplankton in the water column, detritus from wetlands and submerged grasses, and benthic microalgae and macroalgae on soft bottoms and other structure (Currin et al. 1995; Wainright et al. 2000). Of these, benthic microalgae have only recently been recognized as an important source of primary production in estuarine systems (Pinckney and Zingmark 1993; MacIntyre et al. 1996; Cahoon and Cooke 1992; de Jong and Van Beusekom 1995). Benthic microalgae are the major food source for deposit feeders such as mud snails, certain bivalve clams, and many polychaete worms (MacIntyre et al. 1996). Chlorophyll *a* biomass and carbon productivity rates are often used as indicators of overall productivity. In North Carolina estuaries, values for chlorophyll *a* biomass from soft bottom has varied widely but generally ranged from 10-90 mg/m^2 (Posey et al. 1995). Similar ranges were found in other Atlantic coast states (Table 6.1). Production rates in North Carolina are thought to be similar to that reported for Delaware and South Carolina (Table 6.1) (C. Currin, NMFS, pers. com., 2004). In flowing freshwater creeks and rivers, little information is available in the scientific literature on benthic productivity. In general, primary production in these freshwater areas is greatest in shallow, well-illuminated benthic substrates.

Table 6.1. Benthic productivity estimates in Virginia and Delaware (Chesapeake Bay), North Carolina (Masonboro Sound), and South Carolina (North Inlet Estuary).

Region	Chl. *a* biomass (mg/m^2)	Carbon production (gC/m^2/yr)	Reference
Virginia	5 – 65	-	Rizzo and Wetzel (1985)
Delaware	-	79 – 99	Rizzo and Wetzel (1985)
North Carolina	10 – 90	-	Posey et al. (1995)
South Carolina	20 – 110	56 – 234	Pinckney and Zingmark (1993)

The most productive estuarine bottom, in terms of benthic microalgae, tends to be protected and shallow areas with muddy/fine sand (Pinckney and Zingmark 1993; MacIntyre et al. 1996). Productivity is generally lower in exposed areas, deep areas, or on coarse sand bottom (MacIntyre et al. 1996; Sundback et al. 1991; Chester et al. 1983). In the upper reaches of the estuary, where the bottom consists of soupy mud/silt, productivity declines because of the instability of the fine sediment and greater frequency of high turbidity (M. Posey, UNC-W, pers. com., 2003). Many of the typically productive areas of soft bottom, in terms of benthic microalgae, are also productive fish nursery areas. In shallow intertidal bottom, primary production may be greater than in the water column, while in deeper subtidal bottom, benthic production may be slightly less than in the water column (MacIntyre et al. 1996). In the Newport River estuary, benthic diatoms were found to be resuspended into the water column following wind or rain events, greatly altering the composition and abundance of plankton in the water column (Tester et al. 1995). Since there is a large and ongoing exchange of sediment, algae, and nutrients between the soft bottom and water column (benthic-pelagic coupling), especially in shallow waters, it is difficult to distinguish between productivity in the water column versus soft bottom (Cahoon and Cooke 1992; MacIntyre et al. 1996).

Factors that control the magnitude and variability of benthic primary productivity on soft bottom include

temperature, light availability, sediment grain size, and community biomass (amount of chlorophyll present) (Pinckney and Zingmark 1993; Barranguet et al. 1998; Guarini et al. 2000; Cahoon et al. 1999). Since the depth to which benthic microalgae photosynthesize is determined by light, most researchers consider light the major factor affecting primary production rates (MacIntyre et al. 1996). Nutrients are not thought to limit productivity in soft bottom habitat because bacteria quickly convert detritus to inorganic nutrients (remineralization), making nutrients readily available in the sediment (Peterson and Peterson 1979; Admiraal et al. 1982).

In addition to primary productivity from benthic microalgae, organic matter on soft bottom habitat is derived from detrital matter from marsh vegetation, submerged grasses, and macroalgae that settles on soft bottoms (Currin et al. 1995; Wainright et al. 2000). In a South Carolina estuary, benthic microalgae accounted for approximately 22 – 38% of the primary production, with marsh vegetation accounting for approximately 30 – 59% and phytoplankton accounting for approximately 15 – 27%. The relative contribution of different primary producers varies by the diet preference of individual fish or invertebrate species, their position within the estuary, and seasonal and episodic weather conditions (Tester et al. 1995; Wainright et al. 2000; Page and Lastra 2003). Each source of primary production contributes to the estuarine food web. This web supports large numbers of benthic invertebrates, which are the primary food base for North Carolina's bottom feeding larval, juvenile, and adult fish and invertebrates (Peterson and Peterson 1979).

Marine

In the surf zone, inorganic nutrients are continually resuspended by wave action and retained by circulation patterns in sufficient amounts to create localized phytoplankton blooms, particularly composed of diatoms (McLachlan et al. 1981; Hackney et al. 1996). This self-sustaining nutrient input drives phytoplankton production, which supports intertidal filter feeders and, consequently, high concentrations of baitfish and estuarine dependent fish migrating through the shallow waters of the surf zone. Benthic invertebrates in the subtidal bottom of the surf zone and inlets provide an important link between primary producers and predators, such as demersal fish and crustaceans. Many of these predators have high economic value in recreational and commercial fisheries. Peterson and Peterson (1979) compiled a list of the diets of many common fish that forage in the intertidal flats. Some of the species that forage on benthic invertebrates in the surf zone and shoals include inshore lizardfish, pompano, pigfish, pinfish, spot, kingfish, red drum, Atlantic croaker, northern sea robin, and summer flounder. Additional information on fish utilization of the surf zone is discussed in the water column section of this plan.

Benthic microalgae on subtidal bottom in the coastal ocean are an important source of primary production. Viable chlorophyll *a* occurs in sediments across the continental shelf in Onslow Bay (Cahoon et al. 1990). Studies in Onslow Bay have found that roughly 80% of the chlorophyll *a* in the bay was associated with microalgae in or on the sediment. Benthic microalgal biomass (36.4 mg chlorophyll *a*/m^2) exceeded phytoplankton biomass (8.2 mg chlorophyll *a*/m^2). Gross benthic microalgal production averaged 24.9 mg carbon/m^2/hr, compared to 27.4 mg carbon/m^2/hr integrated water column phytoplankton production (Cahoon and Cooke 1992). Benthic microalgal production also surpassed integrated phytoplankton production primarily in the summer months, when light flux to the bottom is greater and phytoplankton biomass is generally lower. Pennate diatoms dominate the benthic microflora. These microalgae are grazed by demersal zooplankton, meiobenthos, and other macrofauna.

Ecosystem Enhancement

Soft bottom plays a very important role in the ecology of estuarine ecosystems as a storage reservoir of chemicals and microbes. Intense biogeochemical processing and recycling establishes a filter to trap and reprocess watershed-derived natural and human-induced nutrients and toxic substances. These materials may pass through an estuary (Mantoura and Woodward 1983), become trapped in the organic rich oligohaline (low salinity) zone (Sigels et al. 1982; Imberger et al. 1983), or migrate within the estuary

over seasonal cycles (Uncles et al. 1988). The fate of the materials depends upon salinity gradients, which are driven by freshwater discharges, density stratification, and formation of salt wedges (Matson and Brinson 1985, 1970; Paerl et al. 1998). Density gradients (stratification) hamper mixing and oxygen exchange of sediments and water in bottom waters with overlying oxygenated waters, leading to depletion of dissolved oxygen in bottom water (Malone et al. 1988).

In North Carolina's slow-moving, expansive estuaries, nutrients and organic matter from the watershed runoff and phytoplankton production are stored in the soft bottoms. Depending upon freshwater discharge and density stratification, these materials are recycled within the sediments via microbial activities and from the sediments into the overlying waters. Increased inflows of nutrients exacerbate the process, leading to more rapid and expanding dissolved oxygen depletion. In organic enriched oligohaline zones (e.g., Pamlico and Neuse River estuaries), nutrient-induced recycling results in higher microbial activity and oxygen depletion (B.J. Copeland, NCSU, pers. com., 2004).

Although soft bottom habitat is composed of unconsolidated shifting sediments, colonization by benthic microalgae reduces the extent to which sediment is resuspended at low velocities, stabilizing bottom sediments and reducing turbidity in the water column (Holland et al. 1974; Underwood and Paterson 1993; Yallop et al. 1994; Miller et al. 1996). In spite of this, microalgae cannot stabilize sediments under intense or prolonged disturbance conditions, such as during large storm events or in the surf zone (Miller 1989). Structure from tube dwelling invertebrates also helps to bind the sediment (Peterson and Peterson 1979), while filtering activity of dense aggregations of suspension feeders (hard clams) clears significant amounts of plankton and sediment from the water column and improves water clarity (Miller et al. 1996). Yet, because of the absence of large, extensive structure, soft bottom provides relatively less stabilization benefits than other estuarine habitats.

Intertidal shorelines, flats, tidal deltas, and sand bars along the ocean shoreline, buffer and modify wave energy, reducing shoreline erosion. Alterations to the ebb and flood tide deltas can result in significant changes in the adjacent barrier island shorelines. Flood-tidal deltas are an important source of sand, which allows barrier island migration to respond to sea level rise (Cleary and Marden 1999). The soft bottom associated with inlets has a great influence on overall barrier island dynamics.

Fish utilization

Like the water column, soft bottom is used to some extent by almost all native coastal fish species in North Carolina. However certain species are better adapted to, characteristic of, or dependent on shallow unvegetated bottom. Flatfish, rays, and skates are well suited for utilization of soft bottom. Juvenile and adult fish species that forage on the rich abundance of microalgae, detritus, and small invertebrates are highly dependent on the condition of soft bottom. Table 6.2 summarizes important fishery and nonfishery species that are dependent on subtidal bottom for some portion of their life history and the ecological function of the soft bottom habitat.

Foraging

One of the most important functions of soft bottom habitat is as a foraging area. Members of several trophic levels in the benthic community benefit directly or indirectly from a) the high concentrations of organic matter transported to and produced on soft bottom and b) the numerically abundant, diverse invertebrate fauna associated with soft bottom – including herbivores (e.g., planktonic and benthic algal feeders), detritivores, predators of benthic invertebrates and fish (secondary consumers), and predators of those predators (tertiary consumers) (Peterson and Peterson 1979).

Table 6.2. Partial list of common or important fish species occurring on soft bottom habitat in riverine, estuarine, and ocean waters, and ecological functions provided to those species. Bolded species indicate relatively higher association on soft bottom habitat.

Species	Habitat utilization[1]					Fishery[2]	Stock status[3]
	Spawning	Nursery	Foraging	Refuge	Corridor		
ANADROMOUS SPAWNING							
Atlantic sturgeon	X	X	X		X	X[7]	O
Shortnose sturgeon	X	X	X		X	X[7]	O
ESTUARINE SPAWNING AND NURSERY							
Hard clam	X	X	X	X		X	U
Hermit crab spp.	X	X	X				
Horseshoe crab	X	X	X			X	
Mud crab spp.	X	X	X				
Mummichug	X	X	X				
Naked goby	X	X	X				
Sheepshead minnow	X	X	X				
Striped killifish	X	X	X				
Whelk spp.	X	X	X			X	
INLET/ESTUARINE CHANNEL SPAWNING, ESTUARINE NURSERY							
Blue crab	X	X	X	X		X	C
Red drum	X	X	X			X	R
Silver perch	X	X	X			X	
MARINE SPAWNING, LOW-HIGH SALINITY NURSERY (>5ppt)							
Atlantic croaker		X	X			X	C
Bay whiff		X	X	X	X		
Blackcheek tonguefish	X[4]	X	X	X	X		
Hogchoker	X	X	X	X	X		
Penaeid shrimp (brown, white, pink)		X	X	X	X	X	V
Southern flounder		X	X	X	X	X	O
Spot		X	X			X	V
Striped mullet		X	X			X	C
MARINE SPAWNING, HIGH SALINITY NURSERY (>18ppt)							
Atlantic stingray	X[4]	X	X	X	X	X	
Black sea bass		X	X			X	O - south of Hatteras, V - north of Hatteras
Coastal sharks[5]	X[4]	X	X			X	O
Cownose ray	X	X	X	X	X	X	
Florida pompano		X[6]	X			X	
Fringed flounder		X	X	X	X		
Gag grouper		X	X			X	V
Gulf flounder		X	X	X	X	X	
Gulf kingfish		X[6]	X			X	U
Smooth dogfish shark	X[4]	X	X			X	U
Spiny dogfish shark		X	X			X	O
Striped anchovy	X[4]	X[6]	X				
Summer flounder		X	X	X	X	X	V

[1] References: Peterson and Peterson 1979; Thorpe et al. in press; Manooch 1984; Hildebrand and Schroeder 1972; Lippson and Moran 1974; Wang and Kernehan 1979

[2] Indicates commercially or recreationally caught species. Other species important to the system as prey items.

[3] Stock status: DMF (2003) V = viable, R = recovering, C = concern, O = overfished, U = unknown

[4] Spawning occurs in state territorial seas (< 3 mi). For blank rows, spawning occurs in federal waters (>3 mi offshore).

[5] Incl. Atlantic sharpnose, blacknose, blacktip, bonnethead, dusky, sandbar, scalloped hammerhead, and spinner sharks

[6] Uses surf zone almost exclusively as nursery area

[7] Former fishery, but fishing moratorium since 1991

Both plankton and benthic feeding herbivorous fish are found in abundance on intertidal flats. Schools of baitfish, small pelagic fish that tend to group together, are common over subtidal soft bottom and very abundant on shallow intertidal flats. These baitfish, such as anchovies, killifish, and menhaden, feed on the abundant supply of phyto- and zooplankton in the water column, but also consume resuspended benthic algae, microfauna, and meiofauna (Peterson and Peterson 1979). Although the majority of detritivores of the soft bottom habitat are invertebrates, striped mullet, white mullet, and pinfish also feed on detritus on subtidal bottom and intertidal flats. Other fish species use detritus as an alternate food source when preferred items are not available.

Most fish that forage on soft bottom are predaceous. Predators of benthic invertebrates include juveniles and adults of the following species (Peterson and Peterson 1979; Bain 1997):

- rays and skates,
- flatfish (southern flounder, summer flounder, hogchoker, tonguefish),
- several species of drum (spot, croaker, red drum, kingfishes, silver perch),
- Florida pompano,
- pigfish,
- sea robins,
- lizardfish,
- spadefish,
- gobies, and
- shortnose and Atlantic sturgeons.

The compressed body forms of flatfish, rays, and skates assist in prey acquisition and predator avoidance on shallow intertidal flats (Peterson and Peterson 1979). For example, flounder forage on shallow flats by laying still, by concealing themselves under a thin layer of sediment, or by changing skin color. Small flatfish, including the bay whiff, fringed flounder, hogchoker, and tonguefish, feed mostly on copepods, amphipods, mysids, polychaetes, mollusks and small fish. By way of comparison, summer and southern flounder primarily consume fish, such as silversides, and anchovies, as well as shrimp and crabs, small mollusks, annelids, and amphipods (Peterson and Peterson 1979). Various rays excavate large pits while feeding, creating slightly deeper pockets of water that other fish and invertebrates use as refuge. Mollusks, annelids, crustaceans, and fish comprise the typical diet of rays.

To avoid predation, small fish commonly feed on open, unvegetated bottom at night and hide near structure during the day (Peterson and Peterson 1979). Larger predators that feed on smaller, benthic-feeding fish and invertebrates typically move onto the flats during high water to feed on schools of fish. These predators include sharks (sandbar, dusky, smooth dogfish, spiny dogfish, Atlantic sharpnose, scalloped hammerhead), drum (weakfish, spotted seatrout), striped bass and estuarine dependent reef fish (black sea bass, gag grouper, sand perch, sheepshead) (Peterson and Peterson 1979; Thorpe et al. 2003).

Due to their size and shape, small baitfish and flat bodied rays, skates, and flounders have a feeding advantage over other fish in that they can forage on intertidal flats for greater amounts of time than larger fish. These fish groups are considered to be most characteristic of intertidal flats and would be most affected by habitat degradation and loss of intertidal flats from dredging, filling, bulkheading, or other anthropogenic causes (Peterson and Peterson 1979).

Fish species and age composition over soft bottom varies seasonally. Baitfish are present on shallow flats throughout the year. In the spring, large schools of baitfish are joined by juvenile fish that were spawned offshore in the winter (spot, croaker, menhaden). In the summer, these species remain abundant on shallow unvegetated bottom; flatfish and rays also appear at this time. By fall, fish species diversity is at a maximum since summer residents and fall migrants are both present. Migratory fish feeding on the soft

bottom include bluefish, striped mullet, kingfish, spotted seatrout, red drum, and many others (Peterson and Peterson 1979).

Ocean subtidal bottom serves as important foraging grounds for numerous fish species, particularly for Florida pompano, red drum, kingfish, spot, and Atlantic croaker, weakfish, and striped bass. Many commercially or recreationally important fish and invertebrate species, such as red drum, striped bass, shrimp, and summer flounder, are caught while they aggregate and feed over subtidal bottom in nearshore ocean waters. These species appear to be strongly associated with distinct topographic features of the subtidal bottom, such as the cape shoals, channel bottoms, sandbars and sloughs. *The natural processes that create these features need to be maintained. Additional public outreach is needed to emphasize the importance of natural barrier island and estuarine processes.*

The food resources present in and on soft bottom are needed to support hard bottom fish species. Demersal zooplankton and infaunal macroinvertebrates from sand substrate have been found to be a quantitatively important component of many species' diets and an important link to reef fish production (Cahoon and Cooke 1992; Lindquist et al. 1994; Thomas and Cahoon 1993). Reef species documented foraging over sand bottom away from the reef include tomtate (*Haemulon aurolineatum*), whitebone porgy (*Calamus leucosteus*), cubbyu (*Equetus umbrosus*), black sea bass (*Centropristis striata*), and scup (*Stenotomus chrysops*) (Lindquist et al. 1994). Therefore, benthic microalgal production on the subtidal bottom of Onslow Bay, as well as other similar shelf habitats, is an important component to the continental shelf productivity and is an important link to the ecology of hard bottom habitats.

Spawning

Many demersal fish spawn over various areas of soft bottom habitat in North Carolina's coastal waters (Table 6.2). In fresh water, resident species such as largemouth bass (*Micropterus salmoides*) and bluegill (*Lepomis macrochirus*) spawn on shallow flats where they lay eggs in bowl-shaped nests. Eggs may be dependent on the small structure available on the unvegetated bottom, such as emerging worm tubes or woody debris, to hold them in position. Since all life stages of freshwater resident fish (spawning adults, eggs, larvae, juveniles) remain near the same area of soft bottom habitat, they are relatively more vulnerable to degraded soft bottom habitat conditions than migratory species. Anadromous species, such as Atlantic and shortnose sturgeon (*Acipenser oxyrinchus oxyrinchus* and *A. brevirostrum*, respectively), spawn in upper freshwater portions of coastal rivers (Moser and Ross 1995).

Estuarine spawners include resident fish and invertebrates, as well as migratory fish that are summer estuarine spawners. Estuarine resident species include common invertebrates that occupy the intertidal flats, like hard clams, whelks, snapping shrimp, and hermit crabs. Small schooling baitfish such as mummichogs and striped killifish spawn in the marsh edges near soft bottom (Hildebrand and Schroeder 1972; Mannoch 1984). Species of flatfish, including the windowpane, and hogfish have been reported to spawn on estuarine soft bottom (Hildebrand and Schroeder 1972; Mannoch 1984).

Summer estuarine spawners include several species of drum. Weakfish and silver perch were documented spawning in deep estuarine channels near Pamlico Sound inlets (Ocracoke and Hatteras inlets) and in deep areas of Pamlico Sound from May to September, peaking in May and June (Luczkovich et al. 1999). Spotted sea trout spawn on the east and west sides of Pamlico Sound during a similar time period, with peak activity observed around July. Specific spawning areas for spotted sea trout identified on the west side of Pamlico Sound were Rose Bay, Jones Bay, Fisherman's Bay, and Bay River (Luczkovich et al. 1999). Red drum were documented spawning in the mouth of the Bay River on the west side of Pamlico Sound, and in estuarine channels near Ocracoke Inlet (Luczkovich et al. 1999). Blue crabs also spawn near inlets in summer (DMF 2000).

Several species of sharks pup in North Carolina's nearshore ocean waters. North of Cape Hatteras, pupping of spiny dogfish over subtidal bottom has been documented in winter months (W. Laney,

USFWS, pers. com., 2003). Subtidal bottom in the southern portion of North Carolina state waters serves as pupping grounds for the Atlantic sharpnose shark (*Rhizoprionodon terraenovae*), bonnethead shark (*Sphyrna tiburo*), blacknose shark (*Carcharhinus acronotus*), spinner shark (*C. brevipinna*), dusky shark (*C. obscurus*), and, to a lesser extent, blacktip shark (*C. limbatus*), sandbar shark (*C. plumbeus*) and scalloped hammerhead shark (*S. lewini*). Most neonate (newborn) sharks were found in June and July (Beresoff et al. 1997; Thorpe et al. 2003).

Most ocean spawning activity by estuarine dependent species occurs beyond state waters during the winter months. However, eggs and larvae are carried in the water column by currents through nearshore state waters and inlets to estuarine nursery areas. Important spawning aggregations of summer flounder occur on Wimble, Platt, and Kinnekeet shoals off the Outer Banks, in state and federal waters from November to March, peaking near January in North Carolina (MAFMC 1998). Locations of summer flounder spawning aggregations are linked to environmental conditions, such as water temperature and wind direction, and are generally concentrated north of Cape Hatteras, but extend to Cape Lookout.

Nursery

Shallow soft bottom habitat, usually adjacent to wetlands, is utilized as a nursery for many species of juvenile fish. The shallow unvegetated bottom provides an abundance of food and is inaccessible to larger predators. Shallow unvegetated flats have been documented as being particularly important nursery habitats for juvenile summer and southern flounder (Burke et al. 1991, Walsh et al. 1999). A partial list of species that use soft bottom habitat as a nursery area are included in Table 6-2. Studies and ongoing DMF juvenile fish monitoring have found that shallow unvegetated bottom supports high abundances of juvenile fish, composed of relatively few species but which have similar life histories and feeding patterns (Ross and Epperly 1985).

The dominant juvenile species utilizing shallow soft bottom estuarine nursery areas are estuarine dependent winter spawners. Most of the species spawn offshore during the winter. The larvae are transported through inlets into estuarine waters. For many species, the uppermost area of shallow creek systems corresponds to where larval settlement of winter spawned species occurs – the primary nursery areas (Weinstein 1979; Ross and Epperly 1985). However, in tributaries on the western side of Pamlico Sound, such as Neuse, Pamlico, Bay and Pungo rivers, larval settlement tends to occur in lower portions of the creeks (Map 2-4 a-b in Chapter 2). Unlike larval settlement in areas south of Pamlico Sound, salinity is low in the upper reaches of the Sound's tributaries and this may deter larval settlement in those areas. Abundance of juvenile species in estuarine nursery areas peaks between April and July and is correlated with water temperatures (Ross and Epperly 1985). As fish grow, they move to deeper waters and areas lower in the estuary.

Analysis of fishery-independent trawl sampling data, from shallow creeks and bays in Pamlico Sound tributaries, found 78 different fish and invertebrate species over a two-year period (Ross and Epperly 1985). Eight species comprised more than 97% of the total fish abundance. Data from DMF's ongoing juvenile fish monitoring program, which began in 1971, show that the same eight species continue to dominate North Carolina's estuaries (Ross and Epperly 1985). This long-term database provides fishery independent information on species composition and abundance to identify primary and secondary nursery areas. From 1990 to 2003, the eight species that were the most abundant in both the northern and southern sampling sites were:

- spot
- pinfish
- brown shrimp
- Atlantic croaker
- bay anchovy

- blue crab
- silver perch
- Atlantic menhaden

In addition, southern flounder and white shrimp were among the most abundant species sampled in the northern and southern areas, respectively. From 1990 to 2003, a total of 178 species was collected and identified from the juvenile fish monitoring stations throughout the coast (DMF, unpub. data). Because sampling is not conducted year-round, it is probable that this figure underestimates the true number of species present. The annual number of species has ranged from 49 to 83 species per year north of Cape Lookout, and from 45 to 60 species per year south of Cape Lookout (DMF, unpub. data). The consistent abundance of several species over time is an indication that these areas continue to function as healthy nurseries. *Temporal and spatial expansion of juvenile fish sampling would provide additional information on trends in juvenile fish utilization of soft bottom and other habitats, especially summer and fall spawning species, which are generally not present at existing sampling stations during May and June.*

Statistical analyses of DMF's juvenile fish data in the Pamlico Sound system identified specific fish groupings or associations (Ross and Epperly 1985; Noble and Monroe 1991). From the latter analysis, four geographically distinct groupings of juvenile fish species occur in the Pamlico estuarine system (Table 6.3). Menhaden and spot were omitted from the analysis because they were so abundant in all areas that they masked other species abundance trends. Group 1 occurred in the Pamlico, Pungo, Neuse rivers, and along eastern Albemarle Sound. Group 2 occurred in the western bays of Pamlico Sound. Group 3 was located in the shallow area behind the Outer and Core banks, from Oregon Inlet south to Cape Lookout. Group 4 was located along the western shore and tributaries of Core Sound (Table 6.3). Fish groupings in Pamlico Sound appeared to be affected by Bluff Shoal, which runs across the sound in a southeast-northwest direction from around Ocracoke Inlet north to Bluff Point. Bluff Shoal effectively separates Pamlico Sound into distinct basins of differing depth and sediment composition and alters larval settlement patterns into the sound. Distinct fish species groupings are found north and south of the shoal (Ross and Epperly 1985). Salinity was the most important abiotic variable affecting species composition (Noble and Monroe 1991). Groups 1, 2, and 4 occurred where the bottom consisted primarily of shallow unvegetated sediment, while group 3 occurred in SAV beds.

Table 6.3. Dominant juvenile fish species groupings found in the Pamlico Sound system by biotic cluster analysis of juvenile fish data (Noble and Monroe 1991).

Group	Location	Dominant fish species	Primary Habitat
1	Pamlico, Pungo, Neuse rivers, eastern Albemarle Sound	Atlantic croaker, brown shrimp, blue crab, southern flounder	Shallow unvegetated sediment
2	Western bays of Pamlico Sound	Species above + weakfish, spotted seatrout, silver perch	Shallow unvegetated sediment
3	Behind the Outer and Core banks	Pinfish, pink shrimp, black sea bass, gag, pigfish, red drum	SAV beds
4	Western shore and tributaries of Core Sound	Summer and southern flounder, brown shrimp	Shallow unvegetated sediment

In the southern portion of the coast, DMF biologists have found that juvenile fish tend to be most abundant in shallow waters with unvegetated muddy sediment (J. Schoolfield, DMF, pers. com., 2003). The dominant, demersal, juvenile species in coastal waters south of the Pamlico system were also found behind Core Banks and the Outer Banks. Although black sea bass and gag are not very common, brown shrimp, white shrimp, striped mullet, spot and menhaden are more common in the southern estuaries (R. Carpenter, DMF, pers. com., 2003).

Many areas used as nurseries by estuarine dependent fish have been designated as Primary or Secondary Nursery Areas by MFC (Maps 4.8-4.10 in Chapter 4). However, there are other areas of soft bottom that function as nurseries but are undesignated. Benthic anadromous fish, such as Atlantic and shortnose sturgeon, use freshwater soft bottom as a nursery. *The specific locations of anadromous fish spawning areas need to be designated by MFC and adequately protected.* Nearshore ocean subtidal bottom is also a nursery area for summer flounder and shark species. The primary nursery grounds for coastal shark species is in the vicinity of where pupping occurs. Small coastal sharks that use this habitat for a nursery area include spinner (*C. brevipinna*), blacknose (*C. acronotus*), and dusky (*C. obscurus*) sharks (Thorpe et al. 2003; Beresoff et al. 1997). Juvenile Atlantic sturgeon and spiny dogfish, both demersal feeders with overfished fishery status, have been documented over nearshore subtidal bottom between Oregon Inlet and Kitty Hawk during winter months (Cooperative Striped Bass Tagging Program, unpub. data). Subtidal bottom, particularly the surf zone, is also a nursery area for Florida pompano, southern and gulf kingfish (Hackney et al. 1996).

Refuge

Soft bottom habitat can provide refuge to some organisms in some locations through predator exclusion. Shallow, intertidal flats may be inaccessible to large fish predators and therefore protect small and juvenile fish and invertebrates (Peterson and Peterson 1979; Ross and Epperly 1985). Consequently juvenile fish recruit into the shallowest portions of the estuary first. Many invertebrates, including hard clams, can avoid predation by burrowing into the sediment (Luettich et al. 1999). Flatfish, such as flounder and rays, and other small cryptic fish like gobies, can bury slightly into the sediment, camouflaging themselves from predators (Peterson and Peterson 1979). Nonetheless, soft bottom habitat in deep water is a vulnerable place for small fish and invertebrates that cannot burrow. For example, flounders also camouflage themselves in the sediment to ambush prey (Walsh et al. 1999). Because of this, many fish in subtidal water will venture out to feed on the open bottom only at night (Summerson and Peterson 1984).

Corridor and connectivity

Freshwater and estuarine soft bottom channels are the highways for migrating adult demersal fish species to and from other estuarine habitats and the ocean. Demersal feeding anadromous fish, such as sturgeon and striped bass, require a corridor of soft bottom to reach upstream spawning areas. Inlets act as conduits for exchange of sediment, water, and marine organisms between the estuaries and the ocean. Because large fish are less likely to be consumed as prey, they can travel relatively safely over less turbid sand flats and in channels of the middle and lower estuaries (Walsh et al. 1999). Smaller flatfish tend to be more abundant in the shallower uppermost portion of the estuary, where salinities are low, turbidity high, and sediments muddy with high detritus content (Walsh 1999).

While connectivity among structured habitat patches, such as SAV, wetlands, and shell bottom, facilitates movement of blue crabs and other mobile predators through an estuary, a few meters of unvegetated bottom can act as a barrier to movement (Micheli and Peterson 1999). Such barriers can be beneficial to small invertebrates by potentially obstructing predator dispersal and reducing predation risk. Small crabs, gastropods, and infaunal bivalves, such as hard clams, were more abundant, denser, and had higher survival rates on isolated oyster beds (at least 10-15 m of unvegetated bottom between habitats) than on oyster beds adjacent to salt marsh or SAV (Micheli and Peterson 1999). Blue crab predation on infaunal bivalves was greater along vegetated edges of salt marshes and seagrass beds than in unvegetated intertidal flats (Micheli and Peterson 1999). Although structural habitat separations by unvegetated soft bottom may benefit the survival or viability of infaunal populations, fish and crustacean productivity may be enhanced by connectivity of structured estuarine habitats (Micheli and Peterson 1999). These habitat-mediated predator/prey interactions point out the importance of maintaining the integrity of an entire estuarine system.

6.3 STATUS AND TRENDS

Status of soft bottom habitat

Since standardized or comprehensive baseline mapping of soft bottom habitat has not been completed, and because sediments shift and move over time, it is currently not possible to quantify how the extent and condition of the habitat has changed through time. The loss of more structured habitat, such as SAV and shell bottom, has undoubtedly led to gains in soft bottom habitat, but the low quality of areas gained may not be considered beneficial to the ecosystem as a whole. The general type and condition of shorelines in the Albemarle-Pamlico region and Bogue Sound, as well as the rough location of eroding and stabilized shorelines in these areas were summarized by Riggs (2001). The primary alterations to soft bottom habitat are associated with dredging for navigational channels and marina basins. Refer to the threats section for more information.

Status of associated fishery stocks

Fishery independent monitoring programs

The DMF began a juvenile fish monitoring program (Estuarine Trawl Survey) in 1971. This long-term database provides fishery independent (data gathered independent of the fishery) information on species composition and abundance to identify primary and secondary nursery areas, shallow soft bottom habitat usually surrounded by wetlands. The Pamlico Sound Survey is another long-term monitoring program used to calculate juvenile abundance indices in Pamlico Sound and the lower portion of the Pamlico and Neuse estuaries. Data from this survey are compared to results from the Estuarine Trawl Survey and are also used as an indicator of young of year class strength. Juvenile abundance indices (JAI) are calculated from these sampling programs for major fish and invertebrates. The JAI is the annual geometric mean (weighted by strata) of the number of individuals per tow for young of the year fish or invertebrates. The JAI is considered an accurate indicator of recruitment and year class strength for many species, including southern flounder (DMF 2003). The information is used to determine stock status of fishery species by various fishery management agencies. Juvenile abundance indices are also used as a criterion to qualify an area as a designated Primary or Secondary Nursery Area. Designated areas are monitored regularly to provide long-term information on status and trends in recruitment of the dominant estuarine dependent species. Both surveys are critical components to stock assessments since they are independent of commercial or recreational fisheries (DMF 2003). Trends in juvenile abundance indices may indicate change in the habitat conditions (DMF 2003). However, consistent and comparable JAI data are only available to about 1990 and, prior to this time, considerable habitat losses and changes occurred.

Flatfish are closely linked to soft bottom habitat and juvenile abundance indices from the Estuarine Trawl Survey for southern flounder and hogchoker are shown in Figure 6.1. Southern flounder is a commercially and recreationally important fishery species, while hogchoker is a non-fishery species found in northern and southern estuaries of the state. The JAIs for both species have followed similar temporal patterns, varying between 0.5 to 2.5. Both species had peak JAIs in 1996. JAI of southern flounder experienced large declines in 1997, 1998 and 2002; notably, a 16.7% decline was recorded between 2001 and 2002. The 2002 stock status report stated that the estimated population biomass of this species had declined by 32% over the past decade (DMF 2003). Hogchoker JAI also declined to low levels in 1998, showed some improvement in 1999, but has remained relatively low since 2000. These results indicate that recruitment of both fishery and non-fishery flatfish species has been variable over time and strongly influences annual JAIs. However, hogchoker has exhibited greater recovery following years with low JAIs than southern flounder. Both species have exhibited relatively low JAIs since 1996.

Trends in JAI of Atlantic croaker from both the Estuarine Trawl Survey and the Pamlico Sound Survey are very similar (Figure 6.2). Atlantic croaker is a benthic feeding fish that could be affected by changes in soft bottom habitat, such as reductions in benthic food sources due to toxicity or anoxia in sediments. Annual trends in juvenile abundance of both surveys are very similar. Sizes of fish collected in the

Pamlico Sound Survey were larger, accurately reflecting that juvenile fish first settle in the primary nursery areas and later move into the sound. Both juvenile abundance indices for Atlantic croaker experienced large fluctuations and are currently near their lowest recorded levels in the past 12 years. According to the DMF 2002 stock status report, there are some signs of recovery, such as increased commercial CPUE, increased landing size, and improved age structure (multiple year classes), but JAIs remain below average and landings in estuarine waters have not returned to historical levels. An ASMFC FMP was created in 1987 and was reviewed most recently in 1998. Research needs, including a coastwide stock assessment, have been completed and are being reviewed by ASMFC. The stock assessment determined that Atlantic croaker is a recruitment-driven stock, where biomass and landings fluctuate in response to large year classes.

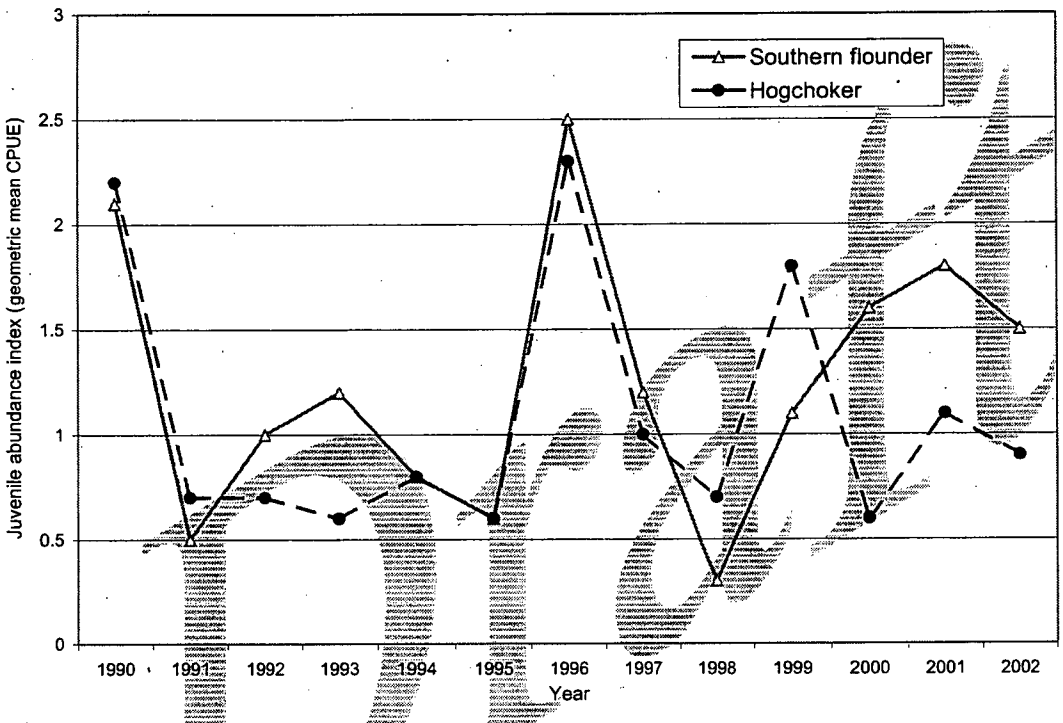


Figure 6.1. Southern flounder and hogchoker juvenile abundance indices (geometric mean CPUE) from two DMF juvenile fish sampling programs, core stations sampled in May and June for each program pooled - the Estuarine Trawl Survey and the Pamlico Sound Survey, 1990-2002.

Hard clams, although also present in shell bottom and SAV habitats, require soft bottom habitat for burrowing. Because clams remain fairly stationary and are filter feeders, they may be vulnerable to habitat degradation, such as sediment contamination or sedimentation. The status of the hard clam stock is currently unknown due to lack of adequate data (DMF 2001). However, using trip ticket data, DMF (2001) concluded that hand harvest of clams appeared to be stable, but that clam abundance, in areas where mechanical clam harvest occurred, appeared to decline from 1994 to 1999. MFC recommended that mechanical harvest limits in Core Sound be further restricted. *Reducing the area available to mechanical clam harvesting is another means of protecting clam stocks and would also provide additional habitat protection.*

Twelve of 18 soft bottom associated fishery species (bolded species in Table 6.2) were evaluated by DMF for stock status in 2002. Of these twelve species, two (17%) were of unknown status. Of the ten stocks

whose status is known, three (30%) were classified as Viable, one (10%) was Recovering, two (20%) were of Concern, and four (40%) were Overfished (Table 6.2, Figure 6.3). Viable species included shrimp, spot, and summer flounder; red drum was a Recovering species. Overfished species included Atlantic and shortnose sturgeons, southern flounder, and coastal sharks. The species listed as Concern include striped mullet and Atlantic croaker.

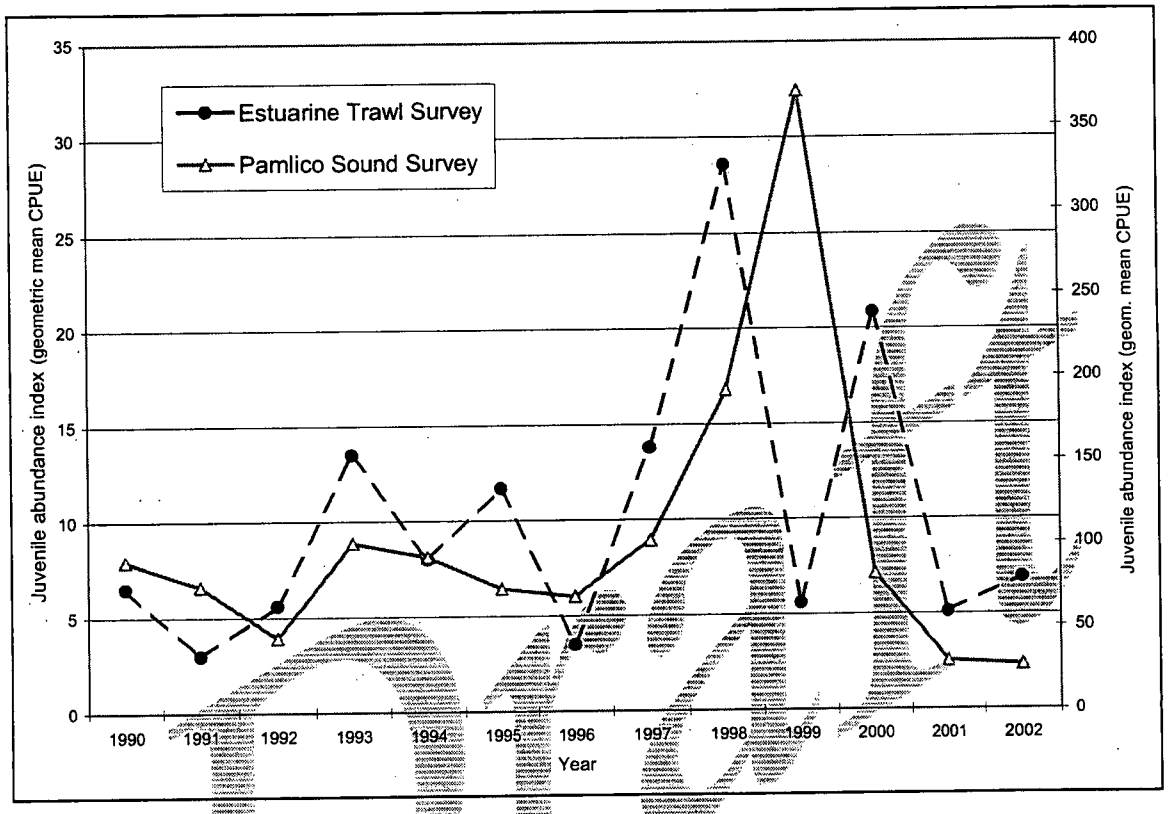


Figure 6.2. Atlantic croaker juvenile abundance indices (geometric mean CPUE) from two DMF juvenile fish sampling programs, core stations sampled in May and June for each program pooled - the Estuarine Trawl Survey and the Pamlico Sound Survey, 1990-2002.

Both sturgeons historically supported a valuable commercial fishery, however landings declined dramatically by the early 1900s. Shortnose sturgeon is currently a federally listed endangered species and Atlantic sturgeon is considered threatened in North Carolina (Ross et al. 1988). Atlantic and shortnose sturgeon have not shown signs of recovery despite a fishing moratorium in North Carolina since 1991, indicating that habitat and water quality issues are also affecting recovery. Potential habitat issues could include reduction of benthic food sources in fresh water due to eutrophication or toxin contamination or degradation of spawning and nursery habitat from channel obstructions, channelization, and sedimentation.

Coastal shark species, such as sand bar sharks, Atlantic blacktips, Atlantic sharpnose, hammerheads and duskys, are slow growing and mature late, making them more vulnerable to overfishing. Federal and state harvest restrictions have been in place since 1993, but there has not been evidence of recovery. Degradation of nearshore marine bottom from beach nourishment or nonpoint runoff could potentially impact pupping and nursery areas.

The overfished status of southern flounder is due in part to overfishing but may also be related to habitat

issues in the low salinity estuaries. Severe hypoxic events and anoxia can directly affect populations of southern flounder through mortality from suffocation and indirectly from reduced growth rates, loss of preferred prey (mortality of benthic community), changes in activity patterns, or disease. The Division is currently working on a Fishery Management Plan for southern flounder.

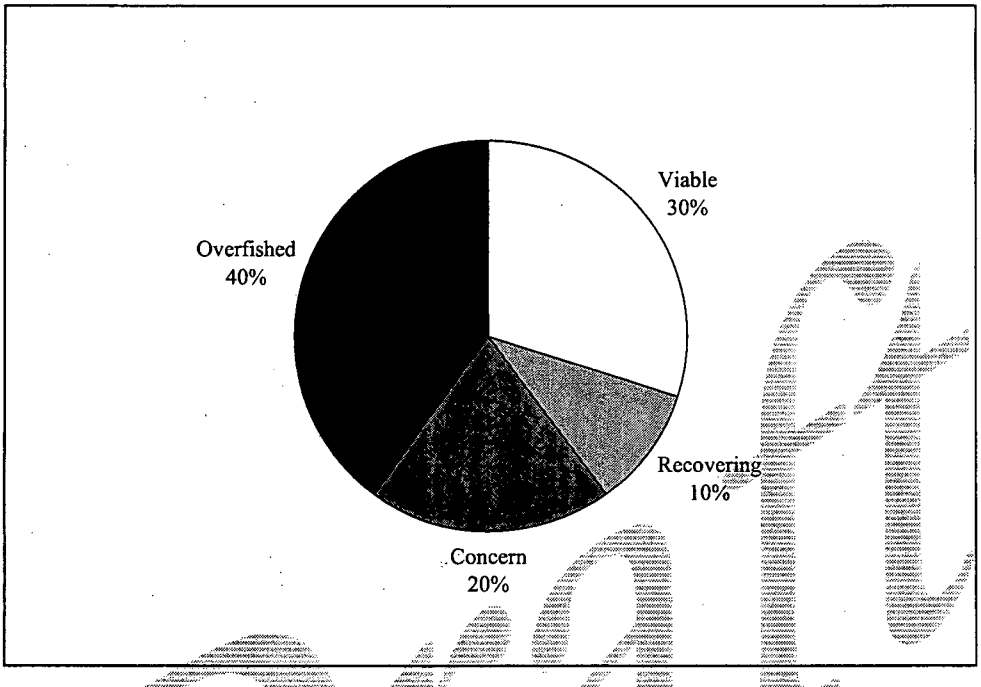


Figure 6.3. Percent of soft bottom dependent fishery species classified as overfished, concern, or viable in the DMF 2003 stock status report, N = 10 (DMF 2003). (refer to Table 6.2 for list of fishery species).

Striped mullet are of concern primarily due to an increase in associated fishing effort. A juvenile abundance index is currently not available for striped mullet and more biological information is needed to determine habitat threats. The Division is currently working on a Fishery Management Plan for striped mullet. Atlantic croaker is listed as concern because JAIs and estuarine landings have remained low. *All three commissions should work together to address habitat issues that will protect or enhance southern flounder, sturgeon, and shark habitat.*

From 1968 to 1981, monthly fish surveys by DMF were conducted in coastal ocean waters but have since been discontinued. Currently in coastal waters of North Carolina, fishery-independent data are available from shallow water trawl surveys conducted by the Southeast Area Monitoring and Assessment Program – South Atlantic (SEAMAP-SA). SEAMAP is a cooperative state/federal/university program that was first implemented in the southeastern United States in 1983 and is coordinated by ASMFC. SEAMAP currently provides the only region-wide standardized surveys for monitoring long-term status and trends of demersal fish and invertebrate populations that utilize marine soft bottoms as well as other habitats. The SEAMAP study area includes inner (4m depth contour) and outer (10m depth contour) strata stations in Long Bay, Onslow Bay, and Raleigh Bay in North Carolina.

Since 1990, 141 species were found in all three bays. Many of the dominant species are also dominant in estuarine waters. In examining data from 1990 to 2000, spot and Atlantic croaker consistently comprised a large portion of the catch in all bays and years. Spot is generally most abundant in Long Bay and accounted for 20 to 50% of the catch in most years in the three bays. Other abundant species included

striped anchovy, squid, pinfish, and porgies.

Since 1990, species diversity from the shallow (approximately 4m) strata sampling sites has been highest in Long Bay (124 – 147 species) and lowest in Raleigh Bay (81 – 104 species). The total number of species collected in each bay has only fluctuated slightly from year to year, and appears fairly stable over time. Densities in Long Bay ranged from 212 individuals/hectare (ind./ha) in 1993 and 2000 to 511 ind./ha in 1991. Long Bay and Onslow Bay had very similar densities of fish and fluctuations in abundance. Fluctuations in fish density among years were greatest in Raleigh Bay. These data indicate strong inter-annual variation in year class abundance but demonstrate no clear trends.

Trends in annual catch per tow, or CPUE, of demersal species from SEAMAP data are an indicator of relative abundance of late juvenile and adult species. Annual trends in catch per tow for summer and southern flounder, striped anchovy and southern kingfish were examined since the flounders are strongly associated with estuarine and marine soft bottom and latter two species are common in the surf zone and nearshore waters. Of these four species, SEAMAP bottom trawl data indicate a decline in abundance only for southern flounder (Figure 6.4). Southern flounder CPUE has shown a general decline since its peak abundance from about eight fish/tow in 1992 to two fish/tow in 2002. Southern flounder spend more time in low salinity estuarine waters than summer flounder, and therefore may be more affected by estuarine habitat and water quality changes. The decline noted in southern flounder CPUE is consistent with DMF's stock status for this species. While DMF's stock status report indicates that the decline in population biomass is primarily due to overfishing (DMF 2003), habitat degradation, such as toxin contamination of bottom sediments or bottom anoxia and benthic kills, could add additional stress to the species, delaying recovery.

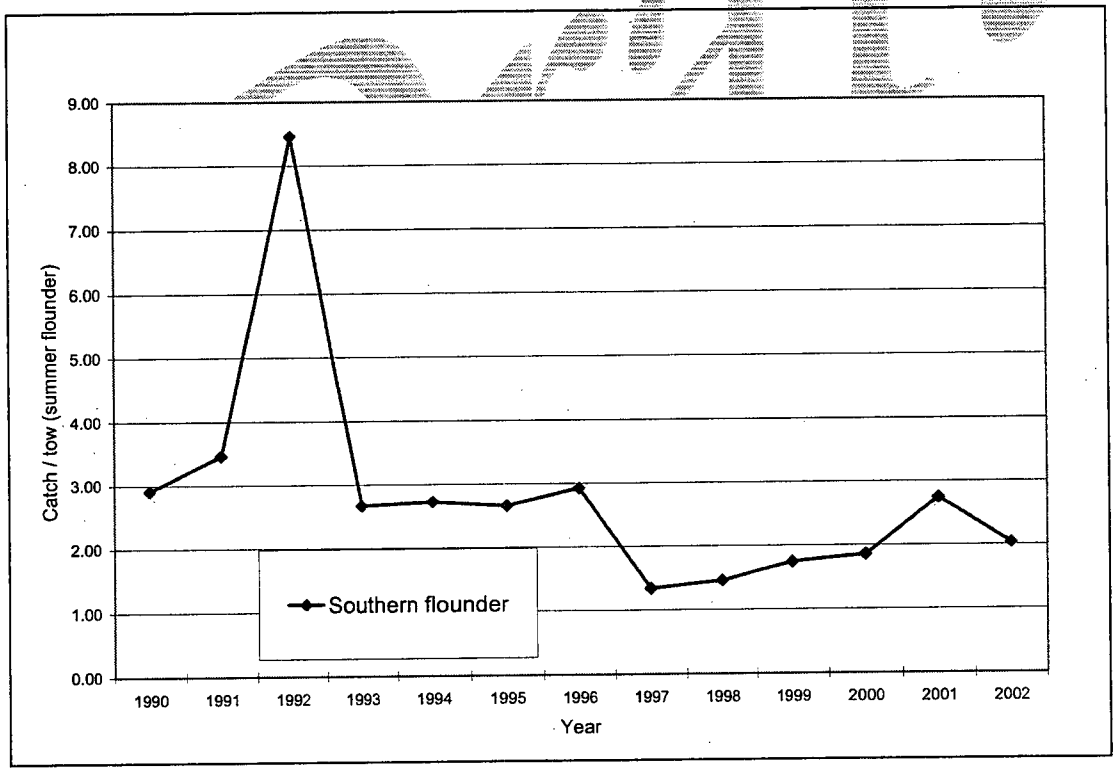


Figure 6.4. Annual CPUE of southern flounder collected in nearshore coastal ocean waters, by fishery independent SEAMAP-SA trawl surveys, 1990-2002

Designated areas

There have been some federal actions taken to designate and protect certain portions of soft bottom habitat in coastal ocean waters. The SAFMC designated all coastal inlets as Habitat Areas of Particular Concern (HAPC) for blue crab, estuarine-dependent snapper-grouper species, penaeid shrimp, and red drum. The sandy shoals of Cape Hatteras, Cape Lookout, and Cape Fear are designated as HAPC for all coastal migratory pelagics, including king mackerel, Spanish mackerel, dolphin, and cobia. In May 2000, Presidential Executive Order 13158, Marine Protected Areas, was implemented. The order mandated strengthening of the management, protection, and conservation of existing marine protected areas and establishing or expanding additional marine protected areas. Marine protected areas (MPA) were defined as "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein" (Federal Register 2000). Among the many agencies cited in the order, Environmental Protection Agency (EPA), relying on existing Clean Water Act authorities, is required to identify and prioritize natural and cultural resources for additional protection, propose science-based protocols for monitoring and evaluating marine protected areas, and propose science-based regulations to ensure appropriate protection of habitat and water quality standards. These actions may provide additional protection for North Carolina's marine soft bottom habitat, as well as hard bottom and other ocean habitats. State agencies are in the process of compiling an inventory of existing marine managed areas prior to assessing the need and feasibility of establishing new MPAs in North Carolina.

6.4 THREATS AND MANAGEMENT NEEDS

Physical threats

Of the coastal habitats in North Carolina, soft bottom is probably the most resilient to physical alterations because of its lack of structure and dynamic nature. However, because this habitat plays a vital role as nursery and foraging grounds for fish and invertebrate species, it is important that threats to soft bottom are identified and addressed. Human activities that can physically impact soft bottom habitat include dredge and fill activities, marinas and docks, shoreline stabilization, and use of bottom disturbing fishing gear.

Dredging

There are physical and biological impacts to the soft bottom communities from dredging activities. New or maintenance dredging for navigational channels or marina construction alters topographic and hydrologic features that attract fish for feeding, refuge, or spawning, and modifies sediment grain characteristics (SAFMC 1998). Dredging removes all benthic infauna from the affected areas immediately, reducing food availability temporarily to numerous fish and crustaceans, including southern and gulf kingfish, Florida pompano, spot, Atlantic croaker, flounder, and shrimp (Hackney et al. 1996; Peterson et al. 2000a). Whether the magnitude of prey reduction limits fish growth, reproduction or survival depends on the species' diet preference, foraging range, mobility, abundance of prey elsewhere, and extent and location of other benthic disturbing activities. In the case of shortnose and Atlantic sturgeon in the Cape Fear river system, dredging for the Wilmington Harbor appeared to disrupt spawning migrations (Moser and Ross 1995). Inlet dredging in winter can kill or displace female blue crabs that are burrowing in the inlet sediments. Disturbance associated with inlet dredging can also deter or alter summer spawning activity of red drum, weakfish, spotted seatrout, silver perch, and blue crab (Luczkovich et al. 1999; DMF 2000). Spawning activity around the inlets occurs from May through October, depending on the species (refer to spawning table in the Water Column section). Because spawning activity occurs at night, daytime dredging may not be a problem. However, there are also possible indirect effects associated with dredging, such as reductions in benthic prey availability and alterations of the acoustic environment (J. Luczkovich, ECU, pers. com., 2003).

Impacts in the water column associated with dredging induced turbidity were discussed in the water

column section of the plan. Turbidity, however, also affects benthic invertebrates in the soft bottom. For example, mole crabs were killed by excess turbidity generated during a beach nourishment project in Atlantic Beach (Reilly and Bellis 1983). Growth of coquina clams was significantly reduced when exposed to elevated turbidity (Lindquist and Manning 2001). The invertebrates and fish associated with inlet subtidal bottoms, tidal deltas, meandering channels and shallow shoals have adapted to that specific environment and to its natural disturbance regimes. *More research is needed to assess direct and indirect dredging impacts on blue crabs and inlet spawning species.*

Map 3.14 a-c depicts the location of the major navigational channels in North Carolina's coastal waters. Soft bottom habitat in the southern portion of the coast has been highly modified by navigational dredging and associated spoil islands. As noted earlier under ecological role and functions, shallow unvegetated bottom is an important nursery and foraging area for many species. Converting shallow bottom into deeper basins and channels can reduce primary and secondary productivity of the bottom (Wendt et al. 1990). *Commenting and permitting agencies should use their existing authorities to 1) minimize new dredging of shallow soft bottom habitat, b) prevent direct impacts from dredge and fill projects, and c) limit as much as possible indirect impacts to shallow soft bottom or other habitats.*

Log salvage is another form of dredging that causes disturbance of soft bottom and water column habitat. However the magnitude of disturbance is much less than that created by dredging of a permanent channel or basin. Refer to the water column section for more information on this activity.

Mining

Mining or mineral extraction is another dredging activity that has potential habitat impacts. Phosphate deposits, of sufficient quality and quantity to be potentially exploitable, have been identified within the Pungo River geological formation in Onslow Bay (Map 6-4). The formation occurs beneath the Pamlico River and also extends beneath ocean soft bottom from Bogue Banks southwest to Frying Pan Shoals, is approximately 150 km long, 40 km wide, and covers approximately 6,000 km^2 (Powers et al. 1990). The largest deposit occurs at Frying Pan Shoals, seaward of state jurisdiction, and is potentially available to dredge mining. Other phosphate deposits, referred to as the Northeast Onslow Bay phosphate district, occur immediately off Bogue Banks within and seaward of state jurisdiction. Because of its proximity to shore and a deep-water port, the economic potential of mining these deposits is high. In addition, other minerals occur in offshore sediments (as phosphate mining byproducts) including trace elements, radioactive substances like uranium and phosphogypsum, heavy minerals such as titanium, zirconium, aluminosilicates, and valuable metals such as gold and silver (Riggs and Manheim 1988). Currently no mining is ongoing in North Carolina waters, although potential exists. Continued cooperation between COE, DWQ 401 staff, CAMA, and others responsible for review of mining projects is necessary to protect and mitigate against soft bottom and other habitat impacts.

Dredge material disposal on subtidal bottom

Deposition of dredge material from navigational channel maintenance on estuarine or coastal dredge disposal sites, ebb tidal deltas, or other areas of subtidal bottom results in increased turbidity, temporary reduction in and slow recovery of the abundance and diversity of benthic invertebrates (SAFMC 1998). In estuarine waters, dredge material islands, also referred to as spoil islands, were often created adjacent to the dredged navigational channels. Subsequent maintenance dredging deposits new material onto these islands. The majority of the dredge material islands were created when the ICW was first created in the 1930s. The creation of permanent dredge islands a) reduced the amount of available underwater habitat (including soft bottom) , b) changed the natural hydrology of the surrounding waterbodies, and c) had a relatively more profound effect on the smaller waterbodies of the southern coast. However, the islands can provide beneficial nesting bird habitat and fringing wetland habitat along the perimeter. *A state policy on dredge material management, that minimizes impacts to coastal fish habitat, including soft bottom habitat, should be developed.*

In ocean waters, dredge disposal occurs in both offshore designated disposal sites and in nearshore waters and ebb tide deltas. Offshore sites are in federal waters in depths greater than 30 ft, whereas nearshore areas are in state waters in depths less than 30 ft deep. Sediment deposited in nearshore waters and on ebb tide deltas are incorporated into the beach profile and are discussed further in the beach nourishment section. The rate of bottom recovery will depend on the volume discharged, characteristics and similarity of the dredge material, hydrography of the disposal area, time of year, and the resulting turbidity (Windom 1976; SAFMC 1998). Disposed dredge material that contains elevated levels of toxic contaminants may have adverse impacts on the benthic community. There are two EPA approved and designated ocean dredge material disposal sites off North Carolina, one off Beaufort Inlet and one off Cape Fear River Inlet. Both are located just seaward of the state territorial seas.

Marinas and docks

Soft bottom habitat may be affected by marina and dock facilities through alteration of the shoreline configuration, circulation patterns, and subsequently, changes in bottom sediment characteristics (Wendt et al. 1990). Because benthic microalgae, an important component of primary production in soft bottom habitat, are light dependent, bottom sediments in dredged marinas will have reduced light availability due to the deeper water depth and shading from docking structures. There are few studies that examine the effect of marinas and boating activity on benthic productivity. A study estimating macroalgae and microalgae productivity before and after construction of a marina in Long Island Sound found that microalgae production on soft bottom would decline by 48% post construction and macroalgae production would decline by 17%, due to changes in depth, light, and hard structures (Ianuzzi et al. 1996). However, the authors concluded that some of this loss would be offset by additional microalgal production on hard structures in the marina.

Operation of a marina can also affect productivity of the soft bottom community due to introduction of heavy metals, hydrocarbons, and bacteria (Chmura and Ross 1978; Marcus and Stokes 1985; Voudrias and Smith 1986). In a South Carolina estuary, distinct differences were found in the benthic community at a marina compared to the control site (Wendt et al. 1990). The marina appeared to favor the occurrence of infaunal burrowers over infaunal tube dwellers. Overall, there was greater abundance of deposit feeders at the marina. The authors concluded that the presence of docks and pilings may have resulted in greater habitat complexity and therefore greater diversity of sessile and motile epifauna. However, the study did find a lower abundance of several pollution sensitive species at the marina, indicating some environmental degradation, which could affect the food chain. Faunal differences were attributed to the finer grained sediments occurring in the marina and proximity to hard structures.

While the higher concentration of organic matter contributed to a greater abundance of certain deposit feeders, certain species were excluded from the marina. While the additional colonization of non-mobile epifauna on dock structures within the marina may provide additional biotic diversity and a food source for some fish, high densities of fouling organisms (tunicates, barnacles, bryozoans) in marinas can reduce dissolved oxygen levels due to high respiration rates (Wendt et al. 1990). Toxic substances in fouling organisms bioaccumulate and can become concentrated in successively higher levels of the aquatic food chain (Nixon et al. 1973; Marcus and Stokes 1985). Both PAHs and heavy metals were found to be significantly higher in bottom sediments in the marina compared to the control site. Heavy metals and hydrocarbons are toxic to many soft bottom dwelling invertebrates and benthic feeding fish (Weis and Weis 1989). The effect of toxins from marinas or other sources is discussed in more detail in the toxins section. *Stringent efforts are needed to prevent toxic contamination of sediments from marinas to reduce impacts to soft bottom productivity. Toxic sources at marinas should also be addressed.*

In another study in South Carolina, differences in the benthic community in areas with no, low, and high densities of docks were examined. Similar to the other South Carolina study, some pollution sensitive species of polychaetes were more abundant at control sites than high dock sites (Sanger and Holland

2002). Areas in the high dock category usually had the lowest values of benthic abundance. Three species (*S. benedicti, T. acutus, P. cornuta*), and the total number of organisms had a significant correlation to docks, with the abundance of organisms decreasing as the number of docks increased (Sanger and Holland 2002). Total fish and crustacean abundance, including bay anchovy, silver perch, spot, and brown shrimp, was highest in the no dock category, but was not significantly correlated with dock number (Sanger and Holland 2002). This study also found that shading from docks decreased stem density of *Spartina alterniflora* by 70%, which was comparable to other studies in Virginia and other areas of the United States. This reduction can lower the overall productivity in the vicinity of marinas and multi-docking facilities. Overall productivity in a marina can also be reduced by effects on associated wetland and shell bottom communities. Refer to these sections for more information related to marina and dock impacts.

Several studies indicate that marinas and concentrations of individual docks have potential to alter soft bottom habitat, particularly shallow water habitat, in ways that can reduce productivity of the system as a whole. Marina siting issues were discussed in the earlier water column section, and the location of marinas in North Carolina was shown in Map 2.14 a-c. The majority of docking facility permits are for individual piers. The number of individual pier permits issued annually by the CRC, with the exception of 2001, has continually increased in the coastal counties through 2000 (Figure 2.9, water column section). Since then, the number of permits issued annually has dropped below 1999 levels to around 800 per year. The DCM estimates that approximately 10% of these piers do not have boats associated with them and are used solely for fishing, swimming, view, etc. The large increase in permit numbers from 1999 to 2000 is at least partially due to large numbers of repair or replacement requests following hurricane damage. If properly designed and located, individual piers do not pose a large threat to soft bottom habitat. However, when docks are permitted in very shallow areas, moored boats or floating docks may actually sit on the bottom for a large portion of a tidal cycle (up to 12 hr) or cause considerable turbidity or prop dredging when attempting to motor to deeper waters (F. Rohde, DMF, pers. com., 2003). Either situation can significantly reduce primary or secondary productivity (F. Rohde, DMF, pers. com., 2003). There is currently no minimum water depth required to receive a dock permit. *Dock siting criteria should include a minimum water depth to prevent boats or floating docks from sitting directly on soft bottom or other benthic habitats.*

Multi-docking facilities (10 slips or less according to the CRC definition) may be a greater threat to soft bottom habitat due to the number of these facilities and their concentration in shallower areas than typical marinas. However, by concentrating boat use, overall impacts may be less than what would be needed to serve the same number of boats with individual piers at individual residences. Also, because boat use is concentrated, other areas of the shoreline, including wetland and shell bottom habitats, may not be impacted by docking related activities. There are about five to eight times more permits issued annually for small multi-docking facilities (non-marinas, 1-10 slips) than marinas (> 10 slips). The annual number of non-marinas has generally increased since 1996 (Figure 2.9- water column section). The annual number of permits issued for new or expanding marinas has remained fairly stable over the past ten years. As waterfront property becomes increasingly developed, requests for new piers and marinas in shallower and less suitable locations will increase. *A comprehensive dock and marina policy is needed to address appropriate design, siting, operation, and maintenance procedure and cumulative impacts to minimize impacts to soft bottom and other fish habitats. Research on the impacts of these parameters is needed.*

Shoreline stabilization

Different shoreline stabilization strategies are effective under different environmental conditions, with varying effects on soft bottom and other habitats. Strategies range from soft techniques such as marsh planting to engineered hard stabilization techniques. Estuarine and ocean shoreline stabilization are discussed separately below.

Estuarine and riverine shoreline stabilization

In North Carolina, estuarine and riverine shoreline stabilization has traditionally utilized hard structures such as bulkheads, rock revetments or riprap, sills, breakwaters, groins, or combinations thereof. Bulkheads are the most commonly used structure. Beach nourishment is generally not utilized. Although excessive sediment loading is considered a water quality issue, erosion of sediments is a natural process that provides sand for maintenance of beaches, wetlands, and shallow water habitat. When this sand supply is cut off by a hard structure under rising sea level conditions, the long-term results are a net loss of beach and intertidal shoreline and the deepening of shallow water habitat. High quality intertidal shoreline and shallow water habitat serve as important nursery, feeding and spawning grounds to many economically and biologically valuable fish species in North Carolina. Multiple studies have shown that the diversity and abundance of invertebrates and juvenile fish are reduced adjacent to bulkheaded areas (Waters and Thomas 2001; Peterson et al. 2000; Byrne 1995; Ellifrit et al. 1972; Gilmore and Trent 1974; Mock 1966; O'Rear 1983). In the 2003 legislative session, House Bill 1028 was approved, which allows the CRC to establish a general permit for construction of offshore parallel rock sills for estuarine shoreline protection. Prior to this, a major permit was required for such activity, while construction of a bulkhead required a general permit. *A comprehensive examination and revision of current CRC shoreline stabilization rules using best scientific information is still needed to minimize impacts from this activity to soft bottom, particularly intertidal estuarine shorelines. Research is needed to determine if and how oyster shell could be utilized as an alternative to rock or wooden stabilization structures to create "living shorelines" that are effective in stabilizing the shoreline while also providing habitat value.* Refer to the wetlands section for additional information of the impact of shoreline stabilization to that habitat.

An additional concern of wooden bulkheads is the toxicity of preserved wood to certain aquatic organisms. Estuarine and riverine bottom may be contaminated by wooden bulkheads treated with copper, chromium, and arsenic (CCA). These elements are leached from CCA treated wood, gradually accumulate in adjacent sediments, and have the capacity to harm marine benthos (Weis and Weis 1994; Weis et al. 1998). The toxicity of these metals to aquatic organisms is well recorded and all three are listed as priority pollutants by the EPA (Hingston et al. 2001). Copper appears to have the most toxic effect on marine organisms and is consistently released in the largest relative amount (Weis and Weis 1994).

Studies have documented significantly elevated concentrations of metals and reduced abundance and diversity of the benthic community extending approximately 30 ft (10 m) from bulkheads treated with CCA, decreasing with distance from the structure (Weis and Weis 1994; Weis et al. 1998). Benthic organisms that were lethally or sublethally impacted included macroalgae, amphipods, polychaetes, oysters, fiddler crabs, sea urchins, mud snails, and fish embryos. Sediment contamination has been documented to be higher in a residental bulkheaded canal than adjacent to bulkheaded open water (Weis and Weis 1995). Concentrations decreased more rapidly with distance from bulkhead in the open water system. Weis et al. (1995) found that oysters living on CCA-treated wood in a residential canal had 15 times more copper (~ 200 µg/g wet weight), two to three times more arsenic, and significantly more degeneration of digestive gland diverticula than compared to that of reference oysters. Copper is known to cause this pathology. Although bioaccumulation has been observed in shellfish and other invertebrates grazing on CCA contaminated algae or bivalves, similar biomagnification in fish has not been documented for these elements (Weis and Weis 1999). The extent of sediment contamination from CCA could be significant, considering the magnitude of preserved timber used in the marine environment for bulkheads and docks (Weis and Weis 1994). Toxicity of wood decreases with time but CCA can continue leaching for many years. In addition, bulkheads need to be replaced periodically, providing a continual source of newly treated wood in coastal waters.

As of January 1, 2004, the EPA will not allow CCA products to be used to treat wood intended for residential uses due to human health concerns, primarily of arsenic, and environmental impacts. Although non-arsenic containing products will be available, these alternatives may also be toxic to marine organisms. Rock sills and revetments are a non-wood alternative that do not require any chemical

preservatives. *Any new wood preservative products should be evaluated for toxicity to marine benthic organisms and juvenile fish. When formulating revisions to CRC's shoreline stabilization regulations and guidelines, CRC should take into account the impact of sediment contamination and potential toxicity of wood preserved bulkheads on marine organisms.*

Oceanfront shoreline hardening

Shoreline hardening, or hard stabilization, involves construction of hard immovable engineered structures, such as seawalls, rock revetments, jetties, and groins. Seawalls and rock revetments run parallel to the beach. Seawalls are vertical structures, constructed parallel to the ocean shoreline and are primarily designed to prevent erosion and other damage due to wave action. Revetments are shoreline structures constructed parallel to the shoreline and generally sloped in such a way as to mimic the natural slope of the shoreline profile and dissipate wave energy as the wave is directed up the slope. Breakwaters are structures constructed waterward of, and usually parallel to, the shoreline. They attempt to break incoming waves before they reach the shoreline, or a facility (e.g., marina) being protected. Jetties and groins are manmade structures constructed perpendicular to the beach, with jetties usually being much longer and located adjacent to inlets. The primary purpose of jetties and groins is to create or widen beaches by capturing sand moving along the shoreline (littoral drift).

It is now well accepted that hard stabilization techniques along high energy ocean shorelines will accelerate erosion in some location along the shore, resulting in the eventual loss of beach and intertidal bottom as well as increased scouring and chronic turbidity in the surf zone (NRC 1995; Peterson et al. 2000a; Walton and Sensabaugh 1979; Pilkey et al. 1998). Recognizing that hardened structures destroy recreational beaches and the intertidal zone, four states have prohibited shoreline armoring: Maine, Rhode Island, South Carolina, and North Carolina (effective in North Carolina since 1985).

Only a relatively small amount of North Carolina's ocean shoreline is hardened compared to other states, having roughly 6% of the developed shoreline hardened (Pilkey et al. 1998). In contrast, South Carolina, Florida (Atlantic coast), and New Jersey have 27%, 45% and 50% of their respective shorelines covered with some form of hard stabilization. Of all hardened structures, seawalls are the greatest threat to beach erosion and degradation of the intertidal beach (Pilkey et al. 1998). Moreover, the areal loss of beach at hardened shorelines is often managed by implementing nourishment projects, possibly having additional damage to subtidal bottom. Jetties, in addition to causing erosion on downdrift beaches and accelerating the need for beach nourishment projects, obstruct fish passage through adjacent inlets (Blanton et al. 1999). Jetties in some locations may therefore be the most directly detrimental shoreline stabilization structure to coastal fish habitat (for more information, refer to water column threats section). In the 2003 legislative session, House Bill 1028 was approved, putting into law the CRC prohibition on construction of permanent erosion control structure on an ocean shoreline. *Prohibition of shoreline hardening of the oceanfront should continue to be enforced for overall protection of barrier island processes, nearshore soft bottom communities, and associated fish species.*

Soft stabilization on oceanfront shorelines

Because hard stabilization is currently prohibited in North Carolina, the only beach stabilization techniques available to local communities are soft techniques, such as beach nourishment and beach bulldozing. Beach nourishment is the introduction of new sand to dry and intertidal beach and adjacent shallow waters from upland areas, navigational channels, inlet systems, or submerged "borrow sites" to restore or enlarge a beach. There are generally two categories of COE projects that result in sand being put on beaches: disposal projects and storm damage reduction projects. Disposal projects are generally much smaller in magnitude than storm damage reduction projects, and can be expected to have a smaller impact on fish habitat. Sand bypassing is a type of disposal project where sand is moved around physical barriers, such as a jetty or deep port, that interrupt the natural littoral drift along the shoreline.

Beach bulldozing, also referred to as beach scraping, is a method of short-term erosion protection that has been used in North Carolina for approximately 40 years. Beach bulldozing is the process of mechanically redistributing beach sand from the lower portion of the intertidal beach to the upper portion of the dry beach to create or enhance the primary dune. In contrast to beach nourishment, new sediment is not added and the existing beach is not widened. Because beach bulldozing only utilizes sand on-site, the impacts of this soft technique are less, relative to those from beach nourishment (Pilkey et al. 1998). *The effectiveness and cumulative impact of this activity should be assessed and appropriate guidelines should be included in a coastal beach management plan.*

Beach nourishment impacts at mining areas / "borrow sites"

Mining is defined under the Mining Act (G.S. 74-48 and G.S. 47-49) as "the breaking of surface soil in order to facilitate or accomplish extraction or removal of mineral, ores, or other solid matter." Whether the purpose is beach nourishment, channel maintenance, or mineral extraction, the consequences of mining activities have similar effects upon the habitat. Dredging of subtidal bottom initially causes mortality of benthic organisms within the dredged area and causes elevated turbidity in an extended area, which may also result in negative impacts. Physical recovery of "borrow sites" in nearshore areas and shoals can be a slow process. Because such sites often refill with finer-grained material than was originally present (NRC 1995; Van Dolah et al. 1998), post-dredging turbidity may remain high indefinitely (Peterson et al. 2000). In South Carolina, refilling of sediment took from two to at least 12.5 years at varying "borrow sites". Since these areas refilled with a more fine-grained, muddy sediment, the sites became unsuitable as future sand sources and altered benthic species recruitment patterns (Van Dolah et al. 1998; Van Dolah et al. 1992). Use of ebb or flood tidal deltas and nearshore sandbars within the active shoreface as a sand source for nourishment projects removes sand from the inlet system, alters the sediment budget, and may result in accelerated erosion from adjacent beaches (Wells and Peterson 1986). Roessler (1998) also suggested that the major cause of beach erosion on Bogue Banks was the removal of sediment from the longshore system due to the intense dredging and deepening of Beaufort Inlet for access to the state port at Morehead City. Sand from that dredging operation has at times been taken out of the inlet, hence out of the longshore system, and disposed of offshore beyond the active beach profile. Biological recovery rates of mined sites vary, but generally are longer than those reported at the intertidal beach disposal sites, and in some cases may be altered indefinitely. Reported recovery rates for mined sites include:

• Van Dolah et al. (1992)	3 – 6 months	South Carolina
• Posey and Alphin (2001)	6 – 18 months	North Carolina
• COE (2001)	18 – 30 months	New Jersey
• NRC (1995)	> 12 months	*location undisclosed*
• Van Dolah et al. (1998)	2 – > 12.5 years	South Carolina

Van Dolah et al. (1998) observed significant changes in the species composition of the recruited benthos, shifting from a dominance by amphipods to mollusks. During the time period monitored (> 12.5 years), the original species composition within the affected area was never restored due to the change in substrate composition (Van Dolah et al. 1998). Mining activities that changed bottom sediment composition were often associated with impacts of the greatest magnitude and most prolonged recovery, typically occurring in areas with little sand movement, with deep borrow pits or that were previously mined (COE 2001; Saloman et al. 1982). Comparison of borrow areas and control sites associated with a storm damage reduction project at Carolina Beach found few statistically significant differences in species abundance 0.5 and 1.5 years after sediment removal (Posey and Alphin 2001). However, after sediment removal, dominant species composition at the "borrow site" was more dissimilar to the control site than before sediment removal. The authors concluded that year to year variability in the benthic community, in addition to multiple hurricanes during the monitoring period, made effects from the project difficult to determine (Posey and Alphin 2001). Observed recovery at this site was more rapid than expected, due in

part to the configuration of the borrow areas. The borrow area was long (3 mi), relatively wide (0.5 mi), and most importantly, not excessively deep (5-10 ft deep) (M. Posey, UNC-W, pers. com., 2003). At "borrow sites" monitored off New Jersey, infaunal assemblages (diversity) recovered within one year after disturbance, while biomass and taxonomic richness took 1.5 to 2.5 years to fully recover (COE 2001). Because material was removed from a topographically diverse bottom, a deep pit was not created, leading the authors to conclude that time to recovery was reduced. In addition, strong water currents and dynamic sand movement in the project area facilitated more rapid infilling.

Repeated use of a "borrow site" for beach nourishment is generally not possible since the excavated areas tend to refill with more muddy substrate or have not completely refilled prior to the next renourishment interval (3 – 8 year cycles). Because of the slow recovery and change in sediment composition, Van Dolah (1998) stated that nearshore borrow areas must be viewed as a non-renewable resource and as the regions most impacted by beach nourishment projects (R. Van Dolah, SC DNR; pers. com., 2002). Locating "borrow sites" at specific soft bottom locations known to support seasonal aggregations of demersal fish, such as the critical overwintering area off the Outer Banks for juvenile Atlantic sturgeon, spiny dogfish, and striped bass, could negatively impact those species. "Borrow sites" established on ebb and flood tide deltas may recover relatively faster due to nearby longshore sediment transport. However, these deltas serve as important feeding sites to a number of commercially and recreationally important species, including red drum, striped bass, spot, Atlantic croaker, weakfish, blue crabs, and shrimp, and serve as spawning sites for red drum, weakfish, spotted sea trout, and blue crab. Removal of a major component of their diet could negatively impact these species (Peterson et al. 1999). Factors that appeared to maximize biological recovery rates include:

- Shallow excavation of borrow areas,
- Use of topographic highs, and
- Location in areas of high sand movement.

When "borrow areas" are necessary for beach nourishment projects, guidelines should strongly encourage siting protocol that maximizes biological recovery rates and does not degrade critical fish foraging areas .

Beach nourishment impacts at intertidal beach and adjacent subtidal bottom

Biological impacts of sediment disposal to the intertidal beach community have been studied by Hackney et al. (1996), Donoghue (1999), Jutte et al. (1999), Van Dolah et al. (1992), Reilly and Bellis (1983), Peterson et al. (2000b), and others. Studies of dredge disposal and storm damage reduction projects demonstrated an almost complete initial reduction in the number of benthic invertebrates in the intertidal zone, as well as in the subtidal zone and dry beach, immediately following the disturbance. The effect on smaller meio- and microfauna is unknown. The rate of reported biological recovery on nourished intertidal beaches has varied from about one month to one year, but in some cases longer (Table 6.4).

Table 6.4. Reported biological recovery times at nourished beaches.

Location	Biological recovery following beach nourishment	Reference
Atlantic Beach, N.C.	More than 3 months. Coquina clams in nearshore overwintering bottom killed initially by turbidity; delayed recruitment and repopulation; Haustoriid amphipods had not recovered after 3 months. Polychaete *S. squamata* recovered 15 – 30 days post nourishment.	Reilly and Bellis 1983
Atlantic Beach, N.C.	Densities of mole crabs and coquina clams were 86 – 99% lower than control sites, 5 – 10 weeks post-nourishment, during mid-summer.	Peterson et al. 2000
North Topsail, N.C.	After 1 year, mole crab, coquina clam, and amphipod abundance remained significantly less than at control sites and body size was significantly smaller. Polychaetes increased in abundance.	Lindquist and Manning 2001
Pea Island N.W.R., N.C.	2 – 9 months for coquina clams and mole crabs.	Donoghue 1999
Hilton Head, S.C.	Density and diversity returned to levels similar to control sites in 6 months.	Van Dolah et al. 1992
Folly Beach, S.C.	2 – 5 months, depending on benthic group and site, polychaetes recruiting earlier than mollusks.	Jutte et al. 1999
Panama City, F.L.	Large reductions in abundance and diversity remained after 2 years.	Rakocinski et al. 1993
Manasquan, N.J.	Abundance, biomass, and diversity completely recovered after 6.5 months. Recovery quickest when filling completed before low point in seasonal infaunal abundance and where grain size of fill material matched natural beach.	COE 2001

Factors likely affecting the recovery time of the intertidal beach community include:

- compatibility of deposited material with native sand (sediment grain size)
- volume of sand
- depth of filled sand
- length of area covered
- time of year
- time period between renourishment events on an individual site
- alteration of the beach geomorphology
- location placed on the beach

In the studies referenced above and others, biological impacts persisted longer when supplemented sand was either coarser (Peterson et al. 2000a; McLachlan 1996; Rakocinski et al. 1993; Rakocinski et al. 1996) or finer (Gorzelany and Nelson 1987; NRC 1995) than the existing sand. Increased grain size of the beach can result in significant reduction in species richness and abundance by 1) limiting body size, 2) limiting burrowing performance and other functions in some species, 3) changing the beach condition to a higher energy swash zone (McLachlan 1996). A decrease in grain size impacts the benthos by 1) smothering organisms, 2) clogging gills from sediment plumes, and 3) decreasing the interstitial space between sediment grains available to small burrowing invertebrates (Rakocinski et al. 1996). Current CRC rules state that sediment grain size shall be equal to or larger than that found naturally at the site. *More specific minimum and maximum grain size standards are needed to minimize biological impacts.*

The time period between renourishment events is also an important factor for successful recovery. Lindquist and Manning (2001) found that at a beach where dredge material was placed between April and June, and redeposited the following year (April – June) the abundance of the mole crabs, coquina clams

and amphipods was significantly lower than the control beach after one year. Also, mole crabs and coquina clams were significantly smaller in size than at control sites, indicating that repeated disturbance from beach disposal (once a year) prevented full recovery of the populations. Peterson et al. (2000b) also argued that recovery could be accelerated if projects were timed to occur before spring recruitment of benthos.

Dredge material from inlet dredging is often placed in nearshore water (< 30 ft deep) within the beach profile to enhance sand supply on the beach. Such sand placement in nearshore waters can delay the duration and reduce the magnitude of the benthos reduction on the beach, but cause additional impacts to subtidal bottom (Donoghue 1999). Monitoring of a nearshore disposal project that occurred on an ebb tide delta near Beaufort Inlet in March – April found that after eight months (December), infaunal invertebrates were only 50% as dense as that of the original benthic community, but mobile epifauna had fully recovered (Peterson et al. 1999). In the following two months (December – February), density estimates doubled , as new recruits rapidly entered the area (Peterson et al. 1999). Projects timed to occur in the winter, prior to peak infauna larval recruitment in the summer and fall, will speed up the recovery of intertidal benthic organisms within the impacted area (Donoghue 1999).

Alternatively, impacts to the intertidal and subtidal benthic community can be minimized by placing dredge material high on the beach, allowing more gradual sand redistribution and time for mobile invertebrates to move and adjust (Van Dolah et al. 1992). Typically most beach nourishment projects extend from the high beach into the intertidal and subtidal bottom. Even if sand is placed only on the dry beach, nearshore subtidal bottom can still be impacted if storm events transport the sand off the beach and across the seafloor. A study in North Carolina documented sand from a nourishment project transported offshore perpendicular to the beach and covering formerly muddy slough and channels (Thieler et al. 1998). Alteration of the sediment composition and temporary reduction in available benthos to demersal fish and crustaceans, could have a negative impact on species that favor muddy substrates, such as southern kingfish and shrimp. In summary, several conditions appear to minimize biological impacts of nourishment projects to the intertidal beach community. These include, but are not limited to:

- Use of sand similar in grain size and composition to original beach sands (specific minimum and maximum standard needed).
- Restrict beach nourishment to winter months to minimize mortality of infauna and enhance recovery rates of intertidal benthic organisms, an important prey source for many surf fish (Donoghue 1999).
- Limit time interval between projects to allow full recovery of benthic communities (1-2 years, depending on timing of project and compatablility of sediment).
- Limit linear length of nourishment projects to provide undisturbed area as a source of invertebrate colonists for the altered beach, and a food source for fish.

The extent of biological impacts from beach nourishment activities is determined not only by these individual conditions, such as grain size, time of project, frequency of reapplication, but by combinations of factors. *Because of the potential impact of beach nourishment and dredge disposal on soft bottom communities, there is a need for a coastwide Beach Management Plan that carefully reviews cumulative impacts of activities and provides ecologically based guidelines, including sediment compatibility standards, to minimize cumulative impacts. The CRC's beach nourishment rules should be evaluated and modified in a comprehensive manner as needed to minimize overall impacts from this activity. Additional research is also needed to more clearly quantify the cumulative impact of nearshore dredge disposal on fish populations.*

The largest biological impact of beach bulldozing appears to be reduction in ghost crab populations on the dry beach (Peterson et al. 2000). Lindquist and Manning (2001) found no significant impact on dominant beach invertebrates associated with beach bulldozing. No decline in surf fish or shorebird use at or adjacent to scraped beaches was observed. Peterson et al. (2000b) found that beach bulldozing at Bogue

Banks reduced the width of the intertidal beach, shifted sediment composition, and immediately reduced abundance of benthic organisms. Because of the relatively quick recovery on intertidal and shallow subtidal benthic communities and the relatively small area that occurs in subtidal waters, fish impacts from bulldozing should be less than other beach management activities. However, beach scraping has not been shown to provide any erosion control benefit, and has actually increased wind erosion of sand where created dunes were left unvegetated (Peterson et al. 2000b; McNish and Wells 1992; Tye 1983; Kerhin and Halka 1981). The CRC modified specific conditions for beach bulldozing in 2000 which should help minimize biological impacts if properly enforced, including time windows for work to be completed, maximum depth of scraping, and replanting of dunes.

Beach nourishment impacts on fish

Fish may be impacted by beach nourishment due to reduction in food availability, alteration of preferred topographic features, disturbance prior to or during spawning, or reduced visibility. Fish and invertebrate species that spend considerable time in the surf zone and feed on benthic invertebrates, such as Florida pompano, gulf kingfish, Atlantic croaker, spot, and shrimp, would be most vulnerable to beach nourishment activities. Very little monitoring has been done to assess the impacts of nourishment projects on fish distribution, feeding, growth, or survival.

A New Jersey study examined surf zone fish distribution, abundance and diet in response to ongoing nourishment projects (COE 2001). In the immediate vicinity, abundance of bluefish, a visual feeder, decreased and northern kingfish, a benthic feeder, appeared to increase. However, no long-term trends were detected in distribution or abundance. Stomach content analyses of kingfish and silversides did not suggest differences in prey availability between control and project sites.

In North Carolina the impact of a Brunswick County beach nourishment project on surf fish, benthic invertebrates, and water quality was evaluated from March 2001 to May 2002. Sand from the lower Cape Fear River dredging project was placed on Bald Head Island, Caswell Beach, Oak Island, and Holden Beach. Seining and trawling before and after the project found no significant differences in fish abundance or diversity between disturbed, undisturbed, and reference sites during any season. This was attributed to the high mobility and schooling behavior of the dominant fish species (anchovies and drum family), resulting in clustered and variable distribution. Although statistically not significant, gulf kingfish were less abundant at the disturbed sites than the undisturbed sites. The decline was thought to be at least partially due to the reduced availability of benthic invertebrates preferred by gulf kingfish (COE 2003). The intertidal benthic community was the most directly impacted by the beach nourishment project. Analysis of the effects of this project was limited by problems with the statistical design (COE 2003). Sample size was often insufficient to calculate confidence limits, partly due to uneven sampling between treatments (disturbed, undisturbed, reference). *Adequate monitoring of the effects of beach nourishment on the soft bottom community and associated surf fish populations is increasingly important as the number of beach nourishment projects increase and should be required for all large-scale or long-term nourishment projects.*

Status of beach nourishment from navigational dredge disposal projects

The COE is charged to maintain North Carolina's navigable inlets and ocean channels through dredging as necessary. Navigational dredging in inlets by the COE is allowed at any time of the year and is not subject to any mandatory dredging moratoriums unless sea turtle take quotas are exceeded. Industry-owned hopper dredges working in the Wilmington and Morehead port areas and Oregon Inlet have a voluntary dredge window of January 1 – May 31, to minimize taking of turtles (T. Wilder, COE, pers. com., 2003; NMFS 1997).

Seven inlets are maintenance dredged on a regular basis with a hopper or pipeline dredge. Many of the others are dredged periodically as needed with a side-cast dredge. Side-cast dredging can be conducted at

any time of the year (COE 1979). Material from a pipeline dredge is pumped onto a nearby downdrift beach. This method can move larger volumes of sediment, but often cannot be used in the inlets due to rough seas or shallow water depth. Material from a hopper dredge is disposed in the surf zone along the 10 foot depth contour, or transported to an offshore dredge disposal site. This is the most frequently used method in North Carolina's inlets. The hopper dredge can hold about 300 cubic yards of sand per load. Material from the sidecast dredge is moved from the center of the channel to the edge of the channel (T. Wilder, COE, pers. com., 2003).

Material from dredge disposal projects is put on or adjacent to ocean beaches in close proximity to the dredged site. Beaches receiving sand from dredged inlets and adjacent waterways are indicated in Table 6.5 and Map 6.3 a-c. Sand from these projects usually only covers a relatively short linear length of the beach (< one mile), generally close to the inlet where the sand originated. The amount of sand deposited and the frequency of dredging varies between sites and with each dredging event (Table 6.5). There are 51 miles of beach designated and approved for dredge disposal, but only about 16 miles of beach receive dredge material (T. Wilder, COE, pers. com., 2003). Areas receiving dredge disposal include several locations on Hatteras Island, south end of Ocracoke Island, Core Banks, both ends of Bogue Banks, Onslow Beach, several locations on Topsail Island, Wrightsville Beach, Masonboro Island, north end of Carolina Beach, Caswell Beach, Oak Island, east end of Ocean Isle Beach, and both ends of Bald Head Island. In addition, privately owned Figure 8 Island has received nourishment projects periodically, most recently in 2002 from the Mason Inlet relocation project.

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Table 6.5. Ongoing COE dredge disposal projects on North Carolina beachs (Source: T. Wilder, COE, pers. com., 2003).

Dredging Project	Disposal location	Approved disposal limits (mi)	Actual disposal limits (mi)	Estimated quantity (cu. Yd.)
Avon Harbor vicinity, Avon	Hatteras Island, south of Avon Harbor and extend north.	3.1	0.4	< 50,000 every 5-6 yr.
Rodanthe Harbor vicinity, Rodanthe	Extends from south end of Pea Island NWR to south of Rodanthe Harbor.	0.9	0.4	<100,000 every 5-6 yr
Rollinson/ Hatteras	Hatteras Island south of Hatteras Harbor and extends 5.85 mi north of Frisco.	5.9	0.4	<60,000 every 2-3 yr
Silver Lake	Southwest end of Ocracoke Island.	0.4	0.4	<50,000 every 2-3 yr
Oregon Inlet	Pea Island south from Oregon inlet.	3.0	1.5	300,000 / year
Drum Inlet	Core Banks, extending 1 mi either side	2.0	1	298,000 initial, 100,000 maint.
Morehead City	Bogue Banks, from Beaufort Inlet west to Coral Bay Club, Pine Knoll Shores	7.3	5.2	3,500,000 every 8-10 yr.
AIWW	Pine Knoll Shores	2.0	0.4	<50,000 every 5-6 yr.
AIWW Bogue Inlet	Bogue Banks from Bogue Inlet east to Emerald Point Villas	1.0	0.4	<100,000 / year
AIWW	Camp Lejeune, from Browns Inlet west	1.6	1	<200,000 every 2-3 yr
AIWW, New River Inlet	N. Topsail Beach from inlet west to Maritime Way	1.5	0.8	<200,000 / yr
AIWW	Surf City opposite N.C. 50 bridge	1.0	0.04	<75,000 every 5-6 yr (only used in 1996)
AIWW	Topsail Island, Queen's Grant	0.6	0.6	<50,000 every 5-6 yr
AIWW, Topsail Inlet and Creek	Topsail Beach, north of Topsail Inlet	1.0	0.4	<75,000 / yr
AIWW, Mason Inlet crossing	North end Wrightsville Beach 2000' from Mason Inlet	0.4	0.4	<100,000 (not scheduled)
Masonboro sand bypassing	North end Masonboro Island, south from Masonboro Inlet	1.2	1	500,000 every 4 yr
AIWW, Carolina Beach Inlet, Snows Cut	South end Masonboro Island, from Carolina Beach Inlet north	1.3	0.4	<50,000 / yr
AIWW	North end of unincorp. Carolina Beach, south of Carolina Beach Inlet to town limit	0.8	0.4	<100,000 / yr
Cape Fear River, Wilmington Harbor	Bald Head Island	3.0		Approx. 1,000,000 / 2 yr.- total for Bald Head, Caswell, and northern Oak Island
Cape Fear River, Wilmington Harbor	Caswell Beach and northern part of Oak Island	4.7 mi initially, 2.8 mi./2 yr		
Cape Fear River, Wilmington Harbor	Sea Turtle Restoration Site, Oak Island (Continuing Authorities Project)	2.4		Only received one time from initial dredging
Cape Fear River, Wilmington Harbor	Oak Island, south of sea turtle project	4.9		Only received one time from initial dredging
Cape Fear River, Wilmington Harbor	Holden Beach	2.0		Only received one time from initial dredging
AIWW Cape Fear River to SC line	East end Ocean Isle Beach	0.6	0.6	<100,000 every 1-2 yr; 250,000 if Lockwood dredged (every 8-10yr)
Total		**50.7**	**16.14**	

Status of beach nourishment from storm damage reduction projects

Storm damage reduction projects involve dredging sand specifically to increase the width and height of the beach and dunes to reduce storm damage to infrastructure and private property adjacent to the beach. To implement a federally authorized and subsidized storm damage reduction project, local governments must follow a lengthy process that can take up to 10 years to initiate. A local government must first identify an erosion problem and request a study by the COE to determine if and how a project could be conducted. Numerous regulations and policies guide permit review and

authorization, although protection of fish habitat is not the primary consideration. DMF and other agencies are given an opportunity to comment to DCM and the COE on the potential impacts of a project to fisheries, fish habitat, and other environmental concerns. The MFC adopted a beach nourishment policy in 2000 to guide the permitting process to more fully consider fish habitat impacts (Appendix K).

The frequency and magnitude of beach nourishment has increased over time. From the 1960s to 2000, only nine miles of beach (3% of the ocean shoreline) had ongoing storm damage reduction projects - Wrightsville Beach, Carolina Beach, and Kure Beach (Table 6.6; Map 6.3 a-c). These projects were initially authorized and begun in the 1960s, although the first nourishment project in Wrightsville Beach occurred in 1939 (COE 1992). With the exception of Currituck County where there have been no nourishment projects, Onslow County has had the least beach renourishment, with only one small project in the 1990s. Currently there are 16 mi of beach along North Carolina's coast (5%) that have authorized and funded storm damage reduction projects ongoing. An additional 35 mi of beaches (11%) have authorization to conduct projects, and 104 mi of additional beaches (33%) are at some stage of requesting long-term beach nourishment (storm damage reduction projects). Beach renourishment of federally authorized storm reduction projects generally occurs on three or four year intervals. Potentially 155 mi or 48% of North Carolina's beaches could be renourished regularly if resources existed, and these beaches could be potentially impacted by such activities. This does not include approximately 16 mi of beach renourished periodically by disposal from channel, inlet, and port dredging.

Table 6.6. North Carolina beach communities with federally authorized or requested storm damage reduction projects (does not include beach disposal from navigational dredging projects). *[Source: T. Jarrett, COE, pers. com., 2004]*

Beach	PROJECT LENGTH (MILES)		
	Existing	Authorized	Requested
S. Kitty Hawk & N. Kill Devil Hills		4.5	2.2
Nags Head		10.5	
Hatteras Island			53 (NC 12 project)
Ocracoke Island			17 (NC 12 project)
Bogue Banks, excluding Atlantic B.			17
Onslow Beach		1.0	
North Topsail Beach			4
Surf City			5.5
Topsail Beach		3	5.5
Figure 8 Island	2		
Wrightsville Beach	3 (every 4 yrs)		
Carolina and Kure Beach	6 (every 3 yrs)		
Caswell Beach, southern part of Oak Island		7.3	
Holden Beach		5.7	
Ocean Isle	5.3		
Sunset Beach		2.7 (needs re-evaluation)	
Total	**16.3**	**34.7**	**104.2**

Preliminary examination of commercial gill net landings data for demersal feeding surf fish in counties with differing levels of beach nourishment activity indicate some relationship may exist between beach nourishment events and low landings (DMF, unpub. data). However, more information and analysis are needed to determine if beach nourishment events negatively impact surf fish abundance, CPUE, or landings. Given the increasing numbers of existing and requested nourishment projects over time, the cumulative impacts of activities on the intertidal and subtidal communities are also expected to increase. *To adequately and correctly assess the direct and cumulative impacts of beach nourishment activities on fish, their habitat, and biological recovery rates, thorough monitoring must be conducte*d. Increasing use of beach nourishment may have a cumulative impact on fish productivity of nearshore waters through impacts on the benthic community and alteration of natural barrier island processes. *Because beach nourishment has greatly increased in recent years, there is a need to complete a comprehensive beach management plan to provide guidelines to minimize long-term impacts. In addition, efforts should be made to educate local government officials and the general public (since these groups initiate and drive the demand for beach nourishment) on natural hazards associated with dynamic coastal systems*

Fishing gear impacts

The extent of habitat damage from fishing gear varies greatly with the gear type, habitat complexity, and amount of gear contact. While MFC rules are designed to minimize commercial fishing gear impacts to fisheries habitat, these restrictions primarily focus on restricting the use of highly destructive bottom disturbing gear from most structural habitats such as oyster or SAV beds. Soft bottom habitat, because of its low structure and dynamic nature, has historically been considered the most appropriate location to use bottom disturbing gear. There are some fishery rules that restrict bottom disturbing gears in soft bottom habitat, since DMF research found that their use disturbed soft bottom substrate. These include prohibition of trawls, dredges, and long haul seines in PNAs (15A NCAC 3N .0104) and prohibition of trawls, or mechanical shellfish gear in crab spawning sanctuaries (15A NCAC 3L .0205) in the five northern-most inlets of North Carolina during the blue crab spawning season (March-August).

Fishing related impacts to fish habitat have been reviewed and compiled in federal fishery management plans for managed species and have been summarized by in fishery management plans by SAFMC and MAFMC, as well as by DMF (1999), MFC (1996), Auster and Langton (1999), and Collie et al. (2000). The MFC Habitat and Water Quality Committee (MFC 1996) compiled a list of the gears used in North Carolina waters and their probable impacts (Appendix L). The gears with the greatest potential for damage to soft bottom or other habitats include dredges and trawls. The impacts of these gears and where they are used are discussed below.

Dredging

Of gears used in North Carolina, dredges are considered to be the most habitat destructive (DeAlteris et al. 1999; Collie et al. 2000). Oyster and crab dredging are conducted in limited areas in northern Pamlico Sound and its tributaries. Oyster dredging is conducted over shell bottom and was discussed in detail in the shell bottom section. Crab dredging is allowed in one area in northern Pamlico Sound (approximately 100,653 acres), primarily on soft bottom (Map 6.5), and is opened by proclamation from Jan 1 to March 1. Crab dredges are similar to oyster dredges, although the dredge teeth are sometimes longer on the crab dredge. Because of the gears' teeth, crab and oyster dredges can dig deep into the sediment and cause extensive sediment disturbance. Crab dredges are limited to a weight of 100 lb and can only be used in January and February (15A NCAC 3L .0203). Mechanical methods, as well as trawls and pots, for the taking of crabs is prohibited in designated Crab Spawning Sanctuaries from March through August. In recent years, fishing effort has been very low, with fewer than 10 crab dredge trips reported per year. Although the amount of fishing effort is low, this gear is documented to cause significant damage (DeAlteris et al. 1999; Collie et al. 2000). *Because less habitat damaging methods are available for harvesting crabs, MFC should prohibit crab dredging.*

There are two types of scallop dredges used in North Carolina. Bay scallop dredges are used in SAV beds. Refer to the SAV section for more information on this gear. Sea scallop dredges are used occasionally in the coastal ocean off Cape Lookout. Studies have found that scallop dredges cause extensive damage to hard bottom and significantly reduce habitat complexity on soft bottom and shell hash bottom (Auster et al. 1996; Currie and Parry 1996). Habitat complexity is reduced through flattening of mounds, filling of depressions, dispersing shell hash, and removing small biotic cover such as hydrozoans and sponges (Auster et al. 1996). Sea scallop dredging primarily occurs in deep coastal waters north of North Carolina. Dredging for sea scallops off North Carolina has been a sporadic fishery, primarily located in federal waters. Since 1994 commercial landings of sea scallop meats have been very low ranging from 13,815 lb in 1999 to 206,790 lb in 1995 (DMF 2001). Because of the location of the fishery and the low level of effort, no additional restrictions appear to be needed.

Hydraulic clam dredging and clam kicking were described in detail in the SAV chapter. Mechanical clamming, including kicking and dredging, accounts for approximately 21% of the annual hard clam landings (DMF, unpub. data). The dredging and kicking activity creates trenches and mounds of discarded material in soft bottom habitat, redistributing and resuspending sediment (Adkins et al. 1983). Water jets from the hydraulic dredge can penetrate 18 inches into bottom sediments, and uproot any biotic structure present (Godcharles 1971). Dredge tracks can remain present from a few days to more than one year and recolonization by vegetation can take months to begin. Recruitment of clams and other benthic invertebrates does not appear to be affected by hydraulic dredging (Godcharles 1971). Because of the severe impacts to habitats, both hydraulic clam dredging and clam kicking are restricted to open sand and mud bottoms, including areas frequently dredged as navigational channels. The locations where mechanical clam harvest is allowed is shown in Map 6.5. There are approximately 39,517 acres that are potentially available to mechanical clam harvest in portions of Core, Bogue, and Pamlico sounds, Newport, North, White Oak, and New rivers, and a portion of the ICW in Topsail Sound. The majority of mechanical harvest areas are located in Core Sound (29,951 acres). These fisheries may be opened by proclamation between Dec 1 and March 31. At this time, no changes are necessary to protect soft habitat because of the low frequency of the activity and dynamic nature of the habitat. However some changes are needed to better protect SAV and are discusses in that section.

Bottom trawling in estuarine waters

Bottom trawling is used more extensively than dredges on soft bottom habitat in both estuarine and coastal ocean waters. Bottom trawling in estuarine waters is used primarily to catch shrimp, although some crab trawling is also conducted. Flounder trawling is restricted to ocean waters. Bottom trawls are conical nets that are towed behind a fishing vessel, held open by water pressure against a pair of "otter boards" or "doors" that are attached to the front of the net. Three components of a bottom trawl can dig into the sediment: the doors, the weighted line at the opening of the net, and the tickler chains (which are sometimes added in front of the net to improve the harvest).

Impacts of shrimp and crab trawling in estuarine waters were reviewed and compiled by DMF (1999), at the request of the MFC and were reported to the General Assembly's Joint Legislative Commission on Seafood and Aquaculture. This report found that trawling can impact fish habitat by altering the physical structure or biological components of soft bottom. Pulling trawl nets across soft bottom reduces habitat complexity by (Auster and Langton 1999):

- directly removing or damaging epifauna
- removing benthic invertebrates which produce structure like burrows and pits
- smoothing sediment features of the seafloor, such as sediment ridges and contours

Gear contact can uproot and remove plants and invertebrates attached to the seafloor, such as algae, sponges, and worm tubes, and SAV, and can expose them to predators. This structure, although small relative to other benthic habitats, is important to certain species, such as *Sabellaria* worms, for

recruitment (Wilson 1968). Gear effects on bottom were described in the SAV chapter (ASFMC 2000). Trawl doors penetrate more than the rest of the gear and will penetrate deeper in muddy substrates. The change and reduction in the structural complexity of the seafloor and increase in turbidity from trawling can reduce feeding success of filter feeding invertebrates due to gill clogging, or increase predation due to increased exposure and reduced cover. Clam trawling (clam kicking) causes severe disturbance to bottom sediments. However, a study in North Carolina found no significant effect of this fishing activity on recruitment of hard clams or abundance of other benthic invertebrates in unvegetated sandy bottom (Peterson et al. 1987).

Reduced diversity and abundance of some benthic taxa are commonly observed in areas experiencing intense fishing activities (Auster and Langton 1999). A shift in dominant species and a reduction in community stability may also occur. Long-lived species, which take more time to recover from fishing disturbance, may be temporarily or indefinitely replaced by short-lived species. Sediment resuspension by trawling can significantly increase the suspended sediment load (turbidity) over soft bottom on the outer shelf. Increased turbidity reduces light penetration and consequently reduces primary productivity of benthic microflora on the seafloor as well as phytoplankton in the water column (Auster and Langton 1999). Decreased primary productivity will affect demersal zooplankton that, in turn, supports higher trophic layers. A reduction in filter feeders on the subtidal bottom can result in reduced water clearing capacity in the water column (Auster and Langton 1999). However whether these effects, given the frequency, magnitude, and location of trawling, are having a significant negative impact on soft bottom habitat in North Carolina's estuarine system, is not known. Trawling can affect primary productivity of both soft bottom and water column by (DMF 1999):

- stimulating chemical exchange between resuspended sediment and the water column
- increasing turbidity and reducing light availability at the surface of soft bottom
- reducing primary production of benthic microalgae

Increased chemical exchange between bottom sediments and the water column (benthic-pelagic coupling) can have positive and negative effects on estuarine systems. Nutrients released into the water column can greatly increase nitrogen and phosphorus levels, stimulating phytoplankton growth, as well as enhancing secondary productivity of herbivorous zooplankton and larger prey (DMF 1999). Eventually, the remains of plankton and other organisms will settle, adding to the food available to benthic deposit feeders. However, if large amounts of organic matter are resuspended, the subsequent increase in plankton can reduce water oxygen levels, causing hypoxia and anoxia (West et al. 1994; Paerl et al. 1998). By resuspending sediments, trawling can make inorganic and organic pollutants (i.e., heavy metals and pesticides, respectively) available in the water column (Kinnish 1992; DMF 1999). Such toxins can negatively affect productivity and may also accumulate in organisms through food chain interactions.

While some consider trawling to be physically disruptive to the bottom and potentially harmful to the benthic community due to gear damage, sedimentation, predation exposure, and reduction in benthic primary production (Auster and Langton 1998), others feel that trawling may mimic natural disturbances and stimulate benthic production, enhancing fish production. In a literature review of the effects of trawling in estuarine waters, DMF (1999) noted that multiple studies demonstrated the presence and absence of long-term effects of trawling in estuarine waters. No or minimal long-term impacts were reported in Van Dolah (1991), MacKenzie (1982), and Currie and Parry (1996). Of these studies, Van Dolah (1991) was located closest to North Carolina, in a South Carolina estuary. After five months of trawling, Van Dolah (1991) found no significant change in abundance, diversity, or composition of soft bottom habitat. Studies which have found long-term habitat impacts include Collie et al. (1997), Engel and Kvitek (1998), Brown (1989), and Bradstock and Gordon (1983).

The DMF trawl report recommended that additional studies be done in North Carolina estuarine waters to better assess the impact of trawling on the estuarine environment. *Further analysis is needed to identify the location, duration and initiation of trawling over soft bottom habitat as well as over structured*

habitats, such as shell bottom and SAV. It is also important to quantify the effects of trawling on the habitat. Specific research needed to evaluate the habitat impacts of trawling include (DMF 1999):

- *Determine the intensity, duration, and spatial scale of trawling effort in different regions of North Carolina.*
- *Determine turbidity levels generated by different gear configurations and the subsequent rates of redeposition.*
- *Determine the physical effect of natural forms of disturbance to compare significance of trawling effects.*
- *Sample areas normally subjected to trawling to describe the local benthic community, identifying seasonal cycles of species abundance and recruitment, to determine the times of year that benthos would be most sensitive to trawling disturbance.*
- *Measure in situ rates of growth, mortality, and recruitment of selected benthic organisms that are exposed to trawling.*
- *Evaluate the effect of trawling on benthic algal growth and primary productivity overall.*
- *Determine the impact of trawling on secondary productivity.*

Attempting to answer questions in the DMF trawl report, Cahoon et al. (2002) studied changes in benthic microalgae, demersal zooplankton, benthic macroalgae (important food sources for recreationally and commercially important species) in the Pamlico River estuary in 1999-2000. Demersal zooplankton include small crustaceans, nematodes, and other animals that are important grazers of benthic microalgae and prey for larger fish and invertebrates. Experimental trawling was conducted to document natural seasonal changes in the benthic community, examine changes before and after experimental trawling, and compare regularly trawled and untrawled areas. No significant differences were recorded in benthic algal biomass prior to and after experimental trawling. In comparing commercially trawled and untrawled areas, benthic microalgae were more abundant in the untrawled sites. This could be because benthic algae in trawled areas are resuspended into the water column. Nematodes, an important food source for shrimp, were the most abundant demersal organism found. The authors concluded that because the soft bottom community in shallow systems is frequently subjected to disturbance (such as exposure to waves and currents), trawling was not detrimental (Cahoon et al. 2002). However, since the experimental treatment consisted of one trawling pass, observed changes do not accurately reflect those consistent with chronic trawling. A key issue in determining if trawling is having a negative impact to soft bottom communities is the frequency and intensity of disturbance. *Further analysis is needed to spatially quantify where, how often, and when trawling occurs in specific areas of soft bottom habitat.*

The impact of trawling and associated bottom changes on fish populations also depends in part on each species' habitat dependence (Auster and Langton 1998). Where a life stage of a demersal species is highly dependent (obligate) on the structural components of a habitat where trawling occurs, particularly for recruitment, there is a greater potential for that species to be impacted by trawling (Auster and Langton 1998). However, if individuals can move to and survive in alternative habitats, impacts may be less severe (i.e., adult flounder foraging over ocean bottom can occupy other habitats) (DMF 1999). Primary nursery areas and inlets are described as "recruitment bottlenecks" for estuarine dependent species in DMF (1999). Since larval flounder, shrimp, and Atlantic croaker must pass through inlets and recruit to shallow PNAs, trawling impacts in inlets and PNAs could be greater than trawling in ocean waters. *Protection of these "recruitment bottlenecks" from trawling or other impacts is therefore very important for estuarine dependent fish and invertebrates.* The current MFC restrictions on trawling protect PNAs. However, there are productive shallow water areas of soft bottom that are not designated as primary or secondary nursery areas but still serve as important habitat to many juvenile fish and invertebrates. *Shallow areas where trawling is currently allowed should be re-examined to determine if additional restrictions are necessary.* There are also other non-habitat related concerns regarding trawling in estuarine waters, including bycatch or socio-economic reasons which may warrant additional restrictions on trawling in estuarine waters. *However, further studies are needed to more accurately assess if trawling is having a negative effect on soft bottom habitat and justify if additional closures are*

necessary for habitat concerns.

Bottom trawling in ocean waters

Many studies have been conducted around the world assessing the effect of trawling on soft bottom habitat in offshore waters. A thorough review of literature on fishing impacts to continental shelf benthos quantified impacts via a meta-analysis, examining data derived in part from studies of otter trawl effects on subtidal bottom in eastern North America (Table 6.7) (Collie et al. 2000). Some of their conclusions included:

- Otter and beam trawling were found to have fewer negative impacts on benthos than intertidal or scallop dredging or intertidal raking.
- In subtidal bottom, sand habitats were the least impacted, and muddy sand and gravel the most impacted.
- In muddy sand, polychaetes and large bivalves were most negatively impacted. Smaller bodied organisms are displaced by pressure waves in front of fishing gear.
- Depth and scale of fishing had insignificant effect on initial impact but significant effect on recovery. Recovery is slower where the spatial scale of impact is larger and in deeper waters where the bottom is more stable.
- Recovery was most rapid in less physically stable habitats such as sandy bottom (recovery in sand, estimated from modeling, was approximately 100 days).
- Benthos most impacted were Anthozoa (corals and anemones) and Malacostraca (crabs, amphipods), while copepods and ostracods were least impacted.
- Benthos had more negative responses to chronic disturbances than to acute disturbances.
- Epifaunal organisms are less abundant in areas subjected to intensive bottom fishing.
- Results suggested that fish and benthos in areas heavily fished would shift from communities dominated by high biomass species towards those with high abundance of small-sized organisms.
- *Large- scale long-term experiments with and without fishing pressure are needed, rather than short-term small-scale studies, to examine and better quantify cumulative fishing impacts and recovery patterns.*

Table 6.7. Trawl impact studies on the continental shelf of eastern North America.

Reference	Habitat	Depth (m)	Recovery Period (days)
Van Dolah et al. (1991)	Hard bottom	20	365
Kaiser et al. (1996)	Gravel	94	n/a
Van Dolah et al. (1991)	Sand	20	180
Van Dolah et al. (1991)	Sand	8	180
Auster et al. (1996)	Sand	30	3,650

These conclusions suggest that the dynamic soft bottom community found in nearshore ocean communities is less impacted by trawling and recovers much quicker than in estuarine systems. However, some long-term impacts to the benthic community may occur, especially to the epibiota depending on the frequency of trawling, and site-specific characteristics.

Status and trends of estuarine and ocean trawling

Trawling is primarily allowed in relatively deeper soft bottom areas. Maps 4.8 - 4.10 (from shell bottom) show the areas where trawling is currently not allowed in estuarine waters. Use of trawl nets is not allowed in Albemarle Sound and is not allowed for taking of finfish in internal (estuarine) waters (15A NCAC 3L .0205, 15A NCAC 3J .0104(a&b)). Shrimp trawling is not allowed in primary or secondary nursery areas (15A NCAC 3N .0105), or in No Trawl Areas (15A NCAC 3R .0106). In North Carolina, bottom trawling in ocean waters is prohibited over hard bottom but is allowed over most soft bottom

communities. Trawling is prohibited in military prohibited areas (15A NCAC 3I .0110 and 3R .0102), a designated sea turtle sanctuary seaward of Onslow Beach from June 1 to August 31 (15A NCAC 3I .0107 and 3R .0101), within 0.5mi of the beach from Virginia to Oregon Inlet (15A NCAC 3J .0202), and in designated crab spawning sanctuaries from March 1 to August 1 (15A NCAC 3L .0205). Map 6.6 a-c shows areas where trawling and some other gears are restricted over soft bottom in ocean waters. The purpose of these regulations is to protect spawning areas and reduce bycatch or user conflicts.

Annual effort with various commercial trawling gears in North Carolina waterbodies is shown in Table 6.8 (DMF, unpub. data). Commercial shrimp trawling accounts for the majority of trawl trips (92% in 2002) (Table 6.8). About 75-80% of shrimp trawl trips occur in estuarine waters, with the remainder in ocean waters, primarily within state territorial seas (<3 mi offshore) off the central and southern coast of North Carolina. Total annual shrimp trawling effort has decreased since 1995 by about 5,500 trips. Total annual shrimp trawling effort has fluctuated with shrimp abundance but appears to have gradually declined since 1994. However, the lower commercial fishing effort observed from 1999 – 2002, compare to earlier years is thought to be mostly due to a change in licensing procedure (R. Carpenter, DMF, pers. com., 2004). In 1999 a recreational commercial gear license became available to fishermen. Under this license, shrimp may be caught recreationally using a trawl, but cannot be sold. Some fishermen with commercial licenses prior to this, switched from a standard commercial gear license (SCGL) to a recreational commercial gear license (RCGL). Effort from RCGL licenses are not included in the data shown in Table 6.8. In 2002 approximately 5000 trips for shrimp were reported (DMF, unpub. data).

Regionally, shrimp trawling effort has generally been greatest in Core and Bogue sounds and associated estuaries (3,400-7,200 trips/year) (Table 6.8). Pamlico Sound and associated rivers and estuaries account for the second largest number of trawl trips per year, ranging from 2,900-5,500 trips/year. In 2000 and 2002, however, the Pamlico region accounted for slightly more trips than the Core/Bogue waters. Decreased effort in Core/Bogue sounds is not attributed to changes in shrimp management or habitat condition. In ocean waters, shrimp trawling is highly concentrated in the southern portion of the state (Onslow through Brunswick counties), primarily in the summer (approximately 2,300-3,400 trips/year) (Figure 6.6). In contrast, the annual effort in the central district (Carteret County) has ranged from 137 to 457 trips per year, and in the northern district (Virginia line through Hyde County) has ranged from 2 to 69 trips per year. Commercial shrimp trawl effort has remained relatively stable over time in the southern portion of the state.

Over 99% of crab trawling occurs in estuarine waters, while all directed flounder trawling (specially targeting flounder) occurs in ocean waters (i.e., no directed trawling for finfish is allowed in internal waters). The majority of crab trawling occurs in Pamlico Sound and adjacent estuarine rivers, followed by Core/Bogue sounds and estuaries. Flounder trawling effort occurs primarily in the northern and central portions of North Carolina's coastal waters. Effort in the northern district has varied from 14 trips in 1994 to 123 trips in 2002. In the central district, trips seem to be declining over time with a peak of 95 trips in 1996 and 19 trips in 2002 (Table 6.8). Overall, current bottom trawling effort in estuarine waters for all fishery species is greatest in Pamlico Sound and associated estuaries.

Table 6.8. Annual number of trips reported for shrimp, crab, and flounder trawls in estuarine and ocean waters [1], 1994-2002 (DMF, unpub. data).

Shrimp trawl								
	Estuarine rivers and sounds				State ocean waters (<3 mi)			
Year	Albemarle estuaries	Core/Bogue estuaries	Pamlico estuaries	Southern estuaries	Northern district	Central district	Southern district	Total
1994	2	7,186	4,869	3,066	3	223	3,409	18,758
1995	0	7,252	5,185	3,361	41	316	3,414	19,569
1996	32	6,070	2,903	2,352	13	327	2,630	14,327
1997	1	5,745	4,790	2,722	23	229	2,742	16,252
1998	0	4,679	1,864	2,053	2	376	2,834	11,808
1999	1	4,868	4,105	2,178	18	457	3,468	15,095
2000	1	3,462	5,556	1,946	69	311	2,657	14,002
2001	0	3,534	3,211	1,273	6	137	2,528	10,689
2002	3	3,763	4,917	1,622	2	210	2,384	12,901

Crab trawl								
	Estuarine rivers and sounds				State ocean waters (<3 mi)			
Year	Albemarle	Core/Bogue	Pamlico	Southern	Northern district	Central district	Southern district	Total
1994	12	238	3,523	36	2	13	0	3824
1995	0	207	1,895	102	0	1	0	2205
1996	9	197	4,058	51	0	2	0	4317
1997	0	657	4,193	198	0	0	0	5048
1998	1	542	5,103	63	1	0	0	5710
1999	0	410	3,127	32	0	0	0	3569
2000	1	265	1,985	50	0	0	0	2301
2001	1	397	2,093	107	0	0	0	2598
2002	7	87	811	79	0	0	0	984

Flounder trawl								
	Estuarine rivers and sounds				State ocean waters (<3 mi)			
Year	Albemarle	Core/Bogue	Pamlico	Southern	Northern district	Central district	Southern district	Total
1994	0	0	4	1	14	35	0	54
1995	0	1	13	6	43	45	0	108
1996	0	1	5	0	17	95	0	118
1997	0	0	11	2	22	46	0	81
1998	0	0	1	0	115	87	0	203
1999	0	0	0	0	99	70	0	169
2000	0	0	0	0	84	22	0	106
2001	0	0	0	0	74	30	0	104
2002	0	0	0	0	123	19	0	142

[1] Albemarle Area: Albemarle Sound, Currituck sound, and all tributaries of Albemarle Sound.
Pamlico Area: Pamlico, Croatan, and Roanoke sounds; Pamlico, Bay, Neuse, and Pungo rivers.
Core/Bogue Area: Core and Bogue sounds; Newport, White Oak, and North rivers.
Southern Area: Masonboro, Stump, and Topsail sounds; Cape Fear, New, Shallotte, and Lockwood Folly rivers; ICW.
Northern district ocean waters: Virginia line through Hyde County.
Central district ocean waters: Carteret County.
Southern district ocean waters: Onslow County to the South Carolina line.

Water quality degradation

The condition of soft bottom is determined by the character and quality of bottom sediments and the quality of the overlying water column. Solids and organic matter in the water column eventually settle out and become a part of the soft bottom habitat. However, soft bottom sediments can also be resuspended by disturbances (e.g., storms and human activities such as dredging). The cycling of

material between the bottom and the water column was discussed previously in this chapter and in the water column chapter. In general, bottom sediments tend to act more as a sink than a source with regards to benthic-pelagic coupling. Aquatic organisms can accumulate pollutants from the sediment or the water column. Because water quality inevitably affects soft bottom (i.e., anoxia in the water column leads to increased production of hydrogen sulfide (H_2S) a gas that is toxic to aquatic life, in bottom sediments), many of the same threats to the water column are threats to soft bottom. The primary pollutants of concern to soft bottom are discussed below.

Toxic chemicals

Toxic chemicals that tend to accumulate in bottom sediments include:

- heavy metals
- polycyclic aromatic hydrocarbons (PAHs)
- petroleum hydrocarbons
- pesticides
- polychlorinated biphenyls (PCBs)
- ammonia

Of the heavy metals, arsenic, copper, cadmium, chromium, nickel, lead, zinc, tin, and mercury are among the greatest concerns. While toxins can fluctuate between the sediment and water column, concentrations of toxic chemicals tend to accumulate in sediments to several orders of greater magnitude than overlying waters (Kwon and Lee 2001). The bioavailability and transport of a chemical depends on the form of the chemical incorporated into the sediments, the feeding habits and condition of aquatic organisms, and the physical and chemical conditions of the environment. Because toxins can accumulate and persist over time, even chemicals that have been banned since 1977, such as DDT, Diedrin and TBT, continue to be found in sediments (Marburger et al. 2002). Toxic chemicals can become active in soft bottom sediment or overlying waters through several mechanisms, including resuspension from natural weather events or human activities. Toxins can also be active in surface waters , when dry sediment is hydrated from rainfall or runoff, toxic chemicals in the soils become oxidized, and heavy metals are released and transported downstream by heavy rains or water movements. Also, several studies have shown that mercury and other metals are released from peat soils subjected to intensive drainage (Evans et al. 1984; Gregary et al. 1984).

Because low concentrations of heavy metals in the water column can be easily incorporated into fine-grained sediment, chemicals can accumulate in the sediment to toxic levels and be resuspended into the water column (Riggs et al. 1991). Studies have shown that fine-grained sediments are the primary reservoir for heavy metals, particularly organic rich muds (ORM) (Riggs et al. 1991). Since organic rich muds are the most extensive sediment type in North Carolina's estuaries and since many primary nursery areas are composed of ORM, resuspension of contaminated ORM sediments in PNAs is of particular concern.

Contaminated sediments affect benthic feeding fish and invertebrates in several ways. Some toxins can inhibit or alter reproduction and development of marine and aquatic organisms, or cause mortality in some situations (Gould et al. 1994; Weis and Weis 1989). Large spills of toxic chemicals, such as pesticides or petroleum products, can result in fish kill events. In North Carolina, spills of pesticide, chlorinated water, and sewage waste were responsible for 8% of fish kill events in 2001 (DWQ 2001). Some heavy metals and pesticides cause hormone alterations that affect reproduction (Wilbur and Pentony 1999). Certain PAHs have been shown to cause mutations or cancer in fish (White and Triplett 2002). Documented effects of PAHs to flatfish include DNA damage, liver lesions, and impacts on growth and reproduction (Johnson et al. 2002).

Early life stages (embryos and larvae) of fish are most susceptible to toxins (Gould et al. 1994; Funderburk et al. 1991; Rice et al. 2001). Visible indications of heavy contamination are development of lesions, deformities, and tumors on fish or high mortality rates of larvae. Anadromous fish larvae are particularly sensitive to many toxins (Funderburk et al. 1991). In Alaskan waters, salmon eggs and larvae were killed and damaged for up to four years following long-term exposure to low concentrations of weathered crude oil, and migrating salmon fry had reduced growth rates and population reductions (Rice et al. 2001). Mollusks are known to be very sensitive to petroleum products, pesticides, and TBT, with relatively low levels of exposure affecting reproduction, tissue development, growth, and survival (Funderburk et al. 1991) (refer to shell bottom section for toxicity levels). Because macrobenthic invertebrate diversity significantly declines with increasing sediment contamination (Brown et al. 2000; Dauer and Weisberg 2000; Weis et al. 1998), food resources for benthic feeders may be limited in areas having significant contamination.

Lethal and sublethal levels of toxicity are known for some benthic aquatic species. However, most information comes from acute toxicity tests conducted in laboratory settings on standard test species. Data are lacking on chronic or sublethal toxicity levels for many important fishery species and interactions of contaminants in the field. Following oil spills, sub-lethal levels of contamination can delay population recovery due to indirect effects, and may lead to increased fish mortality where predation risk is size-dependent (Peterson et al. 2003). *More information is needed on the in situ effects of various contaminant levels, in combination with other contaminants and existing environmental stressors, to many important fish species in North Carolina.*

While the survival of some aquatic organisms is affected by toxins, other organisms survive and bioaccumulate the chemicals to toxic levels, passing them along in the food chain. Multiple studies have shown clear connections between concentrations of toxins in sediments and those in benthic feeding fish and invertebrates (Marburger et al. 2002; Kirby et al. 2001). Heavy metal contamination of sediments has been documented to result in elevated trace metal concentrations in benthic feeding striped mullet, shrimp, oysters, and flounder (Kirby et al. 2001; Livingstone 2001). Largemouth bass and catfish, stocked in a restored and flooded freshwater wetland, had high concentrations of organochlorine (chlordane, DDT, dieldrin) and internal contaminants were significantly correlated to contaminant levels in the sediment (Marburger et al. 2002). Toxic contaminants are also considered one of the most serious threats to native freshwater mussels, which are the most imperiled fauna in North America (Keller 1996).

The bioaccumulation of toxins in fish may pose a risk to human health. High levels of mercury have been found in four saltwater fish species (sharks, swordfish, tilefish, and king mackerel) and three freshwater species (bowfin, largemouth bass, and chain pickerel). Fish consumption advisories have been posted for all of these species (Div. Health Human Services website, 10/2003). The saltwater fish consumption advisory for sharks, swordfish, tilefish and king mackerel covers the entire state of North Carolina and much of the lower East Coast. The fish advisory for bowfin, largemouth bass and chain pickerel extends south and east from Interstate 85. In addition, several site-specific advisories exist. Those are listed on the DHHS website. Limits on consumption of catfish and carp due to dioxin contamination exist for Albemarle Sound, the lower portion of Roanoke River from Williamston to the mouth of Albemarle Sound, all of Welch Creek, a tributary of Roanoke River, and Walters Lake, a reservoir.

Toxic chemicals come from localized point sources as well as diffuse nonpoint sources. Point sources include industrial and municipal waste discharges. Nonpoint sources of toxins include urban runoff containing household and yard chemicals, roadways, marinas and docks, boating activity, runoff from agriculture and forestry, industrial emissions, spills from industrial shipping, and dredge spoil disposal (Wilbur and Pentony 1999). Refer to the water column section for more detailed information on the sources of toxic chemicals.

The extent of sediment contamination in North Carolina coastal waters is not well known. Sediment

sampling is not conducted by the DWQ since there are no sediment standards in the state. Studies examining sediment contamination at sites in North Carolina soft bottom have found various levels of contamination. The EPA Environmental Assessment Program surveyed 165 sites within North Carolina's sounds and rivers during 1994-1997 to evaluate condition of bottom sediments (Hackney et al. 1998). Highest contamination levels occurred in low salinity areas with low flushing and high river discharge. Benthic populations were dominated by tolerant opportunistic species and benthic communities had low species richness. Laboratory bioassays showed that sediments from many sites were toxic to biological organisms. However, because of the low sample size, frequency of sampling, and the confounding effects of hypoxia in areas sampled, results from this study may not accurately assess the condition of North Carolina sediments (C. Currin, NOAA, pers. com., 2003).

Concentrations of heavy metals in the Neuse and Pamlico estuaries have been assessed (Riggs et al. 1991; Riggs et al. 1989). In the Neuse River, surface sediments were found to contain elevated levels of several heavy metals, including zinc, copper, lead, and arsenic. Furthermore, 17 areas between New Bern and the mouth of the river were identified as "contaminated areas of concern". The contaminated sites were primarily attributed to permitted municipal and industrial treatment plant discharges. Marinas were also found to contribute substantial amounts of copper and variable amounts of zinc and lead. Non-point sources were more difficult to evaluate. In the Pamlico River, heavy metal contamination was less severe, although arsenic, cobalt, and titanium exceeded the levels found in the Neuse River. These studies suggest that sediment contamination in some estuarine areas, especially those where both organic rich mud and waste water discharges are present, may be significant and could affect fish populations and the base of their food chain. *To better determine if contaminated sediment is a significant threat to coastal fish habitat, the distribution and concentration of heavy metals and other toxic contaminants in freshwater and estuarine sediments needs to be adequately assessed and areas of greatest concern need to be identified. Continued minimization of point and nonpoint sources of toxic contaminants is vital for protecting not only soft bottom but also the other fisheries habitat.*

Nutrients

Increased nutrient loading and accumulation in bottom sediments is another concern to this habitat. The effects of nutrient enrichment are complicated by additional stressors, such as toxins or hydrological modifications, and by benthic-pelagic coupling (Riedel et al. 2003). High concentrations of organic material in bottom sediments serve as continual sources of additional nutrients to the water column, which can fuel algal blooms. In the shallow Neuse River estuary, high but variable rate of exchange of nutrients between the water column and soft bottom were noted, with soft bottom efficiently storing and providing nutrients that can fuel algal blooms that may lead to hypoxia (Luettich et al. 1999). When nutrient loading reductions occur, a decline in nutrient levels may not be observed in a water body until the nutrient supply in the sediment is depleted (Luettich et al. 1999), making management strategies difficult to evaluate in the short term. Work is currently underway to determine the contribution of resuspended nutrients from bottom sediments to phytoplankton production (<http://www.marine.unc.edu/Paerllab/research/mudboy>, 2003). *Long-term monitoring is required, in combination with management actions that reduce discharge concentrations, to determine effectiveness and future management needs.*

Soft bottoms in North Carolina's estuaries tend to store nutrients for several reasons (Peterson and Peterson 1979). Small clay sized sediment particles that are abundant in ORM adsorb nutrients readily. In addition, suspension feeding invertebrates remove nutrients and particles from the water column which later are transformed and deposited on the bottom as feces (a process known as biodeposition). These nutrients can become stored in the sediment, but later can be resuspended into the water column, maintaining nutrient concentrations at high levels in estuarine waters. The ebb and flood circulation increases the residence time of particles in estuarine waters, further retaining nutrients in the system (Peterson and Peterson 1979). Results from extensive monitoring in the Neuse River found that large quantities of nutrients were stored in the sediment. Refer to the water column section for detailed

discussion of the sources and status of nutrient enrichment in the water column.

Oxygen-depleted sediment

Adequate supply of dissolved oxygen is critical to survival of sessile benthic invertebrates and fish living on or in soft bottom habitat. In freshwater systems, low oxygen levels resulting from eutrophication has been suggested as an important source of mortality in mussels (Neves et al. 1997). In mesohaline estuaries low oxygen events occur when the water column becomes stratified for a long period, particularly during summer in areas of deeper water (Tenore 1972). If stratification persists, hypoxic events in the water column can cause changes in the physical and chemical conditions at the sediment-water interface, lead to stress or mortality of benthic organisms, and reduce species richness (Tenore 1972). In the benthic community, polychaetes tend to be most tolerant to low oxygen, followed by bivalves and then crustaceans (Diaz and Rosenberg 1995). Severe oxygen depletion in the sediment also results in release of toxic levels of sulfide into bottom waters (Luettich et al. 1999).

Mass mortality of benthic infauna due to anoxia and toxic sulfide levels has been documented in the deeper portions of the Neuse River estuary, in association with stratification of the water column in the summer (Luettich et al. 1999; Lenihan and Peterson 1998). During these events, oxygen depletion caused mass mortality of infauna such as clams and worms. Epifauna like oysters and mud crabs and some benthic fish, like blennies, also died when adequate tall refuge (oyster reefs) with oxygenated water was not available (Lenihan and Peterson 1998). More mobile benthos, such as blue crabs, left their burrows when oxygen was not available and moved to shallower or higher areas. In 1997 during a large hypoxic event in the Neuse River estuary, the abundance and biomass of *Macoma balthica* and *M. mitchelli*, the dominant benthic invertebrates and critical food sources for demersal fishes such as spot and croaker, declined by 90 - 100% over a 100 km^2 area (Buzelli et al. 2002). The areas of high benthic mortality coincided with the area estimated to have been the most severely oxygen depleted.

Low oxygen in bottom sediments can also affect the primary productivity of soft bottom and predation on the benthic community. Benthic microalgae are limited to oxygenated sediments (MacIntyre et al. 1996). During a severe anoxic event, mortality of benthic microalgae can occur, due to anaerobic sediments and the higher turbidity that often accompanies the stratification of the water column (M. Posey, UNC-W, pers. com., 2003). Predation on members of the benthic community by species such as flounder, spot, blue crabs, and croaker generally increases in the short-term since burrowing organisms tend to move into the shallowest sediment layers to avoid sulfide release and lack of oxygen in deeper sediments (Luettich et al. 1999). However, the overall reduction in prey could decrease long-term fish production (P. Peterson, UNC-CH, pers. com., 2004). Results from statistical modeling, utilizing field data from the Neuse River, indicated that benthic invertebrate mortality, resulting from intensified hypoxia events, reduced total biomass of heterotrophs (demersal predatory fish and crabs) during the summer by 51% in 1997 and 17% in 1998 (Baird et al. 2004). The decrease in available energy (fewer benthic invertebrates) greatly reduced the ecosystem's ability to transfer energy to higher trophic levels at the time of year most needed by juvenile fish (Baird et al. 2004).

When the benthic community is depleted by a low oxygen event, the pattern of recolonization of the soft bottom will affect higher trophic levels differently over time (Luettich et al. 1999). Opportunistic, fast-growing species of polychaetes and copepods will begin to recolonize the bottom first. Juvenile clams and larger polychaetes will recruit afterwards. The various successional stages may affect or benefit different benthic feeders to differing extents. For example, early successional communities composed of very small, shallow-burrowing opportunists (capitellid worms) and meiofauna may favor small species, such as penaeid shrimp and larval and juvenile croaker and red drum, but not provide food for large adult fish species. Partially recovered benthic communities consisting of polychaetes and small juvenile clams could benefit demersal species like spot, croaker and blue crabs. A fully recovered community with deep burrowing polychaetes and large clams might benefit adult spot and hogchoker but not benefit shrimp (Luettich et al. 1999).

While hypoxia and anoxia can occur naturally, they can also be attributed, in part, to anthropogenic changes in the system, including excess nutrient and organic loading from waste discharges, nonpoint runoff, streambank erosion, and sedimentation (Schueler 1997). In the Neuse River system, MODMON studies found that the sediment oxygen demand is much greater than the biological oxygen demand in the water column. Oxygen depletion in the water column was positively correlated with accumulation of organic material in the sediments (Luettich et al. 1999). Site-specific information on sediment condition is generally lacking in other areas of North Carolina. Several studies have indicated that the frequency, duration, and spatial extent of low oxygen events have increased over the years due to increasing eutrophication of coastal waters from human and animal waste discharges, greater fertilizer use, loss of wetlands, and increased atmospheric nitrogen deposition (Buzelli et al. 2002; Paerl 1985; Cooper and Brush 1991; Dyer and Orth 1994). *More information is needed to understand the consequences on the estuarine food web and to what extent anoxia is impacting the soft bottom community.* As hypoxia and anoxia of bottom sediments becomes more frequent, the quality of soft bottom habitat will deteriorate. *Efforts are needed to reduce anthropogenic nutrient loading, particularly in systems that have a history of hypoxia and anoxia.* Fish kill events that have been attributed to low oxygen can be used as an indication of these hot spot areas.

Turbidity and sedimentation

Organisms in soft bottom habitat are adapted to shifting and changing sediments. Shoreline erosion and stormwater runoff transport sediment into coastal waters, which helps maintain shallow water habitat. However, when sedimentation is excessive, there can be negative impacts. Impacts of sedimentation include (Schueler 1997):

- Physical smothering of benthic invertebrates
- Reduced survival of fish eggs
- Destruction of fish spawning areas in freshwater streams
- Elimination of sensitive species such as anadromous fish or darters
- Increase in sediment oxygen demand and depletion of oxygen
- Decline in freshwater mussels
- Reduced channel capacity, and subsequent acceleration of downstream bank erosion and flooding

The primary areas that are adversely affected by sedimentation are freshwater systems and upstream estuarine systems. The effects of sedimentation can be very gradual. Excessive deposition of sediments in a stream over time causes the depth and velocity to decrease and the width to increase. Consequently, the number and depth of riffle pools, and the temperature gradients within them, decrease. These riffle pools are important habitat for some fish species, such as minnows and darters (AFS 2003). The deposition of silt and fine sediment in gravel bottom rivers and streams fills the interstices of the gravel, and can decrease dissolved oxygen content if the organic content is high. Most North Carolina coastal rivers and streams do not consist of gravel substrate, however.

Excess sedimentation can reduce or eliminate aquatic insect larvae from stream bottoms (AFS 2003). These larvae are the basic fish food source in freshwater streams, and impacts to them can affect the productivity of associated fish species (AFS 2003). High levels of suspended sediment in an estuarine or marine habitat can greatly reduce successful settlement of larval clams and oysters, and can smother other benthic invertebrates (AFS 2003). In some areas, historic oyster bars have been completely covered with fine sediment and mud (P. Peterson, UNC-CH, pers. com., 2004). Refer to the water column section for information on habitat degradation from sedimentation and options for addressing sedimentation.

Excessive sedimentation has been cited as the major cause of freshwater mussel decline in the United States since the late 1800s (Box and Mossa 1999; Neves et al. 1997). Poor land use practices, including

construction and road building activities, agriculture, and forestry, dams, reservoirs, and channelization are among the causes cited for sedimentation (Box and Mossa 1999; Neves et al. 1997). Because freshwater mussels are dependent on specific host fish to complete their reproductive cycle, changes in resident fish populations due to dams channelization, or other habitat alterations, jeopardize survival of mussels (Neves et al. 1997). The decline in mussel populations in North Carolina is considered severe (Neves et al. 1997). Over 50% of approximately 60 native freshwater mussels are designated Endangered, Threatened, of Special Concern within the state and approximately 22 of these occur within coastal draining riverbasins (Neves et al. 1997; <http://www.ncwildlife.org>, April 2004). The Tar River spinymussel (*Elliptio steinstansana*) and dwarf wedgemussel (*Alasmidonta heterodon*) are federally and state endangered species that occur in the upper Tar and Neuse rivers, respectively (<http://www.ncwildlife.org>, April 2004). Since these species are highly sensitive to water quality and habitat degradation, freshwater mussels are often considered an excellent early biological indicator of freshwater stream condition.

Existing management measures

The majority of the management measures discussed in the water column and other habitat sections would also benefit soft bottom by reducing loading of point and non-point pollutants. Recently, several actions have been taken regarding beach nourishment and management of intertidal and subtidal ocean soft bottom habitat. The North Carolina General Assembly enacted House Bill 1840 in the 2000 Session, which required DENR to prepare a Beach Management Plan (DENR 2000b) and make recommendations on several related policy issues. This plan was to be completed by April 2001, although no funding was allocated for this task. *Completion of a beach management plan using the best scientifically based information could be helpful in directing beach nourishment activities in a manner that minimizes impacts to the soft bottom community.*

In addition, the Legislative Research Commission studied the cost, need, and feasibility of beach nourishment, and submitted a report to the 2001 Session of the General Assembly on Coastal Beach Movement, Beach Renourishment, and Storm Mitigation as mandated by the 1999 General Assembly (Legislative Research Commission 2001). The focus of this report was on economics more than environmental impacts, however. As impacts from beach nourishment are increasingly documented and the magnitude of this activity increases, the scientific community has expressed concern regarding the long-term consequences to fish habitat. An environmental forum on beach nourishment was held in April 2001 by the North Carolina Coastal Federation to compile information and knowledge of scientists on beach nourishment and associated impacts to the marine and estuarine environment. In 2000, the MFC adopted a beach nourishment policy that provides specific suggestions and guidance to agencies concerning effects of beach nourishment on fisheries stocks and the habitats on which they depend. Policies call for avoidance, minimization, and mitigation for impacts that do occur, monitoring to document pre- and post- conditions, and assessments that take cumulative impacts into account (Appendix K).

In July 2001, the USFWS designated 1,798 miles of intertidal and supratidal (dry) beaches and dunes to the mean low water (MLW) in eight states as Critical Habitat for the wintering population of piping plover (*Charadrius melodus*). Critical Habitat is defined in the Endangered Species Act as a specific geographic area that is essential for the conservation of a threatened or endangered species and that may require special management and protection (<http://endangered.fws.gov/listing/critical_habitat.pdf>). This may include suitable habitat that is not currently occupied by the species but is needed for its recovery, thereby providing more habitat protection. Federal agencies are required to consult with the USFWS to ensure that any federal actions do not adversely modify Critical Habitat functions, including areas not currently occupied by a designated species. This action, by providing protection to intertidal benthos, which plovers feed on, should also benefit benthic feeding surf fish. There are 18 designated areas in North Carolina, primarily inlet systems and adjacent shoals and spits. Refer to website (<http://plover.fws.gov>) for maps of the designated areas.

Another federal initiative that provides resource protection to ocean soft bottom habitat is the Coastal Barrier Resources Act (COBRA), that began in 1982. The COBRA Act (16 U.S.C. ээ 3501-3510) generally restricts federal spending for establishment or expansion of infrastructure (roads, wastewater systems) and disaster relief funds in high-risk coastal areas. It also prohibits federally guaranteed low-cost flood insurance from designated areas that might contribute to development on designated undeveloped barrier islands. The restrictions are intended to discourage unwise development in ecologically sensitive areas. In North Carolina, some of the areas requesting storm damage reduction projects (portions of Cape Hatteras and North Topsail Beach) are located within federally designated Coastal Barrier Resources Act (COBRA) sites (Map 6.3 a-c). A recent report to Congress estimated that the COBRA has saved taxpayers approximately $1.3 billion, and that about $200 million in disaster relief funds could be saved by 2050 (<http://www.fws.gov/cep/cbrtable.html>, 2003). This act demonstrates an innovative strategy to protect undeveloped natural resources through economic disincentives, while imposing no new regulations on how an individual may develop their land. *Funding for beach nourishment in designated COBRA areas should not be supported by state or local funds.*

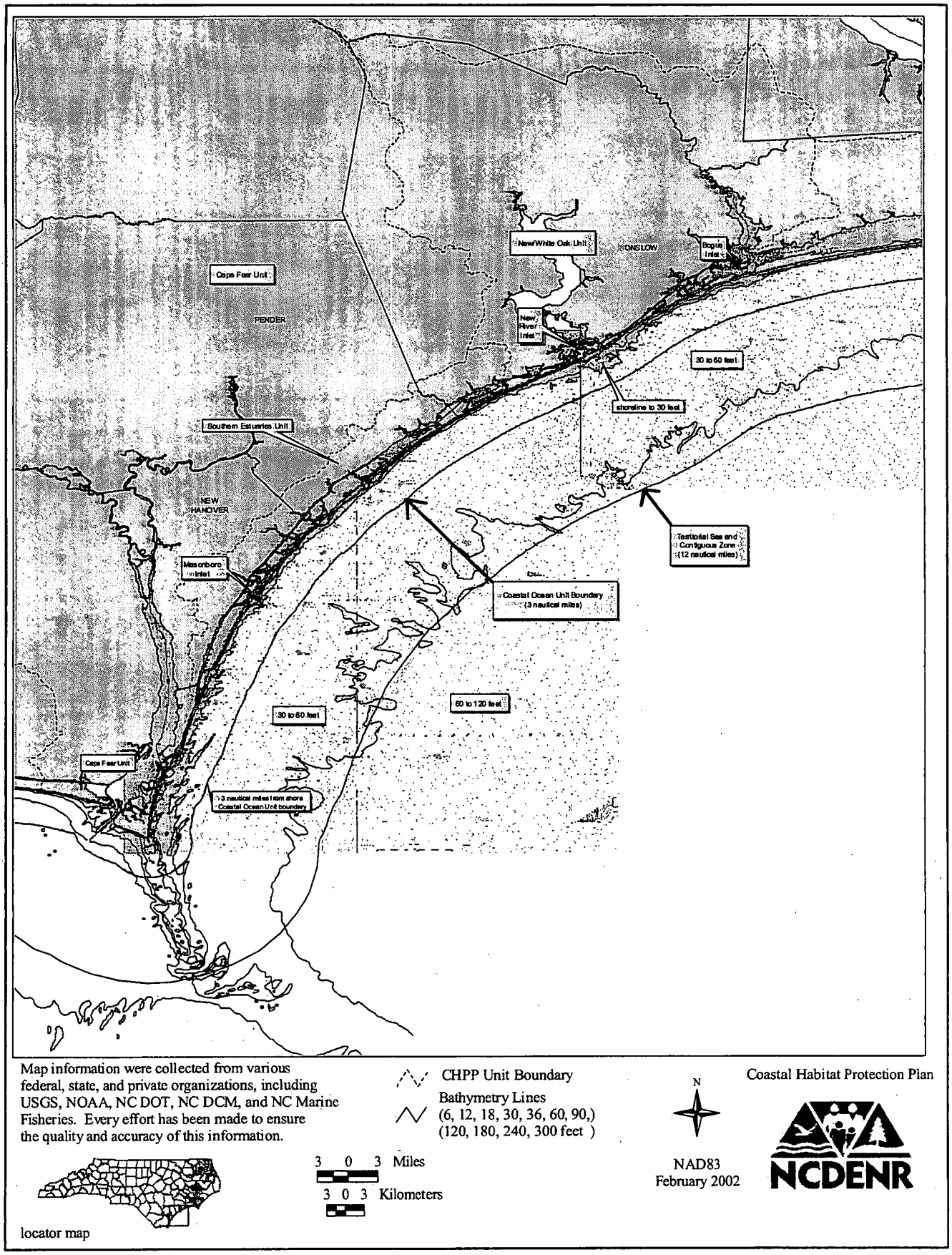
6.5 SUMMARY OF SOFT BOTTOM CHAPTER

Soft bottom habitat is the unvegetated bottom sediment in all coastal systems, and includes features such as inlets, shoals, channel bottoms, intertidal ocean beaches, and cape shoals. Soft bottom plays a key role in primary productivity in shallow estuarine and marine systems. This habitat strongly influences the water column through dynamic cycling processes, storing and releasing nutrients and chemicals over time. Other ecosystem functions of soft bottom include the reduction of physically destructive storm effects on oceanfront beaches, and providing sand sources for barrier island and inlet migration. Soft bottom habitat is particularly important as a foraging area for all size ranges of bottom feeding fish and invertebrates, such as blue crabs, shrimp, flounders, striped mullet, spot, croaker, and kingfish. Burrowing mollusks (i.e., hard clams, coquina clams), flatfishes (i.e., southern flounder, hogchoker) and baitfish (i.e., striped mullet) are highly associated with shallow soft bottom, while larger benthic feeding predators (i.e., weakfish, coastal sharks, sturgeons) typically utilize deeper soft bottom areas. Valued fishery species that depend on healthy soft bottom habitat include hard clams, shrimp, blue crabs, southern flounder, Atlantic croaker, striped mullet, kingfish, and spot. Of these, the DMF stock status of Atlantic and shortnose sturgeons, southern flounder, and coastal sharks was Overfished. Striped mullet and Atlantic croaker were listed as Concern. The Atlantic sturgeon, which is classified as Overfished, has been under a fishing moratorium since 1991 but has not shown signs of recovery. Coastal inlets have been federally designated as Habitat Areas of Particular Concern for blue crab, estuarine-dependent snapper and grouper, penaeid shrimp, and red drum.

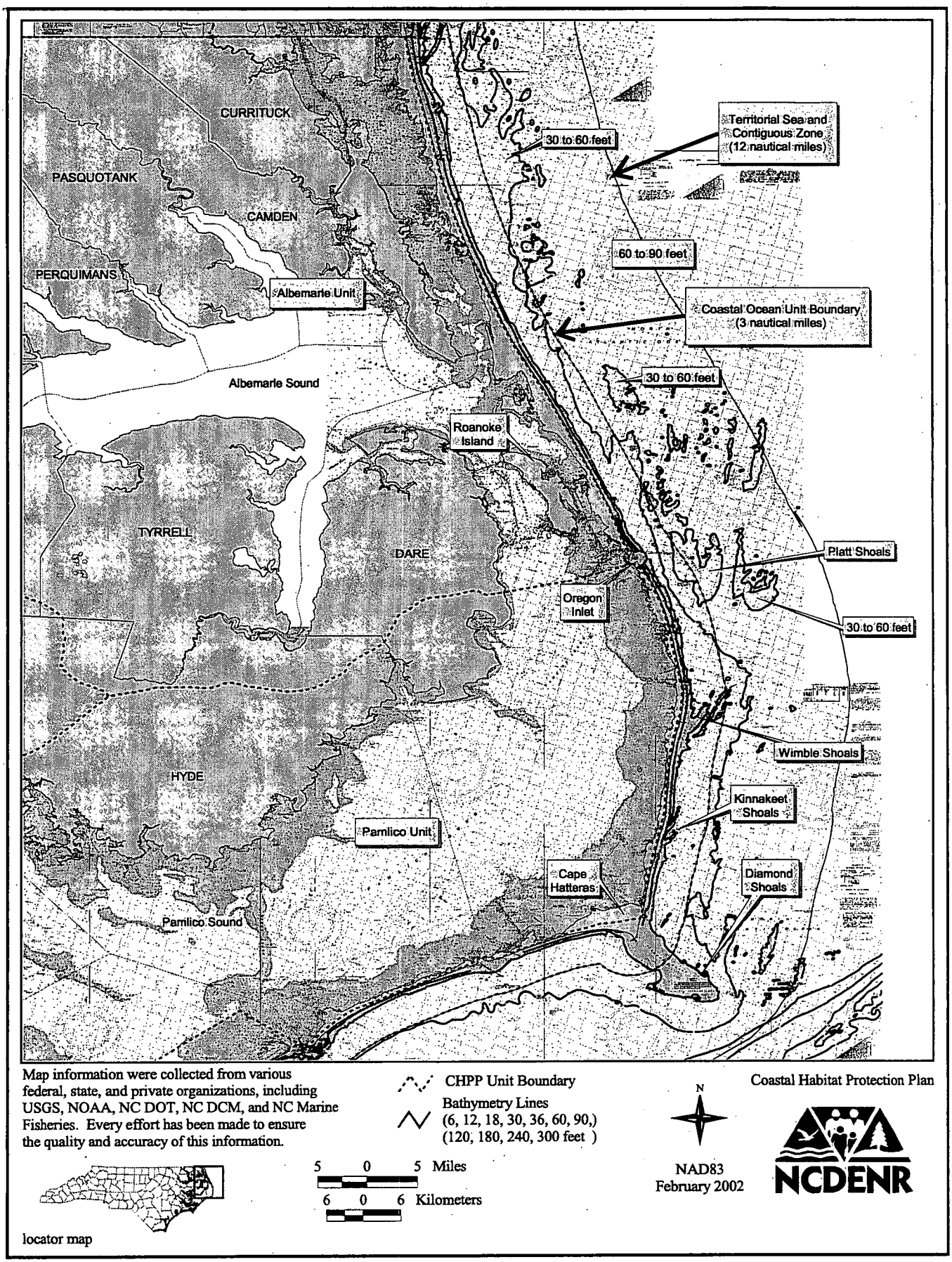
Inadequate data are available to clearly indicate the current condition of soft bottom habitat. Fortunately this habitat is relatively resistant to a changing environment. This is the most abundant submerged coastal fish habitat, and estuarine acreage of soft bottom has undoubtedly increased over time as shell bottom, SAV, and wetland habitats have declined.

Threats of greatest concern include large-scale alterations such as dredging of productive shallow bottom areas, construction of marinas and docks, bottom dredge and trawl fisheries in estuarine waters, and large-scale beach nourishment. Depletion of oxygen and toxic contamination of bottom sediments are the major water quality concerns since those conditions can cause mortality or poor recruitment of benthic invertebrates, which in turn can affect food availability for numerous benthic feeding invertebrates and fish. Therefore, minimizing dredging of productive shallow bottom, properly managing beach nourishment to maintain healthy benthic communities in the surf zone, and reductions in nutrient and toxin loading in all coastal waters are the primary management needs for soft bottom.

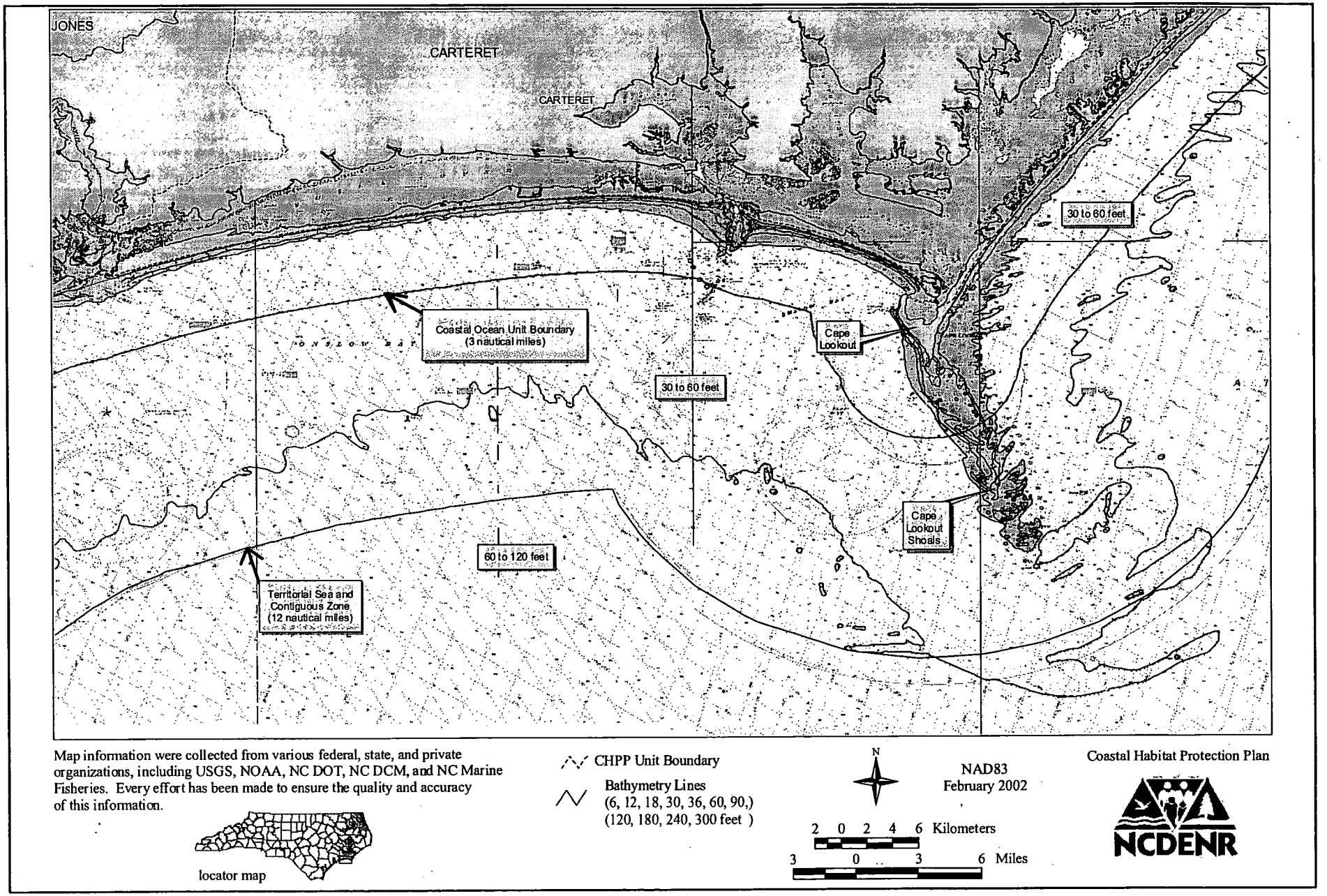
draft



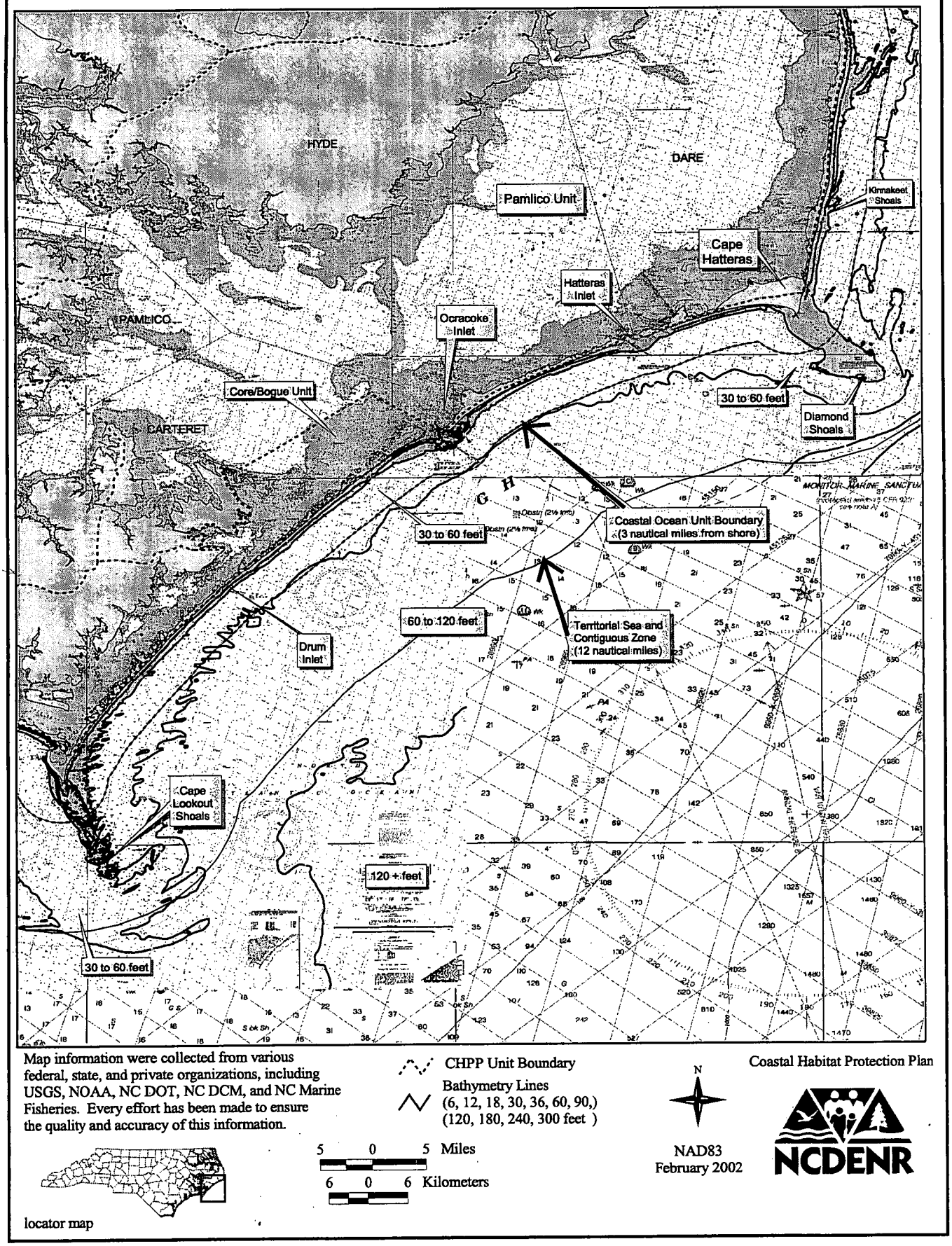
Map 6.1a. Location of marine topographic features.



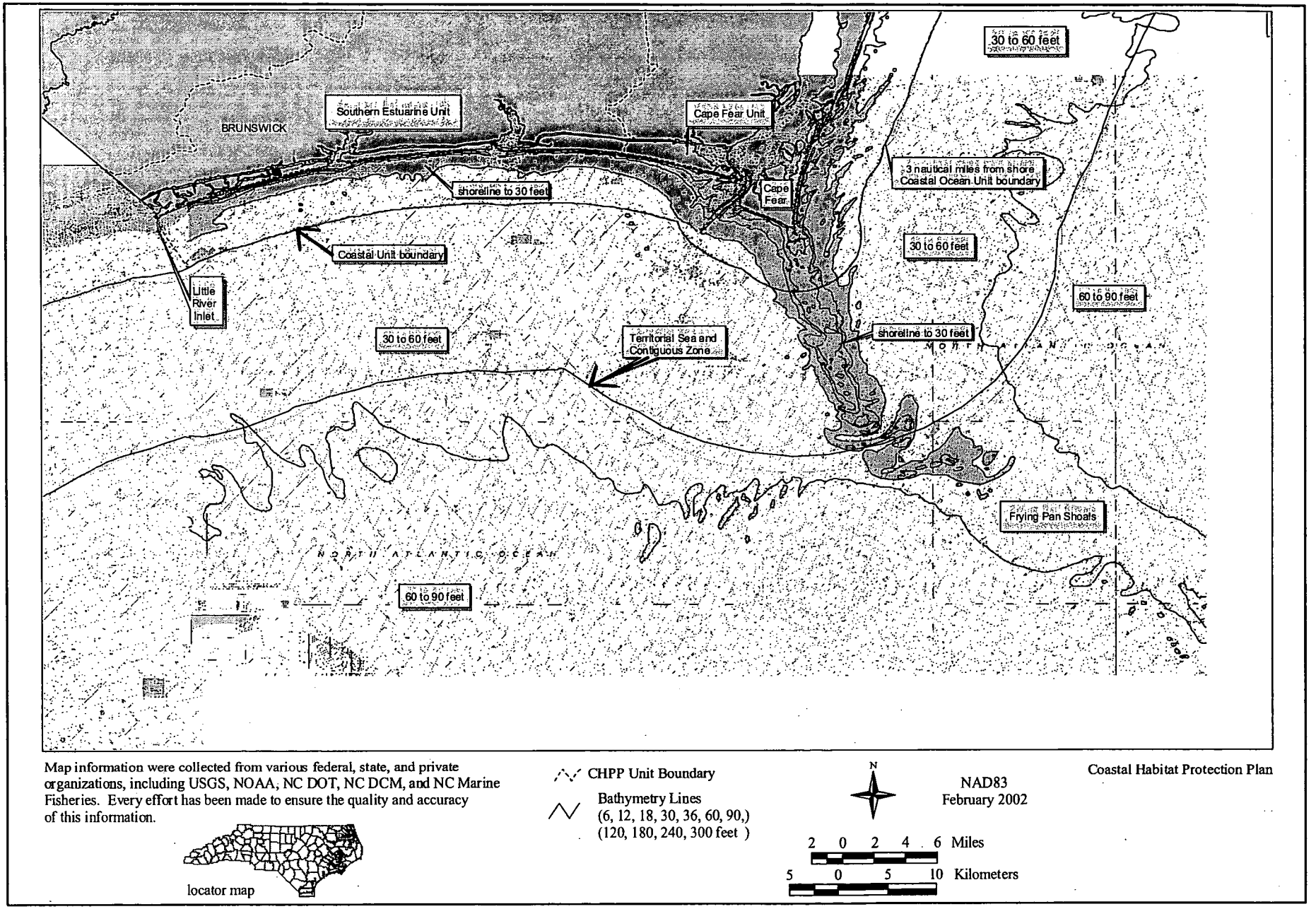
Map 6.1b. Location of marine topographic features.



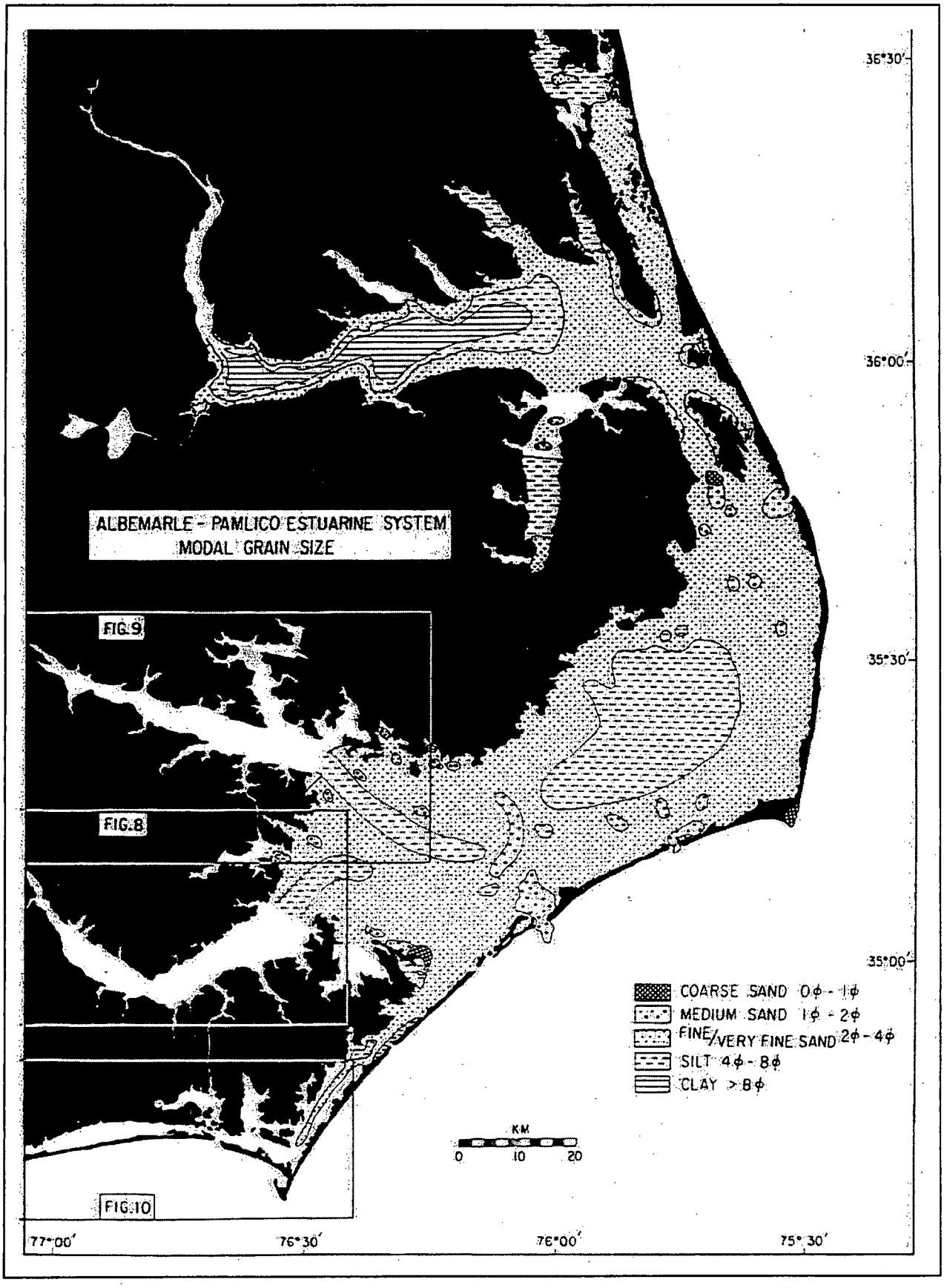
Map 6.1c. Location of marine topographic features.



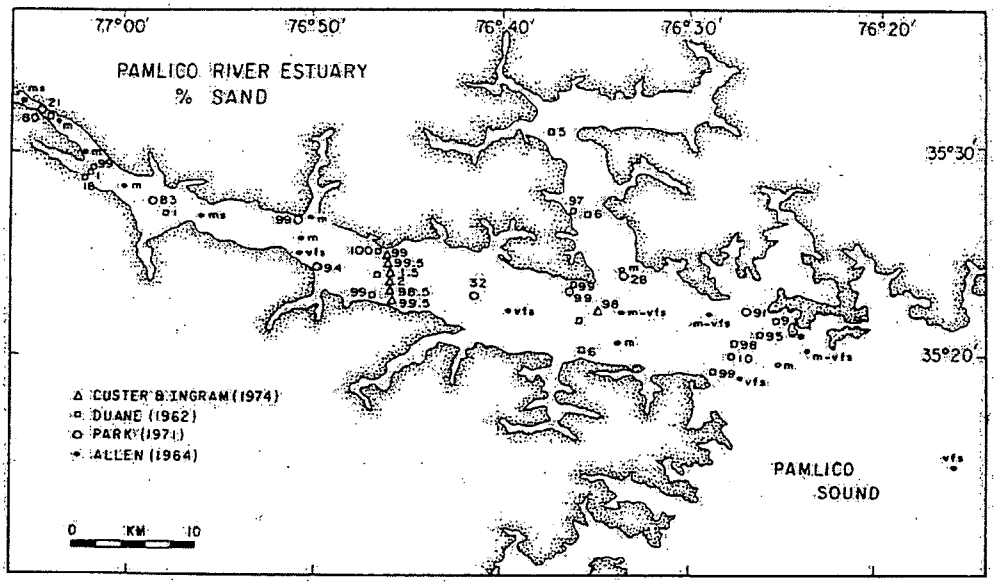
Map 6.1d. Location of marine topographic features.

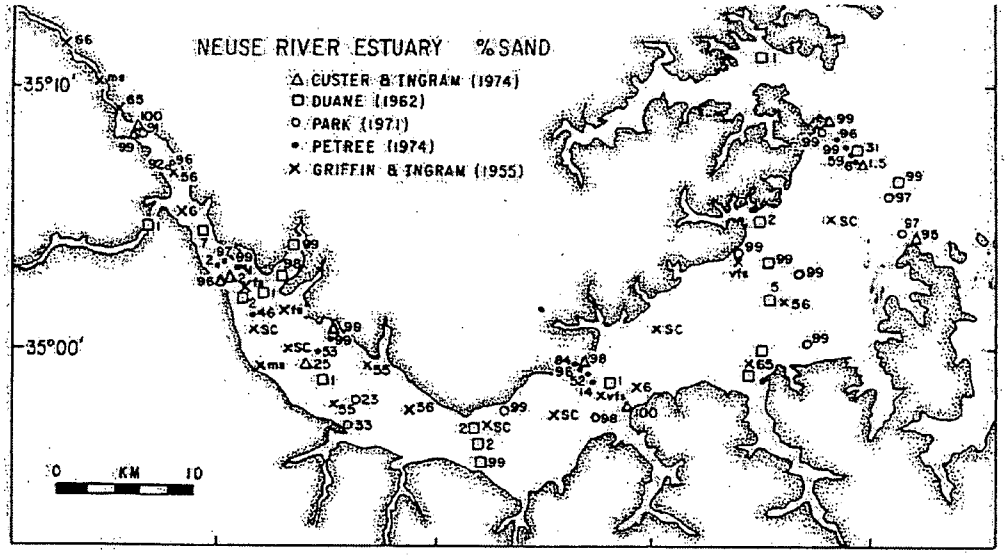


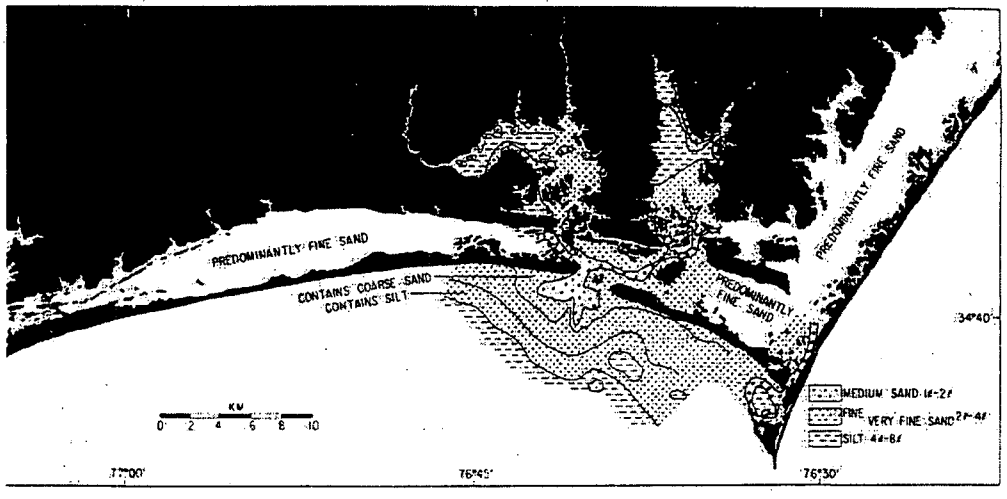
Map 6.1e. Location of marine topographic features.



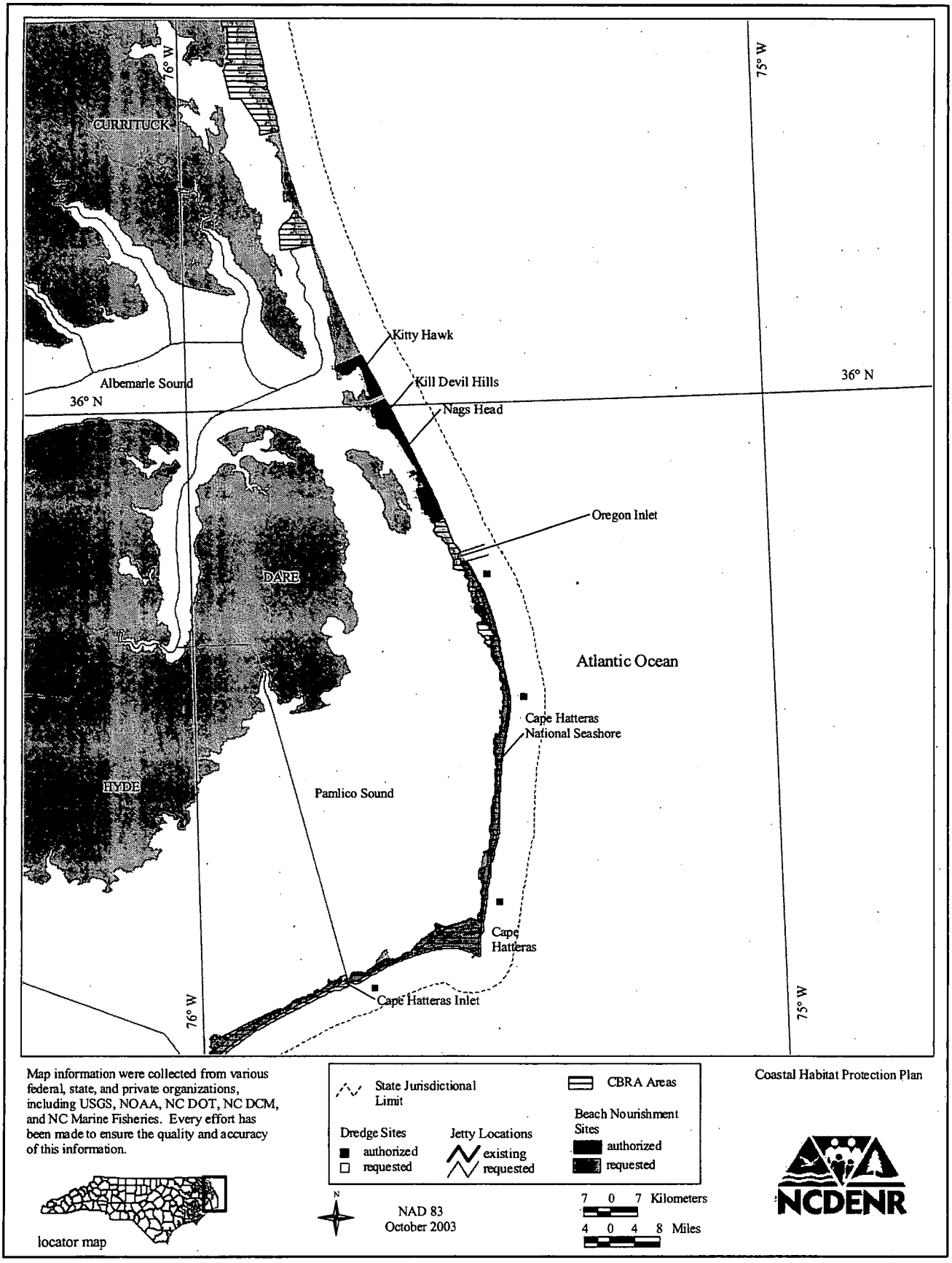
Map 6.2a. Sediment composition in the Albemarle-Pamlico estuarine system. Inset A. = Tar Pamlico , Inset B = Neuse, Inset C= Bogue (Wells 1989)



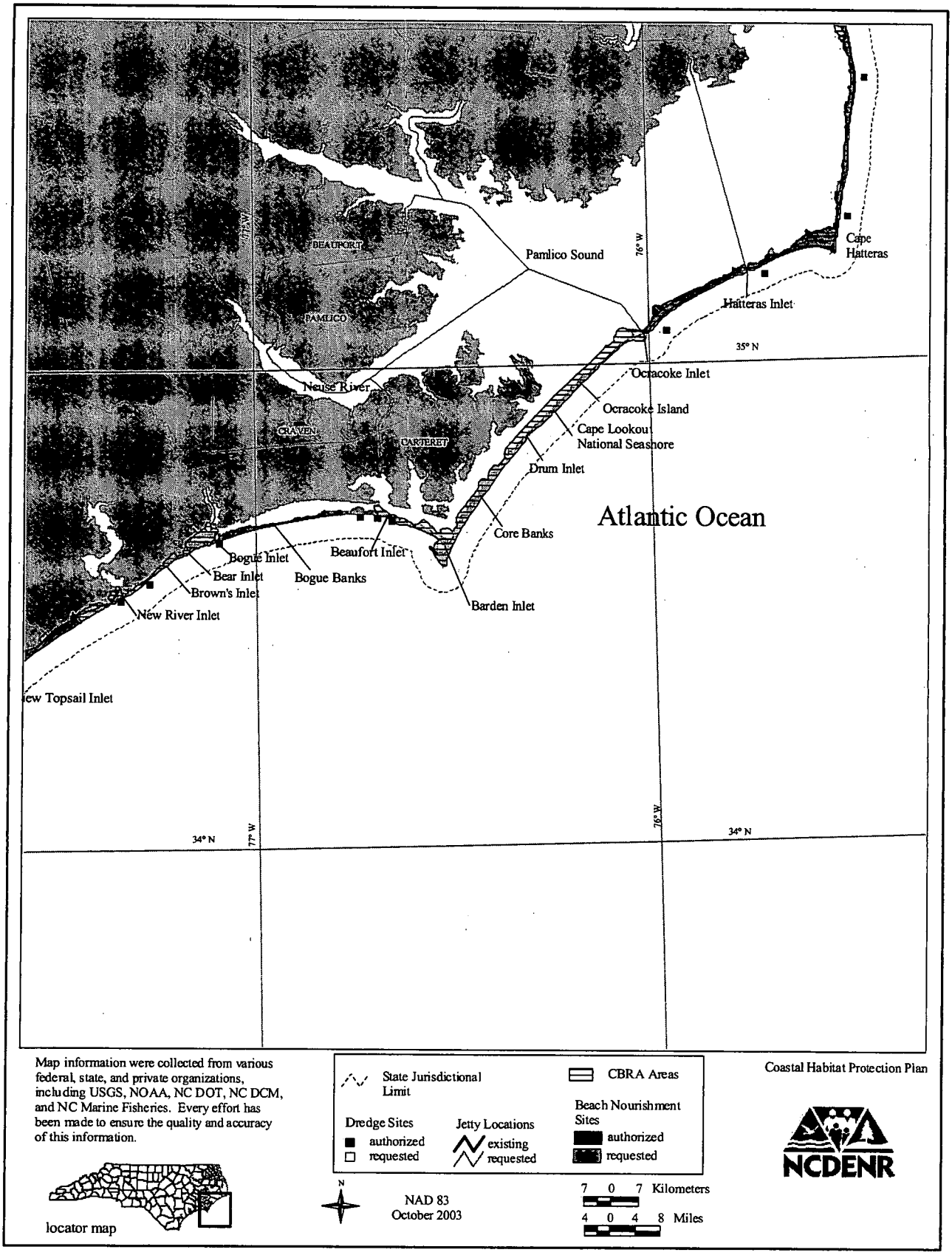




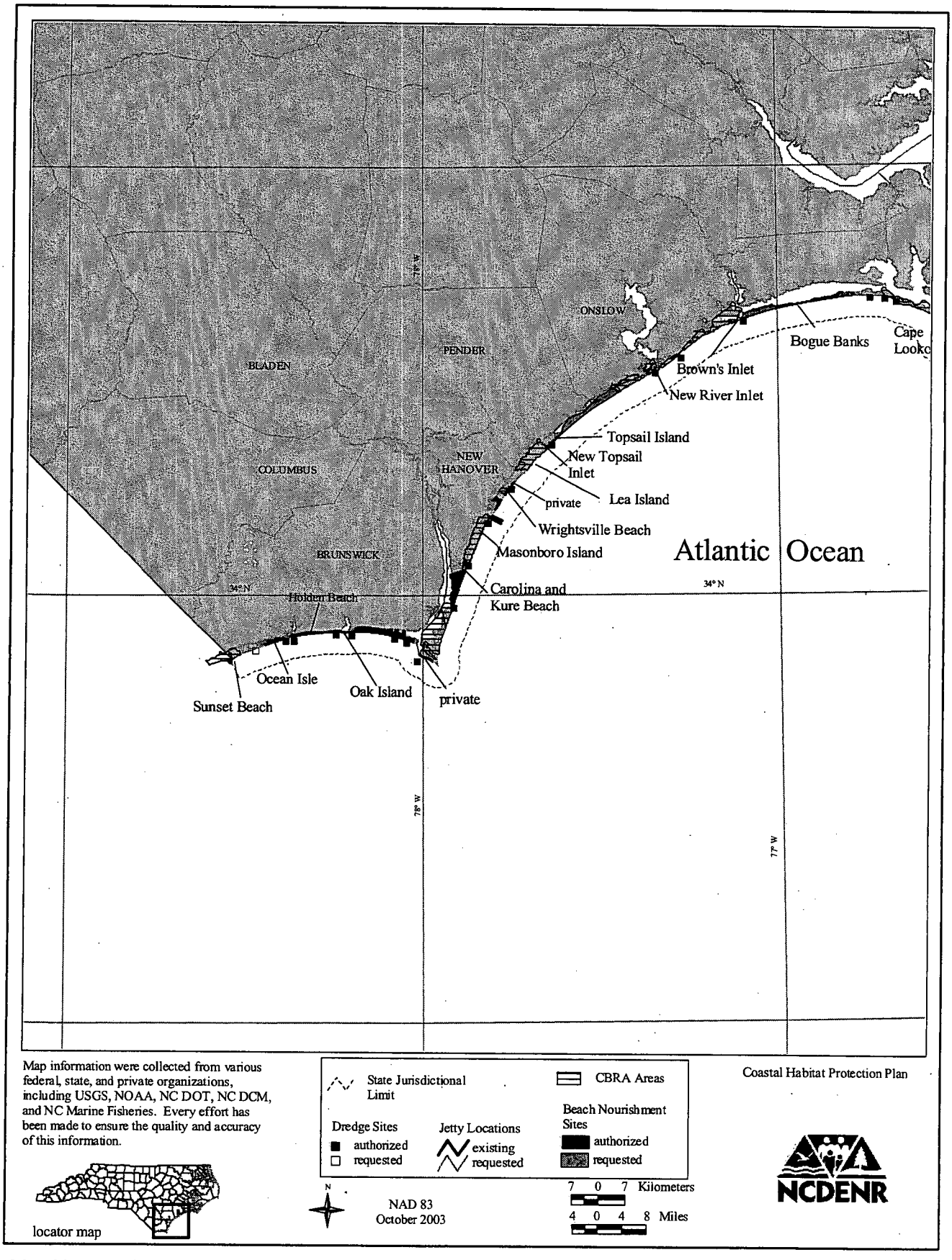
Map 6.2b. Insets. Sediment composition in the Tar-Pamlico, Neuse, and Core/Bogue estuaries (Wells 1989). Numbers = % sand, M= mud, SC=silty clay, VFS= very fine sand, MS= medium sand.



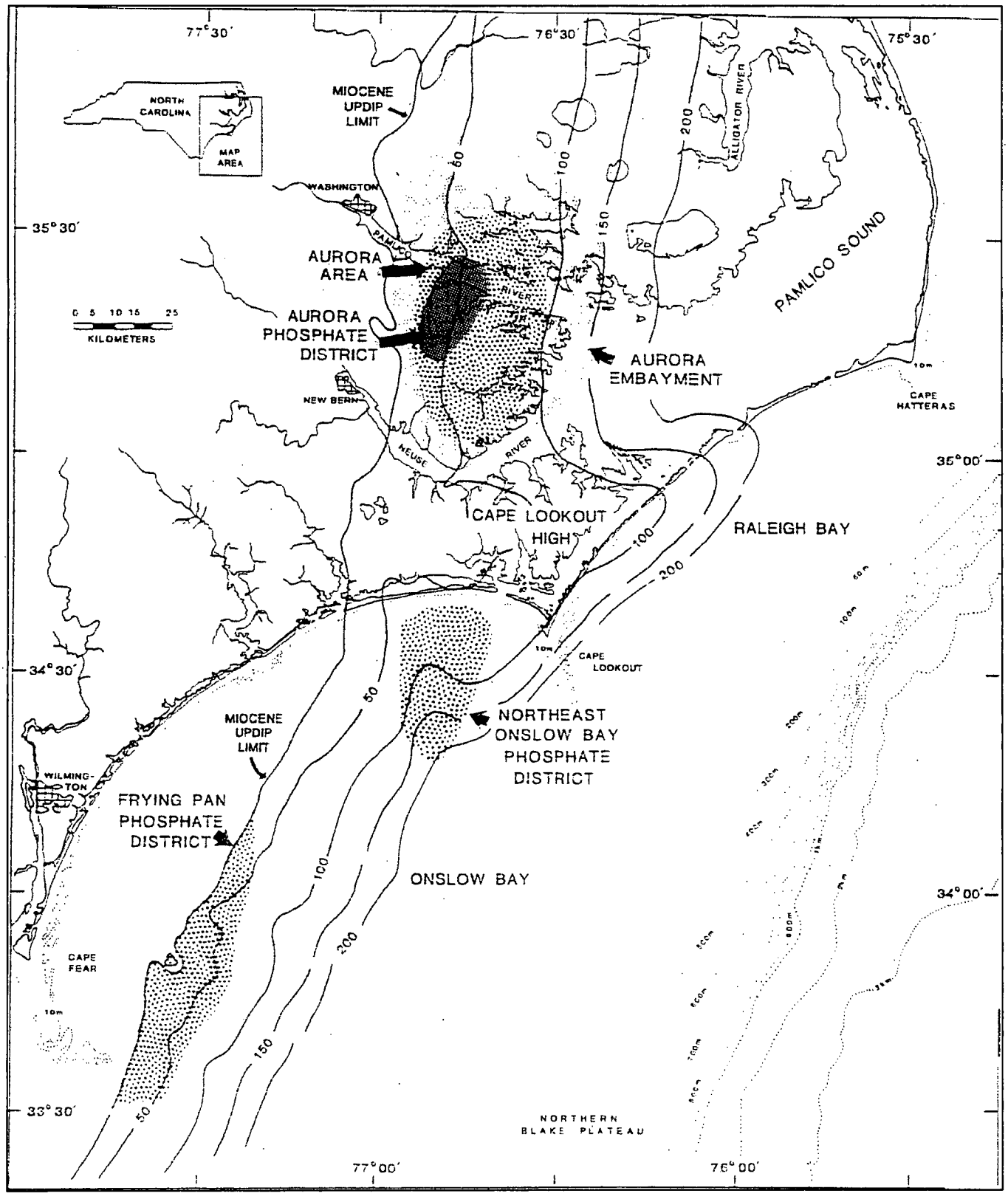
Map 6.3a. Location of authorized and requested beach nourishment projects, dredge disposal sites and jetties. Location of inlets and designated COBRA sites also shown. Northern coast



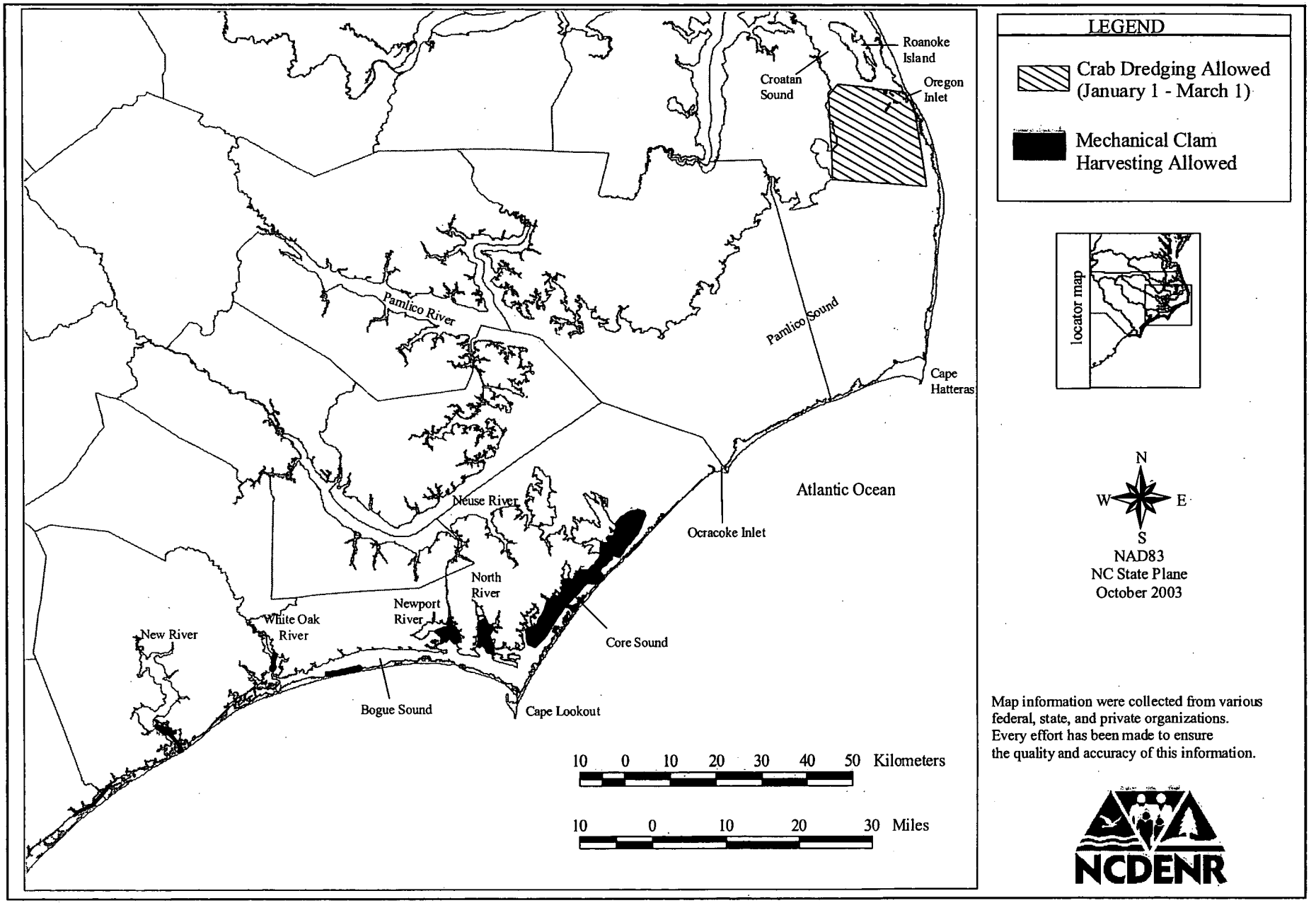
Map 6.3b. Location of authorized and requested beach nourishment projects, dredge disposal sites and jetties. Location of inlets and designated COBRA sites also shown. Central coast.



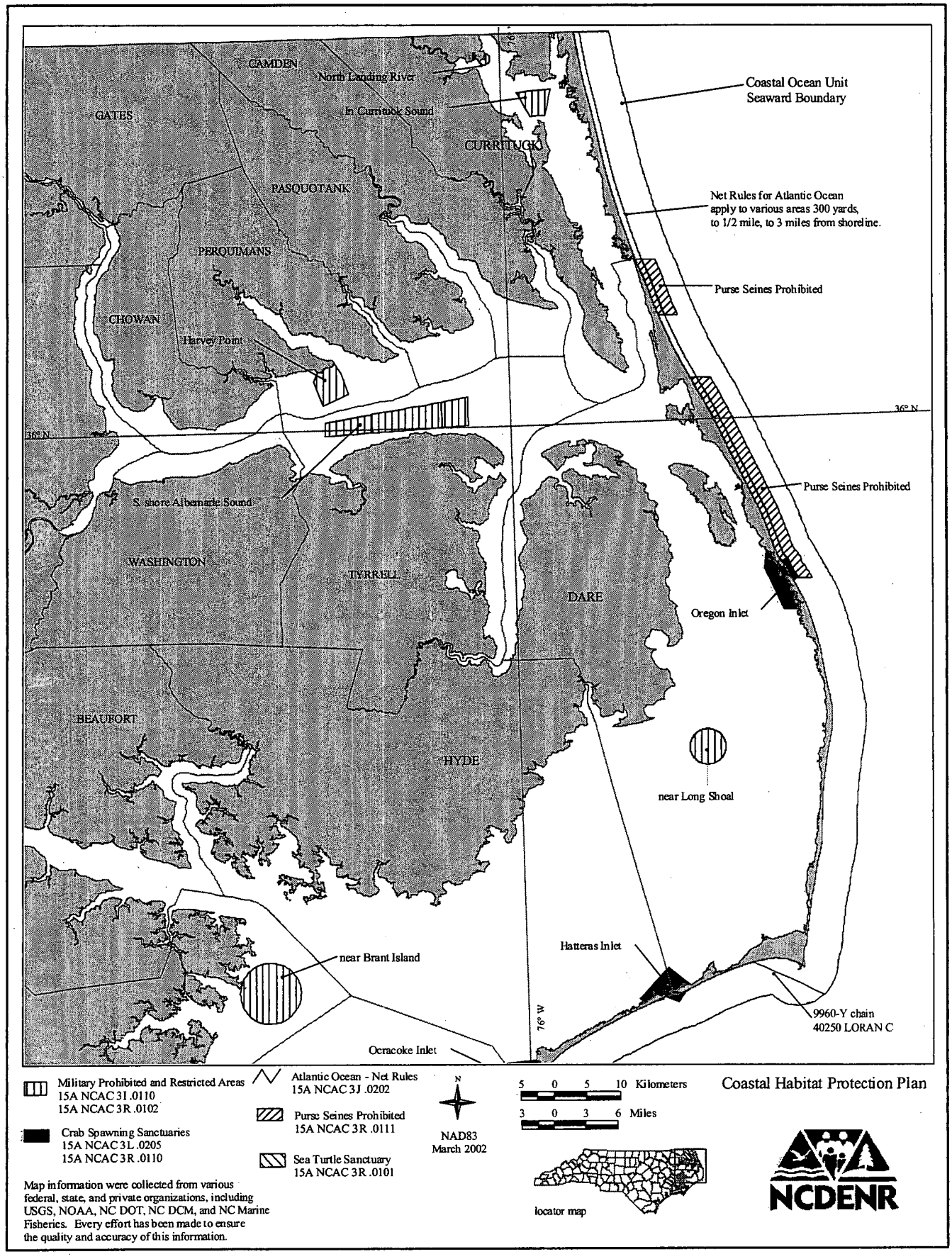
Map 6.3c. Location of authorized and requested beach nourishment projects, dredge disposal sites and jetties. Location of inlets and designated COBRA sites also shown. Southern coast.



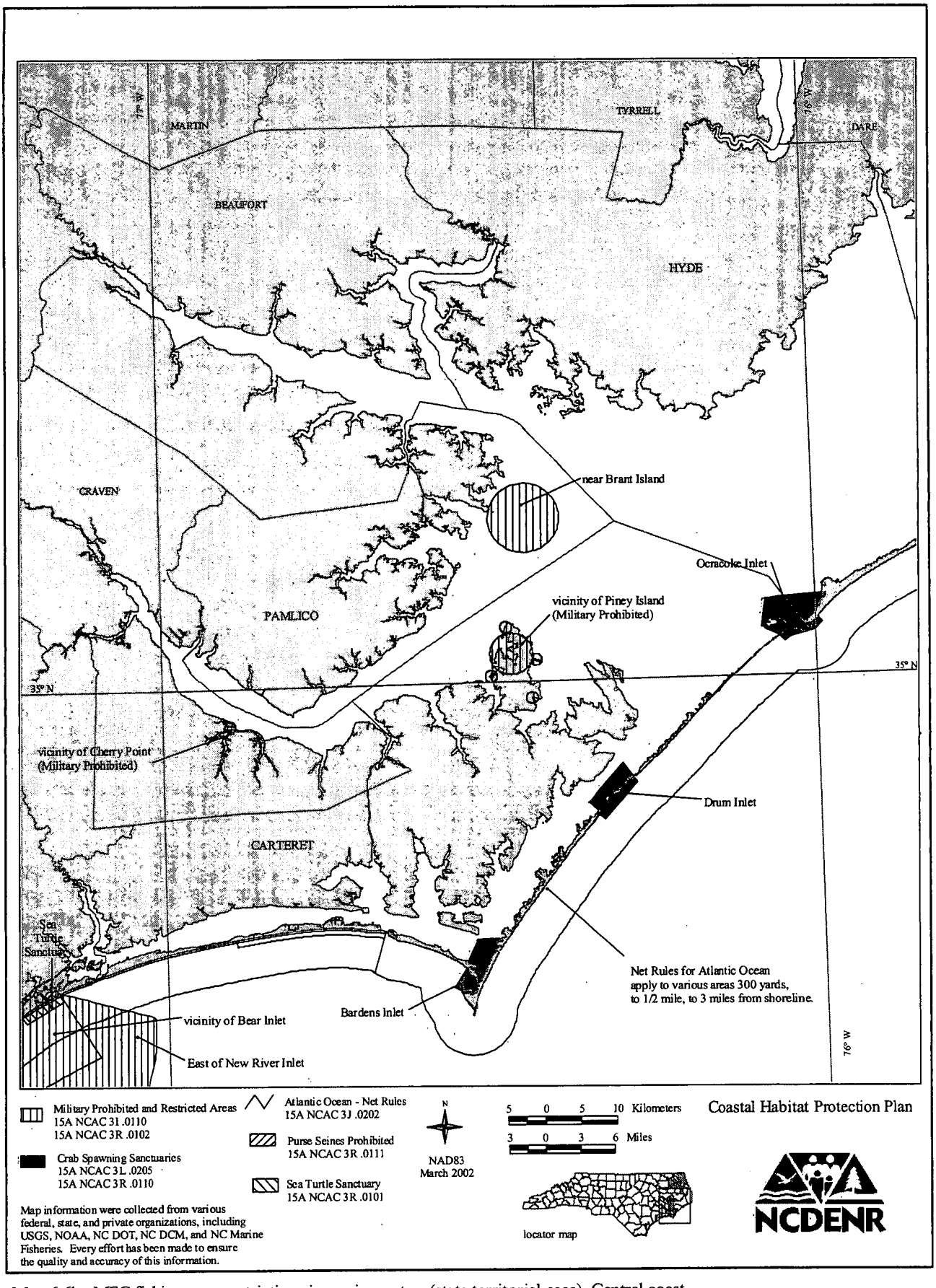
Map 6.4. Location of phosphate districts (known concentrations of phosphate deposits) on the continental shelf off North Carolina. Reprinted from Riggs and Manheim (1988).



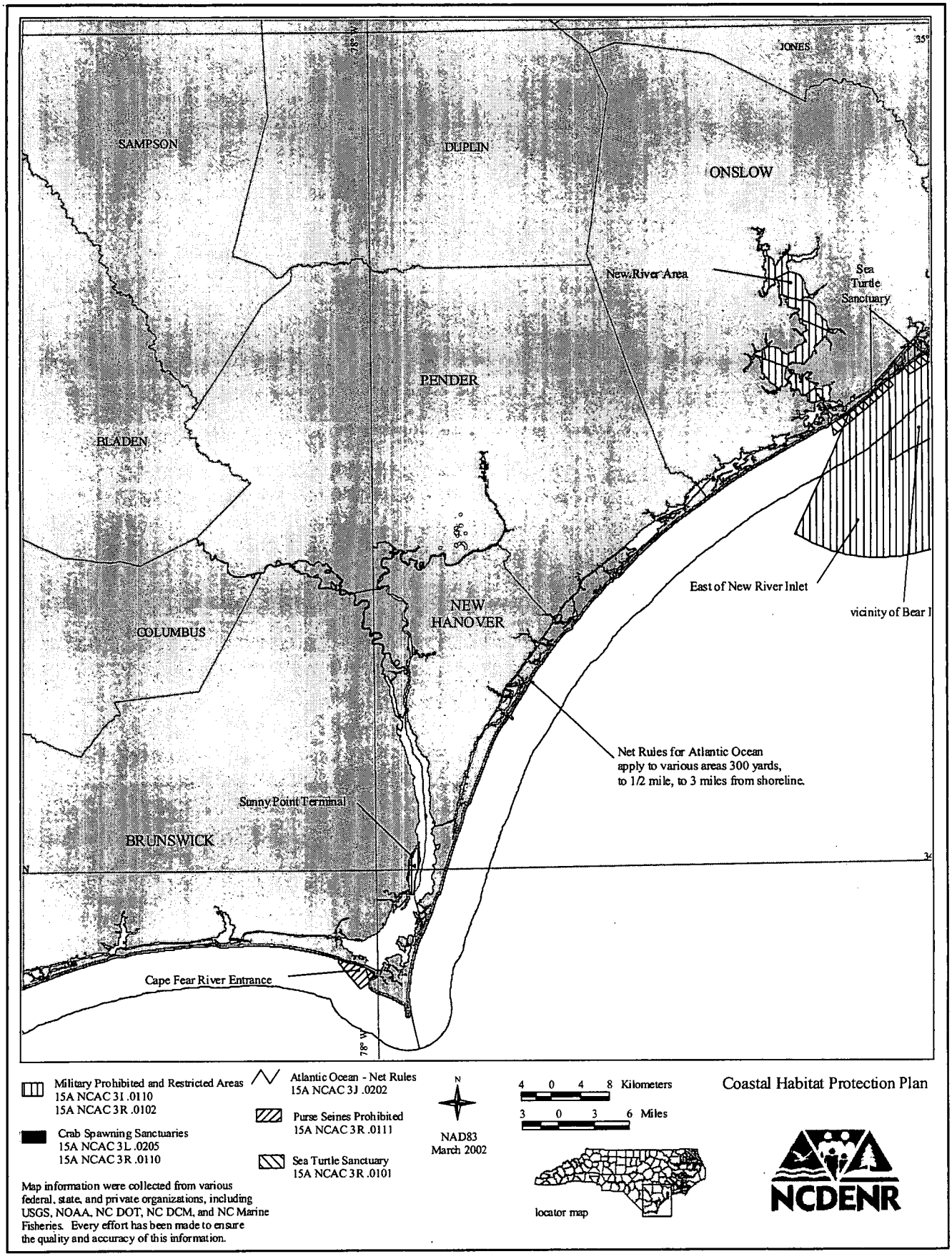
Map 6.5. Areas where the mechanical harvest for clams (clam kicking, hydraulic dredge) and crabs (crab dredge) is permitted in estuarine waters by MFC.



Map 6.6a. MFC fishing gear restrictions in marine waters (state territorial seas). Northern coast.



Map 6.6b. MFC fishing gear restrictions in marine waters (state territorial seas). Central coast.



Map 6.6c. MFC fishing gear restrictions in marine waters (state territorial seas). Southern coast.

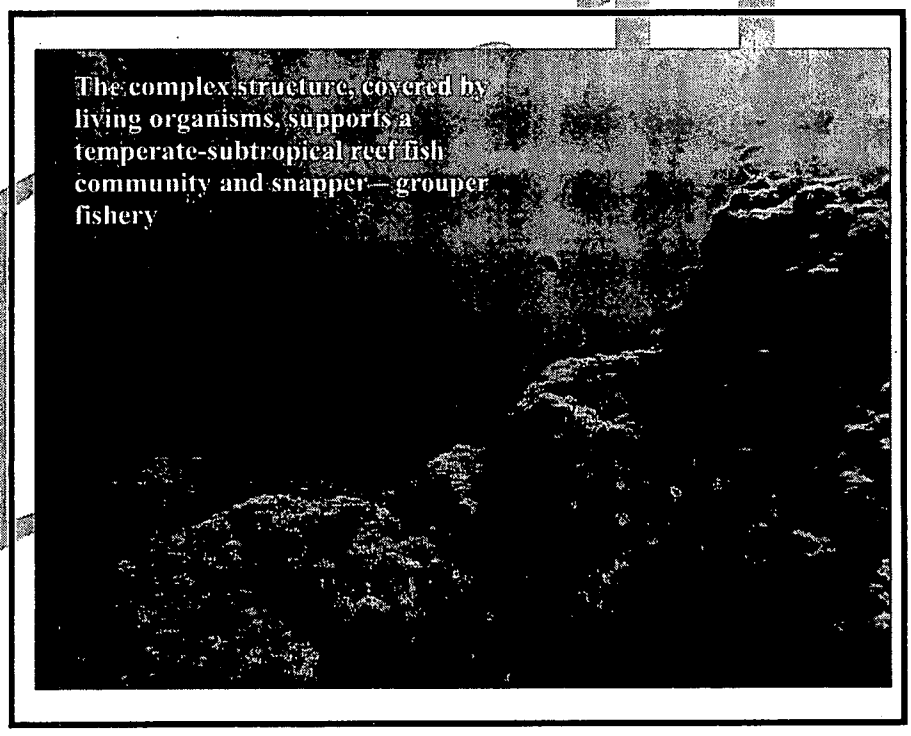
CHAPTER 7. HARD BOTTOM

7.1. DESCRIPTION AND DISTRIBUTION

Definition

Hard bottom refers to a classification of coral communities that occur in temperate, subtropical, and tropical regions that lack the coral diversity, density, and reef development of other types of coral communities (SAFMC 1998a). For the purposes of the CHPP, hard bottom habitat is defined as "exposed areas of rock or consolidated sediments, distinguished from surrounding unconsolidated sediments, which may or may not be characterized by a thin veneer of live or dead biota, generally located in the ocean rather than in the estuarine system."

Man-made structures, such as artificial reefs, wrecks, and jetties, provide additional suitable substrate for development of hard bottom communities. Artificial reefs are structures constructed or placed in waters for the purpose of enhancing fishery resources and providing opportunities for commercial and recreational fisheries. Although the purpose of artificial reef placement is primarily fishery enhancement, colonization of the structures by marine life results in establishment of hard bottom habitat. Vessels that have run aground or sunk and remain on the seafloor can also provide a base for hard bottom communities. These sites are separate from the DMF-managed artificial reef sites.



Description

Natural hard bottom varies in topographic relief from a relatively flat, smooth surface to a scarped ledge having up to 10 m of vertical, sloped, or stepped relief. The exposed areas of rock outcrop or relic reef are colonized to a varying extent by algae, sponges, soft coral, hard coral, bryozoans, polychaetes, and tunicates, which in turn support a large diversity of fish (SAFMC 1998a). Hard bottom is also referred to as "live rock" or "live bottom" because of the abundance of live plants and invertebrates that typically attach to or bore into hard substrate. Erosion of the hard substrate through the long-term actions of

colonizing organisms results in overhanging hard bottom ledges and undercut sloped scarps (Riggs et al. 1995). Rock outcrops, particularly those with low relief, can become buried and unburied by the natural processes of sand movement across the seafloor (SEAMAP-SA 2001). When hard substrate is exposed, a live bottom community may develop on the hard surfaces and persist for many years, later becoming covered by varying thicknesses of sand (SEAMAP-SA 2001). Areas of compacted or sheered mud and sediment also function as consolidated hard bottom (Riggs et al. 1995).

Artificial reefs can be constructed of many different materials. In North Carolina, surplus vessels, steel boxcars, concrete pipe, concrete rubble, boat molds, tires, and surplus military aircraft have been used for artificial reefs. In addition, concrete structures specifically designed and constructed to provide complex habitat (domes, igloos) are used by DMF. In total, artificial reefs provide roughly 2.75 million ft^2 (47 acres) of hard surface area (DMF 1995). This area is equivalent to approximately 2% of the natural hard bottom occurring in Raleigh and Onslow bays. The DMF Artificial Reef Program is responsible for deployment and maintenance of the sites, following the guidelines of the DMF Artificial Reef Master Plan (DMF 1988). In addition to the DMF's artificial reefs, the U.S. Army Corps of Engineers (COE) constructed a large artificial reef off the Cape Fear River, known as the Wilmington Offshore Fishery Enhancement Structure, using rock dredged during deepening of the Cape Fear River shipping channel. Comprised of approximately 800 barge-loads of rock and rubble piled in rows, this structure is currently being disrupted by relocation of the Cape Fear River shipping channel. The North Carolina Department of Cultural Resources, Underwater Archeology Unit, estimates there are more than 1,000 sunken vessels along the North Carolina coast dating from the days of the earliest European explorers to the present (<http://www.arch.dcr.state.nc.us/UW-LIGIT.HTM>, 2003). Documented wrecks include World War II German U-boats, gunboats, tankers, freighters, barges, and wooden and iron-hulled steamers. The abundance of shipwrecks off the North Carolina coast provides additional structure available as hard bottom habitat.

Jetties are man-made structures consisting of large boulders placed perpendicular to the shoreline, usually near inlets, for the primary purpose of stabilizing navigational channels. Because jetties emerge above the water line, they support both intertidal and subtidal hard bottom communities. Groins are similar to jetties, but are generally smaller. They may be constructed to stabilize a marina entrance or navigational channel or used as an erosion control device to trap sand and stabilize the shoreline. Community composition and fish utilization of jetties were described in Hay and Sutherland (1988) and are discussed in section 7.2, Ecological role and functions.

Habitat requirements

The primary requirement for this habitat is exposed hard substrate. Bottom water temperatures at hard bottom habitats in the ocean off North Carolina range from approximately 11 to 27° C. Salinity is generally around 35 ppt with little fluctuation. The composition of invertebrate, algal, and fish communities varies with temperature and depth. Although hard bottom is similar to other coral reef communities, the hard bottom community in warm-temperate regions such as North Carolina is physically stressed by changes in water masses and seasonal fluctuations in water temperature and light penetration (Kirby-Smith 1989). Because of this stress, hard coral and reef fish abundance and diversity in temperate hard bottom are limited and often vary by season.

Distribution

Hard bottom is the most widely distributed coral community in the South Atlantic Bight. It occurs in both warm-temperate and tropical areas, although it is less extensive in the northern end of its range (North Carolina). Along the south Atlantic states, hard bottom ranges from the shoreline and nearshore (within the state's three-mile jurisdictional limit) to beyond the continental shelf edge (>200 m deep). It tends to occur in clusters across the shelf in specific areas (SEAMAP-SA 2001). Estimates of the percent cover of hard bottom vary greatly along the south Atlantic coast between Cape Canaveral and Cape Hatteras.

From Cape Hatteras to Cape Fear, it was estimated that approximately 14% (roughly 504,095 acres) of the bottom between 27 and 101 m water depth consisted of hard bottom; between Cape Fear and Cape Canaveral, 30% (roughly 1,829,321 acres) of the seafloor was hard bottom (Parker et al. 1983). Approximately 7–10% of the hard bottom habitat is estimated to be one meter or more in relief (Parker et al. 1983).

Hard bottom mapping

In 1985, the Southeast Area Monitoring and Assessment Program—South Atlantic (SEAMAP-SA) began a large-scale initiative to identify and map all known hard bottom and coral reef areas in the South Atlantic Bight. A final report and ArcView GIS CD were completed in 1998 and updated in 2001 (SEAMAP-SA 2001). The majority of the data used to identify hard bottom was based the relative presence of indicator species in traps or trawls or on sidescan sonar records (73%). The SEAMAP Bottom Mapping Workgroup identified 177 South Atlantic Bight reef species that indicate reef habitat. The remaining data came from video and diver observations. The majority of identified sites was located in federal waters off North Carolina (> three nautical miles (nm) from shore). Because of the ephemeral nature of low-relief hard bottoms (uncovered and covered by storm-induced shifting sands) and the difficulty of distinguishing soft bottom from low-relief hard bottom using seismic data, the amount of hard bottom habitat identified in this program was most likely an underestimate (SEAMAP-SA 2001).

Hard bottom and artificial reef sites identified by SEAMAP in both state and federal waters are shown in Map 7.1, along with some of the known wrecks. Hard bottom outcrops are most concentrated in Onslow and Long bays. In federal waters, concentrations occur offshore between Shallotte Inlet and the Cape Fear River. In Onslow Bay, hard bottom is most concentrated from Frying Pan Shoals north to Masonboro Inlet, from New Topsail Inlet to Brown's Inlet, and from Bogue Inlet east to Cape Lookout Shoals. In Raleigh Bay, there are two concentrations of hard bottom – one east of Lookout Shoals and another south of Diamond Shoals. Within North Carolina state territorial waters, using point data, the SEAMAP database identified 19 natural hard bottom sites and 16 possible hard bottom sites. In addition, line data from trawls identified 29 hard bottom sites and 59 possible sites.[1]

A follow-up study compiling hard bottom locations in the nearshore ocean waters of North Carolina identified additional sites not included in the SEAMAP-SA database (Map 7.1, Table 7.1) (Moser and Taylor 1995). The study relied on surveys of researchers, dive professionals, and fishermen. Some of these sites may be duplicates of those identified by SEAMAP-SA, due to different sources and slightly different coordinates. A total of 198 hard bottom positions was identified; some were point data, while others represented transects or areas. Over 92% of the identified hard bottom in North Carolina waters are south of Cape Lookout, particularly in the southern half of Onslow Bay and in northern Long Bay. Concentrations of hard bottom occur seaward of inlets, including Shallotte, Lockwood's Folly, New, Carolina Beach, Masonboro, New Topsail, New River and Bogue inlets. There are outcrops of moderate-to-high relief in shallow water near the shoals of Cape Fear and Cape Lookout. Moser and Taylor (1995) estimated that the majority of the bottom in state territorial waters from 1) mid-Onslow Beach to south of New Inlet and 2) the area from Yaupon Beach west to Tubbs Inlet is comprised of hard bottom that is covered with a thin layer of sand.

[1] The lengths of the trawl lines vary, and some lines may actually represent several transects of one area. Similarly, some hard bottom lines may overlap with hard bottom points.

Table 7.1 Hard bottom and possible hard bottom locations in North Carolina by coastal bay. *[Source: Point and line data identified by SEAMAP-SA (2001).]*

Bottom Type	Long Bay	Onslow Bay	Raleigh Bay	North of Hatteras	Total
Hard bottom (point)	2 (19)	14 (58)	1 (4)	2 (3)	19 (86)
Hard bottom (line)	3 (6)	25 (39)	1 (2)	0 (2)	29 (49)
Possible hard bottom (point)	1	8	3	4	16
Possible hard bottom (line)	5	37	12	5	59
Total	11 (25)	84 (97)	17 (6)	11 (5)	123 (135)

Results from Moser and Taylor (1995) in parentheses.

Twenty sites were reported as high-profile relief, defined by Moser and Taylor (1995) as vertical relief greater than two meters. Two of these sites, one off Carolina Beach and one off New River, are extensive in both area and topographic relief; these areas are particularly close to shore, making them more vulnerable to land-based, fishing, and boating-related impacts. A unique intertidal and subtidal coquina rock outcrop extends from the beach into the surf zone at Fort Fisher. This unique habitat supports a diversity of organisms such as starfish, anemones, sea urchins, crabs, octopi, and numerous fish species.

Distribution of man-made hard bottom

There are 11 artificial reefs of varying construction located in North Carolina State ocean waters, 28 in federal ocean waters (Map 7.1), and seven in estuarine waters. The estuarine artificial reefs are located in Pamlico Sound, Albemarle Sound, Neuse River, and Pamlico River. The artificial reef program periodically adds material to the 39 existing ocean sites, rather than creating new reefs. Gentile (1992) listed 46 documented wrecks in North Carolina waters south of Hatteras Inlet. The majority of the wrecks is located northeast and west of the mouth of the Cape Fear River (Map 7.1). There are many more wrecks in federal waters, with concentrations around the three cape shoals. There are also two jetty systems and three groin systems along the ocean shoreline. The groins are located on the south side of Oregon Inlet, off the former site of the Cape Hatteras Lighthouse, and at the west side of Beaufort Inlet. There is a single jetty at the west side of Cape Lookout; Masonboro Inlet has jetties on both sides–one attached to Wrightsville Beach and the other attached to Masonboro Island. The Little River Inlet, which is the state boundary between North and South Carolina, also has a dual jetty system, but both structures are located in South Carolina. There are also numerous small groins and jetty systems in estuarine waters, but these features have not been mapped.

For the purposes of this document, estuarine shell bottom (e.g., oyster reefs, beds, bars) is not categorized as hard bottom habitat. Although technically a "hard" substrate that shares some characteristics with hard bottom (e.g., three-dimensional structure), shell bottom differs in its formation, spatial distribution, function and species composition from those of oceanic hard bottom; it is classified as a distinct habitat type. In addition, shell bottom can be either inter- or subtidal, whereas hard bottom is typically subtidal (with the single exception of the exposed coquina outcrops near Fort Fisher).

7.2. ECOLOGICAL ROLE AND FUNCTIONS

Productivity

Exposed hard substrate (whether rock outcrops, jetties, artificial materials, or semi-compacted sediments) provides surface area for colonization by invertebrates and algae. Hard substrate with vertical relief or irregular surface areas provides more complex habitat, allowing a greater variety of species to coexist (Wenner et al. 1984). This "live bottom" structure, in turn, provides a source of abundant food and protective cover for numerous fishes. These areas may be quite small and isolated and have been considered oases of productivity surrounded by less productive unconsolidated ocean bottom (SAFMC 1998a). The extent and diversity of colonization vary among sites due to topography, habitat diversity,

currents, light availability, and location on the shelf. Studies that have documented the composition and diversity of the communities on hard bottom in North Carolina include MacIntyre and Pilkey (1969), Schneider (1976), Peckol and Searles (1984), Kirby-Smith (1989), and COE (1992). Most of the locations examined in these studies were located beyond the three-mile state boundary.

The dominant colonizing organisms on hard bottom in North Carolina are macroalgae (Peckol and Searles 1984), ranging from 10 to 70% of the biotic cover, and varying among seasons and years. Perennial and crustose brown and red algae were the dominant algal forms, including *Lobophora variegata*, *Lithophyllum subtenellum*, *Zonaria tournefortii*, and *Gracilaria mammillaris*. In nearshore waters (< one nm from shore), between Rich Inlet and Brown's Inlet, large amounts of seaweed grow on and between hard bottom areas during the summer. The algae consist of several types and species, including the brown alga, *Sargassum filipendula* and *Dictyopteris membranacea,* and the red algae, *Halymenia* sp. and *Gracilaria* sp. (DMF 2001). Sargassum *(S. filipendula)* is common in nearshore and offshore waters, and on jetties. Hay and Sutherland (1988) documented several other species on jetties. Roughly 150 species of macroalgae were identified on hard bottom in North Carolina; the majority was red algae (Rhodophyta) (Schneider 1976). Onslow Bay had a higher diversity of species, which was attributed to more available hard substrate (Schneider 1976). The shallow inshore flora consisted of a large component of northern-distributed species, while offshore areas supported more tropical flora. Offshore areas had the greatest abundance of macroalgae, due to the high proportion of suitable substrate, greater relief on the shelf break, and mild water temperatures throughout the year. Of the offshore species, 66% were at their northern limit of distribution in Onslow Bay, and 2% were at their known southern distributional limit (Schneider 1976). The latter include *Arthrocladia villosa*, *Gigartina stellata*, and *Polysiphonia harveyi*. The presence of macroalgae from the shoreline to beyond the shelf break indicates that light and nutrient availability do not limit primary production on hard bottom off North Carolina (Cahoon and Cooke 1992).

Community structure

Non-mobile, attached invertebrates accounted for 10% or less of the biotic cover on hard bottom off North Carolina (Peckol and Searles 1984). The most abundant non-mobile invertebrates were the soft corals, *Titanideum frauenfeldii* and *Telesto fruticulosa,* and the hard coral, *Oculina arbuscula.* Sea urchins (*Arbacia punctulata* and *Lytechinus variegatus*) were the most common mobile invertebrates. Species composition of invertebrates occurring at hard bottom sites in South Carolina and Georgia were studied by Wenner et al. (1984). Study results using dredge and trawl samples showed that sponges, bryozoans, corals and anemones[2] dominated the large macroinvertebrate collection in terms of numbers and species diversity during all seasons. Sponges were the most important invertebrate group overall on the inner shelf, comprising 60–78% of the total biomass. Tunicates, anthozoans, and mollusks also contributed substantially (Wenner et al. 1984). Species characteristic of the inner shelf sites included the sponges, *Homaxinella waltonsmithi, Spheciospongia vesparium, Cliona caribbaea*, and *Halichondria bowerbanki*; the echinoderms, variegated urchin (*Lytechinus variegatus*), purple sea urchin (*Arbacia punctuata*), *Encope michelini*, and *Ocnus pygmaeus*; the bryozoan, *Membranipora tenuis*; and the decapod crustacean, *Synalpheus minus*. Grab samples of small invertebrates showed that polychaetes were the most diverse and abundant group, followed by mollusks, and amphipods[3] (Wenner et al. 1984).

Kirby-Smith (1989) studied hard bottom communities at nearshore and offshore reefs in North Carolina. Community structure varied with season, depth, and distance from the shelf edge. Diversity and abundance of invertebrates were greater in the spring and fall than in winter and summer, attributed to spring and fall plankton blooms. The inner shelf sites, in approximately 16–27 m water depths, had somewhat lower diversity than mid- or outer shelf sites. Mollusks, followed by polychaetes, and then

[2] sponges (89 Porifera taxa), bryozoans (91 Bryozoa taxa) and corals and anemones (70 Cnidaria taxa)

[3] polychaetes (285 species, 72% of total individuals); mollusks (251 species, 4.3% of total individuals); and amphipods (100 species, 13% of total individuals)

amphipods were dominant in the number of observed species.

Due to cooler water temperatures and greater temperature fluctuations, the species composition of hard bottom communities in nearshore waters is less tropical in nature compared to that farther offshore or south of North Carolina (Kirby-Smith 1989). Furthermore, at natural and artificial reefs in Onslow Bay, seaweed species outcompeted a hard coral (*Oculina arbuscula*), limiting its growth and recruitment and largely restricting its distribution to deeper, poorly lit habitats via competitive exclusion (Miller and Hay 1996). Because of these conditions, hard bottom in North Carolina's state territorial sea is colonized by hard and soft corals to a lesser extent than offshore or more southern areas. Two species of reef building corals that have been documented on North Carolina hard bottom are *Solenastrea hyades* and *Siderastrea siderea*. These species occurred on rock outcrops at depths of 20 to 26 m in Onslow Bay approximately 32 km offshore (Macintyre and Pilkey 1969). Other species of coral reported for North and South Carolina include the hard corals, ivory bush coral (*Oculina arbuscula*), *Oculina varicosa*, *Astrangia danae, Phyllangia americana, Balanophyllia floridana*, and the soft corals, sea whip (*Leptogorgia virgulata*), *Telesto* spp., *Lophogorgia* spp., *Titanideum frauenfeldii,* and *Muricea pendula* (Hay and Sutherland 1988; Wenner et al. 1984).

Ecosystem enhancement

In addition to providing habitat for an abundance of reef organisms and fish, hard bottoms, through bioerosion, are a source of sand production for sediment-starved sections of the continental shelf, such as Onslow and Long bays. Riggs et al. (1995) described three primary groups of bioeroders: rock boring bivalves, burrowing shrimp, and macroalgae. These animals and plants tend to occur in or on hard bottom of different hardnesses and slopes. Some species, like the rock boring bivalve *Jouanettia quillingi* and burrowing shrimp *Upogebia* sp., occur on muddy sandstones, while macroalgae tend to colonize Pleistocene limestones. The larvae of rock boring bivalves erode rock by excavating a hole chemically (through secretion of acid) or mechanically (through abrasion from their hard shell). Over time, multiple tunnels from clams eventually weaken the rock until chunks break off, leaving a fresh rock surface for more clam larvae to settle on and bore into. Macroalgae erode rock when their roots (holdfasts) are torn off the rock surface by storms and strong water currents, carrying away small pieces of rock. The decomposition of calcareous macroalgae plant material also produces sediment. Rates of sediment production from bioerosion increase with increasing softness of rock substrate, varying from 5.5 kg/m^2/yr on vertical and sloped Miocene mudstone hard bottom, to 0.4 kg/m^2/yr on vertical and sloped Pleistocene limestone, and 0.03 kg/m^2/yr on flat Plio-Pleistocene limestone. These processes also enhance the structural complexity of the hard bottom outcrops, which promotes diversity of fish habitat within the reef (Riggs et al. 1995).

Fish utilization of natural hard bottom

Because of their structural complexity, more permanent nature, and high functional diversity, hard bottom areas of relatively high relief are particularly important to a variety of fish and invertebrate species. Fish comprise a major portion of the animal biomass on hard bottom, and they are an important component of the overall trophic structure (Jaap 1984). Numerous studies have examined fish assemblages on natural and artificial reef habitats in North Carolina (Huntsman and Manooch 1978; Miller and Richards 1980; Grimes et al. 1982; Lindquist et al. 1989; Potts and Hulbert 1994; Parker and Dixon 1998). With the exception of Hay and Sutherland (1988), who described fish utilization at jetties in North Carolina, all of these studies, including those at the inner shelf, were conducted seaward of state territorial waters. *Fish studies specific to nearshore hard bottom (within state territorial waters) are needed to better understand the dependence of fish species on this habitat.*

Natural hard bottoms off the Carolina coasts support large populations of offshore reef fish, temperate, and coastal pelagic species. In one study along the North and South Carolina coasts, 47 tropical and subtropical resident reef fish species were found on inshore hard bottom (<18 m water depth), and almost

twice as many occurred further offshore (18–110 m water depth). The fauna of hard bottom is characterized by wrasses, damselfish, snappers, grunts, parrotfish, and sea basses. Inshore hard bottom communities support large numbers of more temperate fish species, such as black sea bass (*Centropristis striata*), spottail pinfish (*Diplodus holbrookii*), and estuarine-dependent migratory species (Huntsman and Manooch 1978). A list of species reported for North and South Carolina inshore hard bottom is provided in Table 7.2.

Water temperature and topography are the most important factors in determining use of habitat by warm-temperate and tropical hard bottom species (Wenner et al. 1984; SAFMC 1998a). Temperatures less than 12° C may result in the death of some tropical fish and invertebrate species. Lindquist et al. (1989) reported 32 species at inner shelf hard bottom sites in North Carolina, approximately five miles from shore. Commonly occurring and numerically abundant species for both natural and artificial reefs were, in order of decreasing abundance:

- round scad (Decapterus punctatus)
- tomtate (Haemulon aurolineatum)
- spottail pinfish (*Diplodus holbrookii*)
- black sea bass (Centropristis striata)
- slippery dick (Halichoeres bivittatus)

Other common species included scup (*Stenotomus chrysops*), juvenile grunts, pigfish (*Orthopristis chrysoptera*), cubbyu (*Equetus umbrosus*), and belted sandfish (*Serranus subligarius*). Fish composition varied due to seasonal inshore migrations of tropical and subtropical species, fishing pressure, and microhabitat differences.

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Table 7.2. Fishes occurring at inshore hard bottom in North Carolina and South Carolina coastal waters. *[Sources: Grimes et al. 1982; Powell and Robins 1998; DMF, unpub. data]*

Family	Scientific name	Common name
Carcharhinidae	*Carcharhinus falciformis*	Silky shark
Muraenidae	*Gymnothorax nigromarginatus*	Blackedge moray
Ophichthidae	*Ophichthus ocellatus*	Palespotted eel
Engraulidae	*Anchoa* sp.	Anchovy
Synodontidae	*Synodus foetens*	Inshore lizardfish
	Trachinocephalus myops	Snakefish
Batrachoididae	*Opsanus pardus*	Leopard toadfish
Antennaridae	*Antennarius ocellatus*	Ocellated frogfish
Gadidae	*Urophycis earlii*	Carolina hake
Ophidiidae	*Rissola marginata*	Striped cusk-eel
Sygnathidae	*Hippocampus erectus*	Lined seahorse
	Sygnathus sp.	Pipefish
Serranidae	*Centropristis ocyurus*	Bank sea bass
	C. striata	Black sea bass
	Dermatolepis inermis	Marbled grouper
	Diplectrum formosum	Sand perch
	Epinephelus adscensionis	Rock hind
	E. drummondhayi	Speckled hind
	E. morio	Red grouper
	E. fulva	Coney
	E. guttatus	Red hind
	Mycteroperca microlepis	Gag
	M. phenax	Scamp
	M. venenosa	Yellowfin grouper
	Petrometopon cruenatatum	Graysby
	Serranus subligarius	Belted sandfish
Grammistidae	*Rypticus saponaceous*	Greater soapfish
Priacanthidae	*Pristigenys alta*	Short bigeye
	Priacanthus creuntatus	Glasseye snapper
Apogonidae	*Apogon pseudomaculatus*	Twospot cardinalfish
Pomatomidae	*Pomatomus saltatrix*	Bluefish
Carangidae	*Alectis crinitus*	African pompano
	Caranx ruber	Bar jack
Lutjanidae	*Lutjanus analis*	Mutton snapper
	L. campechanus	Red snapper
	L. griseus	Gray snapper
	Decapterus punctatus	Round scad
Haemulidae	*Haemulon aurolinearum*	Tomtate
	H. plumieri	White grunt
	Orthpristis chrysoptera	Pigfish
Sparidae	*Diplodus holbrookii*	Spottail pinfish
	Archosargus probatocephalus	Sheepshead
	Calamus leucosteus	Whitebone porgy
	Stenotomus chrysops	Scup
Sciaenidae	*Equetus umbrosus*	Cubbyu
	Cynoscion regalis	Weakfish
Labridae	*Haliochores bivittatus*	Slippery dick
Ephippidae	*Chaetodipterus faber*	Atlantic spadefish
Clinidae	*Paraclinus* sp.	Blennies
Gobiidae	*Ioglossus calliurus*	Blue goby
Bothidae	*Paralichthys dentatus*	Summer flounder
	Paralichthys lethostigma	Southern flounder

In general, most reef fish are carnivores (Jaap 1984). Benthic invertebrates are therefore very important as energy assimilators and food sources for reef fish (Jaap 1984). A partial list of the most important fish species that utilize hard bottom in North Carolina's state territorial waters and the function the habitat provides is given in Table 7.3. Several of the reef fish species are overfished or there is concern about their viability as a fishery resource (DMF 2003).

Table 7.3. Habitat utilization, stock status, and use of important fish species that occupy hard bottom areas in North Carolina's nearshore ocean waters.

Species	Functions[1]					Fishery[2]	Stock status[3]
	Refuge	Spawning	Nursery	Foraging	Corridor		
MARINE SPAWNING, LOW - HIGH SALINITY NURSERY							
Atlantic croaker	X			X		X	C
Inshore lizardfish	X	X	X	X		X	
Southern kingfish	X			X		X	U
Spot	X			X		X	V
Striped mullet	X		X	X		X	C
Weakfish	X			X		X	V
MARINE SPAWNING, HIGH SALINITY NURSERY							
Atlantic spadefish	X	X	X	X		X	U
Black sea bass	X	X	X	X	X	X	O (south of Hatteras), V (north of Hatteras)
Bluefish	X			X		X	R
Damselfish (mult. spp.)	X	X	X	X			
Florida pompano	X			X		X	
Gag	X		X	X	X	X	V
Gobies (multiple spp.)	X	X	X	X			
Greater amberjack	X			X		X	V
Gulf kingfish	X			X		X	U
King mackerel	X			X		X	V
Pigfish	X	X	X	X		X	
Planehead filefish	X	X	X	X			
Porgy (red porgy, scup)	X		X	X		X	O
Round scad	X		X	X			
Sand perch	X	X	X	X		X	
Sheepshead	X	X	X	X		X	O
Smooth dogfish	X			X		X	U
Spiny dogfish	X			X		X	O
Spottail pinfish	X	X	X	X		X	
Summer flounder	X			X		X	R
Tautog	X		X	X	X	X	O
Tomtate	X	X	X	X		X	V
White grunt	X	X	X	X		X	V
Wrasses (several species)	X	X	X	X			

[1] Powell and Robins 1998; Grimes et al. 1982; F. Rohde, DMF pers. com 2003

[2] Commercially or recreationally caught species. Other species are important to the ecosystem as prey

[3] Stock status determined by DMF (2003). Reef species from SAFMC (2003) (V = Viable, R = Recovering, C = Concern, O = Overfished, U = Unknown)

Refuge and foraging

Hard bottom provides protective cover and foraging areas for an abundance of organisms, supporting high fish productivity. Nearshore hard bottom habitats can support over thirty times as many individuals per transect as natural sand habitats (Lindeman 1997). Consequently, natural reefs can sustain greater fish

stocks (270 to 5,279 kg/ha) compared to non-reef open shelf bottom (6.3 to 46.3 kg/ha) (Huntsman 1979). In general, natural and artificial reefs support similar fish species assemblages (Ambrose and Swarbrick 1989). The abundance of fish on hard bottom and artificial reefs is related to the amount and type of structural complexity of the reef (Potts and Hulbert 1994; Carr and Hixon 1997). Rocky structures that have more available complex space resources consistently supported a more abundant and diverse resident fish community than less complex structures. In addition, multiple small hard bottom areas surrounded by sand habitat supported greater fish abundance and diversity than one large area of equal material, suggesting the importance of habitat variety to overall ecosystem quality (Bohnsack et al. 1994; Auster and Langton 1999). This research suggests that artificial refugia would be beneficial for enhancement of fish productivity and ecosystem value. An artificial refugia site is an artificial reef that is designated as a no-take area, to provide unfished habitat to aid in stock recovery, conduct research, and test effectiveness of enforcement. *Construction of artificial refugia (no-take artificial reefs) or designation of existing artificial reefs as refugia (no-take, Marine Protected Areas) should be considered to enhance fisheries productivity.*

Spawning

Hard bottom provides not only refuge and foraging areas, but also spawning areas. Most reef fish spawn in aggregations in the water column above the reef, and the eggs remain planktonic during development (Jaap 1984). The timing of egg release is often triggered by dusk, night, or the tides, probably to reduce risk from predation. Nearshore hard bottom has been identified as a spawning site for some reef species. Species known to spawn on nearshore hard bottom include black sea bass (*Centropristis striata*) and sand perch (*Diplectrum formosum*) between January and June (Powell and Robins 1998). Sheepshead (*Archosargus probatocephalus*), Atlantic spadefish (*Chaetodipterus faber*), seaweed blenny (*Parablennius marmoreus*), inshore lizardfish (*Synodus foetens*), and several species of damselfish, wrasses, and gobies (*Loglossus calliurus* and others) are also thought to spawn on inshore hard bottom (F. Rohde, DMF, pers. com., 2001). *More research is needed concerning spawning on, and recruitment to, nearshore hard bottom to understand the importance of this habitat and document trends in fish utilization.*

Nursery

Nearshore and inner shelf hard bottom areas serve as important settlement and nursery habitat for immigrating larvae of many important fisheries species. Powell and Robbins (1998) collected larvae from 22 reef-associated families adjacent to hard bottom habitat in Onslow Bay. Planehead filefish, *Monacanthus hispidus*; the blenny, *Parablennius marmoreus*; the goby, *Loglossus calliurus*; tomtate; white grunt; snappers including vermilion snapper, *Rhomboplites aurorubens*; black sea bass; bank sea bass; sand perch; spottail pinfish; and whitebone porgy were commonly collected. These species are thought to have been spawned in Onslow Bay in somewhat deeper water and recruited locally to nearshore hard bottom (Powell and Robins 1998). Additional species that are not generally reef-associated were also collected adjacent to hard bottom, including estuarine-dependent and oceanic species. It is unclear how planktonic larvae recruit to hard bottom habitat, except that recruitment is dependent on water circulation patterns transporting larvae to suitable habitat (Jaap 1984). Hard bottom habitat with vertical relief provides a variety of microhabitats, allowing a diversity of fish to recruit to the structure. Higher food availability in structure-rich hard bottoms, as well as properly managed artificial reefs, may result in increased growth rates, as well as increased survival.

Nearshore hard bottom also serves as intermediate nursery habitat for late juveniles emigrating out of the estuaries (Lindeman and Snyder 1999). In North Carolina, this group of fishes includes black sea bass, gag, red grouper, sheepshead, Atlantic spadefish, bank sea bass, and gray snapper, which are estuarine-dependent as early juveniles, moving offshore to hard bottom habitat as older juveniles. Juvenile red snapper and mutton snapper have also been documented in North Carolina's estuaries to a lesser extent (DMF, unpub. data). Species migrating offshore benefit from structure-rich hard bottom by using it for

refuge from predators and foraging on the high abundance of invertebrates and macroalgae. Lindeman and Snyder (1999) found that over 80% of the individual fish at hard bottom sites on the southeast coast of Florida were early life stages. The study documented more than 20 species of newly settled stages, including several species of grunts and snappers. In North Carolina, the patchy distribution and limited extent of hard bottom suggest that habitat availability may limit survival of early stages of reef fish, giving available hard bottom habitat particularly high value (P. Parker, NMFS, pers. com., 2002).

Fish utilization of man-made structures

The composition and density of fish at artificial reefs tend to be similar to those at natural hard bottom sites when occurring in similar environmental conditions (Potts and Hulbert 1994; Bohnsack et al. 1994; Huntsman and Manooch 1978; Miller and Richards 1980). Studies comparing fish utilization of shipwrecks and artificial reefs of various designs found that all structures supported similar species composition (Stephan and Lindquist 1989). Species composition, relative abundance, and catch-per-unit-effort (CPUE) on artificial reef sites are documented periodically by DMF (DMF 1998; DMF 2002). In 1997, an assessment of the effectiveness of differently constructed artificial reefs found species assemblages to be similar on reefs composed of concrete pipes, cans, or domes. However, the assessment also found that CPUE was 71 – 85% greater on natural reefs than nearby artificial reefs (DMF 1996), possibly because natural hard bottom habitat is inherently more complex than artificial structures.

DEMERSAL SPECIES	PELAGIC SPECIES
INSHORE REEFS (< 30 M DEPTH)	**INSHORE REEFS (< 30 M DEPTH)**
▪ Pinfish	▪ Amberjacks
▪ Pigfish	▪ Barracuda
▪ Black sea bass	▪ Bluefish
▪ Longspine porgy	▪ Bonito
▪ Whitebone porgy	▪ Cobia
▪ Tomtate	▪ King mackerel
▪ Tautog	
▪ Atlantic spadefish	**OFFSHORE REEFS (> 30 M DEPTH)**
▪ Sheepshead	▪ Dolphin
▪ Weakfish	▪ Sailfish
▪ Flounders	▪ Wahoo
▪ Spot	▪ Yellowfin tuna
▪ Atlantic croaker	
▪ Kingfish	
▪ White grunt	
OFFSHORE REEFS (> 30 M DEPTH)	
▪ Groupers	
▪ Porgies	
▪ Triggerfish	
▪ Snappers	

Jetties provide some of the same habitat functions for fishery resources that natural hard bottoms and artificial reefs provide. The hard surface and irregular relief of the rocks provide shelter and food for the colonized plants and animals, which in turn, serve as prey for higher order invertebrates and fishes. Hay and Sutherland (1988) described fish composition at jetties in North Carolina and South Carolina as a subset of those fish found on offshore hard bottoms and estuarine oyster reefs. The majority of fish moved to deeper water in the winter, gradually returning to inshore habitats as waters warmed in spring. The abundance of *Sparidae* species, such as pinfish, spottail pinfish, and sheepshead, was positively correlated with vegetative cover on the hard bottom. Hay and Sutherland (1988) categorized five general fish groups:

- Small cryptic resident fish, such as blennies and gobies;
- Numerically dominant species that migrate offshore in colder months, such as pinfish, spottail pinfish, black sea bass, and pigfish;

- Predatory pelagic species, such as bluefish, and Spanish and king mackerels;
- Fish attracted to jetties during their northerly migration in spring or southerly migration in fall, such as smooth dogfish (*Mustelus canis*); and
- Tropical species that occur as strays during warmer months, such as butterflyfishes (Chaetodontidae) and sergeant majors (*Abudefduf saxatilis*).

Although jetties provide habitat for some fish, the species that utilize them do not require jetties for survival since they are attracted from other existing natural habitats, such as hard bottom and estuarine oyster reefs. Because of impacts of these artificial structures on intertidal beach and water column functions[4], oceanfront jetties should not be considered as a habitat enhancement tool.

7.3. STATUS AND TRENDS

Status of hard bottom habitat

The condition of this habitat is of particular importance to estuarine-dependent snapper-grouper species that utilize North Carolina's shallow hard bottom habitat as "way stations" or protective stopping points as they emigrate offshore to deeper hard bottom. Protection of the shallow hard bottom habitat in state territorial waters is essential for successful protection of the estuarine-dependent snapper-grouper species and the associated fisheries that primarily occur on hard bottom in federal waters. The offshore snapper-grouper fishery is of great importance to North Carolina's commercial and recreational fisheries because of the market value of the fish, the number of recreational participants, and the associated businesses it supports. The snapper-grouper fishery had an annual market value of $3.6 million between 1992 and 2001 (DMF, unpub. data). For the years 1997–2001, DMF and NMFS records show 10,817 trips annually by private and charter boats and another 1,049 by headboats.

Nearshore reefs, although adversely impacted to various degrees by man, are in good condition overall (SAFMC 1998b). Good information exists on the distribution of hard bottom (Moser and Taylor 1995; SEAMAP-SA 2001). However, there is very little information available to evaluate the status and trends of hard bottom habitat in North Carolina state territorial waters. Anecdotal information from fishermen and local residents in New Hanover County suggests that nearshore hard bottom sites in the 1960s and earlier are now completely covered in sand, and that the abundance of fish along the shore and nearshore areas is much reduced.

Status of associated fishery stocks

Reef fish harvested commercially or recreationally are managed collectively as the reef fish complex or Snapper-Grouper management unit. There are 73 species in this complex, including snappers, groupers, sea bass, porgies, triggerfishes, grunts, jacks, and others. Only a portion of these species is found on North Carolina's nearshore hard bottoms. Information is available on the status of many reef fish species through federal, state, and interstate stock assessments. Fishery-dependent data are collected on reef fish by DMF's Offshore Live Bottom Fishery Program (DMF biological database program 438/448). Fishery-independent status and trends data on reef fish are also available for a portion of North Carolina from the Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) conducted by the South Carolina Department of Natural Resources. This program has conducted standardized groundfish (bottom fish) surveys since 1973 utilizing a variety of fishing gears. Since 1983, surveys have been conducted using fish traps and long lines from Cape Lookout south to Ft. Pierce, Florida. Sampling occurs on mid-shelf live bottom and shelf-edge reef habitats in water from 16 m to more than 92 m deep. Species composition, fish length, and fish weight are recorded to determine community structure, biomass estimates, distribution, and relative abundance of the more abundant species. In addition, CPUE is calculated for vermilion snapper, red porgy, white grunt, gray triggerfish, and black sea bass (SCDNR,

[4] see Water Column (2.0) and Soft Bottom (6.0) chapters

unpub. data). Although sampling occurs seaward of state waters, this program provides valuable information for state and federal stock assessments of reef fish, including species that utilize nearshore hard bottom and estuarine waters in North Carolina.

Most major South Atlantic reef fish stocks are considered fully utilized or over-utilized (NMFS 2002). Of 73 managed species in the South Atlantic Snapper-Grouper management unit, including black sea bass, 14 species were classified as Overfished in 2001 by the NMFS, nine were not Overfished, and 50 were Unknown (NMFS 2002).[5] Red porgy, speckled hind, red snapper, and snowy grouper are a few of the reef species classified as Overfished that occur in North Carolina.

In North Carolina, the reef fish complex as a whole was classified as "concern" by DMF in 2002 (DMF 2003). For stock status of individual reef species, DMF defers to SAFMC (included in Table 7.3). Of the ten fishery species listed in Table 7.3 that are highly associated with inshore hard bottom in North Carolina, nine stocks have been evaluated and eight of these have been given a stock status by DMF or SAFMC. Half of the stocks were reported as overfished (red porgy, sheepshead, tautog, and black sea bass south of Hatteras), while the other half were viable (gag, tomtate, white grunt, black sea bass north of Hatteras) (Figure 7.1). Gag was upgraded by DMF in 2002 from the overfished category to viable. Black sea bass north of Cape Hatteras was upgraded from overfished to viable, based on the Northeast Fishery Science Center spring survey. Black sea bass south of Cape Hatteras was downgraded to overfished based on the SAFMC stock assessment, which indicated low spawning stock biomass and heavy fishing exploitation. Approximately 74% of black sea bass landed in North Carolina are caught south of Hatteras.

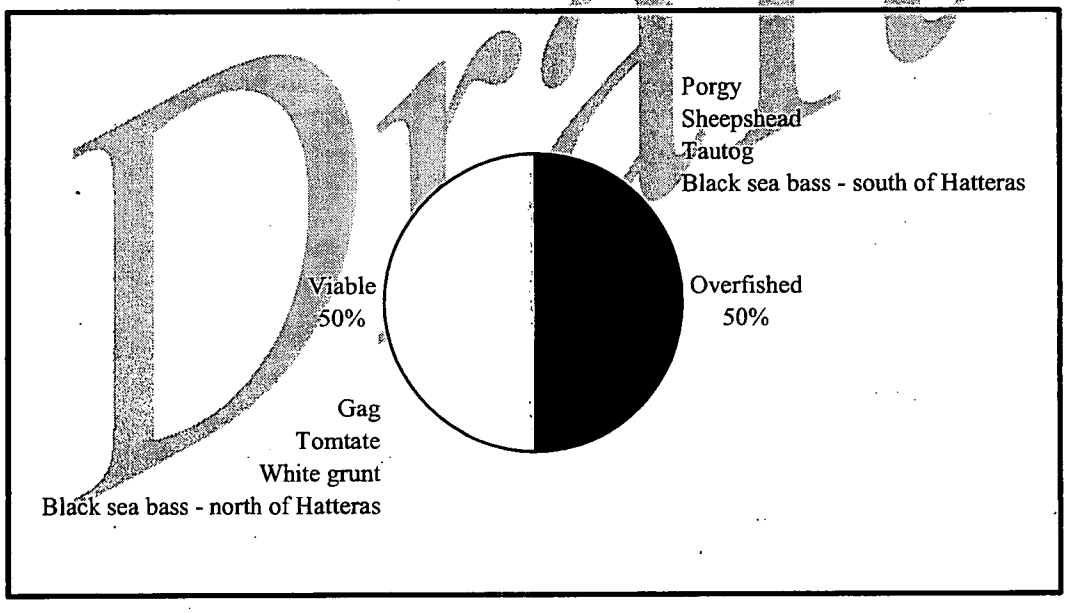


Figure 7.1. Percent of hard bottom associated fish stocks classified as Overfished or Viable in the 2003 DMF Stock Status Report, which includes SAFMC stock assessments of some species in the snapper-grouper complex. No species were reported as Concern or Recovering.

[5] Overfished is defined as "a stock size was below a prescribed biomass threshold" (NMFS 2002) and Unknown is defined as "no recent assessment was conducted or insufficient information about this stock exists to make a determination" (NMFS 2003).

Although most of the overfished species are caught primarily in federal waters, many are highly dependent on the shallow hard bottom habitat in state waters as primary and secondary nursery areas. The status of gag and black sea bass is particularly important because they are highly dependent on nearshore hard bottom and estuarine habitats as primary and secondary nursery areas and for providing migratory corridors as species move offshore as individuals age. The apparent vulnerability of reef species to overfishing is attributed to their long lives, slow growth, ease of capture, large size, and delayed sexual maturity. *The MFC should consider designating inshore hard bottoms (within state territorial seas) as Strategic Habitat Areas because of their importance as secondary nursery habitats and migratory corridors for black sea bass, gag, and other reef fish species.*

Because of concern for the overfished status of major stocks of the snapper-grouper complex and failure of those stocks to adequately recover despite extensive changes in fishing regulations, the SAFMC is considering establishment of Marine Protected Areas (MPAs) in the south Atlantic area. The primary purposes for MPA designation by the Council would be to protect important known grouper spawning aggregations and prevent overfishing, particularly for deepwater species. One deepwater site is currently being considered in federal waters off North Carolina in Onslow Bay, east of Cape Fear. A shallow water site near Cape Lookout has been proposed as an artificial refugia location. An artificial refugia site is an artificial reef that is designated as a no-take area, to provide unfished habitat to aid in stock recovery, to conduct research, and to test effectiveness of enforcement. *Within this area, program sponsors should construct numerous small complex sites surrounded by open areas to mimic natural nearshore hard bottoms and maximize habitat utilization.*

Overfished stocks can be particularly vulnerable to changes in the quantity or quality of habitat. While some research in Florida has indicated that habitat is not limiting and reef fish population is controlled primarily by recruitment success (Bohnsack 1996; Grossman et al. 1997), these studies may not be applicable to North Carolina where hard bottom is much less abundant. In North Carolina, there appears to be a direct relationship between the amount of hard bottom and the number of reef fish. Of the three bays in North Carolina, Onslow Bay has more hard bottom than Long Bay or Raleigh Bay and also has the greatest amount of reef fish (P. Parker, NMFS, pers. com., 2002). This relationship implies that increased habitat quantity would result in more or larger populations of reef fish. *Field experiments using a Before-After-Control-Impact Paired Series (BACIPS) design may be able to compare differences in fish abundance between undisturbed reefs (control sites) and areas with recently-added artificial structure (experimental sites) (Osenberg et al. 2002).*

Hard bottom restoration

Artificial reefs can potentially enhance fish production by increasing foraging, spawning, and refuge habitat (Grossman et al. 1997). However, there is some concern among fishery scientists that the structures may only concentrate available biomass rather than increase regional productivity (Carr and Hixon 1997). Artificial reefs are most effective at increasing production where reef habitat is limiting, when fishing effort is low, and when a large stock reservoir exists (Bohnsack 1996; Grossman et al. 1997). However, the results of studies attempting to determine if habitat is limiting are mixed. Although coral-eating fishes have been shown to decrease in abundance with decreasing live coral coverage, a similar relationship with fish-eating fishes, such as snappers and groupers, has not been observed (Grossman et al. 1997). The latter group is the more common type of reef fish in North Carolina and the primary target of anglers.

Artificial reefs must be properly designed, sited, and managed to successfully increase production of benthic (bottom-dwelling organisms) biomass and fish populations (DMF 1988). If habitat is limiting, artificial reefs that are not marked for fishing exploitation could serve as artificial refugia, providing beneficial habitat functions that could enhance local populations of reef fishes. Also, small complex structures that mimic natural hard bottom may be better for overall recruitment and enhance juvenile habitat and survival, while larger structures may be better for attracting large predators and enhancing

fishing (Bohnsack et al. 1994). One ongoing problem that the DMF has experienced with artificial reefs is the failure of some designs to remain assembled and in position. Early reefs composed of tires have broken apart during storms, and the tires have washed up on beaches and obstructed commercial fishing trawls. More recent artificial reefs constructed of concrete and pipes appear to remain in position as designed (DMF 1995). The DMF Artificial Reef Master Plan provides recommendations for design and siting of artificial reefs (DMF 1988). Some of the recommendations that pertain to habitat enhancement include:

- Materials used should not be toxic to the environment;
- Materials used must be stable and durable;
- Materials used should provide the degree of habitat complexity and profile appropriate for the targeted reef species;
- Artificial reefs should be designed to increase surface area and interstitial space by addition of rock, concrete or other suitable materials to barges and stripped vessels that lack structural complexity;
- Trolling alleys, reef clusters, and reef sanctuaries should be incorporated into reef complex designs;
- Artificial reefs should not be sited where natural hard bottom exists, in high-energy environments, or where traditional commercial fishing activities occur;
- Enhancement of existing artificial reef sites should be a higher priority than construction of new artificial reef sites;
- If artificial reefs are used to replace natural reef habitat that has been damaged or destroyed, they should be designed and constructed to provide proven biologically productive habitat.

High numerical abundance of fish may not necessarily be associated with increased production, survivorship, or species richness. The attraction-production debate regarding artificial reef fish assemblages is not yet resolved (Bohnsack 1989; Pickering and Whitmarsh 1996; Carr and Hixon 1997; Rilov and Benayahu 2000). *Additional research is needed to determine if and to what extent artificial reefs in North Carolina simply concentrate available fish or effectively increase fish biomass.*

7.4. THREATS AND MANAGEMENT NEEDS

Dredging and beach nourishment

In evaluating habitat condition for the snapper-grouper fishery, SAFMC concluded that dredging near or on hard bottom is potentially the most damaging physical human activity to this habitat (SAFMC 1998b). Dredging can be associated with creation or modification to navigational channels, or removal of sediment for beach nourishment projects. Dredging impacts to hard bottom habitat include the following (SAFMC 1998b):

- Dislocation of corals or colonized rock (live rock) and cuts through live tissue that leads to infection or mortality;
- Sedimentation that stresses corals and other sessile invertebrates, causing mortality if the deposited sediment can not be displaced, which in turn may also displace reef fishes;
- Elevated turbidity for extended periods may continue to stress hard bottom organisms, potentially decreasing survival over time;
- Movement of fill material from beaches by waves and currents can result in increased turbidity at and sedimentation on nearby hard bottom sites.

At beach nourishment projects in Florida, added sand was transported offshore from the beach by cross-shelf currents, covering hard bottom habitat (Marsh and Turbeville 1981; Lindeman and Snyder 1999). Studies off Wrightsville Beach and Atlantic Beach demonstrated how sediment was transported from the nourished beaches across the shoreface in southeastern and central North Carolina waters (Thieler et al. 1995; Thieler et al. 1998; Reed and Wells 2000). Hard bottom was observed to be buried by nourishment

sands in the Wrightsville Beach area (R. Thieler, USGS, pers. com., 2001). Commercial fishermen in the Wrightsville Beach area, where beach nourishment has been conducted regularly since the 1960s, reported that nearshore hard bottom areas that were once productive fishing areas are now covered in sand (public comment at SAFMC public meeting on MPAs, Wrightsville Beach, 2001; B. Cleary, UNC-W, pers. com., 2001). These areas are no longer fished due to poor yield. In Florida, Lindeman and Snyder (1999) observed dramatic decreases in numerical abundance of fish species and individuals following the burial of hard bottom habitat via sand transported from an augmented beach. The cumulative number of species detected 12 months prior to and 15 months after site burial decreased by nearly one order of magnitude, from 54 to eight species, respectively (Lindeman and Snyder 1999). The average number of individual fish recorded per transect also declined, from 38 (pre-burial) to less than one (post-burial) (Lindeman and Snyder 1999).

Dredging large navigation channels through ocean bottom is limited to the entrance channels leading to North Carolina's state ports in Wilmington on the Cape Fear River and in Morehead City on the Morehead City Channel. The dredged channels in the ocean lead into the Cape Fear and Beaufort inlets, respectively. Hard bottom is located in close proximity to the Wilmington channel. In 2002, the navigation channel was rerouted as part of a project to deepen the river channel and port and create a new offshore dredge material disposal site. The proposed route was altered to avoid dredging through hard bottom (F. Rohde, DMF, pers. com., 2002). Dredging and stabilization of other inlets can also potentially impact hard bottom when these activities occur close to shore, such as at New River, Masonboro, or Shallotte inlets. Turbidity and sedimentation associated with dredging may also have indirect effects on hard bottom in the vicinity of dredge sites.

In North Carolina, the frequency and magnitude of beach nourishment has increased over time.[6] If all requested and proposed projects are eventually authorized and conducted, approximately 155 miles (48% of ocean shoreline) would be affected and potentially degraded, excluding the beaches nourished periodically from channel and inlet dredging. All of the existing projects and the majority of the newly authorized projects are located south of Cape Lookout where hard bottom is most abundant, especially in the nearshore area. *The transport of sand from nourished beaches over time should be monitored. Future research should attempt to determine if the probability or extent of burial are affected by sand volume, type, or grain size, by the time-of-year of project initiation, or by the distance between nourished beach and hard bottom. A DENR Beach Management Plan should be developed and implemented which includes specific guidelines to minimize impacts to hard bottom from nourishment projects.*

Fishing and diving

Commercial fishing

Bottom longlines, dredges, fish traps, and bottom trawls can cause rapid and extensive physical damage to living and non-living components of hard bottom (SAFMC 1998b). In a comparative analysis of benthic fishing activities, the largest relative declines in benthic species richness and total numbers of individuals were associated with intertidal dredging (Collie et al. 2000). Fishing gear dragged across the bottom causes direct damage and mortality by breaking attached benthic organisms, such as sponges, anemones, and corals, or outcrop structures from the seafloor. Damage is especially extensive where the bottom is uneven and there is a concentration of coral and other invertebrates. The removal of structure and attached benthic organisms decreases species diversity and reduces structural complexity of hard bottom (Watling and Norse 1998). Dragged gear also indirectly damages bottom habitat by increasing the vulnerability of injured organisms to subsequent diseases and predation, smothering invertebrates with sediment (Auster and Langton 1999), and partially or completely destroying burrows and tubes constructed by invertebrates (Watling and Norse 1998). Trawling also results in an immediate reduction of mobile benthic invertebrates (e.g., polychaetes and crabs) on and adjacent to hard bottom, reducing

[6] Refer to the soft bottom threats section for status, trends, and location of beach nourishment activity, Map 6.2.

food resources available to other reef organisms.[7]

Roller-rigged trawls are a specific type of trawl with large rubber discs that is designed to roll over hard bottom habitat without becoming entangled. A study in South Carolina on the effects of roller-rigged trawls found that 32% of the sponges, 30% of the hard corals, and 4% of the soft corals at a hard bottom site were damaged by a single tow (Van Dolah et al. 1987). Damaged individuals require years to completely regenerate to their initial, pre-disturbance sizes, due to the organisms' slow growth rates (Van Dolah et al. 1987). Another study evaluated impacts from a roller-framed shrimp trawl and found that 50% of the sponges, 80% of the hard corals, and 40% of the soft corals were damaged (Tilmant 1979). In addition, catch rates of all animal groups declined over a five-year period; fewer animals may have been available to be caught due to past trawling effort.

Of the fishing gears that can potentially damage hard bottom, longlines, dredges, and fish traps are of minimal concern because they are used little or not at all in North Carolina state waters. There is currently no active dredge fishery in North Carolina's intertidal or subtidal ocean waters. Use of bottom longlines was prohibited by federal regulations in depths of less than 50 fathoms (300 ft) throughout the South Atlantic area as part of Amendment 4 of the Snapper Grouper Fishery Management Plan in 1991 to reduce fishing mortality and habitat damage. Fish traps can cause significant damage if placed on or dragged through hard bottom. However, federal regulations (Amendment 4, Snapper-Grouper Fishery Management Plan) prohibited the use of large fish traps in 1991. Smaller sea bass pots are allowed if equipped with escape vents and biodegradable panels to release undersize fish and eliminate waste from lost pots ("ghost fishing"). Only a relatively small number of black sea bass pots is placed in state territorial waters. Between 1994 and 2000, the total number of fish pot trips in state territorial waters ranged from 40 to 94 (DMF, unpub. data). Fish pots are more commonly used in federal waters and may have a greater impact to hard bottom in those areas.

Bottom trawling is conducted in North Carolina state ocean waters extensively for shrimp and to a lesser extent for flounder. Shrimp trawl effort in the ocean is most concentrated in the southern district of North Carolina (Onslow, Pender, New Hanover, and Brunswick counties), where hard bottom is most abundant (Figure 7.2). Flounder trawling in the ocean occurs in the northern (Currituck, Dare, Hyde counties) and central (Carteret County) districts, primarily north of Cape Hatteras. The number of flounder trawl trips during 1994–2000 has ranged from 49 to 204 trips/year, while the number of shrimp trawl trips has ranged from 2,500 to 3,500 trips/year (DMF, unpub. data). The extent that trawls contact and damage hard bottom in North Carolina is not known. Because the irregular hard surfaces of hard bottom can tear nets and damage expensive gear, fishermen generally try to avoid those areas. Roller-rigged trawls have been prohibited by federal regulations for targeting snapper-grouper since 1989. In addition, ocean trawling is prohibited within one-half mile of the ocean shoreline from Oregon Inlet north to the Virginia border (MFC rule 15A NCAC 3J.0202). Trawling is also restricted in many other areas, as provided by MFC rules (MFC 2001). *While there is potential for damage, research is needed to determine if and to what extent hard bottom is being damaged by trawling activity in North Carolina, particularly shrimp trawls in the southern portion of the coast. The specific locations of trawl trips should be mapped. To assess potential effects of trawling, experimental trawls of predetermined duration, magnitude and frequency should be conducted in a previously untrawled hard bottom location. The MFC should consider designating nearshore ocean hard bottoms as Strategic Habitat Areas due to their importance as secondary nursery habitat and corridors for gag, black sea bass, and other fisheries resources.*

[7] Refer to Appendix L for a list of the fishing gears used in North Carolina waters and their probable habitat impacts.

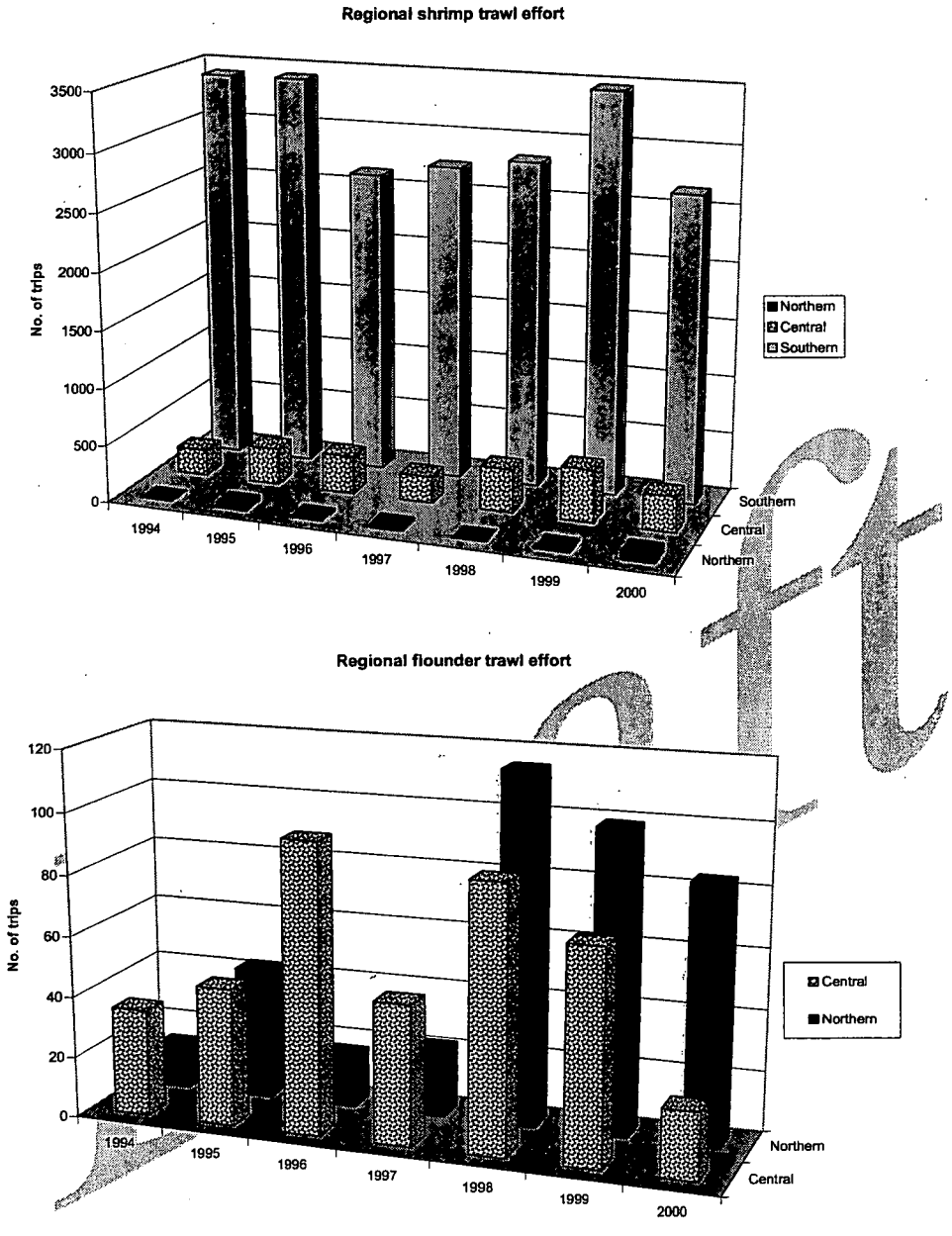


Figure 7.2. Shrimp and flounder trawl fishing effort (number of trips) in North Carolina's nearshore ocean waters (0-3 miles from shore), 1994–2000, by coastal region. *[Source: DMF, unpub. data]*

Recreational fishing

Direct impacts of hook and line gear on hard bottom habitat are considered low. Recreational fishing was identified at a NMFS conference as a major concern because of the large number of participants in the fishery (Hamilton 2000). There were more than six million sport fishing trips in coastal North Carolina in 2001, including more than 500,000 by private boats and charter boats in the ocean. Federal headboat survey data indicate that, additionally, there were more than 1,000 headboat fishing trips in North Carolina's ocean waters south of Cape Hatteras during 2001, involving about 32,000 angler-days (R.

Dixon, NMFS, pers. com., 2002). Hard bottom and artificial reef species are targeted by many recreational fishermen, and may receive concentrated use, leading to unknown cumulative impacts. Anchors and chains from recreational or commercial boats can break corals and other organisms and create lesions, leading to infection (SAFMC 1998b). In addition to habitat damage caused by anchors and chains, lost fishing gear (i.e., line, wire leaders, hooks, sinkers) and discarded rubbish (especially plastics) can entangle or be ingested by marine life, including bottom dwelling organisms. Roughly 52% of marine debris identified in U.S. waters originated from recreational vessels (UNESCO 1994). Chemical contamination from lost lead sinkers is also a concern. *Monitoring of hard bottom is needed to assess the level of impact from hook and line fishing. Educating anglers on the impacts of anchor damage, lost fishing gear and discarded litter to hard bottom habitat and associated species would be helpful in reducing those impacts.* Finally, overfishing of large reef fish predators can indirectly damage hard bottom habitat by creating an imbalance of trophic structure, reducing the quality and productivity of the habitat (NMFS 1999). *This issue is best addressed through fishery management plans, rather than the CHPP process.*

Recreational diving

Diving activities can also damage hard bottom. Divers can kick or overturn corals and live rock, which results in habitat damage. Harvest of live rock for the aquarium trade was found to cause extensive destruction and loss of hard bottom, with additional damage when chemicals were used (SAFMC 1998b). The MFC prohibits harvest or possession of coral or live rock (MFC rule 15A NCAC 3I .0116). The Carteret County area has been rated as one of the premier offshore diving areas in the United States, especially for wreck diving. Recreational spearfishing with power heads has damaged corals where diving activity was concentrated. In North Carolina, however, damage from diving activity is probably minimal due to the relatively low numbers of divers in the inshore areas.

Infrastructure

A relatively new threat to hard bottom comes from the installation or maintenance of fiber optic cables and pipelines placed across oceans and waterways. Cables are increasingly used to transmit telecommunications over long distances and pipelines are used to transport gas products. Since 1988 when the first fiber optic cable was laid across the Atlantic Ocean, an estimated 230,000 miles of oceanic cable have been installed (ASMFC 2001). Fiber optic cables are generally laid directly on the seafloor, and routed into a dredged or bored trench, conduit, or access hole where the cable comes onshore (landing site). Once the access hole or conduit is in place and buried, maintenance or placement of new cables involve dredging these holes back open. While cables are currently being placed under estuarine and inland waters as part of a combined natural gas pipeline and cable project, there are no fiber optic cables located in the ocean off North Carolina at this time (December 2002).

Environmental concerns to hard bottom associated with laying cables or pipelines identified by ASFMC (2001) and Blue Atlantic Transmission System (2003) include:

- During installation, cable "sweeping" and crushing of hard bottom communities can occur, even when pre-construction evaluations and analyses of alternative proposed routes are conducted.
- During repairs, grappling to recover and repair damaged cable has the potential to cause additional impacts to hard bottom resources. The repaired cable is generally not returned to its original location, potentially impacting additional bottom areas.
- When directional drilling (drilling a tunnel under the seafloor) for the landing sites encounters certain subsurface conditions, the pressurized fluid mud used to lubricate the drill hole can escape into the water column. The escaped fluids may cause turbidity plumes and subsequent burial or smothering of sensitive hard bottom resources, and release potentially toxic compounds.
- Sedimentation or excessive suspended sediment can cover hard bottom or impact filter feeders.
- Pipes or cables may restrict or alter invertebrate movement on the seafloor due to physical barrier of

the pipe, noise, vibrations, magnetic fields or other biochemical influences.

These cables and pipes may also pose a conflict for recreational and commercial fishing activities, as well as beach nourishment borrow areas. Permit authority for fiber optic cable corridors in the ocean is vested in the Corps of Engineers, with state review under the DCM consistency process. The ASMFC recommended that offshore corridors be pre-identified and evaluated for environmental impacts and conflicts. The ASMFC also recommended that monitoring be conducted to assess damage and recovery of habitat (ASMFC 2001). *North Carolina should coordinate with ASMFC, other states, and the communications companies to manage the placement of fiber optic cables in North Carolina offshore waters in a manner that minimizes impact to hard bottom and minimizes conflicts with existing activities.*

Water quality degradation

The quality of water at nearshore hard bottom sites is important since fisheries species are most sensitive to toxics and other pollutants during the first months of life. The effect of polluted waters on a given species depends on its life history and feeding behavior. According to the SAFMC (1998b), the primary threats to offshore water quality at hard bottom sites are oil and gas development, offshore dumping, and discharge of contaminants from river and estuarine systems.

The last active offshore oil and natural gas leases in state or federal waters off N.C. were relinquished in November 2000 (<http://www.gomr.mms.gov/homepg/offshore/atlocs/atocsfax.html>, 2003). Several companies, including Amerada Hess, Chevron, Conoco, Marathon, Mobil, Occidental Petroleum Corporation (OXY), and Shell have held interests, singly or jointly, in the Manteo Exploration Unit, a submerged area comprised of 21 lease blocks located approximately 44.8 statute miles northeast of Cape Hatteras (Vigil 1998). Currently, a federal moratorium on oil exploration and development of the eastern U.S. seaboard is in effect until 2012 (<http://dcm2.enr.state.nc.us/Facts/offshore.htm>, 2003). *However, it would be beneficial for the state to develop and implement a policy to prohibit oil and gas drilling in North Carolina's coastal waters, to ensure protection of hard bottom and water column habitats.*

Offshore dumping of dredged material occurs at designated sites in federal waters seaward of the Morehead City and Wilmington ports. A new, enlarged "Ocean Dredge Material Disposal Site" (ODMDS) is being developed by COE off the mouth of Cape Fear River in close proximity to natural hard bottom. The ship channel re-alignment goes through an artificial reef established a few years ago by COE. *Adequate monitoring should be conducted prior to creation and during use of this ODMDS to determine its effect on hard bottom habitat.*

Studies in the Mediterranean Sea examining the effect of pollution on hard bottom benthic communities found that total species richness, abundance, and diversity declined with increasing influence of multiple sources of pollution (Hong 1983) and echinoderm richness and density decreased with proximity to industrial sewage outfalls (Hermelin et al. 1981). Current state (EMC) policies prevent wastewater discharge into the Atlantic Ocean. The only exception to this restriction is the discharge off Oak Island of heated flow-through, non-contact cooling water from a nuclear power plant. *Because nearshore hard bottoms are so vulnerable to damage from physical and water quality changes, this policy should be maintained.*

Hard bottom can be degraded not only by point discharges but by outflowing estuarine and river waters. The effect of estuarine waters on hard bottom in North Carolina's ocean waters is largely unknown since little monitoring has been conducted. In 1999, UNC-W began a Coastal Ocean Monitoring Program (COMP) to assess physical, chemical, and biological properties of the Cape Fear river water plume, extending into Long Bay, and waters in Onslow Bay. Results following Hurricane Floyd found that approximately 200 mi^2 of coastal ocean waters were affected for approximately one month, in terms of turbidity and nutrient levels (<http://rover.phy.uncwil.edu/onslow/CFRPlume/>, 2004). In comparing water quality in nearshore ocean waters in Long Bay, where there is a large riverine influence, to Onslow

Bay, where there is minimal riverine influence, the Long Bay stations had four to seven times greater chlorophyll and nitrate concentrations than stations in Onslow Bay (<http://www.uncw.edu/cmsr/cormp/results.htm>, 2003). Hard bottom is concentrated in Long Bay and the south end of Onslow Bay, where riverine influence has been noted (Map 7.1c). Declines in estuarine water quality are therefore most likely to impact hard bottom in that area. *Monitoring of hard bottom should be initiated and coordinated with UNC-W or other ocean water quality monitoring programs to determine the effects of estuarine water quality, particularly nutrient and sediment loading, on hard bottom.*

Hard bottom in close proximity to shore is more vulnerable to coastal pollution from point and non-point discharge of sewage, industrial waste, and stormwater runoff than offshore hard bottom. Stormwater runoff and discharge of nutrient-rich estuarine waters can increase nutrient levels in coastal ocean waters. Problem levels of nutrients have generally not been found in North Carolina's coastal ocean waters. However, water quality sampling in the ocean waters is extremely limited.[8] Residues of the organochlorine pesticides DDT, PCB, dieldrin, and endrin have been found in gag, red grouper, black grouper, and red snapper, indicating that toxins from stormwater runoff are a potential threat to the hard bottom community (SAFMC 1998b). *Additional water and tissue sampling at hard bottom sites are needed to determine if the benthos of the hard bottom community or the surrounding waters exhibit levels that exceed designated levels of concern.*

Existing management measures

Man-made structures functioning as hard bottom have been given varying levels of designation and protection. In 1975, the wreck of the USS Monitor, a Civil War ironclad located off Cape Hatteras in federal waters, was designated as the first national marine sanctuary. Within North Carolina state territorial waters, the USS Huron, a popular wreck located just 250 yards off the beach in Dare County, was designated by the state as a historic shipwreck preserve (Map 7.1). Despite some concern regarding the effectiveness of artificial reefs, all artificial reefs, along with all natural hard bottom, have been designated by the NMFS as Essential Fish Habitat (EFH). All SAFMC-designated Artificial Reef Special Management Zones (SMZs) are also Habitat Areas of Particular Concern (HAPC) under authority of the federal Sustainable Fisheries Act of 1996 (SAFMC 1998b). Artificial reef SMZs are designated areas surrounding artificial reef sites where certain fishing restrictions or regulations may apply (DMF 1988). The purpose of the designation is to prevent extremely efficient fishing gear from being used on the sites, so that user conflicts are reduced, the resource is used in an orderly manner, biological production is optimized, fish stocks are maintained, and recreational fishing is protected (DMF 1988). There are 21 SMZs in the South Atlantic: seven off Georgia, 11 off South Carolina, one shared by Georgia and South Carolina, and two off Florida. There are no SMZs in North Carolina waters. Fishery management plans adopted by the South Atlantic Council include HAPC designations, which are then put into effect through federal regulations implemented and enforced by NMFS.

Natural hard bottom is protected through several state and federal designations. Certain hard bottom areas were designated as federal Habitat Areas of Particular Concern based on four criteria: 1) importance of ecological functions; 2) sensitivity to human degradation; 3) probability and extent of effects from development; and 4) rarity of the habitat. In North Carolina, all of the nearshore hard bottom areas, two specific offshore areas in Onslow Bay (Ten Fathom Ledge and Big Rock), and the entire shelf break have been given this designation for snapper-grouper (SAFMC 1998a). Approximately 150 reef-associated species have been documented from Ten Fathom Ledge and Big Rock (SAFMC 1998a). Inshore hard bottom (<18 m water depth) is thought to support similar fish species as those documented at Ten Fathom Ledge (P. Parker, NMFS, pers. com., 2001).

The North Carolina Natural Heritage Program inventories, catalogues, and facilitates protection of the

[8] Refer to the Water Column section 2.0 for more information on water quality.

rarest and most outstanding elements of natural diversity in the state. The program designates rare or significant plants, animals, or natural communities, which consequently merit protection or special consideration when making land use and conservation decisions. Currently, four hard bottom ledges within state territorial waters (Map 2.4) have been designated by this state program as Significant Natural Heritage Areas (SNHA) (Natural Heritage Program, unpub. data). These areas include rock outcrops off Bogue Banks (two acres), New River Inlet (1300 acres), South Topsail Island (38 acres), and Masonboro Island (50 acres). There is also one designated intertidal rock outcrop community—the Fort Fisher Coquina Rock outcrops (47 acres). These and other nearshore hard bottom areas are particularly vulnerable to impacts from on-shore land development activities. *These areas should be designated as Strategic Habitat Areas and considered for additional protection under the recent federal Executive Order 13158, which calls for strengthening and expansion of Marine Protected Areas in the United States or through additional state actions specifically designed to protect those sites.*

Several state and federal regulations provide protection for hard bottom habitat. Since 1995, DMF has prohibited directed harvest of all coral or any live rock in North Carolina state waters (MFC rule 15A NCAC 3I .0116). In addition, any live rock or coral which is harvested incidentally with any gear must be returned immediately to the waters where taken. Similar NMFS regulations exist for federal waters. There are a few areas where hard bottom is present and trawling is restricted. This includes the military prohibited and restricted areas and sea turtle sanctuary that are both located in the ocean seaward of Onslow Beach (15A NCAC 3I .0110, 15A NCAC 3I .0107).

Despite the live rock prohibition, hard bottom structure can still be damaged or killed accidentally by certain commercial and recreational fishing gear and boating equipment. Although there is potential for damage, there has been no documentation that fishing gear currently used in North Carolina is damaging hard bottom. An absence of data on past conditions and current fishing and boating effects prevents accurate identification of potential damage to nearshore hard bottom. *Monitoring of hard bottom condition in nearshore waters, as well as fish utilization of the habitat, is the first step in evaluating impacts of fishing gear or threats to that habitat.*

A series of federal regulatory actions have been taken by NMFS to protect hard bottom habitat (SAFMC 1998b). Management measures from the snapper-grouper FMP and subsequent amendments focused on prevention of overfishing through harvest and gear limitations:

- Amendment 1 (1989) addressed habitat damage through prohibition of trawling gear (roller-rigged trawls) for the harvest of species in the snapper-grouper fishery south of Cape Hatteras (SAFMC 1998b);
- Amendment 2 to this plan (1994) prohibited collection of live rock in federal waters. State rules were implemented in 1995 to be consistent with this federal regulation;
- Amendment 4 (1991) prohibited use of fish traps in federal waters, with the exception of black sea bass traps north of Cape Canaveral, Florida. Fish traps cannot be used in North Carolina ocean waters to target snapper-grouper (15A NCAC 3M .0506(s)(1)). These rules limit the potential number of traps and associated impacts to hard bottom in North Carolina. The majority of black sea bass traps is located beyond state waters. Bottom longlines are allowed in south Atlantic federal waters. Collecting corals and use of chemicals are regulated by NMFS pursuant to the 1982 SAFMC Coral Fishery Management Plan (SAFMC 1998b).

Use of Marine Protected Areas has proven effective in habitat protection and fishery enhancement in several areas of the world. A recent study of 89 marine reserves showed that fish and marine life quickly recovered when protected by establishment of marine reserves (Halpern 2003), and the protected areas repopulated adjacent waters (AAAS 2001; Roberts et al. 2001). In New Zealand, overfished snapper populations increased by 40 times within a few years of its establishment, compared to populations outside a reserve. Fish populations tripled in a St. Lucia reserve within three years. North Atlantic sea scallop populations were 14 times greater inside a reserve than outside it after five years of closure.

Estuarine waters near Cape Canaveral that were closed to fishing for over 30 years had 3–12 times greater relative fish abundance than adjacent fished areas (Roberts et al. 2001). In addition, preliminary results from establishment of several no-take reserves in the Florida Keys in 1995 indicate reduced habitat damage and improvement in some reef fish populations, particularly yellowtail snapper and spiny lobster.

Since multiple harvest and gear regulations have not appeared to adequately improve the status of reef fish species in the Snapper-Grouper fishery, and additional species have become overfished, the SAFMC has considered use of Marine Protected Areas as a possible management tool since 1992 (SAFMC 1998b; SAFMC 2001). Marine Protected Areas are considered most effective at protecting species with restricted geographical movements typical of most reef animals or where habitat is limiting (Bohnsack 1993). Creation of MPAs can be a valuable tool for the prevention of or recovery from overfishing. They also protect, and potentially improve, reef habitat previously subjected to physical damage. Finally, MPAs protect age structure, biodiversity, and genetic diversity of fish stocks within their boundaries. Based on the 1992 scoping process, input from SAFMC advisory panels and committees, and an ongoing public involvement process, the SAFMC will likely use some form of MPA's as a fishery management tool in the south Atlantic. There has been little discussion concerning establishment of reserves through state management. The MFC has the authority to establish no-take areas. The Fisheries Director may prohibit or restrict taking of fish and use of any equipment in and around any artificial reef or research sanctuary subject to some conditions (15A NCAC 3I .0109). Many areas within state waters, such as primary nursery areas, are already protected from certain fishing activities through MFC rules. For example, trawling is prohibited in over 46% of North Carolina's estuarine waters. *Hard bottom designated as Strategic Habitat Areas could be considered for incorporation into an MPA to provide protection from fishing gear impacts.*

Two federal Executive Orders issued in 1997 and 2000 also support and encourage establishment of MPAs. In 1997, Executive Order 13089 authorized establishment of a multi-agency task force to direct coral reef conservation in the United States (63 FR 32701–32703, 1998). This task force is exploring recommendations for establishment of MPAs to protect coral reef ecosystems. Establishment of MPAs is currently being considered at Gray's Reef National Marine Sanctuary in Georgia waters (SAFMC 2001). In 2000, Executive Order 13158 directed federal agencies to strengthen the management, protection, and conservation of existing marine protected areas and establish new or expanded MPAs through the creation of a scientifically-based comprehensive national system of MPAs representing diverse marine ecosystems (Federal Register 2000). The MPA executive order calls for:

- Integrated assessments of ecological linkages among MPAs;
- Biological assessment of the minimum area of "No Take" zones needed to preserve representative habitats in different geographic areas of the marine environment;
- An assessment of threats and gaps in levels of protection to natural and cultural resources;
- Practical science-based criteria and protocols for monitoring and evaluating the effectiveness of MPAs;
- Identification of emerging threats and user conflicts affecting MPAs and appropriate, practical, and equitable management solutions, including effective enforcement strategies to eliminate or reduce such threats and conflicts; and
- Assessment of the economic effects of the preferred management solutions.

The DMF should investigate the law enforcement needs necessary to implement MPAs or similar actions for the protection of hard bottom habitat and associated fisheries.

Water quality protection for hard bottom habitat may also result from Executive Order 13158. In addition to establishment of MPAs through NMFS, the order instructs the Environmental Protection Agency (EPA) to identify areas warranting additional protection from pollution and enhancement of water quality standards, and to "propose new science-based regulations, as necessary, to ensure appropriate levels of protection for the marine environment" (Federal Register 2000). The Executive Order also requires the

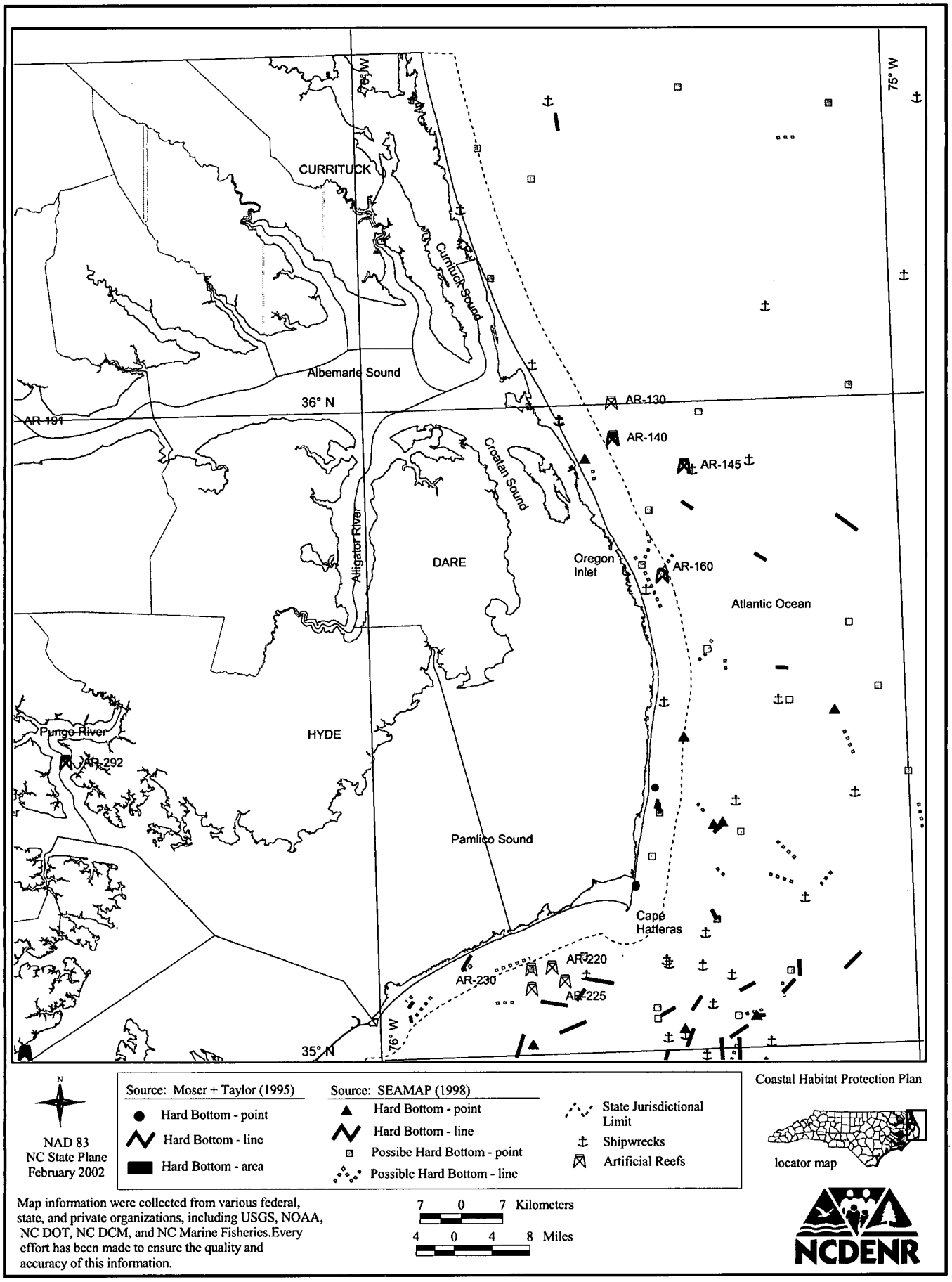
Department of Commerce and the Department of the Interior to consult with relevant states, and to seek expert advice and recommendations of non-federal scientists and resource managers, and other interested organizations through an advisory committee. More information on MPAs is available on the web (<http://www.mpa.gov>, 2003).

7.5 Summary of Hard Bottom chapter

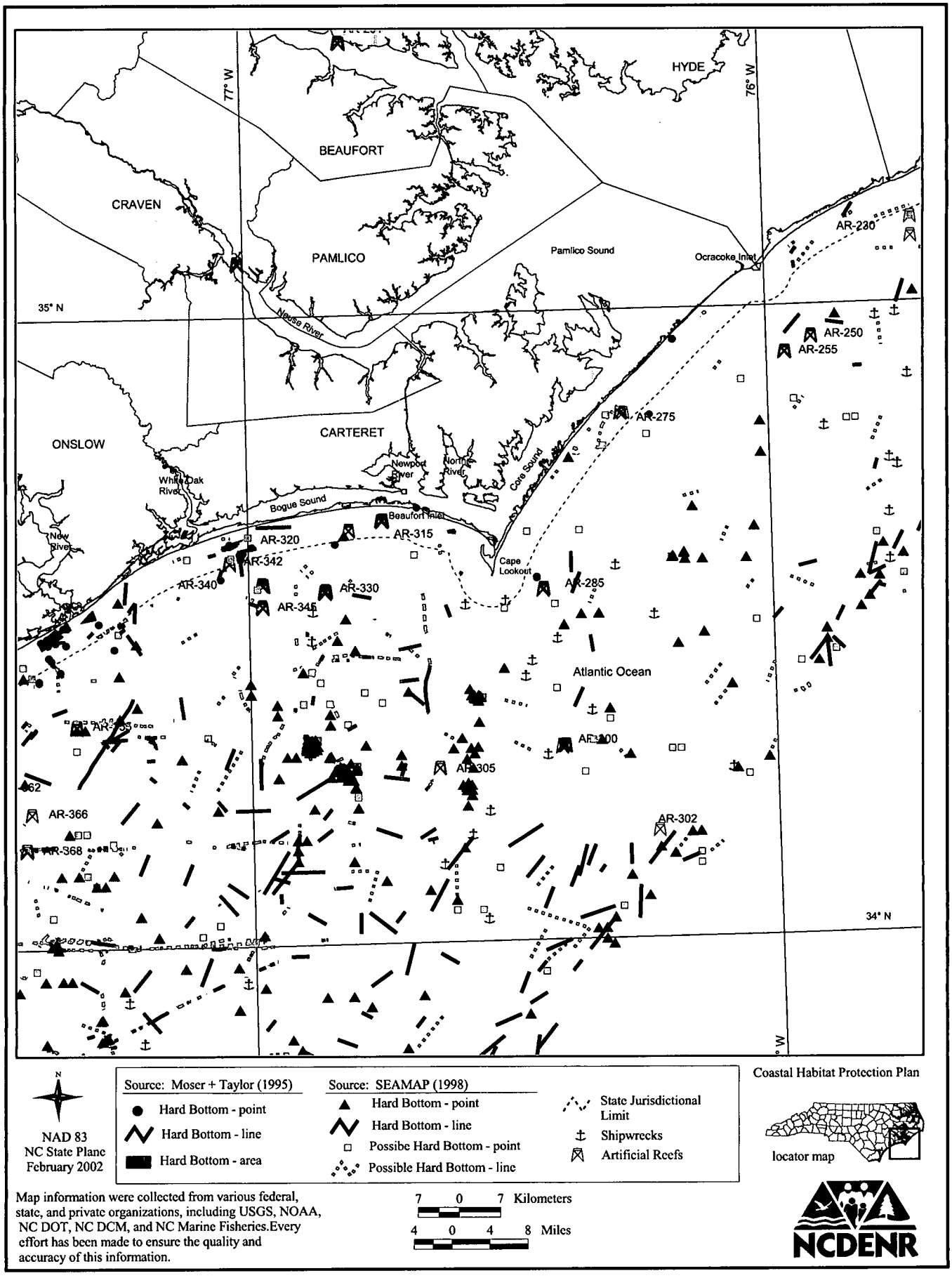
Hard bottom is valuable to fish because it provides structural complexity for foraging and refuge in marine waters. The presence of ocean hard bottom, along with appropriate water temperatures, allows for the existence of a temperate-to-subtropical reef fish community and a snapper-grouper fishery in North Carolina. Many economically important species and many non-fishery species spawn on nearshore hard bottoms, including black sea bass, Atlantic spadefish, sheepshead, tomtate, white grunt, pinfish, pigfish, damselfish, blennies, sand perch, and inshore lizardfish. Nearshore hard bottoms within North Carolina's ocean waters also serve as important nursery areas for these species as well as provide important secondary nursery habitat for estuarine-dependent fish, such as gag, and black sea bass, as the fish move between estuarine areas and offshore reef areas. All nearshore hard bottoms have been federally designated as Habitat Areas of Particular Concern for the snapper-grouper complex.

Although the current distribution of hard bottom habitat has been mapped, little is known about the biological condition of specific hard bottom sites or how it is changed over time. Wrecks and artificial reefs are beneficial since they add to the total amount of hard structure available to marine organisms and may reduce fishing pressure on natural reefs.

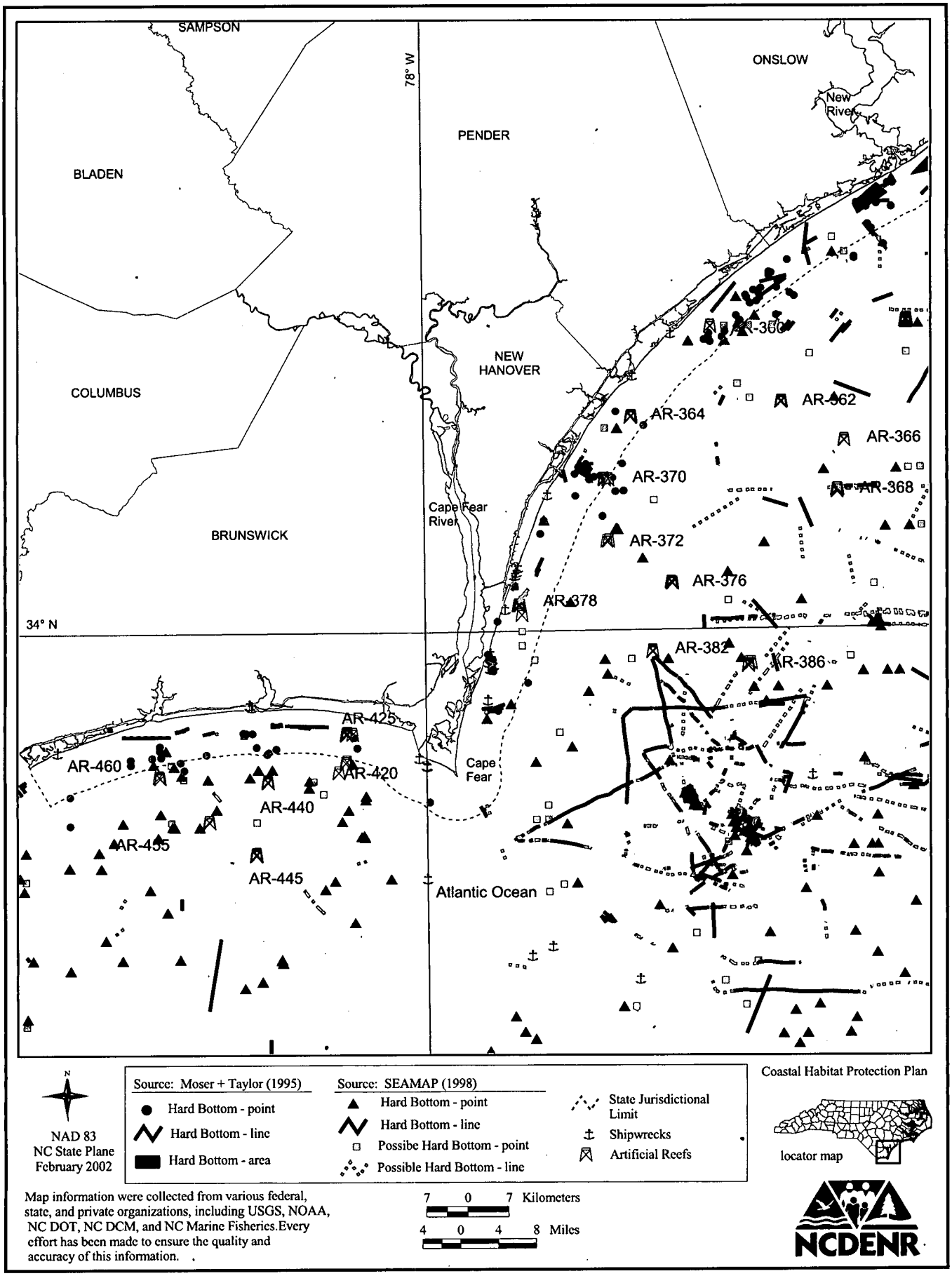
Because of the lack of baseline information on the biological functioning of nearshore hard bottom, the primary management needs for this habitat are continued research and monitoring to determine specific functional importance, determination of status and trends, and protection of existing hard bottom habitats from degradation or destruction. Threats to nearshore hard bottom in North Carolina include beach nourishment, channel dredging, bottom-disturbing fishing gear, and water quality degradation. Channel dredging can directly remove hard bottom habitat or increase turbidity to damaging levels. Sand transported from nourished beaches can cover up hard bottom structure. Bottom-disturbing fishing gear and related equipment, such as bottom trawls and boat anchors, can uproot coral and damage the structure of hard bottom. Excess nutrients, sediments, or toxins can impact growth or survival of the invertebrates living on hard bottom structure. Water-quality degradation to hard bottom originates from nonpoint sources, such as oil and gas from boating activity, oil spills, and nutrient, sediment, or toxin loading from estuarine and riverine discharges. The quality of estuarine waters discharging into marine waters may have the largest overall effect on hard bottom, and can be addressed through the management needs discussed in the other estuarine habitat sections.



Map 7.1a. Location of hard bottom, possible hard bottom, shipwrecks, and artifical reefs in state and federal waters off North Carolina - northern coast



Map 7.1b. Location of hard bottom, possible hard bottom, shipwrecks, and artificial reefs in state and federal waters off North Carolina - central coast.



Map 7.1c. Location of hard bottom, possible hard bottom, shipwrecks, and artificial reefs in state and federal waters off North Carolina - southern coast.

CHAPTER 8. STRATEGIC HABITAT AREAS

While recognizing that all fish habitat is important, scientific data show that certain areas contribute disproportionately more to the viability of fishery and forage stocks, and populations of protected species. These areas of high importance should be the primary focus of habitat protection efforts. While the locations of many Strategic Habitat Areas (SHAs) in North Carolina are currently unverified, some are known (i.e., Primary Nursery Areas). Basic criteria for their location are presented in this chapter. This chapter also provides guidance for the identification, delineation, and designation processes. Location and delineation of these areas will be addressed in the eleven Management Unit plans following adoption of this Coastal Habitat Protection Plan.

8.1. DEFINITION

In 1998, the CRC, EMC, and MFC approved the following definition for Strategic Habitat Areas (SHAs):

"Specific locations of individual fish habitats or systems of fish habitats that have been identified to provide exceptional habitat functions or that are particularly at risk due to imminent threats, vulnerability, or rarity. These may include areas previously delineated by other state or federal agencies (AECs, HAPCs, ORWs, for example), or others as deemed necessary in an approved CHPP. Strategic Habitat Areas allow for site-specific management measures to be recommended."

As noted in the SHA definition, management measures will be site-specific based on the fish population dependence on the habitat and the threats to habitat function. Some measures may be broader reaching than others due to the extent of SHAs in a particular Management Unit. As SHAs are identified, each commission and agency involved with activities impacting those areas will determine appropriate regulatory and non-regulatory actions necessary to protect these sites.

8.2. SYSTEM RELATIONSHIPS

In order to locate and delineate SHAs, the relationships among habitats must be considered. While all fish habitats are of ecological value to fish, numerous studies from a variety of areas show that certain spatial relationships among habitats maximize their ecological value to species in those habitats. For example, the overall abundance and biomass of finfish and other animals in tidal freshwater and estuarine creeks are enhanced by proximity of SAV beds to the marsh edge and depth of adjacent creeks (Rozas and Odum 1987a; Ellis 1995; Irlandi and Crawford 1997). Open-water zooplankton are more vulnerable to predation in close proximity to SAV beds providing refuge for small planktivorous fish than zooplankton occurring well away from such areas (SAFMC 1998). In a Texas estuary, densities of small invertebrates (worms, shellfish, insects) in soft bottom are highest adjacent to emergent salt marsh vegetation in the spring (Rozas and Zimmerman 2000). Species using rocky outcrops in North Carolina marine systems were supported by benthic production from adjacent soft-bottom habitat (Posey and Ambrose 1994). Another example of the synergistic effect of habitat diversity is the co-occurrence of oyster reefs and SAV. In turbid areas with reduced SAV coverage, addition or enhancement of oyster reef habitat facilitates filtration of suspended particles from the water column, enhancing light penetration and improving conditions for SAV. Expansion of SAV habitat can lead to increased production of many fishes and invertebrates dependent on that habitat. These studies show how individual habitats can have a greater value to fish production as part of a system or complex of habitats than as isolated sites.

While delineating complexes of related bottom features is important, it is only part of Strategic Habitat Area delineation. Water circulation patterns play a crucial role in larval settlement and post-larval migration to nursery areas. Maintaining water flow among SHAs is therefore an important aspect of SHA management. The water column surrounding bottom features is also affected by water circulation patterns and land use/land cover characteristics affecting the source of that water. Habitat fragmentation

is a well-recognized problem affecting terrestrial wildlife populations (Saunders et al. 1991). In aquatic systems, Turner et al. (1999) found that SAV patch isolation had a significant influence on benthic community composition, suggesting that habitat fragmentation degrades aquatic systems as well as terrestrial systems. *Therefore, consideration should be given to reducing habitat fragmentation in the process of SHA designation.*

8.3. EXISTING HABITAT DESIGNATION AND PROTECTION PROGRAMS

There are no designated Strategic Habitat Areas in North Carolina at this time. However, several different approaches are used in North Carolina to identify, delineate, and designate ecologically important habitat areas. At the federal level, the Magnuson-Stevens Fishery Conservation and Management Act Reauthorization of 1996 [the Sustainable Fisheries Act (SFA)] requires the National Marine Fisheries Service (NMFS) to amend federal Fishery Management Plans (FMPs) to include provisions for protection of "Essential Fish Habitat" (EFH), defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." In North Carolina, salt marshes, oyster reefs, and seagrass beds are designated EFH for red drum and penaeid shrimp, species managed cooperatively by state and federal authorities. Similar to CHPP Strategic Habitat Areas, federal "Habitat Areas of Particular Concern" (HAPCs) are designated for areas of EFH that are particularly important for managed species or species complexes (SAFMC 1998). North Carolina Primary Nursery Areas, first designated by the MFC in 1977, are similar in concept to HAPCs. However, the NMFS has designated very few HAPCs (none in North Carolina), while the MFC/DMF and WRC have designated tens of thousands of acres as nursery areas in North Carolina (see below). The state designations are well accepted by the various state and federal regulatory and permitting agencies, as well as by the public.

While the concept of HAPC is similar to that of CHPP Strategic Habitat Areas, there are some important differences. First, measures protecting HAPC are focused on federally funded activities. The scope of HAPC protection is also specific to individual species or groups of similar species and, therefore, does not take a watershed-based approach. For oceanic species managed by the federal government (i.e., tunas), this approach presents no obstacle, but for anadromous (i.e., American shad) and estuarine-dependent (i.e., southern flounder) species, which are of primary importance in North Carolina, the watershed approach best captures the nature of threats and impacts, as well as opportunities for restoration, enhancement, and preservation. Finally, the federal FMPs and their implementing rules do not apply to fishery species managed primarily under state authorities (i.e., oysters, spot).

The MFC and WRC have designated nursery areas since 1977 and 1990, respectively, based on field sampling. Approximately 162,000 acres of Coastal Fishing Waters are currently designated by the MFC as Primary, Secondary, and Special Secondary Nursery Areas. About 10,000 acres of Inland Fishing Waters in the coastal area are designated as Inland Primary Nursery Areas, as well as the following areas of the four main rivers draining to North Carolina's coast:

- Roanoke River, U.S. 258 bridge to Roanoke Rapids Dam (35.5 stream miles, 57.1 km)
- Tar-Pamlico River, railroad bridge at Washington to Rocky Mount Mill Dam (90.2 stream miles, 145.2 km)
- Neuse River, Pitchkettle Creek to Milburnie Dam (160.6 stream miles, 258.4 km)
- Cape Fear River, Lock and Dam #1 to Buckhorn Dam (126.7 stream miles, 203.9 km).

Strategic Habitat Areas are not the same as MFC-defined "Critical habitat areas" [MFC Rule 15A NCAC 3I .0101(20)]. Strategic Habitat Areas may include critical habitat areas, but all critical habitat areas may not be SHAs. The term "Strategic Habitat Areas" is also used to avoid confusion with the term "Critical Habitat" used in the federal Endangered Species Act. There are currently no specific protections for MFC-designated Critical habitat areas within EMC or CRC rules. There are, however, specific protections for designated nursery areas included in the rules of all three commissions. For example, a MFC rule [15A NCAC 3N .0104] prohibits use of trawls, dredges, long haul and swipe seines, and

mechanical shellfishing gears in Primary Nursery Areas (PNAs). Once an area has been designated as a PNA by the MFC, the area also comes under protection of existing CRC rules [15A NCAC 07H .0208] and EMC rules [EMC rule 15A NCAC 02B .0301(c)] that protect physical and water quality parameters of PNAs as a class.

Four classes of Critical habitat areas were defined by a MFC rule in the early 1990s [MFC Rule 15A NCAC 3I (20) – submerged aquatic vegetation, shellfish producing areas, anadromous fish spawning areas, and anadromous fish nursery areas], but no specific areas have yet been designated under that rule. The DMF is currently delineating anadromous fish spawning areas based on sampling conducted from the early 1970s to the present for presentation to the MFC. Although neither CRC nor EMC rules offer any specific protection for anadromous fish spawning or nursery areas, regulatory protections exist for other critical habitat areas, such as submerged aquatic vegetation and shellfish producing areas. Beds of submerged aquatic vegetation are protected from the direct impacts of dredging and trawling (in some locations, MFC rule 15A NCAC 3J .0104), and open shellfish harvesting areas are protected from new marina pollution and wastewater discharges [CRC rule 15A NCAC 07H.0208(5)(E)]. (More information regarding protection of fish habitat types is provided in Chapters 2.0 – 7.0). The piecemeal protection of individual habitat types fails to provide the holistic approach needed to protect entire systems of interdependent habitat. Designation and protection of Strategic Habitat Areas are meant to remedy this problem.

8.4. LOCATION AND DESIGNATION PROCESS

Strategic Habitat Areas will be delineated and recommended for designation in CHPP Management Unit plans. To protect these areas, the CRC, EMC, and MFC would enact appropriate management measures following the Administrative Procedures Act (G.S. 150B) for rulemaking. Recommendations for designation of SHAs will be developed based on existing DMF procedures for identifying PNAs and similar procedures by the other commissions and agencies. Government agencies or private parties may suggest potential areas. The process for identifying and designating SHAs should include the following tasks:

- ***Gather data and information to locate potential Strategic Habitat Areas*** by completing and maintaining habitat mapping (including seagrass, shell bottom, and other bottom types) using the most appropriate technology, monitoring the status of those habitats, and assessing the effects of land use and human activities on those habitats. Data on specific habitat areas (such as small watersheds, bays, or creek segments), fish populations and other natural resources, and potential threats in or near those specific habitat areas, will be compiled, including assessment of linkages between habitats and fisheries resources. Staff will evaluate indicators of biological or ecosystem health and integrity; distribution, status, and trends of the habitat; and threats to habitat quality and quantity.
- ***Identify Strategic Habitat Areas using ecologically based criteria*** developed from information gathered in step 1. The checklist outlined in section 8.5 should be utilized in identifying SHAs.
- ***Develop a spatial database for each proposed SHA.*** The boundaries of each SHA will be mapped and entered into a DENR Geographic Information System (GIS) database. The spatial database will also include habitat types, fish populations and other natural resources, existing protected areas (state, federal and local agencies' designated areas), and potential threats, as well as supporting research and sampling information.
- ***Present recommended Strategic Habitat Areas for designation by the appropriate commission.*** These recommendations will be part of the report associated with the proposed SHA.

Once an area is designated, existing rules and voluntary initiatives pertinent to that area should be compared to potential threats in order to identify any gaps in protecting its current strategic functions. This evaluation could lead to new rules to protect the area, or modifications of existing management

activities (i.e., enforcement, education, land acquisition).

8.5. STRATEGIC HABITAT AREA CHECKLIST

1. The area provides exceptional habitat function for coastal fisheries resources and/or related forage species. The coastal fisheries and forage species and stocks to be considered include the following:
    a. All coastal fisheries species for which North Carolina, interstate, or federal FMPs have been adopted by the MFC, WRC, Atlantic States Marine Fisheries Commission (ASMFC), South Atlantic Fishery Management Council (SAFMC), or Mid-Atlantic Fishery Management Council (MAFMC),
    b. Other species that support important commercial and recreational fisheries in coastal North Carolina,
    c. Forage species important in the diets of the above species
2. The area is documented by specific data or scientific studies as highly important for spawning, nursery, foraging, corridor, or refuge functions.
3. Qualitative information indicates the area is highly important for spawning, nursery, foraging, corridor, or refuge functions.
4. The area is documented by specific data or literature as highly important based on
    a. High and consistent species abundance
    b. High and consistent species diversity
5. The area has been documented to provide important functions for state or federally listed protected aquatic animal or plant species.
6. The area is particularly vulnerable to human impacts or is rare (i.e., uncommon, limited geographic range).
7. The area is at particular risk due to demonstrable threats, as indicated by local development patterns, land use plans, or other applicable information.
8. The area is within an existing state, federal, or local government aquatic area designated to provide some level of protection against degradation or loss (designating authority in parentheses):
    a. Primary nursery areas (MFC)
    b. Critical habitat area (MFC)
    c. Inland primary nursery areas (WRC)
    d. Crab spawning sanctuaries (MFC)
    e. Outstanding Resource Waters (EMC)
    f. Wetlands of exceptional functional significance (DCM)
    g. Habitat areas of particular concern (NMFS)
    h. Significant natural heritage areas (Natural Heritage Program)
    i. Sea turtle sanctuaries (MFC)
    j. North Carolina coastal reserves (CRC)
    k. National estuarine research reserves (NMFS)
9. Marine protected areas (NMFS)
10. The site is within an area set aside for natural resource management or protection (designating authority in parentheses):
    a. State parks, natural and scenic rivers (North Carolina General Assembly)
    b. National parks and seashores (United States Congress)
    c. National wildlife refuges (United States Congress)
    d. National forests (United States Congress)
    e. State game lands (WRC)

CHAPTER 9. MANAGEMENT RECOMMENDATIONS

9.1 INTRODUCTION

The discussions of the six major habitat types in the preceding chapters demonstrate the importance of coastal fish habitats, threats to those habitats, and the need to take actions to achieve the stated goal of the Coastal Habitat Protection Plan as provided by the North Carolina General Assembly: "long-term enhancement of coastal fisheries associated with each coastal habitat." This chapter provides management recommendations based on scientific studies cited in chapters 2.0 – 7.0, deliberations of the Environmental Management, Coastal Resources, and Marine Fisheries commissions, and citizen input from two series of well-attended public meetings (20 in all) held during the summers of 2003 and 2004.

The public cited coastal development as the issue most needing immediate attention, followed by enforcement of statutes, rules, and permit conditions, and then environmental education and research. Threats associated with development included polluted stormwater runoff, sewage discharges, and wetland filling. Meeting attendees agreed that existing laws and rules might be sufficient for habitat protection, but that they are not adequately enforced largely due to insufficient staffing and resources. Educating the public about the importance of coastal habitats and the threats they face was repeatedly mentioned as being critical for successful habitat protection and enhancement.

9.2 THREATS

The CHPP law specifically requires identification of "existing and potential threats to the habitats" and "actions to protect and restore the habitats." (G. S. 143B-279.8) Threats to coastal fish habitat come from many sources and usually affect more than one habitat. Table 9.1 provides a listing and evaluation of the principle threats to the six types of coastal fish habitats identified previously in this report. Development, agriculture, forestry, transportation, channel dredging, and marinas and docks pose the greatest threats. The water column and shell bottom are the most threatened habitats (shell bottom because there is so little of it, and the water column because there are so many pollution sources). All habitats are subject to multiple threats.

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Table 9.1. . Evaluation of specific threats to coastal fish habitat based on hydrologic, physical, and water quality alterations. Darker shading indicates greater impact[1].

ACTIVITY TYPE	THREAT / ACTIVITY	Coastal Fish Habitats					
		Water column	Shell bottom	SAV	Wetlands	Soft bottom	Hard bottom
AGRICULTURE/ AQUACULTURE RELATED	Animal operations						
	Aquaculture (incl. Discharges, intro spp.)						
	Cropland						
	Forestry						
WATER CONTROL	Dams						
	Water withdrawal						
DEVELOPMENT RELATED	Urban/suburban construction activities						
	Urban stormwater runoff (impervious surface)						
	On-site wastewater disposal						
	Permitted industrial wastewater discharges						
	Permitted domestic wastewater discharges						
	Waste disposal (landfills, ocean dumping)						
	Fiber optic cables/utility pipelines						
	Estuarine shoreline stabilization						
	Ocean shoreline hardening						
	Ocean beach nourishment						
TRANSPORTATION RELATED	Impervious roadways						
	Culverts, bridges, and fill (physical blockages)						
FISHING RELATED	Bottom trawl						
	Clam trawl (clam kicking)						
	Toothless dredge (bay scallop)						
	Toothed dredge (crab and oyster)						
	Long haul seines						
	Pots (crab)						
	Rakes, tongs						
	Rod and reel						
NAVIGATION RELATED	Marinas and docks - construction, assoc. NPS						
	Ports (incl. introduced spp. via ballast water)						
	Boating activity						
	Channel and inlet dredging						
	Dredge material disposal (on submerged land)						
MINING RELATED	Phosphate and other minerals						
	Log salvage						
	Oil and gas exploration/drilling						
OTHER	Sea level rise						
	Storm events						
	Disease						
	Introduced or nuisance species						
	Marine debris/litter						

[1]Impact ranking Black - severe; Dark gray - moderate; Light gray - minor; White - none, unknown or potential

9.3 RECOMMENDATIONS

The CHPP development process identified hundreds of management needs, as shown in chapters 2.0 – 7.0. The members of the three Commissions reviewed the issues, along with suggested management actions to address those needs. The Commissions selected four general goals and a series of recommended actions to reach each goal, as shown below. Potential funding sources to support the recommendations were also suggested. In addition to these specific management recommendations, numerous research needs were noted, as shown in Appendix M. The goals, recommendations, and possible funding sources shown below are not listed in any kind of priority order. (Numbers at the end of each recommendation refer to that action as shown in Table 9.2.)

GOAL 1. IMPROVE EFFECTIVENESS OF EXISTING RULES AND PROGRAMS PROTECTING COASTAL FISH HABITATS

Every year, an average of more than 100 acres of Outstanding Resource Waters (the highest quality waters in North Carolina) are closed permanently to shellfish harvest, and miles of previously unaltered estuarine shoreline are artificially hardened with vertical shoreline stabilization structures. Thousands of acres of farmland and forests are uprooted, developed, and paved annually, and nutrient-contaminated Public Trust waters suffer from low oxygen events and fish kills. Existing rules and Table 9.1.Evaluation of specific threats to coastal fish habitats based on hydrologic, physical, and water quality alterations. Darker shading indicates greater impact[1].
programs have had only limited success in protecting and enhancing coastal fish habitat and fisheries resources. The following non-regulatory actions must be taken for existing management strategies to be effective:

- Enhance enforcement of, and compliance with, Coastal Resources Commission (CRC), Environmental Management Commission (EMC), and Marine Fisheries Commission (MFC) rules and permit conditions (#16).
- Coordinate and enhance water quality, physical habitat, and fisheries resource monitoring (including data management) from headwaters to the nearshore ocean (#18).
- Enhance and expand educational outreach on the value of fish habitat, threats from human activities, effects of non-native species, and reasons for management actions (#15).
- Coordinate rulemaking and enforcement among regulatory commissions and agencies (#17).

GOAL 2. IDENTIFY, DESIGNATE, AND PROTECT STRATEGIC HABITAT AREAS

Growing resident and visitor populations in coastal North Carolina will further stress productive coastal habitats and fisheries resources through expansion of support services and infrastructure. Inland development degrades the water quantity and quality of streams that flow to the coastal sounds, as do increased boating and some fishing activities. Certain areas are especially important to fish production, and others are particularly vulnerable to these threats. Greater protection for these "Strategic Habitat Areas" must be a high priority in order to maintain a healthy coastal ecosystem. The following regulatory and non-regulatory management actions should be implemented:

- Gather information to identify Strategic Habitat Areas by
    a) Coordinating, completing, and maintaining habitat mapping (including seagrass, shell bottom, and other bottom types) using the most appropriate technology (#1).
    b) Monitoring the status of those habitats (#1).
    c) Assessing effects of land use and human activities on those habitats (#1).
- Identify and designate Strategic Habitat Areas using ecologically based criteria (#2).
- Analyze existing rules and enact measures needed to protect Strategic Habitat Areas (#2).
- Improve programs for conservation (including voluntary actions) and acquisition of areas supporting Strategic Habitat Areas (#2).

GOAL 3. ENHANCE HABITAT AND PROTECT IT FROM PHYSICAL IMPACTS

Studies estimate that up to 50% of North Carolina's original wetlands have been destroyed since colonial times. Development continues to cause degradation and permanent loss of coastal and non-coastal wetlands. Significant negative impacts to wetlands may occur through a combination of larger projects that require state and federal permits and numerous small, unrecorded actions. Regardless of magnitude, each impact contributes to the cumulative loss of habitat functions and biological productivity. Shell bottoms (oyster reefs) in coastal North Carolina were decimated by uncontrolled fishing methods more than a century ago, and later by construction of the Atlantic Intracoastal Waterway in the 1930s. Since that time, hurricanes, mechanical harvest methods, small scale dredging and filling projects, and diseases and parasites have continued to reduce remaining shellfish bottoms, particularly subtidal oyster beds in the Pamlico Sound system, and impede establishment of new shell bottoms. Submerged aquatic vegetation (sea grass, SAV) in low salinity areas, such as Albemarle Sound and western Pamlico Sound, has all but disappeared. Submerged aquatic vegetation is highly vulnerable to physical disturbances, as well as to water quality degradation, especially turbidity. Strong management actions are necessary to reverse historic and current habitat losses and restore wetlands, shellfish beds, and SAV. The following regulatory and non-regulatory measures are recommended:

- Greatly expand habitat restoration, including:
  a) Creation of subtidal oyster reef no-take sanctuaries (#7).
  b) Re-establishment of riparian wetlands and stream hydrology (#7).
- Prepare and implement a coast wide beach and inlet management plan that requires ecologically based guidelines for minimization of impacts to fish habitats, while addressing socio-economic concerns (#3).
- Protect Submerged Aquatic Vegetation (SAV), shell bottom, and hard bottom areas from fishing gear impacts through improved enforcement, establishment of protective buffers around habitats, and further restriction of mechanical shellfish harvesting (#5).
- Protect fisheries resource habitat by revising estuarine and public trust shoreline stabilization rules using best available scientific information, considering estuarine erosion rates, and development and promotion of incentives for alternatives to vertical shoreline stabilization measures (#4).
- Protect and enhance habitat for anadromous fishes by:
  a) Incorporating the water quality and quantity needs of fish in surface water use planning and rule making (#6).
  b) Eliminating obstructions to fish movements, such as dams, locks, and road fills (#6).

GOAL 4. ENHANCE AND PROTECT WATER QUALITY

Because all fish habitats are connected through the water column, maintaining and restoring water quality is the basic component of habitat protection and enhancement. Runoff from developed lands (structures, parking lots, roads, residential yards), agricultural fields and facilities, and intensively managed forests carries excess nutrients into surface waters, which can lead to algae blooms that reduce water clarity and lower dissolved oxygen in the water column. Turbidity from runoff can suppress SAV growth, cause low oxygen events leading to fish kills, and cause mortality of organisms in the bottom community, including oysters. Excess sediment clouds the water, reduces SAV growth and survival, fills in creeks and small water bodies with silt, and degrades spawning and nursery habitats. Heavy metals and pesticides transported into the water with storm water can accumulate in the bottom sediments and organisms. Through the food chain, such pollutants may contaminate fish, affecting their survival and growth, and making them unsafe for human consumption. Runoff also carries fecal material to surface waters after rain events, requiring closure of tens of thousands of acres of shellfishing waters to harvest to protect human health.

Spills and other failures of municipal and on-site wastewater treatment facilities and infrastructure often

send sewage pollution downstream, contributing to algae blooms, and causing shellfishing closures and restrictions on swimming in public waters. Some coastal towns dispose of stormwater on the ocean beaches, while others drain it to the ocean or estuaries. These discharges degrade water quality, leading to shellfishing closures and notifications warning of possible public health dangers from contact with contaminated water. These warnings have a detrimental effect on tourism. Marinas also degrade water quality and restrict use of Public Trust waters via mandatory shellfish harvest closures. Large-scale animal farming expanded rapidly in eastern North Carolina in the 1990s and management of hog waste became a major environmental problem. Current methods generally used for hog waste management can greatly increase nutrient loading to adjacent waters through excessive spraying on fields, aerial deposition, and spills. The following regulatory and non-regulatory management measures are necessary to address a diversity of point and non-point pollution sources:

Point sources

- Reduce point source pollution by:
  a) Enhancing inspections of sewage treatment facilities, collection infrastructure, and land disposal sites (#8).
  b) Providing incentives for upgrading all types of wastewater systems (#8).
- Amend rules to prohibit ocean wastewater discharges (#9).
- Prohibit new or expanded stormwater outfalls to coastal beaches and to coastal shellfishing waters (EMC surface water classifications SA and SB) and continue to phase-out existing outfalls by implementing alternative stormwater management strategies (#10).

Non-point sources

- Improve land-based strategies to reduce non-point pollution and minimize cumulative losses to wetlands and streams through voluntary actions, Best Management Practices (BMPs) and incentives, including:
  a) Improved methods for reducing sediment pollution from construction sites, agriculture, and forestry (#12).
  b) Increased on-site infiltration (#12).
  c) Documentation and monitoring of small but cumulative impacts to wetlands and streams resulting from un-permitted/un-mitigated activities (#12).
  d) Incentives for low impact development (#12).
  e) Enhanced inspections of onsite wastewater treatment facilities (#8).
  f) Increased water re-use and recycling (#12).
- Improve land-based strategies to reduce non-point pollution and minimize cumulative losses to wetlands and streams through rule making, including:
  a) Larger vegetated buffers (#11);
  b) More stringent impervious surface limits (#11);
  c) Expansion of Areas of Environmental Concern (AECs) upstream and landward (#11);
  d) Establishment of setbacks along estuarine and public trust shorelines (#11);
- Develop and implement a comprehensive coastal marina and dock management plan and policy to prevent closures of shellfish harvest waters and cumulative impacts to fish habitats (#14).
- Reduce non-point source pollution from animal operations by the following actions:
  a) Continue the moratorium on new/expanded swine operations until alternative waste treatment technology is implemented (#13).
  b) Use a greater percentage of agricultural conservation funds to phase-out or re-locate concentrated animal operations in sensitive areas (#13).
  c) Mandate the phase-out of waste lagoons by a specific deadline (#13).
  d) Use improved siting criteria to protect fish habitats (#13).

9.4. POSSIBLE FUNDING SOURCES

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Implementation of the above recommendations will involve new program activities and revised priorities for existing programs within DENR and other agencies. Significant new funding is essential to expand and improve enforcement and compliance monitoring to fully implement existing laws and rules. Coordinating and expanding DENR biological, physical, and chemical monitoring and data management within the eight coastal river basins will provide local and state environmental managers and regulatory commissions, as well as the development, agriculture, and forestry communities, with data and analyses necessary to make informed decisions, and to evaluate the effects of those decisions. Implementation of coordinated interagency management requires a significant infusion of personnel, equipment, and operations monies. These funds must be considered as an investment in greatly enhanced environmental productivity that will benefit all citizens and provide important dividends over the long-term.

- Request expansion funds from the North Carolina General Assembly.
- Dedicate funds collected through sale and renewal of a Coastal Recreational Fishing License to manage coastal fish habitats.
- Dedicate funds collected through sale and renewal of a Coastal Recreational Fishing License to environmental education and outreach.
- Incorporate CHPP recommendations into North Carolina Clean Water Management Trust Fund priorities.
- Establish severance fees for commercial extraction of natural resources from coastal lands and waters and utilize such funds to enhance, protect, restore, and manage coastal fisheries resource habitats.
- Support protection, enhancement, restoration, and management of coastal fish habitats by establishing a Coastal Fish Habitat Protection Fund supported by impact fees on development in the vicinity of coastal fish habitats.
- Work with the DENR Ecosystem Enhancement Program to implement coastal habitat restoration projects.
- Develop partnerships to restore and protect coastal fish habitats through private and federal programs, such as the FishAmerica Foundation, Restore America's Estuaries, NOAA Restoration Center, and the U.S. Fish and Wildlife Service.

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Table 9.2 Recommended actions to protect, enhance, restore, and manage habitats important for North Carolina's coastal fisheries resources.

Reference numbers	Recommended actions to protect, enhance, restore and manage coastal fish habitats	Responsible commission or agency [Lead group(s) in bold]	Require rule making?
1	Evaluate potential Strategic Habitat Areas by a) coordinating, completing, and maintaining habitat mapping (including seagrass, shell bottom, and other bottom types) using the most appropriate technology, b) monitoring the status of those habitats, and c) assessing effects of land use and human activities on those habitats.	**MFC/DMF**, CRC/DCM, DENR	No
2	Identify and designate Strategic Habitat Areas using ecologically based criteria, analyze existing rules and enact measures needed to protect Strategic Habitat Areas, and improve programs for conservation (including voluntary actions) and acquisition of areas supporting Strategic Habitat Areas.	**DENR**, CRC, EMC, MFC, WRC	Yes
3	Prepare and implement a coast wide beach and inlet management plan that requires ecologically based guidelines for minimization of impacts to fish habitat, while addressing socio-economic concerns.	**CRC/DCM**, EMC/DWQ, MFC/DMF, DWR, WRC, DENR	Yes
4	Protect fish habitat by revising estuarine and public trust shoreline stabilization rules using best available information, considering estuarine erosion rates, and the development and promotion of incentives for use of alternatives to vertical shoreline stabilization measures.	**CRC/DCM**	Yes
5	Protect Submerged Aquatic Vegetation (SAV), shell bottom, and hard bottom areas from fishing gear effects through improved enforcement, establishment of protective buffers around habitats, and further restriction of mechanical shellfish harvesting.	**MFC/DMF**	Yes

Reference numbers	Recommended actions to protect, enhance, restore and manage coastal fish habitats	Responsible commission or agency [Lead group(s) in bold]	Require rule making?
6	Protect and enhance habitat for anadromous fishes by a) incorporating the water quality and quantity needs of fish in surface water use planning and rule making, and b) eliminating obstructions to fish movements, such as dams, locks and road fills.	**DENR**, EMC, DWQ, DWR, WRC, DMF,	Yes
7	Greatly expand habitat restoration, including a) creation of subtidal oyster reef no-take sanctuaries and, b) re-establishment of riparian wetlands and stream hydrology.	**DMF**, EEP	No
8	Reduce point source pollution from human sewage by a) increasing inspections of sewage treatment facilities, collection infrastructure, land disposal sites, and onsite wastewater treatment facilities, and b) providing incentives for upgrading all types of wastewater treatment systems.	**EMC**, DWQ, CHS, DEH	No
9	Adopt or modify rules or statutes to prohibit ocean wastewater discharges.	EMC	Yes
10	Prohibit new or expanded stormwater outfalls to coastal beaches and to coastal shellfishing waters (EMC surface water classifications SA and SB), and continue to phase-out existing outfalls by implementing alternative stormwater management strategies.	**EMC**, DWQ, CRC, DCM, CHS, DEH	Yes
11	Improve land-based strategies to reduce non-point pollution and minimize cumulative losses to wetlands and streams through rule making, including a) larger vegetated buffers, b) more stringent impervious surface limits, c) expansion of Areas of Environmental Concern (AECs) upstream and landward, and d) establishment of setbacks along estuarine and public trust shorelines.	**EMC**, **CRC**, DWQ, DCM, SCC, DLR	Yes

Reference numbers	Recommended actions to protect, enhance, restore and manage coastal fish habitats	Responsible commission or agency [Lead group(s) in bold]	Require rule making?
12	Improve land-based strategies to reduce non-point pollution and minimize cumulative losses to wetlands and streams through voluntary actions, Best Management Practices (BMPs), and incentives, including a) improved methods to reduce sediment pollution from construction sites, agriculture, and forestry, b) increased on-site infiltration of stormwater, c) documentation and monitoring of small but cumulative impacts to wetlands and streams resulting from un-permitted/un-mitigated activities, d) incentives for low-impact development, and e) increased water re-use and recycling.	**DENR**, EMC, CRC, DWQ, DCM, SCC, DLR, S&WCC, DS&WC, Dept. of Agriculture & Consumer Services, DFR	No
13	Reduce non-point source pollution from concentrated animal operations by the following actions: a) continue the moratorium on new/expanded swine operations until alternative waste treatment technology is implemented, b) use a greater percentage of agricultural conservation funds to phase-out concentrated animal operations in sensitive areas and relocate operations from sensitive areas, c) mandate the phase-out of waste lagoons by a specific deadline, and d) use improved siting criteria to protect fish habitat.	**General Assembly**, **DENR**, EMC, DWQ, S&WCC, DS&WC, Dept. of Agriculture & Consumer Services	Yes
14	Develop and implement a comprehensive coastal marina and dock management plan and policy to prevent closures of shellfish harvest waters and minimize cumulative impacts on fish habitat.	**CRC/DCM**, EMC, DWQ, DMF, WRC	Yes
15	Enhance and expand educational outreach on the value of fish habitat, threats from human activities, effects of non-native species, and the reasons for management measures.	**DENR**	No
16	Expand enforcement of, and compliance with, Coastal Resources Commission (CRC), Environmental Management Commission (EMC), and Marine Fisheries Commission (MFC) rules and permit conditions.	**CRC/DCM**, **EMC/DWQ**, **MFC/DMF**, CHS, SCC, WRC, DFR, DLR, S&WCC	No

Reference numbers	Recommended actions to protect, enhance, restore and manage coastal fish habitats	Responsible commission or agency [Lead group(s) in bold]	Require rule making?
17	Coordinate rulemaking and enforcement among regulatory commissions and agencies.	**EMC, CRC, MFC, DENR, WRC**	No
18	Coordinate and enhance water quality, physical habitat, and fisheries resource monitoring (including data management) from headwaters to the nearshore ocean.	**DENR**, DMF, DWQ, DCM, WRC	No

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Appendix A:
State, federal, and interstate programs affecting Coastal Fish Habitat in North Carolina

Public Trust Doctrine- Implemented as part of North Carolina's constitution; applied in management of North Carolina's coastal lands, surface waters, and the resources in those waters. The doctrine states that "public trust lands, waters, and living resources in a State are held by the State in trust for the benefit of all the people, and establishes the right of the public to fully enjoy public trust lands, waters, and living resources for a wide variety of recognized public uses. The doctrine also sets limitations on the States, the public, and private owners, as well as establishing the responsibilities of the States when managing these public trust assets" (Coastal States Organization, Inc. 1997:1).

North Carolina General Assembly - Enacts statutes affecting all of North Carolina. State laws and rules implementing those laws cannot over rule federal laws. However, state actions can be more restrictive than federal rules for environmental protection.

North Carolina Fisheries Reform Act of 1997 (FRA) - Includes a provision [G.S. 143B-279.8] for preparation of a Coastal Habitat Protection Plans (CHPPs) by the N.C. Department of Environment and Natural Resources, with adoption and implementation by three regulatory commissions and their administrative agencies.

Magnuson-Stevens Fisheries Conservation and Management Act of 1976 - The basic law giving the federal government fisheries management authority in the ocean. The reauthorization law (in 1996) is known as the Sustainable Fisheries Act (SFA), which established the basis for federal designation of "Essential Fish Habitat" (EFH).

National Marine Fisheries Service (NMFS) - The agency in the National Oceanic and Atmospheric Administration (NOAA) charged with principal responsibilities for management of the Nation's fisheries and fish habitat in the oceans beyond individual states' jurisdictions. Federal fishery management plans must include provisions for the protection of Essential Fish Habitat (EFH) from negative impacts from federally funded activities.

Coastal Resources Commission (CRC) - One of three North Carolina regulatory commissions that must adopt CHPPs and implement their recommendations. The CRC enacts rules to manage development and land disturbing activities along estuarine and ocean shorelines, shoreline stabilization, alteration of submerged bottoms and coastal wetlands and marina construction. The Division of Coastal Management (DCM), an agency of the N.C. Department of Environment and Natural Resources, implements CRC rules.

Environmental Management Commission (EMC) - One of North Carolina regulatory commissions that must adopt CHPPs and implement their recommendations. The EMC has wide-ranging authority over activities affecting water quality statewide. Rules adopted by the EMC govern point and nonpoint discharges, wastewater management, alteration of non-coastal wetlands, and stormwater management. Several different DENR agencies implement EMC rules, including the divisions of Water Quality (DWQ), Air Quality (DAQ), Water Resources (DWR), and Land Resources (DLR) of the N.C. Department of Environment and Natural Resources.

Marine Fisheries Commission (MFC) - One of three North Carolina regulatory commissions that must adopt CHPPs and implement their recommendations. The MFC manages commercial and recreational fishing practices in coastal waters through rules implemented by the Division of Marine Fisheries (DMF), and agency of the N.C. Department of Environment and Natural Resources.

Intercommission Review Committee (IRC) - A committee of two members from each of the three regulatory commissions (EMC, CRC, MFC), who reviewed the CHPP and developed the management recommendations.

Division of Marine Fisheries (DMF) - DENR agency that implements MFC rules affecting commercial and recreational fishing practices in coastal waters, including rules governing effects of fishing practices on fish habitats. The DMF also conducts extensive monitoring and research programs concerning fish stocks, landings statistics, licensing, and enforcement, and prepares and implements state fishery management plans.

Division of Water Quality (DWQ) - One of the DENR agencies that implements rules of the Environmental Management Commission to govern point and nonpoint discharges into surface waters, wastewater management, alteration of non-coastal wetlands, and stormwater management. The DWQ conducts an extensive statewide water quality-monitoring program, manages permit programs for wetlands impacts and wastewater discharges, and prepares and implements basinwide management plans.

Division of Air Quality (DAQ) - One of the DENR agencies that implements rules of Environmental Management Commission to govern discharges of particulates and gases into the atmosphere. The DAQ operates a statewide network to monitor air quality.

Division of Water Resources (DWR) - One of the DENR agencies that implements rules of Environmental Management Commission pertaining to use of water resources and water supply. The DWR manages state grant programs for water resource development projects, such as navigation and ocean beach nourishment.

Division of Land Resources (DLR) - The DLR administers rules adopted by Sedimentation Control Commission to control sediment transport from land development, as well as rules of the N.C. Mining Commission. The DLR administers the State's dam safety program, and also includes the N.C. Geological Survey and the N.C. Geodetic Survey.

Division of Coastal Management (DCM) - DENR agency that implements rules adopted by the CRC to manage development and land disturbing activities along estuarine and ocean shorelines, shoreline stabilization, alteration of submerged bottoms and coastal wetlands and marina construction through permit programs. The DCM also sponsors and conducts research and analysis concerning coastal erosion and wetlands mapping.

The North Carolina Wildlife Resources Commission (WRC) - The state agency charged with management of inland fisheries, hunting, and management of wildlife, birds, and protected species. The WRC has over most anadromous fish spawning areas in coastal rivers and creeks. The WRC conducts fisheries research on a statewide basis.

Appendix B:
Intercommission Review Committee
and
Coastal Habitat Protection Plan Development Team

Intercommission Review Committee (Two members each from MFC, EMC, CRC)

Current members as of June 1, 2004

MFC		
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CRC		
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CHPP Development Team – (Scientists and planners from DMF, DCM, DWQ, Division of Environmental Health (DEH), and WRC)

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Appendix C: Land cover descriptions (from DWQ Basinwide Planning documents)

Natural Resources Inventory land cover type	Land cover descriptions
Cultivated cropland	Harvestable crops including row crops, small-grain and hay crops, nursery and orchard crops, and other specialty crops.
Uncultivated crop	Summer fallow or other cropland not planted.
Pastureland	Includes land that has a vegetative cover of grasses, legumes and/or forbs, regardless of whether or not it is being grazed by livestock.
Forest land	Land at least 10% stocked by single-stemmed trees of any size which will be at least 4 meters at maturity, and land bearing evidence of natural regeneration of tree cover. The minimum area for classification of forestland is 1 acre, and the area must be at least 1,000 feet wide.
Urban and built-up	Includes airports, playgrounds with permanent structures, cemetaries, public administration sites, commercial sites, railroad yards, construction sites, residences, golf courses, sanitary landfills, industrial sites, sewage treatment plants, institutional sites, water control structure spillways and parking lots. Including highways, railroads and other transportation facilities if surrounded by other urban and built-up areas. Tracts of less than 10 acres that are completely surrounded by urban and built-up lands.
Other	Rural transportation: Consists of all highways, roads, railroads and associated right-of-ways outside urban and built-up areas; private roads to farmsteads; logging roads; and other private roads (but not field lanes).
	Small water areas: Waterbodies less than 40 acres; streams less than 0.5 miles wide.
	Minor land: Lands that do not fall into one of the other categories.

Appendix D: Land Cover by Management Unit shown as acreage and percentage of total by river basin. [Sources: Natural Resource Conservation Service (NRCS) and National Resource Inventory (NRI) reports. See Maps 1.2 and 2.17 for spatial reference.]

USGS hydrologic unit (CHPP MU)	Year	Landcover types						
		Cultivated crop	Uncultivated crop	Pasture	Forest	Urban/built-up	Other land cover[1]	Total
Albemarle *(95% of Albemarle MU and 5% of Chowan MU)*	1982	493.2	0	3.9	668.7	36.9	198.3	1401.0
	1987	498.9	1	5.4	552.9	50.2	292.4	1400.8
	1992	443.5	0.1	7.8	487.3	58.8	402.0	1399.5
	1997	437.1	0.1	6.7	491.7	68.7	395.0	1399.3
% of total land cover	**1997**	**31.2**	**0.0**	**0.5**	**35.1**	**4.9**	**28.2**	**100.0**
% Change	**1982-97**	**-11.4**	**na**	**71.8**	**-26.5**	**86.2**	**99.2**	**-0.1**
Bogue-Core Sounds *(100% of Bogue/Core MU, 30% of Pamlico MU, and 50% of New/White Oak MU)*	1982	54.3	0	1.7	159.6	25.2	201.6	442.4
	1987	56.8	0	1.7	156.3	32.6	195.1	442.5
	1992	50.4	0	1.7	146.9	46.6	197.1	442.7
	1997	45.5	5	1.7	144.4	51	195.1	442.7
% of total land cover	**1997**	**10.3**	**1.1**	**0.4**	**32.6**	**11.5**	**44.1**	**100.0**
% Change	**1982-97**	**-16.2**	**na**	**0.0**	**-9.5**	**102.4**	**-3.2**	**0.1**
Black, Deep, Haw, Lower Cape Fear, Northeast Cape Fear, Upper Cape Fear *(100% of Cape Fear MU)*	1982	1177	44.6	297	3531.7	370	351.5	5771.8
	1987	1138.4	40.8	304.8	3461.1	435.6	382.1	5762.8
	1992	1077.5	69	277.4	3395.7	517.2	423.3	5760.1
	1997	947.1	143.4	301.1	3312.2	627.6	426.9	5758.3
% of total land cover	**1997**	**16.4**	**2.5**	**5.2**	**57.5**	**10.9**	**7.4**	**100.0**
% Change	**1982-97**	**-19.5**	**221.5**	**1.4**	**-6.2**	**69.6**	**21.5**	**-0.2**
Chowan, Meherrin, Nottaway *(95% of Chowan MU)*	1982	265.4	0	10.5	448.4	14	32.9	771.2
	1987	265.3	0	10.6	445.9	17.3	32.2	771.3
	1992	262.5	1.5	9	446.2	20	32.1	771.3
	1997	263.3	1.5	8	444	22.7	31.4	770.9
% of total land cover	**1997**	**34.2**	**0.2**	**1.0**	**57.6**	**2.9**	**4.1**	**100.0**
% Change	**1982-97**	**-0.8**	**na**	**-23.8**	**-1.0**	**62.1**	**-4.6**	**0.0**
Contentnea, Lower Neuse, Middle Neuse, Upper Neuse *(100% of Neuse MU)*	1982	1054.4	13.1	116.7	1769.4	254.1	235.3	3443.0
	1987	1028.3	32.3	105.3	1697.2	326.3	249.1	3438.5
	1992	985.4	35.1	108.5	1669.4	391.1	247.8	3437.3
	1997	874.7	53.9	136.2	1641.5	481	247.3	3434.6
% of total land cover	**1997**	**25.5**	**1.6**	**4.0**	**47.8**	**14.0**	**7.2**	**100.0**
% Change	**1982-97**	**-17.0**	**311.5**	**16.7**	**-7.2**	**89.3**	**5.1**	**-0.2**
New *(50% of New/White Oak MU and 40% of Southern Estuaries MU)*	1982	12.7	0	0	221.7	28.9	58.7	322.0
	1987	12.7	0	0	217	33.6	58.7	322.0
	1992	12.4	0	0.1	214.5	35.9	59.0	321.9
	1997	12.4	0	4.2	207.4	38.6	59.2	321.8
% of total land cover	**1997**	**3.9**	**0.0**	**1.3**	**64.4**	**12.0**	**18.4**	**100.0**
% Change	**1982-97**	**-2.4**	**na**	**na**	**-6.5**	**33.6**	**0.9**	**-0.1**
Pamlico Sound *(70% of Pamlico MU)*	1982	77	0	0	142.6	5.5	137.0	362.1
	1987	59.1	0	0	124.5	9.5	169.0	362.1
	1992	55.8	0	0	120	11	175.3	362.1
	1997	55	0	0	118.1	13.1	175.9	362.1
% of total land cover	**1997**	**15.2**	**0.0**	**0.0**	**32.6**	**3.6**	**48.6**	**100.0**
% Change	**1982-97**	**-28.6**	**na**	**na**	**-17.2**	**138.2**	**28.4**	**0.0**
Lower Dan, Lower Roanoke, Middle Roanoke, Roanoke Rapids, Upper Dan *(100% of Roanoke MU)*	1982	478.7	24.8	111.8	1377.4	54.9	98.3	2145.9
	1987	437.3	16.2	118.3	1396.6	76.5	100.3	2145.2
	1992	399.1	38.1	102.1	1380.9	105.5	119.9	2145.6
	1997	381	47	87.8	1370.1	129.6	129.0	2144.5
% of total land cover	**1997**	**17.8**	**2.2**	**4.1**	**63.9**	**6.0**	**6.0**	**100.0**
% Change	**1982-97**	**-20.4**	**89.5**	**-21.5**	**-0.5**	**136.1**	**31.2**	**-0.1**
Carolina Coastal-Sampit *(50% of Southern Estuaries MU)*	1982	17.9	0.8	2.5	120.3	13.7	8.9	164.1
	1987	11	0	5.4	110.1	27.8	9.7	164.0
	1992	10.9	0	5.4	109.3	27.9	10.5	164.0
	1997	10.1	0	5.3	105.9	32.1	10.5	163.9
% of total land cover	**1997**	**6.2**	**0.0**	**3.2**	**64.6**	**19.6**	**6.4**	**100.0**
% Change	**1982-97**	**-43.6**	**-100.0**	**112.0**	**-12.0**	**134.3**	**18.0**	**-0.1**
Fishing, Lower Tar, Pamlico *(100% of Tar/Pamlico MU)*	1982	846.2	5.8	94.9	1422.5	90.8	163.9	2624.1
	1987	823.9	2.7	87.1	1427.4	114.7	167.3	2623.1
	1992	782.3	19	81.8	1412.3	139.9	187.4	2622.7
	1997	714.5	27.7	118.9	1390	170	198.7	2619.8
% of total land cover	**1997**	**27.3**	**1.1**	**4.5**	**53.1**	**6.5**	**7.6**	**100.0**
% Change	**1982-97**	**-15.6**	**377.6**	**25.3**	**-2.3**	**87.2**	**21.2**	**-0.2**
Total area	1982	4476.8	89.1	639	9862.3	894	1486.4	17447.6
	1987	4331.7	93	638.6	9589	1124.1	1655.9	17432.3
	1992	4079.8	162.8	593.8	9382.5	1353.9	1854.4	17427.2
	1997	3740.7	278.6	669.9	9225.3	1634.4	1869.0	17417.9
% of total land cover	**1997**	**21.5**	**1.6**	**3.8**	**53.0**	**9.4**	**10.7**	**100.0**
% Change	**1982-97**	**-16.4**	**212.7**	**4.8**	**-6.5**	**82.8**	**25.7**	**-0.2**

[1] Includes minor land uses, rural transportation, federal lands, and Conservation Reserve Program lands (See Table 2.5 for explanation).

Appendix E: State protected species [Data from N.C. Natural Heritage Program (2001)]

Aquatic/wetland	Taxonomic group	Endangered	Endangered-Special Concern	Threatened	Threatened-Special Concern	Special Concern	Candidate	Candidate-Special Concern	Significantly rare
Aquatic	Amphibian	.	.	.	.	1	.	.	.
	Crustacean	.	.	.	.	.	.	.	2
	Fish	5	.	1	.	13	.	.	1
	Insect	.	.	.	.	.	.	.	26
	Mammal	1	.	.	.	.	.	.	.
	Mollusk	4	.	9	.	5	.	.	5
	Moss	.	.	.	.	.	1	.	.
	Reptile	3	.	2	.	2	.	.	.
	Vascular Plant	1	.	3	.	.	6	.	11
	SubTotal	*14*	*0*	*15*	*0*	*21*	*7*	*0*	*45*
Wetland	Amphibian	.	.	1	.	4	.	.	3
	Bird	3	.	2	.	6	.	.	17
	Crustacean	.	.	.	.	.	.	.	2
	Insect	.	.	.	.	.	.	.	25
	Lichen	.	.	.	.	.	.	.	1
	Liverwort	.	.	.	.	.	1	.	4
	Mammal	.	.	1	.	3	.	.	2
	Mollusk	.	.	1	.	.	.	.	.
	Moss	.	.	.	.	.	1	.	2
	Reptile	.	.	2	.	2	.	.	5
	Vascular Plant	18	1	11	2	.	56	1	69
	Subtotals	*21*	*1*	*18*	*2*	*15*	*58*	*1*	*130*
Totals		**49**	**1**	**48**	**2**	**57**	**72**	**1**	**220**

Appendix F: Acronyms (Part 1) and Definitions (Part 2)

Part 1: Acronyms

Acronym	Meaning
A	One of the three primary surface water classifications established by the N.C. Environmental Management Commission
AAAS	American Association for the Advancement of Science
ACOE	U.S. Army Corps of Engineers (see "COE" and "USACOE" below)
ADCP	Acoustic Doppler Current Profiling
AEC	Area of Environmental Concern as established by the Coastal Resources Commission under the Coastal Area Management Act (CAMA)
AFS	American Fisheries Society
AIWW	Atlantic Intracoastal Waterway (see "ICW" below)
APES	Albemarle-Pamlico Estuarine System
ASMFC	Atlantic States Marine Fisheries Commission
B	One of the three primary surface water classifications established by the N.C. Environmental Management Commission
BACIPS	Before-After-Control-Impact Paired Series
BEACH	Beaches Environmental Assessment and Coastal Health Act of 2000
BMPs	Best Management Practices
BOD	Biological Oxygen Demand
BRACO	North Carolina Blue Ribbon Advisory Council on Oysters
C	One of the three primary surface water classifications established by the N.C. Environmental Management Commission
CAAE	Center for Applied Aquatic Ecology at North Carolina State University
CAMA	North Carolina Coastal Area Management Act
CBF	Chesapeake Bay Foundation, Inc.
CCA	Copper, chromium, and arsenic used together as a wood preservative
C-CAP	Coastal Change Analysis Program
CCPCA	Central Coastal Plain Capacity Use Area
cfs	Cubic feet per second
CFZ	Coastal frontal zone
CGIA	Center for Geographic Information and Analysis in DENR
CHAs	Critical Habitat Areas as defined by the MFC
CHPP	Coastal Habitat Protection Plan
CHS	North Carolina Commission for Health Services
C-MAN	Coastal-Marine Automated Network
CMSR	Center for Marine Science Research at the University of North Carolina - Wilmington
COBRA	Coastal Barrier Resources Act
COE	U.S. Army Corps of Engineers (see "ACOE" above and "USACOE" below)
CORMP	Coastal Ocean Research and Monitoring Program
CPUE	Catch per unit effort
CRC	North Carolina Coastal Resources Commission
CREP	Conservation Reserve Enhancement Program of the U.S. Department of Agriculture
CREWS	Coastal Region Evaluation of Wetland Significance, a program of the DCM
CWMTF	North Carolina Clean Water Management Trust Fund
DCM	North Carolina Division of Coastal Management in DENR
DDD	1,1-dichloro-2,2-bis(p-chlorophenyl)ethane
DDE	1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene
DDT	Dichlorodiphenyltrichloroethane
DEH	North Carolina Division of Environmental Health in DENR
DEHNR	North Carolina Department of Environment, Health and Natural Resources
DENR	North Carolina Department of Environment and Natural Resources
Dermo	*Perkinus marinus*, an oyster parasite
DFR	North Carolina Division of Forest Resources in DENR
DLR	North Carolina Division of Land Resources in DENR
DMF	North Carolina Division of Marine Fisheries in DENR
DNA	Deoxyribonucleic acid
DO	Dissolved oxygen
DOT	North Carolina Department of Transportation
DSWC	North Carolina Division of Soil and Water Conservation in DENR
DWQ	North Carolina Division of Water Quality in DENR
EA	North Carolina Division of Soil and Water Conservation
ECU	East Carolina University
EEP	Nort Carolina Ecosystem Enhancement Program in DENR
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EMAP	Environmental Monitoring and Assessment Program
EMC	North Carolina Environmental Management Commission
EO	Executive Order
EPA	U.S. Environmental Protection Agency (see "USEPA" below)
FC	Fecal coliform bacteria
FLDEP	Florida Department of Environmental Protection
FMP	Fishery Management Plan
FPGs	Forestry Practice Guidelines
FWS	U.S. Fish & Wildlife Service
FWS	Future Water Supply

Acronym	Meaning
FY	Fiscal year
GIS	Geographic Information System
HAPC	Habitat Area(s) of Particular Concern
HB	House Bill
HQW	High Quality Water (EMC supplemental water quality classification)
HU	Hydrologic unit
ICW	Atlantic Intracoastal Waterway (see "AIWW" above)
JAI	Juvenile abundance index
LC50	Lethal concentration 50%
MAFMC	Mid-Atlantic Fishery Management Council
MARMAP	Marine Resources Monitoring, Assessment, and Prediction Program
MFC	North Carolina Marine Fisheries Commission
mgd	Million gallons per day
MHW	Mean high water
MLW	Mean low water
MMS	Minerals Management Service of the U.S. Department of the Interior
MODMON	Neuse River Estuary Modeling and Monitoring project
MPA	Marine Protected Area
MS4s	Municipal separate storm sewer systems
MSX	*Haplosporidium nelsoni*, an oyster parasite
MU	Management Unit
NAWQA	National Water Quality Assessment
NCAC	North Carolina Administrative Code
NCDEHNR	North Carolina Department of Environment, Health and Natural Resources
NCDOT	North Carolina Department of Transportation
NCGS	North Carolina General Statute
NCSU	North Carolina State University
NCWRP	North Carolina Wetlands Restoration Program
NHP	Natural Heritage Program
NM	Nautical mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Association
NPDES	National Pollution Discharge Elimination System
NRC	National Research Council
NRCS	Natural Resources Conservation Service of the U.S. Department of Agriculture
NRI	National Resource Inventory
NSW	Nutrient Sensitive Waters (EMC supplemental water quality classification)
NTA	No Trawl Areas
NTU	nephelometric turbidity unit
NWI	National Wetland Inventory
NWR	National Wildlife Refuge
ODMDS	Ocean Dredge Material Disposal Site of the U.S. Army Corps of Engineers
ORCs	???
ORM	Organic rich mud
ORW	Outstanding Resource Water (EMC supplemental water quality classification)
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PNA	Primary Nursery Area as designated by the MFC
ppm	Parts per million
ppt	Parts per thousand
RO	Reverse osmosis, a method for purifying water
SA	One of the three primary surface water classifications for coastal waters established by the N.C. Environmental Management Commission
SAFMC	South Atlantic Fishery Management Council
SAV	Submerged aquatic vegetation
SB	One of the three primary surface water classifications for coastal waters established by the N.C. Environmental Management Commission
SB	Senate Bill
SBFMP	Striped Bass Fishery Management Plan
SC	One of the three primary surface water classifications for coastal waters established by the N.C. Environmental Management Commission
SCC	North Carolina Sedimentation Control Commission
SCDHEC	South Carolina Department of Health and Environmental Control
SCMRD	South Carolina Marine Resources Division
SEAMAP	Southeast Area Monitoring and Assessment Program
SEAMAP-SA	Southeast Area Monitoring and Assessment Program - South Atlantic
SECC	Sedimentation and Erosion Control Commission
SMZ	Federal Artificial Reef Special Management Zone
SMZ	Streamside Management Zone
SNA	Secondary Nursery Area as designated by the MFC
SNHA	Significant Natural Heritage Area
SOC	Schedule of Compliance
SSMAs	Shellfish/Seed Management Areas of the DMF
SSR	Stock Status Report of the DMF

Acronym	Meaning
STORET	Storage and Retrieval System (a data management system)
SW	Swamp waters (EMC supplemental water quality classification)
TBT	Tributyltin, a major component formerly in antifouling paints, now outlawed
TL	Total length
TR	Trout waters (EMC supplemental water quality classification)
TRC	Total residual chlorine
TSS	Total suspended solids
UM	Ulcerative mycosis, a penetrating skin infection of fishes
UNC	University of North Carolina
UNC-IMS	University of North Carolina - Institute of Marine Science
UNC-W	University of North Carolina - Wilmington
USACOE	United States Army Corps of Engineers (see "ACOE" and "COE" above)
USC	United States Code
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency (see "EPA" above)
USFWS	United States Fish & Wildlife Service of the U.S. Department of the Interior
USGS	United States Geological Survey of the U.S. Department of the Interior
UV	Ultraviolet light
WRC	North Carolina Wildlife Resources Commission
WRP	Wetland Restoration Program of the Ecosystem Enhancement Program of DENR
WS	Water Supply (EMC supplemental water quality classification)

Part 2: Definitions

Term	Description
Accretion/accrete	
Adsorption	
Aerenchyma	Specialized thin-walled cells with large air spaces between them to provide buoyancy and support in an aquatic environment (5 – SAV)
Anadromous	Fish species that migrate from the ocean to fresh water streams, lakes, and wetlands to spawn
Anaerobic/reducing	
Anoxia	Absence of oxygen
Anthropogenic	Human-like or caused by humans
Baseflow	
Benthic	Associated with the bottom under a water body
Benthic-pelagic coupling	The influence of the benthic community and sediments on the water column, and in turn, the influence of the water column on the benthic community and sediments, through integrated events and processes such as resuspension, nutrient cycling, settlement, and absorption
Biomass	
Biotic interactions	
Buffer	A vegetated transitional zone between upland areas and aquatic habitats, which functions as a filter of surface water runoff
Catadromous	Fish species that migrate from fresh waters through to spawning areas in the ocean
Catch per unit effort	Amount of fish (numbers or weight) caught by a standard amount of fishing, such as pounds per trip
Compensatory mitigation	
Critical habitat area	Habitat areas that are vital for spawning, early growth and development, and/or the entire life cycleof marine and estuarine fish species (MFC rule 15A NCAC 31 .0101 (20) defines critical habitat areas generally, along with specific definitions for submerged aquatic vegetation, shellfish beds, anadromous fish spawning areas, and anadromous fish nursery areas.)
Strategic Habitat Areas (SHAs)	Specific locations of individual fish habitats or systems of fish habitats that have been identified to provide exceptional habitat functions or that are particularly at risk due to imminent threats, vulnerability, or rarity.
Demersal	Fish species that live primarily on or near the bottom
Denitrification	
Desiccation	
Detritus	Fragments of plant material occurring in the water during the process of decomposition by bacteria and fungi
Detritivores	
Drowned river system	
Dystrophic	Slow flowing streams in the coastal plain, with extensive swamps, bottomland hardwood forest, and marshes in their floodplains; often acidic from high inputs of dissolved organic matter
Embayment	
Emergent vegetation	
Energy regimes	
Epibenthic	
Epibiota	
Estuary	A dynamic coastal water body in which fresh water from rivers and creeks mixes with ocean waters
Estuarine and ocean waters	All the waters of the Atlantic Ocean within the seaward boundary of North Carolina and all the bays, sounds, rivers, and tributaries thereto seaward of the dividing line between coastal fishing waters and inland fishing waters
Euphotic zone	Portion of the water column in which light penetrates sufficiently to allow photosynthesis
Eutrophication	Process of enrichment of a water body with excessive nutrients to the extent that abnormal algae blooms occur and community structure changes
Evapotranspiration	
Extirpation	
Functional equivalence	
Hard bottom habitat	Exposed areas of rock or consolidated sediments, distinguished from surrounding unconsolidated sediments, which may or may not be characterized by a thin veneer of live or dead biota, generally located in the ocean rather than in the estuarine system

Term	Description
Herbivory	
Heterogeneity	
Hydrodynamic conditions	
Hydrogeomorphology	
Hydric soils	
Hypoxia	Condition in which the level of dissolved oxygen in the water column is below that necessary to fully support normal biological functions, resulting in stress for the natural community
Ichthyoplankton	Fish eggs and larvae that drift with the currents near the water's surface
Impoundment	
Interbasin transfers	Artificial movement of water from one river basin to another, generally through pipelines or canals
Inundation	
Isobath	Lines on a map or graph connecting points with the same water depth
Light attenuation	
Light availability	
Macroalgae	Large algae easily visible to the naked eye, such as sea lettuce and kelp
Macrofauna	
Macrophyte	Plant large enough to be visible to the naked eye
Marine systems	Open ocean waters overlying the continental shelf and its associated high-energy coastline where salinities exceed 30 ppt
Meiofauna	Microscopic animals that live in the upper layers of sediment
Meroplankton	Organisms that spend only part of their life cycle in the plankton
Mesohaline	Moderate salinity waters (5-18 ppt)
Nekton	Free-swimming organisms that live in the water column
Oligohaline	Low salinity waters (0.5-5 ppt)
Peat blocks	
Pelagic	Fish species that live primarily up in the water column
Phytobenthic	Refers to microscopic plants that live on the bottom
Phytoplankton	
Plankton	Small organisms that live in the water column, generally near the surface, including eggs, larvae, and adults; they may float with the currents, or have some control over their movements
Polyhaline	High salinity waters (18-30 ppt)
Porewater	
Propagules	A plant seed or spore
Primary production	
Public trust waters	All navigable waters within state jurisdiction and the lands thereunder, below the mean high water line or mean water level
Recruitment	
Rhizomes	Underground plant stem that can give rise to a new plant above the surface
Riparian wetlands	
Sciaenids	Family of fishes that includes the drums and croakers
Sedimentation	
Secondary production	
Sessile	
Silviculture	The branch of forestry dealing with the development and care of forests
Siltation	Process of filling a water body with sediments
Sinks	
slough	
Submersion regime	
Subsidence	
Substrate	
Surface incident light	
Temporal abundance	
Tidal amplitude	Vertical distance between the high and low points of lunar tides
Total suspended solids	
Trophic position	
Trunk estuaries	Coast-perpendicular, drowned river estuaries
Turbidity	Reduced water clarity caused by sediment or other particulates suspended in the water column
Unconsolidated substrate	
Vegetated swales	Very wide ditches with sloping banks constructed to gradually convey storm water to surface waters
Water clarity	A measure of the depth to which light penetrates the water column
Wetlands	
Wind fetch	
Zoogeographical	Related to the geographic distribution of animals

Appendix G: Existing state and federal agency programs that may affect water quality

(From Estuarine Shoreline Protection Stakeholders Report 1999)

Program type	Organization	Program/Policy/Act	Affected Impact	Authority	Geographic Jurisdiction	Issue Permits /Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year	Reference
Federal Government	Council on Environmental Quality	National Environmental Policy Act	F,N, S,T	S	N	X			X	X				1972	Policy for environmental review of federal projects
	Environmental Protection Agency	Clean Air Act	T,N	S	N	X	X	X	X	X	X	X	X	1970	Regulates air pollution
		Clean Water Act	F,S, N,T	S	N	X	X	X	X	X	X	X	X	1977	Regulates water pollution, provides funds to states for implementation
		Insect, Fungi, & Rodenticide Act	T	S	N	X	X			X	X	X	X	1972	Regulates chemical applications
		Off. Wetlnds, Oceans&Watersheds	F,S, N,T	S,R	N	X	X	X	X	X	X	X	X	1977	Wetland ocean and watershed protection & education
		Oil Pollution Act	T	S	N	X	X		X	X	X	X	X	1990	Mandates more stringent oil spill prevention, response; clean up fund
		Pollution Prevention Act	T	S	N			X	X	X	X		X	1990	Assists industry in pollution prevention measures
		Safe Drinking Water Act	F,S, N,T	S	N	X	X			X	X	?	X	1974	Protects quality of drinking water
	Nat. Oceanic & Atmospheric Adm.	Coastal Non-point Source Prog.	F,N, S,T	S	N				X	X	X			1990	Coordinated state approach to coastal non-point source pollution
		National Marine Fisheries Service	F,N, S,T	S,E	N			X		X	X	X			Admin. Endang. Sp. & Magnuson-Stevens Act; manage federal fisheries
	US Army Corps of Engineers	N/A	F,N, S,T	S	N	X	X	X						1899	Regulate activities in tidal & non-tidal waters; adm. Clean Water Act
	US Coast Guard	N/A	F,N, S,T	S	N		X								Discharges from vessels

Program type	Organization	Program/Policy/Act	Affected Impact	Authority	Geographic Jurisdiction	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year	Reference
	US Dept. of Agriculture	Conservation Reserve Enhance. P.	N,F, S,T	V,C	C				X	X				1999	Farmland, former riparian or wetland in NSWs - remove from production
		Conservation Reserve Program	N,F, S,T	V,C	S				X	X					Farm incentives - sensitive farmed former wetlands - selective planting
		Environ. Quality Incentives P.	N,F, S,T	V,C	S				X	X				1996	Farm incentives to develop conservation plans on sensitive farmland
		Farmland Protection Program	N,F, S,T	V,C	S				X	X					Helps farmers keep land in agriculture; conservation easements
		Flood Risk Reduction Program	N,F, S,T	V,C	S				X	X					
		Wetlands Reserve Program	N,F, S,T	V,C	S				X	X					Cost share for farmed wetlands - restore / protect wetlands
		Wildlife Habitat Incentives P.	N,F, S,T	V,C	S				X	X					Incentives for wildlife enhancing - select plantings, livestock exclusion
	US Fish & Wildlife Service	Endangered Species Act	S,N, T	S	N	X	X	X	X	X	X	X	X	1973	Protect & conserve endangered & threatened species & their ecosystems
		Fish & Wildlife Coordination Act	F,S, N,T	S	N			X	X					1934	Requires interagency coordination for fed. projects that alter water bodies
		Magnuson-Stevens Cons./Mgmt.	F,S, N,T	S	N	X	X	X	X	X	X	X	X	1996	Requires identification & protection of essential fish habitat
	US Forest Service	American Heritage Rivers Initiative	S	V,C	N				X	X				1997	Assist communities in finding resources to improve river WQ condition
		Technical Develop. & Planning P.	S	V,C	N				X	X		X	X		Adopt procedures for effective forestry mgmt.
Private organization	Conservation Trust for NC	N/A	F,N, S,T	C	S				X						Preserve and acquire land for conservation and green space
	The Nature Conservancy	N/A	F,N, S,T	C	N				X	X	X	X	X		Acquire and manage land for conservation; conduct biological monitoring

Program Type	Organization	Program/Policy/Act	Affected Impact	Authority	Geographic Jurisdiction	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year	Reference
State government	NC Clean Water Management Trust Fund	Clean Water Mgmt Trust Fund	N,T, S,F	S,C	S					X			X	1996	Sewer upgrades, buffer acquisition, habitat protection, WQ restoration
	NC Dept. of Administration	SEPA Program	N,T, S,F	S*	S			X	X					1971	Interagency coordination
	NC Dept. of Agriculture	Aquaculture and Natural Res. Div.	F,N, S,T	S	S			X	X	X			X	1975	Liaison between farmers & WQ agencies; aquaculture leases
	NC Dept. of Agriculture, Agronomic Division	N/A	F,N, S,T	S	S					X	X	X	X	1938	Analyze soil, plants, waste, & water; advise for BMP
	NC Dept. of Commerce	Business & Industry Dev. P., etc.		S	S				X	X				1971	Business & industry recruitment
	NC Dept. of Commerce, Div. Of Community Assistance	N/A		S	S				X	X				1971	Assist local gov. through economic & community dev., growth mgmt, etc.
	NC Dept. of Transportation	Statewide Planning Branch	S,T, N	S	S				X	X					Transportation planning
	NC Div. Of Highways	Soil and Water Engineering Prog.	S,N, T	S,R	S				X	X					Design erosion/sedimentation plans for highway construction
		Wetland Restoration Program	S,N, T	S	S				X		X				Restore wetlands as mitigation
	NC Division of Air Quality	Air Emissions Permitting Program	N,T, S	S,R*	S	X	X	X	X	X	X			1971	Permit facilities with emissions, parking decks, open burning
		Ambient Air Quality Monitoring P.	N,T, S	S	S					X	X		X	1971	SO2, CO, ozone, particulates, mercury, NOX
		Compliance Program	N,T, S	S,R*	S		X			X	X			1971	Emission compliance - permittees, service stations, farms, incinerators
		Odor Control/Animal Operations P.	N	S,R	S	X		X	X	X	X			1971	Control odors from animal operations - 7 mgmt. practices required
		Planning Section	N,T, S	S,R*	S	X		X	X	X			X	1971	Develop NC air quality plans and regulations; must meet NAAQS
		Public Outreach Program	N,T, S	S,C	S					X	X		X	1990	Air Quality Index, pollen counts

Program (type)	Organization	Program/Policy/Act	Affected Impact	Authority	Geographic Jurisdiction	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year	Reference
	NC Division of Coastal Management	Coastal Reserves Program	F,S, N,T	S,C	C				X		X	X	X	1989	Undeveloped natural areas representing coastal ecosystems protected
		Development Permitting (AEC) P.	F,S, N,T	R	C	X	X	X		X				1974	CAMA permits required for development in designated AEC
		Dredge & Fill Permitting Program	S,N, T	R	S	X	X	X		X				1970	Permitting of excavation and/or filling activities
		Federal Consistency Program	F,S, N,T	R	C		X		X	X				1974	Interagency review of federal projects affecting the coastal region
		Land-use Planning Program	F,S, N,T	S	C			X	X	X				1974	State assistance for local/regional land use planning - suspended eff. 1999
		Marine Sewage Pumpout Program	F,T, N	S	C					X		X	X	1994	Grants to marinas for installation of pumpout facilities
		Ocean Res. Mgmt./OCS Program	F,S, N,T	S*	C			X	X	X				1993	Ocean outfall policy recommendations; marine debris; offshore mining
		Wetland Mapping Program		S,C	C				X	X				1992	Mapping & prioritizing wetlands for conservation & restoration
	NC Division of Environmental Health	On-site Wastewater Program	F,N	S,R	S	X		X		X			X	1977	Subsurface systems; adm. by local health dept; DEH reviews if >3000 gpd
	NC Division of Environmental Health	Public Health Pest Mgmt. Program	S	R	S	X	X	X		X	X		X	1957	Construction of impoundments that create water body >= 100acres
		Public Water Supply Program	Q	R	S	X	X	X	X	X	X		X		Standards for location /protection of public water supplies
		Shellfish Sanitation Program	F	S,R	C	X		X	X	X	X	X	X	1930s	Monitor WQ and shellfish for fecal coliform, survey shoreline for pollutants
	NC Division of Forestry Resources	Forest Practices Guidelines	S,N	R	S				X	X			X	1990	Sets performance standards for forestry operations that minimize water quality impacts
		Forestry BMPs	S,N	V	S				X	X			X		Recommends additional measures to protect downstream water quality
		Forest Stewardship Program	S,N	V	S				X	X			X	1990	Assist private landowners in protecting their forest
		Forest Land Enhancement Program	S,N	V	S				X	X			X		Assist private landowners in protecting their forest
		Forest Development Program	S,N	V	S					X				?	Reforestation cost- sharing program

Program type	Organization	Program/Policy/Act	Area affected by impact	Authority	Geographic jurisdiction	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitoring	Research	Education	Start Year	Reference
	NC Division of Land Resources	Dam Safety Permits Program	S	S/R	S	X	X	X						1967	Dam construction; > 15' height & capacity >10 acre-ft or hazard
		Mining Permits Program	S	S/R	S	X	X	X						1973	Mining activity; > 1 acre
		Sedimentation/ Erosion Control P.	S	S/R	S	X	X	X	X	X				1974	Land disturbing activity; > 1 acre; agriculture and forestry exempt;
	NC Division of Marine Fisheries	Coastal Habitat Protection Program	F,N, S,T	S	S				X					1999	Prepare habitat protection plans to enhance fisheries
		Fisheries Management Section	F,N, S,T	S,R	C			X	X	X	X	X		1822	Fishery management plans
		Permit Review Program	F,N, S,T	S	S			X						1984	Review permits for impacts to fisheries
	NC Division of Parks and Recreation	Natural Heritage Program	N	S,E, C	S				X	X	X		X	1979	Inventory private & public natural areas; land conservation
	NC Division of Soil and Water Conservation	319 Coordinating Program	N,T, S,F	V,C	S					X				1997	Assist landowners in applying for aid
		Agriculture Cost-share Program	N,T, S,F	V,C	S					X			X	1980s?	Coordinator assists Soil Conservation Districts, which implement
		Neuse R. Rules Coordinating P.	N,T, S,F	V,C	C				X	X			X	1996	Assist in BMPs to meet new water quality criteria
		Operational Reviews Program	N,T, S,F	R	S			X	X	X	X		X		Review farm practices for BMP & compliance with DWQ
		Pamlico R. Rules Coordinating P.	N,T, S,F	V,C	C				X	X			X	1996	Assist in BMPs to meet new water quality criteria
		Soil survey Program	S	S	S				X	X	X		X	1938	Soil surveys and state surveys
	NC Division of Waste Management	Hazardous Waste Program	T	SF/R	S	X	X			X				1980	Permit treating, storing, disposing hazardous waste
		Solid Waste Management Program	T	S/R	S	X	X			X	X			1989	Permits treating & disposing solid waste, landfills
		Superfund Program	T	SF	S			X		X				1980	Investigate, prioritizes, & directs cleanup of waste sites
		Underground Storage Tank Prog.	T	S/R	S	X	X			X				1983	Permit all commercial facilities, petroleum storage tanks
	NC Division of Water Quality	303(d) TMDL Program	F,N, S,T	R*	S	X			X	X	X			1997	Sets maximum loads for watershed
		404/401 Wetlands Program	F,N, S,T	R*	S	X	X	X		X				1973	Filling wetlands or streams

Program Type	Organization	Program/Policy/Act	Affected Impact	Authority	Geographic Jurisdiction	Issue Permits / Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year	Reference
		Albemarle-Pamlico Program	F,N, S,T	S,R*	C				X	X				1987	DENR & EPA cooperative - mgmt. plan to improve WQ & ecosystem
		Basinwide Mgmt. Plans Program	F,N, S,T	S*	S				X	X			X	1993	Addresses point & non-point sources within watershed
		Construction Grants & Loan P.	F,N	S*	S				X	X					Grants for sewer upgrades
		NC 319 Program	F,N, S,T	S*	S				X	X				1990	Grants for agricultural BMPs, nutrient management, wetland restoration
		Neuse R. Rapid Response Prog.	F,N, S,T	S,E	C						X		X	?	Event response
		Non-discharge Program - Sewage	F,N	R	S	X	X	X	X	X				rev. 1997	Includes animal waste systems
		NPDES Program – Stormwater	F,N, S,T	S,R*	S	X	X	X	X	X			X	?	Point source - industrial; > 5 acres or municipality with pop. >100,000
		NPDES Program – Wastewater	F,N	S,R*	S	X	X	X	X	X			X	1973	Point source – wastewater
		Nutrient Sensitive Waters Program	F,N	S,R	C	X			X		X			1979	More restrictive WQ regulations
		Pamlico R. Rapid Response Prog.	F,N, S,T	S,E	C						X		X	1996	Event response
		State Stormwater Mgmt. Program	F,N, S,T	R	S	X	X	X	X	X			X	rev. 1997	20 Coastal Co.or discharge to ORW, HQW; > 1 acre; non-point
		Unified Watershed Asses. Program	F,N, S,T	R*	S	X			X	X	X			1998	Prioritizes watershed condition
		Use Restoration Waters Program	F,N, S,T	S*	S	X			X	X				1998	Target areas in need of restoration
		Water Quality Monitoring Program	F,N, S,T	S	S					X	X			1973	Incl. biological, chemical, & physical
		Wetlands Restoration Program	F,N, S,T	S	S				X	X	X		X	1996	Comprehensive approach to restoring wetlands & doing mitigation
		WQ Std. / Classification Program	F,N, S,T	R*	S	X			X		X			1976	Set water quality standards; classification effects allowable activities

Program Type	Organization	Program/Policy/Act	Affected Impact	Authority	Geographic Jurisdiction	Issue Permits/Rules	Enforcement	Review Permits	Planning	Technical Assistance	Monitor	Research	Education	Start Year	Reference
	NC Division of Water Resources	Aquatic Weed Control Program	T	S	S					X				1982	Control of noxious aquatic weeds; cost-sharing of 50% is available
		Interbasin transfer certificate	Q	R	S	X		X		X				1993	Certification of interbasin transfers > 2 million gallons/day
		NC Rivers Assessment	F,N, S,T	S	S				X		X		X	1997	Assessment & evaluation of state's largest river basins
		Project Stream Watch	F,N, S,T	S	S						X		X	1978	Program to monitor and clean up NC streams & rivers
		Project WET	F,N, S,T	S	S								X	1993	Water resources education for teachers
		Streamflow modification notification	Q	S	S	X		X		X				1977	Protection of instream flows
		Water Res. Dev. Grant Program	S,T	S	S					X				1979	Cost-sharing grants with local & federal governments; beach protection
		Water Supply Planning Program	Q	S	S				X	X	X		X	1992	Tech. assist. to local systems as they develop local water supply plans
		Water Use Permit	Q	R	S	X								1967	Withdrawals > 100,000 gallons/day in designated "capacity use area"
		Water withdrawal / transfer	Q	R	S	X		X		X				1991	Registration of water withdrawals > 100,000 gallons/day
	NC Wildlife Resources Commission	Habitat Conservation Program	N,T, S,F	S*	S			X	X	X			X	1989	Review & advise on projects to minimize impacts to fish & wildlife habitat

Authority
S = Statutory
R = Rules
C = Conservation
E = Research
V = Voluntary
* = Federally mandated state program

Geographic jurisdiction
C = 20 coastal counties
S = Statewide
N = National

Affected impacts
F = Fecal coliforms
S = Sediment
N = Nutrient
T = Toxics
Q = Water quality/flow

Appendix H: Status and trends in flow regulation

The status and trends in regulation of flow for North Carolina's coastal rivers are summarized below (adapted from DMF 2002a).

Chowan River Basin

Dams

- One hydropower dam on the Meherrin River in Emporia, Virginia, has effectively blocked anadromous fish movement for over 90 years. For more information, please see the web site (<http://www.sdafs.org/meetings/98sdafs/clupeids/simmonds.htm>). In 1990, a fish elevator or lift was constructed at the Emporia Dam to facilitate migration of American shad and river herring upstream. For more information, please see the web site (<http://www.dgif.state.va.us/fishing/lakes/emporia_reservoir/index.html>). The lift's effectiveness is unknown due to small sample size of tagged individuals recaptured. For information, please see the following web site (<http://www.sdafs.org/meetings/98sdafs/clupeids/simmonds.htm>).
- The lowermost dam on the Nottoway River is the Baskerville Mill Dam, which restricts the historical migratory range of striped bass in that river.

Surface water withdrawal

- There is one municipal intake for Norfolk, Virginia, from Blackwater River; the remainder are only for agriculture. Because small agricultural withdrawals do not need a permit, they are not accounted for in the total water withdrawals.

Roanoke River Basin

Dams

- There are several large dams upstream of Roanoke Rapids, including the Lake Gaston Dam, John H. Kerr Dam, Hyco Dam, Mayo Dam, Smith Mountain Lake Dam, Leesville Dam, Philpott Lake Dam, Avalon Dam and Pinnacles Dam (DWQ 2001c; Pearsall et al. [no date]; <www.rrba.org/facts.htm>). Completed in 1952 and operated by the U.S. Army Corps of Engineers (COE), the Kerr Dam created the largest reservoir in the system, covering approximately 48,900 ac (19,789 hectares) (<http://epec.saw.usace.army.mil/kerrdesc.txt>). The Roanoke Rapids Dam is the lowermost dam on the main stem of the river, and there are no power plants downstream of its location. Numerous small municipal water supply dams and old mill dams exist on the river's tributary streams.

The Roanoke River Water Flow Committee

- The Committee, including state and federal government representatives, academics, local officials and residents, and corporate interests, was established in 1988 to address flow issues. A new flow regime was developed and implemented during striped bass spawning periods, which, along with state fishery management efforts, has resulted in greatly improved juvenile striped bass recruitment (Manooch and Rulifson 1989). However, outside of the striped bass spawning period (April 1–June 15), flows remain altered by hydropower peaking operations. New FERC license for Gaston and Roanoke Rapids dams will expand the spawning period into March.

Surface water withdrawal

- There are 26 registered water withdrawals in the North Carolina portion of the basin. Of these, 16 are surface water withdrawals (DWQ 2001c).
- Water supply demand is expected to increase greatly within the basin, and other basins are also considering the river as a potential water supply source. Withdrawal for power

plant use accounts for the majority of the water volume removed, although most is eventually returned to the system.

Tar-Pamlico River Basin

Dams

- Tar River Dam/ Reservoir controls downstream releases; the reservoir is water supply for the city of Rocky Mount.
- Rocky Mount Mills Dam, a hydropower facility, is the lowermost dam on the Tar River. It is an obstruction to migrating striped bass, American shad, hickory shad, and blueback herring during the spring spawning season (Collier and Odom 1989) (Map 2.11).

Surface water withdrawal

- There are several municipal surface water withdrawals (including Enfield, Greenville, Louisburg, Rocky Mount, Tarboro) and numerous agricultural withdrawals.
- Of the 60 water withdrawals registered in the basin (39 agricultural, 21 non-agricultural), 51 are surface water withdrawals (DWQ 2003).
- Surface water withdrawals are projected to increase because of demand and because the basin is partially located within the Central Coastal Plain Capacity Use Area (CCPCUA). Ground water use within the CCPCUA, so demand for surface water as a replacement source will grow.

Neuse River Basin

Dams

- Removal of Quaker Neck Dam in 1998 opened access to 74 additional miles of upstream river habitat for migrating anadromous fish each spring.
- Milburnie Dam, a small hydropower facility near Raleigh, is now the lowermost dam on the Neuse River (Map 2-11).
- Falls Dam/Reservoir is managed by the COE for flood control, municipal water supply, water quality enhancement downstream, and recreation. Currently, discussions are underway between WRC and COE to stabilize downstream flows to benefit spawning by anadromous species in the Neuse River.

Surface water withdrawal

- There are numerous agricultural and municipal water supply withdrawals from the main stem of the river, as well as from many of its tributaries, including the cities of Durham, Raleigh, Smithfield (in addition to a separate intake for Johnston County), Goldsboro, and Wilson.
- Surface water withdrawals are projected to increase due to demand. The CCPCA rules will also affect portions of this river basin, including Carteret, Craven, Jones, Lenoir, Pamlico, Pitt, Wayne, and Wilson counties. As of 2003, an application was in process for withdrawal of 60 million gallons per day from the Neuse River in Lenoir County to replace existing ground water supplies.
- Of the 176 registered water withdrawals in the Neuse River basin, excluding 78 public water systems, 51 are surface water withdrawals (DWQ 2002).

Cape Fear River Basin

Dams

- The three COE Lock and Dams, constructed for navigation between 1915 and 1934 (Moser et al. 2000), are the lowermost obstructions to fish passage. However, in 1997,

efforts to improve anadromous fish passage were made at Lock #1, including the use of fish-locking cycles or lockage to facilitate fish migration during the spawning period and the construction of a steppass Denil fishway (Moser et al. 2000). Sonic tracking of American shad revealed varying proportions (ranging from 18% in 1997 to 63% in 1998) of successful upstream passage of tagged individuals during Lock # 1 operation (Moser et al. 2000). By way of comparison, passage efficiency of adult shad was relatively lower at the fishway (Moser et al. 2000). In general, efficiency of fish passage was improved by a) increasing the frequency of lockage events per day, b) extending lockage duration to include more of the spawning season, and c) encouraging fish entrance into the lock via attractant flows (Moser et al. 2000). Buckhorn Dam is the lowermost complete barrier to fish migration. Striped bass tagged by DMF in the lower Cape Fear River near Wilmington have been recaptured just below this obstruction. Although the hydropower facility at the Buckhorn Dam no longer operates, the dam continues to provide a pool for cooling water for a nearby coal-fired power plant.

- B. Everett Jordan Dam/Reservoir is located well upstream of the lock and dam system. It provides water for Holly Springs, Apex, Cary, Durham, Morrisville, and Chatham, Orange, and Wake counties. (<www.ncwater.org/ReportsandPublications>).

Surface water withdrawal

- There are numerous municipal water withdrawals, and they are the largest threat to instream flow in the Cape Fear river basin.
- In 1999, there were 57 registered water withdrawals in the basin (DWQ 2000c).
- Surface water withdrawals are projected to increase 39% by 2010, excluding new permitted withdrawals. Municipalities dependent on water withdrawals include Cary, Apex, Orange County, Wake County – Research Triangle Park, Fayetteville, Fort Bragg, Wilmington, and the lower Cape Fear Water and Sewer Authority.

Draft

Appendix I: Effects of environmental pollutants on fish early life stages [exp. = exposure; from Weis and Weis (1989), Key et al. (2000)]

Chemicals	Effect on fish			Water quality standards (ug/l)	
	Test organism	Test	Results	Salt-water aquatic life	Fresh-water aquatic life
Benzo[a] Pyrene (B[a]P)					
Methylmercury	Mummichog	unspecified exp.	Abnormal cell division of embryos		
Chlorine					
Chlorine, total residual	Striped bass	0.07 mg/l exp.	3.5% of embryos hatched and malformation of surviving hatchlings	na	17 (AL)
		0.01 mg/l exp.	23% of embryos hatched		
		0.15 mg/l exp.	Embryo mortality noted in combination with temperature change of 2°C.		
	Spotted seatrout	unspecified exp.	Greater resistance of embryos than larvae		
	Striped bass, white perch, blueback herring, silversides	0.3 mg/l exp.	Lethal to embryos		
Herbicides					
Atrazine	Channel catfish	0.4 mg/l exp.	Embryo deformities		na
Diquat	Mummichog	0.01-10mg/l exp.	Fry neurologically impaired after embryo exposed		
Trifluraline	Sheepshead minnow	unspecified exp.	Embryo deformities		
PCBs					
Aroclor 1016	Sheepshead minnow	>32 ug/l exp.	Total mortality of embryos and fry		
Aroclor 1242	Fathead minnow	<5.4 ug/l exp.	No effect on embryos		
Aroclor 1254	Sheepshead minnow	10 ug/l exp.	Reduced survival rate of embryos		
		>0.1 ug/l exp.	Reduced fry survival		
		0.14 ug/l exp.	Adult exposure and reduced survival of embryos and fry		
Pesticides					
Aldicarb (Temik)	Fathead minnow	<320 ug/l exp.	No effect		
	Fathead minnow	156 ug/l exp.	100% larvae mortality in 30-day test		
Carbaryl (Sevin)	Silversides	10 ug/l exp.	Embryo malformations		
	Killifish	10 ug/l exp.	Arrested embryo development, embryos transferred to clear water after continous exp. had abnormalities		

Chemicals	Effect on fish			Water quality standards (ug/l)	
	Test organism	Test	Results	Salt-water aquatic life	Fresh-water aquatic life
DDT	Killifish	1mg/l exp.	Hatchlings with tail deformities	0.001	0.001
		0.1 ug/l exp.	Slowed development of embryos		
	Silversides	25 ug/l exp.	Embryo malformations		
	Yellow perch	unspecified exp.	No fin ray asymmetry		
Dieldrin	Winter flounder	>1.74 ng/g eggs	Eggs not fertilized	0.0002	0.002
		39 ug/l exp.	50% mortality		
Endrin	Sheepshead minnow	0.31 ug/l	Embryo stunting, some mortality, and lower fertility of adults	0.002	0.002
Fenoprop (Kuron)	Bluegill	>10 ug/l exp.	100% mortality of hatchlings		
Fenvalerate	Sheepshead minnow	3.9 ug/l exp.	Reduced hatchling survival		
	Fathead minnow	0.43 ug/l exp.	Unspecified negative effect on larvae		
Fonofos	Fathead minnow	<80 ug/l exp.	No effect		
		33 ug/l exp.	100% larvae mortality in 30-day test		
Kelthane (Dicophol)	Fathead minnow	125 ug/l exp.	Delayed and reduced hatching, survivors deformed and died		
		39 ug/l exp.	50% mortality		
Kepone	Sheepshead minnow	1.9 ug/l exp.	16% arrested development of embryos		
	Fathead minnow	0.31ug/l exp.	Reducing hatching success		
Lindane	*Caranx*	unspecified exp.	Premature hatching and fry deformaties	0.004	0.01
Malathion	Silversides	10 ug/l exp.	Embryo malformations		
Methoxychlor	Winter flounder	>1.74 ng/g eggs	Eggs not fertilized	0.03	0.03
		39 ug/l exp.	50% mortality		
Mirex	Fathead minnow	2,3,7 ug/l exp.	Increased viability of hatchlings	0.001	0.001
		13,34 ug/l exp.	No effect		
Parathion	Mummichog	10 ug/l exp.	Arrested embryo development, 50% of embryos exposed for 3 days and returned to clean water had malformations	0.178	0.013
	Mummichog	1 ug/l exp.	Few malformations after 3 day exp.		
Permethrin	Sheepshead minnow	22 ug/l exp.	Reduced hatchling survival		
		2.2 ug/l exp.	Reduced hatchling size		
Permethrin biomist	Gambusia	25,114 mg/l	48 h LC_{50}		

Chemicals	Effect on fish			Water quality standards (ug/l)	
	Test organism	Test	Results	Salt-water aquatic life	Fresh-water aquatic life
Permethrin-Permanone	Gambusia	0.0027 mg/l	48 h LC_{50}		
Pyrethroids	Sheepshead minnow	0.06 ug/l exp.	Reduced fish weight		
Temephos	Gambusia	0.014-0.039 mg/l	48 h LC_{50}		
Petroleum hydrocarbon					
Toluene	Fathead minnow	30-45 mg/l exp.	Embryonic malformations	na	11
Water soluable fraction of No. 2 fuel oil	Mummichog	unspecified exp.	Malformation of larvae and decreased time to hatching of embryos, increased toxicity noted at suboptimal water conditions		
	Mummichogs, sheepshead minnow	12 ppm	100% mortality of hatchlings		
		6 ppm	50% mortality of hatchlings		
		1,4 ppm	Stimulated hatching		
Wood preservative					
Pentachlorophenol	Fathead minnow	128 ug/l exp.	Reduced larval survival		
		>73 ug/l exp.	Reduced growth of larvae		

Appendix J. Land protection and conservation opportunities in the North Carolina coastal river basins by eligible land types and conservation techniques (DENR 1999). Eligible land types include agricultural (A), forested (F), wetlands (W), prior converted wetlands (PCW), riparian areas (R), and residential (RES).

Eligible Land Types	Federal and State Programs/Nonprofit/Private Organizations/Land Trusts	Donation	Purchase	Conservation Easement	Lease	Management Agreement	Restoration	Other
A, PCW, R	Conservation Reserve Program (USDA NRCS)				X	X	X	
A, PCW, R	Continuous Conservation Reserve Program (USDA NRCS)				X	X	X	
A, W	Debt Cancellation Conservation Contact Program (USDA FSA)					X		
A,F,PCW,R	Environmental Quality Incentives Program (USDA NRCS)					X		
A, F, W, PCW, R, RES	North American Wetlands Conservation Act (USFWS)	X	X	X		X	X	X
PCW, R	Wetlands Reserve Program (USDA NRCS)			X			X	
A, F, PCW, RES	Wildlife Habitat Incentives Program (USFWS)					X	X	
A, PCW, R	NC Agriculture Cost Chare Program (DENR DSWC)						X	
A, F, W, PCW, R, RES	NC Clean Water Management Trust Fund (DENR)		X	X		X	X	X
A, PCW	Conservation Reserve Enhancement Program (USDA FSA and DENR DSWC)			X	X	X	X	
A, F, W, PCW, R, RES	Conservation Tax Credit Program (DENR)	X	X	X				
A, F, W, PCW, R	NC Forest Development Program (DENR DFR)					X		
F, R	Forest Land Enhancement Program (DENR DFR)					X	X	X
F, R	Forest Legacy (USDS FS)		X	X		X		
A, F, W, PCW, R	Forest Management Technical Assistance (DENR DFR)					X		X
F, W, R	Forest Practice Guidelines/BMP's (DENR DFR)							X
F, W, R	Forest Stewardship Program (USFS, DENR DFR)					X		X
W, R	Public Trust / Submerged Lands Program (DENR DMF)	X						
F, W, R	Registry of Natural Heritage Areas (DENR DPR)			X		X		
R	Rivers Assessment (DENR DWR)							
A, F, W, PCW, R, RES	NC Wetlands Restoration Program (DENR DWQ)	X	X	X			X	
A, F, W, R	Conservation Trust for North Carolina	X	X	X	X	X		X
A, F, W, PCW, R, RES	NC Coastal Federation	X	X	X			X	
A, F, W, R, RES	NC Local and Regional Land Trusts (20)	X	X	X	X	X	X	X
F, W, R	NC Chapter of The Nature Conservancy	X	X	X				

APPENDIX K:

NORTH CAROLINA MARINE FISHERIES COMMISSION

POLICIES FOR THE PROTECTION AND RESTORATION OF MARINE AND ESTUARINE RESOURCES FROM BEACH DREDGING AND FILLING AND LARGE-SCALE COASTAL ENGINEERING

NORTH CAROLINA MARINE FISHERIES COMMISSION HABITAT AND WATER QUALITY STANDING ADVISORY COMMITTEE: NOVEMBER 6, 2000 NORTH CAROLINA MARINE FISHERIES COMMISSION: NOVEMBER 16, 2000

Policy Context

This document establishes the policies of the North Carolina Marine Fisheries Commission (Commission) regarding protection and restoration of the state's marine and estuarine resources associated with beach dredge and fill activities, and related large-scale coastal engineering projects. The policies are designed to be consistent with the overall habitat protection policies of the Commission, adopted April 13, 1999, as amended February 17-18, 2000, as follows:

> It shall be the policy of the North Carolina Marine Fisheries Commission that the overall goal of its marine and estuarine resource protection and restoration programs is the long-term enhancement of the extent, functioning and understanding of those resources.
>
> Toward that end, in implementing the Commission's permit commenting authority pursuant to N.C.G.S. §143B-289.52(a)(9), the Chairs of the Habitat and Water Quality Standing Advisory Committee, in consultation with the Commission Chair, shall, to the fullest extent possible, ensure that state or federal permits for human activities that potentially threaten North Carolina marine and estuarine resources:
>
> (1) are conditioned on (a) the permittee's avoidance of adverse impacts to marine and estuarine resources to the maximum extent practicable; (b) the permittee's minimization of adverse impacts to those resources where avoidance is impracticable; and (c) the permittee's provision of compensatory mitigation for all reasonably foreseeable impacts to marine and estuarine resources in the form of both informational mitigation (the gathering of base-line resource data and/or prospective resource monitoring) and resource mitigation (in kind, local replacement, restoration or enhancement of impacted fish stocks or habitats); and
>
> (2) result, at a minimum, in no net loss to coastal fisheries stocks, nor functional loss to marine and estuarine habitats and ecosystems.

The findings presented below assess the marine and estuarine resources of North Carolina which are potentially threatened by activities related to the large-scale movement of sand in the coastal ocean and adjacent habitats, and the processes whereby those resources are placed at risk. The policies established in this document are designed to avoid, minimize and offset

damage caused by these activities, in accordance with the laws of the state and the general habitat policies of this Commission.

Marine and Estuarine Resources At Risk from Beach Dredge and Fill Activities

The Commission finds:

1) In general, the array of large-scale and long-term beach alteration projects currently being considered for North Carolina together constitute a real and significant threat to the marine and estuarine resources of the United States and North Carolina.

2) The cumulative effects of these projects have not been adequately assessed, including impacts on public trust marine and estuarine resources, use of public trust beaches, public access, state and federally protected species, state critical habitats and federal essential fish habitats.

3) Individual beach dredge-and-fill projects and related large-scale coastal engineering activities rarely provide adequate assessment or consideration of potential damage to fishery resources under state and federal management. Historically, emphasis has been placed on the logistics of sand procurement and movement, and economics, with environmental considerations dominated by compliance with limitations imparted by the Endangered Species Act for sea turtles, piping plovers and other listed organisms.

4) Opportunities to avoid and minimize impacts of beach dredge-and-fill activities on fishery resources, and offsets for unavoidable impacts have rarely been proposed or implemented.

5) Large-scale beach dredge and fill activities have the potential to cause impacts in four types of habitats:

   a) waters and benthic habitats near the dredging sites;
   b) waters between dredging and filling sites;
   c) waters and benthic habitats near the fill sites; and
   d) waters and benthic habitats potentially affected as sediments move subsequent to deposition in fill areas.

6) Certain nearshore habitats are particularly important to the long-term viability of North Carolina's commercial and recreational fisheries and potentially threatened by large-scale, long-term or frequent disturbance of sediments:

   a) inlets;
   b) the swash and surf zones and beach-associated bars; and
   c) underwater soft-sediment topographic features, both onshore and offshore underwater hard-substrate topographic features.

7) Large sections of North Carolina waters potentially affected by these projects, both individually and collectively, have been identified as Essential Fish Habitats (EFH) by the

South Atlantic Fishery Management Council (SAFMC) and the Mid-Atlantic Fishery Management Council (MAFMC). Affected species under federal management include:

a) summer flounder (various nearshore waters, including the surf zone and inlets; certain offshore waters);
b) bluefish (various nearshore waters, including the surf zone and inlets);
c) red drum (ocean high-salinity surf zones and unconsolidated bottoms to a depth of 50 meters);
d) several snapper and grouper species (live hard bottom from shore to 600 feet, and – for estuarine-dependent species [e.g., gag grouper and gray snapper] – unconsolidated bottoms and live hard bottoms to the 100 foot contour);
e) spiny dogfish (various coastal waters from the surf zone to 200 miles);
f) black sea bass (various nearshore waters, including unconsolidated bottom and live hard bottom to 100 feet, and hard bottoms to 600 feet);
g) penaeid shrimps (offshore habitats used for spawning and growth to maturity, and waters connecting to inshore nursery areas, including the surf zone and inlets);
h) coastal migratory pelagics (sandy shoals of capes and bars, barrier island and ocean-side waters from the surf zone to the shelf break inshore of the Gulf Stream; all coastal inlets);
i) corals of various types (hard substrates and muddy, silty bottoms from the subtidal to the shelf break);
j) calico scallops (unconsolidated bottoms northeast and southwest of Cape Lookout in 62-102 feet);
k) sargassum (wherever it occurs out to 200 miles);
l) many large and small coastal sharks, managed by the Secretary of the Department of Commerce (inlets and nearshore waters, including pupping and nursery grounds).

8) Beach dredge and fill projects also potentially threaten important fish habitats for anadromous species under federal, interstate and state management (in particular, inlets and offshore overwintering grounds), as well as essential overwintering grounds and other critical habitats for weakfish and other species managed by the Atlantic States Marine Fisheries Commission and the State of North Carolina. The SAFMC identified for anadromous and catadromous species those habitats that have been EFH if there had been a council plan (inlets and nearshore waters).

9) Many of the habitats potentially affected by these projects have been identified as Habitat Areas of Particular Concern by the SAFMC. The specific fishery management plan is provided in parentheses:

a) all nearshore hard bottom areas (SAFMC, snapper-grouper);
b) all coastal inlets (SAFMC, penaeid shrimps, red drum, and snapper-grouper);
c) near-shore spawning sites (SAFMC, penaeid shrimps, and red drum)
d) well-known seafloor features, including the Point, Ten Fathom Ledge and Big Rock (SAFMC, snapper-grouper, coastal migratory pelagics, and corals);
e) pelagic and benthic sargassum (SAFMC, snapper-grouper);

f) sandy shoals of Cape Lookout, Cape Fear, and Cape Hatteras (SAFMC, coastal migratory pelagics) and;
g) Bogue Sound and New River Estuary (SAFMC, coastal migratory pelagics).

10) Habitats likely to be affected by beach dredge and fill projects include many being recognized in North Carolina Fishery Management Plans as important for state-managed species. Many of these habitats are in the process of being recognized as Critical Habitat Areas by the Commission, in either FMPs or in Coastal Habitat Protection Plans. Examples include:

a) inlets (Blue Crab FMP, Red Drum FMP, River Herring FMP);
b) oceanic nearshore waters (Blue Crab FMP, Red Drum FMP); and
c) many others as FMPs and CHPPs are adopted over the coming years.

11) Recent work by scientists in east Florida has documented exceptionally important habitat values for nearshore, hard-bottom habitats often buried by beach dredging projects, including use by over 500 species of fishes and invertebrates, and juveniles of many reef fishes. Equivalent scientific work is just beginning off North Carolina, but life histories suggest that similar habitat use patterns will be found.

Threats to Marine and Estuarine Resources from Beach Dredge and Fill Activities

The Commission finds that beach dredge-and-fill activities and related large-scale coastal engineering projects (including inlet alteration projects) threaten the marine and estuarine resources of North Carolina through the following mechanisms:

1) Direct mortality and displacement of organisms at and near sediment dredging sites;
2) Alteration of seafloor topography and associated current and waves patterns and magnitudes at dredging areas;
3) Alteration of seafloor sediment size-frequency distributions at dredging sites, with secondary effects on benthos at those sites;
4) Elevated turbidity and deposition of fine sediments down-current from dredging sites;
5) Direct mortality and displacement of organisms at initial sediment fill sites;
6) Elevated turbidity in and near initial fill sites, especially in the surf zone, and deposition of fine sediment down-current from initial fill sites;
7) Alteration of near-shore topography and current and waves patterns and magnitudes associated with fill;
8) Movement of deposited sediment away from initial fill sites, especially onto hard bottoms;
9) Alteration of large-scale sediment budgets, sediment movement patterns and feeding and other ecological relationships, including the potential for cascading disturbance effects;
10) Alteration of large-scale movement patterns of water, with secondary effects on water quality and biota;
11) Alteration of movement patterns and successful inlet passage for larvae, post-larvae, juveniles and adults of marine and estuarine organisms;
12) Alteration of long-term shoreline migration patterns (inducing further ecological cascades with consequences that are difficult to predict); and

13) Exacerbation of transport and/or biological uptake of toxicants and other pollutants released at either dredge or fill sites.

Commission Policies for Beach Dredge and Fill Projects and Related Large Coastal Engineering Projects

The Commission establishes the following general policies related to large-scale beach dredge-and-fill and related projects, to clarify and augment the general policies already adopted on April 13, 1999:

1) Projects should fulfill the Commission's general habitat policy by avoiding, minimizing and offsetting damage to the marine and estuarine resources of North Carolina;

2) Projects should provide detailed analyses of possible impacts to each type of Essential Fish Habitat (EFH), with careful and detailed analyses of possible impacts to Habitat Areas of Particular Concern (HAPC) and Critical Habitat Areas (CHA), including short and long term, and population and ecosystem scale effects;

3) Projects should provide a full range of alternatives, along with assessments of the relative impacts of each on each type of EFH, HAPC and CHA;

4) Projects should avoid impacts on EFH, HAPCs and CHAs that are shown to be avoidable through the alternatives analysis, and minimize impacts that are not;

5) Projects should include assessments of potential unavoidable damage to marine resources, using conservative assumptions;

6) Projects should be conditioned on the avoidance of avoidable impacts, and should include compensatory mitigation for all reasonably predictable impacts to the marine and estuarine resources of North Carolina, taking into account uncertainty about these effects. Mitigation should be local, up-front and in-kind wherever possible;

7) Projects should include baseline and project-related monitoring adequate to document pre-project conditions and impacts of the projects on the marine and estuarine resources of North Carolina;

8) All assessments should be based upon the best available science, and be appropriately conservative so as to be prudent and precautionary; and

9) All assessments should take into account the cumulative impacts associated with other beach dredge-and-fill projects in North Carolina and adjacent states, and other large-scale coastal engineering projects that are ecologically related.

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Appendix L. Impacts to fish habitat from commercial and recreational fishing gears used in coastal North Carolina (adapted from Moratorium Steering Committee (1996)).

Fishing method	Habitat impacts and recommendations
Bay Scallop Dredge: A fairly lightweight (not>50 lbs.) steel frame, without teeth, used in estuarine waters, and that has an attached, nylon webbing bag to accumulate the catch.	The use of patent tongs is thought to have a major effect on shellfish beds and the bottom generally. Recommend collection of information on this gear, e.g., the habitat impact experiences of other states which have or are presently allowing use of patent tongs.
Beach Seine: Net generally used to corral mullets. A beach seine can also be used on such fish as striped bass and spot. Sometimes a beach seine is used in conjunction with a "stop" net. Net usually spread round fish with a boat and then pulled to the shore. Pulling power can be by hand or by vehicle. This is one of the most historic methods of fishing.	No known habitat impacts. No recommendations at this time.
Bull Rake: A large, heavy clam rake, usually having eighteen (18) to twenty-eight (28) teeth. Handles range from ten (10) feet to forty (40) feet long.	Bull rakes have severe habitat impacts when used on oyster rocks, and can damage SAV beds. Recommend that bull rake clamming on marked oyster grounds and SAV beds be prohibited.
Butterfly Trawl: In this gear, a solid frame holds a modified trawl in the top of the water column, acting like a channel net. Its use generally requires a good tidal flow and it is normally used only at night.	Little known habitat impact. Skimmer trawls are generally okay to use in SAV beds, but should not be used in oyster grounds. Recommend that trawls be prohibited in marked oyster grounds and that the more widespread use of this gear be promoted in estuarine waters.
Cast Net: Small net thrown by hand and used to catch "schooled fish", such as mullet, and used by bait-fish dealers and individual fishermen to net bait-fish and shrimp.	No known habitat impacts. No recommendations at this time.
Channel Net: A passive gear built like a shrimp trawl that is anchored in a specific area. Channel nets are used to catch shrimp in areas with strong tidal flow, which is required to hold the net open.	No known habitat impacts. No recommendations at this time.
Clam Kickers: Generally refers to the use of the propeller of a boat to blow the mud/silt off the clams and into a trawl having a heavy steel cage or bag made of rings. The gear is chained so that it plows up the clams as it is towed behind the vessel. Often the stern of the vessel is loaded so that the propeller "wash" is directed at a downward angle.	The use of this gear has severe impacts upon SAV beds and oyster grounds. Recommend that areas that may be used by these dredges not be expanded in public trust areas. However, employment in mariculture operations to recover shellfish crops should be considered a viable use of the gear if leases are located in an area where the gear is already allowed, if adjacent leases would not be affected. Permits should be issued by the division of Marine Fisheries on a case-by-case basis. During the oyster season, legal size oysters caught incidental to clamming should be allowed to be retained.
Clam Tongs: Hand held steel "forceps", used to recover clams from any and all types of bottom. Clam tong teeth tend to be longer and more closely spaced than the teeth on oyster tongs.	Habitat impacts of oyster dredges can be significant. Historically, such dredges have been used only on bottoms that were oyster beds. Dredges can plow down any mounds of shellfish and should not be allowed for use in SAV beds. Recommend maintaining present limits on usage and that steps be taken to ensure that the gear is used with adequate consideration of its habitat impacts.
Crab Dredges: A crab dredge is much like an oyster dredge, except perhaps with longer teeth, and is used to dredge crabs from the bottom sediments during the winter months. Crab dredges are used in northern North Carolina waters from Long Shoal north.	Habitat impacts from the use of crab dredges can be significant, and the gear causes severe damage on oyster grounds or in SAV beds. Recommend that the current restrictions on the use of this gear be maintained, and that steps be taken to ensure that crab dredges are used with adequate regard to their effects on coastal fishery habitats.

Fishing/method	Habitat/Impacts and Recommendations
Crab Pot: A wire trap similar to a fish pot. This is the usual method for catching crabs in North Carolina.	Very little habitat impact. Main habitat impact is from discarded bait cartons. It is generally okay to use crab pots in SAV beds, PNAs , or oyster grounds. Anecdotal reports indicate the use of anti-fouling solution or "cleansing" solutions aboard boats or near the waters edge to treat crab pots. Also anecdotal evidence exists to indicate that zinc used in crab pots to minimize rusting may contribute to heavy metal pollution in estuarine systems. Recommend: (1) a requirement that bait boxes be returned to shore; (2) a requirement that biodegradable escape panels be used in crab pots [Note: There is work being done that indicates that "tagged" crabs left in a crab pot with no food subsequently appear in other baited pots]; (3) prohibition of the use of any anti-fouling solution aboard a vessel or within seventy-five (75) feet of the shoreline; and (4) a study of the effects of zinc used to coat crab pots in terms of estuarine pollution.
Crab Trawl: A trawl consisting of larger mesh nets made like a shrimp trawl. The basic equipment is the same as a shrimp trawl except that the bottom leading edge of the trawl is laced with several loops of heavy chain so that the crabs are "plowed" out of the bottom where they have embedded themselves.	For all bottoms, the severity of habitat impacts from the use of shrimp trawls is related to the size of the doors. Damage to oyster grounds is generally moderate to high. Studies are inconclusive on the question of whether trawling in other areas has significant habitat impacts. Recommend continuation of prohibition of trawling in marked oyster grounds. A study of the impact of trawling on different types of habitat should also be conducted.
Dip Nets/Pier Net: Hand nets that are not usually used to catch fish by themselves, but rather, are used as tools in conjunction with other fishing gears. For example, a flounder fisherman may use a dip net to scoop up a flounder that is in his net but appears ready to fall out, or a fisherman may use a pier net to bring up catches of mullet too large to lift without danger of splitting his cast net, or to lift other species to keep from breaking the line of his fishing rod. However, large dip nets are used to catch river herring and shad in coastal streams.	No known habitat impacts. No recommendations at this time.
Eel Pot: A wire trap that looks like a crab pot, but has smaller wire mesh.	No known habitat impacts. If escape panels are used, the lost pots become habitat. Okay to use in SAV beds or oyster grounds. Recommend that biodegradable escape panels be required for eel pots.
Electric Shocking: Refers to the use of mechanical devices that generate an electric current into coastal fishing waters, which stun the fish and cause them to rise to the surface. The practice of electric shocking is currently allowed only in a portion of the Cape Fear River, where it is used to catch catfish.	Habitat effects on this practice are unknown, but would seem to potentially be significant. Recommend that this practice continue to be prohibited in North Carolina.
Estuarine Gill Net: A major gear used in North Carolina's internal coastal waters that captures fish by entangling them when they swim into the net. The next is often anchored to the bottom or attached to stakes. In some fisheries, gill nets are fished by drifting with the current. A variety of mesh sizes are used to take spot, flounder, American shad, river herring, mullet, striped bass and many other species. This gear is often used by recreational fishermen.	Estuarine gill nets have negligible habitat impacts. Such gear can be safely used in PNAs, SNAs and SAV beds. Proper identification of gear owners should be emphasized, along with regular tending of the fear to avoid wastage of fish. No recommendations at this time.
Explosives: Pyrotechnic devices, such as dynamite, used to create a concussion, which causes the stunned or dead fish to rise to the surface where they are gathered. The use of explosives to fish is not legal in North Carolina	No known habitat impacts. No recommendations at this time.
Fish Pot: A wire trap having directed (one-way) openings whereby fish may enter to get to bait. Fish pots are generally used in the ocean harvesting of black sea bass. Fish pots are also used to harvest catfish in the Albemarle Sound area.	Very little habitat impact. Impact can increase in coral formations. "Lost" pots become habitat when used correctly with biodegradable panels. Pots in estuarine waters do not adversely affect oyster grounds or SAV beds. Recommend that biodegradable escape panels be required for all fish pots.
Fish Trawls/Flynets: Usually large trawl nets, generally fished in ocean waters. Fish trawls may drag on the bottom, but also may utilize "mid-water technology." Fish trawling is not allowed in inside waters in North Carolina.	No known habitat impacts, but complaints have been received of float nets being used in a manner that blocks navigation channels, and of failure to yield to boat traffic. Recommend that float netters be required to yield to boat traffic.
Float Netting: This is done when a shrimp trawler "floats" its doors so that it can act as a butterfly or channel net, usually occurring in ebb tidal flow and at night.	No known habitat impacts, but there have been complaints that these netters have failed to yield to boat traffic when working the Atlantic Intracoastal Waterway and marked channels. Recommend that the use of butterfly trawls be promoted, with a requirement that netters must yield to all boat traffic when utilizing navigation channels

Fishing method	Habitat impacts and Recommendations
Fyke Net: A usually round net having a series of throats. Tyke nets are primarily used in the upper reaches of estuaries.	No known habitat impacts. No recommendations at this time.
Gig: A spear with or without barbed points at its tip, used mostly to spear flounder at night, using underwater lights.	No known habitat impacts. No recommendations at this time.
Hand Clam Rake: A tool that usually has nine (9) teeth or less, and looks a lot like a garden rake. Most rakes have a handle, but they can consist merely of "metal fingers" that rest at the wrist and extend over the fingers. Clam rakes can be utilized to "scratch" for clams under water or for "signing" on tidal flats at low tide.	Very little habitat impact in most areas, but slight impacts occur in SAV beds. Clam rakes are difficult to use on most oyster rocks, but impact can be great when used to pull oysters into piles in order to get at the clams beneath. Recommend that: (1) no rakes be allowed in marked oyster rocks/beds {these oyster areas would be designated "clam seed management areas"}; and (2) during the normal oyster season, clams should be allowed as an unlimited, approved, incidental catch when harvesting oyster.
Hand Clamming: Refers to the clamming method wherein clammers are in the water on their hands and knees feeling for clams. Clammers typically use latex gloves as protection for their hands, but can use the "metal hands" noted under "Clam Rake", above.	Very little known habitat impact. Hand clamming in generally okay in SAV beds. Recommend that hand clamming on marked oyster grounds be prohibited except as part of the normal oyster season.
Hand Seine: Small mesh net used to catch bait. Usually pulled by hand, but sometimes a boat is used to spread the seine.	No known habitat impacts. Recommend increasing allowable hand seine sizes to thirty (30) feet.
Hook and Line: The customary "rod and reel" method of fishing, used as the "up and down" bottom rig in the reef fish fishery. "Electro-mate" reels are customarily used for rapid line retrieval.	Virtually no habitat impacts, but see comments at right on monofilament fishing line and other relevant equipment. No recommendations at present.
Hydraulic Clam Dredge: Gear generally used to harvest clams, that employs a conveyer system that can be lowered to the bottom where jets of water uncover the clams. These dredges are allowed only in "mechanical clamming" areas. The gear is also used by mariculturists to harvest shellfish crops from their public bottom leases.	The use of purse seines has no habitat impacts as the net is fished entirely within the water column. No recommendations at this time.
Long haul seine: Usually a long seine, heavily leaded (weighted) and dragged by boats in estuarine waters to catch fish.	Some damage to SAV beds may occur from the heavily leaded bottom line being dragged through the grass beds. Damage to SAV beds by the boat motor propellers may be significant in shallow waters. There is concern over the use of this gear in PNAs (where use is currently prohibited) and near oyster rocks. Recommend: (1) a study be implemented to determine the actual bottom damage and whether the damage is short-term or long-lasting; (2) all oyster grounds, PNAs, and SAV beds be permanently marked: and (3) a study be conducted into the effects of long haul seine activities in these areas.
Long-line System: Fishing lines used for top-water, underwater or bottom fishing.	Virtually no habitat impacts when used as a top-water gear. Impact of bottom gear can range from minor on sand bottoms to significant when used in live rock (coral) formations. Recommend that bottom gear should be prohibited in coral formations.
Ocean Drift Net: Usually a monofilament gill net constructed so as to be tended from the top down. Ocean drift nets generally utilize a larger mesh size than bottom fishing nets. There is very little, if any, use of this gear in the ocean off North Carolina.	No known habitat impacts. No recommendations at this time.
Ocean Sink Gill Net: These are offshore gill nets that may be heavily anchored or not, as is appropriate to the area and fishery.	Sink nets have very little habitat impact unless gear becomes entangled with live rock formations. Lost or discarded webbing can become a danger for continued fishing until webbing becomes encrusted. Recommend better, more positive identification of net owners.
Otter Trawl: A cone-shaped net fashioned in one of the many patterns of "Otter Trawls", used primarily in North Carolina to catch shrimp. The gear is pulled from behind or alongside a vessel using "doors" or "gates" to keep the trawl open. The doors are sized (18" x 36" to 40" x 120") and weighted (50 lb. to 500 lb.) in direct ratio to the size of the trawl. Trawls skim the bottom, and shrimp are made to "pop" up into the net by a "tickler" chain pulled just ahead of the bottom line. Trawl doors ride along the bottom.	
Oyster Dredge: Usually heavy, large-toothed cages towed by a vessel to recover oysters from deeper waters. Oyster dredges are currently allowed only in Pamlico Sound, with a one hundred-(100) pound weight limit.	These dredges have severe habitat impacts. Recommend that dredges continue to be prohibited in estuaries and on live bottom formations offshore [Note: This fishery is regulated under a federal FMP, and its impacts are not presently an issue in NC].

Fishing method	Habitat impacts and Recommendations
Oyster Tongs: Hand held steel "forceps", typically used while standing in a boat to recover oysters from water ranging in depth from that barely deep enough to float a boat to then 910) to twelve (12) feet.	Some habitat impact in SAV beds. Impacts on oyster beds may be negated if clam and oyster seasons are combined at some future point. Recommend that clam tongs be prohibited on marked oyster rocks except during oyster harvest season.
Patent Tongs: Very large steel "forceps" typically used to recover oysters from deep water.	The use of clam kicking has severe habitat impact on all bottoms. The gear causes severe damage to SAV beds and to oyster rocks. Recommend that gear continue to be prohibited in SAV beds and over marked oyster grounds.
Pound Net: A passive gear using netting "leads", which the fish travel along to a net "pound", where they are captured. Captured fish can be culled alive. Mesh size in the pound can be fish size selective. This gear known also as "weirs", and is one of the oldest methods of fishing. Some states have specific laws protecting weirs.	No known habitat impacts. The poles used to support the pound net leads and pound are permanent structures that can themselves become habitat, but abandoned or broken-off poles can become a hazard to navigation. No recommendations at this time.
Purse Seine: Large net used to catch menhaden. A menhaden school is surrounded by the purse et and a large weight is then dropped to close, or "purse", the bottom of the net.	
Sea Scallop Dredge: An extremely heavy steel cage similar to an oyster dredge that drags the bottom and is used in the ocean. These dredges are intended for use only on beds of scallops at sea.	Very little habitat impact. It is generally okay to use these dredges in SAV beds over a short scallop season. No recommendations at this time.
Shrimp Pot: A wire trap used as a special type of underwater trap or pot to catch shrimp.	No known habitat impacts. Okay to use in SAV beds, PNAs, or oyster grounds. No recommendations at this time.
Skimmer Trawl: A trawl net that utilizes a solid frame and a flat offshore "foot" in order to push a trawl through the water without using doors. Use of this gear is limited to areas where the depth of the water is no more than the size of the metal frame. Its use is highly successful in the "white shrimp" fishery.	The use of crab trawls has severe impacts on all bottoms, causing great damage to oyster grounds and moderate to severe damage in SAV beds. Crab trawling results in substantial sedimentation in the trawled area. Recommend that crab trawls be prohibited in marked oyster grounds. Because of heavy chain at the mouth of these trawls, there was much concern over potential damage to SAV beds. For that reason, also recommend a study of the effects of crab trawling on SAV beds.
Spear: Similar to a gig, but usually single pronged, used by underwater divers using scuba gear.	No known habitat impacts. No recommendations at this time.
Stop Net: [See "Beach Seine", above] A term used for large mesh nets that are set out of "run" perpendicular to the beach. Stop nets are not intended to catch anything themselves, given that the mesh size in these nets is from six (6) to ten (10) inches. During the night, migrating mullet (or other fishes) gather against the stop net, which they perceive as an obstruction to travel. Other species may either swim through the stop net or go around it. A beach seine is used to gather the fish "encamped" at the stop net site. A recent DMF study showed that ninety-five percent (95%) of the fish "encamped" at the stop net are mullet.	Use of this gear can seriously damage live rock formations. Recommend the continued prohibition of use in inside (internal) coastal waters. Federal rules should address the use of flynets in the EEZ.
Trammel Net: A multi-walled net usually made with two outer walls of large mesh (6" to 12" stretch or more" made of heavy gauge monofilament, and an inner wall of small mesh monofilament. A fish "pockets" itself between the walls.	Only impact is from lost or discarded nets. Recommend that better, more positive identification of net owner be required.
Trolling Gear: Fishing lines attached to a reel or directly to a boat and "trolled" through the water. Used when fishing for king mackerel, tuna, etc.	No known habitat impacts. No recommendations at this time.
Trot Line: Lines used in estuarine waters to catch crabs and fish, consisting of a long multi- or monofilament line baited at intervals, with or without hooks, used much like an ocean long-line.	No known habitat impacts. No recommendations at this time.

Appendix M: Research Options

(Currently under development)

Saltwater Fishing License

Prepared for the November 18, 2004 joint meeting of the Joint Legislative Commission on Seafood and Aquaculture and the Environmental Review Commission by Jeff Hudson, Commission Counsel.

General provisions governing Saltwater Fishing Licenses

License Requirement. It is unlawful for an individual to engage in recreational fishing in coastal fishing waters without having purchased a Saltwater Fishing License (SFL).

Exemption. An individual may engage in recreational fishing by means of recreational gear without holding a SFL if the individual is 18 years of age or younger and is currently enrolled in school and is making progress toward obtaining a high school diploma or its equivalent. **Note:** Holders of a Lifetime Resident Comprehensive Fishing License or a Lifetime Sportsman License are not exempt from the Saltwater Fishing License requirements.

Sale of Fish. An SFL does not authorize the license holder to sell fish taken under the license.

Purchase and Renewal. Any SFL may be purchased or renewed at designated offices of the Division of Marine Fisheries (Division); from the Division by mail, electronic mail, the internet, or telephone; or at locations designated by the Board of Trustees of the North Carolina Saltwater Fishing Fund.

Types of Saltwater Fishing Licenses

License Type	Fee	Duration
1-year SFL	$15.00	Valid for a period of one year from the date of issuance
2-year SFL	$30.00	Valid for a period of two years from the date of issuance
3-year SFL	$45.00	Valid for a period of three years from the date of issuance
7-day SFL	$1.00	7 day duration, but may only be purchased once per year
Subsistence SFL	No charge	Valid for a period of one year from the date of issuance
Lifetime SFL:		Lifetime duration
Younger than 6 years of age	$100.00	
6 to younger than 11 years of age	$150.00	
11 to younger than 18 years of age	$200.00	
18 years of age and older	$500.00	

North Carolina Saltwater Fishing Fund

The North Carolina Saltwater Fishing Fund (Fund) is established as a nonreverting fund in the office of the State Treasurer to receive license revenues. The State Treasurer will invest the assets of the Fund and disburse investment income only as directed by the Board of Trustees of the Fund (Board). State agencies, local governments, and nonprofit corporations whose primary purpose is conserving, preserving, or restoring the State's marine resources are eligible to apply for a grant from the Fund.

North Carolina Saltwater Fishing Fund (continued)

The Board may authorize disbursement for:

- Resource and habitat enhancement.
- Fisheries management research for specifically designated species.
- Acquisition of land that provides for the enhancement of fishery habitat or public access to coastal fishing waters.
- Purchase or construction of public beach access areas and public marinas. If the Board purchases or constructs a public marina, it may establish a boat docking fee.
- Emergency dredging for the restoration of access to public fishing areas.
- Establishment of scholarships for individuals pursuing degrees in marine sciences.
- Administrative and operating expenses of the Board (no more than 2% of the annual Fund balance or $1,250,000, whichever is greater, may be used).

The Board may not authorize disbursement for law enforcement. The Board will be composed of eleven members as follows:

- Three members, each of whom holds a saltwater fishing license (SFL), to be appointed by the Governor.
- Three members, each of whom holds a SFL, to be appointed by the Speaker of the House of Representatives.
- Three members, each of whom holds a SFL, to be appointed by the President Pro Tempore of the Senate.
- The Director of the Division or the Director's designee (*ex officio* and non-voting).
- The Chair of the Marine Fisheries Commission (MFC) or the Chair's designee (*ex officio* and non-voting).

The Chair of the Board will report to the Joint Legislative Commission on Seafood and Aquaculture by September 30 of each year on the source and amounts of monies credited to the Fund and the purpose and amount of all expenditures from the Fund during the prior fiscal year.

Miscellaneous Provisions

- The MFC shall adopt rules to define recreational gear and commercial gear.
- The MFC and the Division may not disclose personal information provided by a license applicant.
- The Board shall develop a plan for the implementation of the licensing provisions of the act and study the creation of a unified fishing license for inland and coastal fishing. The Board will report to the Joint Legislative Commission on Seafood and Aquaculture on the plan and study no later than April 15, 2005.
- Of the funds appropriated to Department of Environment and Natural Resources for the 2004-2005 fiscal year, the Division may use up to $450,000 and the Board may use up to $300,000 to implement the saltwater fishing license program. The Board shall repay all of these funds to the General Fund by July 1, 2008.

Effective Date

The licensing provisions become effective January 1, 2006. All other provisions of this act became effective August 17, 2004.

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2003

SESSION LAW 2004-187
HOUSE BILL 831

AN ACT TO ESTABLISH THE NORTH CAROLINA SALTWATER FISHING FUND AND LICENSE AND TO PROVIDE THAT VACANCIES MAY BE FILLED IN CERTAIN OFFICES DURING A HOLDOVER PERIOD.

Whereas, the State of North Carolina has one of the most diverse fisheries in the United States; and

Whereas, the General Assembly recognizes that for many citizens fishing is an important recreational activity and that saltwater fishing is a source of great personal enjoyment and satisfaction; and

Whereas, the General Assembly recognizes the importance of providing plentiful fishery resources to maintain and enhance tourism as a major contributor to the economy of the State; and

Whereas, the General Assembly recognizes that commercial fishermen perform an essential function by providing wholesome food for the citizens of the State, nation, and world, and thereby properly earn a livelihood; and

Whereas, the General Assembly recognizes the economic contribution and important heritage of traditional full-time and part-time commercial fishing; and

Whereas, the General Assembly recognizes the need to protect our coastal fishery resources and to balance the commercial and recreational interests through better management of these resources; and

Whereas, the General Assembly is committed to the continued viability of both recreational and commercial fishing industries in the State; and

Whereas, the General Assembly intends that the commercial fishing industry be allowed to continue to take fish by means of all methods traditionally employed in commercial fishing operations, including the use of nets and trawls, subject to federal and State law and rules adopted by the Marine Fisheries Commission pursuant to G.S. 143B-289.52; and

Whereas, the General Assembly finds that in order to protect coastal fishery resources, it is essential that the recreational as well as the commercial fishing sectors provide data on use of fishery resources for the development of scientifically valid plans to manage fishery resources; and

Whereas, the General Assembly finds that it is essential to the success of efforts to better manage fishery resources that both the recreational and commercial fishing sectors are involved in and support these efforts; Now, therefore,

The General Assembly of North Carolina enacts:

SECTION 1. Chapter 113 of the General Statutes is amended by adding a new Article to read:

"Article 14C.
"North Carolina Saltwater Fishing Fund.

"**§ 113-175. Definitions.**

As used in this Article:

(1) 'Board of Trustees' means the Board of Trustees of the Fund.

(2) 'Fund' means the North Carolina Saltwater Fishing Fund.

(3) 'Investment income' means interest earned from the investment of license revenues and the proceeds of any gifts, grants, or contributions deposited in the Fund.

(4) 'License revenues' means the net proceeds from the sale of Saltwater Fishing Licenses issued under G.S. 113-174.2. The term includes funds realized from the sale, lease, rental, or other grant of rights to real or personal property acquired or produced with license revenues and federal aid project reimbursements to the extent that license revenues originally funded the project for which the reimbursement is made.

"**§ 113-175.1. North Carolina Saltwater Fishing Fund.**

There is hereby established the North Carolina Saltwater Fishing Fund as a nonreverting fund in the office of the State Treasurer. The purpose of the Fund is to enhance the fishery resources of the State for commercial and recreational fishing. License revenues and the proceeds of any gifts, grants, and contributions to the State that are specifically designated for inclusion in the Fund shall be deposited in the Fund. The State Treasurer shall hold the Fund separate and apart from all other moneys, funds, and accounts. The State Treasurer shall invest the assets of the Fund in accordance with the provisions of G.S. 147-69.2 and G.S. 147-69.3.

"**§ 113-175.2. Board of Trustees of the North Carolina Saltwater Fishing Fund.**

(a) Board of Trustees Established. – There is hereby established the Board of Trustees of the North Carolina Saltwater Fishing Fund. The Board of Trustees shall be independent, but for administrative purposes shall be located under the Department of Environment and Natural Resources.

(b) Membership; Qualifications. – The Board of Trustees shall consist of 11 members as follows:

(1) One individual appointed by the Governor, who has purchased a current Saltwater Fishing License at the time of the appointment.

(2) One individual appointed by the Governor, who has purchased a current Saltwater Fishing License at the time of the appointment.

(3) One individual appointed by the Governor, who has purchased a current Saltwater Fishing License at the time of the appointment.

(4) One individual appointed by the General Assembly upon the recommendation of the Speaker of the House of Representatives in accordance with G.S. 120-121, who has purchased a current Saltwater Fishing License at the time of appointment.

(5) One individual appointed by the General Assembly upon the recommendation of the Speaker of the House of Representatives in accordance with G.S. 120-121, who has purchased a current Saltwater Fishing License at the time of appointment.

(6) One individual appointed by the General Assembly upon the recommendation of the Speaker of the House of Representatives in accordance with G.S. 120-121, who has purchased a current Saltwater Fishing License at the time of appointment.

(7) One individual appointed by the General Assembly upon the recommendation of the President Pro Tempore of the Senate in accordance with G.S. 120-121, who has purchased a current Saltwater Fishing License at the time of appointment.

(8) One individual appointed by the General Assembly upon the recommendation of the President Pro Tempore of the Senate in accordance with G.S. 120-121, who has purchased a current Saltwater Fishing License at the time of appointment.

(9) One individual appointed by the General Assembly upon the recommendation of the President Pro Tempore of the Senate in

accordance with G.S. 120-121, who has purchased a current Saltwater Fishing License at the time of appointment.

(10) The Director of the Division of Marine Fisheries or the Director's designee shall serve as a nonvoting, ex officio member of the Board of Trustees.

(11) The Chair of the Marine Fisheries Commission, or the Chair's designee shall serve as a nonvoting, ex officio member of the Board of Trustees.

(c) Officers. – The Governor shall appoint a member of the Board of Trustees to serve as Chair. The Chair shall serve at the pleasure of the Governor. The Board of Trustees shall elect one of its members to serve as Vice-Chair. The Vice-Chair shall serve a one-year term beginning July 1 and ending June 30 of the following year. The Vice-Chair may serve any number of consecutive terms.

(d) Terms. – The term of office of members of the Board of Trustees appointed under subdivisions (1) through (9) of subsection (b) of this section is three years. A member appointed under subdivisions (1) through (9) of subsection (b) of this section may be reappointed to any number of successive three-year terms. Upon the expiration of a three-year term, a member shall continue to serve until a successor is appointed and duly qualified as provided by G.S. 128-7. The term of members appointed under subdivisions (1), (4), and (7) of subsection (b) of this section shall expire on June 30 of years evenly divisible by three. The term of members appointed under subdivisions (2), (5), and (8) of subsection (b) of this section shall expire on June 30 of years that precede by one year those years that are evenly divisible by three. The term of members appointed under subdivisions (3), (6), and (9) of subsection (b) of this section shall expire on June 30 of years that follow by one year those years that are evenly divisible by three. An individual appointed under subdivisions (1) through (9) of subsection (b) of this section must continue to have a current Saltwater Fishing License in order to remain eligible to serve on the Board of Trustees.

(e) Vacancies. – An appointment to fill a vacancy shall be for the unexpired balance of the term. If a vacancy occurs for a member subject to appointment by the General Assembly upon the recommendation of the Speaker of the House of Representatives or the President Pro Tempore of the Senate, the vacancy shall be filled in accordance with G.S. 120-122.

(f) Meetings; Frequency. – The Board of Trustees shall meet at least twice each year and may hold special meetings at the call of the Chair or a majority of the members. Six members of the Board of Trustees shall constitute a quorum for the transaction of business.

(g) Per Diem and Expenses. – The Trustees shall receive per diem and necessary travel and subsistence expenses in accordance with the provisions of G.S. 138-5. Per diem, travel, and subsistence expenses shall be paid from the Fund.

"**§ 113-175.3. Allocation of investment income of the Fund; other powers and duties.**

(a) Disbursement of Funds. – The State Treasurer shall disburse investment income only upon the written direction of the Board of Trustees.

(1) The Board of Trustees may authorize the disbursement of investment income that accrues to the Fund for:

a. Resource and habitat enhancement, including, but not limited to, creation of natural nursery areas, construction of artificial reefs, restoration and enhancement of submerged aquatic vegetation, creation and restoration of oyster habitat, and acquisition of land or an interest in land that provides for the preservation of critical fisheries habitat.

b. Grants to fund fisheries management research for specifically designated species.

c. Acquisition of land or an interest in land that provides for the enhancement of fishery habitat or public access to coastal fishing waters.

d. Purchase or construction of public beach access areas and public marinas. If the Board of Trustees purchases or constructs a public marina, it may establish a boat docking fee.

e. Emergency dredging for the restoration of access to public fishing areas.

f. Establishment of scholarships for individuals pursuing degrees in marine sciences.

g. Administrative and operating expenses of the Board of Trustees.

(2) The Board of Trustees shall not authorize the disbursement of investment income that accrues to the Fund for law enforcement purposes.

(b) Applicants. – Any of the following are eligible to apply for monies from the Fund:

(1) A State agency.

(2) A local government or other political subdivision of the State or a combination of such entities.

(3) A nonprofit corporation whose primary purpose is the conservation, preservation, or restoration of the marine resources of the State.

(c) Administrative and Operating Expenses. – No more than two percent (2%) of the annual balance of the Fund on July 1 or a total sum of one million two hundred fifty thousand dollars ($1,250,000), whichever is greater, may be used each fiscal year for administrative and operating expenses of the Board of Trustees.

(d) Acquisition of Real Property. – The Board of Trustees may acquire real property by purchase, negotiation, gift, or devise. Any acquisition of real property by the Board of Trustees must be reviewed and approved by the Council of State and the deed for the real property subject to approval of the Attorney General before the acquisition can become effective. Nothing in this section shall allow the Board of Trustees to acquire real property by eminent domain.

(e) Real Property Management. – The Board of Trustees may designate managers or managing agencies of the real property acquired under this Article.

(f) Designation of Locations for Purchase and Renewal of Licenses. – Pursuant to G.S. 113-174.2, the Board of Trustees may designate locations at which Saltwater Fishing Licenses may be purchased and renewed.

(g) The Board of Trustees may adopt rules to implement this Article.

"**§ 113-175.4. Report.**

The Chair of the Board of Trustees shall submit to the Joint Legislative Commission on Seafood and Aquaculture by September 30 of each year a report on the Fund that shall include the source and amounts of all moneys credited to the Fund and the purpose and amount of all expenditures from the Fund during the prior fiscal year."

SECTION 2. Chapter 113 of the General Statutes is amended by adding a new Article to read:

"Article 14B.

"Saltwater Fishing Licenses.

"**§ 113-174. Definitions.**

As used in this Article:

(1) 'Commission' means the Marine Fisheries Commission.

(2) 'SFL' means Saltwater Fishing License.

(3) 'Division' means the Division of Marine Fisheries in the Department of Environment and Natural Resources.

(4) 'North Carolina resident' means an individual who is a resident within the meaning of G.S. 113-130(4).

(5) 'Recreational fishing' means any activity preparatory to, during, or subsequent to the taking of any fish, the taking of which is subject to regulation by the Commission, by any means:

a. That does not constitute a commercial fishing operation as defined in G.S. 113-168.

b. Except as provided in G.S. 113-261.

"**§ 113-174.1. General provisions governing licenses.**

(a) License Purchase Required to Engage in Recreational Fishing. – It is unlawful for any individual to engage in recreational fishing in coastal fishing waters without having purchased a current license required by this Article. It is unlawful for any individual to engage in recreational fishing without complying with the provisions of this Article and rules adopted by the Commission under this Article.

(b) Sale of Fish Prohibited. – A license issued under this Article does not authorize an individual who takes or lands any species of fish under the authority of the Commission to sell, offer for sale, barter, or exchange the fish for anything of value. Except as provided in G.S. 113-168.4, it is unlawful for any individual who takes or lands any species of fish under the authority of the Commission by any means to sell, offer for sale, barter, or exchange these fish for anything of value.

(c) Assignment and Transfer Prohibited. – It is unlawful to buy, sell, lend, borrow, assign, or otherwise transfer a license issued under this Article or to attempt to buy, sell, lend, borrow, assign, or otherwise transfer a license issued under this Article.

(d) General Enforcement. – It is unlawful for any individual to engage in recreational fishing in coastal fishing waters in the State without providing the individual's name and residence address upon the request of an inspector or other law enforcement officer authorized to enforce federal or State laws, regulations, or rules relating to marine fisheries.

(e) Enforcement for Charterboats and Headboats. – An inspector or other law enforcement officer may only verify the licensure of an individual fishing from a charterboat or headboat after the charterboat or headboat has returned to shore and the individual has disembarked from the charterboat or headboat. Except as provided in G.S. 113-174.2(d), each individual on board a charterboat or headboat engaged in recreational fishing, other than crew members who do not engage in recreational fishing, must have purchased a current SFL issued pursuant to G.S. 113-174.2. An owner, operator, or crew member of a charterboat or headboat is not responsible for the licensure of a customer fishing from a charterboat or headboat.

(f) Cancellation. – The Division may cancel a license issued on the basis of false information supplied by the license applicant. A cancelled license is void from the date of issuance.

(g) Reporting Requirements. – A person licensed under this Article shall comply with the biological data sampling and survey programs of the Commission and the Division.

"**§ 113-174.2. Saltwater Fishing License.**

(a) License Required. – Except as otherwise provided in this Article, it is unlawful for any individual to engage in recreational fishing in coastal fishing waters by means of recreational gear without having purchased a current SFL issued under this section. It is unlawful for any individual fishing under a SFL to possess fish in excess of recreational possession limits.

(b) Purchase; Renewal. – Any license issued under this section may be purchased or renewed at designated offices of the Division; from the Division by mail, electronic mail, the Internet, or telephone; or at locations designated by the North Carolina Saltwater Fishing Fund Board of Trustees.

(c) Types of SFLs; Fees; Duration. – The Division shall issue the following SFLs:

(1) One-year SFL. – $15.00. This license is valid for a period of one year from the date of issuance.

(2) Two-year SFL. – $30.00. This license is valid for a period of two years from the date of issuance.

(3) Three-year SFL. – $45.00. This license is valid for a period of three years from the date of issuance.

(4) Seven-day SFL. – $1.00. This license is valid for a period of seven consecutive days. An individual may purchase this license only once in any 12-month period.

(5) Subsistence SFL. – An applicant for a license under this subdivision shall provide to the Division a certification from the Department of Health and Human Services that the individual falls below the federal poverty level. A license issued under this subdivision shall be issued without charge and is valid for a period of one year from the date of issuance.

(6) Lifetime SFL. – This license is valid for the lifetime of the licensee. The fee for the Lifetime SFL, based on the age of the prospective licensee as of the date on which the application is filed with the Division, is:

a.	Younger than six years of age	$100.00
b.	Six years of age to younger than 11 years of age	$150.00
c.	11 years of age to younger than 18 years of age	$200.00
d.	18 years of age or older	$500.00

(d) Exemptions. – An individual may engage in recreational fishing by means of recreational gear without having purchased a SFL if the individual is 18 years of age or younger and is currently enrolled in school and is making progress toward obtaining a high school diploma or its equivalent."

SECTION 3. G.S. 113-169.2 reads as rewritten:

"**§ 113-169.2. Shellfish license for North Carolina residents without a SCFL.**

(a) ~~License or Endorsement Necessary to Take or Sell Shellfish.~~ Requirement. – It is unlawful for an individual to take shellfish from the public or private grounds of the State ~~by mechanical means or in quantities greater than the personal use limits set forth in subsection (i) of this section by any means~~ as part of a commercial fishing operation without holding either a shellfish license or a shellfish endorsement of a SCFL. A North Carolina resident who seeks only to take and sell shellfish shall be eligible to obtain a shellfish license without holding a SCFL. The shellfish license authorizes the licensee to sell shellfish.

(b) Repealed by Session Laws 1998-225, s. 4.17.

(c) Fees. – Shellfish licenses shall be issued annually upon payment of a fee of twenty-five dollars ($25.00) upon proof that the license applicant is a North Carolina resident.

~~(d) License Available for Inspection. It is unlawful for any individual to take shellfish in quantities greater than the personal use limits set forth in subsection (i) of this section from the public or private grounds of the State without having ready at hand for inspection a current and valid shellfish license issued to the licensee personally and bearing the licensee's correct name and address. It is unlawful for any individual taking or possessing freshly taken shellfish to refuse to exhibit the individual's license upon the request of an officer authorized to enforce the fishing laws.~~

(e) Repealed by Session Laws 1998-225, s. 4.17.

(f) Name or Address Change. – In the event of a change in name or address or upon receipt of an erroneous shellfish license, the licensee shall, within 30 days, apply for a replacement shellfish license bearing the correct name and address. Upon a showing by the individual that the name or address change occurred within the past 30 days, the trial court or

prosecutor shall dismiss any charges brought pursuant to this subsection.

(g) Transfer Prohibited. – It is unlawful for an individual issued a shellfish license to transfer or offer to transfer the license, either temporarily or permanently, to another. It is unlawful for an individual to secure or attempt to secure a shellfish license from a source not authorized by the Commission.

(h) Exemption. – Persons under 16 years of age are exempt from the license requirements of this section if accompanied by a parent, grandparent, or guardian who is in compliance with the requirements of this section or if in possession of a parent's, ~~grandparent's~~ grandparent's, or guardian's shellfish ~~license.~~license or a parent's, grandparent's, or guardian's shellfish endorsement of a SCFL.

~~(i) Taking Shellfish Without a License for Personal Use. –~~

~~(1) A person may take shellfish for personal use without obtaining a license under this section in quantities up to:~~

~~a. One bushel of oysters per day.~~
~~b. One half bushel of scallops per day.~~
~~c. One hundred clams per day.~~
~~d. Ten conchs per day.~~
~~e. One hundred mussels per day.~~

~~(2) Two or more persons who are using a vessel to take shellfish may take shellfish for personal use without obtaining a license under this section in quantities up to:~~

~~a. Two bushels of oysters per day.~~
~~b. One bushel of scallops per day.~~
~~c. Two hundred clams per day.~~
~~d. Twenty conchs per day.~~
~~e. Two hundred mussels per day.~~"

SECTION 4. G.S. 113-173(j)(4) is repealed.

SECTION 5. G.S. 120-122 reads as rewritten:

"**§ 120-122. Vacancies in legislative appointments.**

When a vacancy ~~occurs, other than by the expiration of term,~~ occurs in any office subject to appointment by the General Assembly upon the recommendation of the Speaker of the House of Representatives, upon the recommendation of the President Pro Tempore of the Senate, or upon the recommendation of the President of the Senate, and the vacancy occurs either: (i) after election of the General Assembly but before convening of the regular session; (ii) when the General Assembly has adjourned to a date certain, which date is more than 20 days after the date of adjournment; ~~or~~ (iii) after sine die adjournment of the regular ~~session,~~ session; or (iv) when the term of office expires and a successor has not been appointed, then the Governor may appoint a person to serve until the expiration of the term or until the General Assembly fills the vacancy, whichever occurs first. The General Assembly may fill the vacancy in accordance with G.S. 120-121 during a regular or extra session. When a person is holding over in office after the expiration of the term, for the purpose of this section that office may be filled as if it were vacant. Before making an appointment, the Governor shall consult the officer who recommended the original appointment to the General Assembly (the Speaker of the House of Representatives, the President Pro Tempore of the Senate, or the President of the Senate), and ask for a written recommendation. After receiving the written recommendation, the Governor must within 30 days either appoint the person recommended or inform the officer who made the recommendation that he is rejecting the recommendation. Failure to act within 30 days as required under the provisions of the preceding sentence shall be deemed to be approval of the candidate, and the candidate shall be eligible to enter the office in as full and ample extent as if the Governor had executed the appointment. The Governor shall not appoint a person other

than the person so recommended. Any position subject to initial appointment by the General Assembly but not filled prior to sine die adjournment of the Session at which the position was created or adjournment to a date certain which date is more than 20 days after the date of adjournment of the session at which the position was created may be filled by the Governor under this section as if it were a vacancy occurring after the General Assembly had made an appointment."

SECTION 6. G.S. 113-168(1) reads as rewritten:

"(1) 'Commercial fishing operation' means any activity preparatory to, during, or subsequent to the taking of any fish, the taking of which is subject to regulation by the Commission, either with the use of commercial fishing equipment or gear, or by any means if the purpose of the taking is to obtain fish for sale. Commercial fishing operation does not include (i) the taking of fish as part of a recreational fishing tournament, unless commercial fishing equipment or gear is ~~used or~~ used, (ii) the taking of fish under a ~~RCGL.~~ RCGL, or (iii) the taking of fish as provided in G.S. 113-261."

SECTION 7. G.S. 143B-289.52(a) is amended by adding a new subdivision to read:

"(13) To adopt rules to define fishing gear as either recreational gear or commercial gear."

SECTION 8. G.S. 143B-289.52 is amended by adding a new subsection to read:

"(h) Neither the Commission nor the Department may disclose personal information provided by an applicant for a license issued under Article 14A or 14B of Chapter 113 of the General Statutes."

SECTION 9. In order to establish a schedule of staggered terms of three years for the Board of Trustees of the North Carolina Saltwater Fishing Fund, the terms of members of the Board initially filling positions established by subdivisions (1), (4), and (7) of subsection (b) of G.S. 113-175.2, as enacted by Section 1 of this act, shall begin on the date the member is appointed and duly qualified and shall expire on June 30, 2010; the terms of members of the Board initially filling positions established by subdivisions (2), (5), and (8) of subsection (b) of G.S. 113-175.2, as enacted by Section 1 of this act, shall begin on the date the member is appointed and duly qualified and shall expire on June 30, 2009; the terms of members of the Commission initially filling positions established by subdivisions (3), (6), and (9) of subsection (b) of G.S. 113-175.2, as enacted by Section 1 of this act, shall begin on the date the member is appointed and duly qualified and shall expire on June 30, 2008.

SECTION 10. Notwithstanding G.S. 113-175.3, the Board of Trustees of the North Carolina Saltwater Fishing Fund may authorize disbursement and the State Treasurer may disburse up to fifty percent (50%) of the license revenues in the North Carolina Saltwater Fishing Fund during fiscal years 2005-2006 through 2015-2016.

SECTION 11. The first report required pursuant to G.S. 113-175.4, as enacted by Section 1 of this act, is due by September 30, 2005.

SECTION 12.(a) The Board of Trustees of the North Carolina Saltwater Fishing Fund shall develop a plan for the implementation of Section 2 of this act. The plan shall provide that:

(1) Licenses may be purchased or renewed via mail, electronic mail, the Internet, or telephone.

(2) The licensing and renewal system shall be fully automated and shall allow for the purchase or renewal of licenses at any time, without delay.

(3) The licensing system shall not require individuals to hold a physical license.

(4) Verification of licensure shall be accomplished by an individual providing only the individual's name and residence address.

SECTION 12.(b) The Board of Trustees of the North Carolina Saltwater Fishing Fund shall determine a date by which the plan developed pursuant to subsection (a) of this section would be fully implemented.

SECTION 12.(c) The Board of Trustees of the North Carolina Saltwater Fishing Fund shall study issues related to the establishment of a unified recreational fishing license for recreational fishing in both the inland and coastal fishing waters of the State. The Board shall make specific findings as to whether a unified licensing system should be adopted for recreational fishing in the State and, if so, what the system should be and how it should be implemented.

SECTION 12.(d) A report on the implementation plan, the determination of the date of full implementation, and the unified fishing license study required by subsections (a), (b), and (c) of this section shall be submitted to the Joint Legislative Commission on Seafood and Aquaculture no later than April 15, 2005.

SECTION 12.(e) Notwithstanding the provisions of G.S. 113-175.2 as enacted by Section 1 of this act, the requirement that members of the Board of Trustees of the North Carolina Saltwater Fishing Fund must have purchased a current Saltwater Fishing License at the time of appointment and the requirement that members of the Board of Trustees must continue to have a current Saltwater Fishing License in order to remain eligible to serve on the Board of Trustees shall not apply until such time as the Saltwater Fishing License becomes available.

SECTION 13. There is appropriated from the General Fund to the North Carolina Saltwater Fishing Fund for fiscal year 2004-2005 up to the sum of five million dollars ($5,000,000). Notwithstanding G.S. 113-175.3, as enacted by Section 1 of this act, the Board of Trustees of the North Carolina Saltwater Fishing Fund shall use these funds to implement the provisions of this act. Notwithstanding G.S. 113-175.3, as enacted by Section 1 of this act, the Board of Trustees shall repay funds appropriated pursuant to this section to the General Fund by July 1, 2010.

SECTION 14. If any section or provision of this act is declared unconstitutional or invalid by the courts, the unconstitutional or invalid section or provision does not affect the validity of this act as a whole or any part of this act other than the part declared to be unconstitutional or invalid.

SECTION 15. Sections 2, 3, and 4 of this act become effective January 1, 2006. All other sections of this act become effective when the act becomes law.

In the General Assembly read three times and ratified this the 17th day of July, 2004.

s/ Marc Basnight
President Pro Tempore of the Senate

s/ James B. Black
Speaker of the House of Representatives

s/ Michael F. Easley
Governor

Approved 11:20 a.m. this 17th day of August, 2004

Comments on Saltwater Fishing License Presented to Joint Meeting of ERC and JLCSA

Division of Marine Fisheries

November 18, 2004

- **Immediate Tasks to be Completed**

  - ❑ The Board of Trustees (BOT) overseeing the license revenue fund is tasked with developing an implementation plan for license sales, determining a date for full implementation, and studying a unified recreational fishing license for both fresh and salt water fishing. A report on these tasks is to be submitted to the JLCSA no later than April 15, 2005.

    Status: The Board has not yet been appointed.

    The statute is mute on staff support for the BOT, but, DMF has assumed that role for the initial stages of plan development. Clarification of the source of staff support for the future will be necessary.

    DMF is moving ahead with identifying and evaluating options for license sales. Includes cost and benefit analysis of each option.

    They are: 1) Sales through a new system developed and managed by DMF, 2) Sales through an expanded WRC system, and 3) a unified license.

- **Public Comments on Legislation**

  - ❑ DMF developed a fact sheet and a list of frequently asked questions and posted them on the division's website (copies attached).

  - ❑ Comments through email and phone calls were recorded (summary attached).

    - Need blanket license for charter boats.
    - Lifetime WRC license should apply.
    - Two licenses needed if fishing in Joint Waters.

- **Recommendations and Concerns**

  - ❑ Potential Impacts to federal Sportfish Restoration Act (SRA) Funds

    - The annual grant is based on the size of the state and the number of licensed anglers in the state.

- NC receives approximately $5 million per year.
- DMF receives approximately $1.5 million of the state's grant. $3.5 million goes to the Wildlife Resources Commission.
- The SRA requires that a state is eligible for grants only if license revenues are not diverted from primary purpose of the agency.
- Assent legislation is necessary to assure that no such diversions occur.
- Preliminary review of the SFL by the US Fish and Wildlife Service indicates that certain eligible uses of funds would be considered a diversion (copy of opinion attached). They identified the funding category of scholarships and operating expenses of the board as diversions.
- Possible solutions include amendments to the statutes governing the authority of DMF, and changes to the SFL to restrict or redefine categories of activities that can be funded with license revenues.
- The Act also requires that the cost of processing the license not exceed the license fee in order for the license sales to count towards the level of grant eligibility for the state. This will be a problem with the $1, seven day license. The fee will need to be increased to solve this problem.

❑ Enforcement Issues

- SFL will increase demands on already limited enforcement capabilities.
- DMF has prepared and submitted to DENR an expansion budget request for more officers since funds from the SFL cannot be used for enforcement.
- Uncertainties about efficiency of available technology and how lack of efficiency will affect ability to manage a paperless license system.

❑ Funding Issues

- The SFL makes no provisions for funding either the staff or technology needs of the system to sell licences. Such needs are not identified as a category of funding that can be approved by the BOT. There are $450,000 available this year for developing the implementation plan, but, no assurances after that.

- The funding category for habitat enhancement should be expanded to allow funding of research and monitoring for traditional and innovative projects

❑ Licensing Issues

- Blanket permit for charter boats and piers.

  Results of DMF survey of For Hire Permit holders (copy attached)

  Could satisfy DMF management data needs

- Requirement to be pursuing a high school education will be impractical to verify and will cause enforcement problems. Match WRC exemption by lowering age from 18 to 16 with no education requirement.

- Increase duration of short term license to either 10 or 14 days and charge at least $5. Do not restrict how many can be bought in a year.

- The subsistence license qualifying criterion needs to be examined and simplified to something more specific than the "poverty level"; such as qualifying for either Medicaid, food stamps or housing assistance.

❑ Confidentiality of licensee information

- The SFL makes personal data on recreational and commercial license holders confidential. We have many examples of how the commercial data has been shared with others to the benefit of the fishermen. Confidentiality of that data will make similar use in the future impossible and should be removed.

- This problem could be corrected by allowing release of the data only to those that have signed a confidentiality statement to use the data for specific and pre-approved purposes.

❑ Unified license

- A good idea that will require careful analysis of all the costs and benefits.

❑ Effective date of license requirement

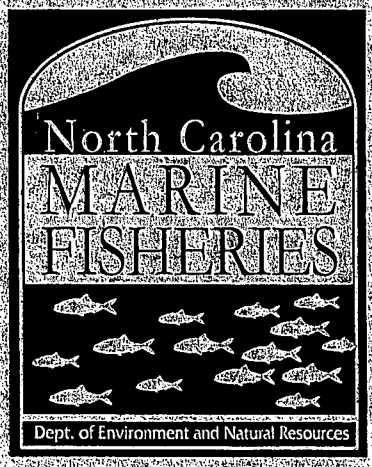
- The law specifies that the license requirements will be effective January 1, 2006. Development of the system cannot start until after the implementation plan is submitted to the JLCSA.

- The implementation plan is supposed to identify a date for full implementation of the license requirement. At this time, it is likely that the more realistic date is January 2, 2007.

North Carolina Saltwater Fishing License

License Types

- **Annual license for anyone age 18 or older, regardless of state residency - $15**
- **Seven-day license, regardless of state residency (can only be purchased once a year) - $1**
- **Subsistence license for fishermen whose annual income is below the federal poverty level – No Charge**
- **Lifetime license:** **Age 0 through Age 5 - $100**
  Age 6 through Age 10 - $150
  Age 11 through Age 17 - $200
  Age 18 and above - $500



Effective Date: Jan. 1, 2006

Requirements

The Saltwater Fishing License is an annual license allowing recreational fishermen to harvest seafood for personal consumption. The license is required for ***ANY*** type of recreational fishing activity not included under the N.C. Recreational Commercial Gear License. Seafood harvested under this license cannot be sold. Fishermen using this license will be held to the state's ***recreational size and possession limits***. This license cannot be assigned or transferred.

The license is required to recreationally fish in **Coastal Fishing Waters,** which include sounds, coastal rivers and their tributaries, out to three miles in the ocean. Recreational fishermen who catch fish in the **Exclusive Economic Zone** (3 miles – 200 miles offshore) will be required to possess this license to land fish in state waters. Fishing in **Joint Waters** (areas managed by both the Marine Fisheries and the Wildlife Resources commissions) will also require the Saltwater Fishing License.

Fishermen holding the Saltwater Fishing License are required to comply with all sampling and survey programs administered by the state Division of Marine Fisheries (DMF).

Individuals who hold a Wildlife Resources Commission Lifetime Fishing License are still required to purchase this license to recreationally fish in N.C.'s coastal and ocean waters.

Individuals 18 years and younger may fish without the license if they are currently enrolled in school and are making progress toward obtaining a high school diploma or its equivalent.

The license may be purchased or renewed at designated DMF offices; by mail, electronic mail, the Internet, or telephone; or at locations designated by the N.C. Saltwater Fishing Fund Board of Trustees. Upon request of a Marine Patrol officer, or other law enforcement officers authorized to enforce federal or state laws, regulations or rules relating to marine fisheries, the license holder must provide their name and residence address, but are not required to have the physical license in their possession.

N.C. Saltwater Fishing Fund

Proceeds from the sale of this license will go into the N.C. Saltwater Fishing Fund to be administered by an 11-member board of trustees. The board will issue grants to be used for resource and habitat enhancement, research, land acquisition to enhance fishery habitat or public access to coastal fishing waters, construction of public beach access and public marinas, emergency dredging to restore access to public fishing areas, marine science scholarships and administrative and operating expenses for the board. State and local agencies, and nonprofit organizations whose focus is conservation, preservation or restoration of marine resources, may apply for these grants.

For more information about the new Saltwater Fishing License, please visit www.ncdmf.net or call the DMF at 252-726-7021 or 1-800-682-2632 and ask for the License Office.

8/4/04

North Carolina's Saltwater Fishing License
Frequently Asked Questions

When will the Saltwater Fishing License be required?
The license is required beginning Jan. 1, 2006.

In what areas or waters will the license be required?
*The license is required to recreationally fish in **Coastal Fishing Waters**, which include sounds, coastal rivers and their tributaries, out to three miles in the ocean. Recreational fishermen who catch fish in the **Exclusive Economic Zone** (3 miles – 200 miles offshore) will be required to possess this license to land fish in state waters. Fishing in **Joint Waters** (areas managed by both the Marine Fisheries and the Wildlife Resources commissions) will also require the Saltwater Fishing License.*

Where can I purchase a license?
The license may be purchased or renewed at designated offices of the Division of Marine Fisheries (DMF); from the DMF by mail, electronic mail, the Internet, or telephone; or at locations designated by the North Carolina Saltwater Fishing Fund Board of Trustees.

How much will the license cost?
There are several different types of Saltwater Fishing License's available, each with different license durations and fees, see below:

*(1) **One-year license** - $15.00. This license is valid for a period of one year from the date of issuance.*

*(2) **Two-year license** - $30.00. This license is valid for a period of two years from the date of issuance.*

*(3) **Three-year license** - $45.00. This license is valid for a period of three years from the date of issuance.*

*(4) **Seven-day license** - $1.00. This license is valid for a period of seven consecutive days. An individual may purchase this license only once in any 12-month period.*

*~~(5) **Subsistence license.** - An applicant for a license under this subdivision shall provide to~~ the DMF a certification from the Department of Health and Human Services that the individual falls below the federal poverty level. A license issued under this subdivision shall be issued without charge and is valid for a period of one year from the date of issuance.*

*6) **Lifetime license** - This license is valid for the lifetime of the licensee. The fee for the Lifetime license, based on the age of the prospective licensee as of the date on which the application is filed with the DMF, is:*

a. Age 0 through Age 5 - $100
b. Age 6 through Age10 - $150
c. Age 11 through Age17 - $200
d. Age 18 and above - $500

I have a lifetime hunting and fishing license issued by the Wildlife Resources Commission; will this license cover me in coastal waters?
No, you will still need to purchase a Saltwater Fishing License.

Does everyone need a license or are there any exemptions?
There is only one exemption - an individual may engage in recreational fishing by means of recreational gear without having purchased a Saltwater Fishing License if the individual is 18 years of age or younger and is currently enrolled in school and is making progress toward obtaining a high school diploma or its equivalent.

Are licenses available for anglers who reside out of state?
Yes, they are available for everyone regardless of residency.

Are the license fees different for anglers who reside out of state?
No, they are the same.

Will I need a license to fish on a private or public pier?
Yes, in coastal waters no types of recreational fishing activities are exempt.

Will I need a license to fish on a charterboat or headboat?
Yes, in coastal waters no types of recreational fishing activities are exempt.

Will I need a license to fish from public or private shoreline?
Yes, in coastal waters no types of recreational fishing activities are exempt.

If I have a Saltwater Fishing License, can people fish on my private boat without purchasing a license?
No, they must all have a license if you are fishing in coastal waters.

Can I sell my catch if I have a Saltwater Fishing License?
No, seafood harvested under this license is for personal consumption and cannot be sold.

I have a standard commercial fishing license; do I still need a Saltwater Fishing License to go fishing for fun?
Yes.

Is the Saltwater Fishing License only required to fish with hook and line or do you need this license to use other recreational gears like gigs and castnets?
The license is required for ANY type of recreational fishing activity not included under the N.C. Recreational Commercial Gear License.

Which recreational gear use beside hook and line would require someone to purchase a Saltwater Fishing License?
Any type of recreational activity not included under the N.C. Recreational Commercial Gear License will require this license. This includes, but is not limited to spears, gigs, hook-and-line, bait-and-line, seines less than 30 feet, dip nets, landing nets, cast nets and recreational shellfish activities.

I have a Recreational Commercial Gear License (RCGL); do I still need a Saltwater Fishing License to go fishing for fun with a rod and reel?
Yes.

Do I need a Saltwater Fishing License and a RCGL to set my RCGL gear for recreational purposes?
No, only a RCGL is required to set RCGL gear.

Do I need a Saltwater Fishing License to catch shellfish recreationally?
Yes.

Which species of shellfish are included?
All types.

Do I need a Saltwater Fishing License to use a bait and line to catch crabs?
Yes.

How many crab pots can I set if I have a Saltwater Fishing License?
You may set one crab pot per Saltwater Fishing License holder. The pot has to be attached to the shore along privately owned land or to a privately owned pier and must have a buoy that is no less than five inches in diameter and no less than five inches in length. Engraved in the buoy or engraved in a metal or plastic tag attached to the buoy, must be the license holder's last name and initials and one of the following if vessel is used: owner's N.C. motor boat registration number (Wildlife Resources Commission number), or owner's U.S. vessel documentation name.

If I hold a Saltwater Fishing License can I keep all the fish and seafood I catch?
No, you will be held to the state's recreational size and possession limits.

Can I transfer my Saltwater Fishing License to a family member or other person if I'm not using it?
No, it is unlawful to buy, sell, lend, borrow, assign, or otherwise transfer a license to any other individual.

What kind of documentation do I need to prove I have a Saltwater Fishing License?
You must provide your name and residence address upon the request of a Marine Patrol officer or any other law enforcement officer authorized to enforce federal or state laws, regulations, or rules relating to marine fisheries. You do not have to have the license in your possession.

Are there any other Saltwater Fishing License requirements?
Yes, there are reporting requirements. A person licensed shall comply with the biological data sampling and survey programs of the DMF.

Where does all the Saltwater Fishing License money go?
A N.C. Saltwater Fishing Fund will be established as a nonreverting fund in the office of the state treasurer. License revenues and the proceeds of any gifts, grants, and contributions to the state specifically designated for inclusion in the N.C. Saltwater Fishing Fund shall be deposited in the fund. The state treasurer shall hold the fund separate and apart from all other moneys, funds, and accounts. The state treasurer shall invest the assets of the fund in accordance with the provisions of G.S. 147-69.2 and G.S. 147-69.3.

How will the Saltwater Fishing License money be spent?
The board of trustees may authorize the disbursement of 50 percent of the license revenues for the first ten years. After that, they may only spend the investment income that accrues from the fund.

The Fund may be used for:
a. Resource and habitat enhancement, including, but not limited to, creation of natural nursery areas, construction of artificial reefs, restoration and enhancement *of submerged aquatic vegetation, creation and restoration of oyster habitat, and acquisition of land or an interest in land that provides for the preservation of critical fisheries habitat.*

b. Grants to fund fisheries management research for specifically designated species.

c. Acquisition of land or an interest in land that provides for the enhancement of fishery habitat or public access to coastal fishing waters.

d. Purchase or construction of public beach access areas and public marinas. If the board of trustees purchases or constructs a public marina, it may establish a boat docking fee.

e. Emergency dredging for the restoration of access to public fishing areas.

f. Establishment of scholarships for individuals pursuing degrees in marine sciences.

g. Administrative and operating expenses of the board of trustees.

The board of trustees shall not authorize the disbursement of investment income that accrues to the fund for law enforcement purposes. The purpose of the fund is to enhance the fishery resources of the state for commercial and recreational fishing.

Who can apply for this money?
Any of the following are eligible to apply for monies from the fund:

(1) A state agency.
(2) A local government or other political subdivision of the state or a combination of such entities.
(3) A nonprofit corporation whose primary purpose is the conservation, preservation, or restoration of the marine resources of the state.

Who decides how the Saltwater Recreational Fund is used?
The North Carolina Saltwater Fishing Fund Board of Trustees.

How are the members of the North Carolina Saltwater Fishing Fund Board of Trustees appointed?
There will be 11 Members. The Marine Fisheries Director and Chairman of the Marine Fisheries Commission will be members along with three members appointed by the Governor, three members appointed by the Speaker of the House, and three members appointed by the Senate President ProTempore.

Will there be any additional modifications to the Saltwater Fishing License requirements prior to its implementation?
Possibly. Several members of the General Assembly expressed an interest in revisiting the license issue during the next legislative session.

Summary of Public Input/Interest in the North Carolina Saltwater Fishing License

Prepared by the N.C. Division of Marine Fisheries

During the last legislative session, consideration of the new Saltwater Fishing License received a great deal of media attention and fishermen began contacting the Division of Marine Fisheries to share their views and concerns about the potential new license. While the bill was being debated, the majority of the calls and inquiries centered on the issue of a blanket license for charter boats – many charter and headboat operators felt they needed to have a blanket license in order to effectively run their businesses.

Upon passage of the Saltwater Fishing License, the Division of Marine Fisheries developed a fact sheet containing the major points of the legislation and posted it on-line in response to the demand from the public for information about the new license. The fact sheet has been well received – to date the page has had 9,851 visitors.

Since passage of the new license, the vast majority of the calls and correspondence have focused on the question of an exemption for those individuals who have purchased a lifetime comprehensive fishing license issued by the N.C. Wildlife Resources Commission. These fishermen feel strongly that they bought a lifetime license with the understanding that their hunting and fishing requirements would be covered for the rest of their life. They now feel betrayed that the state is requiring them to buy another license to fish in coastal waters.

The next most frequently mentioned topic concerns license requirements for Joint Waters, which are waters managed by both the Marine Fisheries and the Wildlife Resources commissions. As the law is currently interpreted, fishermen will need to hold both a Freshwater License and the new Saltwater Fishing License to fish in Joint Waters. Fishermen feel this is an unfair burden and that either license should cover them in Joint Waters.

Other comments have been:

- The $500 Lifetime License is too expensive and should be the same cost as the WRC Lifetime Fishing License ($250).
- The $15 annual fee is too much.
- The $1 per week license is too little.
- The $1 license should be good for two weeks.
- Create a combined North Carolina Fishing License for both fresh and saltwater to simplify the licensing process.
- Tourism will be adversely impacted by the new license.
- A portion of revenues generated by the new license should be allocated for additional law enforcement.
- An exemption needs to be created for the disabled.
- There is no need for the license.

Updated 11/15/04

OCT 2 2 2004

[ ] ARD-MS/FA
[ ] Secretary - MS/FA
[ ] Chief - FA
[ ] AdminA - FA
[ ] GMA
[ ] Fiscal Control
[ ] Farm Bill
[ ] Staff
[ ] Staff

File Code:
Return To:

In Reply Refer To:
FWS/R4/MS-FA

Memorandum

To: Regional Solicitor, DOI, Atlanta, GA

From: Acting Regional Director, Southeast Region /s/ Cynthia K. Dohner

Subject: Request for Solicitor's opinion on North Carolina Saltwater Sport fish fishing license

The General Assembly of North Carolina in session 2003 passed legislation (Session Law 2004-187) establishing a Saltwater Fishing Fund to be supported, in part, by a fishing license for saltwater sport fish (Attachment 1). The license is effective January 1, 2006, and will be administered by the Division of Marine Fisheries. Prior to this legislation the State of North Carolina has not required a fishing license for saltwater sport fishing. Both the Sport Fish Restoration Act and our program regulations found in 50 CFR 80 establish criteria that must be met before a State is eligible to participate in the Sport Fish Restoration program. We have reviewed the legislation and have identified six issues on which we would like your opinion. Five issues pertain to the potential diversion of license revenues, and the sixth issue is related to assent legislation. For your reference, a copy of North Carolina General Statutes Chapter 113, Conservation and Development, is provided as Attachment 2.

A diversion of license revenue occurs when fees paid by hunters and fishermen are used for purposes other than the administration of the State fish and wildlife agency. The administrative function and legislative duties and powers of the Division of Marine Fisheries are identified and located in North Carolina General Statutes Chapter 113, Conservation and Development, Article 15, § 113-181 (Attachment 2). Federal regulations in 50 CFR 80.4 stipulate that "Revenues from license fees paid by hunters and fishermen shall not be diverted to purposes other than administration of the State fish and wildlife agency." Subsection (b) further states "... administration of the State fish and wildlife agency include only those functions required to manage the fish and wildlife-oriented resources of the State for which the agency has authority under State law." Regulations in 50 CFR 80.4 (c) states, "A diversion of license fee revenues occurs when any portion of license revenues is used for any purpose other than the administration of the State fish and wildlife agency."

The current legislation in § 113-175.2(a) establishes a Board of Trustees of the North Carolina Saltwater Fishing Fund. The Board of Trustees shall be independent, but for administrative purposes shall be located under the Department of Environment and Natural Resources. The Board of Trustees will serve to authorize approval and disbursement of investment income from

the Salt Water Fishing Fund for seven specific purposes identified in the legislation at § 113-175.3. Administrative and operating expenses paid to the Board of Trustees for per diem, expenses, travel, etc., will be from the Salt Water Fishing Fund and will not exceed two percent of the balance of the fund on July 1 or $1,250,000 whichever is greater. The following are our specific concerns requiring the Regional Solicitors review and opinion :

Is the operation of the Board of Trustees an authorized administrative function of the Department of Environment and Natural Resources based on legislation at § 113-181?

Are the costs paid to the Board of Trustees for expenses a diversion of license revenues?

Are the seven activities The Board of Trustees has authority to disburse investment income from the Salt Water Fishing Fund authorized pursuant to legislation at § 113-181?

Based on the Organization Chart Attachment 3 and individual assent legislation found in North Carolina General Statutes Chapter 113, Conservation and Development, § 113-181 Division Marine Fisheries and § 113-307.1 Wildlife Resources Commission, we would like an opinion if the Division of Marine Fisheries and Wildlife Resources Commission are separate agencies for the purposes of diversion determination.

If it is determined that the North Carolina Division of Marine Fisheries Commission has created a diversion of funds would this impact the freshwater fisheries program of the North Carolina Wildlife Resources Commission.

Pursuant to 50 CFR 80.3 a State may participate in the benefits of the Sportfish Restoration Act only after it has passed legislation which assents to the provisions of the Acts and has passed laws for the conservation of the fish and wildlife including a prohibition against the diversion of license fees paid by hunters and sport fishermen to purposes other than administration of the fish and wildlife agency. A review of the legislation found in North Carolina General Statutes Chapter 113, Conservation and Development, § 113-181 Division of Marine Fisheries and § 113-307.1 Wildlife Resources Commission confirms each agency has individual assent legislation. However, legislation found at § 113-181 does not include a prohibition against the diversion of license fees paid by sports fisherman. Until this time a license for saltwater sport fishing has not been required in North Carolina. Our specific concern requiring the Regional Solicitors review and opinion regarding assent legislation follows:

Does the Legislature need to enact separate assent legislation for the Saltwater Fishing Fund, or is the existing assent legislation at § 113-307.1 adequate?

If you should have any questions, please contact me at 404/679-4000 or Mr. Michael L. Piccirilli at 404/679-4154.

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Responses from charterboat owner/operators, pier owner/operators and headboat owner/operators regarding questions relating to blanket license.

Area	Would you favor a Blanket License?		If yes, would you favor a Blanket License if you required to keep list?	
PIERS	**Yes**	**No**	**Yes**	**No**
Northern	100%	0%	40%	60%
Central	67%	33%	67%	33%
Southern	60%	40%	50%	50%
Combined	**75%**	**25%**	**53%**	**47%**
Area	Would you favor a Blanket License?		If yes, would you favor a Blanket License if you required to keep list?	
HEADBOATS	**Yes**	**No**	**Yes**	**No**
Northern	100%	0%	100%	0%
Central	100%	0%	89%	11%
Southern	100%	0%	100%	0%
Combined	**100%**	**0%**	**95%**	**5%**
CHARTER & GUIDE	**Yes**	**No**	**Yes**	**No**
Northern	100%	0%	65%	35%
Central	100%	0%	100%	0%
Southern	100%	0%	100%	0%
Combined	**100%**	**0%**	**84%**	**16%**

Statement to the Joint Legislative Commission on Seafood and Aquaculture and the Environmental Review Commission on

Implementation of the Salt Water Fishing License (Article 14C, Chapter 113, NCGS) and Its Impact on the Wildlife Resources Commission by

Richard B. Hamilton, Executive Director, NCWRC
November 18, 2004

The concept of licensing fishers and hunters is well established and sound. License fees support regulatory, enforcement, research, management, and education programs of most state fish and wildlife agencies. License information provides a valuable database from which fish and wildlife managers can estimate important population and harvest information that is used to regulate and protect the resource. License fees and information from licensees have served the programs of the WRC well over the past sixty years. Licensing fishers in coastal waters is a sound and positive development that will yield important returns to our coastal resources and to the people who enjoy them.

WRC has many resources and capabilities that could enable a relatively smooth, efficient, and equitable transition and implementation of the new salt water fishing license requirement. Correct implementation of the salt water fishing license, building on the years of experience and capability of the WRC will save the State millions of dollars and considerable time in implementing this new license. The constituency of the WRC is expressing concern over the impact the new license may have upon them and their fishing activities. We have received hundreds of inquiries through our 1200 license agents, over our webpage, and directly by telephone and mail since the new license requirement was enacted this summer. These people are not against the license, but they have questions and concerns that must be addressed.

I will list the major concerns we have identified and the ones we are hearing over the probable impact the salt water fishing license will have on programs of the WRC and its licensed fishers. I will also give possible solutions to these problems to be considered as the Board of Trustees and General Assembly implements and improves the new license as provided by ratified HB 831.

- Protection of Sport Fish Restoration Funds – North Carolina receives over $5 million annually from Sport Fish Restoration Grants

administered through the USFWS. A condition of eligibility for a state to participate in this federal grant program is passage of "Assent Legislation" by the state stating that license fees will be used exclusively for administration of the fishery program and for no other purpose. Such legislation exists to protect inland fishing license revenues from diversion, but was not included in the salt water fishing license. Failure to pass this assurance jeopardizes the entire federal grant program for NC and would cause us to lose the entire $5 million every year.

- Uses of the Fund – Federal officials have reviewed ratified HB 831 and told us that they will consider NC to be in non-compliance with diversion of license fees under the new license unless some of the allowable uses are eliminated or changed. Specifically, the uses in question are dredging for boat access to fishing areas and scholarship awards. They also raised a question about the allowance of $1,250,000 per year for administration and operation of the Board of Trustees. These issues need to be addressed and agreement reached with USFWS to insure that Sport Fish Restoration Grants for NC are not lost.
- Unified Fishing License – The law directs the Board to consider the feasibility and benefits of developing a unified fishing license. WRC believes that a unified fishing license is the most equitable and practical approach to implementation of the salt water fishing license. A unified fishing license will eliminate the unnecessary burden placed upon fishers by requiring separate licenses depending upon the classification of water where they fish. The concept of a unified license can easily be implemented by creating a salt water fishing license ($15) that can be used in coastal and joint waters and by selling a privilege supplement ($5) for the regular inland fish license ($15) that will allow fishing in inland, joint, and coastal waters. Fees from the salt water license and from the supplement to the inland waters license would go to the new Salt Water Fishing Fund.
- License Structure – The license structure of the salt water fishing license should be simple for ready understanding by the public and for economy in implementation. There should be an annual license (12 months) for $15, a week license (7days) for $10, and a daily license for $5. Eliminate the two year and three year licenses because they are cumbersome and unnecessary. Inland fishing licenses should follow the same structure and fee. The structure outlined here is simple and functional and provides great flexibility to the fisher. All the fees, durations, exemptions, age limits and categories for fishing licenses should be consistent between salt water and inland water fishing licenses. For instance, the salt water

license gives an exemption for persons under 18 while the age exemption for the inland water license is 16. This is unnecessarily confusing. The categories and fees for lifetime licenses are different for salt water and inland water licenses. No reason for these differences is clear. The $1 license for 7 days should be eliminated because it costs more than $1 to issue and record a license and rules apportioning federal funds among the states do not allow counting licenses that generate no positive income for program support.

- The "subsistence fishing license" established by ratified HB 831 is a fine idea and should be applied to inland fishing as well. This change will eliminate the huge natural bait exemption in inland waters except for persons who are below the poverty level in income and who justifiably need exemption from license fees. The provision in the new salt water fishing license that protects license holders from release of private information collected when they buy a license is good and should be applied to all hunting and fishing licenses too.
- Lifetime Licenses – The greatest concern we have heard (and it has been loud and clear) is from our current lifetime license holders who insist that their lifetime license came with a promise from the State that this is the only hunting or fishing license that would ever be needed to hunt or fish in NC. We recommend that current lifetime license holders be grandfathered into the lifetime salt water license at no cost. After implementation of the unified fishing license concept, a lifetime salt water fishing license for adults could be sold ($250) with the revenue going to the salt water endowment fund. A lifetime inland fishing license for adults would be sold ($250) with an optional salt water rider for $50 which would allow fishing in salt water. The $50 fee would be deposited into the salt water endowment fund. An infant and youth lifetime salt water fishing license could also be sold at reduced prices, but the adult license should be sold for the same fee as the lifetime inland water fishing license ($250) and the age categories for both types of licenses should be the same.
- Sale of Licenses – The current law provides for sale of salt water fishing licenses through outlets authorized by the Board of Trustees. The most efficient and cost effective way to sell these new licenses is through the WRC system. This system already exists, it is known to fishers, and it is efficient and robust. We can add the new salt water fishing license in its simplified and unified form, sell 1 million of them every year, keep the records that will be accessible to DMF for research and management purposes, and transfer the revenue to the salt water fishing fund every week within a reasonable cost

and timeframe. We figure it will cost about $500,000 to add 100 agents in coastal areas, to acquire additional computer and server capacity for 1 million licenses, and to write programs for reports and updates to DMF. We can do this work in house within six months. The law should be changed to direct that sales be handled through the existing WRC system of agents and other sales media. The law should also be changed to eliminate sales by e-mail because this method is not secure and is not an acceptable business practice. All other sales media are feasible and WRC is already selling licenses in these ways.

- Effective Date – The effective date for implementation of the new salt water fishing license should be changed to July 1, 2006 to allow adequate time to establish a unified fishing license, to establish the system for distribution and accounting, and to allow time for public awareness and understanding. This day is also the beginning of a new fiscal year which has some budget and administrative advantages.

These are fairly general observations and recommendations. We are available to work on these proposals to improve the salt water fishing license and to help with implementation as may be required to make this license meaningful and successful.

We will be conducting public hearings in January to present proposed changes to the hunting and inland fishing regulations for next year. We expect thousands of sportsmen and sportswomen to attend these hearings. Many of them will have questions and comments about the salt water fishing license. If you think it would be a good idea, we could focus on this issue and report back on the nature of comments we receive. We invite any Members who might be able to attend a hearing near you to join us to get input from our public. If Preston Pate or any legislative staff would like to attend these hearings to hear comments about the salt water fishing license, they are welcome.

Thank you for this opportunity to share some of our observations with you.

Comments on Saltwater Fishing License Presented to Joint Meeting of ERC and JLCSA

Daniel Whittle
On behalf of Environmental Defense and CCA North Carolina

November 18, 2004

- Thank you. I am speaking today on behalf of my organization, Environmental Defense and its more than 10,000 members in North Carolina, and on behalf of the NC Chapter of the Coastal Conservation Association (CCA), and its 5,000 members. Our two organizations have worked together for several years to support a saltwater fishing license for NC and wish to thank all of you for passing this important legislation.

- Most recently our two groups have worked with the NC Division of Marine Fisheries in identifying important next steps.

- The Saltwater Fishing Fund and License completes work began in 1997, when the General Assembly adopted the Fisheries Reform Act to prevent overfishing and to protect fish habitat.

- The license will provide resource managers with the data they need to manage fish stocks responsibly and sustainably. The Fund will provide millions of dollars to protect fish habitat, restore fish stocks, and fund research. This Act follows on the precedent established by the successful freshwater fishing license administered by the NC Wildlife Resources Commission. Time and time again, fishermen express support for license programs where revenues generated go directly back to the resource.

- NC also joins states from coastal states from Maryland to Texas, all of which have successful saltwater fishing license programs.

- Now the hard work begins. Getting the license program up and running will take time and money and your continued support. As Preston Pate indicated, it may also require a handful of technical amendments to the legislation to ensure that the program is efficient, cost-effective and fair.

- **Environmental Defense and CCA offer the following principles and recommendations for moving forward:**

Principles

- **Principle #1—Everyone who fishes should be counted.** This is the only way to ensure that data accurately captures fishing effort. In the few exceptions where some persons are exempt from obtaining a license (e.g., juveniles), alternative mechanisms should be used to estimate the number of those anglers.

- **Principle #2—The Division of Marine Fisheries should have adequate funding to administer and enforce the license program.**

- **Principle #3—Conservation funds should be dedicated to restoring and protect fish stocks and their habitats.**

Recommendations

- **Recommendation #1**—As soon as possible, the Governor, the Speaker of the House and the President Pro Tem of the Senate should make their appointments to the Board of Trustees (BOT). Among other things, the BOT is responsible for developing a license implementation plan and assessing the feasibility of developing a unified recreational fishing license for fresh and saltwater fishing. The initial report of the BOT is due to the JLCSA on April 15, 2005.

- **Recommendation #2**—Depending on the findings of the BOT study, we would support the development of a unified license provided that data could be generated that accurately identifies those anglers that fish in saltwater. We will work closely with DMF and WRC on this issue.

- **Recommendation #3**—At this time, we do not support the use of blanket licenses for charter boats, head boats or piers. We are sympathetic to the concerns raised by these groups and support continued study of this issue to determine whether their needs can be addressed in a manner that ensures that every angler is counted. If blanket licenses are approved, sufficient fees should be applied to ensure that the Saltwater Fishing Fund does not experience a loss in revenues.

- **Recommendation #4**—North Carolina receives around $5 million dollars per year from the federal funds generated pursuant to the Sportfish Restoration Act. The General Assembly should ensure that license revenues are used in a manner that does not jeopardize the state's continued ability to receive those funds.

- **Recommendation #5**—Good enforcement is a critical component of effective fisheries management. We recommend that the law be amended to allow that some portion of license revenues can be used for law enforcement. In the meantime, we support full funding of the Division's expansion budget request for more marine patrol officers.

- **Recommendation #6**—In order to ensure that the license program is efficient, effective and customer-friendly, the Division needs adequate funding to develop and operate it. We support full funding for the program.

- **Recommendation #7**—The law provides for a seven day license for $1. This fee will not even cover the cost to process the license application. We support the Division's recommendation that this short-term license be extended to 10 days and that the fee be set at $5. There need not be a limit on how many can be bought in one year.

- **Recommendation #8**—The fee for an annual license is $15, regardless of whether you are a NC resident or from out of state. Most other states charges non-residents a higher fee (often $5 to $25 more). We recommend that the law be amended to impose a higher fee on non-residents. (SC charges residents $10 and non-residents $35 for an annual license. Every other state from Maryland to Texas, except Virginia, charges a higher fee for non-residents.)

- **Recommendation #9**—We support the Division's recommendation that data on recreational licensee be made available to the public.

- **Recommendation #10**—We support extending the effective date of the license requirements in order to provide a reasonable amount of time to get the program up and running. We agree with the Division that a realistic effective date is January 2, 2007.

Marine Fish Com
Mac Currin

JLCSA meeting November 18, 2004

Thanks to Chairs and members of the Commission

SW License-

MFC has twice endorsed ~~the~~ a Saltwater license, based on the recommendations of the MSC - urge you to compare the '04 version from legislature to the earlier models and ~~modify to reflect the~~ consider MSC recommendations.

After legislature passes and modifies the license- unless you fish in saltwater, you are through with the license. Imperative that you remember who is left to use, implement and enforce those provisions- anglers, the DMF and the MFC to some degree. Modifications must have provisions to fund DMF for implementing, administering and enforcing the program and providing services for the anglers- these are not small nor unimportant tasks. Remember that there are an estimated 2 million anglers.

- blanket licenses for piers and charter boats w/ requirements for logs to submit names of anglers to DMF- For Hire ~~survey~~ permit already in place for charter boats and piers are probably simplest fishery to sample efficiently + effectively. ID charter operations

- paperless licence is a great idea, but we must have some way to enforce compliance. Simply asking an angler to give his name and address will not suffice. Verification is dependent on instant (Satellite??) communication available to Marine Patrol- already carry guns, radios, and more.- more training and less time on the water. All anglers and hunters EVERYWHERE are used to and comfortable with carrying a license- or at least being able to prove they had one at a future time. WRC enforcement deals with this every day.

- BUT- the DMF needs money for enforcement- $$ for enforcement was recommended by the MSC and is necessary to have an effective license and insure compliance with regulations.

- MFC has not discussed, but **MY OPINION** that A $1.00 license is not a reasonable way to provide one-time users with a break. Substantial costs in administration AND tracking to prevent abuse (HOW IS THE ISSUER GOING TO KNOW THAT THE PERSON HAS PURCHASED ONE BEFORE?). $5.00 - $7.00 for a one week license is very reasonable and then no-one has to worry about whether a person has purchased a license previously.

* - effects on W-B funds - input to DMF & WRC

* - meetings - don't neglect us W of 95 lots of fun do here

suggest SW lic w/ $5.00 freshwater rider

Coastal Recreational Fishing License Survey

Final Report

William Clifford and Tom Hoban
North Carolina State University

John Whitehead
East Carolina University

Ron McPherson
Winston-Salem Saltwater Sport Fishing Club

with the assistance of

Jack Thigpen , UNC Sea Grant

Vernon Kelly, Coastal Carolina Community College

SALTWATER FISHING LICENSE

CHANGES NEEDED:

- Paperless license is not workable – need paper license
- Need money for Enforcement
- Need appropriately qualified people to serve as Fund Board members (ex. primarily recreational fishermen including a marine scientist, an environmentalist, a biologist, an educator, etc.)
- Increase $1.00 weekly license to $5.00 – at $1.00 no one will want to sell them
- Need a Blanket license for Charter Boats
- Grandfather the Wildlife Lifetime License to include saltwater fishing

Further input or clarification: Ron McPherson – 252-726-2762

The research on which this report is based was financed by the UNC Sea Grant Program. Contents of the publication do not necessarily reflect the views and policies of the UNC Sea Grant Program and the mention of any trade names or commercial products does not constitute their endorsement by the North Carolina Government.

August, 1999

Executive Summary

The purpose of this study is to better understand the knowledge and attitudes of coastal recreational anglers relative to a range of issues affecting North Carolina fishery resources. Information was collected through a scientific survey of a random sample from each of the following groups:

- 100 saltwater sportfishing club members (interviewed by telephone);
- 200 commercial license holders who did not have endorsements to sell (interviewed by telephone); and
- 300 point-of-contact interviews with anglers along the coast (in-person).

Particular attention is paid to the evaluation of alternative management strategies, including a coastal recreational saltwater fishing license. The results will be used to develop strategic policy recommendations and practical action that can be taken to better protect the saltwater fisheries resources of the state. A determination is also being made of public support for and willingness to pay for the license.

All respondents had fished in saltwater during the previous 12 months in North Carolina or off its coast. The average number of days spent fishing in saltwater was 30. The average number of years respondents have been fishing along the coast was 27. The majority of respondents regularly read fishing or boating magazines, but only a small percentage belonged to conservation organizations. Fishing club members were more active in both of these activities than either license holders or point-of-contact anglers. Most respondents already had freshwater fishing licenses. The fishing gear used most often were rods and reels. Other results show that: the average number of trips was t

26 per year; the average catch is 10 fish; the average distance traveled to fish is about 99 miles; and average costs per trip is $229.00. These vary for each group.

Respondents from all groups expressed general satisfaction with saltwater fishing in North Carolina. However, over half of all respondents rated saltwater fishing along the coast as fair or poor. When asked to compare fishing today with five years ago, nearly half rated it as worse; and about a third rated it about the same. Few rated fishing today as better than in the past. Of those who thought fishing was worse, the reasons mentioned most often included: over-fishing by commercial fishermen, pollution of estuaries, and excessive netting.

There is clear support for a wide variety of alternatives for managing the saltwater recreational fishery in North Carolina's coastal area. A majority of individuals from the overall sample supported each of the following:

- more research (86%);
- increased monitoring of fishery conditions (85%);
- limits on minimum size of fish (84%);
- stronger laws to prevent loss of wetlands (83%);
- educational programs (79%);
- limits on number of fish (78%);
- public money to purchase land for buffer strips (73%);
- mandatory certification in catch and release techniques (65%);
- specific allocations and closure when quotas are met (62%);
- limits on times of the year (55%);
- limits on areas (51%);
- a saltwater fishing license (50%).

There is less support for the saltwater fishing license among license holders license holders (44%) and point-of-contact anglers (42%) than among club members (80%). However, support increased significantly among all groups when respondents were told about the conditions under which the money from the license would be used. Respondents were asked later in the interview if they would purchase the Coastal Recreational Fishing License (CRFL) at *"a cost of $15.00 if the money raised would go into a dedicated fund to improve coastal recreational fishing through habitat restoration, better enforcement, expanded research, and education. The license would also help the NC Division of Marine Fisheries get an accurate count of the number of recreational anglers."* Overall, **78 percent** of all respondents would purchase the annual CRFL under these conditions. In fact, when told that additional funding might be needed to fund improved fisheries management, 46 percent said they would be willing to pay more than $15.00 for the license. In addition, over a third (37%) of those who would not purchase the annual CRFL would purchase a one-week CRFL. Overall, **84 percent** would purchase an annual or one-week license.

The annual revenue generated from the CRFL fees will be about $11 million. A more rigorous analysis of the economic benefits of improved fishing was conducted using willingness to pay data. The maximum willingness to pay for the license is an estimate of the value of the increase in the quantity and quality of trips. Results indicate that the club sample would be willing to pay almost $100 more for the annual CRFL, license holders would pay $70 and point-of-contact anglers $47. A conservative estimate of the annual benefit from the CRFL derived from the willingness to pay analysis is that anglers wold be willing to pay $23 million for improved fishing.

In summary, there is clear support for the proposed CRFL, if the money raised is used as proposed by the Moratorium Steering Committee.

ACKNOWLEDGMENTS

We would like to thank a number of people for their assistance and valuable insight. The authors gratefully acknowledge help received from:

- David Griffith (East Carolina University)
- Larry Coble (Winston-Salem Saltwater Sport Fishing Club)
- Solo Diaby and Mike Street (Division of Marine Fisheries)
- Mike Orbach (Duke Marine Lab)
- Yevonne Brannon, Rick Shields, Art Anthony, Stephen Blackwelder, and Connelly Simmons (Center for Urban Affairs and Community Services, NCSU)
- All the anglers who participated in the study

IV. SUMMARY AND CONCLUSIONS

Most of the respondents are avid anglers. All reported fishing in the last 12 months, with fishing club members fishing 34 days on average, license holders 26 days and point-of-contact anglers, 30 day. The average number of years respondents have fished is 27. More time is spent fishing from a boat followed by the beach and piers.

While the respondents are avid anglers, most do not belong to either conservation organizations or fishing clubs. However, the majority do regularly read fishing or boating magazines and have freshwater fishing licenses. Very few have a commercial fishing license. The fishing gear used most often is rods and reels.

The majority of respondents rated fishing today in North Carolina coastal waters as fair or poor. This was the case for all sample subgroups. When asked to compare fishing with five years ago, over half reported that fishing is worse. Most of the blame is placed on over-fishing by commercial license holders, followed by pollution of estuarine waters.

Most anglers generally support a number of different alternatives for managing the saltwater recreational fishery in North Carolina including more research, increased monitoring of fishery conditions, limits on size and number of fish caught, stronger laws to protect wetlands, educational programs and a saltwater recreational fishing license. While a majority supported a license, it ranked lowest in priority. When respondents understand that money generated for a license will be used for fisheries management, the percentage supporting a license increases significantly. Also, club members were most supportive and point-of-contact anglers least supportive of these alternatives.

The number of fishing trips taken in the past twelve months is 26, with fishing club members taking 31 and the other two groups taking 25. In all cases, most trips are one-day trips. Most fish for "anything that is biting" but fishing club members and

license holders are much more likely than point-of-contact anglers to target specific species, such as king mackerel, spot and flounder. The typical catch is 10 fish per trip.

The average number of miles traveled in a typical fishing trip is 99 miles one-way. The average total cost per trip is $229.00. Fishing club member spend more, on average, than the other two groups, due mostly to higher lodging and fuel costs.

People were told that the CRFL would be required for anyone who fishes in North Carolina coastal waters and that all the money raised who go in to a dedicated fund for habitat restoration, better enforcement, expanded research, and education. Respondents were also told that the license would help the Division of Marine Fisheries get an accurate count of the number of recreational anglers. Under these circumstances, 78 percent of the respondents would purchase the annual CRFL. Of those who would not purchase an annual license, thirty-seven percent would purchase the one-week license. Overall, 84 percent of the anglers interviewed would purchase a CRFL. Club members and point-of-contact anglers were most likely to purchase either an annual or one-week license. Clear support for the CFRL. This is true even for comparisons by region, number of times fish, and shore versus boat fishing. Of the very few not willing to buy purchase a license, the reason given for not purchasing is that the respondents do not support it or feel it is unfair.

Additional support is found when respondents are asked if they would be willing to pay more money to fund improved fisheries management. Overall, 46 percent of those willing to purchase a license, would be willing to pay a higher fee. Fishing club members are the most willing to pay higher fees. The maximum willingness to pay estimates are $90, $70, and $47 for the fishing club, license holders, and point-of-contact samples.

The annual revenue generated by the CRFL from North Carolina and out-of-state anglers would be about $11 million. The total benefits of the CRFL are $23.6 million derived from estimates of the number anglers and the willingness to pay estimate from point-of-contact anglers. The total costs of the North Carolina CRFL, the sum of lost economic benefits from those who cease to fish and from administrative costs, would be $2.65 million. An estimate of the annual benefit (net benefit=benefits - costs) of the CRFL to North Carolina is $21.05 million ($23.6 million minus $2.65 million).

Most respondents agreed:

- that the license is a good idea if used for the estuaries;
- that the money raised would help the fisheries;
- that recreational anglers need to pay to manage the fishery;
- that the license would provide managers with better information;
- that it is important to keep track of the number people fishing; and
- that the saltwater license should help just as the freshwater license has helped.

However, most disagreed that government listens to the concerns of recreational anglers.

When asked to divide each dollar raised by a license for resource enhancement, law enforcement, research, and public information, the respondents distributed the money in almost the exact proportions as recommended by the Moratorium Steering Committee. The respondents would allocate 31 cents for resource enhancement, 22 cents for law enforcement, 26 cents for research and 21 cents for education. Generally, a similar pattern prevails for each sub-group.

Respondents were asked a number of questions concerning their attitudes and behavior related to fisheries management. The majority of respondents feel that the government is doing too little to manage the fisheries in North Carolina. Fishing club

members are most likely to feel this way. Interestingly, the majority of respondents have never attended a public hearing or contacted a government agency to voice concerns about fishing. However, nearly 70 percent of club members have done so. Most have never contributed money to a fishing cause. Among fishing club members, 86 percent have contributed money. Most respondents have some or a little trust or confidence that the government will effectively protect North Carolina's fishery. Not many have a lot of trust. This pattern is similar for each group.

There appears to be clear support for the CRFL when anglers understand that the money generated from the license will be used to manage the fishery. Furthermore, there appears to be positive attitudes about the impact of a license. There is strong sentiment that the license would help the fisheries in North Carolina, that recreational anglers need to pay to help manage the fishery and would provide better information for fisheries management. In addition to supporting a recreational license, anglers are supportive of other management alternatives as well, including research, monitoring fishery conditions, limits on size and number, mandatory certification in catch and release techniques, educational programs, stronger wetland laws and so on. A much greater commitment to education will be needed to build and maintain support for fisheries management programs.

GENERAL ASSEMBLY OF NORTH CAROLINA

JOINT LEGISLATIVE COMMISSION ON SEAFOOD AND AQUACULTURE
AND
ENVIRONMENTAL REVIEW COMMISSION MEETING

Public Comment on Saltwater Fishing License (S.L. 2004-187)

	Name	County of residence	Organization or interest represented
1	Richard Guiney	Mecklenburg	Sportfishing
2	Larry Coble	Brunswick	My Way Charters
3	Britton Shackleford	Dare County	Doghouse Sportfishing
4	Ernie Foster	Dare	Albatross Fleet
5	Rom Whitaker	Dare	Release Charters
6	Tom Harper	Dare	Folly Sportfishing
7			
8			

Tom Vass of Wake County signed up to speak, but was unable to stay for the entire discussion on the Saltwater License.

My Way Charters

Out of Southport, NC

Full Electronics
Rod, Reel & Bait Supplied
Trolling or Bottom
Parties of 6 or Less
Affordable Rates

Capt. Larry Coble
USCG Licensed
700 E. Leonard St.
Southport, NC 28461
(910) 619-1274

November 18,2004

Comment on HB 831
An Act to Establish the North Carolina
Recreational Saltwater Fishing Fund and License
To the Seafood and Aquaculture Committee of the Legislature

Honorable Chairman and Honorable Members of the Committee, my name is Larry Coble. I would like to thank you for being allowed to speak to you today on this very important issue. I own and operate a charter boat in Southport, NC. I have long been in favor of a Recreational Saltwater Fishing License (RSFL) and was a participant in the meetings of the Moratorium Steering Committee meeting chaired by Bob Lucas. I was president of the Winston-Salem Saltwater Sport Fishing Club in 1998 and 1999. During this time the Club obtained funding from Sea Grant and conducted the North Carolina Coastal Recreational Fishing License Survey of 1998 (Survey of 1998). This survey showed that 84% of the individuals surveyed were in support of a RSFL with certain conditions.

While I feel that HB 831 is a great step in the right direction. I feel that in order for a RSFL to be successful there are several additional items required. The years of work by the Moratorium Steering Committee and results of the Survey of 1998 should not be ignored.

During this past year approximately 70% of the people fishing on my boat were from out of state. These included people from all walks of life, from Governor Easley's brother and nephew, to man and wife truck driving teams from Idaho hauling munitions to Sunny Point Ordnance Depot for shipment to Iraq. The latter got into town a day early and wanted to go fishing because they couldn't unload the munitions over the weekend. Based on my experiences, I have four (4) issues that I would like for you to consider in refining the intent of HB 831.

Issue I: One of the conclusions of the Moratorium Steering Committee and the Survey of 1998 was that blanket licenses should be issued to charter boats. I feel that it would be an extreme burden on me as a small business owner and operator to have to advise my customers that in order to fish on my boat they had to obtain a RSFL. A majority of my customers arrive in town late on Friday evening and the boat leaves the dock at 6:30 am the next morning. If any of you have ever been to Southport you would find it very difficult to find many places open during those hours. It would appear to be better for all concerned to just allow the boats to be licensed rather than the individuals. Marine Fisheries already has in place the mechanism to license charter boats. We currently are required to be licensed, but there is no fee charged. All that is required is for Marine Fisheries to charge a reasonable license fee. If needed, I don't think it would be too much of a burden to report to the Marine Fisheries, on some periodic basis, the number of individual going fishing on my boat. It is my opinion that this blanket license should be issued only to bona fide charter boats and not made available to the recreational boaters.

I also, feel that it will be very difficult to obtain local agents to bother with issuing a RSFL for only $1.00. It just won't be profitable or worth the time for many merchants to bother with all the record keeping that I am sure the State will require. This will make it that much more difficult for individuals to obtain a RSFL on short notice.

Issue II: Under Statute 113-174.2, I am confused concerning whether as a licensed commercial fisherman, I would be required to obtain a RSFL in order to continue fishing. The commercial fishing that is done on my boat is with rods & reels, the same as is used for recreational fishing. Some clarification appears to be needed. It is my opinion that if a person is holding a commercial license, they should not be required to obtain a RSFL, also.

Issue III: Section 12. (c) of HB 831 speaks of the Board of Trustees studying the issues related to the establishment of a unified recreational fishing license for both inland and coastal fishing waters. This issue was extensively debated in the Moratorium Steering Committee public meetings and it was strongly supported that individuals who currently hold a lifetime North Carolina Sportsman or lifetime fishing license issued by the Wildlife Resources Commission (WRC) be grandfathered into the RSFL program. I also, recommend that immediate discussion be started with WRC to develop a unified recreational fishing license.

Issue IV: Statute 113-175.2 (b) Establishes qualifications for the Board of Trustees. As a long time interested party in RSFL issue, it is felt that the qualifications of the Board members should be more defined than just having a RSFL. I agree that they should have one, but they should have other qualifications as well and these should be defined in the Statute. It is suggested that qualifications of the nine (9) Board Members be modified to include the following:

1. One at large and residing west of Hwy I-77.
2. One at large and residing between Hwy I-77 and Hwy I-95.
3. One at large and residing east of Hwy I-95.
4. One with an environmental science background.
5. One with a marine science background.
6. One charter boat owner/operator.
7. One pier owner/operator.
8. One a member in good standing of a surf fishing club.
9. One a member in good standing of a saltwater sport fishing club.

Again I would like to thank you for being allowed to make comments on these issues and hope you will consider them in your deliberations and if I can be of further assistance on this or other issue, please do not hesitate to contact me.

August 7, 1996

Mr. Maury Wolff
Marine Sport Fish Restoration Program Coordinator
Division of Marine Fisheries
P. O. Box 769
Morehead City, NC 28557

Dear Maury:

I have reviewed the Report of the License Subcommittee to the Moratorium Steering Committee. I have discussed several points with the Department of the Interior Solicitor (who is familiar with the Federal Aid program and the "diversion" concerns). The following comments are provided for your consideration as you work with the Legislators in the development of a marine recreational fishing license.

Draft Report, page 3, paragraph 3.c.

The statement "advice and consent of a Marine and Estuarine Resources Enhancement Trust Fund Board of Trustees" has potential to become an issue under the Federal Aid Rules and Regulation, section 80.4 Diversion of License Fees. What I mean is that it depends on the function of the Board of Trustees. If the Board only provides advice and consent on the budget, projects, activities, and etc. that the Secretary (Division of Marine Fisheries) presents to the Board then this activity by the Board would probably not be considered diversion. However, if the Board provides specific directions and priorities, specific projects and activities for the Secretary, then this type of activity by the Board may be considered a diversion of the license fees.

Draft Report, page 33 & 34, paragraph C.

The issue of what type and/or activities that would be included in a recreational "fishing" license is the State's decision. Also the deposit of these license fees and/or other license fees into a "Trust" fund would not create a diversion of license fees. Once the license fees were collected and deposited, the expenditure of the funds in the "Trust" funds governs the issue of a diversion. Under Section 80.4 (c) and (b), the regulation states:

> (c) A diversion of license fee revenues occurs when any portion of license revenue is used for any purpose other than the administration of the State fish and wildlife agency.

(b) For the purposes of this rule, administration of the State fish and wildlife agency includes only those functions required to manage the fish and wildlife-oriented resources of the State for which the agency has authority under State law.

Therefore, as long as the collected fees were used by the Division to manage the marine fishery resources of the State of North Carolina, the diversion of license fees would not appear to be an issue.

Draft Report, page 7, paragraph 9

Under paragraph 9, there are several types of licenses being considered. It should be pointed out that issuance of a new Coastal Recreational Fishing License will not necessarily mean that North Carolina will be able to count the total number the freshwater and saltwater license sold as the certified fishing license holders. Since an individual could hold more than one license to fish the State of North Carolina and the regulation require that individuals be counted once as a license holder, the State would need to eliminate duplication or multiple count of individuals with more than one required license. Some of the special licenses would require a review to insure that they provide a net return commensurate with the period for the fishing privileges are granted.

If I can be of additional help, please give me a call at (404) 679-4159.

Sincerely yours,

Cleophas R. Cooke, Jr.
Assistant Regional Director
Federal Aid

bmd:08/07/96
\cooker\nc-law.wpd

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

IN REPLY REFER TO:

Ms. Sandy Semans
Communications Director
North Carolina Fisheries Association, Inc.
P. O. Box 12303
New Bern, NC 28561

Dear Ms. Semans:

The following information is in response to the questions in your letter of August 15, 1996.

1. If recreational fishermen buy the proposed saltwater fishing license and they already hold a Wildlife Resource Commission license, which agency can count them toward the number of resident fishermen needed for Wallop-Breaux funding?

> In the Federal Aid Rules & Regulations section 80.10(c)(5) the paragraph states that some States may require an individual to hold more than one license to fish in the State and that such individual shall not be counted more that once as a fishing license holder. The State certifying officer is responsible for eliminating duplication or multiple counting of single individuals.
>
> The certification of license holders for the State of North Carolina is done for the entire State not by individual agencies within a State. Currently, the Director for the Wildlife Resource Commission is the certifying officer for the State of North Carolina.

2. What happens to WB funding if the number of actual fishing licenses sold are less than current estimates of fishermen used on which to base funding? Will that reduce funding?

> Funding level for any State is set by the distribution ratio that is spelled out in the Federal Aid in Sport Fish Restoration Act.
>
> > "The Secretary of the Interior shall apportion the annual appropriation among the States in the following manner: 40 per centum in the ratio which the area of each State including coastal and Great Lakes waters bears to the total area of all the States, and 60 per centum in the ratio which the number of persons holding paid licenses to fish for sport or recreation in the State bears to the number of such persons in all the States. Such apportionments shall be adjusted equitably so that no State shall receive less than one per centum nor more than five per centum of the total amount

apportioned."

3. Do "special licenses" sold for reduced rates or given away have to show a net profit or are all recreational licenses grouped together to determine "profit" status.

In the Federal Aid Rules & Regulations section 80.10(c)(2) the paragraph states that licenses which do not return net revenue to the State shall not be included. Free or give away licenses could not be counted in the certification of license holders. Licenses valid for more than one year can be counted if the license fee provides net revenue commensurate with the period for which fishing privileges are granted and a technique is used to determine whether the licensee remains a license holder in the year of certification.

4. If a fisherman buys both a commercial fishing license and a recreational license, can they still be counted for funding?

Yes, but the information in question 1, 3, and 5 applies to the holders of recreational fishing licenses.

5. How would one determine the numbers of resident saltwater fishermen under proposed "blanket" licenses to be issued to charter boats and piers in lieu of their patrons holding individual licenses?

Only individual license holders can be counted in the certification of license holders for the purpose of determine in apportionment for a State.

6. Does the enhancement of the resource, such as creating artificial habitat projects qualify as administration of the agency?

In the Federal Aid Rules & Regulations section 80.4(b) the paragraph states for the purposes of this rule, administration of the State fish and wildlife agency include only those functions required to manage the fish and wildlife-oriented resources of the State for which the agency has authority under State law. If the agency has the authority under State law to create "artificial" habitats for enhancement of resource, then this activity would be a function to manage fish and wildlife resources of the State.

7. Am I correct in understanding that "diversion of license fee revenues" under the Federal Aid Rules & Regulations, section 80.4(c and b) Diversion of License Fees, refers to expenditures of a particular fund as a whole rather than "mixing" of monies from other sources? In other words, if

commercial license revenues and recreational licenses revenues are deposited in the same account, is that acceptable as long as ALL the monies are spend for fish and wildlife administration?

The "diversion of license fee revenues" applies only to the fees imposed by the State to hunt or fish for sport or recreation and these fees can not be diverted for any purpose other than the administration of the State fish and wildlife agency.

In answering the second part of the question, if the monies in an account can maintain its original identity as to the source of the revenue then the protection from "diversion of license fee revenues" would only apply to the fees imposed by the State to fish for sport or recreation. However, if monies from several revenue sources are commingled in one account and its identity is loss then the total fund would be protected by the diversion rule.

8. Am I correct in understanding that if the revenues are placed under the direct control of a board which would decide how and where the monies are spent that this could be considered diversion of funds?

The simple answer to the question is probably **YES.** But as I stated in the letter to Mr. Wolff, the question of diversion would depend on what is the function of the Board and what role it would have in providing direction and priority of the administration of the State fish and wildlife agency.

9. How much does the NC Division of Marine Fisheries currently receive in WB funding?

The State of North Carolina received in the Federal Fiscal Year 1996 (Oct. 1, 1995 to Sept. 30, 1996) a total of $3,026,314. Within the State the funds are divided between freshwater (74%) $2,239,472 and saltwater (26%) $786,842.

10. What is the current estimate of saltwater recreational fishermen on which current funding is based?

The State of North Carolina uses the 1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation survey conduct by the U.S. Fish and Wildlife Service and the Bureau of the Census to determine the allocation of funds to freshwater and saltwater activities. According to the attached table 989,000 fishermen (74%) fished in freshwater and 347,000 fishermen (26%) fished in saltwater.

11. If recreational saltwater licenses include gear and methods different from hook and line, do resource users who hold the license but don't use hook and line have to be eliminated from the numbers used for funding?

> Under the Federal Aid Rules & Regulations, we find in section 80.4 (a) the following " licenses issued by the State conveying to a person the privilege to pursue or take wildlife or fish." In section 80.4 (a)(1) we find "recreation fees or other charges imposed by the State to hunt or fish for sport or recreation." In section 80.10 (c)(1) we find "Trapping licenses, commercial licenses and other licenses which are not for the express purpose of permitting the holder to hunt or fish for sport or recreational shall not be included." Thus, if the State of North Carolina requires a saltwater recreational fishing license that conveys to the individual the privilege to pursue or take fish for sport or recreation, then that individual license holder could be certified within the limitation described in questions 1, 3, and 5.

Under the diversion rule, one must keep in mind that it is the State of North Carolina that goes into diversion not individual agencies within a State. So if there was a problem in one of the State fish and wildlife agencies that creates a state of diversion, the State of North Carolina would be declared in diversion and all Federal Aid funds would be withdrawn. ★★★

We have enclosed for your information a copy of the Federal Aid in Sport Fish Restoration Act and the Federal Aid Rules and Regulations. If you have any question, please contact me at 404/679-4159.

Sincerely yours,

Cleophas R. Cooke, Jr.
Assistant Regional Director
Federal Aid

Normalized Percentages of Resident Recreational Anglers who Fished in their State of Residence in 1991

(Population 6 years old and older. Numbers in thousands)

COASTAL STATE	SUM - BOTH CATEGORIES	PERCENT	FRESHWATER ANGLERS	NORMALIZED PERCENT	SALTWATER ANGLERS	NORMALIZED PERCENT
Alabama	874	100	772	88	102	12
Alaska	238	100	140	59	98	41
California	3,719	100	2,520	68	1,199	32
Connecticut	413	100	279	68	134	32
Delaware	95	100	47	49	48	51
Florida	2,754	100	1,243	45	1,511	55
Georgia	1,133	100	1,083	96	50	4
Hawaii	191	100	37	19	154	81
Louisiana	1,040	100	815	78	225	22
Maine	345	100	269	78	76	22
Maryland	660	100	362	55	298	45
Massachusetts	718	100	402	56	316	44
Mississippi	644	100	545	85	99	15
New Hampshire	224	100	175	78	50	22
New Jersey	982	100	428	44	554	56
New York	1,905	100	1,418	74	487	26
North Carolina	1,337	100	989	74	347	26
Oregon	689	100	543	79	146	21
Rhode Island	124	100	63	51	61	49
South Carolina	768	100	640	83	128	17
Texas	3,234	100	2,390	74	844	26
Virginia	1,076	100	790	73	286	27
W[redacted]ington	1,202	100	769	64	433	36

SOURCE: FH-2 and FH-3 data files of the 1991 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

Notes: "Saltwater anglers" excludes those who shellfished only. The number of anglers are measured directly from the 1991 National Survey for those 16 years old and older. Ratio estimation was used to add the 6-15 year old anglers, using the ratio of 6-15 year olds to all anglers from the 1991 National Survey screening phase. "Sum - Both Categories" is the sum of tabulated freshwater and saltwater anglers. Hence, it does not represent the number of individuals who fished in their State of residence (since individuals may fish in both freshwater and saltwater), but rather the sum of all residents who fished in freshwater in their State of residence plus all residents who fished in saltwater in their State of residence.

General Assembly of North Carolina
Joint Legislative Commission on Seafood and Aquaculture
and
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

November 15, 2004

Coastal Site Visit Information
9:00 a.m. Monday, November 29, 2004
Duke University Marine Laboratory

TO: Members of the Joint Legislative Commission on Seafood and Aquaculture (JLCSA)
Members of the Environmental Review Commission (ERC)

FROM: Jeff W. Hudson, Commission Counsel, JLCSA and ERC
George F. Givens, Commission Counsel, ERC and JLCSA
Cindy J. Davis, Commission Clerk, JLCSA
Mary R. Watson, Commission Clerk, ERC

RE: Coastal Site Visit

The Joint Legislative Commission on Seafood and Aquaculture and the Environmental Review Commission will visit coastal sites in the Atlantic Beach/Morehead City/Beaufort, North Carolina area on Monday, November 29, 2004.

Please find enclosed the following information related to the site visits:

- Information on accommodations.
- The itinerary for the coastal site visits.
- A map and driving directions for the Duke University Marine Laboratory and the Sheraton Atlantic Beach Hotel.

If you have questions about the Commission meeting or other matters related to the Commission, contact Jeff Hudson or George Givens, Commission Counsels, at (919) 733-2578, Cindy Davis, JLCSA Commission Clerk, at (919) 733-5705, or Mary Watson, ERC Commission Clerk, at (919) 715-3050.

Coastal Site Visits

The Joint Legislative Commission on Seafood and Aquaculture

and

The Environmental Review Commission

November 29, 2004

Atlantic Beach/Morehead City/Beaufort, North Carolina

ACCOMMODATIONS

Rooms have been blocked off at the Sheraton Atlantic Beach Hotel, 2717 West Fort Macon Road, Atlantic Beach, North Carolina for the evening of November 28. The Sheraton Atlantic Beach Hotel will hold these rooms until November 25. After this date, room availability is not guaranteed. Oceanview rooms are available at the rate of $57.25. Contact the Reservations Department at the Sheraton Atlantic Beach Hotel for reservations at 1-800-214-0258. Please advise them that you are with the joint meeting of the Joint Legislative Commission on Seafood and Aquaculture and the Environmental Review Commission.

If you have any questions, please call:
George Givens or Jeff Hudson, Commission Counsels, at (919) 733-2578;
Cindy Davis, Commission Clerk for the Joint Legislative Commission on Seafood and Aquaculture, at (919) 733-5705; or
Mary Watson, Commission Clerk for the Environmental Review Commission, at (919) 715-3050.

ITINERARY

November 29, 2004

THE JOINT LEGISLATIVE COMMISSION ON SEAFOOD AND AQUACULTURE
AND
THE ENVIRONMENTAL REVIEW COMMISSION

VISIT TO

THE DUKE UNIVERSITY MARINE LABORATORY
135 DUKE MARINE LAB ROAD
BEAUFORT, NORTH CAROLINA

Some activities will be outdoors and will include boating.
Wear comfortable clothing, rubber-soled shoes, sunglasses, and sunscreen.
Also, bring a warm jacket along.

MORNING

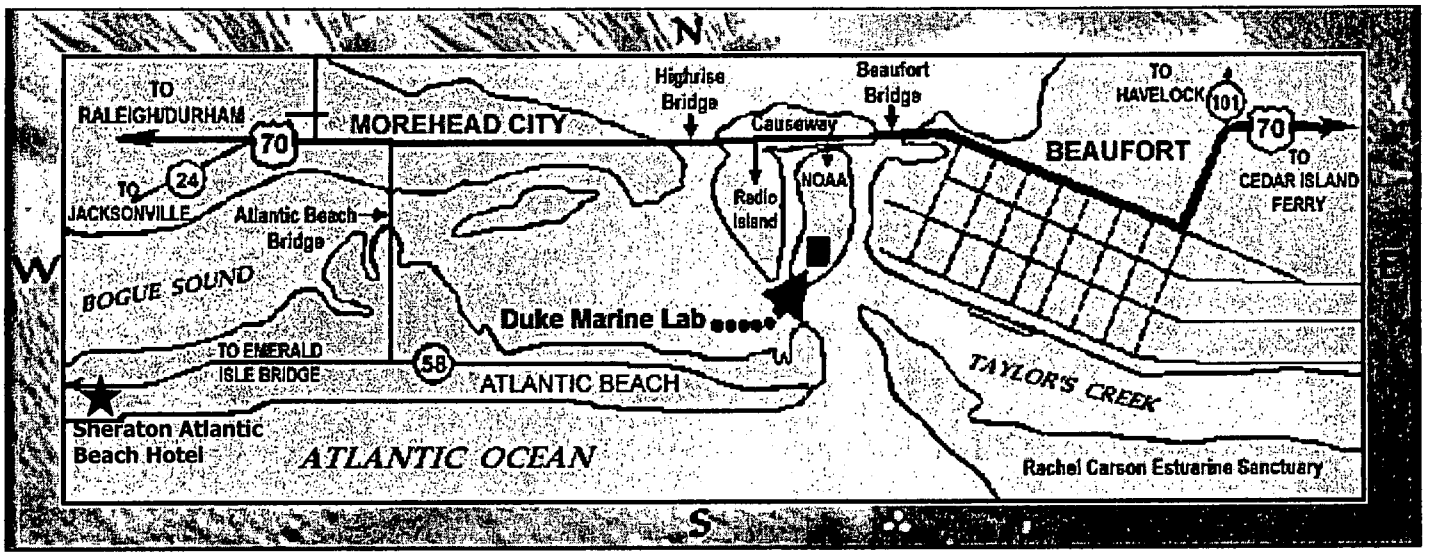
9:00 – 9:30 A.M.	Orientation – Auditorium Duke University Marine Laboratory
9:30 – 11:30 A.M.	Trawling trip aboard the *Susan Hudson, Capricorn,* and *Carolina Coast*

AFTERNOON

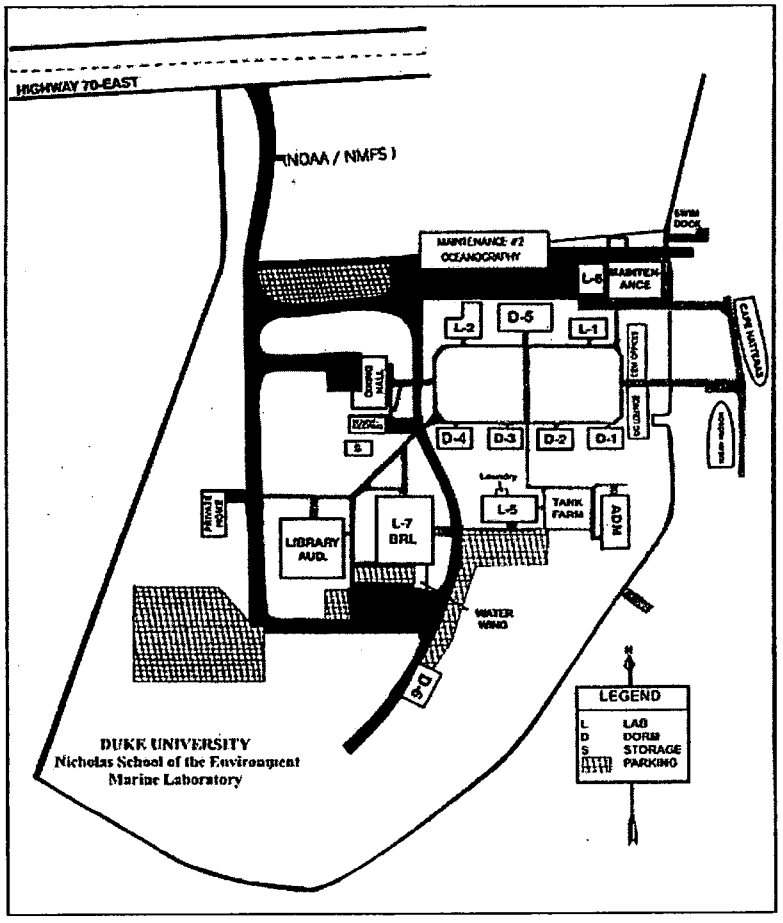
Noon – 1:30 P.M.	Lunch – Dining Hall Duke University Marine Laboratory (Lunch Provided)
1:30 P.M. – 3:30 P.M.	Boat tour of the Rachel Carson Estuarine Research Reserve

If you have any questions, please call:
George Givens or Jeff Hudson, Commission Counsels, at (919) 733-2578
Cindy Davis, Commission Clerk for the Joint Legislative Commission on Seafood and Aquaculture, at (919) 733-5705
Mary Watson, Commission Clerk for the Environmental Review Commission, at (919) 715-3050

LOCATION MAP: DUKE UNIVERSITY MARINE LAB AND SHERATON ATLANTIC BEACH HOTEL



FACILITY MAP: DUKE UNIVERSITY MARINE LAB



DRIVING DIRECTIONS TO MOREHEAD CITY

- From Raleigh, follow Interstate 40 East to Garner/Smithfield Highway 70 East Exit 306.
- Follow Highway 70 East all the way to Beaufort (through Goldsboro - be sure to take the By-pass! - Kinston, New Bern, Havelock, and Morehead City). Highway 70 East is also the main street, Arendell Street, in Morehead City.

To Duke University Marine Lab:

- Continue on Highway 70 East through Morehead City over a highrise bridge (crosses Newport River). From the base of the bridge, it is .6 miles (or second right turn) to the turn for the Duke University Marine Lab.
- Cross the railroad tracks and go straight over the very small bridge leading onto Pivers Island.
- Turn left at the third drive, or go straight to the parking lots at the back of the island.

To Sheraton Atlantic Beach Hotel:

- From Highway 70, turn right onto Atlantic Beach Bridge and cross over bridge.
- Turn right at stop light onto Fort Macon Rd. Hotel is 2 miles on the left.

DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
November 19, 2004

The Environmental Review Commission (ERC) met on Friday 19 November 2004 at 9:30 a.m. in Room 544 of the Legislative Office Building.

Representative Daniel McComas and Senator Charlie Albertson presided over the 19 November 2004 meeting. The following members were present: Senators Albertson, Dorsett, Horton, Kinnaird, Swindell and Weinstein and Representatives Fox, Gibson, Hackney, Justice, LaRoque, McComas, Weiss and Williams. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Jennifer McGinnis, Assistant Commission Counsel, Tim Dodge, Research Assistant, and Mary Watson, Commission Clerk were also present.

On 5 November 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Representative McComas called the meeting to order and asked members to introduce themselves and tell which district they represent.

George Givens, Commission Counsel, was called on to explain the agenda.

Mr. Givens called members' attention to a large packet of information distributed to them containing several items related to today's agenda.

Mr. Givens said that he had distributed a colored map of all of the areas in the state that have some type of water quality protection program. The newest addition to this map was the Phase II stormwater. These handouts are listed as **Exhibit D**.

Mr. Givens announced that ERC would be doing coastal site visits on Monday 29 November 2004. No business meeting will be connected with these site visits.

Mr. Givens announced that the next regular business meeting is on Tuesday, 7 December 2004 at 9:30 a.m. in Room 544 and the staff public planning meeting will be held on Wednesday, 1 December 2004 at 10:00 a.m. in Room 605 of the Legislative Office Building.

Mr. Givens said that some of the items that will be included on the 7 December agenda would be reports from land resources, coastal resources, environmental health and soil and water as well as a report on wetlands.

Mr. Givens said that with regard to the January schedule, he asked members to continue to reserve the four dates of 12 January 13 January 20 January and 25 January 2005.

Mr. Givens asked visitors to sign the visitor registration sign-in sheet and asked members to sign and send forward their reimbursement forms.

Mr. Givens added that the public staff-planning meeting for this meeting was held on Tuesday, 9 November 2004 in Room 605.

Representative Gibson asked Mr. Givens if ERC would have a joint meeting with Transportation Oversight.

Mr. Givens said that ERC is charged to jointly study issues relating to underground storage tanks. Transportation Oversight had that issue on their agenda for their October meeting. ERC had a similar presentation in October.

Mr. Givens said that he has been in conversation with staff of Transportation Oversight and they are considering how best to address this issue and whether a joint meeting is appropriate.

Mr. Givens said that he has suggested 20 January 2005 for this joint meeting.

Representative McComas said that Transportation Oversight has already taken up the issue of UST's and bringing the two committees together will not take much effort.

Representative Gibson asked Representative McComas if Transportation Oversight was comfortable with where we are headed with this issue.

Representative McComas said there are some environmental issues that come into play with transportation that may be appropriate to bring up at a joint meeting.

Representative Gibson asked Mr. Givens that when the time is appropriate, he would like to have a copy of what action Transportation Oversight has taken on the issue of UST's.

Mr. Givens said that on the subject of endangered and threatened species, the staff of Transportation Oversight had looked into the possibility of an extended agenda item on this subject. He believes that a joint meeting with ERC to discuss this issue would be helpful.

Mr. Givens said there is a program sponsored by the Rural Center on 15 December 2004 at the North Raleigh Hilton from 9:00 to 4:00 p.m. on planning for the future water needs of our state.

Representative Gibson said that he had talked to several members regarding the fishing license and asked Representative McComas to have a brief discussion on the subject at today's meeting when he deemed it appropriate.

Representative McComas asked Mr. Givens to send him an e-mail message asking him to confer with the other chairs of Transportation Oversight to arrange a joint meeting.

Mr. W. Andrew Adams, Acting Chief, Onsite Wastewater Section, Division of Environmental Health, Department of Environment and Natural Resources (DENR), gave a report on the Wastewater Discharge Elimination Program (WADE).

Mr. Adams said that he has been in his current job as Acting Section Chief for the past 10 weeks and has been with the State Onsite Wastewater Program for the past six years. Prior to working with the state, he worked in local health department across the state in the septic tank program. Mr. Adams' report is included in packet in Exhibit D.

Mr. Adams said that the WADE program was created by the General Assembly in 1996. This program, based in Asheville, serve 26 western counties.

Mr. Adams said that the two main components of the WADE program are to work with local health department and identify systems are straight piping to surface waters of the state, concentrating on public watershed areas, and to help these folks locate and identify funding to repair these systems.

Mr. Adams said that in 1996, the WADE program started with two members, but in 2001, with the help of a grant from the Clean Water Management Trust Fund and the EPA, they were able to expand to 11 members on the team doing survey work.

Mr. Adams said that since the expansion of the WADE program, the team has surveyed over 4700 homes in western North Carolina and has identified 725 violations from straight piping to a stream or malfunctioning systems going into a stream.

Mr. Adams said that of the 725 violations, 229 have been successfully repaired and over half have received financial assistance channeled through the program.

Mr. Adams said that since its inception in 1996, the WADE program has survey over 19,000 homes in western North Carolina and found over 2500 violations of sewage going into streams and surface waters. Over 1200 of

these violations, to date, have been repaired, and 480 of these received some type of financial assistance through the program.

Mr. Adams said that the most important thing is that this represents almost 300,000 gallons of sewage being removed that was going into the surface waters of North Carolina.

Mr. Adams said that the WADE program provides a win-win situation from the environmental standpoint in that it eliminates wastewater discharges, protecting watersheds and protecting public health.

Representative Weiss asked Mr. Adams how the progress is going with the outstanding violations and what is the timeframe on these.

Mr. Adams said they have a database for tracking violations and staying in touch with local health departments to keep them moving forward.

Mr. Adams said that often times the failing systems are with people with limited income and some are resistant to accept financial assistance. On the county level, legal action sometimes has to be taken. Because these are considered misdemeanors, they are sometimes slow in moving through the court system.

Senator Dorsett asked Mr. Adams to what extent is straight piping a problem in other parts of the state and what are the plans to expand to other communities.

Mr. Adams said this problem is not limited to western North Carolina. He said he would love to see the program expanded to address statewide problems. The program has gone into Halifax County to assist with a small community there to get them off of outhouses.

Mr. Adams said the WADE program has recently worked with a property owner in Onslow County to help get some financial assistance.

Senator Dorsett asked what criteria are used to move beyond the 26 counties.

Mr. Adams said that the criteria now being used is surveying of public water supply watersheds.

Senator Horton asked if violations are given a notice of violation.

Mr. Adams said that the people who are self-reporting on the WADE program, they would not be issued a violation; however, there are cases where some notice of violation is needed.

Senator Horton asked Mr. Adams how many notices of violation have been issued.

Mr. Adams said that he could get this information for Senator Horton.

Senator Horton asked Mr. Adams to provide him with a sample of the letter give notice of violation.

Mr. Adams said he would do this.

Representative McComas asked Mr. Adams to provide this information to all ERC members.

Mr. Givens asked Mr. Adams to send the sample letter to him and he would distribute it to members.

Senator Albertson asked Mr. Adams how many folks have the resources to correct the violation but are not in compliance.

Mr. Adams said that those are the ones who would show up in the database as those who are dragging their feet. These people would be sent a notice of violation and would be worked with through the court system.

Senator Albertson said that these people should be made to comply and held responsible.

Representative McComas asked Mr. Adams if we are seeing more use of blue water coming out of wastewater treatment plants to be used for irrigation purposes.

Mr. Adams said that in the Division of Environmental Health, they do not see much of the reuse of water for irrigation. This is permitted through the Division of Water Quality.

Mr. Givens said that as a follow up to Senator Dorsett's question, does DENR have plans to come forth with a budget proposal to expand the WADE program to other parts of the state.

Mr. Adams said he is uncertain as to whether or not a formal proposal has been put together at this point but would check on this and get back to him.

Mr. Givens asked Mr. Adams to follow up with him and Senator Dorsett with this information.

Mr. Givens noted that a colored map had been handed out to each member showing where all of the public water supply intakes are in the State. This handout is listed as **Exhibit E**.

Mr. John N. Morris, Director, Division of Water Resources, DENR, gave a report on the programs, activities, and priorities of the Division of Water Resources (DWR). A copy of the Division of Water Quality 2004 Organization Chart was handed out and is listed as **Exhibit F**.

Mr. Morris said that the most important mission of DWR is to make sure we have an adequate supply of water for North Carolina's future. To do that we have to have a partnership effort with local governments and with other water users who are involved in delivering this water to customers.

Mr. Morris said that in order to be successful in this task, three things have to be accomplished: monitoring, planning and regulation.

Mr. Morris said that monitoring is getting the essential data needed to expand the water resource and managing it properly. In terms of surface water, monitoring is done in streams through a network of stream gauges in partnership with the U.S. Geological Survey.

Mr. Morris said that many of these gauges have records that go back 50-75 years which gives a very good understanding what to expect from a drought, wet year or a normal year.

Mr. Morris said that to monitor groundwater availability, DWR operates about 500 monitoring wells across North Carolina. These wells monitor the water level in aquifers and tell whether groundwater withdrawals are sustainable. They are the danger signs that show if we are taking out water faster than it can recharge.

Mr. Morris added, that in addition to the monitoring of water levels, water use monitoring is needed to determine how much water we are using so that we can determine the impact on our water resources. The local water supply plans give an excellent database on how much water is being used by municipalities.

Mr. Morris said that large water users over 100,000 gallons a day are required to register their water use. This gives us good information on industry and agriculture.

Mr. Morris said that the NC Department of Agriculture has recently done a special survey of water use in the 15 county central coastal plain areas. This is by far the most detailed water use data survey we have ever had. This survey showed that agriculture uses much less water than we originally thought.

Mr. Morris said the second part of strategy is planning. Planning means that they forecast water needed for future use and select the best sources to meet that future need. These sources must be sustainable and cost effective.

Mr. Morris said the General Assembly created an excellent system for water supply planning in 1989, requiring all local governments to prepare water supply plans. These plans are updated every five years. These plans are on the DWR website.

Mr. Morris said the water supply plans contain a 30-year projection for future water needs and the designation of sources to meet those needs.

Mr. Morris said the third part of the program is regulation. There are some cases where the level of water use threatens to deplete a water supply. The General Assembly has provided the Water Use Act, which is the primary water use regulatory mechanism in North Carolina.

Mr. Morris said that the Water Use Act allows the Environmental Management Commission to declare a capacity use area within a specific geographic area where there is a danger of depleting water resources and then develop a custom made permitting plan for that area.

Mr. Morris said that is only one of these capacity use areas in existence, the 15 county central coastal plain capacity use area.

Mr. Morris said that another regulatory statute is the regulation of surface water transfers, which the EMC manages.

Mr. Morris said that several other regulatory statues that are important include The Dam Safety Act, an act that requires the owner and operator of dams to release an adequate flow from the dam to maintain aquatics habitat and other water needs downstream and The State Environmental Policy Act, a mechanism that allows the impacts of a future water withdrawal to be quantified and studied.

Mr. Morris said that the central coastal plain capacity use area demonstrates how monitoring, planning and regulation work together.

Mr. Morris said that it is extremely gratifying to see how hard local governments have worked and how effectively they are finding solutions to this problem.

Mr. Morris said that Kinston, Lenoir County and several smaller communities formed a new water authority and are developing a surface water source to use water from the Neuse River. Farmville and Greene County were a couple of water users who at first glance did not have an obvious source to go to. They have entered into a creative agreement with the City of Greenville's Utility Commission by which Greenville will sell them water on an interruptible basis. For the peak periods that they do not buy water, Farmville and Greene County will use their groundwater supplies to provide their needs.

Mr. Morris said that water banking is another concept being developed. Some of these communities are going to reduce their withdrawals of groundwater much faster than the 16 year transition period provides and will essentially bank the water they are not withdrawing from the groundwater for use when they need it.

Mr. Morris said that Onslow County and Jacksonville are moving to the Castle Hayne aquifer and a number of other communities are working out their solution. What had been a big threat to the economy of this region is now being solved and we are well on our way to having water sources that will be sustainable in the future.

Senator Horton asked Mr. Morris if any improvement in the situation has been recognized in the central coastal plain capacity use plan.

Mr. Morris said that no improvement has been seen, yet, because the reductions will take place in 2008. Due to the water-banking concept, some of the users are going to make more rapid reductions, early, so they should learn a lot from this. They will see how quickly the aquifer responds to that reduction.

Representative Justice asked if monitoring is in place to make sure that the current users of the Castle Hayne aquifer will not get into trouble and have to move somewhere else.

Mr. Morris said that the new wells being put in the Castle Hayne aquifer are also subject to permitting. Those permits are subject to public hearing and review by his staff and they think they are ahead in preventing such a problem occurring.

Representative Weiss asked Mr. Morris to comment on sedimentation and the impact it has on water supply.

Mr. Morris said that sedimentation is thought of as one of the most serious water pollution problems. It has two impacts on water supply—it makes it more expensive and difficult to treat it. Probably one of the most important, long-term impacts is that in the piedmont and mountain reservoirs, sediment tends to settle out in the upper end of the reservoirs when the water slows down as it hits the lake. Gradually, the deposit of that sediment is reducing the storage capacity of the reservoirs.

Senator Weinstein asked Mr. Morris about inter-basin transfers and if the Cape Fear and Neuse are cooperating now with transfers.

Mr. Morris said that the Cape Fear basin has had many battles with inter-basin transfer. The General Assembly has created a regulatory program for inter-basin transfer and Cary had to get a permit under that program for transfer of water from the Cape Fear River Basin. As a part of that issue, a long-range water supply plan was developed for the Cape Fear Basin and some 50-year water use projections were developed. This has become the pilot project for water supply planning across the state.

Mr. Morris said that the main secret for solving these water supply battles is to have good data and good analysis that everyone has confidence in.

Senator Weinstein asked Mr. Morris what is done to address the problem when an aquifer drops eight feet that is supplies a major industry.

Mr. Morris said that the southern coastal plain, which is the area that encompasses Lumberton, Bladen County and Elizabethtown, has an issue with use of underground water supplies, which is similar to the central coastal

plain. Fortunately, it is not as bad, yet and not as far advanced. The EMC asked WRC to do a special study of that region and considering all of the information, they are trying an approach to solve that problem which is a little different.

What the EMC has said is that there is too heavy a withdrawal by one industry and there is a gradual decline in aquifer levels throughout the region. If local governments can come up with a plan to make sure that the water use moves toward a sustainable basis, they will not need to have a regulatory program for that area. So, the EMC adopted certain guidelines to judge whether progress is being made. They are fortunate that the Lumber River council of governments has taken a strong lead in bringing people together to work toward a sustainable water supply plan.

Senator Weinstein said that he had been told that the battle will not be over oil but will be over water.

Senator Kinnaird asked Mr. Morris about water reuse. Is this a possibility in a giant hog slaughtering business.

Mr. Morris said that water reuse and water conservation are an important ingredient in meeting our future water needs. A number of communities throughout North Carolina are experimenting with this type of water reuse. To the extent that we can reuse water and become more efficient in the way we use water creates a new element of water supply to meet our future needs.

Senator Kinnaird asked Mr. Morris if the slaughterhouse water could be cleaned up for reuse.

Mr. Morris said that water from an animal processing plant, after it is properly treated, could be used for irrigation and there are many opportunities for that.

Mr. Morris said the General Assembly has been very active in giving guidance and tools for water conservation.

Mr. Morris said that water conversation is used in two different terms. One of the meanings is what occurs when there is a drought—emergency water conservation. At this time, we need to use less water during this period. The North Carolina Drought Council was recently given status in managing droughts. They will issue official scientific bulletins to identify which part of the state is affected by a drought and how severe it is. This gives local governments and water users very good information on how bad the problem is and helps them be prepared to manage their resources properly during a drought.

Mr. Morris said that another enactment by the General Assembly has made it mandatory for local governments to have a drought response plan. This is part of their local water supply plan. They are currently being evaluated by DWR.

Mr. Morris said that the General Assembly recently called upon the EMC to develop an administrative rule that would set minimum standards for water conservation during droughts. DWR and EMC are working on this together. It has become complicated because the statute applies to all kinds of water users—municipalities, industry and agriculture.

Mr. Morris said that the rule also raises the issue of what the proper sphere is for state standards and what the proper sphere is for local government autonomy and judgment.

Mr. Morris said that another word used for water conservation is water use efficiency—using less water to get the same job done. To the extent that they can become more efficient, it benefits the water user and everyone else if we become more efficient in using water.

Mr. Morris concluded by listing a couple of priorities of the DWR, better groundwater monitoring and river basin water supply planning.

Mr. Morris said that the General Assembly provided additional resources to help expand the program statewide and they are now underway for developing a 50-year plan in the Catawba and Yadkin basins. These two are being done first because of utility relicensing is underway in these two basins.

Mr. Morris said that the Neuse and Tar basin plans will be developed. The value of a 50-year plan is that it gives early warning of future problems and helps make good 20-30 year plans.

Senator Swindell asked Mr. Morris to comment on interbasin transfer permits and who is responsible for submitting a permit. He also asked Mr. Morris to comment on how much water a day is being transferred to Virginia Beach in the 85 pipeline and how much water is being transferred now, in gallons, from other basins in North Carolina.

Senator Swindell asked Mr. Morris to explain what it means when local governments have not yet submitted a water supply and if that carries a penalty.

Mr. Morris said that they anticipated that about 585 water systems should prepare local water supply plans, and as yet, they have not received plans from 60 of the systems. There is no immediately penalty applied but there are incentives.

Mr. Morris said there are some real incentives for doing the plans. Counties without a plan cannot apply for grant monies and face a more stringent procedure when they want to expand their water lines.

Mr. Morris said that with regard to the interbasin transfer issue, the Lake Gaston pipeline was difficult because no part of that system was in the State of North Carolina and the state had no jurisdiction over it. When the

North Carolina interbasin transfer law grandfathered previous interbasin transfers, it really did not have anything to do with the Lake Gaston transfer because it was outside of our jurisdiction.

Mr. Morris said that last year when re-licensing was being done for the Dominion Generation Hydroelectric projects on the Roanoke, an agreement was reached with Virginia Beach that would require them to go into water conservation measures whenever they are needed in North Carolina from the Roanoke. In other words, during a severe drought on the Roanoke, Virginia Beach would use the same level of conservation that we do in North Carolina.

Senator Swindell asked Mr. Morris how many gallons of water are currently being transferred in North Carolina.

Mr. Morris said that the Lake Gaston pipeline transfer to Virginia Beach is the only transfer being done in our state at this time.

Representative Gibson asked Mr. Morris if that sets a precedent for us as it relates to South Carolina.

Mr. Morris said the Catawba and Yadkin basins are similar in that the headwaters in North Carolina flow into South Carolina. It is complicated by the fact that on both rivers there are both hydro powered lakes operated by utility companies, which are regulated by the federal government. Currently, these are under re-licensing.

Senator Albertson asked Mr. Morris what we can do from here on out to make sure we protect our water resource to make sure we have adequate supplies for the future.

Mr. Morris said that we are on the right track. The two priorities for the next few years would be to improve groundwater-monitoring network and continue to do long-range river basin planning for the state.

Senator Albertson asked Mr. Morris if he feels like they have the resources to carry out these plans.

Mr. Morris said there is a budget item in the mill.

Mr. B. Keith Overcash, Director, Division of Air Quality, DENR, gave a report on the programs, activities, and priorities of the Division of Air Quality. A copy of Mr. Overcash's slide presentation was handed out and is included as **Exhibit G**.

Mr. Overcash gave some background on the ozone standard. The ozone standard was litigated in the court for a number of years, upheld by the Supreme Court and once it was upheld, the EPA moved to require the states to make sure they were in compliance with the standard and to delineate areas to make sure we are in attainment with the standards.

Mr. Overcash reviewed the Nonattainment designation timeline for ozone. In June 2004, nonattainment new source review requirements came into effect for large emitters of NOx and VOC compounds in North Carolina. In one year from June, transportation conformity comes into play and within three years, a state implementation plan (SIP) has to be in place and in five to six years, attainment has to be reached in all of the areas.

Mr. Overcash showed a slide on where we have been and where we have come to at this point in the attainment of the one hour and eight hour standards. The numbers have come down in the last two years and there are reductions that have taken place to reduce these numbers.

Mr. Overcash said that the Hickory Unifour area is one of those areas in nonattainment. Based on the information in the 2004-year, they will go back to EPA to have this area designated in attainment, along with the Fayetteville Cumberland County area.

Mr. Overcash said that Edgecombe and Nash County and Triad/Triangle/Charlotte-Mecklenburg areas are still in nonattainment.

Mr. Overcash said that the Early Action Compacts (EAC's) are compacts between local and state governments and EPA to try to do things that will get cleaner air, sooner. These four areas of the State entered into these compacts in December 2002. The mountain area attained compliance with the standard before EPA made the designation, so although some of the counties are still working toward local measures to reduce emissions, they are no longer an official EAC because that area is in attainment.

Mr. Overcash said that those who signed the compact in December 2002, the local people had to submit a list of measures they planned to implement by December 31, 2003. March 31, 2004, the local plan was submitted to the state and by April 2004, EPA had to designate the areas they thought were doing a good enough job to be deferred from noncompliance. Our three EAC areas in North Carolina were designated as compact areas and had the nonattainment deferred in those areas.

Mr. Overcash said that by December 31, 2004, we have to submit a SIP to EPA on those EAC's for approval. In 2005, areas implement local control measures and in June 30, 2006, progress assessment and report to EPA and December 2007, areas must attain the eight-hour ozone standard.

Mr. Overcash said that the PM-Fine Standard is a new standard with a similar history to the ozone standards. It was litigated in the courts and upheld and EPA required the states to start measuring for the standard. The standard itself is 15 micrograms per cubic meter, an annual arithmetic mean concentration over a three-year period. The 24-hour concentration is 65 micrograms per cubic meter.

Mr. Overcash said that North Carolina's recommendation to EPA in February on the areas they thought to be in nonattainment. There are only

two monitors that show nonattainment for the particulate matter (PM) standard at this time.

Mr. Overcash said that EPA responded to their recommendations and based on their information, their proposal would be for us to have more extensive areas of non-attainment for PM fine, the five counties in the triad areas, Catawba, Caldwell and Burke counties in the Unifour area.

Mr. Overcash said that Randolph County was another county EPA wanted to include. Most of the emissions in Randolph County are mobile source emissions. There are already systems in place at the federal level to reduce these emissions.

Mr. Overcash said that EPA also included Stokes County because of the Belews Creek Power Plant.

Mr. Overcash said that there are already measures being taken by North Carolina—the Clean Smokestacks Act and the Inspection Maintenance Program for automobiles.

Mr. Overcash said that another federal action taking place is the New Source Review Permit changes. EPA came out with two changes to the NSR rule, one in December 2002 and one in August 2003. The 2002 rule changes were rules to change applicability requirements.

Senator Horton asked Mr. Overcash to explain what a New Source Review is.

Mr. Overcash said that a NSR is a permitting program that is required of major facilities in the state that are major emitters of pollutants. If they want to make a modification that is called a significant modification, they have to go through a NSR process to determine what type of controls they have to put on.

Senator Horton asked Mr. Overcash if a new industry has to get permission to pollute.

Mr. Overcash said that this applies to both new and modified sources of pollution.

Mr. Overcash said that the August 2003 rule, ERP or equipment replacement provision) was a change that proposed a cost to determine whether modifications triggered a review. The ERP rule was stayed by the courts and is not moving forward at the present time.

Mr. Overcash said that in the past two sessions of the General Assembly there was a request brought before them to change the statute to allow the construction of an emissions source before an air quality permit is issued for that source. That statute was passed into law last year and allows existing permitted facilities to request construction of a source before the Division of Air Quality issues a permit. It requires public notice of the

proposed action before a facility can move forward and then they have to submit information to DAQ in order to meet certain criteria. DAQ has 15 days to make a decision on whether to approve or deny that action.

Mr. Overcash said they had received 24 requests to date and all have been approved to move forward with construction. The average turnaround time is 10 days on these actions.

Mr. Overcash said that with regard to the Clean Smokestacks Act, there was a cap on NOx and SOx emissions by EPA and the actual reductions have to be made in North Carolina. There is a requirement in the statutes that DAQ produce reports for three years and provide them to ERC for deliberation on requirements for reductions on CO2.

Mr. Overcash said that the numbers we will get from the Clean Smokestack's Act reductions in 2009 will be 75 percent NOx reductions from 245,000 tons to 56,000 tons. For SO2 emissions, we started with 489,000, the cap required to be met in 2013 is 230,000, resulting in a 75 percent reduction in emissions.

Mr. Overcash said that the carbon dioxide and mercury reports required by the statutes were provided to the ERC on 1 September 2004. These reports are included in Exhibit D.

Mr. Overcash said that the federal government has done a good job with mobile source reduction emission rule and they are counting heavily on those rules to help North Carolina get into compliance with the federal air quality standards for ozone and PM-fine.

Mr. Overcash said that North Carolina is proceeding to adopt a heavy-duty diesel engine rule even though there is already a federal standard in place. They are doing this because of some concern at the federal level that there might be some attempts to postpone that rule.

Mr. Overcash said that a number of states are moving forward on their own to adopt a rule that would basically create a defector federal rule that would require these reductions to be made throughout the United States. If the rule is put into place, the counter reductions will be achieved in the white, if they don't the emissions will continue to grow from those emission sources.

Mr. Overcash said that there are some things underway within the southeast to help reduce heavy-duty diesel emissions. North Carolina has been very active in this by giving grants to school systems within the state to retrofit school buses to reduce particulate emissions from those buses.

Mr. Overcash said there are some truck stop electrification projects underway in North Carolina where the trucks can pull up to an electrical supply at a truckstop and not burn excess fuel. There is one of these in place in Mebane and there is a grant being awarded for locating another facility in Rowan County.

Mr. Overcash said that the Attorney General filed petitions against sources in 13 states in February 2004 to ask them to reduce emissions because they were affecting air quality in North Carolina. EPA gave themselves a six-month extension of that requirement to act on this petition. They have given themselves another six-month extension.

Mr. Overcash said that on Onboard Diagnostics (OBD) testing of automobiles in North Carolina continues its expansion. Five to six counties are being added every six months and there are now 35 counties in the program. All 48 will be in by January 2006.

Mr. Overcash said that there is a significant problem resource wise with responding to open burning complaints. It has become a situation where about half of the notices of violations are for open burning and half of the enforcement cases are open burning cases. A process has been started for an outreach campaign for open burning and some of the results will be seen soon.

Senator Kinnaird asked Mr. Overcash about the open burning by DOT and about the ban on open burning in Orange County with regard to public health.

Mr. Overcash said that the problem with DOT is with their contractors understanding what the law and rules are. Training has been done with the contractors and they are informed now about what the law and rules are.

Mr. Overcash said that with regard to the open burning ban in Orange County, that is up to the county. This is not a Division of Air Quality issue.

Senator Horton asked Mr. Overcash to give specific examples of EAC's and what local governments are doing.

Mr. Overcash said that local governments are looking at their fleets to put alternative fuel vehicles in place, they are encouraging more ride share

Mr. Brock Nicholson, Division of Air Quality, was called on to give examples of what local governments are doing with EAC's. He said that the examples Mr. Overcash gave are typical of many EAC's. There are a number of enforceable measures that the counties and cities are looking at to limit emissions, fuel use and banning open burning during episode days.

Mr. Overcash said he would get a list of what counties are included in the open burning ban.

Representative Gibson asked Mr. Overcash if he could provide information on the number of variables of what DAQ is doing with regard to attainment and nonattainment. He wants to be able to explain to his folks back home what it means when they cannot get a burning permit or what it means when they have to pay more for an inspection.

Representative Gibson asked Mr. Overcash if the mobile source expansion headed the way it is supposed to be going. Are we catching enough of the newer vehicles to justify the expense to the ones who are paying it.

Mr. Overcash said he believes it is working and can provide the data to support it. There has been a significant amount of situations out there where the controls were not working properly on the automobiles and this is what is being caught.

Representative Gibson asked Mr. Overcash if we are catching enough of a percentage in the seven-year or fewer to justify the $30 charged.

Mr. Overcash said that he believes that it is working.

Mr. Nicholson said that with the tailpipe test in the nine counties were experiencing a one percent failure rate. They are averaging a three to four percent failure rate on OBD for the new vehicles. This is an indicator of the level of mechanical malfunctions and is a good balance between the severity of the test and what they are finding.

Representative Gibson asked Mr. Nicholson if we are seeing the delineation of the need for a tailpipe.

Mr. Nicholson said that based on their calculations, they are seeing any model year 10 years or older being the meat of the problem.

Senator Albertson asked Mr. Overcash what the accuracy of his models are in determining the source of emissions.

Mr. Overcash said that the modeling shows pretty well what is going on out there.

Senator Albertson asked Mr. Overcash how much of the emissions are coming from out of state vehicles.

Mr. Overcash said that he could not answer that question but would get that information to Sen. Albertson.

Senator Weinstein said that he had traveled in the mountains and has seen quite a bit of mountain area destroyed by NOx and something needs to be done to protect the air coming in from other states.

Mr. Overcash said that the federal government is trying to move forward a national standard on the power boilers. They have proposed a rule to be finalized by the end of this year. This rule would require similar reductions to the ones we are requiring in North Carolina.

Senator Albertson said that it would be nice if someone could develop a technology like NC State to determine where the source of nitrogen is coming from.

Representative Weiss asked Mr. Overcash how the light rail proposal is being used as a solution to air quality compliance and emissions reduction.

Mr. Overcash said that this would certainly be looked at as a solution.

Mr. William F. Bailey, Principal Consultant, Dupont, gave a report on issues related to greenhouse gas emissions and global climate change. A copy of Mr. Bailey's slide presentation is listed as **Exhibit H**.

Mr. Bailey said that Dupont has facilities at RTP, Cedar Creek, Fayetteville and Kinston. IT is a 202 year old global science company, with 135 manufacturing plants, 80 research and development facilities in 70 countries. The company currently has 60,000 employees.

Mr. Bailey said that Dupont is in the midst of transformation to achieve sustainable growth. The manufacturing plants are trying to achieve this by reducing manufacturing costs and reducing their energy use and emissions to reduce their environmental footprint on society.

Mr. Bailey said that Dupont has committed to meet a publicly stated level of performance by reducing greenhouse gas emissions by 65 percent versus a 1990 baseline; hold total energy use flat versus a 1990 baseline and by supplying 10 percent of total energy needs from renewable resources at a cost competitive with the best available fossil derived alternatives by 2010.

Mr. Bailey said that most of Dupont's CO2 emissions come from energy use and some from the manufacture of some refrigerants and adipic acid, which creates nitrous oxide.

Mr. Bailey said to reduce these emissions by 65 percent, Dupont had to change the way they made two very profitable products, nylon and HFC's or refrigerants.

Mr. Bailey said that Dupont spent $50 million to abate emissions in those manufacturing processes but they believe it was well worth it. Although they were not legally required to make those reductions, they have been able to meet their greenhouse gas emission goal eight years early.

Mr. Bailey said that Dupont uses what they call Six Sigma, a statistically based methodology for looking at a problem, trying to identify a defect in a manufacturing process or the utilization of energy and through the use of statistics and data, determine ways that defects, such as high energy use, can be eliminated by changing the process.

Senator Kinnaird asked if Six Sigma was used in other ways such as state government.

Mr. Bailey said that it is a statistically based process to improve an operation, the workings of government, or whatever you want to apply it to. It requires that you be able to measure your cost or whatever you want to

improve. Through the use of statistics and taking measurements of how the operation is currently performing, you are able to identify areas where defects exist that are increasing your costs, or causing your operation to perform poorly.

Mr. Bailey showed a chart where Dupont increased its production of products by 35 percent.

Representative McComas asked Mr. Bailey if that chart was based on those facilities that existed within Dupont from the 1990's on or does it take into account those facilities that have been sold and acquired.

Mr. Bailey said that Dupont goes back and adjusts the 1990 baseline based on acquisitions and divestitures.

Mr. Bailey said that the key elements of Dupont's program are having clear and measurable goals, flexibility to find the lowest cost reduction, knowing what to measure and being able to measure it in order to track progress, and to publicly report progress.

Mr. Bailey said that Dupont's goals are reported annually through the Dupont Sustainable Growth Progress Report, a 1605b report issued through the EPA.

Dr. William H. Schlesinger, James B. Duke Professor Biogeochemistry Dean, Nicholas School of the Environment and Earth Sciences, Duke University, gave a report on the current status of climate change science. A copy of Dr. Schlesinger's comments, verbatim, are included in a handout and is listed as **Exhibit I.**

Representative Williams asked Dr. Schlesinger if we have a trend set that shows North Carolina is predicting a rise in the average annual temperature in this state between 4 and 10 degrees Fahrenheit by the end of this century.

Dr. Schlesinger said the increase is mapped out over 100 years and then averaged by decade that shows that kind of an increase.

Representative Williams asked Dr. Schlesinger if the increase was one-tenth of a degree per decade.

Dr. Schlesinger said it was one-tenth of a degree Fahrenheit per decade since the late 1800's.

Representative Williams asked Dr. Schlesinger how much the average annual temperature in North Carolina had risen since 1900.

Dr. Schlesinger said it would be two degrees for the century.

Senator Albertson asked Dr. Schlesinger if we had seen a three-fold increase in the pollen count in North Carolina or would see a three-fold increase.

Dr. Schlesinger said that at the CO2 level expected 50 years from now; we get a three-fold increase in seed and pollen production. So, it is an experimentally based prediction.

Senator Albertson asked Dr. Schlesinger if we are currently seeing an increase in the pollen count or not.

Dr. Schlesinger said he did not come prepared to answer that question today and would get this information for Senator Albertson. He said he suspects there has been an increase in pollen, species by species, depending on the change in agricultural land cover in the state versus forests.

Mr. Michael J. Shore, Senior Policy Analyst, Environmental Defense, gave a report on policy options to address climate change. A copy of Mr. Shore's slide presentation is listed as **Exhibit J**.

Mr. Shore said that he would speak on solutions and opportunities for North Carolina.

Mr. Shore said that the nations of the world have come together and committed to capping greenhouse gas emissions. On February 16, 2004, the international treaty to cap global warming pollutants will come into force. The United States is not part of that treaty, but all of the rest of the major nations of the world are participating. As the nations set caps, there is a carbon marketplace that will emerge.

Mr. Shore said that for climate change, as the nation caps greenhouse gas emissions, they would then permit their polluters' allocations on how much they can pollute. Companies that can economically reduce pollution beyond their permitted level will receive pollution credits that can be sold into the carbon marketplace.

Mr. Shore said that on the supply side of the equation, there are companies who may find it more economical to buy some of their emissions reductions in the marketplace to make those reductions in-house.

Mr. Shore said that eventually, the United States will join the world in capping greenhouse emissions and when it does, the carbon marketplace will be strengthened in North Carolina as it is internationally, already.

Mr. Shore said that it is not unlikely that North Carolina would go into the carbon marketplace to buy some of their credits. Meanwhile, the hog industry in North Carolina emits a lot of greenhouse gases; however, the swine industry is poised in the next five years to begin installing environmentally superior technologies that not only will reduce the impact of the hog industry on water quality issues but also will dramatically cut the amount of greenhouse gas emissions coming from the swine sector.

Mr. Shore said the swine industry has millions of dollars of value in greenhouse gas credits that when there is a carbon marketplace for North Carolina, they will have credits to sell into the carbon marketplace, annually.

Mr. Shore said this is big money and it can help fund the conversion to cleaner technologies in the swine industry.

Mr. Shore that forestry and agriculture, as we grow crops, the trees pull carbon out of the atmosphere and hold it. The forestry and agriculture can get credits for those reductions.

Mr. Shore added that some business and industries, like Dupont and Bank of America, are committed to making reductions beyond requirements. And, the renewable energy industry in North Carolina will also benefit tremendously.

Mr. Shore said that North Carolina not playing in the carbon marketplace, with all of its potential, would be like Michael Jordan with all of his value and potential, choosing not to play basketball.

Mr. Shore said that this is a great opportunity for North Carolina and we not only should be preparing for the inevitability of the United States capping greenhouse emissions, but we should be figuring out ways to move toward this carbon marketplace as soon as possible.

Mr. Shore said that the five suggestions his has for the General Assembly are to put in place a state goal to set itself in the right direction on climate change, provide incentives for early reductions, clean car standards, energy efficiency and renewables, and a stakeholder process.

Mr. Shore concluded with a quote from Thomas Edison, "opportunity is missed by most people because it looks like work."

Senator Kinnaird asked Mr. Shore how the State of North Carolina would join the treaty to reduce greenhouse emissions.

Mr. Shore said that in the United States, this carbon marketplace exists but it is at very small level. Until the federal government caps greenhouse gas emissions, the value of a ton of carbon dioxide is quite small.

Mr. Shore said that in the meantime, there are many things that North Carolina can do to move toward that. One, is to set a goal to align ourselves to the reality that there will be caps on greenhouse gas emissions and the other is to be advocating to the federal government that a cap on greenhouse gas emissions is the right thing to do to protect our environment, public health and to move ourselves forward economically.

Mr. Shore added that that the Governor could be proactive in starting conversations with other states to come together with a plan.

Senator Horton commended Mr. Shore on his presentation and said that he believed that environmental defense was the only way to go in protecting the environment in our state.

Representative Gibson announced that ERC would be served lunch today, provided by the Forestry Association, and that the committee would continue to hear presenters through the lunch period.

Representative Gibson asked members to consider this a regular practice and to also consider whether they would be willing to pay $5.00 or $6.00 for lunch for future meetings.

Senator Albertson said that he would make sure a poll was taken of members to ask if they would be willing to pay for their lunch in the future.

Representative Gibson asked those members and staff who planned to go on the field trip to the coast on 29 November 2004 to let Mr. Givens know. He urged members and staff to attend because the direct effect of what our legislations has done would be visibly shown through the tours that are planned.

Senator Albertson thanked all members for their attendance today and for working through lunch.

Mr. James A. Carter, Assistant Secretary for Operations and Development, Department of Environment and Natural Resources (DENR), gave a status report on the actions taken the Department of Environment and Natural Resources (DENR) in response to flooding in western North Carolina. A copy of Mr. Carter's remarks, verbatim, is listed as **Exhibit K**.

Representative Gibson asked Mr. Carter how much did it cost DENR to respond to flooding in western North Carolina.

Mr. Carter said that for the damaged DENR incurred, the park systems incurred something in the ballpark of $300,000 to $400,000 worth of damage. Forestry estimates their loss at around $1.5 million in damages. The EPA folks who came in and helped with the drum and tanks cleanup received some federal assistance and they spent around $500,000 to $700,000.

Representative LaRoque asked Mr. Carter of the 100 that failed, how many of the Notice of Violations and NODs were issued in fines.

Mr. Carter said that he did not know of any fines that were issued.

Representative Gibson asked for copies of his comments today for distribution to those legislators who were affected by the flooding in western North Carolina.

Robin W. Smith, Assistant Secretary for Policy and Planning, DENR, gave a report on the actions taken by the Department of Environment and Natural Resources (DENR) in response to flooding in western North Carolina.

A copy of a handout giving basic information about the environmental permits required for stream-clearing activities, developed specifically for counties outside the coastal area, is listed as **Exhibit L**.

Ms. Smith said that her office has received a lot of questions about what can be done in terms of clearing debris out of streams. Over the years they have known what to tell the people in the eastern half of the state, but this time around the questions were coming from the western half of the state and the answers are a little different.

Ms. Smith said that in the eastern part of the state and the coastal counties, most often the coastal management program becomes the lead agency to deal with authorizing debris or dredging out material from streams. And in the western part of the state, that responsibility largely falls on the U. S. Army Corps of Engineers.

Ms. Smith said that a description has been put together regarding the permitting requirements and how they work in the western part of the state. The U.S. Army Corps of Engineers needs to be contacted about the need for a federal permit if someone is proposing an activity that involves excavation of sediment or removal of rocks from a streambed, use of equipment that will be operated in a streambed, disturbance of the streambank, or placement of sediment, rocks or other debris in or near surface waters or wetlands.

Ms. Smith said that some of the permits issued by the U. S. Army Corps of Engineers are issued under the Rivers and Harbors Act of 1899, an act that covers dredging activities and obstructions in navigatal waters.

Ms. Smith said that Corps of Engineers also issues permits under Section 404 of the Clean Water Act, which deals with putting fill material in waters and wetlands.

Ms. Smith said that their efforts over the last few weeks have been to get the information out to folks in the counties affected by these storms.

Ms. Smith said that the one exception to that is woody debris, vegetative debris or household appliances that have washed into the streams. Folks can remove those themselves without a permit.

Ms. Smith said that some folks had received notices of violation for failure to get the federal permits. What also goes along with the Corps permits is the need for State Water Quality Certification, and the State DWQ issues that certification.

Ms. Smith said that the State personnel in the Asheville office as well as the Corps personnel have been out meeting with citizens and local government officials to make sure they know what the rules of the road are and what they need to be doing in terms of permits before actually getting in a stream and doing a significant amount of work.

Senator Albertson asked Ms. Smith if she believes we are learning from these events and how to better respond in the future to other events that may occur.

Ms. Smith said that there are still gaps in our communication system. We have experience in the coastal area but this time we found ourselves answering questions in the western part of the state.

Ms. Smith said that we might need to put together a disaster response booklet with basic information about what to do in the aftermath of an event.

Representative Gibson asked Ms. Smith how many notices of violation (NOV) are we talking about during the western flooding event.

Ms. Smith said that she did not have the answer to his question but she said she believed it would be a handful of violations. In some cases it has been both the Corps of Engineers NOV for failure to get a permit and an NOV from Division of Water Quality for failure to get certification.

Representative Gibson asked Ms. Smith for a short description of how DENR interfaces with FEMA and local officials whenever there is disaster.

Ms. Smith said there are ways that we can be prepared to get information out, quickly, and there is some additional work that DENR needs to do to make sure that local government officials and local people are informed about what they should and should not do with regard to permitting.

Ms. Smith said there is about $50 million dollars of federal money that will be available through the Natural Resource Conservation Service (NRCS) for stream clearing activities in North Carolina. These monies require some planning.

Ms. Smith said that one challenge in this situation is to get to people quickly enough to let them know not to do too much too soon. There are things that can be done without a permit and waiting until the federal process comes in would be to their advantage and avoid NOV's.

Representative Gibson asked whose responsibility this would be.

Ms. Smith said that this is still being sorted out. Anytime the federal resources are involved the NRCS likes to send their assistance out directly to local governments. DENR has to get into the loop somewhere to make sure that the permits are needed are issued.

Representative Gibson said he would like to meet with Senator Weinstein and chairs of NER to make sure we do whatever is required to alert folks of what their responsibilities are in case of a catastrophe.

Senator Albertson said he agreed with this idea and said we need to be as prepared as we can to respond to catastrophes.

Mr. James D. Simons, State Geologist and Director, Division of Land Resources, DENR, gave a report on the identification of geologic hazards and lessons learned from flooding in western North Carolina. A copy of two handouts related to Mr. Dorman's presentations are listed as **Exhibit M**.

Mr. Simons said that dam safety also falls into the responsibility of his division and is pleased that given the amount of rainfall they had in that area and the number of high hazards of dams that are potential disasters; there were relatively few emergencies in dam safety. The lesson to be learned there is that we can make things better. The dams that have been repaired and built in modern times are holding well.

Mr. Simons said that unfortunately, we are much farther behind on our geohazards problem, particularly landslides. At least 75 landslides damaged or destroyed 25 homes and caused five fatalities from the Hurricanes Frances and Ivan.

Mr. Simons said that before the storm season came, The Geohazards Program was working with a modest grant from emergency management to inventory and form a database of geohazards in North Carolina, which included landslides.

Mr. Simons said that Exhibit M includes a Fact Sheet on landslide protection. They knew that landslides were going to be a problem with the type of rain that was involved with the Hurricanes Frances and Ivan.

Mr. Simons showed slides from some of the landslides from Hurricane Ivan.

Mr. Simons said there is a certain amount of safety involved before rescuers can enter sites from landslide damage.

Mr. Simons said it was important to have teams in place to respond to the residents. There are only two or three geologists in the Asheville office who could respond.

Mr. Simons said that presentations have been given to river interest groups, answered media inquiry and put into place a database and created a web page.

Mr. Simons said they would like to continue to inventory the spots they have not gotten to, yet, and see what caused them. Unlike lightening, landslides do happen at the same spot again and there are lessons to be learned from studying the spots where there was a failure.

Mr. Simons said that most of the geologists are already committed to other projects. They do have a grant with the Division of Emergency Management that will help them with their work over the next year.

Mr. Simons said that landslides are not the only geohazards in North Carolina. The threat of erosion to the Outer Banks is a hazard. The underlying geology makes certain areas more erodeable.

Mr. Simons said that a problem they see occurring more frequently now is a number of underground gold, copper and silver mines in the Charlotte and Cabarrus County, Monroe and Union County area and land developers who are not aware of these mines.

Mr. Simons said that another problem are sinkholes in the limestone in central and southeastern part of the state. Pumping for agriculture or domestic use wells disturbs ancient voids in the limestone that occurred over millenniums.

Mr. Simons said that he did not believe that we have too much potential for gigantic sinkholes as in Florida but a sinkhole of any size can become a major hazard.

Mr. Simons said that earthquakes are not a great risk but they are out there.

Mr. Simons said that one thing getting more attention now is naturally occurring toxins in the groundwater such as radon and arsenic. More work needs to be done to try to predict where these toxins are located.

Mr. Simons said that in some areas of the state, shrink swell soils are a problem in foundations. We don't have some of the problems like California has but we have hurricanes that California doesn't have.

Mr. Simons said that when we see the blip off of the African coast, we not only have to worry about the Outer Banks but we need to worry about the Gulf and whether it will come up to our mountains.

Mr. Simons said that with the mountain development, as bad as these storms were, historically they were not as bad as the rainfall in 1916-1940, which had fatalities without all of the development. The landslide hazard is out there for a tremendous potential hazard in the future.

Mr. Simons introduced Mr. Rick Wooten, Senior Geologist, North Carolina Geological Survey, who led the efforts on investigating these landslides during the hurricanes.

Representative Gibson asked Mr. Simons what type of landslide or geohazards do we typically see in North Carolina.

Mr. Simons called on Mr. Wooten to answer the question.

Mr. Wooten answered Representative Gibson's question by saying that there is some type of landslide in North Carolina each year. The threshold value looked at in terms of rainfall is about five inches of rain in 24 hours.

This can occur in rainfalls such as hurricanes as well as in summer thunderstorms in the mountains.

Representative Gibson asked if we had somewhere in the neighborhood of 75 landslide or geohazards events as a result of these two storms.

Representative Gibson asked if that is twenty five times more than normal.

Mr. Wooten said that there are about twenty times more landslides during storms like the hurricanes than those seen in a normal year. By inventorying the landslides, they hope to get information on those areas that are more susceptible to slides and get that information to the counties so they can start planning for future events.

Representative Gibson asked Mr. Wooten if the inventorying of these slides had been going on for about ten years.

Mr. Wooten said the inventorying has been done for one year, since receiving funding for this project.

Representative Gibson asked if we had an idea of how many landslides we have had in North Carolina in the past ten years.

Mr. Wooten said we did not have specific numbers but we do have Arial photography from 1940 to look at landslides in Watauga County that occurred from that hurricane.

Mr. Wooten said that he doesn't think we have to have every landslide counted before we start finding out what areas are more susceptible than others.

Representative Gibson said that he is interested in finding out how much of the landslides are caused by manmade conditions and how are we going to find out what we need to do if we don't know where we are on this.

Mr. Wooten said that this is what the Geological Survey is working on. From the data collected so far, they have about 400 data entries of no landslide locations on where old landslide deposits are. They have provided reports to county emergency management folks to give them an idea of locations in their counties where potential problems could occur.

Mr. Wooten said that a lot of what they have seen in the recent storms, the landslides are related to development on steep slopes.

Mr. Simons said that a five inch rain has about a two percent chance of occurring somewhere in North Carolina each year and somewhere in North Carolina will get a 100-year storm.

Representative Gibson asked if in every 100 storms, two of them would be a five-inch event.

Mr. Simons said that it was just a statistical way of saying it was a two percent probability.

Mr. Givens asked Mr. Wooten if there was a program that could map and possibly predict where these events might occur in the future.

Mr. Wooten said that was correct.

Mr. Givens asked if this program has been in place about a year.

Mr. Wooten said they have been using this program for about a year.

Mr. Simons said that this program is a temporary grant with Emergency Management.

Mr. Givens said asked then if it is a grant rather than an appropriation.

Representative Gibson asked if this was a state grant or a federal grant.

Mr. Simons said it was a state grant from Emergency Management.

Representative Gibson asked Mr. Simons how much more money it would take to finish the program.

Mr. Simons said there was not enough money to continue the program and don't know whether the program will be funded again.

Mr. Givens asked Mr. Simons if they were going about this on a county-by-county basis.

Mr. Wooten told me Givens that he thought he was referring to a computer program.

Mr. Givens said that he found out that floodplain mapping was proceeding at the stately pace of one county per year and that it would take 100 years to do them all.

Mr. Givens asked Mr. Simons at what pace they are proceeding with their program and at what pace to they need to proceed.

Mr. Wooten answered the question by saying that this was being done on an "as requested" basis. An example is the Peeks Creek watershed and areas in Watauga County.

Mr. Wooten said that to do an assessment of landslide potential in a given area, they could do it relatively quickly—in a month, by county. This would be a planning level type of assessment, not ground truth, but would be

useful in emergency response and land use planning but not for assigning insurance rates or determining whether you could or could not build in certain areas. The more detailed information needed, the longer it would take. He believed it would take in excess of five years.

Mr. Givens suggested to members that they might want to request of Mr. Simons and Mr. Wooten for an estimated proposal as to what it would take to do this in the same manner as the floodplain mapping and some type of estimate of time and resources to get it done.

Senator Albertson asked Mr. Simons if he would be able to provide this information.

Mr. Simons said that he would be happy to provide this information for ERC and staff.

Senator Kinnaird asked if landslides are something that insurance companies will pay for and/or can such insurance be purchased and if so, is it wise to do so.

Mr. Wooten said that in the case of Peeks Creek, people are having difficulty in getting insurance reimbursements.

Senator Horton said that in the aftermath of Hurricane Floyd, there was some discussion of new floodplain delineation that did not involve the old fashioned technique. Using the new technique, would it still take 100 years to get the job done.

Mr. Simons said that it can be done in much less time with new technology.

Senator Horton asked if we are being held up by lack of funds, like of personnel, or lack of maps.

Mr. Simons told Senator Horton that the holdup is due to all of the things he mentioned.

Mr. Givens told Senator Horton that the next presentation would address floodplain mapping and the question was how to apply that type of program to geologic hazard mapping.

Senator Horton said that our state is too flood prone to not have clear delineations and have them in hand and suggested that we get this information as to what needs to be done as soon as possible.

Mr. John K. Dorman, Director, North Carolina Floodplain Mapping Program, Division of Emergency Management, Department of Crime Control & Public Safety, gave a report on the Floodplain Mapping Program and efforts to expedite the updating of floodplain maps in western North Carolina. A copy of Mr. Dorman's slide presentation is listed as **Exhibit N**.

Mr. Dorman said that the floodplain-mapping program was started following Hurricane Floyd due to a number of issues that arose. Either 80 percent of properties that were either damaged or destroyed during Hurricane Floyd were not depicted accurately in or outside of a floodplain.

Mr. Dorman said that those individuals who were depicted outside the floodplain had not bought flood insurance and therefore had to bear the expense or the state and federal government had to bear the burden.

Mr. Dorman said that the currency of the maps were outdated. The majority of the maps were at least ten years and 75 percent of the maps were over five years old. As development, new roads and changes in topography of the ground changed so did the floodplain.

Mr. Dorman said that $56 million a year was estimated to be cost avoided from flood damage if we had up to date, accurate maps across the State of North Carolina. That is solely because there would be no new development into a risked area that in a 100-year event would be flooded.

Mr. Dorman said that U.S. G. S. estimated that for every dollar spent on flood mapping program and the data collected from that, that data could be used for other purposes other than flood mapping.

Mr. Dorman said that most of the counties and communities, other than Charlotte-Mecklenburg, did not have the resources to update their maps. As Mr. Givens indicated, FEMA had a limited amount of money back in 2000-2001, approximately $50 million dollars a year to do the nation as a whole and they estimated to do one county per year. In that county, it was not studying all of the streams in the county, but rather one or two miles of study. There was a real issue or need for the state to take this over.

Mr. Dorman said that the real issue is when we will get flooded. In 2004, the majority of the western part of the state, from Ivan and Frances, flooded.

Mr. Dorman said that in two years, 95 out of 100 counties had federally declared disasters, the majority of which came from flooding.

Mr. Dorman said that in 2000, the Governor met with the leadership in the General Assembly to come up with three strategies: the first strategy was to develop a state-wide program that would go across the whole State of North Carolina, updating and collecting new elevation data, new engineering studies, building new maps with a new digital component that would allow it to be much more efficiently updated.

Mr. Dorman said that the hand and glove to that strategy was going to FEMA. FEMA did not have the funds or resources to put its attention to North Carolina, so North Carolina became the first state in the nation to become a cooperating, technical state. That basically turned over the responsibility for updating the maps and maintaining the maps to North Carolina.

Mr. Dorman said that there were a number of people who died in Hurricane Floyd by driving across inundated roads. At that time, they were asked to establish a real-time inundation and flood alert component that will be released in February 2005.

Mr. Dorman said that the flood plain mapping program was a phased report, basin by basin.

Representative Hackney asked Mr. Dorman was a real-time alert is for flooding.

Mr. Dorman said that once a stream is studied and know the level of water in the stream, new stream gauges are being placed in strategic locations that go to the USGS satellite every fifteen minutes, which comes back to our system. Based on that stream gauge level at every half foot, we are depicting where that water will be at that time.

Representative Hackney asked Mr. Dorman what would happen next.

Mr. Dorman said that what they would be adding to this would be an alert component. If that gauge had a reading of 9 and one half feet, then an alert would go out to the emergency managers in the community to let them know that it is at alert one.

Senator Kinnaird asked Mr. Dorman why this information would not be aired on television and radio.

Mr. Dorman said that is exactly what they would be doing. They are meeting with the major television stations in the area to coordinate getting this information on a website that they can, in turn, show on TV. At whatever point this information can be provided to this public, it will be shown.

Senator Albertson asked Mr. Dorman that when there is an increase in development, would that change the flood maps over a period of time.

Mr. Dorman said that it would. Impervious surfaces, backfilling with dirt, new roads and bridges would affect the maps.

Mr. Dorman showed an example of one of the new maps, which showed an aerial image of the ground. The maps are derived solely from digital data. Digital base map information is being collected from communities as well as digital elevation data. The engineering studies are being done in a digital model and all of that data is being layered to develop an updated map.

Mr. Dorman said that NASA created a technology back in the late 1960's that allowed an airplane to be flown that gave out pulses of light. As those pulses of light hit the ground and bounce back up, there is a new understanding of what is on the ground. This is what North Carolina has used to collect the elevation data.

Mr. Dorman said that what is done in flood mapping is to remove all of the artifacts off the ground so they know what the bare earth looks like how the water will flow. Then impervious surfaces, development, bridges and anything that can change that flow are added back. This is what is shown on the flood maps.

Mr. Dorman said that there are 42 counties that have flood maps in their hands to make good flood plain mapping decisions. Some of the counties are split between basins, so they are trying to finish those up that are between the Roanoke and Tar Pam basins.

Mr. Dorman said that there are about 18 counties with final floodplain maps. The Cape Fear basin was funded in 2003 by FEMA and they believe the Cape Fear will be completed by March or April 2005. They have collected elevation data for all of Phase II and have received $13 million in funding to do the Catawba and Roanoke basins.

Mr. Dorman said they are waiting on funding for the Yadkin, Chowan, Watauga and New River basins, totaling $19.8 million, which they are asking out of their 2005 budget. Phase III has not been started.

Mr. Dorman said that there are basically 16 counties in the western part of the state with maps that are all over five years old. There are two counties with maps between five and ten years old and six counties with maps that are 11-20 years old. The map scale is pretty course and a much more accurate of scale is needed. There are four counties that have never had flood studies done.

Mr. Dorman said that Macon, Polk, and Rutherford counties have the oldest flood maps.

Mr. Dorman said that if a development comes in, it pushes dirt and causes the floodplain to change; therefore, pushing housing developments into a floodplain.

Senator Albertson asked Mr. Dorman how they plan to keep these maps updated.

Mr. Dorman said that in the State's business plan with FEMA, they are going to take over what is called the maintenance component or letters of map division. With the digital version, they maps can be updated quickly.

Mr. Dorman showed that in the Division of Emergency Management, there is actually mitigation work for homes that have been flooded or want to have prevention from flooding.

Mr. Dorman concluded by saying that in Phase II, they will be collecting some digital orthos. They have the funding for this. The engineering cost is being paid for by FEMA. The State of North Carolina was appropriated $1.2 million in 2002 by the General Assembly for Phase II. They are getting from FEMA about $32 million for Phase II by leveraging what has been done.

Mr. Dorman said that Phase III will be to collect elevation data and the cost for that is right at $5.2 million as well as digital orthos, which will cost right at $250,000.

Mr. Dorman said that if this data is collected, they will be able to leverage from FEMA about $9.8 million to do the engineering and studies.

Representative Gibson asked Mr. Dorman and Mr Carter to share their presentations and information with those members of the General Assembly who were west of I-77.

Representative Gibson asked Mr. Dorman if the League of Municipalities, County Commissioners, Emergency Management folks and engineers were all on the same page.

Mr. Dorman said that North Carolina was the national leader in flood mapping. We have cooperating state committee that has local, county, federal, state, private, building community and the environmental community all on board in providing input and feedback.

Representative Gibson said that the private sector would find this an incredibly valuable tool.

Mr. Dorman said that all of the data can be downloaded, free of charge, that is currently on the website. It is www.ncfloodmaps.com

Representative Gibson asked if the information would be downloadable and manipulative.

Mr. Dorman said that it would be. He said they also have a person solely responsible for providing data requests.

Mr. Dorman said that 40 counties have asked for the elevation data. Counties are collecting their own digital orthos. The elevation provided to those 40 counties saves them between $45,000 and $65,000 on their collection of orthos or a $4.2 million savings to the counties.

Representative Gibson asked their data could be transposed over what is provided to them by the mapping program.

Mr. Dorman answered in the affirmative. He added that in the next two to three months, they would be able to pull other county data on the fly into their county data.

Representative Gibson asked what areas would be mapped next.

Mr. Dorman said that the approach is to do the piedmont area before the western area.

Representative Gibson asked if there was a complication involved when development pressure and number of people causes grief because science doesn't care.

Mr. Dorman said that it was not causing complication because different levels of impervious surface are based on population, soil conditions which the model allows.

Mr. Dorman said that they meet with county municipalities upfront before any work is begun to find out which streams need to be studied.

Mr. Dorman said that they have not had any counties who refused to adopt these maps.

Representative Gibson asked if the piedmont was being done next based on population and impervious surfaces and asked would it not take twice as long to do the piedmont before the western part of the state.

Mr. Dorman said that the piedmont should go much quicker than the eastern maps took. They studied in Phase I over 12,000 stream miles and Phase II will be close to 13,200 stream miles.

Senator Albertson asked Mr. Dorman how we can be assured that this information is correct.

Mr. Dorman said that certified engineers do the model. The State's engineers review the data and FEMA has a set of engineers that look at the data. When it goes to the community, there is a 90-day appeal period. So, there are four reviews to make sure the data is accurate.

Representative Gibson asked Mr. Dorman what is the rate for quality control.

Mr. Dorman said that FEMA has standards that have to be met and the state is exceeding those standards.

Mr. Dorman said that every county is responsible for doing a mitigation plan. In that plan are a lot of different hazards that communities need to deal with and the one in the western part of the state will be landslides and flooding.

Representative Gibson asked when these mitigation plans are due.

Mr. Dorman said they were due in November.

Representative Gibson asked if all of these mitigation plans were in.

Senator Kinnaird said that in the discussions yesterday regarding the fishing license and the proposal that it not be due until 2007, she hoped that we would go to the mid-July point of 2006 instead. She said she would like this to be the goal.

Senator Kinnaird brought up the method of distribution of handouts. She asked if the handouts could be distributed by request only.

Representative Gibson said that all handouts are recycled or returned to the Departments who distribute them.

Representative Gibson said that it was clear to him on the fishing license issue at yesterday's meeting that we have the makings of a workable solution and urged ERC members to have fisheries and wildlife get together before our next to the last meeting in January 2005, and come up with a chronology and possible solution to the license issue as well as a timeline.

Senator Albertson said that the challenge for us was to come up with what it is we want them to do so they can move ahead with the process.

The meeting was adjourned at 1:50 p.m.

Representative Daniel McComas Presiding Co-Chair	Mary R. Watson Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Packet of information including reports related to 19 November 2004 agenda, reports held for future presentations, and other reports
EXHIBIT E:	Color map of NC Water Quality Protection Strategies
EXHIBIT F:	Division of Water Quality 2004 Organizational Chart
EXHIBIT G:	Slides from Keith Overcash's presentation Air Quality Issues update
EXHIBIT H:	Slides from William F. Bailey's presentation on Dupont, Climate Change and Sustainable Growth
EXHIBIT I:	Verbatim remarks by Dr. William Schlesinger, Duke University on current status of climate change science
EXHIBIT J:	Slides from Michael J. Shore's presentation on policy options to address climate change
EXHIBIT K:	Verbatim remarks by James A. Carter on DENR's response to Western North Carolina flooding
EXHIBIT L:	Handouts: Robin Smith - basic information about the environmental permits required for stream-clearing activities, developed specifically for counties outside the coastal area
EXHIBIT M:	Two handouts: James D. Simons – Landslides from Hurricanes Frances and Ivan and an overview of Geohazards in North Carolina
EXHIBIT N:	Slide presentation by John K. Dorman on floodplain Mapping in North Carolina

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Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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5 November 2004

TO: Members of the Environmental Review Commission
Interested Parties

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of November Commission Meetings**
Notice of Planning Meeting
Coastal Site Visits
Schedule of Future Meetings
Meetings of Interested Parties (605 Working Groups)
Additional Information

COMMISSION MEETING:

The Environmental Review Commission (ERC) will meet jointly with the Joint Legislative Commission on Seafood and Aquaculture (JLCSA) at 11:00 a.m. Thursday 18 November 2004 in Room 544 of the Legislative Office Building in Raleigh. The meeting will focus on the development and implementation of the Coastal Habitat Protection Plan pursuant to G.S. 143B-279.8 and a discussion of issues regarding the implementation of the coastal recreational fishing license established by S.L. 2004-187 (Saltwater Fishing Fund). **We anticipate that the meeting will last until late afternoon. Boxed lunches will be provided for members of the ERC and JLCSA.**

The ERC will meet for its regular monthly business meeting at 9:30 a.m. Friday 19 November 2004 in Room 544 of the Legislative Office Building in Raleigh. At this meeting, the ERC will begin or continue studies for which the ERC is responsible, hear reports from State agencies, discuss topics to be considered at future meetings, and attend to other matters. Listed below are potential agenda topics for this meeting and for future meetings. More specific information regarding the agenda for the 19 November meeting of the ERC will be developed at the staff planning meeting discussed below. **We anticipate that the meeting will last until early to mid afternoon. Boxed lunches will be provided for members of the ERC.**

STUDY TOPICS:

Air Quality:

1) Modification of the current highway use tax so that all or a portion of the highway use tax paid on a private passenger vehicle is based on the fuel efficiency rating of the vehicle (S.L. 2004-161, Sec. 19.10(1))

2) Modification of the current vehicle registration fee so that all or a portion of the annual vehicle registration renewal fee for a passenger vehicle is based on the vehicle miles traveled by the vehicle (S.L. 2004-161, Sec. 19.10(2))

3) Issues related to greenhouse gas emissions and global climate change

Miscellaneous:

4) Effectiveness of the State's efforts to protect the environment and conserve the natural resources of NC (S.L. 2004-161, sec. 19.2)

5) Development of a plan to share floodplain mapping information (S.L. 2004-161, Sec. 19.3)

6) Efforts to stimulate renewable energy production in the State

7) Results of the conservation needs assessment conducted by the Land for Tomorrow Coalition

Water Quality:

8) Approaches to prevent and reduce stormwater pollution throughout the State (S.L. 2004-161, Sec. 19.11)

9) Issues related to the Leaking Petroleum Underground Storage Tank (UST) Cleanup Program (S.L. 2003-352, Sec. 12)

10) The role of the State and DENR in implementing the Leaking UST Cleanup Program (S.L. 2004-124, Sec. 30.10.(f)) (joint study with the Joint Legislative Transportation Oversight Committee)

11) Identification and closure of inactive or abandoned animal waste management lagoons

Water Quantity:

12) Water restriction guidelines created by DENR and implemented by local governments, including an evaluation of economic impacts and recommendations for establishing consistency across the State with respect to classes of water use (S.L. 2004-161, Sec. 19.4)

13) Development and funding of regional water supply systems (S.L. 2004-161, Sec. 19.5)

14) Water conservation measures being implemented in the State and incentive programs and other voluntary programs that can help foster water conservation and reuse

15) Expansion of the guaranteed energy savings contracts program for governmental units to include contracts that provide for the conservation of water and sewer usage

REPORT TOPICS:

Air Quality:

16) Annual report on the cost of the Title V Program (G.S. 143-215.3A(c)

17) Annual report on implementation of S.L. 2002-4 (Clean Smokestacks Act) (S.L. 2002-4, Sec. 14)

18) Annual report on issues related to the development and implementation of standards and plans to implement programs to control emissions of mercury and carbon dioxide from coal-fired generating units and other stationary sources of air pollution (S.L. 2002-4, Sec. 12-13)

19) Annual report on increasing the use of alternative-fueled and low-emissions light-duty cars and trucks in privately owned fleets (G.S. 143-215.107C(c))

20) Annual report on development and implementation of a plan to reduce vehicle miles traveled by private sector employees and vehicle emissions resulting from job-related travel, including commuting to and from work (G.S. 143-215.107C(e))

21) Annual report on development and implementation of a plan to reduce vehicle miles traveled by State employees and vehicle emissions resulting from job-related travel, including commuting to and from work (S.L. 1999-328(4.6))

22) Annual report on promotion of telework/telecommuting for State employees and achieving the goal of reducing State employee vehicle miles traveled in commuting by 20% without reducing total work hours or productivity (S.L. 1999-328(4.8))

23) Report on the evaluation and adjustment of the boundaries of the area served by each Metropolitan Planning Organization (G.S. 136-202(d))

Parks and Recreation / Land Conservation:

24) Parks and Recreation Trust Fund Annual Report, Fiscal Year 2003-2004 (G.S. 113-44.15(c))

25) North Carolina Natural Heritage Trust Fund Award Report, Fiscal Year 2003-2004 (G.S. 113-77.9(e))

26) Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands (G.S. 113A-241(c))

27) Annual report on implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR (G.S. 113A-235(c))

Water Quality:

28) Annual report on the Wastewater Discharge Elimination Program (S.L. 2001-452, Sec. 2.9)

Water Quantity:

29) Annual report on the progress of water supply planning (G.S. 143-355(n))

Wetlands:

30) Implementation of the Wetlands Restoration Program and use of funds in the Wetlands Restoration Fund (G.S. 143-214.13)

PLANNING MEETING:

To facilitate development of the agenda for the 19 November meeting of the ERC, to plan for subsequent meetings of the ERC, and to receive input from interested persons regarding the work of the ERC, the Commission Counsel will hold an informal planning meeting at **10:00 a.m. on Tuesday 9 November 2004 in Room 605 of the Legislative Office Building**. Persons who wish to participate in the development of the agenda for meetings of the ERC, or who are interested in any matter before the ERC, are invited to attend.

COASTAL SITE VISITS:

Members and staff of the ERC and JLCSA will visit several coastal sites in the Atlantic Beach/Morehead City/Beaufort area related to marine fisheries beginning at 9:00 a.m. on Monday 29 November 2004. These site visits will be similar to those originally scheduled for 27 September 2004 but were subsequently canceled because of Hurricane Jeanne. No business meeting will be held in conjunction with the 29 November 2004 site visits. Members should, however, plan to arrive in Atlantic Beach by 5:00 p.m. Sunday 28 November 2004 if possible. Further information on the site visits, including information on accommodations, will be sent to members of the ERC and the JLCSA in the next week.

SCHEDULE OF FUTURE MEETINGS:

The ERC will not meet on 22, 23, or 30 November, so it is no longer necessary to ask that you reserve these dates. Below is a schedule of meetings of the ERC for December 2004 through January 2005. This schedule is tentative and subject to adjustment. For planning purposes, please reserve these dates.

Commission Meeting	Staff Planning Meeting
Tuesday 7 December 2004	Wednesday 1 December 2004
Wednesday 12 January 2005	Wednesday 5 January 2005
Thursday 13 January 2005	
Thursday 20 January 2005	
Tuesday 25 January 2005	

MEETINGS OF INTERESTED PARTIES (605 WORKING GROUPS):

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Limit Liability for Environmental Cleanups Working Group (HB 1603/SB 1222)
10:00 a.m. Thursday 2 December 2004 – 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel or other Commission staff at (919) 733-2578.

November 19, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 11/19
Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Doug Lassiter	NCSTA
Steve Woodson	NC Farm Bureau
Brock Nicholson	NC DAQ
DONNIE REDMOND	NC DAQ
Larry Shirley	State Energy Office
George Everett	Duke Power
Tommy Stevens	NCPC
Jim Kuszaj	MCIC
Sarah Blazewicz	NCADA
Mark Benson	Capitol Group
Jim Lowry	NC Utility Contractors Assn

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION
Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Doug Howey	NCPMA
Amy Pickle	SELC
Kathy Hawkins	Progress Energy
Sharon Miller	CUCA
John Morris	DENR - Water Resources
Anita Watkins	NCLM
Kim Hibbard	NCLM
Keith Overcash	DENR - DAQ
Roger Bone	Bone & Assoc -
John McHugh	COG offices
Gary Harris	NCPMA

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VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION
Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Elizabeth Oates	NCPIRG
T REEDER	DWQ
Don Reuter	DENR
Fred Allen	NCAA
Tom Bean	NC Envir. Defense
Rick Zechini	NC Assoc. of Realtors
John Goodman	Alcy Associates
Gudy McCain	N.C. Commerce Natural
David Mumey	BREDL
Tom Peterson	TDP CLC
Steve Wall	DENR

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VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 11/19/04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Jenny Fullam	Hunton & Williams
Sharon Strand	State Energy Office
Amber Munger	Environmental Defense
Don Rayno	NCDWR
Robin Smith	DENR
Butch Gunnells	NCSDA
Stephen Smith	SACE
Ulla Reeves	SACE
Marjorie Mulhall	SACE/ED
Jon Carr	Jordan Price.
Karen Fadely	Duke Univ (student)

5.

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION
Name of Committee **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Sara Brodnax	Duke University
Ken Melton	D.O.R.
John Sandolski	Moore + Van Allen
Rick Wooten	DENR Geological Survey
Jim Simons	DENR Land Res
Wm. Schlesinger	Duke University
Michael Shore	Environmental Defense
Jimmy Carter	NC DENR

November 19, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
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AGENDA
9:30 a.m. Friday 19 November 2004
Room 544 Legislative Office Building

1. Call to order
   Representative Daniel F. McComas, Presiding

2. Introductory remarks by Cochairs
   Representative Daniel F. McComas
   Representative Pryor A. Gibson
   Senator Charles W. Albertson
   Senator Daniel G. Clodfelter

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Annual Report on the Wastewater Discharge Elimination Program (S.L. 2001-452, Sec. 2.9)
   W. Andrew Adams, Acting Chief
   Onsite Wastewater Section, Division of Environmental Health, Department of Environment and Natural Resources (DENR)

5. Report on the programs, activities, and priorities of the Division of Water Resources
   John N. Morris, Director
   Division of Water Resources, DENR

6. Report on the programs, activities, and priorities of the Division of Air Quality
   B. Keith Overcash, Director
   Division of Air Quality, DENR

7. Discussion of issues related to greenhouse gas emissions and global climate change

   Voluntary programs to address climate change
   William F. Bailey, Principal Consultant
   DuPont

Current status of climate change science
William H. Schlesinger, James B. Duke Professor of Biogeochemistry
Dean, Nicholas School of the Environment and Earth Sciences
Duke University

Policy options to address climate change
Michael J. Shore, Senior Policy Analyst
Environmental Defense

WORKING LUNCH – Estimated for 12:00 p.m. to 1:00 p.m. (Lunch Provided)

8. Status report on the actions taken by the Department of Environment and Natural Resources (DENR) in response to flooding in western North Carolina
James A. Carter, Assistant Secretary for Operations and Development
Department of Environment and Natural Resources (DENR)

Robin W. Smith, Assistant Secretary for Planning and Policy
DENR

9. Report on the identification of geologic hazards and lessons learned from flooding in western North Carolina
James D. Simons, State Geologist and Director
Division of Land Resources, DENR

10. Report on the Floodplain Mapping Program and efforts to expedite the updating of floodplain maps in western North Carolina
John K. Dorman, Director
North Carolina Floodplain Mapping Program, Division of Emergency Management, Department of Crime Control & Public Safety

11. Commission discussion and announcements

12. Adjourn

SCHEDULE OF FUTURE MEETINGS:

Below is a schedule of meetings of the Environmental Review Commission for December 2004 and January 2005. This schedule is tentative and subject to adjustment. For planning purposes, however, please reserve these dates.

Commission Meeting:
Tuesday 7 December 2004
Wednesday 12 January 2005
Thursday 13 January 2005
Thursday 20 January 2005
Tuesday 25 January 2005

Staff Planning Meeting:
Wednesday 1 December 2004
Wednesday 5 January 2005

COASTAL SITE VISITS:

Members and staff of the Environmental Review Commission and the Joint Legislative Commission on Seafood and Aquaculture will visit several coastal sites in the Atlantic Beach/Morehead City/Beaufort area related to marine fisheries beginning at 9:00 a.m. on Monday 29 November 2004. These site visits will be similar to those originally scheduled for 27 September 2004 but which were subsequently canceled because of Hurricane Jeanne. No business meeting will be held in conjunction with the 29 November 2004 site visits.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Limit Liability for Environmental Cleanups Working Group (HB 1603/SB 1222)
10:00 a.m. Thursday 2 December 2004 – 605 Legislative Office Building

November 19, 2004 ERC Meeting
EXHIBIT D

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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19 November 2004

MEMORANDUM

To: Members of the Environmental Review Commission
From: Tim Dodge, Research Assistant for Environmental Issues
Re: Reports to the Commission

This memorandum lists reports that have been submitted to the Environmental Review Commission by State agencies, as required by law, since the last reports distribution on 21 October 2004.

A. REPORTS RELATED TO TODAY'S AGENDA

The following reports are attached to this memorandum. These reports may be referenced during the course of the 19 November 2004 Commission meeting.

Environmental Health (Agenda item 4):

1. *Annual Report on the Wastewater Discharge Elimination Program.* Department of Environment and Natural Resources (DENR). 16 November 2004. Statutory Authority: S.L. 2001-452, Sec. 2.9.

Water Quantity (Agenda item 5):

2. *Annual report on the progress of water supply planning.* Division of Water Resources, DENR. 17 November 2004. Statutory Authority: G.S. 143-355(n).

Air Quality (Agenda item 6):

3. *Annual report on the cost of the Title V Program.* Division of Air Quality, DENR. 18 November 2004. Statutory Authority: G.S. 143-215.3A(c).

4. *Annual report on implementation of S.L. 2002-4 (Clean Smokestacks Act).* DENR and the North Carolina Utilities Commission. 1 June 2004. Statutory Authority: S.L. 2002-4, Sec. 14.

5. *Annual report on issues related to the development and implementation of standards and plans to implement programs to control emissions of mercury from coal-fired generating units and other stationary sources of air pollution.* Division of Air Quality, DENR. 1 September 2004. Statutory Authority: S.L. 2002-4, Sec. 12.

6. *Annual report on issues related to the development and implementation of standards and plans to implement programs to control emissions of carbon dioxide from coal-fired generating units and other stationary sources of air pollution.* Division of Air Quality, DENR. 1 September 2004. Statutory Authority: S.L. 2002-4, Sec. 13.

7. *Annual report on increasing the use of alternative-fueled and low-emissions light-duty cars and trucks in privately owned fleets.* DENR. 1 September 2004. Statutory Authority: G.S. 143-215.107C(c).

8. *Report on the evaluation and adjustment of the boundaries of the area served by each Metropolitan Planning Organization.* Department of Transportation. 1 November 2004. Statutory Authority: G.S. 136-202(d).

B. REPORTS HELD FOR FUTURE PRESENTATIONS

The following reports are being held for distribution in conjunction with a potential agenda item at a future meeting of the Commission.

Parks and Recreation / Land Conservation:

9. *Parks and Recreation Trust Fund Annual Report, Fiscal Year 2002-2003.* Division of Parks and Recreation, DENR. 1 October 2004. Statutory Authority: G.S. 113-44.15(c).

10. *North Carolina Natural Heritage Trust Fund Award Report, Fiscal Year 2002-2003.* Division of Parks and Recreation, DENR. 1 October 2004. Statutory Authority: G.S. 113-77.9(e).

11. *Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands.* DENR. 1 October 2004. Statutory Authority: G.S. 113A-241(c).

C. OTHER REPORTS

The following report was discussed during oral presentations at the 21 October 2004 Commission meeting, but a written copy was not distributed at that time:

Water Quality:

12. *Annual report on the compliance/ enforcement of water quality laws for facilities that discharge into surface waters.* DENR. 1 October 2004. Statutory Authority: G.S. 143-215.9A.

The following report was distributed to members of the Environmental Review Commission at its joint meeting with the Joint Legislative Commission on Seafood and Aquaculture on 18 November 2004.

General:

13. *Annual report on progress in developing and implementing Coastal Habitat Protection Plans.* DENR. 1 September 2004. Statutory Authority: G.S. 143B-279.8(e).

Please contact George Givens, Jeff Hudson, Jennifer McGinnis, or Tim Dodge at (919) 733-2578 if you have any questions or comments.

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: Environmental Review Commission Members

FROM: William G. Ross, Secretary

RE: Annual WaDE Program Report

S.L. 2001-452 requires the Department of Environment and Natural Resources to report to the Environmental Review Commission each year on the Wastewater Discharge Elimination Program. Attached is this year's report.

If you have any questions, please contact Andy Adams at 919-715-3274.

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NC Wastewater Discharge Elimination Program

2004 Annual Report to the North Carolina General Assembly

November 2004

North Carolina Department of Environment and Natural Resources
Division of Environmental Health
On-site Wastewater Section

N.C. Wastewater Discharge Elimination Program
2004 Report

The North Carolina Wastewater Discharge Elimination (WaDE) Program is located in the On-site Wastewater Section of DENR's Division of Environmental Health. The WaDE Program was established pursuant to S.L. 1996-18es2, Section 27.26, to identify and eliminate discharges from straight pipes and failing septic systems to land surfaces and streams. Funds appropriated by the N.C. General Assembly support a two-member team to address the straight pipe and failing septic system issues in North Carolina. Additional financial support has been secured through grants from the N.C. Clean Water Management Trust Fund (CWMTF) and the U.S. Environmental Protection Agency (EPA) 319 Non-point Source Program. Strong collaboration with local and federal agencies as well as the public, the media, and environmental groups is the hallmark of the WaDE program and the key to its successes thus far.

Program Goals

The primary goal of the WaDE Program is to identify and correct violations of on-site wastewater systems in western North Carolina, ultimately eliminating domestic sewage discharges into streams and other water systems. Based in Asheville and serving 26 western North Carolina counties, the WaDE Program works with local health departments to identify straight piping and keep sewage out of streams that are used as public water supplies (see attachment 'Public Water Supply Surface Intake Points of NC'). The program also identifies, and at times channels, sources of financial assistance for low-income homeowners in need of septic system repairs. This financial assistance is usually in the form of grants and loans, which are distributed through regional councils of government or non-profit housing rehabilitation agencies. The WaDE Program also provides public health and environmental education to homeowners and other stakeholders at the community, county, regional, state, and federal levels related to on-site wastewater issues. In addition, to meet the statewide demand for septic system repair and straight pipe elimination, the WaDE Program is currently collaborating with the University of North Carolina's Environmental Finance Center to develop a statewide model for a septic repair financial assistance program.

Previous Accomplishments

During the first four years of the program, the WaDE team directed one survey project (Buncombe County) and assisted in four other independent county surveys funded by the CWMTF, N.C. Department of Commerce's Division of Community Assistance (DCA), Appalachian Regional Commission, and N.C. Rural Communities Assistance Project (RCAP). The counties targeted in the independent surveys were Alleghany/Ashe, Jackson, Madison, and Avery/Mitchell/Yancey. The WaDE Program's 1998 independent survey of the Ivy Watershed in Buncombe County received a small amount of funding from RCAP; its results are included in the Expanded WaDE Program section below.

Participating local health departments tracked survey-related corrections; however, many are no longer tracking corrections due to loss of funding support. As of the last report, approximately 19,150 homes were surveyed during these independent efforts, and violations were found at 2,505 (13%) of these homes. As of 2003, 1,244 (50%) of those violations had been corrected, with 480 (39%) violations being corrected with financial assistance. At the minimum rate of 240 gallons of

wastewater per household per day, this represents 298,560 gallons of untreated wastewater removed from the streams daily.

The Expanded WaDE Program

In 2001, the WaDE team proposed a new model for achieving the goals of the program, and this model was approved and funded for three years by the CWMTF ($1.2 million over three years) and the EPA 319 Non-point Source Program ($500,000 over three years). Since the expansion in 2001, the WaDE program has added seven full-time and two temporary team members (surveyors) to the original two-person staff.

The WaDE surveyors provide support to county environmental health specialists with already-full workloads who have the responsibility for issuing septic system repair permits and inspecting the repaired work for homes identified as needing improvements by the WaDE surveys. In addition, WaDE surveyors assist homeowners who self-report problems with their on-site wastewater systems, giving homeowners substantial time to resolve the problem. In this capacity as DENR employees, surveyors also provide amnesty considerations to homeowners who cooperate with the field surveys, as these homeowners are considered to be self-reporting. In the past 21 months, WaDE team members have surveyed 4,707 homes and identified 725 violations (15% violation rate) in nine counties. About 229 repairs have been completed; 143 of them with financial assistance (see second attachment for additional survey statistics).

As part of the expanded model, the WaDE Program provides financial assistance for septic system repairs in 19 counties in western North Carolina. Financial assistance is being provided through collaboration with CWMTF, DCA, U.S. Department of Agriculture's Rural Development Program, and regional councils of government that have experience with similar housing rehabilitation programs. In addition, the WaDE Program works to annually identify changing sources of financial assistance for septic repairs in all North Carolina counties.

The WaDE Program also provides public education on various public health concerns and environmental issues. This information is offered to the public through such mechanisms as public service announcements, public community meetings in survey areas, door-to-door visits by trained WaDE surveyors, teachers' guides and videos for school children, outreach to the N.C. Real Estate Commission on property disclosure requirements, and other various publications, slide shows, and talks geared toward local, state, and national audiences. The program has also received positive attention from the local media, which aids in informing the public and encouraging owners of failing systems and straight pipes outside of survey areas to come forward for assistance.

Future Directions

The WaDE Program is performing well within its mandate and scope, however, addressing several challenges would enable this program to reach its full potential in assisting residents of the state.

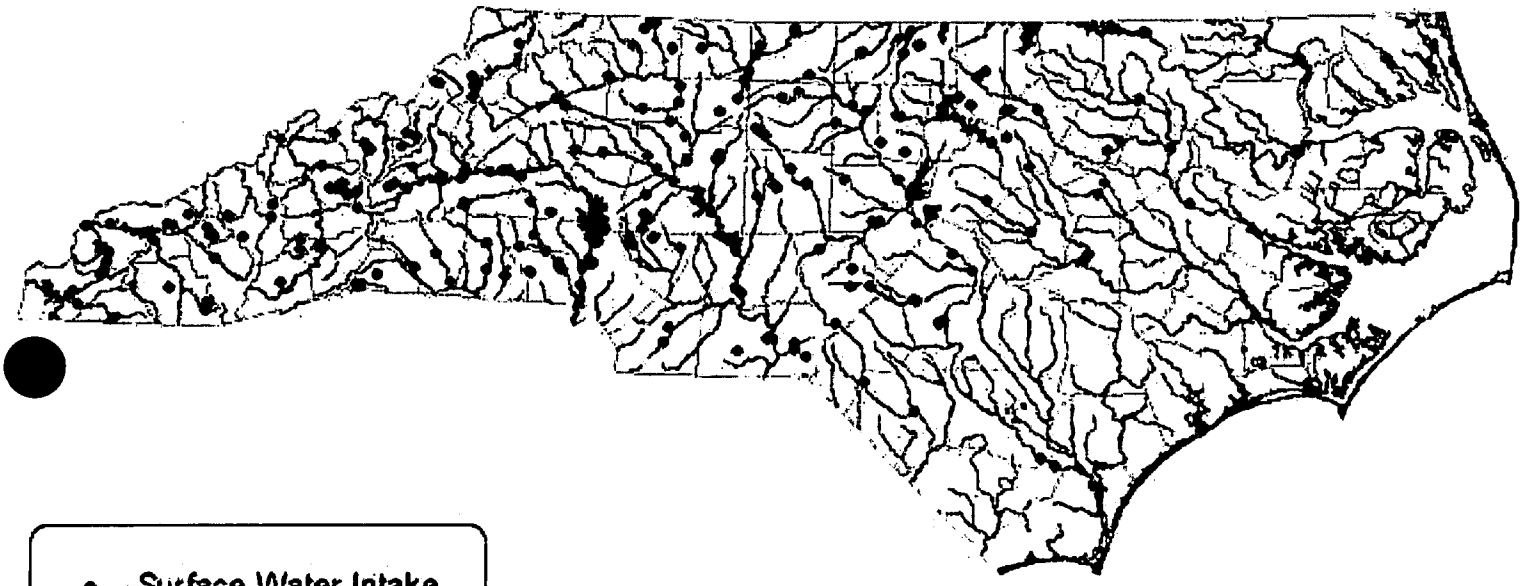
- *Human capacity*. While the WaDE Program has developed strong relationships with the local health departments serving the 26 counties in which it works, as well as with state and federal funding agencies, the current staff cannot identify and assist in the repair of all failing septic systems in those counties.

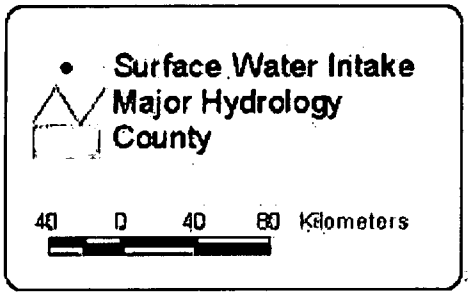
- *Geographical scope.* The WaDE Program currently serves 26 western counties in North Carolina. However, the impacts of straight pipes and failing septic systems are not limited to these counties. Failing septic systems present a threat to public health and to the environmental quality of North Carolina's waterways in communities across the state.

- *Financial resources available for repair/replacement.* A large number of systems in need of repair or replacement are identified during each door-to-door survey. Many of these systems belong to people with limited financial resources who are unable to pay for system repairs even when the local health departments waive the repair permit fees. Sources of financial assistance are critical for these systems. The WaDE Program has secured temporary funding for financial assistance. A permanent mechanism for identifying, providing and distributing grants and low-interest loans to eligible homeowners in need of septic repair across the state would enable the removal of more untreated waste from North Carolina's streams and rivers and provide safer and healthier wastewater treatment options for many residents beyond the timeframe of the current funding. This establishment could work with local governments, regional councils of governments, and local housing rehabilitation agencies to identify potential sources of financial assistance.

State of North Carolina

Public Water Supply Surface Water Intakes





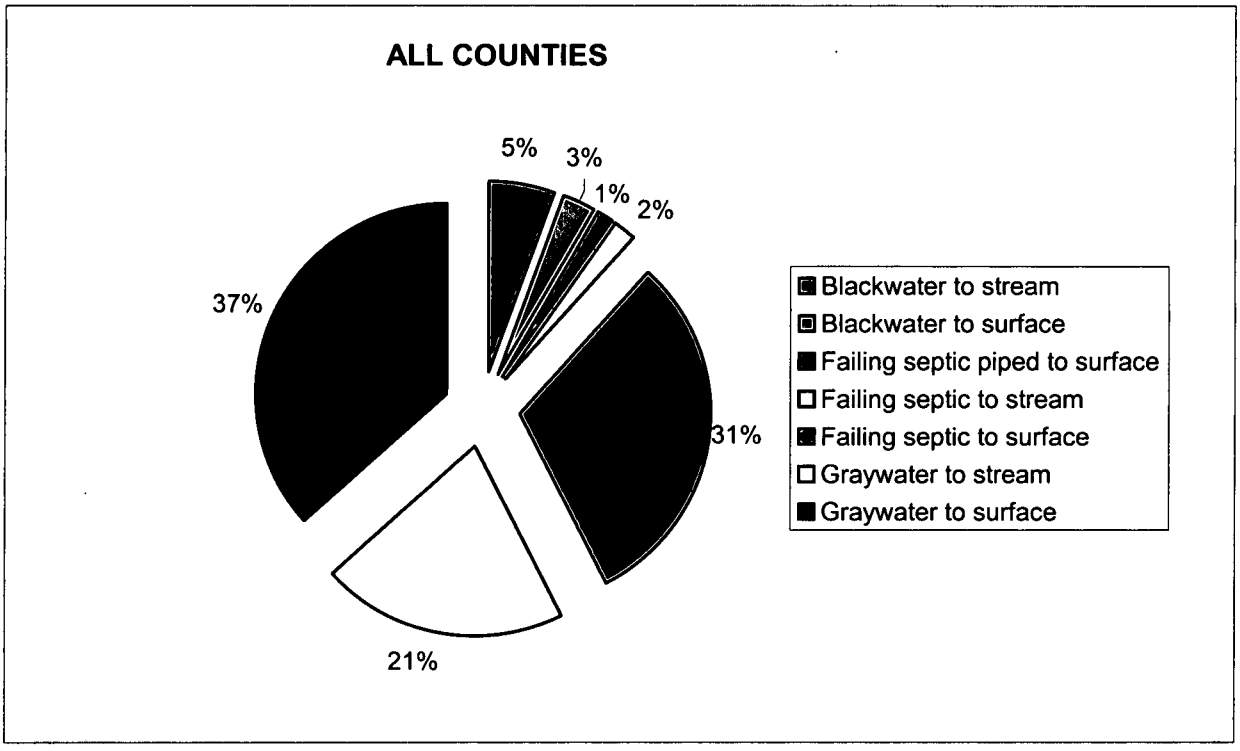
DEH Public Water Supply Data

All Counties

Buncombe,Burke, Henderson, Macon, Rutherford, Wilkes, Watauga,Yancey

Total homes visited	6808		
Completed surveys	4707		
Doorhangers	2028		
Refused Entry	47		
Incompletes	22		
Get copy of permit	4		
Violations	725	15%	
Condition of System	Count	Completed Repairs	%
No violation evident	3982		
Blackwater to stream	36	25	69%
Blackwater to surface	19	7	37%
Failing septic piped to surface	9	1	11%
Failing septic to stream	13	5	38%
Failing septic to surface	203	82	40%
Graywater to stream	137	50	36%
Graywater to surface	242	45	19%
Other	38	8	21%
Pit privy	27	5	19%
Pit privy over stream	1	1	100%

Total Violations	725	15% *(violation rate)*
Total Repairs	229	32% *(repaired of total violations,*



NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

November 17, 2004

TO: Environmental Review Commission Members

FROM: William G. Ross, Secretary

RE: Annual State Water Supply Plan Report

G.S. 143-355(n) requires the Department of Environment and Natural Resources to report to the Environmental Review Commission each year on the development of the state water supply plan. Attached is this year's report. If you have any questions, please contact John Morris at 919-733-4064.

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Department of Environment and Natural Resources

Division of Water Resources

STATUS REPORT TO THE GENERAL ASSEMBLY ON WATER SUPPLY PLANNING SEPTEMBER 1, 2003 THROUGH AUGUST 31, 2004

Assuring a sustainable future water supply for North Carolina is the primary mission of the Division of Water Resources. To carry out this responsibility, the division administers several monitoring, planning and regulatory programs.

The division, in partnership with the U.S. Geological Survey, monitors the availability of water through a network of monitoring wells and stream gages. DWR assists community water systems with the preparation of Local Water Supply Plans and prepares the North Carolina Water Supply Plan. The division receives and maintains the registrations of large water withdrawals and issues permits for water withdrawals in designated capacity use areas. DWR handles applications for certification of interbasin transfers of surface water and is the lead agency for the Department of Environment and Natural Resources in the relicensing of hydropower projects. This status report provides an update on these water supply programs and on other related division activities.

Water Quantity Monitoring

The division maintains ground water and surface water monitoring networks partly in partnership with federal agencies. The data from these networks provide essential information on the conditions of water resources throughout the state. North Carolina cooperates with the U.S. Geological Survey (USGS) to maintain monitoring sites with near-real time data collection capabilities. The division also maintains a network of ground water monitoring wells. Data from these wells are collected quarterly. About forty percent of these wells have data recorders that provide daily water level data. To improve the accessibility and usefulness of this data for water resource management, the DWR has recently joined with the State Climate Office at N.C. State University, the U.S. Army Corps of Engineers, USGS and others to develop a uniform database to store and disseminate water resources data.

In recent years, with the support of the General Assembly, the DWR has expanded the monitoring well network in the Coastal Plain region, an area where ground water resources are being stressed by over-pumping. Four new monitoring stations with eighteen wells have added critical data to improve management of the regional aquifer systems. The division will expand the monitoring well network as funds permit to reduce the gaps in ground water data.

Changes to the funding formula for the monitoring stations operated cooperatively with USGS have resulted in the discontinuance of data collection at some monitoring sites. Maintenance of near-real time data reporting in the system will require upgrading existing equipment in the near future.

Local Water Supply Plans

The General Assembly established a water supply planning program under General Statutes 143-355(l) and (m) to assure the availability of adequate supplies of good quality water to protect the public health and to support desirable economic growth. The original statute required units of local government that provide or plan to provide public water service to prepare a Local Water Supply Plan (LWSP). During the 2003 legislative session, the General Assembly expanded the scope of water systems required to prepare a LWSP to include community water systems that regularly serve 1,000 or more service connections or 3,000 or more individuals.

LWSPs describe current and future water needs, and assess the system's ability to meet those supply needs. LWSPs must be adopted by the water system's local governing board and be updated at least every five years. The Division of Water Resources is responsible for reviewing the local plans for completeness and consistency.

The plans provide a valuable source of data for all local and regional water supply planning. Information from the local plans is available on the division's Web site www.ncwater.org. In the current update cycle, local government water systems were asked to update their local plans to reflect system conditions and water use during 2002 and to submit the plans to the division by July 31, 2003. The newly-added community water systems were required to submit plans by January 1, 2004. Division staff members expect to receive updated or new plans from about 585 water systems. A list of the 61 water systems not submitting 2002 local plans as of November 17, 2004 is included at the end of this document.

Session Law 2003-387, which expanded the scope of water systems required to prepare a LWSP, also added the requirement that water systems include a description of how they will respond to water shortage emergencies and continue to meet essential public water supply needs as part of their local plan. DWR staff members provide assistance with developing these water shortage response plans.

North Carolina Water Supply Plan

The division uses the information from the LWSPs and other sources to develop the North Carolina Water Supply Plan (NCWSP), mandated by G.S. 143-355(m). The NCWSP presents a summary of water use by major river basin and identifies areas of concern where water availability or conflicts between users may limit the ability to meet water demand.

The 2001 NCWSP is available on the division's Web site at www.ncwater.org. The plan is based on information from the 1992 and 1997 LWSPs and 1999 water withdrawal registrations submitted pursuant to General Statute 143-215.22H. No changes were made to this document during the period covered by this report. The NCWSP will be updated to reflect information in the 2002 Local Water Supply Plans and the results of the River Basin Water Supply Plans discussed in the next section.

River Basin Water Supply Plans

To further the legislative goal of assuring the availability of adequate supplies of water, the Division of Water Resources is developing a River Basin Water Supply Plan for each of the major river basins in the state. The River Basin Water Supply Plans will provide a basin analysis of long-range cumulative water supply demands. By projecting

water needs to 2050 and evaluating these future demands with a hydrologic model, the plans will give local governments and other water users a reliable, quantitative framework within which to plan for sustainable and cost-effective water sources for future needs.

While data from the LWSPs can be used to estimate future water demands and wastewater discharges, analysis of the impacts on a river basin depends on the ability to determine the effects of withdrawals and discharges on river flows. This analysis is performed by using a computer-based hydrologic model that can simulate water movement in the river system. The division prepared a Cape Fear River Basin Water Supply Plan in 2002 in conjunction with analysis of allocations of water supply storage in B. Everett Jordan Lake. The hydrologic model used in that case was developed to analyze the potential impacts of the movement of water between the Cape Fear River system and the neighboring basins. This Cape Fear plan became the model for the river basin water supply planning initiative.

DWR is currently developing River Basin Water Supply Plans for the Catawba and Yadkin river basins. Hydrologic models for these basins are currently under construction in conjunction with the relicensing of the hydropower projects on these rivers. Long-term water supply needs will be documented for inclusion in the new licenses to be issued by the Federal Energy Regulatory Commission. The next priorities for river basin plans will be the Neuse and Tar basins, followed by the remaining North Carolina basins.

Drought Response

Session Law 2003-387 (House Bill 1062) gave the Department of Environment and Natural Resources the authority to establish a Drought Management Advisory Council (DMAC) to improve coordination, management and mitigation of the harmful effects of drought. The DMAC was given the responsibility to issue drought advisories to assist local governments and other water users in taking appropriate actions to address the impacts of reduced water availability.

Division of Water Resources staff members are working with other resource management and data collection agencies to develop a methodology to evaluate the severity of drought conditions in North Carolina. The resulting tool will provide an objective measure of drought severity. The Web-based tool will allow water managers and local decision makers to stay informed of conditions in their particular region of the state and take timely actions to reduce the harmful effects of drought. The DMAC will issue drought advisories to help water users respond appropriately to drought-induced water shortages.

Session Law 2002-167 (House Bill 1215) required the department to conduct an analysis of water conservation measures and possible incentives and voluntary programs that could encourage water conservation and water reuse. A report summarizing the findings of this analysis is available on the DWR Web site at www.ncwater.org under the "Water Conservation" link. The division has invited further public comment on this report and will revise and reissue it by the end of 2004.

The statute also requires the Environmental Management Commission (EMC) to develop administrative rules establishing minimum standards and practices for water use during drought and water emergencies. DWR is coordinating the effort to develop these rules. Several meetings have been held with interested parties to get input on important issues that need to be addressed in any proposed rules. Division staff will continue to meet

with interested stakeholders and members of the EMC to develop a draft rule to go to public hearing. The EMC has to adopt permanent rules that will become effective following legislative review by the 2006 session of the General Assembly.

Central Coastal Plain Capacity Use Area

Rules designating the Central Coastal Plain Capacity Use Area and establishing a water withdrawal permitting system became effective August 1, 2002. The rules were designed to gradually reduce withdrawals from the endangered Black Creek and Upper Cape Fear aquifers in the designated counties. The rules require stepped reductions in withdrawals from the endangered aquifers and encourage the development of alternative sustainable sources of water. Anyone wishing to withdraw more than 100,000 gallons of ground water a day must apply for and receive a permit from the Division of Water Resources. As of November 17, 2004, 109 water withdrawal permits have been issued or renewed resulting in a total of 153 permitted users and 38 permit applications were under review.

Water withdrawers have not made significant reductions in water use from the impacted aquifers to date. The rules provide an initial six-year period for systems to develop plans to adjust water withdrawals and develop alternative sources. Water systems have made substantial progress in identifying new sustainable water sources. Several are pursuing surface water options and some are developing wells to withdraw water from other aquifers. Additional information on the Central Coastal Plain Capacity Use Area and the associated rules can be found on the division's Web site at www.ncwater.org.

Bladen County Capacity Use Investigation

In December 2002, the Water Allocation Committee of the EMC asked DWR to conduct a capacity use investigation of the Southern Coastal Plain area surrounding Bladen County. The study determined that there are areas in the region where water levels are declining due to overpumping of ground water. In some areas, water levels have recovered when pumping was reduced. Other areas show steady water level declines. The monitoring well network in this region is sparse and new wells need to be added to effectively monitor the impacted areas. Water users in the region are taking actions to reduce the impacts on regional ground water resources. The division did not recommend declaring a Capacity Use Area at this time, but supported the formation of an agreement between DWR and local stakeholders and the EMC to expand ground water monitoring and protection efforts. The Water Allocation Committee and the EMC approved this agreement in October 2004. The Southern Coastal Plain Capacity Use Investigation report is available on the division's Web site at www.ncwater.org.

Interbasin Transfer Certifications

Surface water users that wish to transfer more than two million gallons of water in any one day from one river basin to another must apply to the EMC for an Interbasin Transfer Certificate. Users that had an interbasin transfer prior to July 1993 are permitted to continue but must apply for certification before making significant increases. The EMC has to look at the impacts on the source basin and the receiving basin and weigh the benefits against the detriments of the transfer. The process involves extensive

environmental analysis and numerous opportunities for public input and comment. Since the last status report, the following interbasin transfer-related activities have been undertaken.

Concord and Kannapolis are jointly conducting an environmental analysis to support a potential request for an Interbasin Transfer Certificate to transfer water from the Catawba and the Yadkin basins to the Rocky River Basin.

In early 2004, the Kerr Lake Regional Water System began the process to increase their grandfathered transfer of water from the Roanoke to the Tar and Neuse river basins to accommodate the expansion of their water treatment plant from 10 to 20 million gallons per day.

Hydropower Facility Relicensing

The Federal Energy Regulatory Commission (FERC) licenses non-federal hydroelectric generation projects on navigable waterways. The licenses, issued for 30 to 50 years, govern how the hydroelectric projects are managed and therefore how the rivers on which they are located are affected. Upon expiration of an existing license, the licensee has to apply for a new license in order to continue operating the project. Five years prior to the expiration date of an existing license, the licensee has to file a Notice of Intent to apply for a new license. The license application is filed 24 months before the expiration of the existing license. The three years between filing the Notice of Intent and the license application are used to compile the data needed to evaluate the impacts of a project on regional resources and to support the application and requested provisions of the new license.

There are 26 FERC licensed projects in North Carolina. Fourteen of the projects have licenses that expire between 2015 and 2047 and nine have filed license applications that are being reviewed and awaiting decisions by FERC. The remaining three projects, which include most of the major reservoirs in the North Carolina Piedmont, have licenses that expire in 2008. The licensees are currently conducting technical studies and gathering data to support the license applications. These projects are in the Catawba and Yadkin-Pee Dee river basins in North Carolina. Duke Power, a Duke Energy Company, operates the Catawba-Wateree Hydro Project, consisting of 11 reservoirs and 13 hydropower generation facilities in North Carolina and South Carolina. Alcoa Power Generating Inc. – Yadkin Division operates the Yadkin Project, comprised of four reservoirs and hydropower generation facilities on the Yadkin River in North Carolina. Progress Energy Carolinas, Inc. operates the Yadkin-Pee Dee River Project, with two reservoirs and hydropower generation facilities on the Pee Dee River in North Carolina downstream of Alcoa Power Generating Inc. – Yadkin Division's project.

DWR is working closely with the licensees to ensure that water supply issues are given due consideration in the relicensing process. The division is developing river basin water supply plans for the Catawba-Wateree and Yadkin-Pee Dee river basins in conjunction with the relicensing process. In the Catawba-Wateree River Basin the licensee is funding an independent study to estimate water supply use in both North Carolina and South Carolina through 2058. The division is working closely with this project.

To update the information on the other projects discussed in last year's status report, licenses for Duke Power's Nantahala Area projects and Alcoa Power Generating, Inc.'s Tapoco Division projects are still under review by the FERC. Dominion Energy's Lake Gaston /Roanoke Rapids project is expected to be issued a license in the near future.

Local Water Supply Plan systems that have not submitted a plan for review as of November 16, 2004			
County	Water System	County	Water System
Alamance	Ossipee SD	Hertford	Murfreesboro
Ashe	Lansing	Hoke	Northwest Water Supply Inc.
Avery	Sugar Mountain	Iredell	Love Valley
Brunswick	Boiling Spring Lake	Johnston	Micro
Brunswick	Navassa	Mecklenburg	Lamp Lighter South Danby
Brunswick	Oak Island	Montgomery	Badin Shores Resort
Brunswick	Southport	Montgomery	Troy
Cabarrus	Cabarrus Woods/Cambridge Subdivision	Moore	Taylortown
Carteret	Bogue Banks WC	Nash	Nashville
Carteret	Merrimom Comm	New Hanover	Runnymeade
Carteret	Pine Knoll Shores	New Hanover	The Cape Sudivision
Carteret	West Carteret WC	Northampton	Rich Square
Caswell	Milton	Pender	Surf City
Catawba	Southeast Catawba County	Pitt	Fountain
ChathamG	oldston-Gulf SD	Randolph	Randleman
Cleveland	Grover	Robeson	St. Pauls
Columbus	Brunswick	Rutherford	Bostic
Columbus	Columbus County WD I	Rutherford	Ellenboro
Columbus	Columbus County WD III	Sampson	Harrells WC
Columbus	Riegelwood SD	Scotland	Gibson
Columbus	Sandyfield	Stanly	Stanly County-Aquadale
Craven	Dover	Stanly	Stanly County-Badin Road
Craven	Fairfield Harbour	Stokes	Walnut Cove
Craven	Vanceboro	Swain	Whittier SD
Cumberland	Hope Mills	Transylvania	Connestee Fall Development
Dare	Manteo	Watauga	Appalachian State University
Gates	Gatesville	Watauga	Boone
Graham	Santeetlah	Watauga	Seven Devils
Greene	Hookerton	Wilkes	Ronda
Harnett	Angier	Yancey	Burnsville
Henderson	Henderson County		

NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

November 18, 2004

TO: Environmental Review Commission Members

FROM: William G. Ross, Secretary

RE: Annual Title V Air Quality Report

G.S. 143-215.3A(c) requires the Department of Environment and Natural Resources to report to the Environmental Review Commission each year on the cost of the Title V program. Attached is this year's report. If you have any questions, please contact Charles Valrie at (919)-715-6281.

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STATE OF NORTH CAROLINA

TITLE V AIR QUALITY PERMIT PROGRAM

ACCOUNTABILITY REPORT

PURSUANT TO

N.C.G.S. 143-215.3A(c)

15A NCAC 2Q .0206(f)

40 CFR 70.9

NOVEMBER 2004

DIVISION OF AIR QUALITY

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

EXECUTIVE SUMMARY

The Clean Air Act Amendments of 1970, reviewed and amended by Congress in 1977 and 1990 formed the basis of the federal air pollution control currently in place. Health-based national ambient air quality standards are the strategic basis of the Clean Air Act. The standards were to be met through the application of control technology that would reduce emissions continuously and result in improved air quality. Costs of technological capability were to be subordinated to public health protection requirements. Also, all requirements were to be national, with no facility having a competitive edge by having to meet less stringent controls. The Environmental Protection Agency (EPA) is responsible for carrying out the program.

Prior to the 1990 Clean Air Amendments, EPA set two kinds of National Ambient Air Quality Standards (NAAQS) specifying maximum acceptable levels of pollutants for outdoor air. Primary standards set limits that protect human health; secondary standards provide welfare protection (i.e. plants, animals, aesthetics and materials). EPA set primary and secondary standards for six criteria pollutants: carbon monoxide, nitrogen dioxide, lead, sulfur dioxide, ozone and particulates. Eight substances were listed as hazardous air pollutants: asbestos, beryllium, mercury, vinyl chloride, radionuclides, inorganic arsenic, benzene, and coke oven emissions. National Emissions Standards for Hazardous Pollutants (NESHAPS) were promulgated for sources of seven of these pollutants.

Most air pollution comes from either stationary sources, such as factories, power plants and smelters, or mobile sources such as cars, trucks and airplanes. To limit mobile source pollution, controls were established for automobile emissions. EPA also set standards that applied to new industrial plants and existing ones that were substantially modified. Additionally, state governments were required to draw up State Implementation Plans (SIP's) that set out other measures to achieve acceptable air quality.

Congress mandated the Title V Permit Program, primarily for regulating major air pollution sources, under the Federal Clean Air Act Amendments of 1990. The North Carolina Environmental Management Commission (EMC) established the state Title V Permit Program in 1994 in accordance with state and federal laws and with guidance from the N.C. Clean Air Act Advisory Council. The state Division of Air Quality (DAQ) carries out the program, which received interim approval from the U.S. Environmental Protection Agency (EPA) on December 15, 1995 and final approval in October 2001. To date, the DAQ has issued 402 Title V permits. The Division has one remaining application under review and expects to issue this remaining initial Title V permit by the end of the year.

The Clean Air Act requires that permit fees cover the entire cost of the Title V Program. In North Carolina, the revenue raised from Title V permit fees is close to the estimated cost of the program. This is true even though the total fees collected are only about 78 percent of the minimum fees presumed necessary to run the program under the Federal

Clean Air Act. Many other states charge the minimum presumptive fee, which is $25 per ton in 1990 dollars. The permanent staff size for carrying out North Carolina's Title V program is considered adequate, given the current number of permit applications, the known program requirements, and the DAQ's experience with the program. Contract personnel were, until December 2002, used to assist in the completion of the work on the initial round of permit applications. Now that the initial TitleV permits have been issued, reconsideration of the staffing needs for Title V modifications and renewals will be conducted.

The following additional points are provided to clarify/highlight the information provided in this report:

- The issuance of permits is progressing in a satisfactory manner.
- The division has been able to run a fiscally sound program collecting less in fees than was authorized by the oversight committee at the start of the program.
- The break down of staff between the central office and the regional offices has adequately covered the needs of the division to date. This distribution of staffing is being reviewed since issuance of the initial Title V Permits is nearing completion.

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INTRODUCTION

This Accountability Report describes the Title V Permit Program in North Carolina as carried out by the Division of Air Quality, Department of Environment and Natural Resources. The report focuses on funding and staffing issues. It does not cover Title V permit programs under the jurisdiction of local air pollution control programs in Buncombe, Forsyth, and Mecklenburg counties.

Congress established the Title V Permit Program under the Federal Clean Air Act (1990 Amendments), primarily as a way to regulate major air pollution sources. Under the Clean Air Act, Title V Permits are required for certain industry groups as designated by the EPA as well as facilities that emit at least:

- 100 tons per year of regulated pollutants; or
- 10 tons per year of any hazardous air pollutant; or
- 25 tons per year of any combination of hazardous air pollutants.

In North Carolina, the General Assembly enacted laws in 1991 and 1993 authorizing the Title V program. The legislature also established the North Carolina Clean Air Act Advisory Council to develop the programs needed to comply with the Clean Air Act, including the structure of the Title V permit fees. The Clean Air Act Advisory Council issued a final report in August 1992, and the Environmental Management Commission followed the council's recommendations in adopting rules for the state Title V Permit Program in 1994. The EPA gave interim approval to North Carolina's Title V Permit Program on December 15, 1995, with final approval pending certain rules changes, which have been submitted to EPA. EPA gave final approval, in October 2001.

The Clean Air Act as well as the N.C. General Assembly, the EPA, the EMC and the Clean Air Act Advisory Council all required or recommended accountability measures for the state Title V program. This Accountability Report includes:

- A discussion of program accomplishments and goals;
- A detailed description of the Title V permit fee structure for calendar year 2003;
- A detailed, line-item budget for state fiscal year 2003;
- An organizational chart for total staff in the Division of Air Quality and Title V related positions; and
- An account of Title V receipts and expenditures from state fiscal year 1992 to 2002;

The Division of Air Quality started receiving Title V permit applications after EPA's interim approval of the program on December 15, 1995. Facilities were given until December 1996 to submit their applications or they would be considered in violation of the permitting rules. Applications received during the aforementioned timeframe were called "Initial Title V Applications" and all other Title V applications received after December 1996 were called "First Time Title V Applications." By January 1998, DAQ had 475 Title V applications under review. Since program approval, the DAQ has received a total of 558 Title V applications (488 initial and 70 first time). To date DAQ

has issued all but one initial Title V permit and expects to issue this remaining permit before the end of the year. The issuance of the last permit has been delayed by the need for public hearing and recent comments by permit applicants. One hundred and eight of the initial Title V applications have been withdrawn due to reclassification or closure. To date DAQ has issued 51 of the First Time Title V permits and is currently reviewing 20 applications. Currently, DAQ has 382 operating facilities classified as Title V facilities.

Questions about this Accountability Report or request for copies should be directed to Charles Valrie, Division of Air Quality, Department of Environment and Natural Resources, 1641 Mail Service Center, Raleigh, NC 27699-1641; telephone (919) 715-6281; email: Charles.Valrie@ncmail.net.

ACCOMPLISHMENTS AND GOALS

The Division of Air Quality (DAQ), the Department of Environment and Natural Resources (DENR), and the North Carolina Environmental Management Commission (EMC) have accomplished the following measures in developing and carrying out a Title V Permit Program in North Carolina. Goals are included where applicable.

1. The DAQ has established a Title V Permit Program based on rules adopted by the EMC (15A NCAC 2Q .0500). The program meets the requirements of state law (N.C.G.S. §§143-215.3 and 143-215.108) that authorized the program in North Carolina and set up the North Carolina Clean Air Act Advisory Council. The EPA gave interim approval to the program in 1995, and following the DAQ's revision to the Title V regulations; EPA gave final program approval in October of 2001.

2. In 2002 the DAQ revised the Title V application forms including the development of special forms for the renewal of Title V permits. These revised forms are intended to facilitate the application process, and they have been placed on the Division's website (http://daq.state.nc.us).

3. The DAQ has developed a permit fee schedule that generates an appropriate amount of revenue to carry out the Title V permitting program. The Federal Clean Air Act requires that Title V permit holders pay fees sufficient to cover the cost to administer the permitting program. The DAQ will continue to evaluate the fee structure to ensure that the necessary fees are collected.

4. The DAQ has hired approximately 139 staff members to operate the Title V program since it started in 1992. The total staff size is still smaller than the projected size from the Final Report of the Clean Air Act Advisory Council and has remained constant for several years. There are no plans to increase the number of positions funded by the Title V fees above the current level.

5. DENR has established a Small Business Assistance Program, hired a Small Business Ombudsman, and appointed a Compliance Advisory Panel to conduct citizen overview of small business activity.

6. The DAQ continues to hold meetings, including quarterly Outside Involvement Committee meetings, to provide citizens and the regulated community the opportunity for input into DAQ's permitting and planning procedures.

7. DAQ provided and continues to provide a range of options to qualify facilities as Non-Title V facilities. Many facilities have taken advantage of these options, which is one of the reasons why the number of Title V facilities is much less than initial estimates; that is, 382 Title V facilities now versus the 2000 estimated in the Clean Air Act Advisory Council's Final Report. For example, the DAQ established the synthetic minor program so facilities could avoid the Title V permitting program by taking permitted emission limits and/or operating restrictions. Also, the EMC adopted and EPA approved exclusionary rules to

allow reasonable potential emission calculations in cases where standard methods would produce unreasonably high potential emissions thus subjecting such facilities to Title V. **Goal:** The DAQ will continue to issue appropriate permits to qualified facilities that wish to remain non-Title V facilities.

8. To date, DAQ has issued 402 permits (380 initial and 22 first time). **Goal:** DAQ will issue the one remaining initial permit by the end of December 2004.

9. In 1994 DAQ conducted its first comprehensive emissions inventory for all facilities in North Carolina. This comprehensive inventory process has been repeated every three years for all non-Title V facilities. In January 2003 the inventory requirement was changed to every five years for non-Title V facilities. Title V facilities continue to be required to submit an inventory annually. This emission information is stored on a computer database that DAQ uses to calculate fees and for use in regulatory planning. **Goal:** The DAQ has started to develop an electronic on-line inventory system and the system was made available to permittees to use in 2003.

CALENDAR YEAR 2003 PERMIT FEES TABLE

NOTES AND EXPLANATION

The federal Clean Air Act requires that the entire cost of the Title V Permit Program, including both direct and related expenses, be funded by facilities' permit fees and that Title V permit fees be used only for this purpose. The Clean Air Act also set a presumptive minimum for total fees at $25 per ton of air pollutant emissions in 1990 dollars, with a cost-of-living escalator that has raised this minimum to $37.43 in 2004 dollars. The Title V permit fees schedule for North Carolina now yields only 78 percent of the presumptive minimum. However, DAQ considers this amount adequate to run the program as long as all other funding sources for DAQ remain unchanged. The Title V permit fees are required by federal statutes and DAQ rules to be adjusted each January 1st by an official cost-of-living factor from the U.S. Environmental Protection Agency.

The Clean Air Act Advisory Council established by the General Assembly recommended in 1992 that the Title V permit fees should total $25 per ton of emission (adjusted annually for cost-of-living from the 1990 base), rather than the $36.45 per ton shown by the workload analysis in the council's final report. The council recommended this level so North Carolina could remain competitive with neighboring states — most of which were expected to use the $25/ton plus inflation presumptive minimum — and because of the many uncertainties in the program at that time.

The advisory council also considered the fairness of basing fees entirely on the amount of pollutants emitted, rather than on the amount of work required to administer Title V permits for various types of facilities. Because a certain amount of work is required to issue every Title V permit, regardless of the facility's emissions, the council recommended that half of the total Title V permit fees come from an applications fee (an annual flat fee for each permit) and the other half of the revenues come from annual per-ton charges.

A major uncertainty during the advisory council's work was the number of facilities that would be required to hold Title V permits and their emissions levels. This existed because a comprehensive emission inventory had never been required for all facilities. Since the council concluded its work, the EPA has issued many regulations, policies, clarifications, and changes to the Title V program, and the state has responded accordingly.

The state also has shown flexibility in the Title V program by using size exclusions for some industry groups (such as service stations, grain elevators, dry cleaners and emergency generators) and by allowing facilities to adopt permit limits that reduce their potential emissions below the Title V thresholds (known as synthetic minor sources). As a result, the number of Title V facilities has decreased from an estimated 2,000 in the Clean Air Act Advisory Council's Final Report, to 850 when the Title V permit fees schedule was adopted effective March 8, 1994, to about 382 facilities today. The total amount of emissions has changed little since the council's final report.

In Table I, "non-attainment" refers to permits issued under special rules applicable in areas that are in non-attainment with federal standards for criteria air pollutants such as ozone or carbon monoxide. "PSD" refers to permits issued under federal Prevention of Significant Deterioration rules. "NSR/NAA" refers to permits issued under special rules for New Source Review in Non-attainment Areas.

Another feature of the fee schedule that should be noted is that no permit application fee is charged for a simple renewal of a permit. In addition, no permit application fee is charged when the reason for the change is initiated by the director of the Division of Air Quality or the Environmental Management Commission, e.g., new control equipment required by a new rule or even the initial Title V permits for existing permitted sources.

CALENDAR YEAR 2005 PROJECTED TITLE V PERMIT FEES 10/21/2004

TITLE V PRESUMPTIVE MINIMUM	316829 TONS *	$37.34	=	$11,830,395	IN 2004 $
FEES PER NC RULE (TOTALS FROM BELOW)		TITLE V		$8,097,758	IN 2004 $
		AVERAGE TITLE V $/TON		$25.56	IN 2004 $
		AVERAGE TITLE V $/TON		$17.11	IN 2004 $
		% OF PRESUMPTIVE		68.45	

		PERMITS	FEE RATE	FEE SUBTOTAL	
TITLE V	ANNUAL FEES				
	BASIC	382	$6,074	$2,320,268	IN 2001 $
	TONS/TONNAGE FACTOR	316829	$17.42	$5,519,162	
	NONATTAINMENT	0	$3,097	$0	
TITLE V	APPLICATION FEES				
	SIGNIFICANT MODIFICATION	17	$8,576	$145,792	
	MINOR MODIFICATION	185	$834	$154,290	
	OWNERSHIP CHANGE	9	$60	$540	
	NEW	10	$8,576	$85,760	
	PSD OR NSR/NAA	9	$12,982	$116,838	
	PSD & NSR/NAA	0	$24,504	$0	

*The 2001 presumptive minimum fee was used in these calculations.

TITLE V EXPENDITURE BUDGET
STATE FISCAL YEAR 2004

ACCOUNT	ACCOUNT DESCRIPTION	BUDGETED AMT
531212	SPA-REG SALARIES-RECPT	5,253,886
531462	EPA&SPA-LONGVTY PAY-REC	45,360
531512	SOCIAL SEC CONTRIB-RECPT	388,985
531522	REG RETIRE CONTRIB-RECPT	179,391
531562	MED INS CONTRIB-RECPTS	357,033
531631	WRKER COMP-MED PAYMENTS	0
532110	LEGAL SERVICES	174,124
532133	EMPLOYEE/EMPLOYMENT PHYSIC	27,848
532140	OTH INFORMATION TECH SVC	331,422
532160	ENGINEERING SERVICES	49,318
532170	ADMIN SERVICES	124
532181900	WORKSHOP/CONF EXP-FOOD SE	315
532210	ENRG SER -ELECTRICAL	11,835
532310	REPAIRS - BUILDINGS	300
532310003	REP BLDG-ELECT SYSTEMS	290
532331	REPAIRS-MOTOR VEHICLES	906
532332	REPAIRS-OTH COMPUTER EQP	380
532333	REPAIRS-OTHER EQUIPMENT	0
532337	REPAIRS-PC/PRINTERS	29
532390	REPAIRS-OTHER	3,237
532430	MAINT AGREEMENT-EQUIP	3,253
532441	MAINT AGRMT-OTHER SOFTWR	4,381
532443	MAINT AGRMT-OTHER DP EQP	7,433
532447	MAINT AGREE-PC/PRINTER	2,576
532448	MAINT AGREE-SERVER SOFTWARE	0
532449	MAINT AGREE-SERVER SOFTWARE	19,377
532450	MAINT AGREE-SERVER EQUIP	0
532490	MAINT AGREEMENT-OTHER	1,509
532512	RENT/LEASE-BLDINGS/OFFIC	279,396
532513	RENT/LEASE-OTH FACILITIE	100
532521	RENT/LEASE-MOTOR VEHICLE	108,251
532590	RENT/LEASE OTHER PROPERT	4,574
532711	TRANSP AIR - IN STATE	0
532712	TRANS AIR-OUT STATE,IN U	5,305
532714	TRANSP-GRND - IN STATE	16,029
532715	TRANS GRND-OUT STA,IN US	902

TITLE V EXPENDITURE BUDGET

STATE FISCAL YEAR 2004

ACCOUNT	ACCOUNT DESCRIPTION	BUDGETED AMT
532717	TRANSP OTHER - IN STATE	26
532718	TRANS OTH-OUTSTATE, IN U	491
532721	LODGING - IN STATE	6,979
532722	LODGING-OUT STATE, IN US	6,872
532724	MEALS - IN STATE	4,402
532725	MEALS-OUT OF STATE,IN US	3,078
532727	MISC - IN STATE	20
532728	MISC - OUT STATE, IN US	68
532811	TELEPHONE SERVICE	39,741
532812	TELECOMMUN DATA CHRG	0
532814	CELLULAR PHONE SERVICES	8,193
532815	EMAIL AND CALENDARING	8,939
532819	TELEPHONE WIRING SVC CHR	0
532821	COMPUTER/DATA PROCESS SV	3,008
532822	MANAGED LAN SVC CHARGE	308
532840	POSTAGE, FREIGHT & DELIV	17,774
532840001	POST,FR&DEL-MAILING SVCS	0
532840003	POST,FR&DEL-POSTAL METER	876
532850	PRINT,BIND,DUPLICATE	4,287
532860	ADVERTISING	39,581
532911	PROPERTY-INSURANCE	3,240
532912	MOTOR VEHICLE INSURANCE	9,115
532913	LIABILITY INSURANCE	329
532930	REGISTRATION FEES	8,749
532942	OTHER EMP EDUCATIONAL EX	7,429
532950	EMP MOVING EXPENSES	0
533110	GENERAL OFFICE SUPPLIES	15,289
533120	DATA PROCESSING SUPPLIES	7,733
533130	PHOTOGRAPHIC SUPPLIES	602
533150	SECURITY & SAFETY SUPP	13,636
533190	OTHER ADMIN SUPPLIES	61
533240	CARPENTRY & HARDWARE SUP	1,200
533310	GASOLINE	307
533330	OIL, LUBRICANTS, FLUIDS	203
533340	TIRES & TUBES	0
533350	MOTOR VEH REPLCEMNT PART	0

TITLE V EXPENDITURE BUDGET

STATE FISCAL YEAR 2004

ACCOUNT	ACCOUNT DESCRIPTION	BUDGETED AMT
533640	OPTICAL SUPPLIES	1,591
533710	SCIENTIFIC SUPPLIES	52,099
533720	EDUCATIONAL SUPPLIES	0
533900	OTHER MATERIALS & SUPP	9,471
534210	BUILDING ACQUISIT COSTS	0
534511	FURN-OFFICE	16,399
534521	OFFICE EQUIPMENT	486
534523	EQUIP-SCIENTIFIC/MEDICAL	43,956
234528	EQUIP-VOICE COMMUNICATION	1,342
534530	OTHER DP EQUIPMENT	2,598
534534	PC/PRINTER EQUIPMENT	43,132
534535	SERVER EQUIPMENT	0
534539	OTHER EQUIPMENT	2,799
534620	TEXTBOOKS	88
534630	LBRRY&LRNING RESRCE COLL	5,765
534711	OTHER COMPUTER SOFTWARE	0
534713	PC SOFTWARE	6,549
534714	SERVER SOFTWARE	0
535830	MEMBERSHIP DUES&SUBSCRIP	1,743
535900	OTHER EXPENSES	8,447
536929	OTHER CONT/GRT-ED-INST	62,178
536961	AID TO COUNTIES	6,000
536989	OTHER CONTRACTS/GRANTS	118,074
538010	DEPENDENT CARE-OP TFR	7,873
538102	I 1615	58,656
538108	TFR IND. COST 1940/14300	126,229
538111	TRANSFER TO CODE 14300	625,930
538129	TFR TO REG FIELD OFFIC	143,896
TOTAL		8,835,706

HISTORY
TITLE V FEES/ASSESSMENTS AND EXPENDITURES
EXPLANATION

DENR collected Title V assessments until the Environmental Management Commission adopted rules setting the permit fees schedule in 1994, as specified by the General Assembly in House Bill 551(N.C.G.S. 143-215.3 and 143-215.108). The rule adoption process occurred after the North Carolina Clean Air Act Advisory Council issued its final report in 1992, as specified by the legislature. Assessments were collected in state fiscal years 1992 (starting July 1, 1991) 1993, and 1994. The Title V permit fees set by rule were collected beginning in state fiscal year 1995 (starting July 1, 1994).

In 1997, facilities received a partial refund of Title V fees. This was accomplished by sending the facility a check, valued at 21 percent of the permit fees paid in 1997. This refund was to reduce the budgeted carry forward as of July 1, 1998.

The Division of Air Quality, based on an analysis of variability in fuel tax revenue, decided that it is prudent to have a carry forward of about 35 percent. The 35 percent is well within the statutory limitation that allows a state's Title V program to carry forward 100 percent of the expected cost of the Title V program for the next year. By terms of the Federal Clean Air Act, the entire cost of the Title V program must be paid with Title V permit fees, and Title V permit fees can only be used for this purpose.

HISTORY

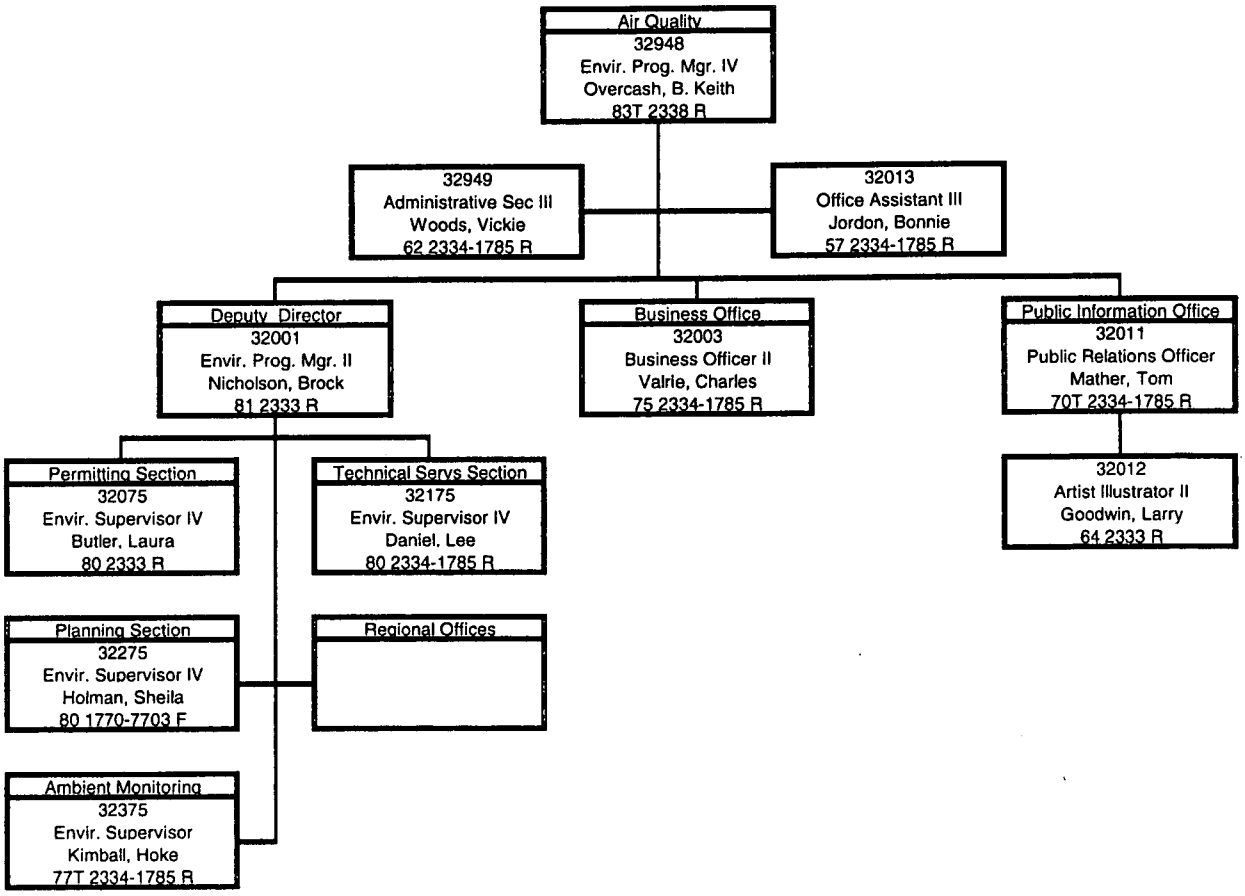
TITLE V FEES/ASSESSMENTS AND EXPENDITURES

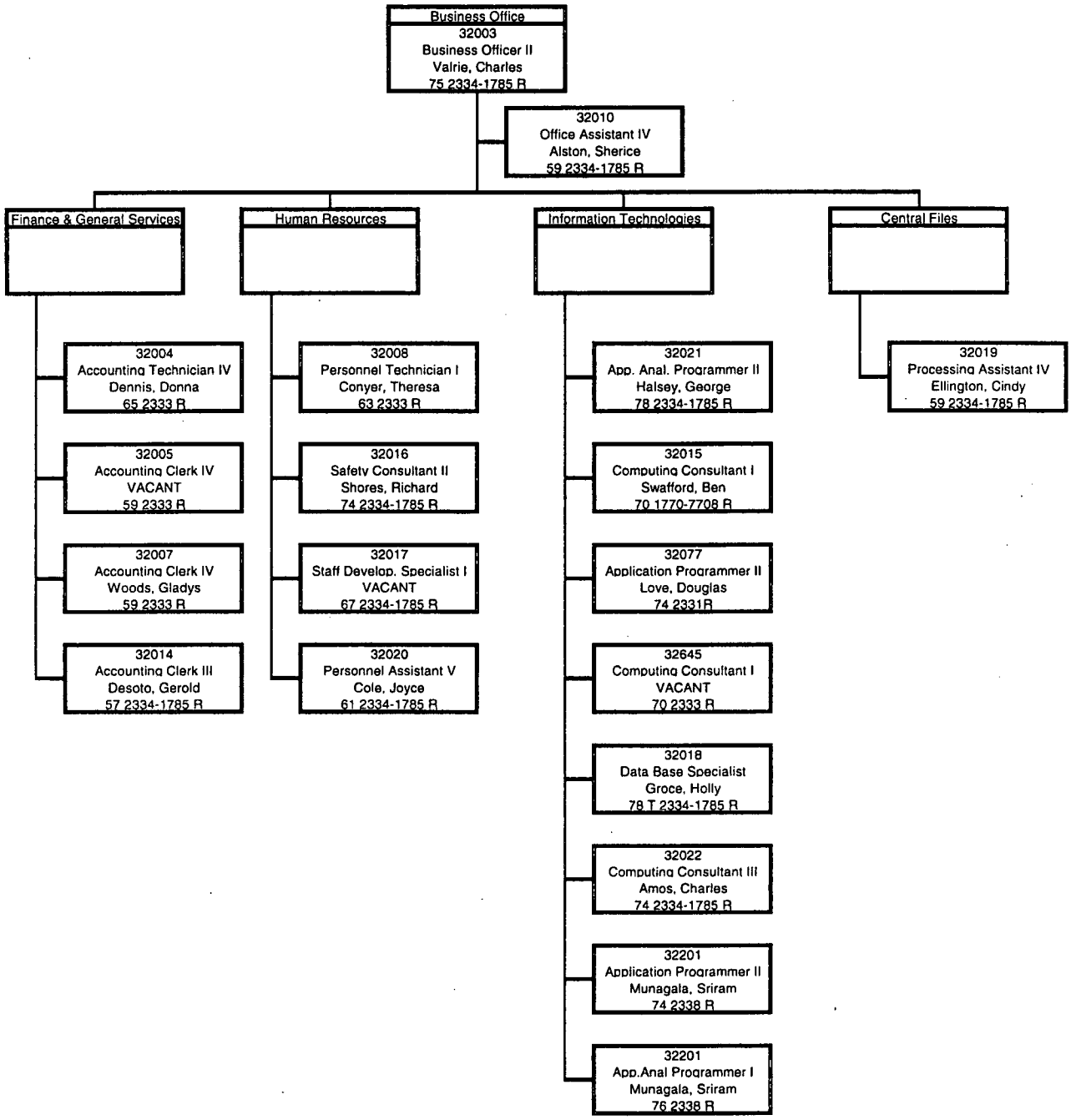
(MILLIONS $)

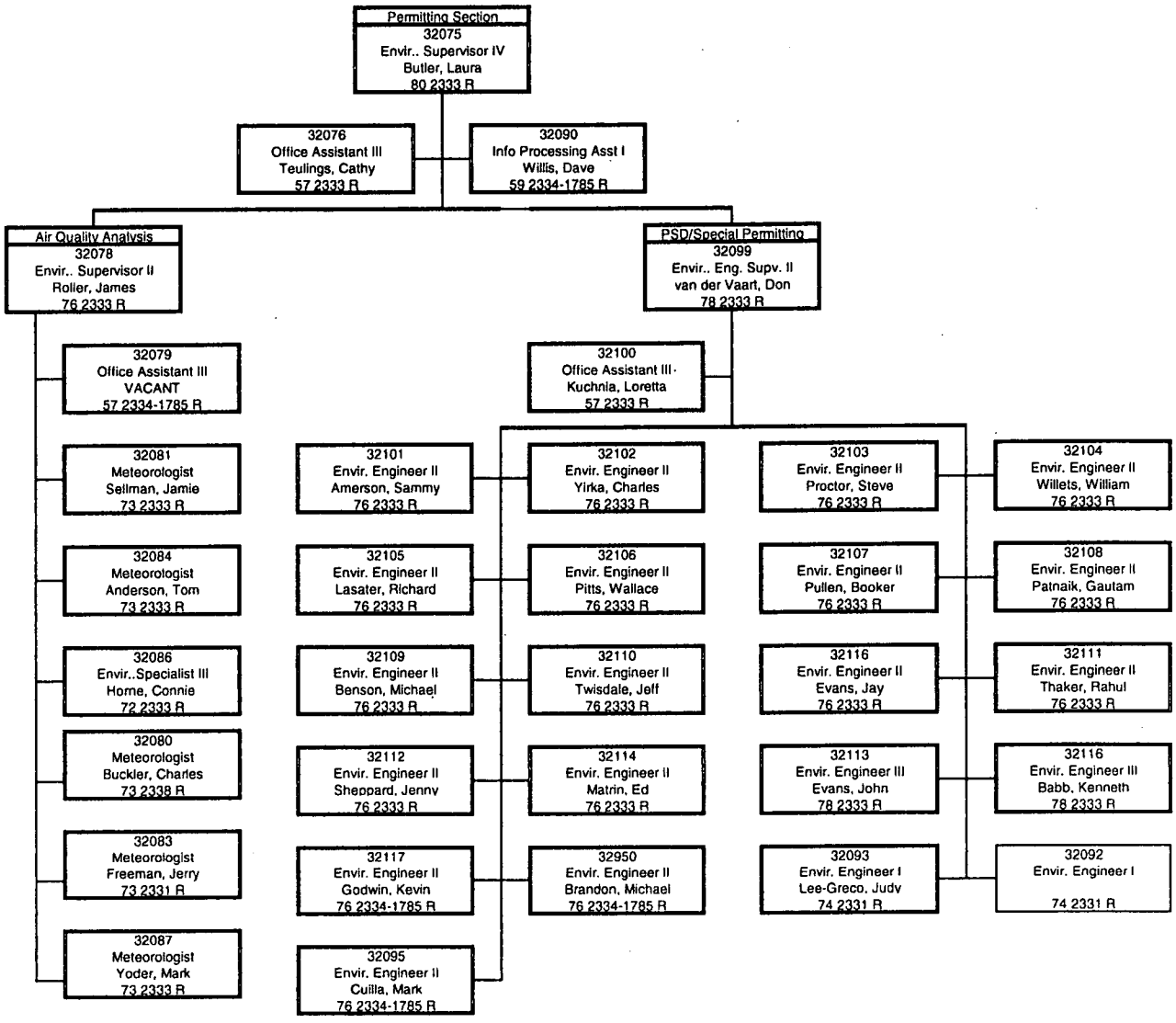
State Fiscal Year	92	93	94	95	96	97	98	99	00	01	02	03	Projected 04	05
Carried Forward	0	0.6	1.8	1.7	2.8	4.5	5.5	5.7	5.4	4.8	4.5	5.6	4.8	4.1
Fees Beginning '95/Assessments before	0.9	3.9	3.5	6.3	7.9	7.6	9.3	7.8	7.9	8.7	9.1	7.7	8.1	8.5
Salary	0.1	0.9	2.3	3.6	4.2	4.7	5.1	5.8	6	6.4	5.9	6.0	6.2	6.4
Travel		0.1	0	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.4	0.1
Supplies	0.1	0.3	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.6	0.2
Equipment	0.1	1.1	0.3	0.5	0.3	0.2	0.4	0.3	0.4	0.2	0.1	0.3	0.1	0.4
Contracts		0.3	0.4	0.2	0.1	0.2	0.3	0.1	0.3	0.3	0.3	0.4	0.4	0.3
Other (Rent, Utilities, Regl. Office Fund, etc)			0.3	0.4	0.7	0.6	0.9	0.8	0.8	1.2	0.7	0.9	0.6	0.9
Small Business Ombudsman's			0.2	0.2	0.3	0.3	0.1	0.3	0.3	0.3	0.3	0.4	0.3	0.4
Transfer to DENR Agencies					0.2	0.3	0.4	0.6	0.4	0.4	0.4	0.3	0.7	0.3
Total Expenses	0.3	2.7	3.6	5.2	6.2	6.6	7.5	8.1	8.5	9	7.9	8.5	8.8	9.0
Refund to Sources							1.6							
TO BE CARRIED FORWARD	0.6	1.8	1.7	2.8	4.5	5.5	5.7	5.4	4.8	4.5	5.6	4.8	4.1	3.6

ORGANIZATION CHART EXPLANATION

The organization chart shown in this document lists all the positions authorized by State Personnel for the Division of Air Quality. Positions that are funded using Title V fees are listed with a funding designation of 2333R. Additionally, positions outside the Division of Air Quality that are funded through the transfer of Title V funds are listed separately.


Air Quality
32948
Envir. Prog. Mgr. IV
Overcash, B. Keith
83T 2338 R
32949
Administrative Sec III
Woods, Vickie
62 2334-1785 R
32013
Office Assistant III
Jordon, Bonnie
57 2334-1785 R
Deputy Director
32001
Envir. Prog. Mgr. II
Nicholson, Brock
81 2333 R
Business Office
32003
Business Officer II
Valrie, Charles
75 2334-1785 R
Public Information Office
32011
Public Relations Officer
Mather, Tom
70T 2334-1785 R
Permitting Section
32075
Envir. Supervisor IV
Butler, Laura
80 2333 R
Technical Servs Section
32175
Envir. Supervisor IV
Daniel, Lee
80 2334-1785 R
32012
Artist Illustrator II
Goodwin, Larry
64 2333 R
Planning Section
32275
Envir. Supervisor IV
Holman, Sheila
80 1770-7703 F
Regional Offices
Ambient Monitoring
32375
Envir. Supervisor
Kimball, Hoke
77T 2334-1785 R


Business Office
32003
Business Officer II
Valrie, Charles
75 2334-1785 R
32010
Office Assistant IV
Alston, Sherice
59 2334-1785 R
Finance & General Services
Human Resources
Information Technologies
Central Files
32004
Accounting Technician IV
Dennis, Donna
65 2333 R
32005
Accounting Clerk IV
VACANT
59 2333 R
32007
Accounting Clerk IV
Woods, Gladys
59 2333 R
32014
Accounting Clerk III
Desoto, Gerold
57 2334-1785 R
32008
Personnel Technician I
Conyer, Theresa
63 2333 R
32016
Safety Consultant II
Shores, Richard
74 2334-1785 R
32017
Staff Develop. Specialist I
VACANT
67 2334-1785 R
32020
Personnel Assistant V
Cole, Joyce
61 2334-1785 R
32021
App. Anal. Programmer II
Halsey, George
78 2334-1785 R
32015
Computing Consultant I
Swafford, Ben
70 1770-7708 R
32077
Application Programmer II
Love, Douglas
74 2331R
32645
Computing Consultant I
VACANT
70 2333 R
32018
Data Base Specialist
Groce, Holly
78 T 2334-1785 R
32022
Computing Consultant III
Amos, Charles
74 2334-1785 R
32201
Application Programmer II
Munagala, Sriram
74 2338 R
32201
App.Anal Programmer I
Munagala, Sriram
76 2338 R
32019
Processing Assistant IV
Ellington, Cindy
59 2334-1785 R


Permitting Section
32075
Envir.. Supervisor IV
Butler, Laura
80 2333 R
32076
Office Assistant III
Teulings, Cathy
57 2333 R
32090
Info Processing Asst I
Willis, Dave
59 2334-1785 R
Air Quality Analysis
32078
Envir.. Supervisor II
Roller, James
76 2333 R
PSD/Special Permitting
32099
Envir.. Eng. Supv. II
van der Vaart, Don
78 2333 R
32079
Office Assistant III
VACANT
57 2334-1785 R
32100
Office Assistant III
Kuchnia, Loretta
57 2333 R
32081
Meteorologist
Sellman, Jamie
73 2333 R
32101
Envir. Engineer II
Amerson, Sammy
76 2333 R
32102
Envir. Engineer II
Yirka, Charles
76 2333 R
32103
Envir. Engineer II
Proctor, Steve
76 2333 R
32104
Envir. Engineer II
Willets, William
76 2333 R
32084
Meteorologist
Anderson, Tom
73 2333 R
32105
Envir. Engineer II
Lasater, Richard
76 2333 R
32106
Envir. Engineer II
Pitts, Wallace
76 2333 R
32107
Envir. Engineer II
Pullen, Booker
76 2333 R
32108
Envir. Engineer II
Patnaik, Gautam
76 2333 R
32086
Envir..Specialist III
Horne, Connie
72 2333 R
32109
Envir. Engineer II
Benson, Michael
76 2333 R
32110
Envir. Engineer II
Twisdale, Jeff
76 2333 R
32116
Envir. Engineer II
Evans, Jay
76 2333 R
32111
Envir. Engineer II
Thaker, Rahul
76 2333 R
32080
Meteorologist
Buckler, Charles
73 2338 R
32112
Envir. Engineer II
Sheppard, Jenny
76 2333 R
32114
Envir. Engineer II
Matrin, Ed
76 2333 R
32113
Envir. Engineer III
Evans, John
78 2333 R
32116
Envir. Engineer III
Babb, Kenneth
78 2333 R
32083
Meteorologist
Freeman, Jerry
73 2331 R
32117
Envir. Engineer II
Godwin, Kevin
76 2334-1785 R
32950
Envir. Engineer II
Brandon, Michael
76 2334-1785 R
32093
Envir. Engineer I
Lee-Greco, Judy
74 2331 R
32092
Envir. Engineer I
74 2331 R
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Meteorologist
Yoder, Mark
73 2333 R
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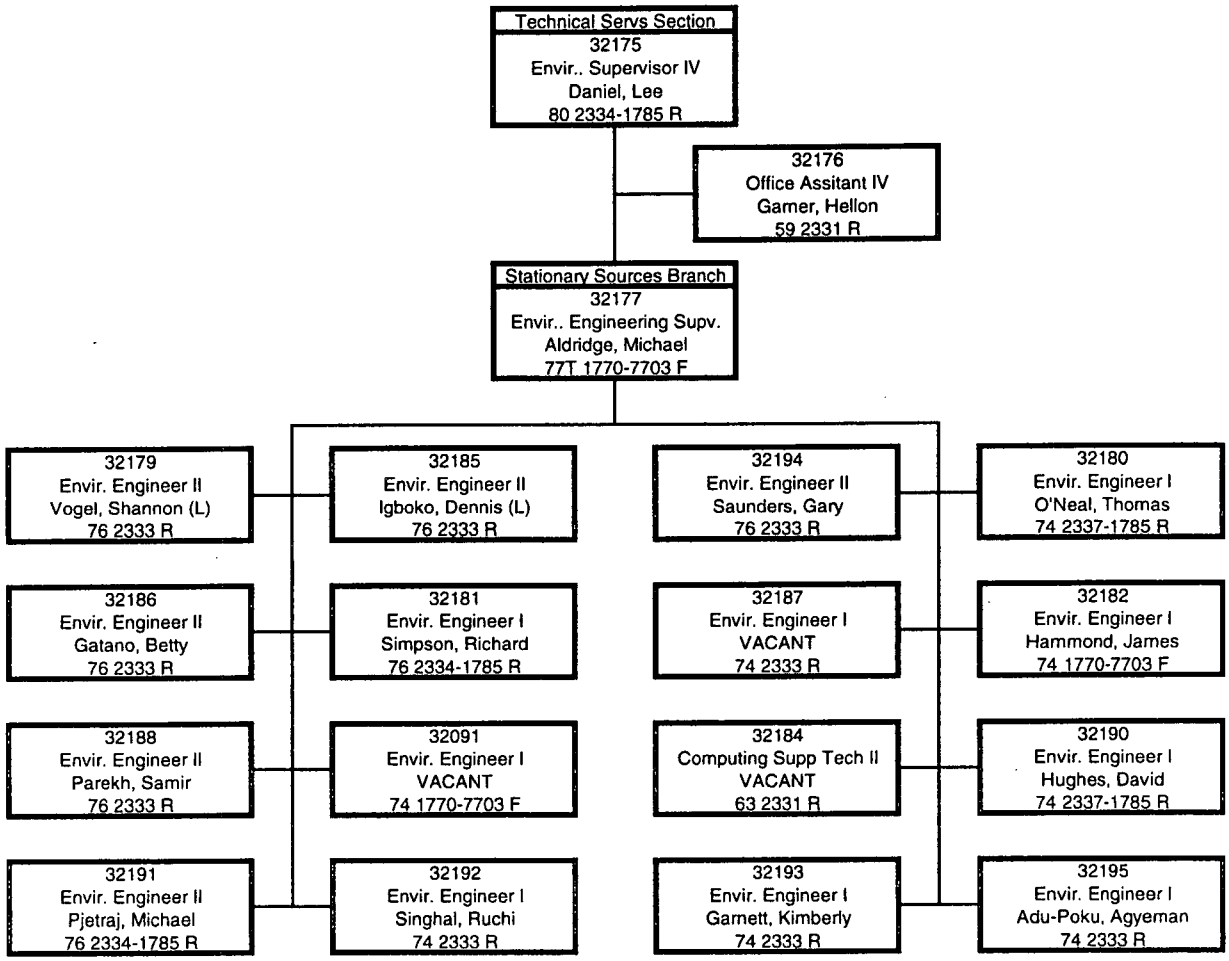
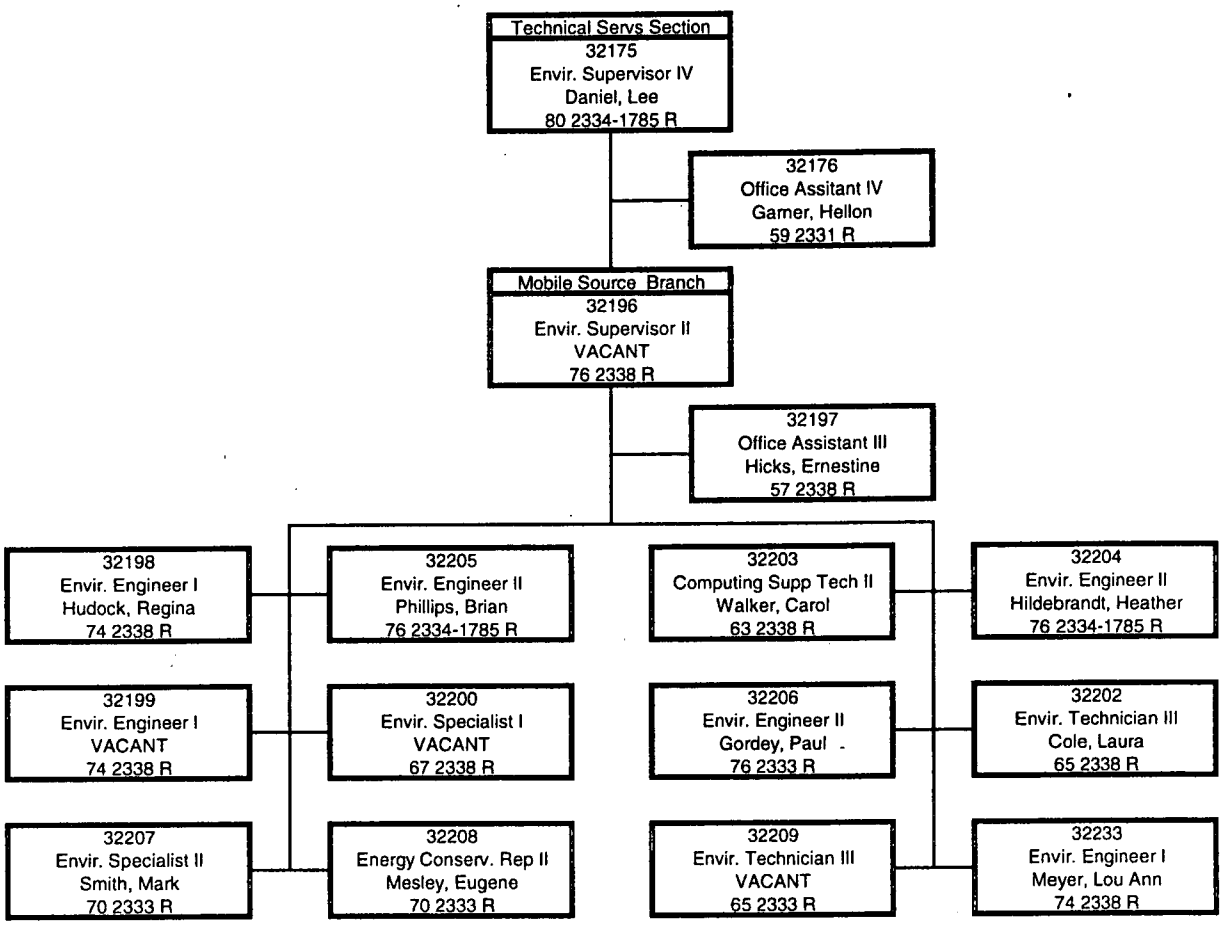
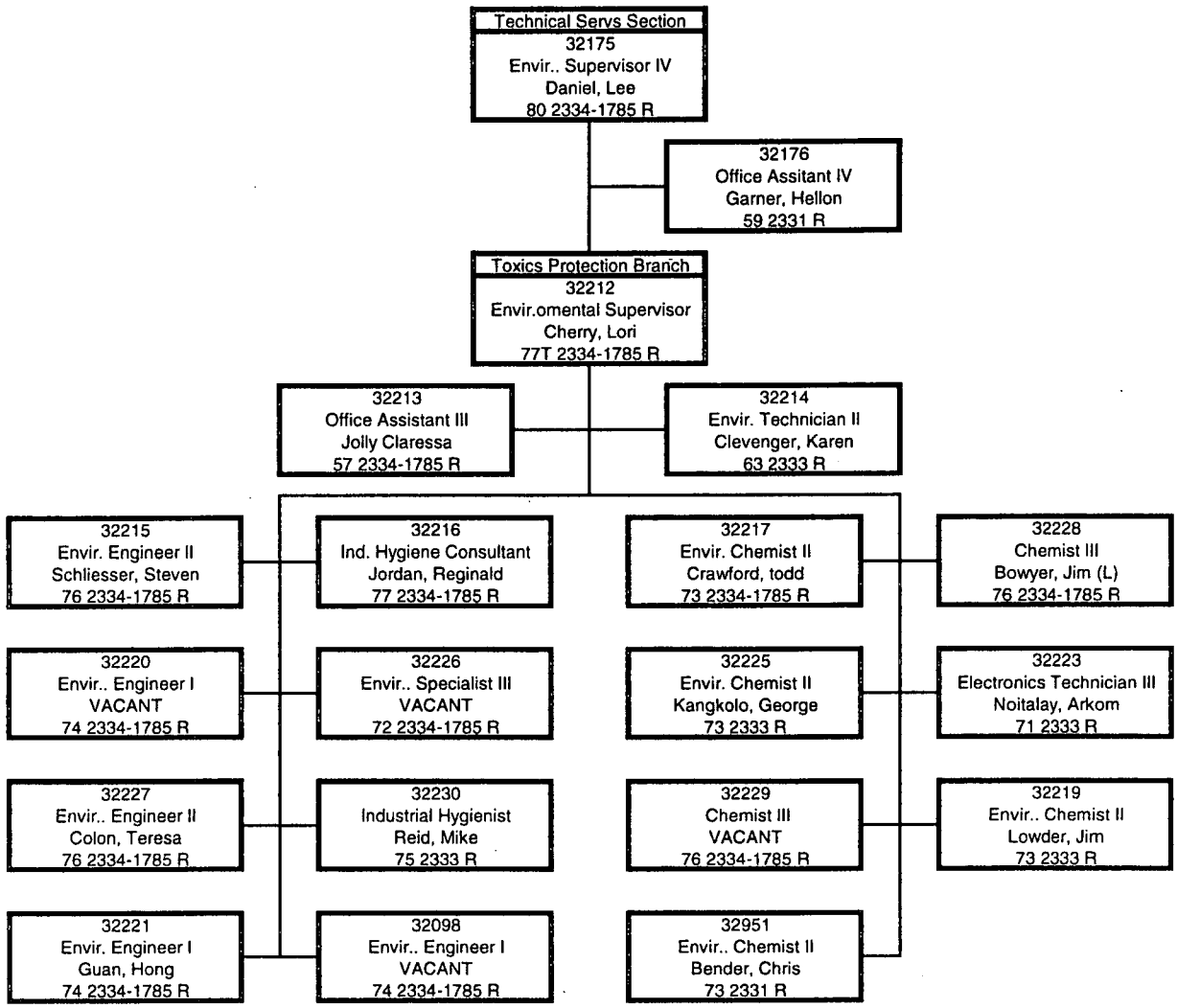
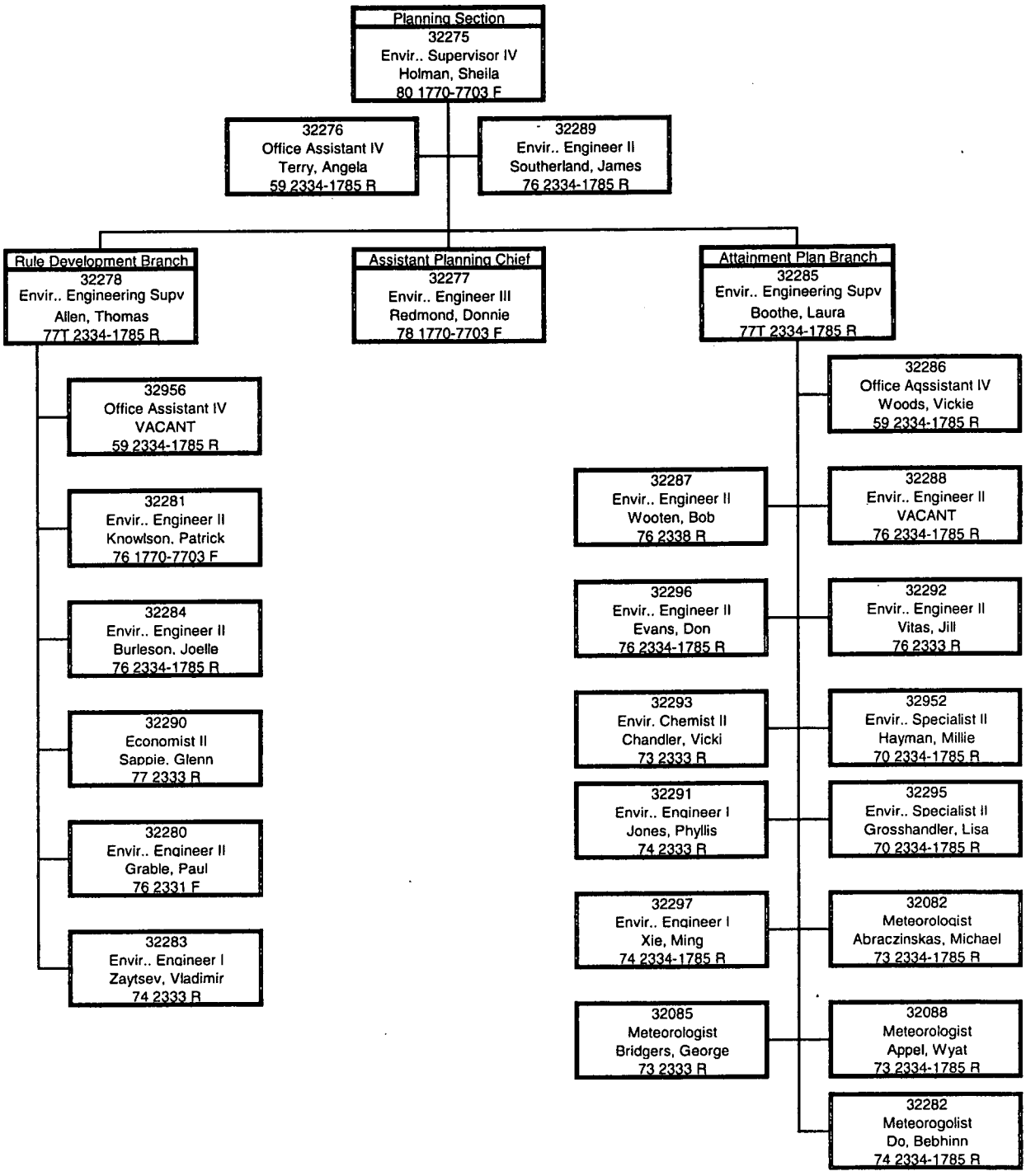
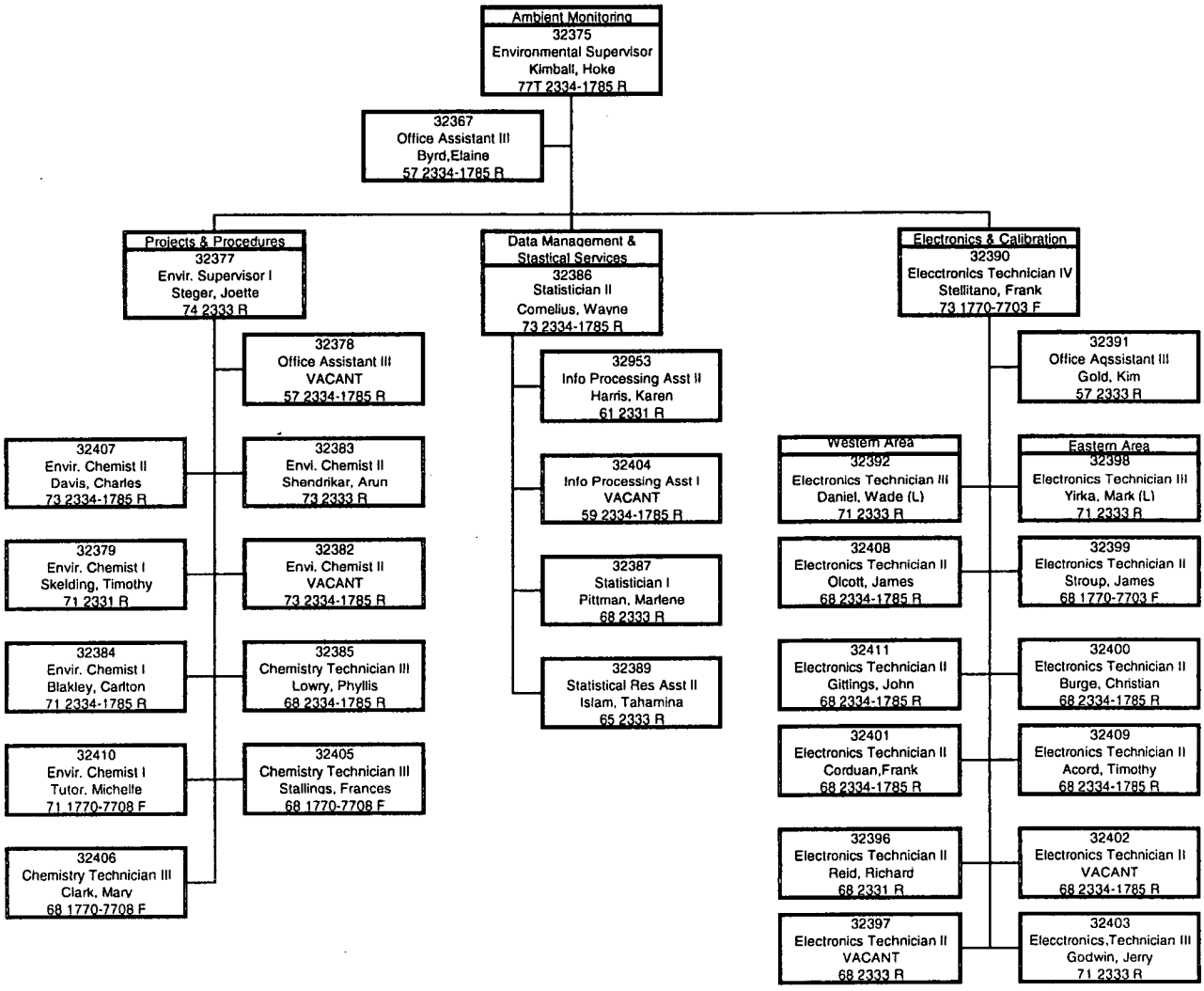
Envir. Engineer II
Cuilla, Mark
76 2334-1785 R

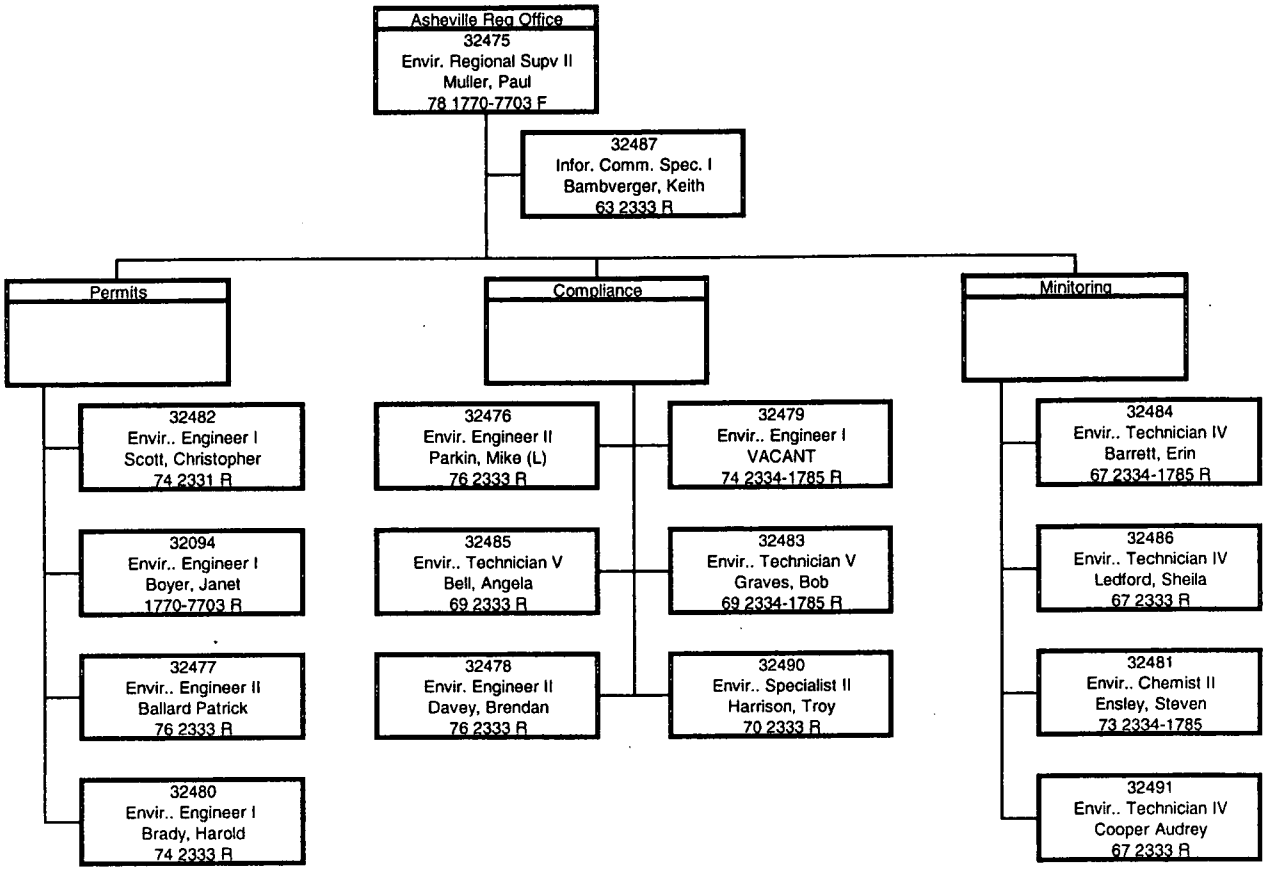

Technical Servs Section
32175
Envir.. Supervisor IV
Daniel, Lee
80 2334-1785 R
32176
Office Assitant IV
Gamer, Hellon
59 2331 R
Stationary Sources Branch
32177
Envir.. Engineering Supv.
Aldridge, Michael
77T 1770-7703 F
32179
Envir. Engineer II
Vogel, Shannon (L)
76 2333 R
32185
Envir. Engineer II
Igboko, Dennis (L)
76 2333 R
32194
Envir. Engineer II
Saunders, Gary
76 2333 R
32180
Envir. Engineer I
O'Neal, Thomas
74 2337-1785 R
32186
Envir. Engineer II
Gatano, Betty
76 2333 R
32181
Envir. Engineer I
Simpson, Richard
76 2334-1785 R
32187
Envir. Engineer I
VACANT
74 2333 R
32182
Envir. Engineer I
Hammond, James
74 1770-7703 F
32188
Envir. Engineer II
Parekh, Samir
76 2333 R
32091
Envir. Engineer I
VACANT
74 1770-7703 F
32184
Computing Supp Tech II
VACANT
63 2331 R
32190
Envir. Engineer I
Hughes, David
74 2337-1785 R
32191
Envir. Engineer II
Pjetraj, Michael
76 2334-1785 R
32192
Envir. Engineer I
Singhal, Ruchi
74 2333 R
32193
Envir. Engineer I
Garnett, Kimberly
74 2333 R
32195
Envir. Engineer I
Adu-Poku, Agyeman
74 2333 R

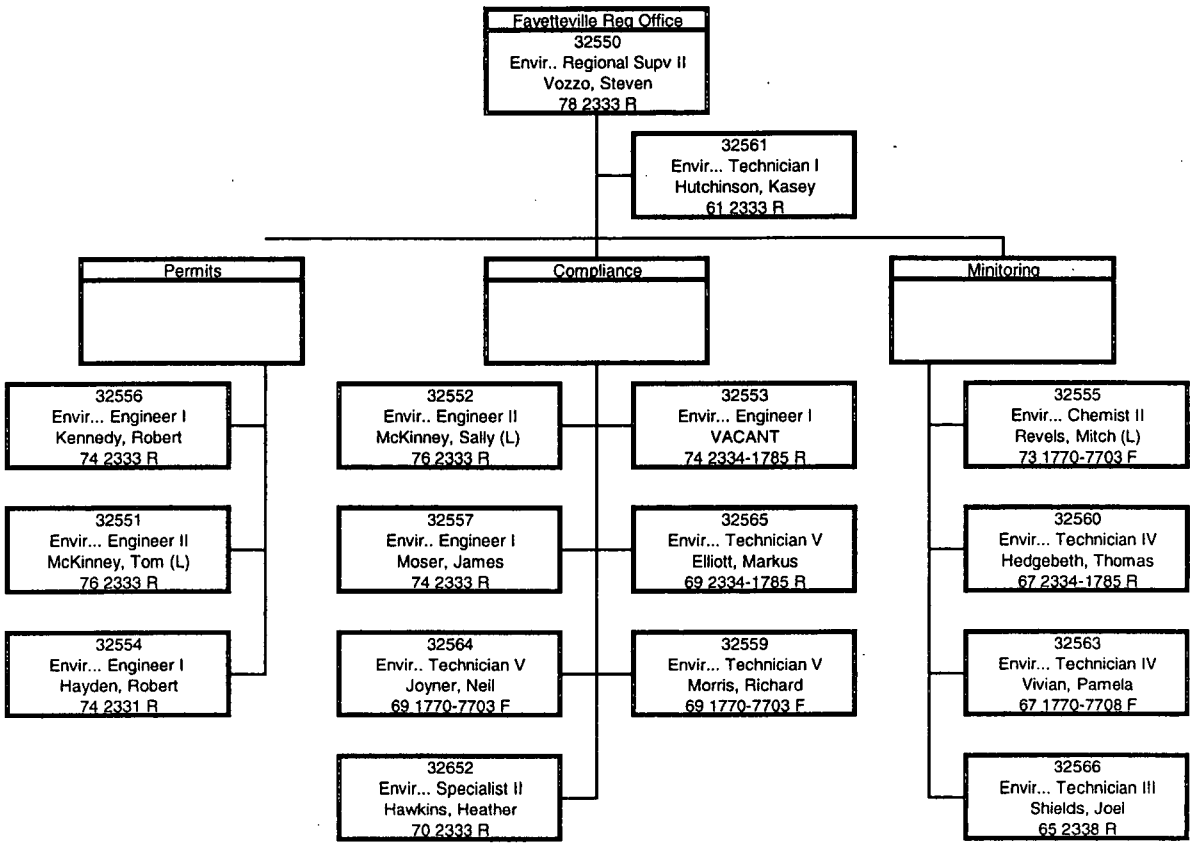

Technical Servs Section
32175
Envir. Supervisor IV
Daniel, Lee
80 2334-1785 R
32176
Office Assitant IV
Garner, Hellon
59 2331 R
Mobile Source Branch
32196
Envir. Supervisor II
VACANT
76 2338 R
32197
Office Assistant III
Hicks, Ernestine
57 2338 R
32198
Envir. Engineer I
Hudock, Regina
74 2338 R
32205
Envir. Engineer II
Phillips, Brian
76 2334-1785 R
32203
Computing Supp Tech II
Walker, Carol
63 2338 R
32204
Envir. Engineer II
Hildebrandt, Heather
76 2334-1785 R
32199
Envir. Engineer I
VACANT
74 2338 R
32200
Envir. Specialist I
VACANT
67 2338 R
32206
Envir. Engineer II
Gordey, Paul
76 2333 R
32202
Envir. Technician III
Cole, Laura
65 2338 R
32207
Envir. Specialist II
Smith, Mark
70 2333 R
32208
Energy Conserv. Rep II
Mesley, Eugene
70 2333 R
32209
Envir. Technician III
VACANT
65 2333 R
32233
Envir. Engineer I
Meyer, Lou Ann
74 2338 R


Technical Servs Section
32175
Envir.. Supervisor IV
Daniel, Lee
80 2334-1785 R
32176
Office Assitant IV
Garner, Hellon
59 2331 R
Toxics Protection Branch
32212
Envir.omental Supervisor
Cherry, Lori
77T 2334-1785 R
32213
Office Assistant III
Jolly Claressa
57 2334-1785 R
32214
Envir. Technician II
Clevenger, Karen
63 2333 R
32215
Envir. Engineer II
Schliesser, Steven
76 2334-1785 R
32216
Ind. Hygiene Consultant
Jordan, Reginald
77 2334-1785 R
32217
Envir. Chemist II
Crawford, todd
73 2334-1785 R
32228
Chemist III
Bowyer, Jim (L)
76 2334-1785 R
32220
Envir.. Engineer I
VACANT
74 2334-1785 R
32226
Envir.. Specialist III
VACANT
72 2334-1785 R
32225
Envir. Chemist II
Kangkolo, George
73 2333 R
32223
Electronics Technician III
Noitalay, Arkom
71 2333 R
32227
Envir.. Engineer II
Colon, Teresa
76 2334-1785 R
32230
Industrial Hygienist
Reid, Mike
75 2333 R
32229
Chemist III
VACANT
76 2334-1785 R
32219
Envir.. Chemist II
Lowder, Jim
73 2333 R
32221
Envir. Engineer I
Guan, Hong
74 2334-1785 R
32098
Envir.. Engineer I
VACANT
74 2334-1785 R
32951
Envir.. Chemist II
Bender, Chris
73 2331 R


Planning Section
32275
Envir.. Supervisor IV
Holman, Sheila
80 1770-7703 F
32276
Office Assistant IV
Terry, Angela
59 2334-1785 R
32289
Envir.. Engineer II
Southerland, James
76 2334-1785 R
Rule Development Branch
32278
Envir.. Engineering Supv
Allen, Thomas
77T 2334-1785 R
Assistant Planning Chief
32277
Envir.. Engineer III
Redmond, Donnie
78 1770-7703 F
Attainment Plan Branch
32285
Envir.. Engineering Supv
Boothe, Laura
77T 2334-1785 R
32956
Office Assistant IV
VACANT
59 2334-1785 R
32281
Envir.. Engineer II
Knowlson, Patrick
76 1770-7703 F
32284
Envir.. Engineer II
Burleson, Joelle
76 2334-1785 R
32290
Economist II
Sappie, Glenn
77 2333 R
32280
Envir.. Engineer II
Grable, Paul
76 2331 F
32283
Envir.. Engineer I
Zaytsev, Vladimir
74 2333 R
32286
Office Aqssistant IV
Woods, Vickie
59 2334-1785 R
32287
Envir.. Engineer II
Wooten, Bob
76 2338 R
32288
Envir.. Engineer II
VACANT
76 2334-1785 R
32296
Envir.. Engineer II
Evans, Don
76 2334-1785 R
32292
Envir.. Engineer II
Vitas, Jill
76 2333 R
32293
Envir. Chemist II
Chandler, Vicki
73 2333 R
32952
Envir.. Specialist II
Hayman, Millie
70 2334-1785 R
32291
Envir.. Engineer I
Jones, Phyllis
74 2333 R
32295
Envir.. Specialist II
Grosshandler, Lisa
70 2334-1785 R
32297
Envir.. Engineer I
Xie, Ming
74 2334-1785 R
32082
Meteorologist
Abraczinskas, Michael
73 2334-1785 R
32085
Meteorologist
Bridgers, George
73 2333 R
32088
Meteorologist
Appel, Wyat
73 2334-1785 R
32282
Meteorogolist
Do, Bebhinn
74 2334-1785 R


Ambient Monitoring
32375
Environmental Supervisor
Kimball, Hoke
77T 2334-1785 R
32367
Office Assistant III
Byrd,Elaine
57 2334-1785 R
Projects & Procedures
32377
Envir. Supervisor I
Steger, Joette
74 2333 R
Data Management & Stastical Services
32386
Statistician II
Cornelius, Wayne
73 2334-1785 R
Electronics & Calibration
32390
Elecctronics Technician IV
Stellitano, Frank
73 1770-7703 F
32378
Office Assistant III
VACANT
57 2334-1785 R
32953
Info Processing Asst II
Harris, Karen
61 2331 R
32391
Office Aqssistant III
Gold, Kim
57 2333 R
32407
Envir. Chemist II
Davis, Charles
73 2334-1785 R
32383
Envi. Chemist II
Shendrikar, Arun
73 2333 R
32404
Info Processing Asst I
VACANT
59 2334-1785 R
Western Area
32392
Electronics Technician III
Daniel, Wade (L)
71 2333 R
Eastern Area
32398
Electronics Technician III
Yirka, Mark (L)
71 2333 R
32379
Envir. Chemist I
Skelding, Timothy
71 2331 R
32382
Envi. Chemist II
VACANT
73 2334-1785 R
32387
Statistician I
Pittman, Marlene
68 2333 R
32408
Electronics Technician II
Olcott, James
68 2334-1785 R
32399
Electronics Technician II
Stroup, James
68 1770-7703 F
32384
Envir. Chemist I
Blakley, Carlton
71 2334-1785 R
32385
Chemistry Technician III
Lowry, Phyllis
68 2334-1785 R
32389
Statistical Res Asst II
Islam, Tahamina
65 2333 R
32411
Electronics Technician II
Gittings, John
68 2334-1785 R
32400
Electronics Technician II
Burge, Christian
68 2334-1785 R
32410
Envir. Chemist I
Tutor, Michelle
71 1770-7708 F
32405
Chemistry Technician III
Stallings, Frances
68 1770-7708 F
32401
Electronics Technician II
Corduan,Frank
68 2334-1785 R
32409
Electronics Technician II
Acord, Timothy
68 2334-1785 R
32406
Chemistry Technician III
Clark, Mary
68 1770-7708 F
32396
Electronics Technician II
Reid, Richard
68 2331 R
32402
Electronics Technician II
VACANT
68 2334-1785 R
32397
Electronics Technician II
VACANT
68 2333 R
32403
Elecctronics,Technician III
Godwin, Jerry
71 2333 R


Asheville Reg Office
32475
Envir. Regional Supv II
Muller, Paul
78 1770-7703 F
32487
Infor. Comm. Spec. I
Bambverger, Keith
63 2333 R
Permits
Compliance
Minitoring
32482
Envir.. Engineer I
Scott, Christopher
74 2331 R
32094
Envir.. Engineer I
Boyer, Janet
1770-7703 R
32477
Envir.. Engineer II
Ballard Patrick
76 2333 R
32480
Envir.. Engineer I
Brady, Harold
74 2333 R
32476
Envir. Engineer II
Parkin, Mike (L)
76 2333 R
32485
Envir.. Technician V
Bell, Angela
69 2333 R
32478
Envir. Engineer II
Davey, Brendan
76 2333 R
32479
Envir.. Engineer I
VACANT
74 2334-1785 R
32483
Envir.. Technician V
Graves, Bob
69 2334-1785 R
32490
Envir.. Specialist II
Harrison, Troy
70 2333 R
32484
Envir.. Technician IV
Barrett, Erin
67 2334-1785 R
32486
Envir.. Technician IV
Ledford, Sheila
67 2333 R
32481
Envir.. Chemist II
Ensley, Steven
73 2334-1785
32491
Envir.. Technician IV
Cooper Audrey
67 2333 R


Fayetteville Reg Office
32550
Envir.. Regional Supv II
Vozzo, Steven
78 2333 R
32561
Envir... Technician I
Hutchinson, Kasey
61 2333 R
Permits
Compliance
Minitoring
32556
Envir... Engineer I
Kennedy, Robert
74 2333 R
32551
Envir... Engineer II
McKinney, Tom (L)
76 2333 R
32554
Envir... Engineer I
Hayden, Robert
74 2331 R
32552
Envir.. Engineer II
McKinney, Sally (L)
76 2333 R
32557
Envir.. Engineer I
Moser, James
74 2333 R
32564
Envir.. Technician V
Joyner, Neil
69 1770-7703 F
32652
Envir... Specialist II
Hawkins, Heather
70 2333 R
32553
Envir... Engineer I
VACANT
74 2334-1785 R
32565
Envir... Technician V
Elliott, Markus
69 2334-1785 R
32559
Envir... Technician V
Morris, Richard
69 1770-7703 F
32555
Envir... Chemist II
Revels, Mitch (L)
73 1770-7703 F
32560
Envir... Technician IV
Hedgebeth, Thomas
67 2334-1785 R
32563
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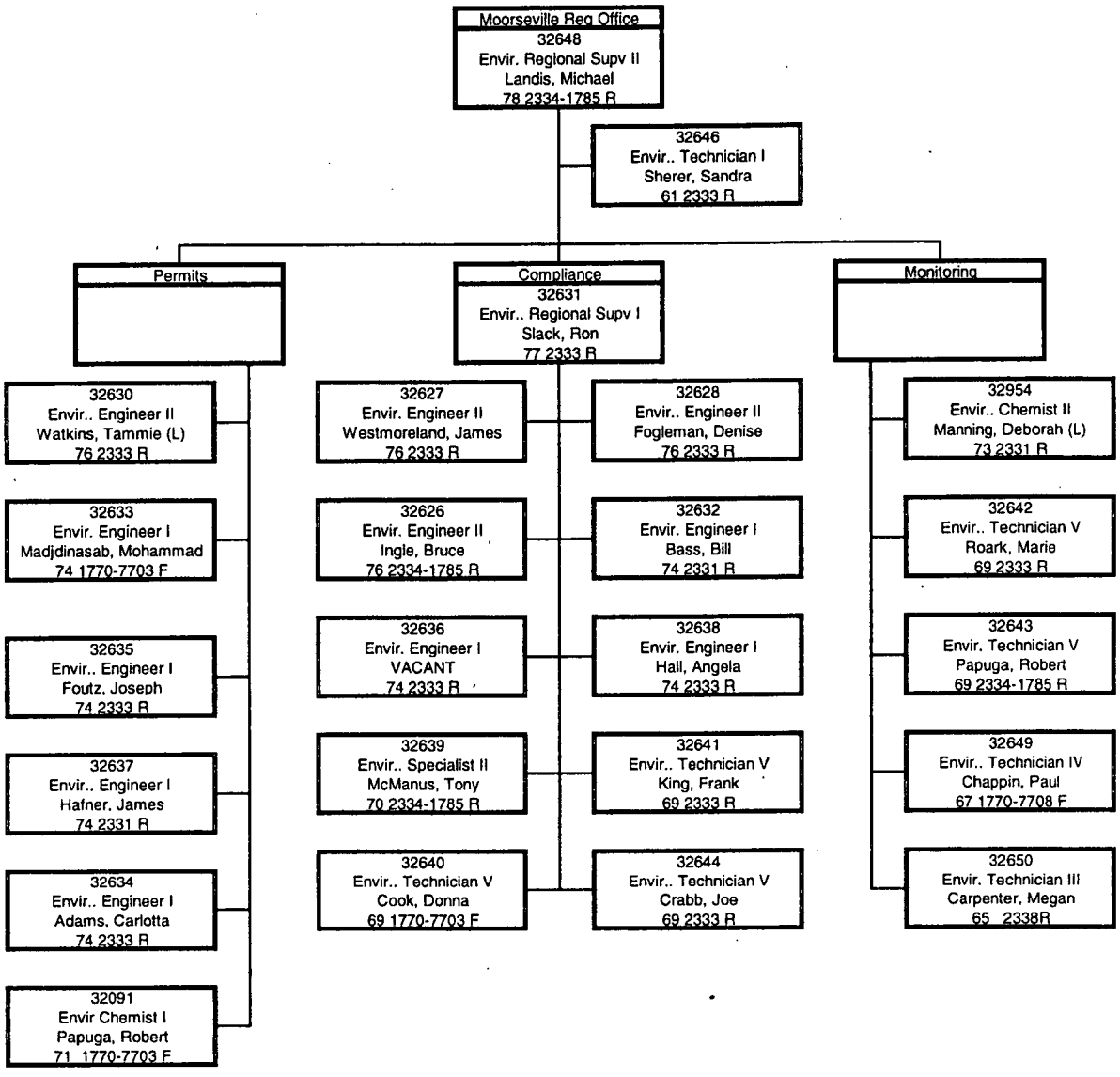
Vivian, Pamela
67 1770-7708 F
32566
Envir... Technician III
Shields, Joel
65 2338 R


Moorseville Reg Office
32648
Envir. Regional Supv II
Landis, Michael
78 2334-1785 R
32646
Envir.. Technician I
Sherer, Sandra
61 2333 R
Permits
Compliance
32631
Envir.. Regional Supv I
Slack, Ron
77 2333 R
Monitoring
32630
Envir.. Engineer II
Watkins, Tammie (L)
76 2333 R
32633
Envir. Engineer I
Madjdinasab, Mohammad
74 1770-7703 F
32635
Envir.. Engineer I
Foutz, Joseph
74 2333 R
32637
Envir.. Engineer I
Hafner, James
74 2331 R
32634
Envir.. Engineer I
Adams, Carlotta
74 2333 R
32091
Envir Chemist I
Papuga, Robert
71 1770-7703 F
32627
Envir. Engineer II
Westmoreland, James
76 2333 R
32626
Envir. Engineer II
Ingle, Bruce
76 2334-1785 R
32636
Envir. Engineer I
VACANT
74 2333 R
32639
Envir.. Specialist II
McManus, Tony
70 2334-1785 R
32640
Envir.. Technician V
Cook, Donna
69 1770-7703 F
32628
Envir.. Engineer II
Fogleman, Denise
76 2333 R
32632
Envir. Engineer I
Bass, Bill
74 2331 R
32638
Envir. Engineer I
Hall, Angela
74 2333 R
32641
Envir.. Technician V
King, Frank
69 2333 R
32644
Envir.. Technician V
Crabb, Joe
69 2333 R
32954
Envir.. Chemist II
Manning, Deborah (L)
73 2331 R
32642
Envir.. Technician V
Roark, Marie
69 2333 R
32643
Envir. Technician V
Papuga, Robert
69 2334-1785 R
32649
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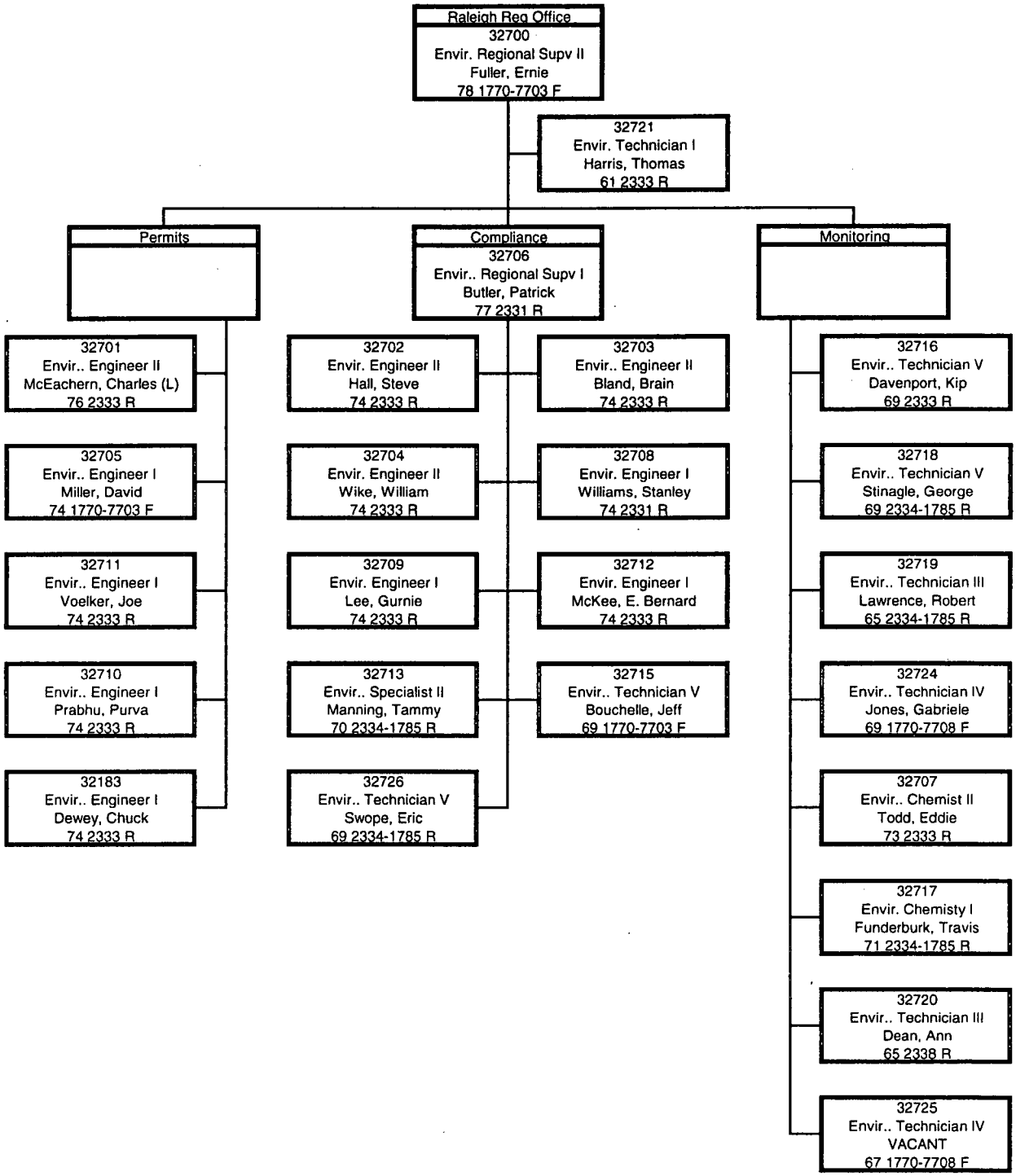
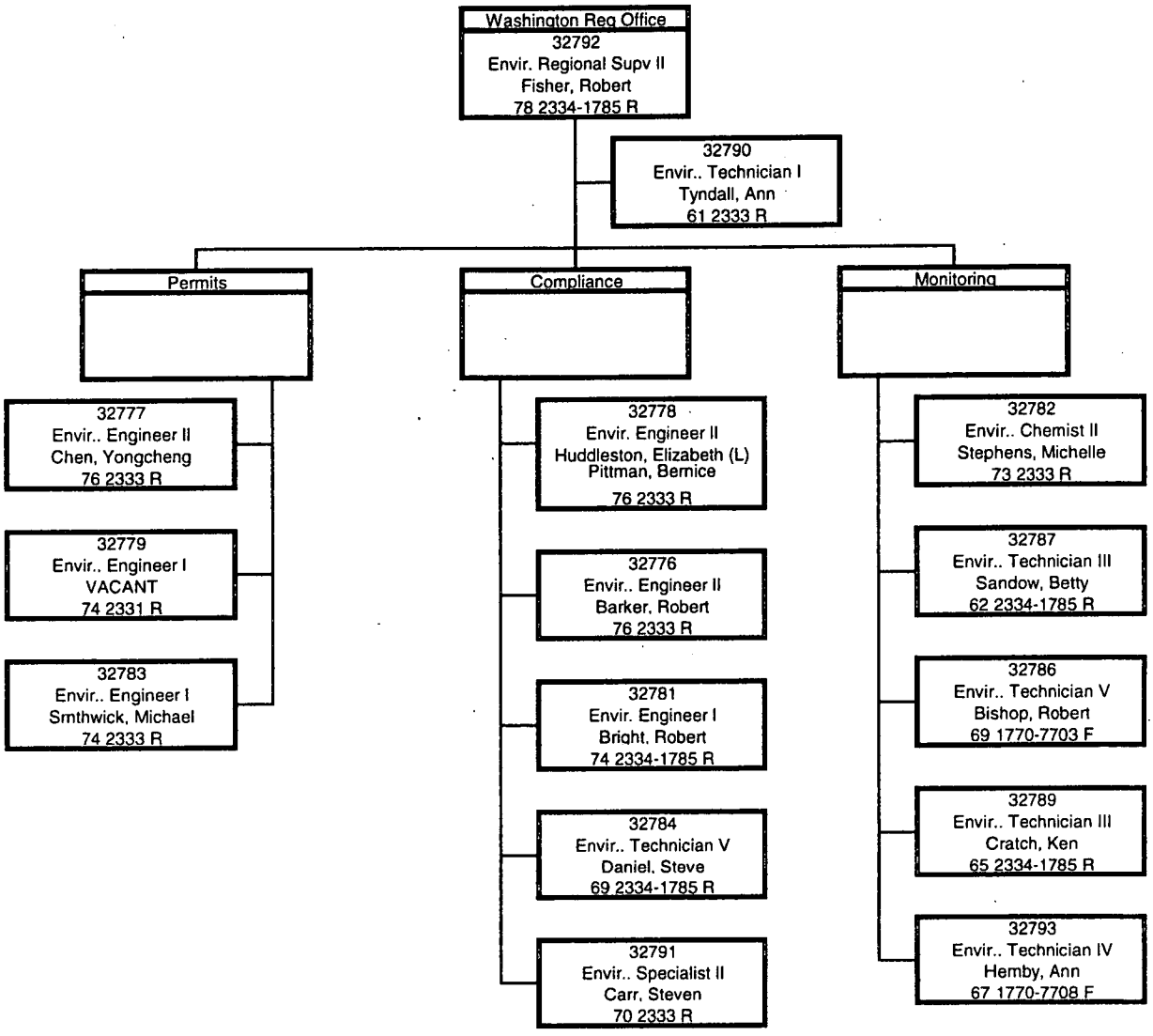
Chappin, Paul
67 1770-7708 F
32650
Envir. Technician III
Carpenter, Megan
65 2338R


Raleigh Reg Office
32700
Envir. Regional Supv II
Fuller, Ernie
78 1770-7703 F
32721
Envir. Technician I
Harris, Thomas
61 2333 R
Permits
Compliance
32706
Envir.. Regional Supv I
Butler, Patrick
77 2331 R
Monitoring
32701
Envir.. Engineer II
McEachern, Charles (L)
76 2333 R
32705
Envir.. Engineer I
Miller, David
74 1770-7703 F
32711
Envir.. Engineer I
Voelker, Joe
74 2333 R
32710
Envir.. Engineer I
Prabhu, Purva
74 2333 R
32183
Envir.. Engineer I
Dewey, Chuck
74 2333 R
32702
Envir. Engineer II
Hall, Steve
74 2333 R
32703
Envir.. Engineer II
Bland, Brain
74 2333 R
32704
Envir. Engineer II
Wike, William
74 2333 R
32708
Envir. Engineer I
Williams, Stanley
74 2331 R
32709
Envir. Engineer I
Lee, Gurnie
74 2333 R
32712
Envir. Engineer I
McKee, E. Bernard
74 2333 R
32713
Envir.. Specialist II
Manning, Tammy
70 2334-1785 R
32715
Envir.. Technician V
Bouchelle, Jeff
69 1770-7703 F
32726
Envir.. Technician V
Swope, Eric
69 2334-1785 R
32716
Envir.. Technician V
Davenport, Kip
69 2333 R
32718
Envir.. Technician V
Stinagle, George
69 2334-1785 R
32719
Envir.. Technician III
Lawrence, Robert
65 2334-1785 R
32724
Envir.. Technician IV
Jones, Gabriele
69 1770-7708 F
32707
Envir.. Chemist II
Todd, Eddie
73 2333 R
32717
Envir. Chemisty I
Funderburk, Travis
71 2334-1785 R
32720
Envir.. Technician III
Dean, Ann
65 2338 R
32725
Envir.. Technician IV
VACANT
67 1770-7708 F


Washington Reg Office
32792
Envir. Regional Supv II
Fisher, Robert
78 2334-1785 R
32790
Envir.. Technician I
Tyndall, Ann
61 2333 R
Permits
Compliance
Monitoring
32777
Envir.. Engineer II
Chen, Yongcheng
76 2333 R
32779
Envir.. Engineer I
VACANT
74 2331 R
32783
Envir.. Engineer I
Smthwick, Michael
74 2333 R
32778
Envir. Engineer II
Huddleston, Elizabeth (L)
Pittman, Bernice
76 2333 R
32776
Envir.. Engineer II
Barker, Robert
76 2333 R
32781
Envir. Engineer I
Bright, Robert
74 2334-1785 R
32784
Envir.. Technician V
Daniel, Steve
69 2334-1785 R
32791
Envir.. Specialist II
Carr, Steven
70 2333 R
32782
Envir.. Chemist II
Stephens, Michelle
73 2333 R
32787
Envir.. Technician III
Sandow, Betty
62 2334-1785 R
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Envir.. Technician V
Bishop, Robert
69 1770-7703 F
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Cratch, Ken
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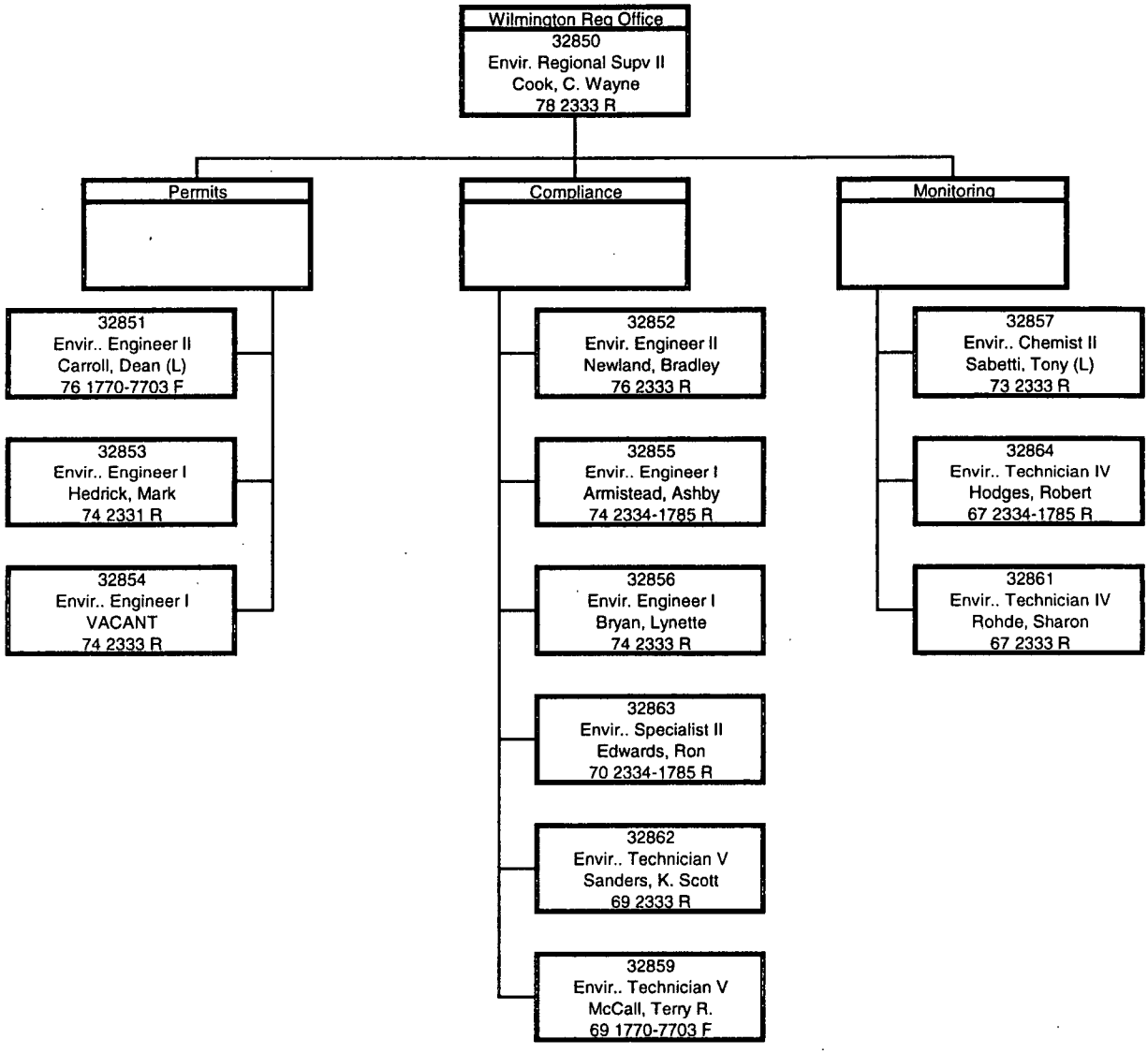
Hemby, Ann
67 1770-7708 F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Carroll, Dean (L)
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Hedrick, Mark
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Sanders, K. Scott
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McCall, Terry R.
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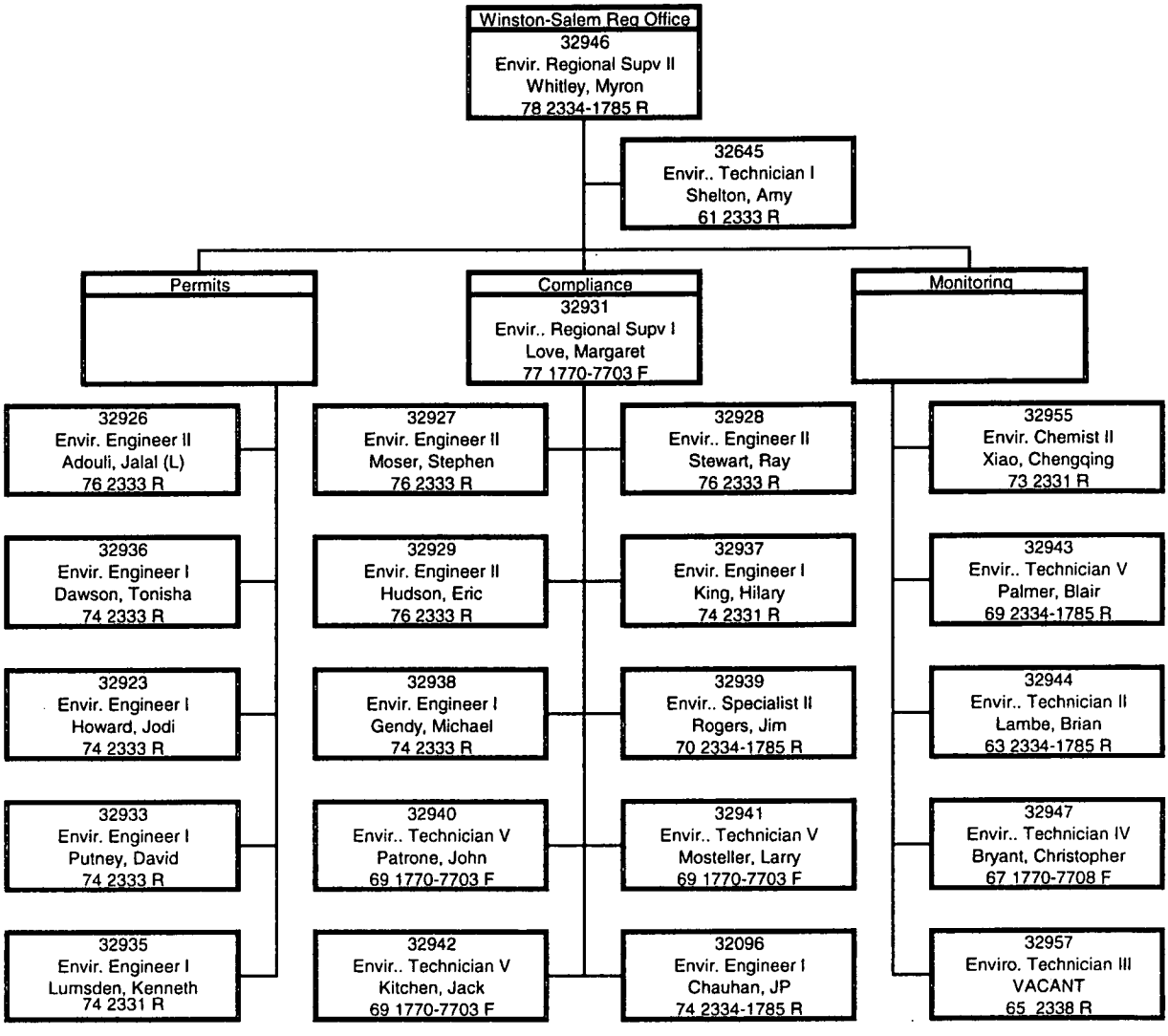
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Love, Margaret
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Adouli, Jalal (L)
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Moser, Stephen
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Stewart, Ray
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Bryant, Christopher
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Envir. Engineer I
Lumsden, Kenneth
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Envir.. Technician V
Kitchen, Jack
69 1770-7703 F
32096
Envir. Engineer I
Chauhan, JP
74 2334-1785 R
32957
Enviro. Technician III
VACANT
65 2338 R

POSITIONS OUTSIDE THE DIVISION OF AIR QUALITY FUNDED BY TITLE V DURING STATE FISCAL YEAR 2004

2 Positions
Regional Office Local Area Network Managers
Regional Offices: Raleigh and Winston-Salem
$101,060

1 Position
Division of Pollution Prevention and Environmental Assistance
$56,000

2.3 Positions
Department of Environment and Natural Resources
$126,299

4 Positions
Office of Small Business Ombudsman
$249,932

5 Positions (2 are half-time)
Regional Office, Office Assistants
Regional Offices: Fayetteville, Raleigh, Mooresville, Washington, and Winston-Salem
$117,185

0.5 Positions
Division of Waste Management
$10,112

2.3 Positions
Attorney General's Office
$296,817

Total $957,405

Implementation of the "Clean Smokestacks Act"

A Report to the Environmental Review Commission and the Joint Legislative Utility Review Committee

Submitted by the North Carolina Department of Environment and Natural Resources and the North Carolina Utilities Commission

June 1, 2004

Implementation of the "Clean Smokestacks Act"

A Report to the Environmental Review Commission and the Joint Legislative Utility Review Committee

Submitted by the North Carolina Department of Environment and Natural Resources and the North Carolina Utilities Commission

This report is submitted pursuant to the requirement of Section 14 of Session Law 2002-4, Senate Bill 1078 enacted June 20, 2002. The actions taken to date by Progress Energy Carolinas, Inc. and Duke Power, a Division of Duke Energy Corporation, appear to be in accordance with the provisions and requirements of the Clean Smokestacks Act.

Signed: _____

William G. Ross, Jr., Secretary
Department of Environment and Natural Resources

Signed: _____

Jo Anne Sanford, Chair
North Carolina Utilities Commission

June 1, 2004

Implementation of the "Clean Smokestacks Act"

A Report to the
Environmental Review Commission and the Joint Legislative Utility Review Committee

June 1, 2004

The General Assembly of North Carolina, Session 2001, passed Session Law 2002-4 also known as Senate Bill 1078. This legislation is titled "*An Act to Improve Air Quality in the State by Imposing Limits on the Emission of Certain Pollutants from Certain Facilities that Burn Coal to Generate Electricity and to Provide for Recovery by Electric Utilities of the Costs of Achieving Compliance with Those Limits*" ("the Clean Smokestacks Act" or "the Act"). The Clean Smokestacks Act, in Section 14, requires the Department of Environment and Natural Resources ("DENR") and the Utilities Commission ("Commission") to report annually, i.e., by June 1 of each year, on the implementation of the Act to the Environmental Review Commission and the Joint Legislative Utility Review Committee.

The Act, in Section 9, requires Duke Energy and Progress Energy to submit annual reports to DENR and the Commission containing certain specified information. Duke Energy and Progress Energy filed reports, with DENR and the Commission, dated March 31, 2004, and April 1, 2004, respectively. Specifically, such reports were submitted in compliance with the requirements of G.S. 62-133.6(i). Duke Energy's and Progress Energy's reports are attached, and made part of this report, as Attachments A and B, respectively.

Additionally, the Secretary of DENR wrote the Commission on May 3, 2004, as follows:

"North Carolina's investor owned electric utilities, Duke Energy and Progress Energy, have filed their compliance plan annual updates for 2004 in accordance with N.C.G.S. 62-133.6(i), Section 9(i) of S.L. 2002-4, known as the 'Clean Smokestacks Act'. Pursuant to N.C.G.S. 62-133.6(j), the Department of Environment and Natural Resources has reviewed this information, and the submittals comply with the Act. The plans and schedules of the companies appear adequate to achieve the emission limitations set out in N.C.G.S. 143-215.107D."

This report is presented to meet the reporting requirement of the Act pertaining to DENR and the Commission, as discussed above, and is submitted jointly by DENR and the Commission. The report is structured to address the various actions that have occurred pursuant to the provisions of Sections 9, 10, 12 and 13 of this Act. Reports of actions under these Sections describe the extent of implementation of the Act to this date.

I. Section 9(c) of the Act, Codified as Section 62-133.6(c) of the North Carolina General Statutes

G.S. 62-133.6(c) provides: *The investor-owned public utilities shall file their compliance plans, including initial cost estimates, with the Commission and the Department of Environment and Natural Resources not later than 10 days after the date on which this section becomes effective. The Commission shall consult with the Secretary of Environment and Natural Resources and shall consider the advice of the Secretary as to whether an investor-owned public utility's proposed compliance plan is adequate to achieve the emissions limitations set out in G.S. 143-215.107D.*

Status: North Carolina's investor-owned electric utilities, Progress Energy Carolinas, Inc. (Progress Energy) and Duke Power, a division of Duke Energy Corporation (Duke Energy), filed their initial compliance plans as required in June and July of 2002, in accordance with G.S. 62-133.6(c), Section 9(c) of S.L. 2002-4, the Clean Smokestacks Act. DENR reviewed this information and determined that the submittals comply with the Act and, as proposed, appear adequate to achieve the emission limitations set out in G.S. 143-215.107D.

II. Section 9(i) of the Act, Codified as Section 62-133.6(i) of the North Carolina General Statutes

G.S. 62-133.6(i) provides: *An investor-owned public utility that is subject to the emissions limitations set out in G.S. 143-215.107D shall submit to the Commission and to the Department of Environment and Natural Resources on or before 1 April of each year a verified statement that contains all of the following [specified information]:*

The following are the eleven subsections of G.S. 62-133.6(i) and the related responses from Progress Energy and Duke Energy for each subsection:

1. **G.S. 62-133.6(i)(1) requires:** *A detailed report on the investor-owned public utility's plans for meeting the emissions limitations set out in G.S. 143-215.107D.*

Progress Energy Response: "The plan for Progress Energy Carolinas, Inc. was originally submitted on July 29, 2002. Appendix A (of the attached Progress submittal dated April 1, 2004) contains an updated version of this plan, effective April 1, 2004."

Duke Energy Response: "Exhibits A and B (of the attached Duke submittal dated March 31, 2004) outline the technology selections by facility and unit, projected operational dates, expected emission rates, and the corresponding tons of emissions that demonstrate compliance with G.S. 143-215.107D."

2. **G.S. 62-133.6(i)(2) requires:** *The actual environmental compliance costs incurred by the investor-owned public utility in the previous calendar year, including a description of the construction undertaken and completed during that year.*

Summary of Progress Energy Report: The actual environmental compliance costs incurred by Progress Energy in calendar year 2003 were $22.3 million. Construction began at both Roxboro and Asheville plants after receipt of the necessary Title V permits and approval of soil and erosion control plans.

Summary of Duke Energy Report: The actual environmental compliance costs incurred by Duke Energy in calendar year 2003 were $16.0 million. The Company reported that such costs were incurred for such things as a variety of project studies and investigations, engineering, equipment specifications development, equipment layout, contracting related costs, and logistics.

3. **G.S. 62-133.6(i)(3) requires:** *The amount of the investor-owned public utility's environmental compliance cost amortized in the previous calendar year.*

Summary of Progress Energy and Duke Energy Reports: Progress Energy amortized $74.2 million in 2003. Duke Energy amortized $114.8 million in 2003. As indicated in the May 30, 2003 report to the Environmental Review Commission and the Joint Legislative Utility Review Committee ("the May 30, 2003 report"), Progress Energy, in response to a data request submitted by the Commission, projected that it would amortize $100 million of environmental compliance costs in 2003. Also, as indicated in the May 30, 2003 report, Duke Energy, in response to a Commission data request, projected that it would amortize $70 million of environmental compliance costs in 2003.

4. **G.S. 62-133.6(i)(4) requires:** *An estimate of the investor-owned public utility's environmental compliance costs and the basis for any revisions of those estimates when compared to the estimates submitted during the previous year.*

Summary of Progress Energy Report: Progress Energy reported that, while some unit total and annual costs have changed, the total project cost in future dollars remains at $813 million. More specifically, in its 2004 report, the Company estimated such cost to be $812.968 million, as compared to the $813.119 million reflected in its 2003 report, a reduction of $151,000. The Company observed that the projected SO_2 removal rates have increased for scrubbed units. As a result, the planned scrubber for Lee 3 has been cancelled

Summary of Duke Energy Report: Duke Energy reported that its expected costs are not significantly different than the estimates provided in 2003. More specifically, in its 2004 report, the Company estimated its compliance costs to be $1.526 billion, as compared to the $1.479 billion reflected in its 2003 report, an increase of $47 million. The Company also reported that the technologies expected to be required to support compliance have not changed. The Company further stated that the

minor adjustments to the estimates at the project level are the result of additional project scope definition and refinement of project schedules only.

5. **G.S. 62-133.6(i)(5) requires:** *A description of all permits required in order to comply with the provisions of G.S. 143-215.107D for which the investor-owned public utility has applied and the status of those permits or permit applications.*

Progress Energy Response:

Asheville Plant

- Revised Title V permits to support construction activities have been issued
- NPDES Permit application submitted for required wastewater system modifications
- Soil erosion and sedimentation control plans have been approved

Roxboro Plant

- Revised Title V permits to support construction activities have been issued
- Soil erosion and sedimentation control plans have been approved

Duke Energy Response:

"Allen Steam Station SNCR, Unit 1

- Air Permit Application for temporary trial submitted and final permit received in 2002
- NPDES Permit Modification for temporary trial submitted and permit modification received in 2002
- Air Permit Application for permanent equipment installation submitted and final permit received in 2002

Marshall Steam Station SNCR, Unit 4

- Air Permit Application for temporary trial submitted and final permit received in 2002
- NPDES Permit Modification for temporary trial submitted and permit modification received in 2002
- Marshall Steam Station Scrubbers, Units 1-4
  - Air Permit Application – Submitted 9/17/03; received 2/5/04
  - Sedimentation and Erosion Control Plan – Submitted 9/11/03; received 10/8/03; amended 12/19/03; amendments approved 12/31/03
  - NPDES Modification – Submitted 4/30/03; received 1/23/04
  - Landfill Site Suitability Application – Submitted 9/3/03"

6. **G.S. 62-133.6(i)(6) requires:** *A description of the construction related to compliance with the provisions of G.S. 143-215.107D that is anticipated during the following year.*

Progress Energy Response: See Appendix C of the attached letter from Progress Energy dated April 1, 2004, for details of construction and installation of equipment. The Asheville and Roxboro plants will have significant construction in 2004.

Duke Energy Response: See attached letter from Duke Energy dated March 31, 2003, for details of construction anticipated for the next year for:

- Allen Steam Station SNCR, Unit 3
- Allen Steam Station SNCR, Unit 4
- Allen Steam Station Scrubbers
- Belews Creek Steam Station Scrubbers
- Buck Steam Station SNCR, Unit 5
- Buck Steam Station SNCR, Unit 6
- Cliffside Steam Station Scrubbers
- Marshall Steam Station SNCR, Unit 1
- Marshall Steam Station SNCR, Unit 2
- Marshall Steam Station SNCR, Unit 3
- Marshall Steam Station Scrubbers
- Riverbend Steam Station SNCR, Unit 4
- Riverbend Steam Station Burners, Unit 5
- Riverbend Steam Station SNCR, Unit 7

7. **G.S. 62-133.6(i)(7) requires:** *A description of the applications for permits required in order to comply with the provisions of G.S. 143-215.107D that are anticipated during the following year.*

Progress Energy Response: "An NPDES permit modification application will be submitted in the 2nd quarter of 2004 to request changes to the existing wastewater discharge permit for the Roxboro Plant. Operation of scrubbers to comply with G.S. 143-214.107D will create a new wastewater stream, which requires modification of our current permit. The application characterizes expected wastewater contaminant concentrations and flows."

Duke Energy Response:

"Allen Steam Station SNCR, Unit 3

- Air Permit Application – Plan to submit 8/1/04

Belews Creek Steam Station Scrubbers, Units 1-2

- Landfill Site Suitability Application – Plan to submit 1/11/05
- Air Permit Application – Plan to submit 5/20/05
- Sedimentation and Erosion Control Plan – Plan to submit 6/6/05
- NPDES Permit Application – Plan to submit 5/25/04

Dan River Steam Station SOFA, Unit 3

- Air Permit Application – Plan to submit January , 2005

Marshall Steam Station SNCR, Unit 2

- Air Permit Application – Plan to submit June, 2005

Marshall Steam Station SNCR, Unit 3

- Air Permit Application – Plan to submit 6/1/04
- NPDES Permit Modification (if required) – Plan to submit 10/27/04

- Sedimentation and Erosion Control (if required) – Plan to submit 11/15/04

Marshall Steam Station Scrubbers

- Landfill Construction Plan Application – Plan to submit 4/1/04
- Sedimentation and Erosion Control Plan for balance of Marshall site work – Plan to submit 6/18/04
- Authorization to Construct (ATC) application for FGD wastewater treatment system – Plan to submit 6/1/04

Riverbend Steam Station SOFA, Unit 5

- Air Permit Application – Plan to submit 5/1/04

Riverbend Steam Station SOFA, Unit 6

- Air Permit Application – Plan to submit January, 2005"

8. **G.S. 62-133.6(i)(8) requires:** *The results of equipment testing related to compliance with G.S. 143-215.107D.*

Progress Energy Response: "No equipment testing related to compliance with G.S. 143-215.107D occurred in 2003."

Duke Energy Response:

"Allen Steam Station SNCR, Unit 1

- Technology demonstration in December, 2001 (one week test)
  - Nominal 30% reduction in NOx with ammonia slip of 5 to 10 ppm at full load
  - Average NOx outlet rate of 0.15 #/MMBTU for the test period
- Equipment acceptance testing in November, 2003
  - Nominal 25% reduction in NO_x with ammonia slip of less than 5 ppm at full load

Marshall Steam Station SNCR, Unit 4

- Technology demonstration in October - November, 2002 (one month test)
  - Average 24% - 25% reduction in NOx with ammonia slip of 5 to 10 ppm at full load
  - Average NO_x outlet rate of 0.163 #/MMBTU for the test period "

9. **G.S. 62-133.6(i)(9) requires:** *The number of tons of oxides of nitrogen (NOx) and sulfur dioxide (SO2) emitted during the previous calendar year from the coal-fired generating units that are subject to the emissions limitations set out in G.S. 143-215.107D.*

Progress Energy Response: "The total calendar year 2003 emissions from the affected coal-fired Progress Energy Carolinas units are:

- NOx - 56,059
- SO_2 - 196,184"

Duke Energy Response: In the 2003 calendar year, the following were emitted from the North Carolina based Duke Energy coal-fired units:

- NOx - 75,550 tons
- SO2 - 264,031 tons

10. **G.S. 62-133.6(i)(10) requires:** *The emissions allowances described in G.S. 143-215.107D(i) that are acquired by the investor-owned public utility that result from compliance with the emissions limitations set out in G.S. 143-215.107D.*

Progress Energy Response: "No emissions allowances resulting from compliance with G.S. 143-215.107D were acquired in 2003."

Duke Energy Response: "No emissions allowances have been acquired by Duke Power Company resulting from compliance with the limitations set out in G.S. 143-215.107D."

11. **G.S. 62-133.6(i)(11) requires:** *Any other information requested by the Commission or the Department of Environment and Natural Resources*

Summary of Commission Request: The Commission submitted data requests to Progress Energy and Duke Energy on April 16, 2004. The information requested, among other things, concerned current projected amortization schedules over the six remaining years of the seven-year accelerated cost recovery period.

Progress Energy Response: Progress Energy responded that it currently expects to amortize its remaining compliance costs as follows: 2004 - $75 million; 2005 – $120 to $140 million; 2006 - $125 to $145 million; 2007 – $130 to $150 million; 2008 - $121.5 million; and 2009 - $121.5 million. The Company noted that those amounts are subject to change.

Duke Energy Response: Duke Energy responded that it currently plans to amortize its remaining compliance costs as follows: 2004 - $171 million; 2005 – $277 million; 2006 - $277 million; 2007 – $277 million; 2008 - $214 million; and 2009 - $169 million.

III. Section 10 of the Act provides: *It is the intent of the General Assembly that the State use all available resources and means, including negotiation, participation in interstate compacts and multistate and interagency agreements, petitions pursuant to 42 U.S.C. § 7426, and litigation to induce other states and entities, including the Tennessee Valley Authority, to achieve reductions in emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) comparable to those required by G.S. 143-215.107D, as*

enacted by Section 1 of this act, on a comparable schedule. The State shall give particular attention to those states and other entities whose emissions negatively impact air quality in North Carolina or whose failure to achieve comparable reductions would place the economy of North Carolina at a competitive disadvantage.

DENR and Division of Air Quality (DAQ) Activities to implement this Section:

- A meeting was held between DENR/DAQ and the Tennessee Valley Authority (TVA) and the Tennessee air program officials in August 2002, to discuss actions planned by TVA that would be comparable to the Clean Smokestacks Act. TVA presented their plans to add five additional SO2 scrubbers to power plants primarily in the eastern portion of the TVA system. These new scrubbers should benefit North Carolina most. TVA plans to complete installation of the new facilities by 2010 and the first plant, Paradise, will be installed by 2006. Regarding NOx control, TVA is on schedule to have the first 8 of its selective catalytic reduction (SCR) systems in place. TVA plans to have 25 boiler units controlled by 2005 at a cost of $1.3 billion which will reduce ozone season NOx by 75 percent.

Through DENR's efforts, the Clean Smokestacks Act is achieving notoriety nationally and is being touted in other States as a model for State action. The Secretary of DENR and the Chief of Planning of DAQ made presentations about the Clean Smokestacks Act at two national state environmental organization meetings in the fall of 2002. The Chief of Planning of DAQ testified in 2002, at a U.S. Senate Environment and Public Works Committee Hearing on the features and benefits of North Carolina's Clean Smokestacks Act. The Deputy Director of DAQ participates on a national dialogue workgroup addressing ideal features of national multi-pollutant legislation for coal-fired utility boilers. The Clean Smokestacks Act is held up as an ideal example.

- The State also has been active in maintaining federal standards. In an April 2003 letter to EPA Administrator Whitman, Governor Easley urged the Administration to ensure that the federal Clear Skies bill not override State initiatives such as the Clean Smokestacks Act. The Governor also indicated the State's opposition to bill text that would extinguish the statutory rights of States regarding interstate pollution abatement. DAQ and the Attorney General commented last month in opposition to a proposed federal rule that would weaken the federal New Source Review program and potentially result in significant new upwind emissions. North Carolina filed a petition on March 18, 2004, calling for the U.S. Environmental Protection Agency to require major reductions of air pollution in 13 upwind states that are significantly impacting this state. Reducing these emissions will substantially improve air quality in North Carolina. The petition, filed pursuant to Section 126 of the Clean Air Act, calls for the EPA to require cuts in fine particle-forming emissions from power plants in Alabama, Georgia, Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania,

South Carolina, Tennessee, Virginia and West Virginia, and ozone-forming emissions in Georgia, Maryland, South Carolina, Tennessee and Virginia.

IV. Section 12 of the Act provides: *The General Assembly anticipates that measures implemented to achieve the reductions in emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) required by G.S. 143-215.107D, as enacted by Section 1 of this act, will also result in significant reductions in the emissions of mercury from coal-fired generating units. The Division of Air Quality of the Department of Environment and Natural Resources shall study issues related to monitoring emissions of mercury and the development and implementation of standards and plans to implement programs to control emissions of mercury from coal-fired generating units. The Division shall evaluate available control technologies and shall estimate the benefits and costs of alternative strategies to reduce emissions of mercury. The Division shall annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003. The Division shall report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than 1 September 2005. The costs of implementing any air quality standards and plans to reduce the emission of mercury from coal-fired generating units below the standards in effect on the date this act becomes effective, except to the extent that the emission of mercury is reduced as a result of the reductions in the emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) required to achieve the emissions limitations set out in G.S. 143-215.107D, as enacted by Section 1 of this act, shall not be recoverable pursuant to G.S. 62-133.6, as enacted by Section 9 of this act.*

DAQ Actions to Implement this Section: The DAQ submitted a report on September 1, 2003, as required by this section. The first report primarily focused on the "state of knowledge" of the co-benefit of mercury control that will result from the control of NOx and SO2 from coal-fired utility boilers. Also, preliminary estimates were made for this co-benefit for the North Carolina utility boilers based on the initial plans submitted by Progress Energy and Duke Energy. Two public workshops were held in June and July 2003, to meet with all interested stakeholders to offer review of the draft DAQ report. DAQ is presently developing the September 1, 2004 report.

V. Section 13 of the Act provides: *The Division of Air Quality of the Department of Environment and Natural Resources shall study issues related to the development and implementation of standards and plans to implement programs to control emissions of carbon dioxide (CO2) from coal-fired generating units and other stationary sources of air pollution. The Division shall evaluate available control technologies and shall estimate the benefits and costs of alternative strategies to reduce emissions of carbon dioxide (CO2). The Division shall annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003. The Division shall report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than*

1 September 2005. The costs of implementing any air quality standards and plans to reduce the emission of carbon dioxide (CO2) from coal-fired generating units below the standards in effect on the date this act becomes effective, except to the extent that the emission of carbon dioxide (CO2) is reduced as a result of the reductions in the emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO2) required to achieve the emissions limitations set out in G.S. 143-215.107D, as enacted by Section 1 of this act, shall not be recoverable pursuant to G.S. 62-133.6, as enacted by Section 9 of this act.

DAQ Actions to Implement this Section: The DAQ submitted a report on September 1, 2003, as required by this section. The first report primarily focused on the "state of knowledge" and actions being taken or planned elsewhere regarding CO2 control from coal-fired utility boilers. Two public workshops were held in June and July 2003, to meet with all interested stakeholders to offer review of the draft DAQ report.

VI. Supplementary Information: As stated in the May 30, 2003 report, the Public Staff – North Carolina Utilities Commission (Public Staff) will audit the books and records of Progress Energy and Duke Energy in regard to the costs incurred and amortized by the Companies concerning their compliance with the provisions of the Clean Smokestacks Act. The Public Staff has undertaken such a review, focusing on the verification of costs related to complying with the Act, the amortization of those costs, and contracts with vendors who will engineer and construct emission reduction equipment. The Public Staff filed its reports with the Commission on May 3, 2004. Attached, and made part of this report, are the Public Staff's reports for Duke Energy and Progress Energy (without Attachment), Attachments C and D, respectively.

CONCLUSION

Actions taken to date by Progress Energy and Duke Energy appear to be in accordance with the provisions and requirements of the Clean Smokestacks Act.

ATTACHMENTS

Attachment A: Clean Smokestacks Act Compliance Plan Annual Update dated March 31, 2004, Submitted by Duke Power, a Division of Duke Energy Corporation

Attachment B: Annual North Carolina Clean Smokestacks Act Compliance Report dated April 1, 2004, Submitted by Progress Energy Carolinas, Inc.

Attachment C: Report of the Public Staff on Costs Incurred and Amortized by Duke Energy Corporation in Compliance with Session Law 2002-4

Attachment D: Report of the Public Staff on Costs Incurred and Amortized by Progress Energy Carolinas, Inc. in Compliance With Session Law 2002-4

Duke Power
A Duke Energy Company

George T. Everett, Ph.D.
Vice President, Environmental and Public Policy

Duke Power
526 South Church Street
P.O. Box 1006
Charlotte, NC 28201-1006

704-373-4363
gteverett@duke-energy.com

FILED
APR 02 2004
Clerk's Office
N.C. Utilities Commission

March 31, 2004

Ms. Jo Anne Sanford, Chair
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, NC 27699-4325

E-7 Sub 718

Subject: Senate Bill 1078

Duke Power Compliance Plan Annual Update

Record No. NC CAP 003
Certified: 7002 3150 0003 7316 2413

Dear Ms. Sanford:

As required by Senate Bill 1078, Duke Power is required to file information on or before 1 April of each year to update the Commission on progress to date, upcoming activities and expected strategies to achieve the emissions limitations set out in G.S. 143-215.107D.

The current plan to meet the emission requirements for NO_x and SO_2 continues to include:

NO_x Control – The installation of Selective Catalytic Reduction (SCR) on Cliffside Steam Station Unit 5 and Belews Creek Steam Station Units 1&2; the installation of Selective Non Catalytic Reduction (SNCR) with Low-NO_x burners on the 24 remaining units.

SO_2 Control – The installation of wet scrubbers on our twelve largest generating units.

Exhibits A and B outline the unit specific technology selections, projected operational dates, expected emission rates, and the corresponding tons of emissions that demonstrate compliance with the legislative requirements. The projected 'environmental compliance costs' for these pollution control projects are included in Exhibit C.

Duke Power will continue to optimize the technology selection, implementation schedule and cost, and will provide annual updates to the NC Utilities Commission as required. If you have questions regarding any aspect of our plan, please do not hesitate to contact my office at 704-373-4363.

Sincerely,

George T. Everett

George T. Everett, Ph.D.
Vice President, Environmental and Public Policy
Duke Power

Enclosure

cc w/ attachments: Robert P. Gruber
Executive Director - Public Staff
4326 Mail Service Center
Raleigh, NC 27699-4326

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APR 5 2004
Operations Division
N.C. UTILITIES COMMISSION

3/31/2004

Duke Power Company

General Assembly of North Carolina Session 2001
Senate Bill 1078 – Improve Air Quality/Electric Utilities (NC Clean Air Legislation)
Annual Data Submittal

1. **A detailed report on the investor-owned public utility's plans for meeting the emissions limitations set out in G.S. 143-215.107D.**

   Exhibits A and B outline the technology selections by facility and unit, projected operational dates, expected emission rates, and the corresponding tons of emissions that demonstrate compliance with the provisions of G.S. 143-215.107D.

2. **The actual environmental compliance costs incurred by the investor-owned public utility in the previous calendar year, including a description of the construction undertaken and completed during that year.**

   In the 2003 calendar year, Duke Power Company spent $16,041,000 on activities in support of compliance with the provisions of G.S. 143-215.107D. Exact amounts associated with each project are provided in Exhibit C, and a description of the associated activities is provided below:

   Allen Steam Station SNCR, Unit 1
   - Equipment installation completed
   - Acceptance testing completed

   Allen Steam Station SNCR, Unit 3
   - Project planning and scope development initiated
   - Boiler testing and modeling completed

   Allen Steam Station SNCR, Unit 5
   - Project planning and scope development initiated

   Allen Steam Station Scrubbers
   - Project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics completed

   Belews Creek Steam Station Scrubbers
   - Project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics completed

   Cliffside Steam Station Scrubbers
   - Project studies and investigations related to reagent handling, equipment optimization, byproduct handling, equipment layout and logistics completed

   Dan River Steam Station Burners, Unit 3
   - Electrical and mechanical design continued

   Marshall Steam Station SNCR, Unit 1
   - Project planning and scope development initiated

Marshall Steam Station SNCR, Unit 2

- Project planning and scope development initiated
- Boiler testing and modeling completed

Marshall Steam Station SNCR, Unit 3

- SNCR Equipment engineering completed

Marshall Steam Station SNCR, Unit 4

- SNCR Equipment engineering completed

Marshall Steam Station Scrubbers

- Initial engineering phase for balance of plant (BOP) scope completed
- Approximately 25% of detailed engineering completed
- EPC contract for FGD Project awarded on December 19, 2003

Riverbend Steam Station Burners, Unit 5

- Electrical and mechanical design continued

Riverbend Steam Station Burners, Unit 6

- Electrical and mechanical design continued

3. **The amount of the investor-owned public utility's environmental compliance costs amortized in the previous calendar year.**

   In the 2003 calendar year, **$114,813,336** was amortized related to construction work activity in support of compliance with the provisions of G.S. 143-215.107D.

4. **An estimate of the investor-owned public utility's environmental compliance costs and the basis for any revisions of those estimates when compared to the estimates submitted during the previous year.**

   The estimated 'environmental compliance costs' as defined in G.S. 143-215.107D are provided in Exhibit C.

   These expected costs are not significantly different than the estimates provided in the 2003 annual filing. The minor adjustments to the estimates at the project level are the result of additional project scope definition and refinement of project schedules only.

   The technologies expected to be required to support compliance have not changed from what was provided in the 2003 annual filing or subsequent data requests. These technology decisions continue to be evaluated more fully, and changes to these technology decisions may ultimately be required in order to comply with emissions limitations.

5. **A description of all permits required in order to comply with the provisions of G.S. 143-215.107D for which the investor-owned public utility has applied and the status of those permits or permit applications.**

Allen Steam Station SNCR, Unit 1

- Air Permit Application for temporary trial submitted and final permit received in 2002
- NPDES Permit Modification for temporary trial submitted and permit modification received in 2002
- Air Permit Application for permanent equipment installation submitted and final permit received in 2002

Marshall Steam Station SNCR, Unit 4

- Air Permit Application for temporary trial submitted and final permit received in 2002
- NPDES Permit Modification for temporary trial submitted and permit modification received in 2002

Marshall Steam Station Scrubbers, Units 1-4

- Air Permit Application – Submitted 9/17/03; received 2/5/04
- Sedimentation and Erosion Control Plan – Submitted 9/11/03; received 10/8/03; amended 12/19/03; amendments approved 12/31/03
- NPDES Modification – Submitted 4/30/03; received 1/23/04
- Landfill Site Suitability Application – Submitted 9/3/03

6. **A description of the construction related to compliance with the provisions of G.S. 143-215.107D that is anticipated during the following year.**

Allen Steam Station SNCR, Unit 3

- SNCR equipment engineering expected to occur in 2004
- SNCR equipment installation expected to occur in 2nd quarter of 2005

Allen Steam Station SNCR, Unit 4

- Boiler testing and modeling expected to occur in 2004

Allen Steam Station Scrubbers

- No FGD construction planned in 2004-2005, and no further substantial FGD engineering anticipated until 2008

Belews Creek Steam Station Scrubbers

- Further FGD engineering study expected to be awarded in 3rd or 4th quarter of 2004 to finalize FGD project scope, funding, and implementation schedule
- EPC contract expected to be awarded in 3rd quarter of 2005
- Release for detailed engineering and potentially authorization for some early site prep may be awarded under a Limited Notice To Proceed (LNTP) to the EPC Contractor in 2nd quarter of 2005
- Full site mobilization of the EPC Contractor expected to begin in the 3rd quarter of 2005

- Only substantial construction expected to be started in 2005 would be general excavation, grading, and drainage
- Foundations may be started in 4th quarter of 2005

Buck Steam Station SNCR, Unit 5

- Boiler testing and modeling expected to occur in 2004
- SNCR equipment engineering expected to begin in 2004

Buck Steam Station SNCR, Unit 6

- Boiler testing and modeling expected to occur in 2004
- SNCR equipment engineering expected to begin in 2004

Cliffside Steam Station Scrubbers

- No FGD construction planned in 2004-2005, and no further substantial FGD engineering anticipated until 2006

Marshall Steam Station SNCR, Unit 1

- SNCR equipment engineering expected to begin in 2004

Marshall Steam Station SNCR, Unit 2

- SNCR equipment engineering expected to begin in 2004

Marshall Steam Station SNCR, Unit 3

- SNCR equipment installation expected to be completed by 2nd quarter of 2005

Marshall Steam Station Scrubbers

- EPC Contractor began mobilization at site on January 5, 2004
- Site prep (timber clearing) began in January and finished in March, 2004
- General excavation, grading, and drainage expected to start in April, 2004
- Installation of foundations expected to begin in June, 2004
- Erection of new wet stack (concrete wind screen) and installation of undergrounds (electrical duct bank and piping) expected to begin in September, 2004
- Erection of scrubber (absorber) building structural steel expected to begin in January, 2005
- Excavation and drainage for gypsum by-product landfill expected to start in February, 2005
- Erection of FGD ductwork structural support steel expected to begin in June, 2005
- Installation of FGD wastewater pre-treatment package (clarifier for removal of solid fines) expected to begin in July, 2005
- Switchyard tie-in and electrical power backfeed to FGD equipment expected to occur in November 2005.

Riverbend Steam Station SNCR, Unit 4

- Boiler testing and modeling expected to begin in 2004

Riverbend Steam Station Burners, Unit 5

- Installation of burners expected to be completed by 4th quarter of 2004

Riverbend Steam Station SNCR, Unit 7

- Boiler testing and modeling expected to begin in 2004

7. A description of the applications for permits required in order to comply with the provisions of G.S. 143-215.107D that are anticipated during the following year.

Allen Steam Station SNCR, Unit 3
- Air Permit Application – Plan to submit 8/1/04

Belews Creek Steam Station Scrubbers, Units 1-2
- Landfill Site Suitability Application – Plan to submit 1/11/05
- Air Permit Application – Plan to submit 5/20/05
- Sedimentation and Erosion Control Plan – Plan to submit 6/6/05
- NPDES Permit Modification – Plan to submit 5/25/04

Dan River Steam Station SOFA, Unit 3
- Air Permit Application – Plan to submit January, 2005

Marshall Steam Station SNCR, Unit 2
- Air Permit Application – Plan to submit June, 2005

Marshall Steam Station SNCR, Unit 3
- Air Permit Application – Plan to submit 6/1/04
- NPDES Permit Modification (if required)- Plan to submit 10/27/04
- Sedimentation and Erosion Control (if required) – Plan to submit 11/15/04

Marshall Steam Station Scrubbers
- Landfill Construction Plan Application – Plan to submit 4/1/04
- Sedimentation and Erosion Control Plan for balance of Marshall site work – Plan to submit 6/18/04
- Authorization to Construct (ATC) application for FGD wastewater treatment system – Plan to submit 6/1/04

Riverbend Steam Station SOFA, Unit 5
- Air Permit Application – Plan to submit 5/1/04

Riverbend Steam Station SOFA, Unit 6
- Air Permit Application – Plan to submit January, 2005

8. The results of equipment testing related to compliance with G.S. 143-215.107D.

Allen Steam Station SNCR, Unit 1
- Technology demonstration in December, 2001 (one week test)
  - Nominal 30% reduction in NO_x with ammonia slip of 5 to 10 ppm at full load
  - Average NO_x outlet rate of 0.15 #/MMBTU for the test period
- Equipment acceptance testing in November, 2003
  - Nominal 25% reduction in NO_x with ammonia slip of less than 5 ppm at full load

Marshall Steam Station SNCR, Unit 4

- Technology demonstration in October - November, 2002 (one month test)
  - Average 24% - 25% reduction in NO_x with ammonia slip of 5 to 10 ppm at full load
  - Average NO_x outlet rate of 0.163 #/MMBTU for the test period

Note: Test results do not necessarily guarantee long term results. Expected annual emission rates are provided in Exhibit A.

9. The number of tons of oxides of nitrogen (NO_x) and sulfur dioxide (SO_2) emitted during the previous calendar year from the coal-fired generating units that are subject to the emissions limitations set out in G.S. 143-215.107D.

In the 2003 calendar year, 75,550 tons of NO_x and 264,031 tons of SO_2 were emitted from the North Carolina based Duke Power Company coal-fired units located in North Carolina and subject to the emissions limitations set out in G.S 143-215.107D.

10. The emissions allowances described in G.S. 143-215.107D(i) that are acquired by the investor-owned public utility that result from compliance with the emissions limitations set out in G.S. 143-215.107D.

No emissions allowances have been acquired by Duke Power Company resulting from compliance with the emissions limitations set out in G.S. 143-215.107D.

11. Any other information requested by the Commission or Department of Environment and Natural Resources.

No additional information has been requested to be included in this annual data submittal.

Expected Duke Power Company Compliance Plan for NC Clean Air Plan
(Exhibit A)

NO_x							
				2007 Compliance		2009 Compliance	
Facility	Unit	Technology	Operational Date	Expected Rate #/MMBTUs	Tons	Expected Rate #/MMBTUs	Tons
Allen	1	SNCR	2003	0.17	715	0.17	650
Allen	2	SNCR	2007	0.19	703	0.17	829
Allen	3	SNCR	2005	0.17	1,310	0.17	1,086
Allen	4	SNCR	2006	0.17	1,357	0.17	1,458
Allen	5	SNCR	2008	0.23	1,845	0.17	1,516
Belews Creek	1	SCR	2003	0.10	3,482	0.10	3,463
Belews Creek	2	SCR&Burners	2004	0.10	3,540	0.10	3,524
Buck	3	SNCR	2009	0.42	458	0.25	392
Buck	4	SNCR	2008	0.42	285	0.25	238
Buck	5	SNCR	2006	0.21	682	0.17	605
Buck	6	SNCR	2007	0.17	593	0.17	646
Cliffside	1	SNCR	2009	0.35	205	0.25	198
Cliffside	2	SNCR	2009	0.35	201	0.25	199
Cliffside	3	SNCR	2008	0.35	339	0.25	357
Cliffside	4	SNCR	2008	0.35	326	0.25	343
Cliffside	5	SCR	2002	0.07	1,179	0.07	1,225
Dan River	1	SNCR	2009	0.37	374	0.25	349
Dan River	2	SNCR	2009	0.37	410	0.25	378
Dan River	3	SNCR&Burners	2007	0.20	484	0.17	588
Marshall	1	SNCR	2007	0.20	2,107	0.18	2,145
Marshall	2	SNCR	2006	0.18	1,548	0.18	2,153
Marshall	3	SNCR	2005	0.17	3,457	0.17	2,915
Marshall	4	SNCR	2008	0.23	4,447	0.17	3,615
Riverbend	4	SNCR	2007	0.20	359	0.17	397
Riverbend	5	SNCR&Burners	2008	0.24	375	0.17	383
Riverbend	6	SNCR&Burners	2008	0.22	693	0.17	653
Riverbend	7	SNCR	2007	0.17	557	0.17	651
			Expected Total:		**32,032**		**30,956**
			Compliance Limit:		**35,000**		**31,000**

Technology
SNCR - Selective Non Catalytic Reduction.
SCR - Selective Catalytic Reduction

Expected Duke Power Company Compliance Plan for NC Clean Air Plan
(Exhibit B)

SO_2							
				2009 Compliance		2013 Compliance	
Facility	Unit	Technology	Operational Date	Expected Rate #/MMBTUs	Tons	Expected Rate #/MMBTUs	Tons
Allen	1	Scrubber	2011	1.55	5,931	0.15	707
Allen	2	Scrubber	2011	1.55	7,554	0.15	765
Allen	3	Scrubber	2011	1.55	9,905	0.15	1,183
Allen	4	Scrubber	2012	1.55	13,298	0.15	1,238
Allen	5	Scrubber	2012	1.55	13,819	0.15	1,361
Belews Creek	1	Scrubber	2008	0.15	5,355	0.15	5,255
Belews Creek	2	Scrubber	2008	0.15	5,450	0.15	5,331
Buck	3			1.40	2,195	1.40	2,172
Buck	4			1.40	1,333	1.40	1,322
Buck	5			1.40	4,981	1.40	5,093
Buck	6			1.40	5,322	1.40	5,716
Cliffside	1			1.70	1,344	1.70	1,328
Cliffside	2			1.70	1,356	1.70	1,400
Cliffside	3			1.70	2,426	1.70	2,495
Cliffside	4			1.70	2,329	1.70	2,451
Cliffside	5	Scrubber	2009	0.19	3,474	0.15	2,829
Dan River	1			1.40	1,953	1.40	1,949
Dan River	2			1.40	2,114	1.40	2,134
Dan River	3			1.40	4,841	1.40	4,843
Marshall	1	Scrubber	2007	0.15	1,787	0.15	1,776
Marshall	2	Scrubber	2007	0.15	1,794	0.15	1,781
Marshall	3	Scrubber	2006	0.15	2,572	0.15	3,122
Marshall	4	Scrubber	2006	0.15	3,190	0.15	3,147
Riverbend	4			1.60	3,740	1.60	3,867
Riverbend	5			1.60	3,609	1.60	3,581
Riverbend	6			1.60	6,146	1.60	6,260
Riverbend	7			1.60	6,130	1.60	6,230
			Expected Total:		**123,947**		**79,339**
			Compliance Limit:		**150,000**		**80,000**

Expected Duke Power Company Compliance Plan for NC Clean Air Plan
(Exhibit C)

Facility	Unit(s)	Technology	Operational Date	Spent to Date			Remaining
				2001 ($000)	2002 ($000)	2003 ($000)	2004-2013 ($000)
Allen	1	SNCR	2003	$179	$160	$2,883	$18
Allen	2	SNCR	2007				$2,503
Allen	3	SNCR	2005			$216	$5,936
Allen	4	SNCR	2006				$3,677
Allen	5	SNCR	2008			$99	$3,683
Allen	1-5	Scrubber	2012	$16	$429	$587	$353,645
Belews Creek	1	Catalyst Add					$4,636
Belews Creek	2	Catalyst Add					$4,752
Belews Creek	1-2	Scrubber	2008	$7	$502	$776	$431,314
Buck	3	SNCR	2009				$2,790
Buck	4	SNCR	2008				$1,408
Buck	5	SNCR	2006				$3,041
Buck	6	SNCR	2007				$1,658
Cliffside	1	SNCR	2009				$2,422
Cliffside	2	SNCR	2009				$1,314
Cliffside	3	SNCR	2008				$2,147
Cliffside	4	SNCR	2008				$1,325
Cliffside	5	Catalyst Add					$2,751
Cliffside	5	Scrubber	2009	$4	$529	$673	$220,658
Dan River	1	SNCR	2009				$1,694
Dan River	2	SNCR	2009				$1,420
Dan River	3	SNCR&Burners	2007	$8	$162	$22	$6,626
Marshall	1	SNCR	2007			$1	$3,443
Marshall	2	SNCR	2006			$198	$4,875
Marshall	3	SNCR	2005		$622	$956	$4,661
Marshall	4	SNCR	2008				$3,258
Marshall	1-4	Scrubber	2007	$76	$521	$9,618	$413,950
Riverbend	4	SNCR	2007				$1,965
Riverbend	5	SNCR&Burners	2008	$365	$282	$0	$5,283
Riverbend	6	SNCR&Burners	2008	$145	$415	$12	$5,720
Riverbend	7	SNCR	2007				$2,607
			Subtotals:	**$800**	**$3,623**	**$16,041**	**$1,505,178**
						Program Total:	**$1,525,642**

Duke Power
A Duke Energy Company

George T. Everett, Ph.D.
Vice President, Environmental and Public Policy

Duke Power
526 South Church Street
P.O. Box 1006
Charlotte, NC 28201-1006

704-373-4363
gteverett@duke-energy.com

VERIFICATION

I, George T. Everett, state and attest that the attached information updating the North Carolina Utilities Commission on progress to date, upcoming activities, and expected strategies to achieve the emissions limitations set out in N. C. G.S.143-215.107.D (Annual Update) is filed on behalf of Duke Power, a division of Duke Energy; that I have reviewed said Annual Update and, in the exercise of due diligence, have made reasonable inquiry into the accuracy of the information provided therein; and that, to the best of my knowledge, information, and belief, all of the information contained therein is accurate and true, and no material information or fact has been knowingly omitted or misstated therein.

George T. Everett
George T. Everett, Ph.D.
Vice President, Environmental & Public Policy

3/31/04
Date

Subscribed and sworn before me this the 31 ST day of March, 2004.

Sandra G. Baker
Notary Public

My commission expires My Commission Expires November 19, 2006

Progress Energy

E-2, Sub 815

FILED
APR 01 2004
Clerk's Office
N.C. Utilities Commission

April 1, 2004

Mrs. Geneva S. Thigpen
Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, NC 27699-4325

Re: Annual NC Clean Smokestacks Legislation Compliance Report

Dear Mrs. Thigpen:

Progress Energy Carolinas, Inc. submits the attached report for calendar year 2003 regarding the status of compliance with the provisions of the North Carolina Clean Smokestacks legislation. Section 9(i) of the legislation requires that an annual report of compliance progress be submitted to the Commission by April 1 of each year for the previous calendar year.

Very truly yours,

Len S. Anthony
Deputy General Counsel

LSA:at

Attachment

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RECEIVED
APR 5 2004
Operations Division
N.C. UTILITIES COMMISSION

Progress Energy Service Company, LLC
P.O. Box 1551
Raleigh, NC 27602

Progress Energy

Charles R. Wakild, PE
Executive Director
Environment, Health & Safety
Progress Energy Service Company, LLC

April 1, 2004

FILED
APR 0 1 2004
Clerk's Office
N.C. Utilities Commission

William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, NC 27699

Dear Secretary Ross:

Progress Energy Carolinas, Inc. submits the attached report for calendar year 2003 regarding the status of compliance with the provisions of the North Carolina Clean Smokestacks legislation. Section 9(i) of the legislation requires that an annual report of compliance progress be submitted by April 1 of each year for the previous calendar year. Progress Energy Carolinas looks forward to continuing to work with you and your staff in processing the necessary permits that will facilitate the company's compliance with this important legislation.

Please feel free to contact me at (919) 546-2449 if you have any questions.

Sincerely,

Charles Wakild

c: North Carolina Public Utilities Commission
Keith Overcash

P.O. Box 1551
Raleigh, NC 27602

T> 919.546.2449

bc: Len Anthony
Byron Covey
Mike Engelman
Jack Keenan
Mike Kennedy
John McArthur
Dwain Lanier
Jeff Stone
Gary Tonnemacher
Patty West
Ben White
Vicky Will
Mike Williams

Progress Energy Carolinas, Inc.
Senate Bill 1078 – Clean Smokestacks Law
Calendar Year 2003 Progress Report

On June 20, 2002, North Carolina Senate Bill 1078, also known as the "Clean Smokestacks Law," was signed into effect. This law requires significant reductions in the emissions of nitrogen oxides (NOx) and sulfur dioxide (SO_2) from utility owned coal-fired power plants located in North Carolina. Section 9(i) of the bill, which is now incorporated as Section 62-133.6(i) of the North Carolina General Statutes, requires that an annual progress report regarding compliance with the Clean Smokestacks Law be submitted on or before April 1 of each year. The report must contain the following elements, taken verbatim from the statute:

1. A detailed report on the investor-owned public utility's plans for meeting the emissions limitations set out in G.S. 143-215.107D.
2. The actual environmental compliance costs incurred by the investor-owned public utility in the previous calendar year, including a description of the construction undertaken and completed that year.
3. The amount of the investor-owned public utility's environmental compliance costs amortized in the previous calendar year.
4. An estimate of the investor-owned public utility's environmental compliance costs and the basis for any revisions of those estimates when compared to the estimates submitted during the previous year.
5. A description of all permits required in order to comply with the provisions of G.S. 143-215.107D for which the investor-owned public utility has applied and the status of those permits or permit applications.
6. A description of the construction related to compliance with the provisions of G.S. 143-215.107D that is anticipated during the following year.
7. A description of the applications for permits required in order to comply with the provisions of G.S. 143-215.107D that are anticipated during the following year.
8. The results of equipment testing related to compliance with G.S. 143-215.107D.
9. The number of tons of oxides of nitrogen (NOx) and sulfur dioxide (SO_2) emitted during the previous calendar year from the coal-fired generating units that are subject to the emissions limitations set out in G.S. 143-215.107D.
10. The emissions allowances described in G.S. 143-215.107D(i) that are acquired by the investor-owned public utility that result from compliance with the emissions limitations set out in G.S. 143-215.107D.
11. Any other information requested by the Commission or the Department of Environment and Natural Resources.

Information responsive to each of these report elements follows. The responses are given by item number in the order in which they are presented above.

1. **A detailed report on the investor-owned public utility's plans for meeting the emissions limitations set out in G.S. 143-215.107D.**

The plan for Progress Energy Carolinas, Inc. was originally submitted on July 29, 2002. Appendix A contains an updated version of this plan, effective April 1, 2004.

2. **The actual environmental compliance costs incurred by the investor-owned public utility in the previous calendar year, including a description of the construction undertaken and completed that year.**

Appendix B contains the costs incurred toward compliance with G.S. 143-215.107D in 2003 and the projected costs for future years through 2013.

Construction began in the fourth quarter of 2003 at both Roxboro and Asheville plants after receipt of the necessary Title V permits and approval of soil and erosion control plans. At Asheville, the general contractor mobilized, soil erosion and control measures were installed, site preparation began, various underground piping was relocated, and production piles for the new chimney and absorber foundations were started.

At the Roxboro plant, soil and erosion control measures were installed, and excavation began for the relocation of the existing coal dumper to allow for installation of the new scrubber absorber towers, chimneys, and other flue gas desulfurization equipment.

3. **The amount of the investor-owned public utility's environmental compliance costs amortized in the previous calendar year.**

Progress Energy Carolinas, Inc. amortized $74,218,806.00 in 2003.

4. **An estimate of the investor-owned public utility's environmental compliance costs and the basis for any revisions of those estimates when compared to the estimates submitted during the previous year.**

Appendix B contains the costs incurred toward compliance with G.S. 143-215.107D in 2003 and the projected costs for future years through 2013. The estimated total capital costs (escalated) remain $813M. Projected SO_2 removal rates have increased for scrubbed units. As a result, the planned scrubber for Lee 3 has been cancelled.

5. **A description of all permits required in order to comply with the provisions of G.S. 143-215.107D for which the investor-owned public utility has applied and the status of those permits or permit applications.**

Revised Title V permits to support construction activities for compliance with G.S. 143-215.107D have been issued for Asheville Plant (WNCRAQA Permit 11-628-03) and Roxboro Plant (NCDENR Permit 01001T31). We have no pending air permit applications. Progress Energy has submitted an NPDES Permit application package for required wastewater system modifications at Asheville Plant, and will be submitting the same for Roxboro Plant in 2004. The Asheville NPDES permit submittal includes an innovative constructed wetland treatment system, and the same is being evaluated for the Roxboro Plant. Soil erosion and sedimentation control plans have been submitted and approval received for the Asheville and Roxboro projects.

6. **A description of the construction related to compliance with the provisions of G.S. 143-215.107D that is anticipated during the following year.**

Appendix C presents the planned construction schedule for compliance with G.S. 143-215.107D. Note that this is a projected schedule of construction activity through 2013 that will be subject to modification. The schedule will be updated as part of this report each year.

Significant construction activities at Asheville during 2004 will include the erection of a new chimney to handle the lower temperature flue gas from the scrubbers, the absorber towers for both units, and various other scrubber support systems. At Roxboro, the significant construction activities in 2004 will focus on installation of a new limestone unloading facility and coal unloading facility to allow installation of the scrubber equipment beginning in 2005

7. **A description of the applications for permits required in order to comply with the provisions of G.S. 143-215.107D that are anticipated during the following year.**

An NPDES permit modification application will be submitted in the 2nd quarter of 2004 to request changes to the existing wastewater discharge permit for Roxboro Plant. Operation of scrubbers to comply with G.S. 143-214.107D will create a new wastewater stream, which requires modification of our current permit. The application characterizes expected wastewater contaminant concentrations and flows.

8. **The results of equipment testing related to compliance with G.S. 143-215.107D.**

No equipment testing related to compliance with G.S. 143-215.107D occurred in 2003.

9. **The number of tons of oxides of nitrogen (NOx) and sulfur dioxide (SO_2) emitted during the previous calendar year from the coal-fired generating units that are subject to the emissions limitations set out in G.S. 143-215.107D.**

The total calendar year 2003 emissions from the affected coal-fired Progress Energy Carolinas units are:

NOx 56,059
SO_2 196,184

10. The emissions allowances described in G.S. 143-215.107D(i) that are acquired by the investor-owned public utility that result from compliance with the emissions limitations set out in G.S. 143-215.107D.

No emissions allowances resulting from compliance with G.S. 143-215.107D were acquired in 2003.

11. Any other information requested by the Commission or the Department of Environment and Natural Resources.

NC Clean Smokestacks Audit Public Staff Data Request No. 1 was issued to Progress Energy in September of 2003, and a response was provided on October 6, 2003 .

Appendix A

Progress Energy's Air Quality Improvement Plan Supplement
April 1, 2004

On June 20, 2002 Governor Easley signed into law SB1078 which caps emissions of nitrogen oxides (NOx) and sulfur dioxide (SO_2) from utility owned coal-fired power plants located in North Carolina. Progress Energy's annual NOx emissions must be less than 25,000 tons beginning in 2007 and annual SO_2 emissions must be less than 100,000 tons beginning in 2009 and less than 50,000 tons beginning in 2013. The emissions caps are cumulative for all coal-fired units in North Carolina. These caps represent a 56% reduction in NOx emissions from 2001 levels and a 74% reduction in SO_2 from 2001 levels for Progress Energy.

Progress Energy owns and operates 18 coal-fired units at seven plants in North Carolina. The locations of these plants are shown on Attachment 1.

Nitrogen Oxides Emissions Control Plan

Progress Energy has been evaluating and installing NOx emissions controls on its coal-fired power plants since 1995 in order to comply with Title IV of the Clean Air Act and the NOx SIP Call rule adopted by the Environmental Management Commission (EMC). Substantial NOx emissions reductions have already been achieved (56,000 tons of NOx in 2003 compared with 112,000 tons in 1997) and further reductions will ensure compliance with the SB1078 target of 25,000 tons in calendar year 2007. This target will be achieved with a mix of combustion controls (which minimize the formation of NOx) such as low NOx burners and over fire air technologies, and post-combustion controls (which reduce NOx produced during the combustion of fossil fuel to molecular nitrogen) such as selective catalytic reduction and selective non-catalytic reduction technologies. Attachment 2 details Progress Energy's North Carolina coal-fired electric generating units, their name plate generation capacity, and identifies the control technologies already installed and planned for installation. As technologies evolve or other circumstances change, a different mix of controls may be selected. Attachment 2 also projects the NOx emissions on a unit by unit basis based on the energy demand forecast and expected efficiencies of the NOx emissions controls employed. This information is provided only to show how compliance may be achieved and is not intended in any way to suggest unit specific emission limits. Actual emissions for each unit may be substantially different in 2007.

Flue Gas Desulfurization (FGD)

Progress Energy has completed screening studies on its coal-fired units at Asheville, Roxboro and Mayo plants. Wet scrubbers will be installed at these plants to remove 97% of the SO2 emissions. Babcock and Wilcox has been selected as the equipment supplier,

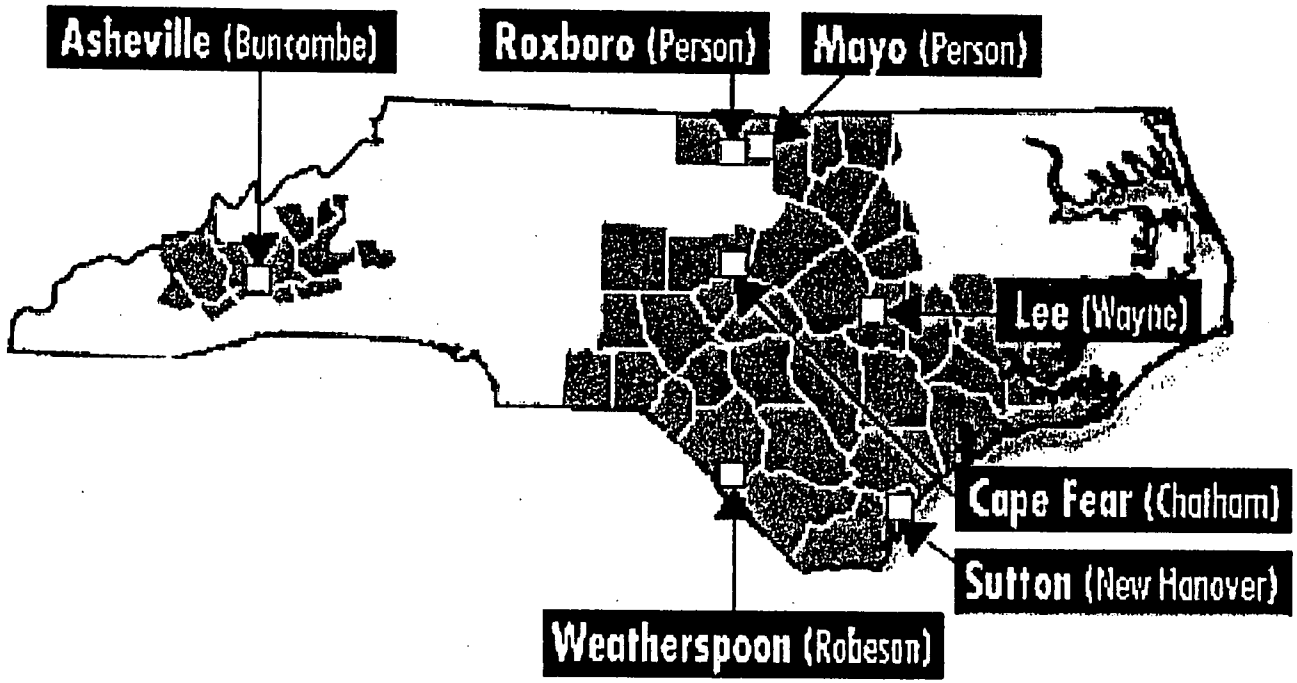
and Fluor Enterprises has been selected as the general contractor for the installation of the SO2 and NOx controls.

Wet scrubbers and dry scrubbers produce unique waste and by-product streams. Issues related to wastewater permitting and solid waste disposal are being addressed for each site. A contract was recently signed with a gypsum product end-user that will construct a wallboard facility at our Roxboro Plant. Progress Energy is working to identify beneficial uses for gypsum produced from its other FGD facilities. The Company plans to treat the scrubber wastewater stream at Asheville Plant using an innovative constructed wetland treatment system to ensure compliance with discharge limits. A similar system is being evaluated for Roxboro Plant. Discussions with various permitting divisions within DENR are ongoing.

Specific units are listed on Attachment 3 with data on projected schedules and projected annual emissions for 2009 and 2013. These projections are based on a 97% SO_2 removal efficiency, forecasted energy demand, 3.3 lbs SO2/Mbtu coal on scrubbed units, and 1.2 lbs SO2/Mbtu coal on others. Note that these are projected schedules and will be subject to revision. In 2003, foundation work began for Asheville 1 and 2 scrubbers, as well as the new common stack. Construction work also commenced at Roxboro to relocate coal handling facilities in support of upcoming scrubber and stack construction.

Particular units controlled and control technologies utilized are subject to change depending on future developments in SO_2 removal technologies, energy demand, sulfur content of coal, and other circumstances which may produce a more optimal plan for meeting the SO_2 emissions limits in 2009 and 2013. DENR will be advised as changing circumstances dictate.

Attachment 1: Location of Progress Energy's Coal-Fired Power Plants in North Carolina



Attachment 2: Progress Energy NOx Control Plan for North Carolina (April 2004)

Unit	MW Rating	Control Technology	Operation Date[1]	Projected NOx Tons, 2007[2]
Asheville 1	198	LNB/AEFLGR/SCR	2009	2,773
Asheville 2	194	LNB/OFA/SCR		546
Cape Fear 5	143	ROFA/ROTAMIX		1046
Cape Fear 6	173	ROFA/ROTAMIX		1209
Lee 1	79	WIR		708
Lee 2	76	**ROFA**	2007	561
Lee 3	252	LNB/OFA/SCR	2010	2,686
Mayo 1	745	LNB/OFA/SCR		1,595
Roxboro 1	385	LNB/OFA/SCR		1,264
Roxboro 2	670	TFS2000/SCR		1,463
Roxboro 3	707	LNB/OFA/SCR		2,726
Roxboro 4	700	LNB/OFA/SCR		1,750
Sutton 1	97	SAS		583
Sutton 2	106	**ROFA**	2006	1,235
Sutton 3	410	LNB/ROFA/ROTAMIX		2,719
Wspn 1	49			495
Wspn 2	49			514
Wspn 3	78	WIR		1109
Total	5,111			24,982

AEFLGR – Amine-Enhanced Flue Lean Gas Reburn
LNB = Low NOx Burner
SNCR = Selective Non-Catalytic Reduction
OFA = Overfire Air
ROFA = Rotating Opposed-fired Air
ROTAMIX = Injection of Ammonia to further reduce NOx (used in combination with ROFA)
WIR = Underfire Air
TFS2000 = Combination Low-NOx Burner/Overfire Air
SAS = Separated Air Staging

[1] Note: This is the operation date for the control technology installed to comply with the North Carolina Improve Air Quality/Electric Utilities Act only (shown in bold).
[2] Unit by unit emissions are illustrative only and specific emissions limits should not be inferred. Actual emissions in 2007 may be different from unit to unit.

Attachment 3: Progress Energy SO_2 Control Plan for North Carolina (April 2004)

Unit	MW Rating	Technology	Operation Date	Projected SO_2 Tons, 2009[1]	Projected SO_2 Tons, 2013[1]
Asheville 1	198	Scrubber	2005	605	529
Asheville 2	194	Scrubber	2006	629	621
Cape Fear 5	143	Scrubber	2012	5,767	465
Cape Fear 6	173	Scrubber	2011	7,133	537
Lee 1	79			2,616	2,798
Lee 2	76			2,308	2,429
Lee 3	252			8,733	10,685
Mayo 1	745	Scrubber	2008	2,324	2,889
Roxboro 1	385	Scrubber	2009	6,854	1,475
Roxboro 2	670	Scrubber	2007	1,213	2,213
Roxboro 3	707	Scrubber	2007	2,672	2,740
Roxboro 4	700	Scrubber	2007	2,435	2,404
Sutton 1	97			3,096	3,035
Sutton 2	106			3,945	3,810
Sutton 3	410	Scrubber	2012	17,830	1,206
Wspn 1	49			1,265	1,349
Wspn 2	49			1,384	1,365
Wspn 3	78			3,007	2,889
Total	5,111			73,817	43,441

[1] Unit by unit emissions are illustrative only and specific emissions limits should not be inferred. Actual emissions in 2009 and 2013 may be different from unit to unit.

[2] Projections are based on 97% SO2 removal efficiency, forecasted energy demand, 3.3 lbs SO2/Mbtu coal on scrubbed units, and 1.2 lbs SO2/Mbtu coal on others

Appendix B

Actual 2002 and 2003 Costs and Projected Costs Through 2013

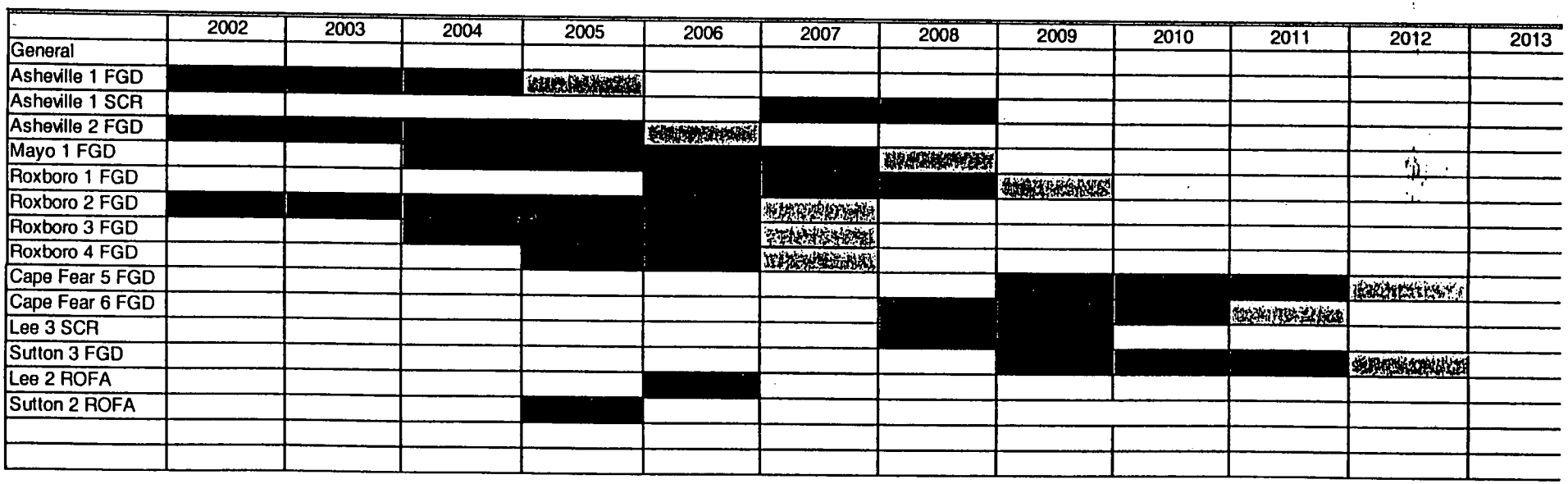
	Start-up	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Asheville 1 FGD	F 2005	$100,000	$8,018,400	$32,250,308	$35,714,522	$1,682,090	$140,736							$77,906,056
Asheville 1 SCR	2009			$2,700,000			$4,600,000	$8,050,000	$9,476,000					$24,826,000
Asheville 2 FGD	S 2006	$100,000	$7,125,475	$21,343,221	$29,855,959	$6,513,995	$684,800							$65,623,450
Asheville FGD Common		$191,778												$191,778
Mayo 1 FGD	F 2008	$155,592		$436,586	$2,439,453	$27,469,519	$34,304,782	$28,685,117	$1,991,773					$95,482,822
Roxboro FGD Common		$218,351	$4,781,408	$13,884,491	$31,395,184	$21,387,013	$22,088,576	$6,495,926						$100,250,948
Roxboro 1 FGD	S 2009					$5,578,031	$13,009,059	$27,029,042	$16,334,345	$95,976	$47,988			$62,094,441
Roxboro 2 FGD	S 2007	$120,000	$2,398,510	$2,000,000	$19,550,677	$30,000,000	$10,100,000							$64,169,187
Roxboro 3 FGD	F 2007			$2,537,313	$27,319,080	$31,000,000	$8,700,000							$69,556,393
Roxboro 4 FGD	F 2007				$5,922,829	$22,154,499	$16,218,577	$13,236,425						$57,532,330
Cape Fear 5 FGD	2012								$500,000	$10,437,241	$19,018,972	$10,965,626		$40,921,839
Cape Fear 6 FGD	2011							$500,000	$9,000,000	$18,555,095	$10,698,172			$38,753,266
Lee 3 SCR	2010							$5,000,000	$15,000,000	$11,596,934				$31,596,934
Sutton 3 FGD	2012								$500,000	$19,714,788	$34,471,887	$17,666,842	$3,122,157	$75,475,674
Lee 2 ROFA	2007					$1,851,250	$2,153,781							$4,005,031
Sutton 2 ROFA	2010				$2,262,816	$2,319,387								$4,582,203
Escalated Total		$885,721	$22,323,793	$75,151,919	$154,460,520	$149,955,784	$112,000,311	$88,996,510	$52,802,118	$60,400,034	$64,237,019	$28,632,468	$3,122,157	$812,968,353

FGD Design and Construction
FGD in service
NOx Controls Design and Construction
NOx Controls in service

Total Escalated Cost: $812,968,353

ATTACHMENT B
PAGE 13 OF 15

Appendix C
NC Clean Air Bill Compliance Plan



Scrubber Design and Construction
Scrubber in service
NOx Controls Design and Construction
NOx Controls in service

Progress Energy

NORTH CAROLINA

WAKE COUNTY

VERIFICATION

Mike Williams, having been first duly sworn, deposes and says that he is Senior Vice President in Power Operations at Carolina Power & Light Company d/b/a Progress Energy Carolinas, Inc.; that he has read the foregoing North Carolina Clean Smokestacks Legislation Compliance Report and knows its contents; that the same is true of his own personal knowledge, except for those matters alleged on information and belief, and as to those matters, he is informed and believes them to be true.

This is the 1st day of April, 2004.

E M Williams

Mike Williams

Sworn to and subscribed before
me this the 1st day of April, 2004.

Kathleen Morton Curtis

Notary Public

My Commission Expires:

11-10-08

201437

NORTH CAROLINA
PUBLIC STAFF
UTILITIES COMMISSION

FILED
MAY 03 2004
Clerk's Office
N.C. Utilities Commission

May 3, 2004

Ms. Geneva S. Thigpen, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4325

Docket No. E-7, Sub 718

Dear Ms. Thigpen:

Enclosed herewith for filing in the above-referenced docket are twenty-one (21) copies of the Report of the Public Staff on Costs Incurred and Amortized by Duke Energy Corporation in Compliance with Session Law 2002-("the Clean Smokestacks Act" or "the Act"). This report presents the results of the Public Staff's review of environmental compliance costs incurred and amortized by Duke Energy pursuant to the Act through the end of calendar year 2003. The Public Staff expects to file an update to this report annually.

Sincerely,

Antoinette R. Wike

Antoinette R. Wike
Chief Counsel

Enclosure

cc: Robert W. Kaylor

RECEIVED
MAY 4 2004
Operations Division
N.C. UTILITIES COMMISSION

Executive Director 733-2435 | Communications 733-2810 | Economic Research 733-2902 | Legal 733-6110 | Transportation 733-7766
Accounting 733-4279 | Consumer Services 733-9277 | Electric 733-2267 | Natural Gas 733-4326 | Water 733-5610

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REPORT OF THE PUBLIC STAFF
ON COSTS INCURRED AND AMORTIZED BY DUKE ENERGY CORPORATION
IN COMPLIANCE WITH SESSION LAW 2002-4

FILED
MAY 03 2004
Clerk's Office
N.C. Utilities Commission

Docket No. E-7, Sub 718

May 3, 2004

Section 14 of Session Law 2002-4 ("the Clean Smokestacks Act" or "the Act") requires the Department of Environment and Natural Resources and the Utilities Commission to report by June 1 of each year, on the implementation of the Act to the Environmental Review Commission and the Joint Legislative Utility Review Committee. The May 30, 2003, report states that the Public Staff will audit the books and records of the investor owned utilities on an ongoing basis in regard to the costs incurred and amortized in compliance with the Act. The Public Staff has undertaken such a review, focusing on the verification of costs related to complying with the Act, the amortization of those costs, and contracts with vendors who will engineer and construct emission reduction equipment. This report presents the Public Staff's findings with regard to Duke Energy Corporation ("Duke Energy").

I. Work to be Performed

To comply with the emissions limitations for nitrogen oxides ("NO_X") and sulfur dioxide ("SO_2") established in the Act, Duke Energy plans to install emission reduction technologies at several of its facilities. Duke Energy has proposed to install Selective Non-catalytic Reduction ("SNCR") technology to remove NO_x and flue-gas desulfurization ("FGD") technology to remove SO_2. The facilities requiring these technologies are as follows:

Facility	NO_X Reduction	SO_2 Reduction
Allen Units 1-5	√	√
Belews Creek Units 1&2		√
Buck Units 3-6	√	
Cliffside Units 1-5	√(units 1-4 only)	√(unit 5 only)
Dan River Units 1-3	√	
Marshall Units 1-4	√	√
Riverbend Units 4-7	√	

In addition, Duke Energy is currently installing Selective Catalytic Reduction ("SCR") technology to remove NO_x from its Belews Creek and Cliffside Unit 5 facilities to comply with the North Carolina State Implementation Plan for NO_x ("NO_x SIP Call"), which is discussed below.

Duke Energy has conducted preliminary testing on the SNCR equipment at the Allen facility and the SCR equipment at Belews Creek. Such testing is normal for start-

up with new systems. Results indicated that the NO_X emissions targets at both facilities were not achieved. Duke Energy suspects that fuel quality may be the reason for the higher than expected emissions at its Allen facility, but it is still studying the problem at Belews Creek. Further testing will be conducted during the ozone season of 2004, with the results expected in late 2004. Duke Energy has expressed confidence that there is sufficient time to continue shake-down testing and achieve successful results, since the NO_x targets are not triggered until 2007.

II. Capital Costs Associated with the Installation of Emission Reduction Technologies

Duke Energy is required by the Act to report its actual capital costs ("environmental compliance costs") associated with its plan to install emission reduction technologies pursuant to the Act. Operational costs related to these emission reduction technologies are not environmental compliance costs as defined by the Act.

Duke Energy reported that its actual environmental compliance costs in calendar year 2003 were $16,041,000. The cumulative environmental compliance costs incurred through 2003 are $20,464,000, broken down as follows:

Year	2001	$ 800,000
Year	2002	3,623,000
Year	2003	16,041,000
		$20,464,000

Duke Energy's expenditures to date involve emission reduction technologies at its Allen, Belews Creek, Cliffside, Dan River, Marshall, and Riverbend facilities. Environmental compliance costs were incurred for project studies and investigations, engineering, equipment procurement, and contracting.

As part of its review, the Public Staff requested information from Duke Energy on the project costs, invoices documenting costs, and the purpose of the costs. Duke Energy provided project cost sheets delineating actual project costs by year into the following categories: (1) direct labor costs including overtime and premiums; (2) labor loads; (3) contract costs; (4) material costs; (5) overhead costs; and, (6) other costs. These costs are as follows:

Direct Labor	$ 2,075,949
Labor Loads	1,500,133
Contracts	12,020,087
Materials	3,091,897
Overheads	344,789
Other	1,430,696
	$20,463,551

The project cost sheets were supported by detailed spreadsheets that incorporated all expenditures to date for a particular category. The Public Staff selected invoices in each category from the detailed spreadsheets, and requested Duke Energy to provide specific information on the selected costs. The Public Staff also had extensive discussions with Duke personnel regarding the individual cost items charged to specific projects. Duke Energy provided sufficient documentation to support each selected cost.

Duke Energy was also requested to delineate costs related to complying with NO_X SIP Call. NO_X SIP Call requires electric utility generating facilities to reduce their emissions of NO_X during the summer ozone season, while the objective of the Clean Smokestacks Act is to reduce overall NO_X emissions for the entire year.

As a result of NO_X SIP Call, Duke Energy has undertaken a program to reconfigure its coal and air injection systems on its boiler units. In two cases, Belews Creek and Cliffside Unit 5, Duke Energy has chosen to install SCR technology to comply with NO_X SIP Call. Costs related to NO_X SIP Call are specifically exempted from the amortization allowed in Section 9 of the Act. The Public Staff has determined that Duke has not included any NO_X SIP Call related costs to date in its reported actual environmental compliance costs. However, Duke Energy may be required to install additional SCR technology on facilities where it initially plans to install SNCR technology to comply with the Act, if the SNCR technology fails to achieve the emission reduction goals set forth in the Act due to matters, such as coal quality, that are beyond the scope of Duke's contracts for work related to the Act.

III. Amortization of Costs

In Section 9 of the Act [G.S. 62-133.6(b)], the investor owned utilities are allowed to accelerate the cost recovery of their estimated environmental compliance costs over a seven-year period, beginning January 1, 2003, and ending December 31, 2009. Duke Energy's estimated environmental compliance costs are $1.5 billion. The statute requires that a minimum of 70% of the environmental compliance costs shall be amortized before December 31, 2007, when the rate freeze period expires. In Duke Energy's case, this amount is $1,050,000,000. The annual levelized amount is $214,285,714. The maximum amount that can be amortized in any given year is 150% of the annual levelized environmental compliance costs or, in Duke Energy's case, $321,428,000.

On December 11, 2003 the Commission issued an order authorizing Duke Energy to use certain regulatory liability and amortization accounts to record the environmental compliance costs associated with the Act. The Commission further ordered that no accrual of AFUDC would be allowed on any construction expenditures up to the $1.5 billion required to be amortized pursuant to the Act.

Using the protocols established by the Act and subsequent Commission orders, Duke reported that its environmental compliance costs amortization for 2003 is

$114,813,336. The Public Staff has reviewed Duke Energy's quarterly amortization filings and concluded that the reported amounts appear to be accurate.

IV. Contracts

The Public Staff also requested Duke Energy to provide for its review copies of any contracts for engineering, procurement, project management, and construction awarded to engineering firms and construction companies for the purpose of installing the emission reduction technologies. Duke Energy complied with the Public Staff's request and provided the applicable contracts.

Duke Energy has contracted with a vendor to install SNCR equipment at its Allen Steam Station. Duke Energy has elected to award separate fixed-price contracts for each project requiring emission reduction technologies to comply with the Act.

Duke Energy has also signed an alliance agreement with two vendors, creating a consortium between the companies for the installation of FGD technology, optimized specifically for Duke Energy. This agreement is a fixed price contract for each of the twelve coal-fired generation units identified by Duke Energy that require emission reduction technology to comply with the Act.

The Public Staff reviewed these contracts and determined that they contain language establishing minimum performance standards on the equipment to be installed. The contracts contain a two-year performance standard that requires the equipment to perform as designed or the vendor would be responsible for replacing, repairing, or redesigning the equipment to achieve the emission reduction target specified by Duke Energy.

V. Site Inspections

On March 9, 2004, the Public Staff conducted a site inspection of Duke Energy's Allen Steam Station in Belmont, North Carolina. Specifically, the Public Staff inspected the SNCR equipment that had been installed on the boilers and the other ancillary equipment used in the reduction of NO_X emissions from those boilers. The Public Staff confirmed the installation of the equipment and discussed the testing procedures with the plant engineer. No other facilities were inspected. It is the intent of the Public Staff to conduct inspections of other coal-fired generating facilities as Duke Energy continues to install emission reduction equipment in its boiler units.

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MAY 03 2004
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N.C. Utilities Commission

NORTH CAROLINA
PUBLIC STAFF
UTILITIES COMMISSION

May 3, 2004

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MAY 4 2004
Operations Division
N.C. UTILITIES COMMISSION

Ms. Geneva S. Thigpen, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4325

Re: Docket No. E-2, Sub 815

Dear Ms. Thigpen:

Enclosed herewith for filing in the above-referenced docket are twenty-one (21) copies of the Report of the Public Staff on Costs Incurred and Amortized by Progress Energy Carolinas, Inc. ("PEC") in Compliance with Session Law 2002- ("the Clean Smokestacks Act" or "the Act"). This report presents the results of the Public Staff's review of environmental compliance costs incurred and amortized by PEC pursuant to the Act through the end of calendar year 2003. The Public Staff expects to file an update to this report annually.

Sincerely,

Antoinette R. Wike
Chief Counsel

Enclosure

cc: Len S. Anthony

Executive Director	Communications	Economic Research	Legal	Transportation
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REPORT OF THE PUBLIC STAFF ON COSTS INCURRED AND AMORTIZED BY PROGRESS ENERGY CAROLINAS, INC. IN COMPLIANCE WITH SESSION LAW 2002-4

Docket No. E-2, Sub 815

May 3, 2004

Section 14 of Session Law 2002-4 ("the Clean Smokestacks Act" or "the Act") requires the Department of Environment and Natural Resources and the Utilities Commission to report by June 1 of each year, on the implementation of the Act to the Environmental Review Commission and the Joint Legislative Utility Review Committee. The May 30, 2003, report states that the Public Staff will audit the books and records of the investor owned utilities on an ongoing basis in regard to the costs incurred and amortized in compliance with the Act. The Public Staff has undertaken such a review, focusing on the verification of costs related to complying with the Act, the amortization of those costs, and contracts with vendors who will engineer and construct emission reduction equipment. This report presents the Public Staff's findings with regard to Progress Energy Carolinas, Inc. ("PEC").

I. Work to be Performed

To comply with the emissions limitations for nitrogen oxides ("NO_X") and sulfur dioxide ("SO_2") established in the Act, PEC plans to install emission reduction technologies at several of its facilities. PEC has proposed to install Selective Catalytic Reduction ("SCR") technology to remove NO_x and flue-gas desulfurization ("FGD") technology to remove SO_2 to comply with the Act. The facilities requiring these technologies are as follows:

Facility	NO_X Reduction	SO_2 Reduction
Asheville Units 1&2	√(Unit 1 only)	√
Cape Fear Units 5&6		√
Lee Unit 3	√	
Mayo Unit 1		√
Roxboro Units 1-4		√
Sutton Unit 3		√

PEC is also installing SCR technology and reconfiguring its coal and air injection systems to remove NO_x from its other coal-fired generating units to comply with the North Carolina State Implementation Plan for NO_x ("NO_x SIP Call"), which is discussed below.

Although PEC initially planned to install a scrubber on Lee Unit 3, PEC indicated in its annual compliance report filed on April 1, 2004, that this work has been cancelled because projected SO_2 removal rates for scrubbed units have increased.

PEC is only in the initial design and engineering phase of construction plan, and therefore no testing data is yet available.

II. Capital Costs Associated with the Installation of Emission Reduction Technologies

PEC is required by the Act to report the actual capital costs ("environmental compliance costs") associated with its plan to install emission reduction technologies pursuant to the Act. Operational costs related to these emission reduction technologies are not environmental compliance costs as defined in the Act.

PEC reported that its actual environmental compliance costs in calendar year 2003 were $22,323,791. The cumulative environmental compliance costs incurred through 2003 are $23,209,512, as follows:

Year	2002	$ 885,721
Year	2003	22,323,791
		$23,209,512 [1]

PEC's expenditures to date involve emission reduction technologies at its Asheville, Mayo, and Roxboro facilities. Environmental compliance costs were incurred for project studies and investigations, engineering, and contracting.

As part of its review, the Public Staff requested information from PEC on the project costs, invoices documenting costs, and the purpose of the costs. PEC provided project cost sheets delineating actual project costs by year into the following categories: (1) company labor costs; (2) materials costs; (3) outside services costs; and (4) other costs. These costs are as follows:

Company Labor	$ 1,276,561
Materials	68,249
Outside Services	21,631,350
Other	233,351
Total	$23,209,511

The project cost sheet was supported by detailed spreadsheets that incorporated all expenditures to date for a particular category. The Public Staff selected invoices in each category from the detailed spreadsheets and requested PEC to provide specific

[1] PEC's estimated and reported environmental compliance costs exclude costs attributable to the portion of its Mayo and Roxboro facilities that is owned by the North Carolina Eastern Municipal Power Agency.

information on the selected costs. The Public Staff also had extensive discussions with PEC personnel regarding the individual cost items charged to specific projects. PEC provided sufficient documentation to support each selected cost.

However, the Public Staff determined that there is a discrepancy between the environmental compliance costs that are being recorded on PEC's books and the environmental compliance costs that are being reported to the Commission. The reported costs do not include labor loads or overhead costs. PEC explained that this practice is consistent with the types of costs considered to be environmental compliance costs in its estimate of $813,000,000. Typically, these costs are treated as part of project costs, whether they are considered incremental or not. The Public Staff recommends that PEC be required to file a reconciliation showing the per book and reported environmental compliance costs.

As stated above, PEC has cancelled the planned scrubber for Lee Unit 3. However, according to Appendix B to PEC's April 1, 2004, report, PEC's estimated environmental compliance costs remain approximately $813 million. Attachment I to this report shows the differences in the estimated environmental compliance costs between 2003 and 2004 according to PEC's annual reports.

PEC was also requested to delineate costs related to complying with NO_X SIP Call. NO_X SIP Call requires electric utility generating facilities to reduce its emissions of NO_X during the summer ozone season, while the objective of the Clean Smokestacks Act is to reduce overall NO_X emissions for the entire year.

As a result of NO_x SIP Call, PEC has undertaken a program to reconfigure its coal and air injection systems on its boiler units and/or install SCR technology at its Asheville 2, Cape Fear 5&6, Lee 1, Mayo 1, Roxboro 1-4, Sutton 1&3, and Weatherspoon 1-3. PEC also intends to use this equipment to achieve it emissions limitations as set forth in the Act. However, PEC will also be required to install SCR technology at its Asheville 1 and Lee 3 facilities in order to fully comply with the Act and achieve its required emissions limitations by 2007. The Public Staff has determined that PEC has not included any NO_x SIP Call related costs to date in its reported actual environmental compliance costs.

III. Amortization of Costs

In Section 9 of the Act [G.S. 62-133.6(b)], the investor owned utilities are allowed to accelerate the cost recovery of their estimated environmental compliance costs over a seven-year period, beginning January 1, 2003, and ending December 31, 2009. PEC's estimated environmental compliance costs are $813,000,000. The statute requires that a minimum of 70% of the environmental compliance costs be amortized before December 31, 2007, when the rate freeze period expires. In PEC's case, this amount is $569,100,000. The annual levelized amount is $116,142,857. The maximum amount that can be amortized in any given year is 150% of the annual levelized environmental compliance costs or, in PEC's case, $174,214,285.

On December 11, 2003, the Commission issued an order authorizing PEC to use certain regulatory liability and amortization accounts to record the environmental compliance costs associated with the Act. The Commission further ordered that no accrual of AFUDC would be allowed on any construction expenditures up to the $813,000,000 required to be amortized pursuant to the Act.

Using the protocols established by the Act and subsequent Commission orders, PEC reported that its environmental compliance costs amortization for 2003 is $74,218,804. The Public Staff has reviewed PEC's quarterly amortization filings and concluded that the reported amounts appear to be accurate.

IV. Contracts

The Public Staff also requested PEC to provide copies of any contracts for engineering, procurement, project management, and construction awarded to engineering firms and construction companies for the purpose of installing the emission reduction technologies. PEC complied with the Public Staff's request and provided the applicable contracts.

PEC has contracted with three vendors for engineering and design work, procurement of equipment, project management, and construction. PEC has elected to use one vendor for overall project management and engineering, another vendor for procurement of equipment, and a general contractor who will actually install the emission reduction technologies to comply with the Act.

PEC's agreements with its vendors are incentive-fee based contracts for all of the thirteen coal-fired generation units identified by PEC that required emission reduction technology to comply with the Act. PEC does not intend to execute separate agreements for each facility.

The Public Staff reviewed these contracts and determined that they contain language establishing minimum performance standards on the equipment to be installed. PEC's contract with its engineering and project management vendor contains a twelve-month performance guarantee from the date of functional operation. PEC's contract with its equipment vendor contains a two-year performance standard that requires the equipment to perform as designed or the vendor will be responsible for replacing or repairing the equipment to achieve the emission reduction target specified by PEC. PEC's contract with its general contractor contains a twelve-month workmanship guarantee.

V. Site Inspections

The Public Staff conducted no site inspections of any PEC facilities in connection with this audit. It is the intent of the Public Staff to conduct inspections of PEC's coal-fired generating facilities as emission reduction equipment is installed.

Progress Energy Carolinas, Inc.
Docket No. E-2, Sub 815
Environmental Compliance Cost Estimates

Attachment I

	planned outage	2003 estimate 1/	2004 estimate 2/	difference 3/
	(a)	(b)	(c)	(d)
General				
Asheville 1 FGD	F2004	$ 62,750,610	$ 77,906,056	$ 15,155,446
Asheville 1 SCR	S2012	25,387,755	24,826,000	(561,755)
Asheville 2 FGD	F2005	63,404,068	65,623,450	2,219,382
Asheville FGD Common		175,887	191,778	15,891
Mayo 1 FGD	S2007	88,849,025	95,482,822	6,633,797
Roxboro FGD Common		51,214,618	100,250,948	49,036,330
Roxboro 1 FGD	S2009	51,244,851	62,094,441	10,849,590
Roxboro 2 FGD	S2005	77,004,137	64,169,187	(12,834,950)
Roxboro 3 FGD	F2006	72,289,067	69,556,393	(2,732,674)
Roxboro 4 FGD	S2008	64,224,392	57,532,330	(6,692,062)
Cape Fear 5 FGD	S2012	41,426,445	40,921,839	(504,606)
Cape Fear 6 FGD	S2011	40,114,613	38,753,266	(1,361,347)
Lee 3 FGD	F2009	53,293,359	-	(53,293,359)
Lee 3 SCR	F2009	35,269,245	31,596,934	(3,672,311)
Sutton 3 FGD	F2012	77,452,773	75,475,674	(1,977,099)
Lee 2 ROFA	F2007	4,460,486	4,005,031	(455,455)
Sutton 2 ROFA	S2010	4,733,504	4,582,203	(151,301)
Total		$ 813,294,835	$ 812,968,352	$ (326,483)

1/ Appendix B attached to PEC's Annual NC Clean Smokestacks Legislation Compliance Report filed April 1, 2003.
2/ Appendix B attached to PEC's Annual NC Clean Smokestacks Legislation Compliance Report filed April 1, 2004.
3/ Column (c) - Column (b).

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Air Quality

Michael F. Easley, Governor

William G. Ross, Jr., Secretary
B. Keith Overcash, P.E., Director

September 1, 2004

MEMORANDUM

TO: Environmental Management Commission
Environmental Review Commission

FROM: Keith Overcash

SUBJECT: Mercury and CO_2 Reports for Sections 12 and 13 of Clean Smokestacks Act

The **Clean Smokestacks Act (CSA)** Sections 12 and 13 require the Division of Air Quality (DAQ) to provide the Environmental Review Commission and the Environmental Management Commission with reports and recommendations annually by September relative to controls for mercury and CO_2. The attached reports constitute the second interim reports in fulfillment of these requirements.

These second interim reports are intended to add to the initial summary of the "state of knowledge" on the emissions and controls for these two substances and to define some of the options that are available for recommendations in the final reports in 2005. The 2005 drafts are planned to be available in the spring of 2005 for additional stakeholder input and discussions for final recommendations.

Significant activities continue at the federal level, which will likely be forthcoming before the final reports are due. North Carolina's decisions and actions will remain critical to the citizens of North Carolina and elsewhere. Finals reports, due by September 2005, are expected to provide the Division's and Department's more specific conclusions and recommendations reflecting developments prior to that date.

If you desire DAQ to provide any presentations, or otherwise discuss these reports, we will be available to do so. Any reactions and specific guidance for future reports would be helpful.

BKO/jhs

Attachments: Mercury Report (2nd Interim)
CO_2 Report (2nd Interim)

cc: George Givens, Environmental Review Commission Counsel
Members of EMC
Members of ERC
Mercury and CO_2 Stakeholder Groups

1641 Mail Service Center, Raleigh, North Carolina 27699-1641
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Second Interim Report

Mercury Emissions and Mercury Controls For Coal-fired Electrical Utility Boilers

SEPTEMBER 1, 2004

NCDENR

North Carolina
Department of Environment and Natural Resources
Division of Air Quality

REQUIREMENT FOR THIS REPORT

Excerpted from the *North Carolina Clean Smokestacks Act*

[**Title**: An Act to Improve Air Quality in the State by Imposing Limits on the Emission of Certain Pollutants from Certain Facilities that Burn Coal to Generate Electricity and to Provide for Recovery by Electric Utilities of the Costs of Achieving Compliance with Those Limits]

SECTION 12. The General Assembly anticipates that measures implemented to achieve the reductions in emissions of oxides of nitrogen (NO_x) and sulfur dioxide (SO2) required by G.S. 143-215.107D, as enacted by Section 1 of this act, will also result in significant reductions in the emissions of mercury from coal-fired generating units. The Division of Air Quality of the Department of Environment and Natural Resources shall study issues related to monitoring emissions of mercury and the development and implementation of standards and plans to implement programs to control emissions of mercury from coal-fired generating units. The Division shall evaluate available control technologies and shall estimate the benefits and costs of alternative strategies to reduce emissions of mercury. The Division shall annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003. The Division shall report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than 1 September 2005. The costs of implementing any air quality standards and plans to reduce the emission of mercury from coal-fired generating units below the standards in effect on the date this act becomes effective, except to the extent that the emission of mercury is reduced as a result of the reductions in the emissions of oxides of nitrogen (NO_x) and sulfur dioxide (SO_2) required to achieve the emissions limitations set out in G.S. 143-215.107D, as enacted by Section 1 of this act, shall not be recoverable pursuant to G.S. 62-133.6, as enacted by Section 9 of this act.

GENERAL ASSEMBLY OF NORTH CAROLINA - SESSION 2001 – (SENATE BILL 1078)

Ratified the 19th day of June 2002. (Ch. SL 2002-4 S.13)

Marc Basnight - President Pro Tempore of the Senate
James B. Black - Speaker of the House of Representatives
Michael F. Easley- Governor

AN INVITATION FROM SECRETARY ROSS

TO: Environmental Review Commission
Environmental Management Commission

FROM: William G. Ross, Jr.

William G. Ross, Jr.

DATE: September 1, 2004

SUBJECT: Mercury and CO_2 Reports Required by Clean Smokestacks Act

On March 23, 2004, the United States Environmental Protection Agency recognized North Carolina and the Clean Smokestacks Act for outstanding, innovative efforts in improving air quality through regulatory and policy innovations and presented our state with a Clean Air Excellence Award. I had the privilege of saying a few words at the award ceremony in Washington, D.C., on behalf of our state, Governor Easley, and all the other partners who played vital roles in the passage of the law. It was a pleasure for me to describe the story of the Clean Smokestacks Act as a story about the power of innovation, partnerships, teamwork, and leadership.

The act, in addition to providing for major reductions in SO_2 and NOx emissions from NC's 14 coal-fired power plants, directed our Division of Air Quality, over a three year period, to study and make recommendations concerning emissions of mercury and carbon dioxide.

As you know, these are important, controversial issues. For example, Donald Kennedy, the Editor of *Science*, has called climate change "the most serious issue" we face.

Last year, 2003, the Division, working with a broad group of interested parties, put together reports reviewing and summarizing the state of scientific research on mercury and carbon dioxide emissions. This year, 2004, the Division has updated the review of research, and has inventoried options for the recommendations we must make next year (2005). We now ask all interested parties to read this year's report and give us their views, questions and suggestions about it.

> In the upcoming year, as we consider what to recommend, we will evaluate options for action with a number of criteria and principles in mind. As a starting point for those criteria and principles, we plan to use ones suggested in a report of a November, 2003 Aspen Institute policy dialogue chaired by Eileen Claussen and Robert W. Fri. The title of the report is: *A Climate Policy Framework: Balancing Policy and Politics*. As adapted for use in the task that the General Assembly has given us, the criteria and principles are as follows:

1. Environmental effectiveness: How effective is the option in meeting its environmental and public health and welfare target, whether that target is public awareness, information collection and evaluation, or emission reduction?
2. Cost effectiveness: Will the option design allow cost-effective compliance? How will it affect the ability of business to compete?
3. Administrative feasibility: Can the option be administered and does it minimize administrative and transaction costs?
4. Distributional equity: Is the burden of compliance with the option fairly apportioned?
5. Political acceptability: Are there elements of option design that affect its political acceptability?
6. Technology development and diffusion: Will the option help provide a platform for technology development and diffusion?
7. Adaptability: Will the option be able to adapt to changing circumstances and incorporate new information?
8. Monitoring and counting: Will the option include things that can be monitored and are verifiable?
9. Encouraging long term success: Will the option encourage long-term progress and success?

As I mentioned above, we invite your input with respect to whether these are the appropriate criteria and principles and how the various options for recommendations come out when judged against the appropriate criteria and principles. Also, we invite you to suggest options that are not in our inventory and to tell us why such options should be considered.

In the interest of giving every citizen of our State, now and in the future, a reasonable opportunity to live a happy, healthy, and prosperous life, we solicit your input and appreciate your help.

PREFACE

The goal of this report is to present information concerning the state of knowledge for controlling mercury emissions and to begin establishing the cost/benefits relationships. This information needs to be openly considered, evaluated, discussed, and corrected where necessary. In other words, information contained in this report is anticipated to become the basis for the final report on September 1, 2005. In that report, the Department of Environmental and Natural Resources will present the Department's final findings and recommendations concerning mercury emissions from coal-fired electrical utility boilers. Stakeholders and all other interested parties are encouraged to comment on information contained in this report at their earliest convenience.

This 2004 report is based on informational updates, the three-day workshop at North Carolina State University sponsored by the Department of Environmental and Natural Resources, Stakeholders and other resources. The Department appreciates the efforts of all the workshop presenters, stakeholders and other individuals who committed their time and effort to the three-day workshop and the development of this 2004 report. This open process will continue in the development of the final report on this topic.

Portions of this document were taken directly from other government (non-copyrighted) documents in the interest of time and completeness. Some of these sections may have only minor wording changes from the original documents. Quotations are not strictly used to identify these parts, but a strong effort has been made to reference these documents and acknowledge them. The purpose has not been to claim credit for original work of others, but to provide as much detail and accuracy as possible within a limited time. Additional portions of this document have been transferred and condensed from the first interim report for document integrity.

"The greatest obstacle to discovery is not ignorance - it is the illusion of knowledge."
Daniel J. Boorstin (1914-2004)[1]

[1] Provided by O. Russell Bullock, Jr., NOAA Air Resources Laboratory, (On assignment to the U.S. EPA Office of Research and Development), Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

Acronyms Used In This Report

AC – Activated carbon
ACI – Activated carbon injection
ALAPCO - Association of Local Air Pollution Control Officials
CAA – Clean Air Act – Primary federal clean air statute
CAIR – Clean Air Interstate Rule
CESP – Cold-side electrostatic precipitator
CEM – Continuous Emission Measurement
COHPAC™ - Compact Hybrid Particulate Collector
CO_2 – Carbon Dioxide
CSA – NC Clean Smokestacks Act
DAQ – NC Division of Air Quality
DENR – NC Department of Environment and Natural Resources
DHHS – NC Department of Health and Human Services
DMF – Division of Marine Fisheries
DOE – U. S. Department of Energy
DWQ – Division of Water Quality
EEI - Edison Electric Institute
EMC – NC Environmental Management Commission
EPA – U. S. Environmental Protection Agency
EPRI – Electric Power Research Institute
EU/ICR- Electric Utility Steam Generating Unit Mercury Information Collection Request
FF – Fabric filter
FGD – Flue gas desulfurization
Hg - mercury
HAP – hazardous air pollutant
IAQR – Interstate Air Quality Rule
IGCC - Integrated Coal Gasification Combined Cycle
kWh – Kilowatt hour (1000 watts for one hour)
MACT – Maximum Achievable Control Technology
MW - megawatts (million watts)
NC – North Carolina
NCSU – North Carolina State University
NESHAP - national emission standards for hazardous air pollutants
NHANES –National Health and Nutrition Examination Survey
NMA - National Mining Association
NO_x – Oxides of Nitrogen, including NO_2, the primary nitrogen species from combustion.
NPR – Notice of Proposed Rulemaking
PAC – Powdered Activated Carbon
PM – Particulate matter
RGM – Reactive Gaseous Mercury
SCR – Selective Catalytic Reduction
SIP – State Implementation Plan
SNCR – Selective Non-Catalytic Reduction
SO_2 – Sulfur Dioxide
SO_3 – Sulfur Trioxide
SO_x – Oxides of Sulfur, including SO_2, the primary combustion product of sulfur
STAPPA - State and Territorial Air Pollution Program Administrators
TBtu – trillion British thermal units
TMDL – Total Maximum Daily Load

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CHAPTER I EXECUTIVE SUMMARY

This executive summary provides highlights of this 2004 interim mercury report. Chapter II discusses the human risks of mercury species in different environments. The status of state and federal legislative and regulatory action is covered in Chapter III. A discussion of various mercury control devices for use at coal-fired electrical utility boilers is found in Chapter IV. Chapter V explains the use and limitations of two existing mercury emission estimating tools. Arguments concerning the influences of local atmospheric mercury emissions are presented in Chapter VI, including findings and views concerning the Florida Everglades study. Chapter VII reports North Carolina's coal-fires utility boiler characteristics and presents a comparison of speciated mercury emissions before and after the installation of emission control equipment to control of oxides of nitrogen and sulfur dioxide. A discussion follows in Chapter VIII of three options or directions that the Division of Air Quality may take when reporting its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission by September 2005.

Methylmercury is a serious health threat to humans, particularly to unborn and young children. Mounting scientific evidence and public concern argue strongly that mercury emissions must be reduced. The mercury health concern is primarily related to the existence of methylmercury in fish, resulting in fish advisories and associated health effects. These elevated levels are caused by mercury in the environment being converted to organic mercury, primarily methylmercury, which accumulates in predatory fish. Total mercury concentrations in North Carolina's rainwater are currently above levels believed necessary to allow natural processes to restore acceptable levels of methylmercury in fish.

North Carolina is one of the leading electricity producing states with 46 coal-fired utility boilers, with a total electrical generating capacity of approximately 13,300 megawatts. These coal-fired generating units currently account for up to 66 percent of total mercury emissions estimated to be emitted into the air in North Carolina.

In response to the Clean Smokestacks Act (CSA) of 2002, Progress Energy and Duke Power are required to reduce their nitrogen oxide (NO_x) emissions 77 percent by 2009 and their sulfur dioxide (SO_2) emissions 73 percent by 2013. While the CSA addresses NO_x and SO_2, the General Assembly recognized mercury emission issues and that reducing NO_x and SO_2 from utility boilers has the co-benefit of significant mercury emission reduction. The General Assembly, through the CSA, directed the Division of Air Quality (DAQ) to study mercury emission control performance and to make recommendations as to the course of further actions needed. In response, DAQ has calculated the estimated emissions for each NC utility boiler under its current and future configuration and highlights the following emission changes from current and future mercury emissions using conventional wet scrubber technology:

- Improvement in total mercury emission removal (from pre-CSA conditions) from 33% to 64%

- Nearly two-fold decrease in total mercury emissions from 2730 to 1460 lb/yr
- Nearly five-fold drop in oxidized mercury emissions from 1810 to 380 lb/yr.

Of the three species of mercury (elemental, oxidized, and particulate), it can be argued that oxidized mercury represents the most important species to control from the State's perspective because of its tendency to be deposited within the State. This significant reduction in oxidized mercury emissions suggests the possibility of considerable reductions in mercury deposition across NC.

A dramatic drop in oxidized mercury emissions could have major implications for reduced methylmercury contamination in fish. However, the relative contribution of global versus statewide and local mercury emissions to atmospheric mercury deposition is poorly understood and remains an area of scientific debate.

DAQ's estimated mercury reduction numbers should be considered conservative. Greater mercury reductions are anticipated from improvements in scrubber efficiency. Additionally, both mercury emission estimating tools did not include effects of possible mercury oxidation by selective catalytic converters. Recent studies indicate selective catalytic converters oxidize some elemental mercury, increasing mercury capture in scrubbers.

The electrical power sector is not the only industrial sector that would need to make significant reductions. The EPA is requiring a variety of industries to meet new maximum achievable control technology (MACT) standards, which will create emission reductions of both criteria and air toxics pollutants, including mercury. In addition, various changes and trends in industry are reducing other sources of mercury to the environment in rather dramatic proportions (e.g. changes in incineration processes, changes in the metallurgical industries, recycling changes, reductions in fluorescent bulb mercury content, etc.).

There are mercury emission sources in North Carolina that are not subject to the CSA. These non-CSA mercury sources currently represent approximately 34 percent of the total 2002 mercury emissions in North Carolina. From 2005 to 2012, the installation of SO_2 controls to meet the SO_2 cap are estimated to reduce CSA mercury sources to 43 percent of the total of mercury emissions in North Carolina. Non-CSA mercury sources percentage increases to 57 percent of a greatly reduced number of pounds of mercury then expected to be emitted in North Carolina.

There are two sources of mercury deposition: the "global pool" of elemental mercury that stays in the atmosphere for a number of months or years and speciated (elemental, oxidized, and particulate) mercury emissions generated by local sources. The United States presently accounts for three to five percent of total global mercury air emissions. Experts disagree on the relative effect of mercury deposition from the global pool and deposition from local emission sources. Atmospheric mercury models are under development at several institutions around the world, with a concerted effort on model

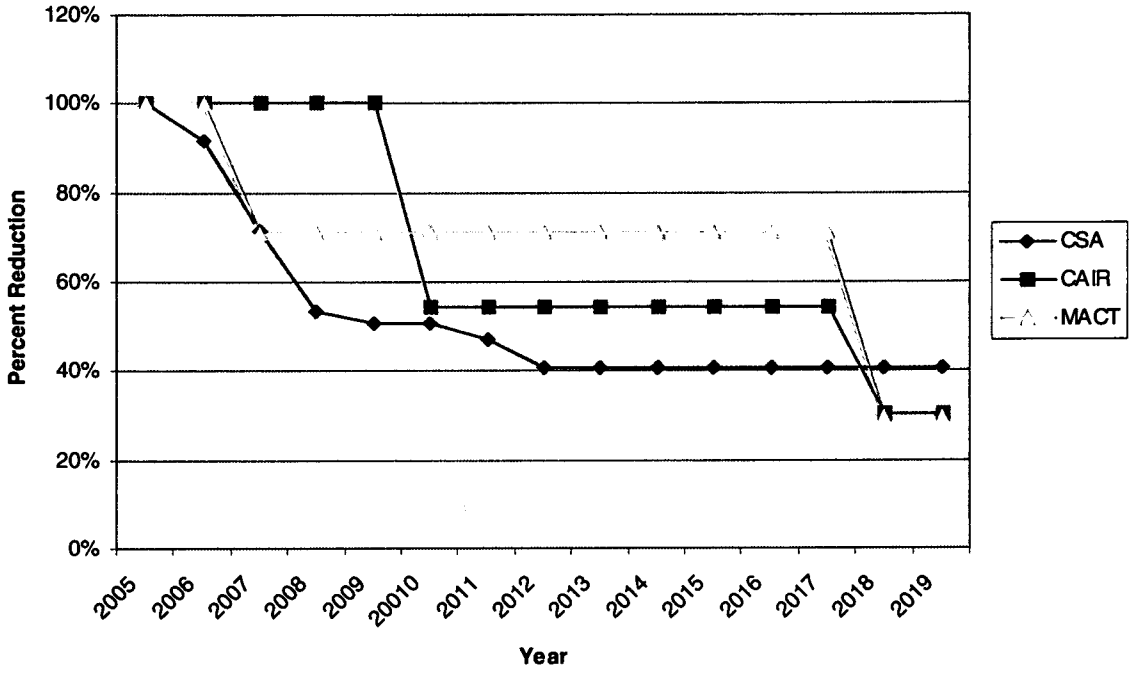
inter-comparison to identify important uncertainties in relative effects of global versus local mercury pollution.

However, at least one recently completed study indicates controlling local mercury emission sources may be important to local mercury deposition. In that study, the Florida Department of Environmental Protection examined an area of the Florida Everglades in an attempt to establish a link between airborne mercury emissions and methylmercury concentrations in top predator fish. This study provides the best example so far of the potential importance of dry deposition of mercury to total ecosystem impacts. Report findings point to a linear relationship existing between airborne mercury emissions and methylmercury concentrations in largemouth bass. The actual reduction of atmospheric sources of mercury in Florida was monitored. Since the peak deposition, monitoring showed a 60 percent decline in methylmercury in Everglades fish and wildlife in less than 15 years. The time required to achieve 50 percent of the ultimate response in fish tissue mercury concentrations is estimated to be approximately 10 years.

It is unknown if the results of this study are applicable in North Carolina as a predictive tool. South Florida's meteorology differs from that found in this State. There are also major differences in mercury sources (such as stack height and mercury emission speciation), topography, soil structure, and exposure to pollution affects across state borders. However, this study does demonstrate a strong direct correlation between decreases in mercury emissions and decreases in methylmercury in Everglade predatory fish.

The EPA has offered three approaches (proposals) to mercury emission reductions from coal-fired utility boilers. The first is to pursue traditional command-and-control of the federal Clean Air Act, section 112 MACT requirements for utility units. This proposal is estimated to reduce mercury emissions from 48 to 34 tons by January 2008. The second proposal is a cap-and-trade approach under guidelines outlined in the Clean Air Act, section 112(n)(1)(A). The third proposal involves a market-based, cap-and trade approach under section 111. The final rule is scheduled to be signed on or before March 2005.

The EPA mercury emission tool was used to estimate mercury emission reductions from the co-benefits of meeting requirements of the CSA. Credit for mercury reductions are credited for the year's planned project completion date. The following graph indicates the estimated CSA utility emissions are at or below both the proposed MACT and Clean Air Interstate Rule (CAIR) mercury reduction percentages until 2018.



The study of the complex and evolving science regarding mercury emission controls and their affects is not complete. Many (seemingly) conflicting theories on mercury chemistry and deposition exist. Within this unsettled legislative and scientific environment, DAQ is proposing three options to be considered for making specific mercury reduction recommendations in 2005.

1. Option one is to continue to study the problem and to defer any rulemaking action until a later time. The federal government, electric power industry, and pollution control industry are advancing the technology and state-of-the-science on the measurement, control, fate, and health effects of mercury emissions. The EPA is scheduled to finalize similar federal standards for controlling mercury emissions from coal-fired power plants in March 2005. The format of the federal requirements may add to the significant mercury emission reductions to be realized from the CSA. Additionally, it may be premature to accurately predict mercury emission reductions and corresponding deposition from in-state power plants resulting from co-benefits of the NOx and SO_2 control device installations that will result from the CSA.

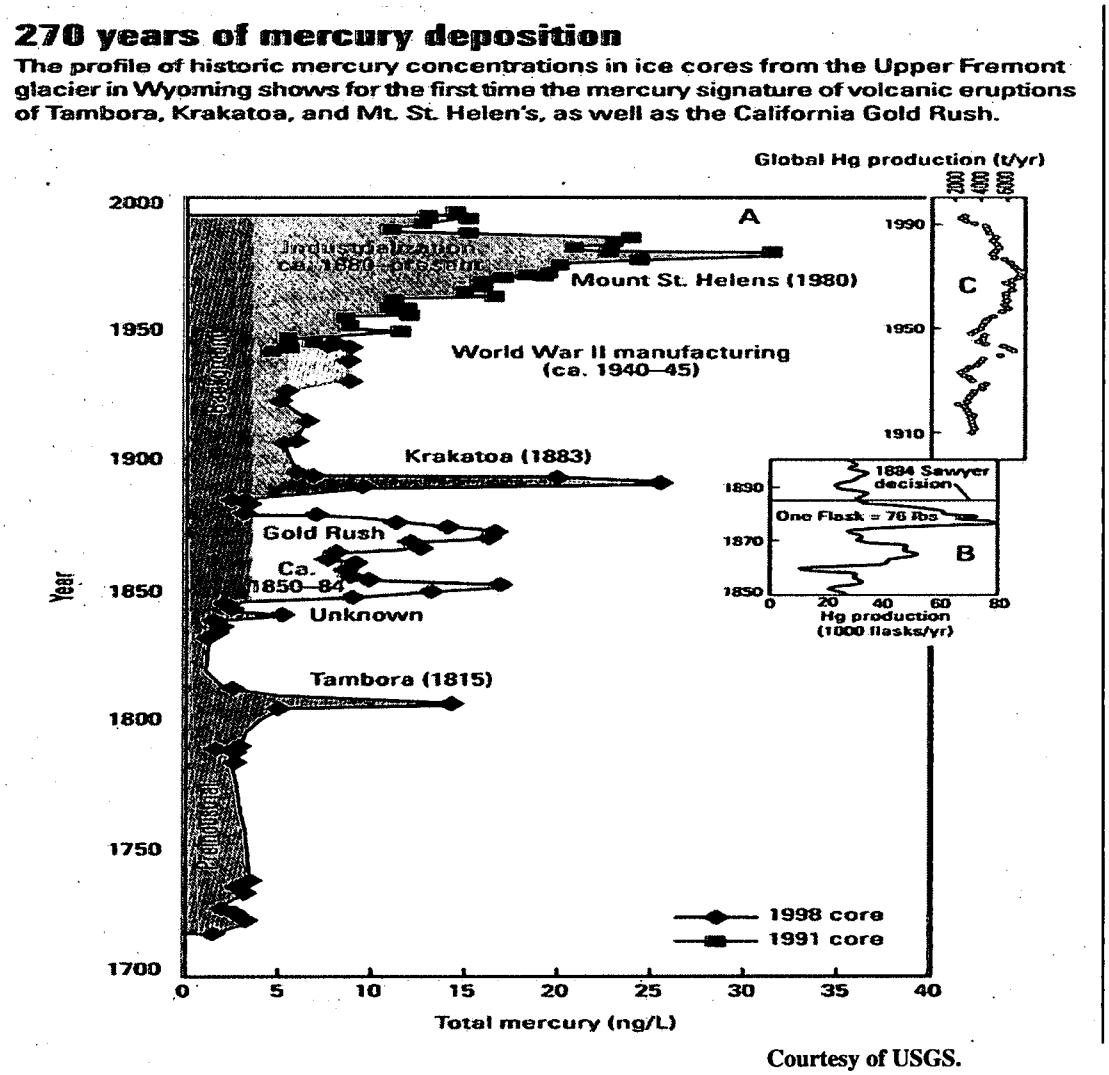
2. The second option is to follow the lead of other states and set mercury emission standards. These states take the position that, while the science and technology are not fully developed, they are adequately developed to initiate rulemaking requirements. States with mercury standards appear to be acting from the basis that, since rulemaking has a history of forcing cost-effective technological developments, rulemaking will again be the engine for development.

3. Option three is to continue the study further, and then expect to set specific mercury emission standards at a later time. Upon completion of more comprehensive studies, DAQ would recommend that the General Assembly direct the Environmental Management Commission to initiate rulemaking. This option is based on the premise that it would be beneficial for all stakeholders to wait until additional information is available for additional future mercury control than to propose standards soon that may need to be revised later.

CHAPTER II MERCURY, METHYLMERCURY, AND RISKS

The United States presently accounts for 3 to 5 percent of total global mercury air emissions. Natural sources of mercury, such as volcanic eruptions and emissions from the ocean, are estimated to contribute about 40 percent of current worldwide mercury air emissions, whereas human-made sources account for the remaining 60 percent. Figure II-1 is a graphic representation of the connection between historical events and the age of deposits in the Upper Fremont glacier in Wyoming. The growth of Industrial mercury contributions is striking.

FIGURE II-1
270 YEARS OF MERCURY DEPOSITION



Courtesy of USGS.

ATMOSPHERIC MERCURY

Mercury in the atmosphere comes both from natural sources and from global emissions from human activities. Most of the mercury in the atmosphere is elemental mercury vapor, which may circulate in the atmosphere for years ("global pool") in a dynamic deposition and re-emission state of flux, and hence, can be transported thousand of miles from the source.[2] However, modeling studies recently have suggested that the rate of oxidation of elemental mercury in the atmosphere may be occurring twice as fast (half-life of six months instead of one year) as previously believed.

Mercury transformation processes from smokestack to earth are not yet well understood. Recent experiments using plume chemistry in a static plume dilution chamber, developed by the Electric Power Research Institute, may change the interpretation of chemistry used to calculate percentages of elemental mercury and oxidized (inorganic) mercury transported in the plume. [3] This study suggests that oxidized mercury rapidly converts to elemental mercury near the stack. This finding may explain measurements made near a large coal-fired power plant in Georgia. Based on mercury concentrations in coal burned at the plant, scientists predicted that the stack gases would contain 60-percent oxidized mercury and 40 percent elemental mercury. Mercury measured in air 15 miles downwind was found to be 9 percent oxidized mercury and 91 percent elemental mercury.[3] Mercury in an oxidized form is more amenable to removal by controls on the boiler (e.g., Scrubbers) and also believed to be deposited down wind of the plant than elemental mercury.

Information presented at the workshop on Mercury and CO_2 during April 19-21, 2004 is italicized.

Update On DAQ's Air Quality Measurements & Mercury Studies[4]

NC has relatively high mercury, well above US average, in terms of:

- *Emissions into ambient air*
- *Measurements in specific ambient airsheds*
- *Modeling in specific ambient airsheds*
- *Wet deposition levels*
- *Fish of selected species*
- *People who eat selected fish species*

Power Generation Is a Major Contributor to National Air Pollutant Emissions[5]

- *SO_2: 63%*
- *NOx: 22%*

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[2] Ref. 3, page 1.

[3] Ref. 18

[4] **Update On DAQ's Air Quality Measurements & Mercury Studies**, Steve Schliesser & Todd Crawford, NC Division of Air Quality, Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

[5] **Mercury And CO_2 Emissions From The Power Generation Sector**, C.V. Mathai, Ph. D., Manager for Environmental Policy, Arizona Public Service Company, Phoenix, Arizona, Electricity and Fuel Diversity, Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

- *Hg: 37%*
- *CO_2: ~40%*

A diverse fuel mix is critical to ensure electrical reliability, minimize price volatility, and strengthen national security

MERCURY IMPACT ON LAND

Mercury modeling efforts initially made an assumption that all inorganic mercury compounds that settled on the ground would eventually enter the surface water drainage system and accumulate in rivers, streams, and lakes. Contrary to that assumption, inorganic mercury compounds have been shown to have a strong propensity to attach to and remain on leafy vegetation and soil particles. The majority of inorganic mercury compounds found in water bodies arrive directly from the atmosphere. Mercury deposited on soil and vegetation does not appear to result in exposures believed to be detrimental to health through terrestrial exposure pathways.[6]

MERCURY IMPACT IN WATER

To be converted to organic mercury, elemental mercury must first combine with another element (such as sulfur, chlorine or oxygen) or combine with other compounds to form inorganic mercury compounds, and then undergo further reactions. Recent investigations suggest that a substantial portion of what is often considered "dissolved" mercury is actually mercury associated with macromolecular colloidal organic matter (submicroscopic particles that do not settle out). Either a living organism must act on this inorganic mercury compound or an organic compound must react with it to obtain organic mercury (methylmercury) and then undergo biological interactions.

METHYLMERCURY

The main pathway of introducing methylated mercury forms into aquatic systems is mediated by sulfate-reducing bacteria. While the amount of inorganic mercury is indeed an important factor, it is not the only important factor; nor is it necessarily the controlling factor. A number of parameters have been identified as important in influencing the production rates and abundance of methylmercury in aquatic systems. They include inorganic mercury loading, chemical speciation, water temperature, the availability of an organic substrate for sulfate-reducing bacteria, mercury demethylation activity (by bacteria), natural reduction-oxidation conditions, and in some cases photo-demethylation (light induced).[7] Demethylation is the opposite action of methylation, the creation of methylmercury.

To complicate the issue further, many of these parameters vary temporally and spatially in aquatic systems. Any of these parameters can potentially limit the abundance of bio-available methylmercury in an aquatic system.[8] Demethylation eliminates the toxic

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[6] Ref. 7, page 18.
[7] Ref. 4, page 1.
[8] Ref. 4, page 1.

methylmercury molecule. Some types of bacteria, naturally occurring reduction-oxidation chemical reactions, and light break the molecular bonds of the methylmercury molecule. Mercury methylation and demethylation are constantly taking place at the same time in the same body of water.

Two lakes that are similar biologically, physically, and chemically have been shown to have different methylmercury concentrations in water, fish, and other aquatic organisms.[9] Additional factors influence the bioaccumulation of mercury in aquatic biota. They include the acidity (pH) of the water, length of the aquatic food chain, temperature, and dissolved organic material. Physical and chemical characteristics of a watershed, such as soil type and erosion or proportion of area that is wetlands, can affect the amount of mercury that is transported from soils to water bodies. Interrelationships among these factors are poorly understood and are likely to be site-specific. No single factor has been correlated with the extent of mercury bioaccumulation in all cases examined.

FOOD CHAIN

Organic mercury, primarily methylmercury, accumulates in long-lived animals. Predatory fish at the top of the food chain accumulate increasing concentrations of methylmercury in their body tissues (bioaccumulation), which becomes a health threat to humans who eat unsafe quantities of these fish.

MERCURY IMPACT ON PEOPLE'S HEALTH

HEALTH RISKS FROM ELEMENTAL AND INORGANIC MERCURY IN AIR

The elemental and inorganic mercury that exits the smoke stack becomes part of the global pool of mercury in the atmosphere or falling on land or water. Elemental and inorganic mercury are not believed to represent major health hazards in the ambient air environment.

HEALTH RISKS FROM ELEMENTAL AND INORGANIC MERCURY IN WATER

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water that do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals (MCLG). The MCLG for mercury has been set at 2 parts per billion (ppb) because EPA believes this level of exposure would not cause potential health problems.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies. The MCL for total mercury in drinking water has also been set at 2 ppb because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

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[9] Ref. 5, Chapter 2, page 6.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations. EPA has found mercury to potentially cause kidney damage when people are exposed to it at levels above the MCL for relatively short periods of time.[10]

The U.S. Environmental Protection Agency (EPA) has announced the availability of a recommended fish tissue residue criterion for methylmercury to protect human health. This water quality criterion describes the maximum advisable concentration of methylmercury in freshwater and estuarine fish and shellfish tissue to protect consumers of fish and shellfish among the general population. EPA expects the criterion recommendation to be used as guidance by States, authorized Tribes, and EPA in establishing or updating water quality standards for waters of the United States. Because consumption of contaminated fish and shellfish is the primary route of human exposure to methylmercury, EPA is expressing this water quality criterion as a fish and shellfish tissue value rather than as a water column value. EPA is providing suggested approaches for relating this criterion to water column concentrations, and also plans to develop more detailed guidance to help water quality managers implement the methylmercury criterion in water pollution control programs.[11] The current EPA's recommended fish tissue residue criterion for freshwater and estuarine fish is 0.3 mg methylmercury per kilogram of fish.[12]

HEALTH RISKS FROM METHYLMERCURY IN AIR

Methylmercury is very unstable and breaks down rapidly when exposed to oxygen and sunlight. It is not believed to represent a health risk in ambient air because it is unable to exist there.

HEALTH RISKS FROM METHYLMERCURY IN WATER

Several fishing village epidemiological studies have been conducted to assess the neurodevelopment of children. Results show that the developing human nervous system to be particularly sensitive to methylmercury. The Seychelles Islands and Faroes Islands fishing village epidemiology studies of the 1980s and 1990s assessed the neurodevelopment of children from birth to several years old following maternal consumption of fish or whale meat on a routine basis during pregnancy. The Seychelles Islands are located in the Indian Ocean near Africa. The Seychelles Islands study was conducted by the University of Rochester School of Medicine and Dentistry. The Faroes Islands are located in North Atlantic between Scotland and Iceland. That study was conducted by the Harvard School of Public Health.[13]

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[10] http://www.epa.gov/safewater/contaminants/dw_contamfs/mercury.html
[11] http://www.epa.gov/waterscience/criteria/methylmercury/factsheet.html
[12] N.C. DHHS, Occupational and Environmental Epidemiology Branch, August 5, 2004
[13] Toxicological Effects of Methylmercury, National Research Council, 2000, National Academy Press.

The Seychelles Islands study evaluated approximately 740 mother-infant pairs where the mothers consumed 12 meals per week of fish with low levels of methylmercury of less than 0.3 ppm, which is less than the North Carolina's fish advisory action level of 0.4 ppm. The mercury levels in the mothers' hair during pregnancy were on average 6.8 ppm (range 0.5 – 27 ppm). A broad range of cognitive-behavioral tests were given to the children at approximately 6 months, 1 ½ years, 2 ½ years, 5 ½ years and 9 years. No effects were detected among the children. Based on this study, maternal consumption during pregnancy of fish with low methylmercury levels (less than 0.3 ppm) is accepted as safe. [15,14,]

The Faroes Islands study evaluated approximately 700 mother-infant pairs where the mothers consumed 1-3 meals per week of fish with low levels of methylmercury (less than 0.3 ppm) and 1 meal a month of pilot whale meat containing high levels of methylmercury (1 ppm and greater), which is higher than the North Carolina's action level of 0.4 ppm. The average hair levels of the Faroes mothers during pregnancy was 4.3 ppm (range 0.2 – 39 ppm), which is similar to Seychelles. When children were evaluated at 7 years of age, researchers detected deficits in attention, language, and memory. A maternal hair level of 10 ppm, a cord blood of 58 ppb, and a daily dose of 1 microgram per kilogram per day were found to be associated with a 10 percent risk of abnormalities in language, attention, and memory in children. Based on this study, maternal consumption of seafood with high methylmercury levels may be associated with an increased risk to the developing child.[15]

According to the American Academy of Pediatrics, the differences in the results of these studies may be due to the bolus or high doses that the Faroes Islands fetuses received from maternal consumption of pilot whale meat monthly verses the low doses that the Seychelles Islands fetuses received from maternal consumption of fish weekly. Additional studies are needed to further evaluate the issue of whether the bolus doses of methylmercury that were received by the Faroes children during the sensitive time periods of development are more likely to cause neurodevelopmental damage than the same doses given cumulatively over a period of several months. The average maternal hair levels and range of maternal hair levels for these two studies were similar but the doses were delivered differently.[16]

CURRENT NCDENR WATER AND AIR SAMPLING EFFORTS

DIVISION OF WATER QUALITY

The Division of Water Quality (DWQ) has two long-term programs that monitor mercury in surface waters. These two programs, the Ambient Water Quality Monitoring Program and the Fish Tissue Monitoring Program perform assessments of total mercury on a continual basis. Additional special studies are conducted in tandem with these long-term

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[14] Prenatal Methylmercury Exposure From Ocean Fish Consumption in the Seychelles Child Development Study, Myers G et al., 2003, *The Lancet* 361, pp 1686-1692

[15] EPA Mercury Report To Congress, Vol. 1 Summary, No.EPA-452/R-97-001

[16] Technical Report, *Mercury in the Environment: Implications for Pediatricians,* American Academy of Pediatrics, *Pediatrics* 108:1, pp 197-205, Goldman, l, Shanon, M, 2001.

programs in order to address specific questions or issues.

The Ambient Water Quality Monitoring Program involves the long-term water sampling of surface waters. Under this program, quarterly surface water samples are collected and analyzed for total mercury using EPA Method 245.1. With a reporting limit of 200 ng/L, this method typically identifies relatively large releases of mercury to surface waters and would not describe background or typical conditions. The DWQ chemistry laboratory is in the process of constructing a Class 1000 Clean Room in order to perform the new, low-level total mercury analytical methods described in EPA Method 1631. The DWQ expects that sample analysis will begin early 2005. With a total mercury reporting limit of 0.5 ng/L, EPA Method 1631 should allow the DWQ to determine background and typical levels of total mercury in surface waters, as well as begin to establish a database to determine trends.

The Ambient Water Quality Monitoring Program does not include the measurement of methylmercury in surface waters. Current methodology to determine methylmercury in surface waters is expensive and would require major equipment purchases for DWQ to perform the analyses.

The Fish Tissue Monitoring Program has collected thousands of fish tissue samples for mercury, and tens of thousands of fish tissue samples that includes a suite of other pollutants (e.g., PCBs, dioxin, pesticides). Since January 2000, the DWQ has processed over 800 fish tissue samples for total mercury from locations across the state. However, a majority of the samples were collected from eastern North Carolina. The DWQ continues to process up to 300 samples per year for fish tissue analysis, including total mercury. Multiple sizes and species of fish are collected and analyzed in order to provide a representation of those fish typically caught and consumed by fishermen. Presently, it is assumed that 100 percent of total mercury measured in higher trophic level fish is methylmercury (EPA 2001). This is a reasonable assumption since freshwater fish currently under advisory (i.e., bowfin, largemouth bass, chain pickerel) are high on the food chain. However, for smaller fish (e.g., sunfish), this may be an overestimation of the fraction of total mercury that is methylmercury.

In 2003, DWQ completed sampling and analysis for the Eastern Regional Mercury Study (ERMS). This study included the analysis of total mercury and methylmercury in surface water and sediment, and total mercury in fish from eastern North Carolina. Study sites tended to focus on the coastal plain physiographic region of the state (Figure II-2), however two sites were located in the piedmont. The ERMS study indicated that total mercury and methylmercury concentrations in surface water, sediment, and fish are similar to those found in other water bodies in the southern Atlantic drainage. Southern Atlantic drainage tends to have higher levels of methylmercury in surface waters than other northern and western states. The U.S. Environmental Protection Agency funded the laboratory analysis of total mercury and methylmercury.

The DWQ is currently conducting several special studies associated with mercury. This includes a special study near Riegelwood, NC (Cape Fear River Basin), additional marine

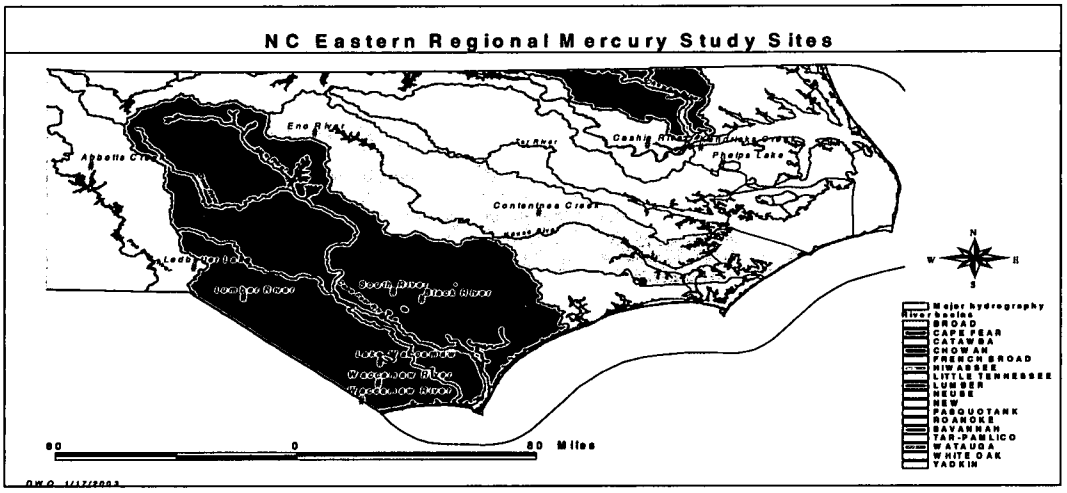
fish sampling and additional low-level mercury studies:

- The Riegelwood area monitoring study began in 2001 as a result of the closing of a chlor-alkali facility. The study seeks to evaluate the potential changes to fish tissue levels of total mercury as a result of the removal of a known atmospheric source. This study includes fish sampling and tissue analysis for total mercury at six downwind locations in the Cape Fear River Basin. Regular fish tissue sampling and analysis will continue as resources allow.

- Additional marine fish species analysis will be conducted as a joint effort between the DWQ, Division of Marine Fisheries, and the Department of Health and Human Services (DHHS). This follow-on study plans to focus on total mercury levels in spot, croaker, speckled trout, and bluefish. Additional species may be added if resources allow.

- Additional low-level mercury studies will be conducted to continue work begun in the ERMS. The additional studies will continue monitoring key DWQ-DAQ locations (i.e., Lakes Waccamaw, Lumber River Basin, and Lake Phelps, Pasquotank River Basin) and add new monitoring locations. New monitoring locations will be added to characterize total mercury and methylmercury west of the Yadkin River. The laboratory portion of this additional monitoring will be funded from a USEPA grant.

Figure II-2



DIVISION OF AIR QUALITY

The Division of Air Quality (DAQ) operates two North Carolina mercury wet (precipitation) deposition sites. The Pettigrew State Park site is located near Phelps Lake in Washington County, while the Waccamaw State Park site is stationed next to the atmospheric mercury monitoring unit near Lake Waccamaw.

Mercury levels in samples of eastern North Carolina rainwater vary widely from week to week but are comparable to data from sites across the United States. Volume-weighted average rainwater mercury levels are consistently higher at Lake Waccamaw than at a comparable site 150 miles to the north in remote northeastern North Carolina (Pettigrew State Park). Recent data from both sites during 1999 and 2000 suggests that mercury levels in precipitation may be declining in these areas. Levels declined to values typical of the more remote location at Pettigrew State Park between 1998 and 1999 at Lake Waccamaw State Park. In the years following however, the levels have crept back up. The reasons for this are definitively clear. Cleanup activities at the chlor-alkali facility have generated a considerable amount of fugitive mercury emissions. It is possible these "cleanup" emissions are to blame for the rise in mercury levels following the drop that was observed after the plant shut down in 1999. Continued sampling throughout the cleanup process and beyond should help to answer that question.

A new North Carolina mercury wet deposition measurement site is being planned. This sampling represents a joint venture by DAQ and DWQ. The existing air monitoring site is known as Condor, a CASTNET site. It is located inland from the coast in Montgomery County. The purpose of the new monitoring site is to collect background mercury concentrations. New mercury wet deposition equipment is being purchased for the site. The current schedule has valid data collection underway by late winter of 2004.

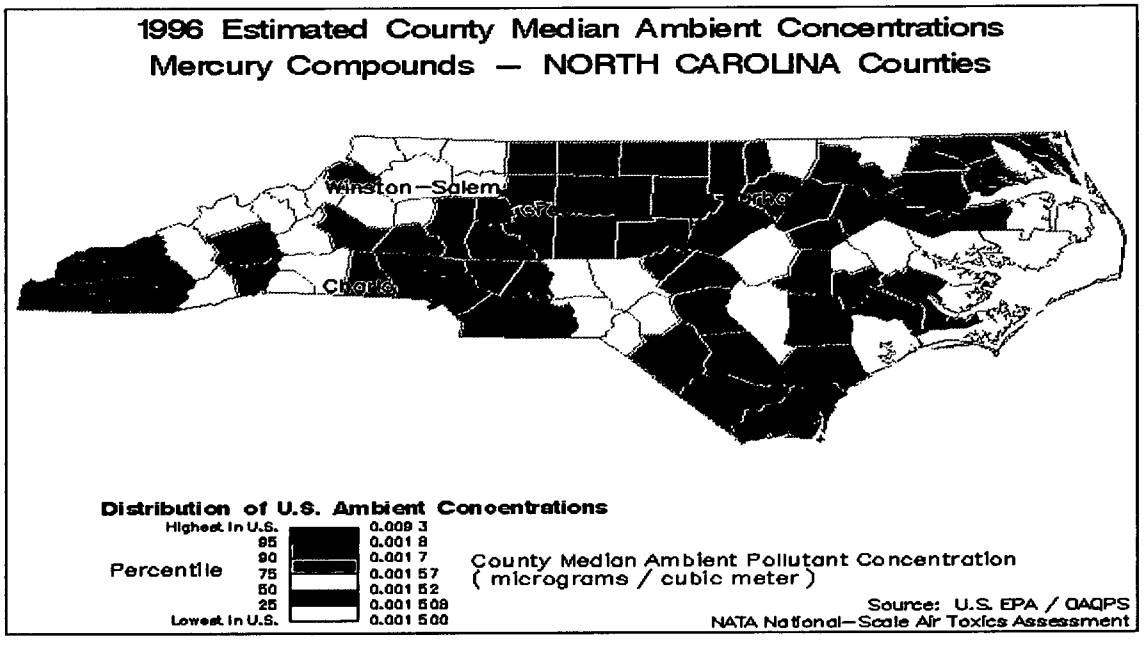
Additional DAQ mercury monitoring sites were located in the vicinity of Charlotte, North Carolina, to help define temporal and geographic trends in atmospheric mercury. To achieve this, two sampling equipment groups were operated continuously for one calendar year beginning March 2002. The first sampling site was a permanent site near the center of downtown Charlotte. Continuous data on total gaseous mercury and meteorological conditions was generated at this site. The downtown site also houses a variety of other instruments providing data for other DAQ atmospheric monitoring initiatives. It is anticipated that the data will create a snapshot of "urban" air quality conditions. Figure II-3 shows the estimated 1996 ambient mercury compound concentrations in North Carolina.

The second sampling equipment group is installed in a mobile monitoring trailer. The trailer was shared at three site locations on the perimeter of Charlotte over the course of the year. It is equipped to monitor for total gaseous mercury, reactive gaseous mercury, and elemental mercury, with the capability to also monitor for VOCs and carbonyls. These three site locations were selected to capture air quality conditions on the rapidly changing periphery of Charlotte. The final data collected are currently undergoing DAQ internal review.

At the July 30, 2004 stakeholder meeting, there was discussion about conducting a fish, air, and water sampling study to determine the mercury levels in these media before, during and after the utilities have made the CSA installments. The NC Division of Air Quality, NC Division of Public Health, NC Division of Water Quality, Duke Power, Progress Energy, Electric Power Research Institute and Research Triangle Institute could participate in the study design. Funding will be solicited to support this study. The study

length is anticipated to occur over 10-15 years. The progress of the study will be provided to the stakeholders and General Assembly on a biannual basis or sooner if needed.[17]

FIGURE II-3



NORTH CAROLINA FISH ADVISORIES

The most recent safe fish eating guidelines issued by the Department of Health and Human Services (DHHS) were prepared by the Medical Evaluation and Risk Assessment Unit (MERAU) and dated August 29, 2001. Women of childbearing age (15-44 years), pregnant women, nursing women, and children under 15 years may eat two meals per week of fish low in methylmercury, like farm-raised fish, canned tuna and other canned fish, fish sticks, shrimp, crab, lobster, clams, oysters, scallops, salmon, trout, cod, whitefish, pollock, mahi-mahi, ocean perch, halibut, haddock, flounder, croaker, herring, crappie, sunfish, white perch, yellow perch, and bream.[18] They should not eat any shark, swordfish, tilefish, or king mackerel.[19] Also, they should not eat bowfin (blackfish), chain pickerel (jack fish) or largemouth bass caught in North Carolina waters south and east of Interstate 85.

According to the guidelines, other women, men, and children over 15 years old may eat four meals per week of fish low in methylmercury, such as farm-raised fish, canned light tuna and other canned fish, fish sticks, shrimp, crab, lobster, clams, oysters, scallops, salmon, trout, cod, whitefish, pollock, mahi-mahi, ocean perch, halibut, haddock,

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[17] N.C. DHHS, Occupational and Environmental Epidemiology Branch, August 5, 2004

[18] All fish and shellfish should be properly prepared and cooked.

[19] On January 12, 2001 EPA and FDA issued national fish consumption advisories due to high levels of mercury in some marine fish. These advisories recommend that women of childbearing age and children should not eat shark, swordfish, king mackerel or tilefish.

flounder, croaker, herring, crappie, sunfish, white perch, yellow perch, and bream.[20]. They should eat no more than one meal per week of shark, swordfish, tilefish, or king mackerel. Also, they should eat no more than one meal per week of bowfin (blackfish), chain pickerel (jack fish), or largemouth bass caught in North Carolina waters south and east of Interstate 85.

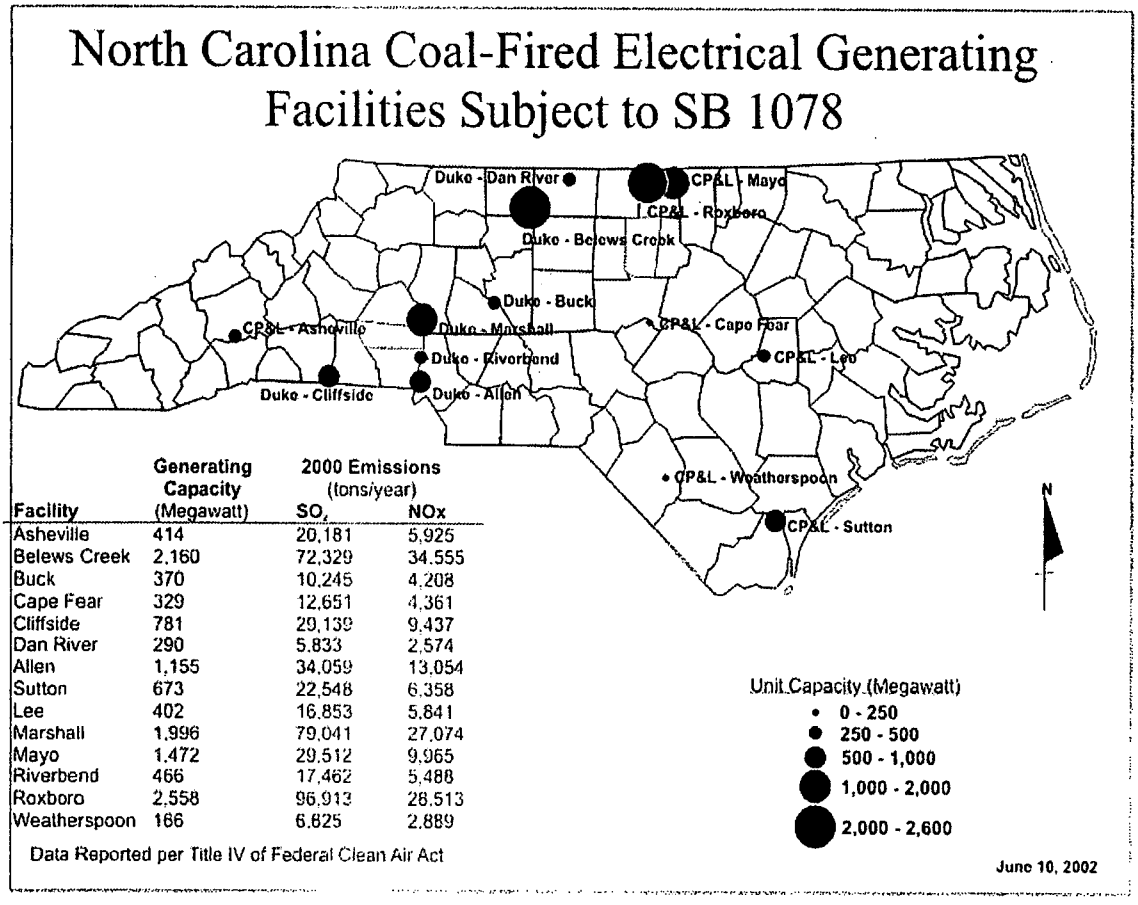
[20] All fish and shellfish should be properly prepared and cooked.

CHAPTER III LEGISLATIVE AND REGULATORY EFFORTS TO REDUCE MERCURY EMISSIONS

NORTH CAROLINA'S CLEAN SMOKESTACKS ACT (CSA)

In response to the CSA of 2002, the utility companies are required to reduce their NO_x emissions 78 percent by 2009 and their SO_2 emissions 73 percent by 2013. In order to achieve these requirements, Duke Energy and Progress Energy are in the process of installing flue gas desulfurization (FGD) wet and/or dry scrubbers to reduce SO_2 emissions, and combustion controls and post-combustion controls to lower NO_x emissions. Figure III-1 indicates the location and relative emissions of CSA boilers.

Figure III-1



Facility	Generating Capacity (Megawatt)	2000 Emissions (tons/year) SO_2	NOx
Asheville	414	20,181	5,925
Belews Creek	2,160	72,329	34,555
Buck	370	10,245	4,208
Cape Fear	329	12,651	4,361
Cliffside	781	29,139	9,437
Dan River	290	5,833	2,574
Allen	1,155	34,059	13,054
Sutton	673	22,548	6,358
Lee	402	16,853	5,841
Marshall	1,996	79,041	27,074
Mayo	1,472	29,512	9,965
Riverbend	466	17,462	5,488
Roxboro	2,558	96,913	28,513
Weatherspoon	166	6,625	2,889

CSA BOILER EMISSIONS

Coal-fired generating units currently account for approximately 66 percent of mercury emissions estimated to be emitted into the air in North Carolina. Emission control equipment planned for installation to meet the North Carolina Clean Smokestacks Act (CSA) are estimated to capture about 65 percent of mercury emissions from Duke

Power's and Progress Energy's coal-fired generating units in North Carolina by 2012.[21] Although the Act does not prescribe mercury-specific controls, these substantial mercury emission reductions are achieved as a secondary benefit (co-benefits). The proposed addition of wet scrubbers to control sulfur oxides (SO_2) is expected to reduce total mercury emissions from CSA coal-fired electrical generating units from an estimated 3,056 pounds per year (ppy) to 1,416 ppy.

Figure III-2 shows the relative percentage of each CSA affected electrical generating plant's contribution of mercury into the atmosphere in 2002 by Coal-fired boilers covered under CSA. The Roxboro, Marshall, and Belews Creek facilities combined mercury emissions are estimated to represent 60 percent of the total CSA mercury emissions.

There are mercury emission sources in North Carolina that are not subject to the CSA. A list of all sources reporting mercury emissions, including coal-fired boilers covered under CSA, was truncated with Craven County Wood Energy, who reported emissions of 6.91 pounds of mercury emissions in 2002 (see Appendix D). These non-CSA mercury sources represent approximately 34 percent (1,737 pounds) of the total 2002 (5,111 pounds) of mercury emissions in North Carolina. CSA boilers represent 66 percent (3,374 pounds). Figure III-3 graphically shows the predominance of the CSA boilers.

From 2005 to 2012, the installation of SO_2 controls to meet the SO_2 cap are estimated (EPA's Mercury Emission tool) to reduce CSA mercury sources to 43.5 percent (1,340 pounds) of the total (3,077 pounds) of mercury emissions in North Carolina. The assumption is that non-CSA mercury sources mercury discharge remains constant at 1,737 pounds of mercury per year. Figure III-3 shows that the remaining contribution of the non-CSA mercury sources percentage increases to 56.4 percent from 34 percent of a reduced number of pounds of mercury (5,111 to 3,077 pounds in 2012). Figure III-4 shows the new predominance of the non-CSA mercury sources in the State.

[21] See Appendix C

FIGURE III-2
PERCENT OF TOTAL MERCURY PRE-CSA BY FACILITY

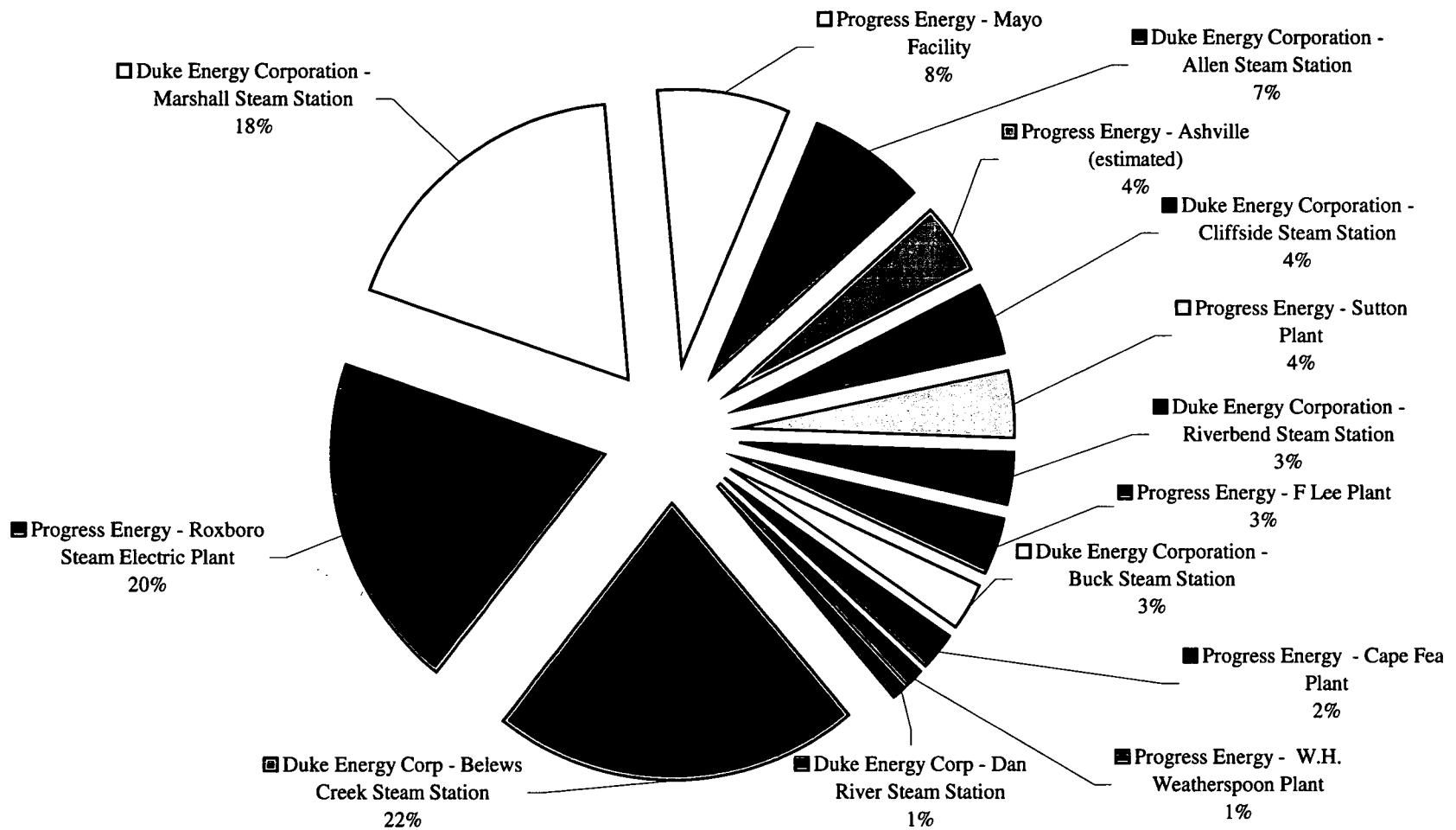


FIGURE III-3
PRE- CSA UTILITIES MERCURY CONTRIBUTION
66 PERCENT OF 5,111 LBS. MERCURY

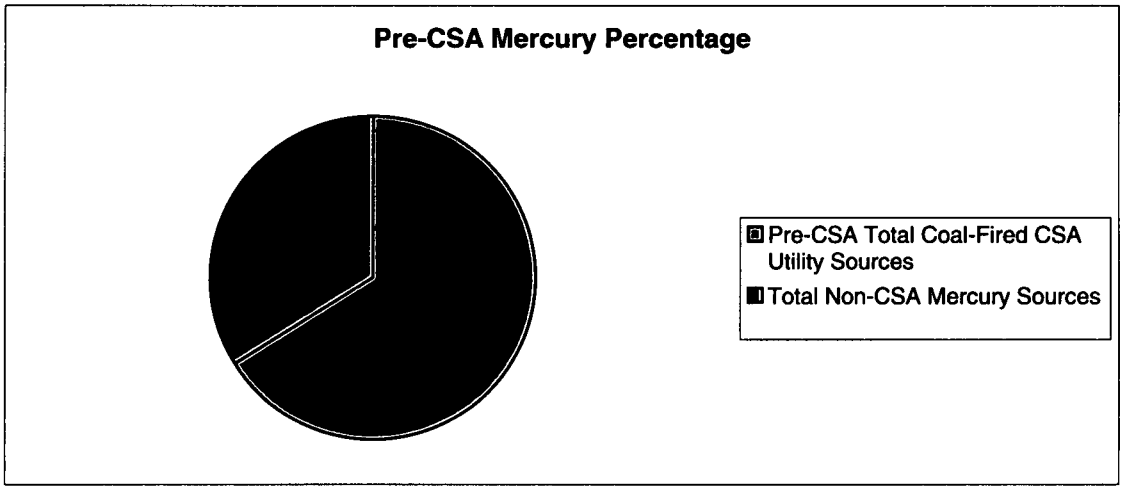
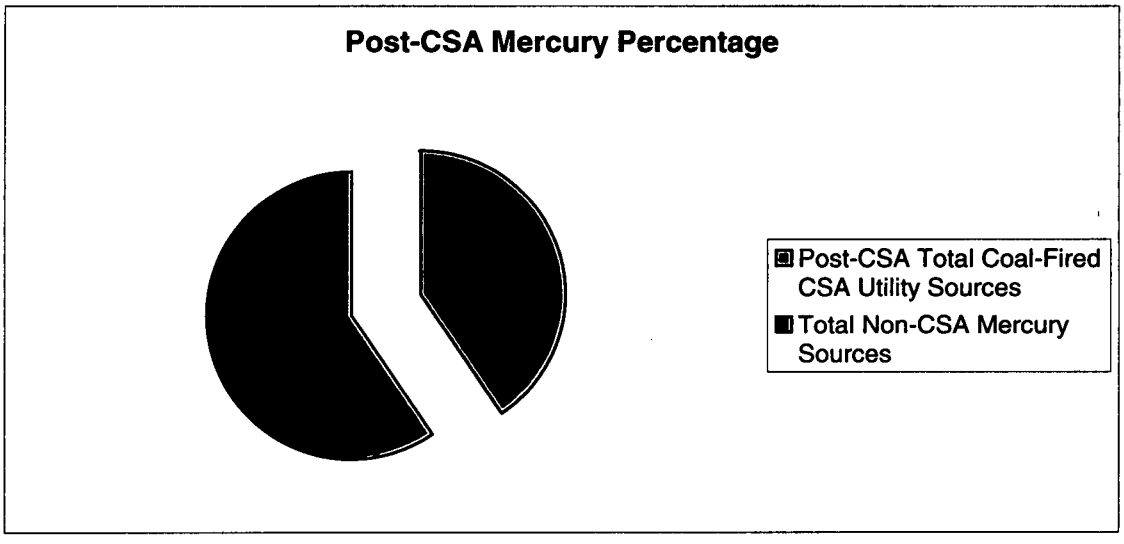


FIGURE III-4
POST- CSA UTILITIES MERCURY CONTRIBUTION
43.5 PERCENT OF 3,077 LBS. MERCURY



Information presented at the workshop on Mercury and CO_2 during April 19-21, 2004 is italicized.

CURRENT AND PROJECTED MERCURY EMISSIONS[22]

- *Current Emission Estimates*

[22] New North Carolina Coal-fired Utility Multiple Pollutant Regulations,2004 Electric Utilities Environmental Conference, Tucson, AZ, January 20, 2004, Steve Schliesser, QEP, Senior Engineer, NC Division of Air Quality

a. *Uncontrolled Emissions ~ 4,100 lb/yr*

b. *Cold-side ESP Efficiency – 29%*

c. *Hot-side ESP Efficiency – 11%*

d. *Controlled Emissions ~ 3,050 lb/yr*

e. *Overall Statewide Reduction – 25%*

- *Future Emission Estimates*

a. *Cold-side ESP / FGD Efficiency – 78%*

b. *Hot-side ESP /FGD Efficiency – 39%*

c. *Controlled Emissions ~ 1,370 lb/yr*

d. *Overall Statewide Reduction– 65%*

CURRENT CSA PROGRESS BY THE UTILITIES

Progress Energy reported to the North Carolina Utility Commission on April 1, 2004, that the total project cost in future dollars remains at $813 million. The company observed that the projected SO_2 removal rates have increased for scrubbed units, resulting in a cancellation of a planned scrubber for Lee 3. Significant construction at the Asheville and Roxboro plants is taking place in 2004.

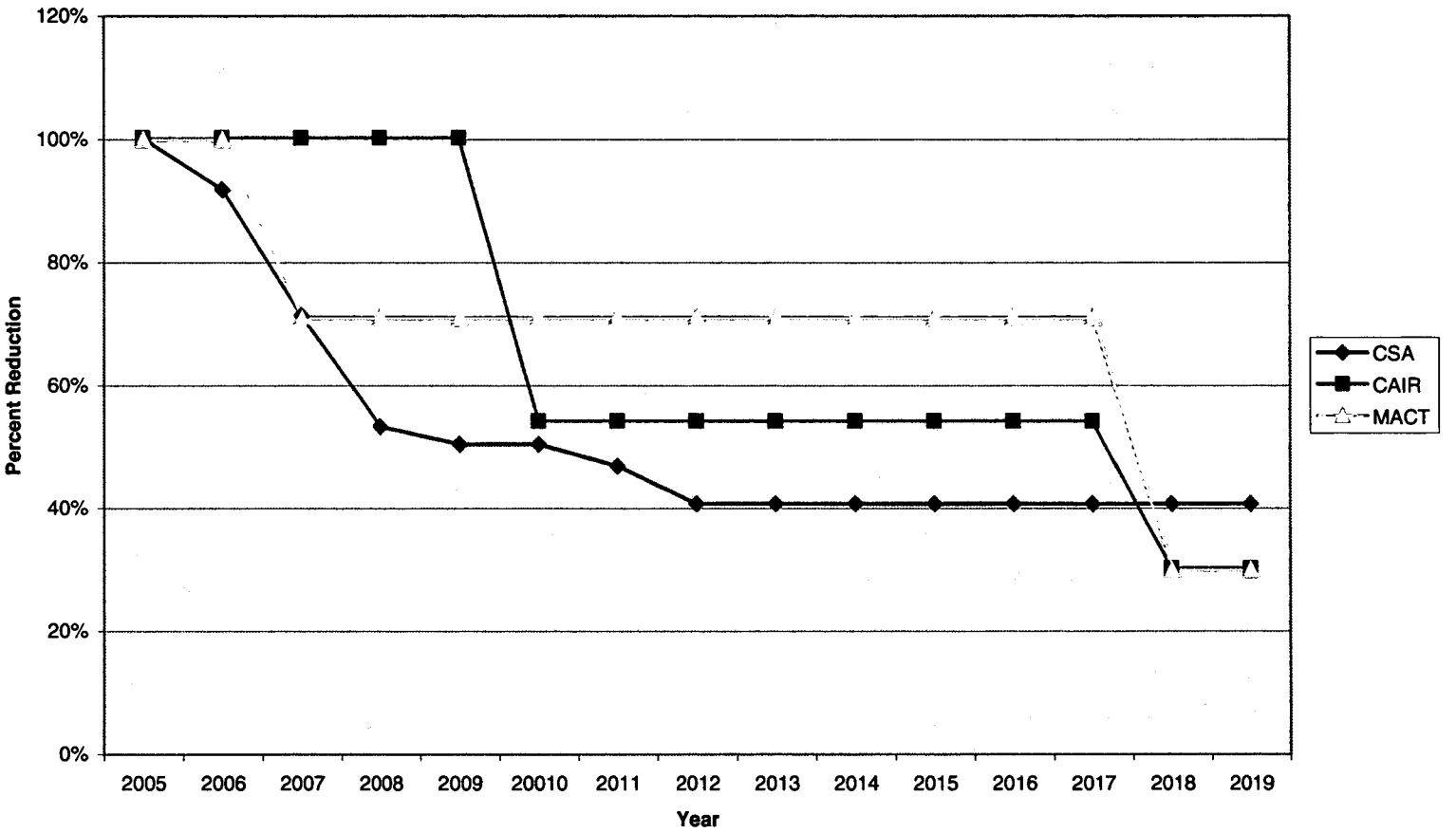
Duke Energy reported April 1, 2004, that its estimated compliance costs to be $1.526 billion. The company reported that the technologies expected to be required to support compliance have not changed.

The North Carolina Department of Environment and Natural Resources and the North Carolina Utilities Commission certified that "the actions taken to date by Progress Energy Carolinas, Inc. and Duke Power, a Division of Duke Energy Corporation, appear to be in accordance with the provisions and requirements of the Clean Smokestacks Act."[23]

The EPA Tool was used to estimate mercury emission reductions from the co-benefits of meeting requirements of the CSA. Credit for mercury reductions are credited for the year's planned completion date. Figure III-5 indicates the CSA utility emissions are at or below both the proposed MACT and Clean Air Interstate Rule (CAIR) mercury reduction percentages indicated until 2018.

[23] *The Implementation of the "Clean Smokestacks Act"*, A Report to the Environmental Review Commission and the Joint Legislative Utility Review Committee, June 1, 2004.

FIGURE III-5
COMPARISON OF CSA TO FEDERAL MACT AND CAIR PROPOSALS



CLEAN SMOKESTACKS & DUKE POWER'S MERCURY EFFORTS[24]

Power Plants in the US:

- *About 1/3 of Total US Non-Natural Emissions.*
- *About 1 % of Total Global Emissions.*
- *Mercury in coal is a "trace" element and concentrations emitted are very small.*
- *Low concentration makes control difficult.*
- *Control technologies not commercially ready. Extended run times needed to determine full impact.*
- *Inhalation of mercury from power plants is not an issue.*

Mercury types from coal combustion.

- *Elemental (Hg°), 40 to 60% (Bituminous Coal)*
- *Oxidized (HgCl), 40 to 60% (Bituminous Coal)*
- *Particulate Mercury, 0.05% Bituminous Coal)*

Co-Benefits

- *Case 1: SCR, ESP, & FGD*
- *Three Units 39% of projected system MW-hrs*
- *SCR oxidizes Hg to HgCl (80 – 90+%)*
- *Cold Side ESP 25 – 35% Hg collection*
- *FGD collects 80-90+% of oxidized Hg*
- *Expected overall Mercury removal of 80 to 90% reduction*

Duke Research:

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[24] Mercury - Power Plants, Clean Smokestacks & Mercury Efforts, Duke Power Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

- *2001 – Collection efficiency across ESP (Marshall & Allen).*
- *2002 – Mercury oxidation with & without SCR (Cliffside 5).*
- *2004 – August: Mercury collection from pilot FGD (Marshall).*

Co-Benefits

- *Case 2: ESP, & FGD*
- *9 Units 43% of projected system MW-hrs*
- *Cold Side ESP 25 – 35% mercury collection*
- *FGD collects 50 to 60+% of remaining mercury*
- *Expected overall Mercury removal of 55 to 65% reduction*

Duke Research:

- *2005 – DOE: Pilot of oxidation catalyst downstream of ESP (Marshall).*
- *2004 – 1/04: Impact of Low NOx combustion on oxidation & ESP Collection efficiency (Marshall) – Increased oxidation & collection eff.*
- *2004 – 5/04: Verification of the impact of Low NOx combustion with different coals and unit (Allen).*

Co-Benefits *Case 3: Cold Side ESP*

- *1 Units .01% of projected system MW-hrs*
- *Cold Side ESP 25 – 35% mercury collection*

Duke Research:

- *2004 – DOE: Southern Co testing with activated carbon & impregnated carbon. Results to date 60-70% removal with activated carbon. Impregnated carbon may increase removal with less injection.*

Co-Benefits

- *Case 4: Hot Side ESP*
- *18 Units 17 % of projected system MW-hrs*

- *Hot Side ESP 0 – 9 % mercury collection*

Duke Research:

- *1999 – EPA ICR data request stack test on Cliffside 1.*
- *2003-2005 DOE: Impregnated carbon injection on Hot Side ESP.*
- *9/03 – 1 wk trial Cliffside 2*
- *Reduction: 30% full load, 70+% low load*
- *9/04 – 1 wk trial Cliffside 2 (verification of 9/03 results)*
- *2/05 – 1 month trial Buck 5*
- *Cliffside Unit 2 Hot Side ESP mercury Control, September 2003 trial.*

Continuous measurement of mercury is in the very early stage of development.

LEGISLATION TO CONTROL MERCURY EMISSIONS IN OTHER STATES[25]

The following bills were introduced in state legislatures for the 2003-2004 sessions to reduce mercury emissions and other pollutants from power plants.

Colorado – SB 140 sponsored by Senators Grossman and Williams – Requires large electrical power plants to install best available control technology by the later of 1/1/2014, or the date that is 40 years after the date on which the plant begins operation.

***Connecticut** (law) – HB6048 (Public Act 03-72) HB 6048 requires coal-fired power plants to comply with an emissions rate equal to or less than 0.6 pound of mercury per trillion BTU of heat input, or alternatively, an emissions rate comparable to a 90 percent reduction in mercury emissions. The legislation would achieve compliance through the installation of best available control technology (the act notes that if a facility installs and properly maintains the best available control technology and still fails to meet the emissions rate, it can request an alternative emissions rate from the Department of Environmental Protection

***Hawaii** – HB195 sponsored by Representative Morita - The purpose of this part is to regulate the emissions of nitrogen oxide, sulfur dioxide, mercury, and carbon dioxide by power plants, in order to protect the public health and safety and to enhance

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[25] The National Caucus of Environmental Legislators, Compiled 2-4-04, http://www.ncel.net/news_uploads/96/Mercury.Power%20Plant%20emissions%20bills.doc,

environmental quality of life. The bill would reduce aggregate mercury emissions by an amount equal to ninety per cent from 1999 levels not later than January 1, 2007.

***Iowa** – HF435 sponsored by Representative Don Shoulz – Directs the state to set mercury emissions limits for coal fired power plants and waste incinerators by 2010.

***Maryland** – (DRAFT awaiting bill number) sponsored by Delegate James Hubbard – Sets emission limits from coal-fired power plants for nitrogen oxide, sulfur dioxide, mercury and carbon dioxide.

***Michigan** – HR187 sponsored by Representative Jack Minore - A resolution to urge the Environmental Protection Agency to reconsider and reverse its proposal to ease restrictions on mercury emissions.

***Minnesota** - HF803 sponsored by Representatives Johnson, S., Ozment, Ellison, Wagenius, Cox & SB1032 sponsored by Senators, Anderson, Pogemiller, Marty, Metzen - By July 1, 2010,an electric generation facility that uses coal as its primary fuel shall install applicable best available control technology identified by the United States Environmental Protection Agency for controlling criteria pollutants under the federal Clean Air Act, if installation of such technology is economically feasible. If installation of such technology is not economically feasible at a particular facility, the facility shall instead upgrade the facility to comply with the new source performance standards promulgated under the federal Clean Air Act applicable to a new coal-fired power plant of that type. The owner of a facility subject to this bill may opt to convert the facility to one that uses natural gas as the primary fuel to comply with that paragraph.

***New York** – AB479 sponsored by Assemblyman Pete Grannis – Directs the state to set mercury emissions limits for coal fired power plants and waste incinerators by 2010.

***New York** – AB5933 sponsored by Assemblyman Richard Brodsky - This bill requires the Department of Environmental Conservation ("DEC") to establish air pollution standards for power plants regarding nitrogen oxide, sulfur dioxide, carbon dioxide and mercury. Requires the commissioner to promulgate emergency regulations within thirty days such that electric generators of a 15MW capacity or more shall emit no more than 1.5 pounds per MW hour of Nitrogen oxide (NO_x) by 2004 and no more than 3 pounds per MW hour of sulfur dioxide (SO_2) by 2007. Requires the department to promulgate regulations for reductions in emissions of carbon dioxide and establish a cap by January 1, 2007, that is 7 percent less than the total 1990 CO_2 emissions. Requires the department to promulgate regulations for reduction in emissions of mercury from electric generators that is no more than 10 percent of the mercury emissions generated in 1999 by January 1, 2007.

***New York** – SB3172 sponsored by Senator Eric Schneiderman – This bill directs the state to set regulations reducing power plant emission of NO_x, SOx, CO_2 and mercury. The bill calls for a 90 percent reduction in mercury emissions.

Virginia – HB1472 sponsored by Representative Jack Reid - Establishes a schedule by which investor-owned public utilities that own or operate coal-fired generating units are required to reduce by specific amounts their emissions of oxides of nitrogen, sulfur dioxide and mercury. The utilities are to determine what technologies will be used to achieve the emission limits established by the bill. Any permit issued by the Air Pollution Control Board for a coal-fired generating unit, which is subject to this new law, will have to provide for testing, monitoring, record keeping and reporting to assure compliance with the reduction requirements. The bill also authorizes the Governor to enter into agreements with the utilities to transfer to the state any emissions allowance that may be acquired by the utilities under federal law. The Department of Environmental Quality and the State Corporation Commission (SCC) are to report annually to the status of the emissions reduction and cost recovery efforts to the committees having jurisdiction over the subject matter. In addition, the Department of Environmental Quality is required to conduct an ongoing analysis of the issues related to the development and implementation of standards and plans to control carbon dioxide (CO_2) from coal-fired generating units. The Department is also to evaluate available control technologies and perform a cost-benefit analysis of alternative strategies to reduce emissions of CO_2, and report its findings to the committees with jurisdiction

***Washington** - SB582 sponsored by Senator Keiser, Fraser and Kline – Requires the state to develop a toxic air emissions strategy that includes: 1) establishing a ten-year schedule to adopt emission reduction standards that significantly reduce emissions for the top ten toxic air pollutants and 2) undertaking actions, including any necessary rule making, to begin emission reductions for the six toxic air pollutants posing the greatest relative risk, as determined by the department, no later than January 1, 2006.

***Wisconsin** – On February 4, state legislators will request that the DNR reintroduce rules seeking an 80 percent reduction in mercury emissions by 2018. The rules were rejected by a legislative committee last December and were being held in limbo by the DNR Board, a group that has oversight over the DNR.

Other States' Actions

Massachusetts – On September 19, 2003, Governor Mitt Romney announced regulations that will require the state's oldest power plants to significantly reduce mercury emissions. The Executive Office of Environmental Affairs (EOEA) and the Massachusetts Department of Environmental Protection (DEP) have proposed a two-phase mercury emissions standard. The first phase requires facilities to capture 85 percent of the mercury contained in combusted coal by October 1, 2006. The second phase requires facilities to capture 95 percent of the mercury by October 1, 2012. In total, the regulations will cut mercury emissions by over 130 pounds per year. (Source: Massachusetts Dept. of Enviro. Protection news release, 9/13/03; http://www.state.ma.us/dep/pao/news/mercregs.htm)

***New Hampshire** – In 2002, New Hampshire passed the nation's first 4-pollutant law requiring reductions in NO_x, SO_2, CO_2, and mercury. The law requires an annual cap applicable to total mercury emissions from all affected sources burning coal as a fuel, to be recommended by the department not more than 60 days following the U.S.

Environmental Protection Agency's proposed regulation establishing a Maximum Achievable Control Technology (MACT) standard for mercury emissions from utility boilers, but in no case later than March 31, 2004, with timely consideration by the legislature expected by July 1, 2005. (Source: HB284 sponsored by Rep. Jeb Bradley)

*Sponsored or co-sponsored by a participant in the National Caucus of Environmental Legislators.

FEDERAL ACTIONS AND STATUS

In the January 30, 2004 Federal Register, EPA proposed new air rules for reducing emissions of sulfur dioxide (SO_2), nitrogen oxides (NO_x), and mercury. EPA proposed the Interstate Air Quality Rule, which focuses on states whose SO_2 and NO_x emissions are significantly contributing to fine particle and ozone pollution problems in other downwind states. The proposed Interstate Air Quality Rule would cover 29 states in the Eastern United States and the District of Columbia. In a separate but closely related action, EPA proposed the Utility Mercury Reduction Rule for controlling mercury emissions from power plants. Together, the Interstate Air Quality Rule proposal and mercury proposal create a multi-pollutant strategy to improve air quality throughout the U.S.[26]

INTERSTATE AIR QUALITY RULE[27]

EPA Administrator Mike Leavitt signed the proposed Interstate Air Quality Rule on December 17, 2003. The proposed Interstate Air Quality Rule would reduce emissions of SO_2 and NO_x in 29 eastern states and the District of Columbia in two phases. SO2 emissions would be reduced by 3.6 million tons in 2010 (approximately 40 percent below current levels) and by another 2 million tons per year when the rules are fully implemented (approximately 70 percent below current levels). NO_x emissions would be cut by 1.5 million tons in 2010 and 1.8 million tons annually in 2015 (about 65 percent below today's levels).

Each affected state would be required to revise its state implementation plan to include control measures to meet specific statewide emission reduction requirements. To achieve the required reductions in the most cost effective way, the proposal suggests that states regulate power plants under a cap and trade program similar to EPA's highly successful Acid Rain Program. Emissions would be permanently capped and could not increase.

CLEAN AIR INTERSTATE RULE (CAIR)[28]

On May 18, 2004, the Environmental Protection Agency proposed additional details and rule text supplementing its January 2004 proposal (and renaming it) to reduce interstate transport of fine particulate matter and ozone. The CAIR would require 29 eastern states and the District of Columbia to significantly reduce and permanently cap emissions of sulfur dioxide (SO_2) and/or nitrogen oxides (NO_x). In 2015, NO_x emissions from the

[26] http://www.epa.gov/oar/interstateairquality/

[27] http://www.epa.gov/oar/interstateairquality/basic.html

[28] http://www.epa.gov/oar/interstateairquality/pdfs/cairsuppfs51804final.pdf, Supplemental Proposal for Reducing Interstate Transport of Fine Particulate Matter and Ozone.

power sector would be 65 percent below today's levels. SO2 emissions from that sector would be 50 percent below current levels by 2015 and approximately 70 percent below current levels when fully implemented.

Reducing emissions of these pollutants will significantly address these health issues, in addition to improving visibility and protecting sensitive ecosystems. EPA's modeling predicts that when combined with existing emissions reduction requirements, this rule would help approximately 90 percent of "nonattainment areas" meet national air quality standards for ozone and particle pollution.

By addressing air pollutants from electric utilities in a cost-effective fashion, EPA's Clean Air Interstate Rule proposal would protect public health and the environment without interfering with the steady flow of affordable energy for American consumers and businesses. Each of the 29 states affected by the program and the District of Columbia must submit a plan to EPA that demonstrates it will meet its assigned statewide SO_2 and/or NO_x emissions budget (i.e., emissions reduction requirements). States can meet the emissions reduction requirements by either: joining the EPA-managed cap-and-trade programs for power plants, or achieving reductions through other emissions control measures.

UPDATE ON MACT PROPOSAL[29]

The proposed new proposed rulemaking (NPR) Clean Air Act (CAA), section 112 MACT rule would limit emissions of mercury from coal-fired EGUs and Ni from oil-fired EGUs. Exposure to mercury or nickel above identified thresholds has been demonstrated to cause a variety of adverse health effects. The NPR also proposed an alternative to regulate mercury from coal-fired EGUs and Ni from oil-fired EGUs under Section 111. In the January 30, 2004 NPR, EPA also proposed, in the alternative, standards of performance under CAA section 111 to establish a mechanism by which mercury emissions from new and existing coal-fired Utility Units would be capped at specified, nation-wide levels. A first phase cap would become effective in 2010 and a second phase cap would become effective in 2018. Facilities would demonstrate compliance with the standard by holding one ''allowance'' for each ounce of mercury emitted in any given year.

DESCRIPTION OF MERCURY EMISSION CREDIT TRADING RULE PROPOSAL

Allowances would be readily transferrable among all regulated facilities. EPA believes that such a ''cap and trade'' approach to limiting mercury emissions is the most cost effective way to achieve the reductions in mercury emissions from the power sector that are needed to protect human health and the environment. The added benefit of this cap-and trade approach is that it dovetails well with the sulfur dioxide (SO_2) and nitrogen oxides (NO_x) Interstate Air Quality Rule (IAQR) that was also proposed through a notice January 30, 2004 (69 FR 4565). That proposed rule would establish a broadly applicable Federal Actions and Status.

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[29] Federal Register / Vol. 69, No. 51 / Tuesday, March 16, 2004 / Proposed Rules

In the January 30, 2004 Federal Register, EPA proposed new air rules for reducing emissions of SO_2, nitrogen oxides NO_x, and mercury. EPA proposed the Interstate Air Quality Rule, which focuses on states whose SO_2 and NO_x emissions are significantly contributing to fine particle and ozone pollution problems in other downwind states. The proposed Interstate Air Quality Rule would cover 29 states in the Eastern United States and the District of Columbia. In a separate but closely related action, EPA proposed the Utility Mercury Reduction Rule for controlling mercury emissions from power plants. Together, the Interstate Air Quality Rule proposal and mercury proposal create a multi-pollutant strategy to improve air quality throughout the U.S.[30]

REDUCING POWER PLANT EMISSIONS: EPA'S NEW PROPOSED RULES FOR MERCURY[31]

EPA Proposes to Reduce Utility Emissions through Current Clean Air Act (CAA) Authorities

1. *Interstate Air Quality Rule (IAQR) to address the contribution of transported SO_2/NO_x emissions to ozone (smog) and fine particle ($PM_{2.5}$) nonattainment problems in the Eastern U.S.*

Standards to Reduce Mercury Emissions and Deposition

1. *Section 112 standards*
   - *Maximum achievable control technology (MACT)*
   - *Command-and-control*
   - *Take comment on trading options*

2. *State-implemented section 111 standards*
   - *Emissions Guidelines and New Source Performance Standards*
   - *Market-based, cap-and-trade program*

Proposed Alternatives to Reduce Mercury Emissions from the Power Sector

- *Three individual approaches outlined in the January 30, 2004 proposal*

  1. *Propose traditional, command-and-control section 112 MACT requirements for utility units. Reduces mercury emissions from 48 to 34 tons by January 2008*

  2. *Propose cap-and-trade approach under guidelines outlined in section 112(n)(1)(A)*

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[30] http://www.epa.gov/oar/interstateairquality/

[31] Reducing Power Plant Emissions: EPA's New Proposed Rules For Mercury, William H. Maxwell, Combustion Group, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, Workshop on Mercury and CO2, Raleigh, NC, April 19-21, 2004

3. *Propose market-based, cap-and trade approach under section 111*

   a. *Revises December 20, 2000 finding that it is "appropriate and necessary" to regulate Utility Units under section 112*

   b. *Caps mercury emissions at 15 tons in 2018; interim cap for 2010 proposed to encourage early reductions in SO_2 and NO_x, generating additional mercury emissions reductions*

   c. *Final approach to be determined following completion of public hearings and close of public comment period*

Final rule signed on/before March 2005

SECTION 112 MACT

A. *Affected source definition*

1. *Electric Utility Steam Generating Unit (Utility Unit)*

   a. *Any fossil fuel-fired combustion unit of more than 25 MWe that serves a generator that produces electricity for sale*

   - *Cogeneration Utility Unit – unit that generates steam and electricity and supplies more than one-third of its potential electric output capacity and more than 25 MWe output to any utility power distribution system for sale*

   - *Cogeneration is defined as the simultaneous production of power (electricity) and another form of useful thermal energy (usually steam or hot water) from a single fuel-consuming process*

2. *Non-Utility Units, not subject to this rule*

   - *Any unit that meets the above definition, <u>but</u> combusts natural gas >98% of the time*

   - *Simple- and combined-cycle turbine units*

   - *Industrial boilers*

SECTION 111(D) – EMISSION GUIDELINES (EG)

1. *Requires EPA to prescribe regulations that outline a procedure by which each State shall submit plans which create standards of performance for existing sources for which air quality criteria have not been set but for which NSPS have been established.*

2. *Cap-and-Trade program reduces the overall amount of emissions by:*
   - *Requiring sources to hold allowances to cover their emissions on a one-for-one basis*
   - *Limiting overall allowances so that they cannot exceed specified levels (i.e., the "cap level"*
   - *Reducing the cap to less than the amount of emissions actually emitted, or allowed to be emitted, at the inception of the program*
   - *Allowing for a declining cap over time*
   - *Creating market-based incentives for early reductions*

SECTION 111 – REGULATORY APPROACH

1. *Primary goal is to reduce Utility Unit mercury emissions from current levels*
   - *2018 cap is permanent*

2. *Effectively becoming more stringent as more plants are required to keep their collective emissions below 15 tons*
   - *Near-term interim cap in 2010*

3. *Level will reflect the maximum level of mercury reductions achievable through FGD and SCR installations (for SO_2 and NO_X emission reductions) on units covered under the IAQR*

4. *Level is not prescribed in current proposal because of uncertainties associated with the ability of these controls to reduce mercury emissions*

5. *EPA seeks comment and technical information on the Phase I cap level*

6. *EPA believes that a carefully designed "multi-pollutant" approach – a program designed to control NO_X, SO_2, and mercury at the same time – is the most effective way to reduce emissions from the electric power sector*

Details of section 111 trading program are outlined in a Supplemental Notice of Proposed Rulemaking (SNPR), which was published on March 16, 2004

SNPR: MERCURY PROGRAM REQUIREMENTS UNDER SECTION 111

1. *Each State must submit a plan that demonstrates it will meet its assigned statewide mercury emissions budget*

    a. *States may join the trading program by adopting or referencing the model trading rule in State regulations; or, adopting regulations that mirror the necessary components of the model trading rule*

    b. *States can choose not to join the federal trading program and meet their budget through intra-state trading or no trading*

    c. *States can also choose to implement more stringent mercury emissions requirements*

2. *EPA has taken comment on a proposal to promulgate, under section 112(n)(1)(A), a cap-and-trade program for mercury from coal-fired utility units*

    a. *Trading program would be federally implemented with the EPA, instead of states, serving as the permitting authority*

SNPR: MONITORING MERCURY EMISSIONS

1. *Monitoring of mercury will resemble current monitoring of SO_2 and NO_x under the Acid Rain and NO_x SIP Call programs*

2. *A comprehensive QA/QC program ensures the adequacy of emissions data*

3. *Current monitoring in the Acid Rain and NO_x SIP Call programs averages over 98% availability*

4. *A petition process enables monitoring flexibility and facilitates the resolution of issues*

5. *Commensurate with the SO_2 and NO_x cap-and-trade programs, regulated sources would have the flexibility of using alternative monitoring approaches as long as such approaches meet the performance requirements in the rule*

SUMMARY

1. *Recent proposals are based on 3 major points regarding public health*

   - *Science continues to tell us to move aggressively on fine particles*
   - *There is growing evidence that ozone may be a larger problem than previously expected*
   - *Mounting scientific evidence and public concern/interest indicate that mercury emissions must be controlled*

2. *Administration strongly prefers the Clear Skies Act legislation instead of controlling NO_x, SO_2 and Hg under the existing CAA*

   - *EPA will stay with the current package of proposals, absent any movement on the legislation*
   - *EPA is committed to action*

3. *Power sector is not the only industrial sector EPA is looking towards to make significant reductions*

   - *Petroleum refining, car/truck/engine manufacturing, and construction equipment industries are making reductions through the Tier II, Heavy Duty Diesel, and Non-road Diesel rules*
   - *EPA is also requiring a variety of industries to meet new MACT standards, which will create emission reductions of both criteria and air toxics pollutants*

NEXT STEPS

Finalize Mercury Rule	*December 2004*
Finalize Interstate Air Quality Rule	*December 2004*

PROPOSED UTILITY MACT MERCURY EMISSION LIMITS[32]

	New Unit		*Existing Unit*	
Coal Rank	*10^{-6} lb/MWh*	*or lb/TBtu*	*10^{-6} lb/MWh*	*or lb/TBtu*
Bituminous	*6*	*0.57*	*21*	*2.0*
Subbituminous	*20*	*1.90*	*61*	*5.8*
Lignite-Fired	*62*	*5.82*	*98*	*9.2*

[32] Summary of Proposed Regulations: Mercury, Paul Farber, Sargent & Lundy, LLC Chicago, IL, Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

IGCC Unit	*20*	*1.90*	*200*	*19*
Coal Refuse	*1.1*	*0.102*	*4.1*	*0.38*

Note: Emission limits for new units are proposed in 10^{-6} lb/MWh units only (12-month rolling average).
Equivalent lb/TBtu limits are provided for reference.
Existing units have the option of complying with either the lb/TBtu or lb/MWh emission limit.

INSIGHTS ON ECONOMIC IMPACTS OF UTILITY MERCURY AND CO_2 CONTROLS[33]

Mercury trading is very cost-effective compared to mercury unit-specific targets

EPA's proposed MACT would cost 5-10 times more than its proposed mercury Cap on NPV basis:

- *Mercury trading is far more cost-effective*
- *MACT achieves ~32 tons by 2008*
- *Mercury Cap achieves 15 tons by 2020 (32 tons at ~2012)*

Cost-effectiveness advantages of proposed trading rule would be heightened by technical improvements in mercury control options:

- *Timing flexibility gives opportunities for technology to improve before it must be implemented broadly.*
- *Trading "places a price" on mercury emissions which also incentivizes technical improvements better than MACT.*
- *Mercury trading tends to concentrate reductions on the largest sources.*

OTHER OPINIONS CONCERNING THE CONTROL OF MERCURY EMISSIONS

EDISON ELECTRIC INSTITUTE

In comments by Edison Electric Institute (EEI) to Environmental protection agency in response to 40 CFR Parts 60 and 63, Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units; Proposed Rule 40 CFR Parts 60, 72, and 75 Supplemental Notice for the Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility

[33] Insights on Economic Impacts of Utility Mercury and CO2 Controls, Anne Smith Charles River Associates, North Carolina DENR/DAQ Workshop on Mercury and CO2, Raleigh, NC, April 19-21, 2004

Steam Generating Units; Proposed Rule, June 29, 2004, the following major points were addressed:[34]

- EEI believes that, despite dramatic decreases in emissions from the electric generating sector in recent decades, further cost-effective reductions in emissions may be achieved under the proper framework, especially under a properly designed national cap-and-trade program.

- Legislation provides greater certainty for business and the environment, while regulation generally fails to address the overlapping nature of more than a dozen existing interconnected air programs.

- There are inconsistencies in the proposed rule. The preamble states that a unit is considered to be an oil-fired unit and subject to the nickel MACT if it is equipped to fire oil and/or natural gas, and if "it fires oil in amounts greater than or equal to two percent of its annual fuel consumption." However, the same preamble states that the nickel MACT would not apply to units that combust natural gas "greater than 98 percent of the time."

- Integrate and streamline these programs if the mercury rule is to achieve the desired emission reductions at reasonable cost to the American consumer. A cap-and-trade approach is the best way to reduce emissions from the electric utility industry. Such a rule would be protective of public health, scientifically sound, flexible, and cost-effective – all components of reasonable and sensible public policy.

- EPA should establish subcategories for the source category of electric utility steam generating units. Fluidized bed combustion units should be in a separate category and Integrated Gas Combined Cycle (IGCC) units should be exempt. Conventional boilers must be subcategorized by coal rank (bituminous, subbituminous and lignite); other considerations could include process differences and coal chemistry for further subcategorization.

- MACT floors for subcategories must account for the inherent variability in mercury emissions from the best performing units. There are numerous methods for addressing variability, and more than one approach may be necessary to account for variability related to fuel and variability related to plant operations.

- There is currently no justification for regulation beyond the MACT floor.

- There should be no additional requirements beyond what is required to meet the MACT floor for existing units and to satisfy NSPS requirements.

[34] http://www.eei.org/about_EEI/advocacy_activities/Environmental_Protection_Agency/EEI_mercury_final_040629.pdf

- There should be a choice between the least stringent of either a percent reduction standard (percent mercury removed as difference between mercury in coal and mercury emitted from stack) or input-based emission rate (stack concentration in lb/TBTU) standard.

ENVIRONMENTAL DEFENSE

Environmental Defense Recommends: [35]

- Reducing power plant pollution is critical to lowering local mercury deposition and avoiding the dangerous contamination of fish, wildlife and people.

- The EPA should issue strong mercury standards for power plants to reduce mercury pollution from 48 tons today to about 5 tons, or a 90 percent reduction. These reductions are consistent with national standards for other source sectors and achievable through available pollution-control technology.

- States with mercury deposition hot spots should pursue their own mercury pollution standards to protect local water bodies and public health, and all states should press for rigorous national standards.

THE NATIONAL MINING ASSOCIATION

Mr. Jack Gerard, president and CEO of the National Mining Association (NMA), said that after studying the Environmental Protection Agency's emissions data, NMA concludes that EPA's statistical analysis, sampling and methodology are inadequate for determining mercury reduction values for any coal type and for setting emissions limits. "In the absence of adequate emissions data for the wide variety of US coal types and power plants, and without demonstrated technologies for reducing mercury emissions, EPA cannot implement an effective MACT [maximum achievable control technology] rule for power plants, nor set accurate emissions allowances for a cap-and-trade program," Gerard went on to say that EPA's data represents at best only a partial snapshot of the industry. "We don't think it's wise to base decisions that will have far-reaching economic implications on inadequate data that reflect neither the differences among coal types nor the differences among power plant operations," NMA suggestions for mercury proposals include:

- A modification of EPA's cap-and-trade proposal that would allow for greater certainty in setting achievable emissions reductions. Under this proposal, hard data from actual mercury reductions achieved under EPA's new interstate air quality rule would lead to a fairer allocation of emissions allowances for coal types, allow for a more thorough assessment of

[35] http://www.environmentaldefense.org/documents/3370_MercuryPowerPlants.pdf

mercury abatement technologies commercially available, and form the basis of interim emissions allowances in 2015.

- New units should not be forced to rely on purchased credits alone for meeting emissions targets, but should be granted modest allowances to minimize the possibility that power plants would switch to more costly fuels and raise energy costs further.

- NMA suggests that banking of emissions credits be deferred until 2015, stating the later date would better ensure that target reductions in 2018 would be achieved without heavy use of credits banked throughout the longer, eight-year period proposed by EPA.

STAPPA/ALAPCO ORGANIZATION

The State and Territorial Air Pollution Program Administrators (STAPPA) and the Association of Local Air Pollution Control Officials (ALAPCO) are the two national associations representing air pollution control agencies in 54 states and territories and over 165 major metropolitan areas across the United States. State and local air pollution control officials formed STAPPA and ALAPCO over 30 years ago to improve their effectiveness as managers of air quality programs. The associations serve to encourage the exchange of information among air pollution control officials, to enhance communication and cooperation among federal, state and local regulatory agencies, and to promote good management of our air resources.

With respect to mercury, STAPPA and ALAPCO based their analysis on state actions to reduce mercury emissions. State mercury limits proposed or adopted in Connecticut, Massachusetts and New Jersey will achieve control efficiencies on the order of 90 percent or more, while in Wisconsin, where mostly western coal is used, limits are 80 percent. Accordingly, STAPPA and ALAPCO extrapolated such reductions nationwide and arrived at a recommended national mercury emission cap range of 5 to 10 tons per year by 2013; such a range accommodates both eastern and western coal. Further, this range is consistent with STAPPA and ALAPCO's October 2002 recommendation to the EPA Utility MACT Working Group, which, if implemented nationwide, would result in mercury emissions of less than 7.5 tons per year.

The associations also identified a range for an interim mercury emission cap of 15 to 20 tons per year, to be achieved by 2008. Mercury levels in this interim cap range they project to be should be largely achievable through the application of the same air pollution control equipment needed to achieve compliance with the interim NO_x and SO_2 caps that STAPPA and ALAPCO have identified in this analysis. Traditional control technologies for criteria pollutants have been shown to be effective for mercury reduction, especially when used in combination; the most effective for mercury is a combination of low-NO_x burner, selective catalytic reduction, baghouse and scrubber technologies. This interim cap range is also intended to encourage the use of mercury specific control technologies, such as activated carbon injection (ACI), by some facilities. ACI has low capital cost, especially with an existing baghouse, has been proven on

incinerators, and has been piloted and demonstrated and is currently available for coal. The 20-ton-per-year level results if mercury reductions are achieved in the same proportion as NO_x and SO_2 reductions under the recommended interim caps for those pollutants. The 15-tonper-year level reflects a desire to be more progressive in controlling mercury, because it is a hazardous air pollutant. Approximately twice the level that STAPPA and ALAPCO recommended for MACT, a 15-ton-per-year level for mercury is appropriate in the context of a harmonized strategy addressing multiple pollutants.[36]

On June 29, 2004, STAPPA and ALAPCO addressed problems they found with the "National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units: Proposed Rule," A copy of the letter is in Appendix B of this report. Primary concerns as cited in their letter include:

- STAPPA and ALAPCO are extremely dismayed with EPA's proposals to regulate hazardous air pollutants from electric utilities. "We do not believe the rule will adequately protect public health and the environment, a concern that is shared by many others," they said.

- STAPPA and ALAPCO strongly urge the agency to abandon its proposed strategy and, instead, develop final Maximum Achievable Control Technology (MACT) standards, with stringent emission limits and expeditious deadlines, as required by Section 112(d) of the Clean Air Act.

- The Clean Air Act clearly calls for emissions of hazardous air pollution from electric utilities to be regulated under Section 112. Therefore, EPA's proposal to regulate those sources under Section 111, instead, is totally inappropriate.

- The limits contained in the Section 111 proposal are not nearly stringent enough. The proposal calls for an interim emissions cap, expected to be 34 tons per year to be achieved by 2010 that, in fact, does not require any additional control of mercury beyond the co-benefits expected from other programs aimed at reducing emissions of sulfur dioxide and nitrogen oxide, such as the Interstate Air Quality Rule (IAQR).

- The EPA proposal sets MACT levels that would result in national emissions of 34 tons per year, which is clearly not consistent with the legislative mandate for calculating MACT under Section 112.

- EPA should establish a MACT standard that reflects *at least* "the average emission limitation achieved by the best performing 12 percent of the existing sources" or "the emission control that is achieved in practice by the best controlled similar source." Rather than recommending a specific

[36] http://www.4cleanair.org/Multi-P%20Analysis-FINAL-031504-lthd.pdf

technology, STAPPA and ALAPCO suggest a performance standard. Also, we prefer a common standard for bituminous and subbituminous coal, but different percent limits can be considered for the coal types, as long as the limits provide for very good controls of mercury emissions and do not promote fuel switching or blending to avoid controls.

- STAPPA and ALAPCO are extremely concerned that EPA is proposing on a national basis to allow trading of mercury emissions between utilities. "Not only do we question the legality of mercury trading, we are also very concerned that trading could lead to serious hotspot problems around the country."

- The concern about local sources causing local mercury hotspots must not be dismissed. Mercury emissions can travel great distances, some of the pollutant can also be deposited near its source. In fact, there is recent evidence that sources of mercury can have significant local impacts.

- STAPPA and ALAPCO believe it is reasonable to consider 90-percent control for sources using bituminous coal and 80-percent control for units firing subbituminous coal. These limits would result in a national emission reduction between 85-90 percent, which is much more stringent than the decreases expected from EPA's proposal.

- STAPPA and ALAPCO strongly urge EPA to abandon its proposed strategy, and, instead, develop final MACT standards with stringent limits as required by Section 112(d) of the Clean Air Act.

THE NORTH CAROLINA DIVISION OF AIR QUALITY

On June 29, 2004, the North Carolina Division of Air Quality (DAQ) addressed problems found with the EPA's proposed and supplemental proposed rules addressing national emission standards for hazardous air pollutants (NESHAP) for mercury and nickel, which were published in the Federal Register January 30, 2004 and March 16, 2004. A copy of the letter is in Appendix B of this report. DAQ's primary concerns extracted from the letter include:

1. The health effects of mercury in North Carolina

   - Mercury is a significant health problem in North Carolina. Methylmercury levels in fish from eastern North Carolina continue to be elevated above all of the existing toxicological benchmarks provided by the federal government.

   - The Department of Health and Human Services has advised women of childbearing age and small children not to consume these three species of fish when caught from surface waters south

and east of Interstate-85, and reduced consumption rates are recommended for the general public.

- Total mercury concentrations in rainwater are at or above levels that water quality agencies would seek in order to restore the ability to eat locally caught fish without an increased risk of neurological effects.

- Significant reduction in mercury emissions to the atmosphere is necessary for public health protection.

2. Comparison of the EPA Proposal with Existing Measures in North Carolina

   - In 2002, North Carolina passed the Clean Smokestacks Act (CSA), which substantially cuts the state's coal-fired power plants emissions of multiple air pollutants that cause smog, haze and other pollution problems. The speed and amount of reduction of EPA's proposal are less than those for North Carolina's own requirements.

   - The pollution controls required under the CSA are projected, as a co-benefit, to reduce mercury emissions in North Carolina by more than 50 percent by 2012.

   - Under the proposed MACT, the reductions projected are 29 percent until 2018 nationally. In addition, there is no guarantee of site-specific reductions due to EPA's proposed Cap-and-Trade system.

1. Relationship Between the EPA Proposal and the Future Steps Required to be taken by North Carolina.

   - DAQ encourages EPA to consider in its final rule the process North Carolina already has in motion for evaluating the health needs and available technologies for achieving additional mercury reductions.

   - Given the significant early reductions from implementation of the CSA, North Carolina hopes EPA will pass regulations that require similar reductions in other States.

   - The EPA rule needs to offer explicit right and authority for States to deal with residual local issues and to avoid preempting State programs.

- Compliance should be monitored using EPA Method 101A, since mercury continuous emission measurements (CEM)s will most likely not be commercially available, accurate, or reliable by the time that a mercury MACT rule is to be implemented. Title V permits will include compliance assurance monitoring (CAM) plans for periods between compliance tests. There should be an initial compliance demonstration followed by annual testing for large sources and biennial testing for small sources to demonstrate compliance with mercury MACT limits.

- Compliance with MACT limits should be on a facility basis rather than on a boiler-by boiler basis.

- The presumptive three-year compliance period contained in § 112(d) is too short to bring all coal-based units into compliance with mercury MACT limits. Several practical concerns limit the ability to design, build and finance the pollution control equipment that would need to be installed or retrofitted for the entire electric utility industry to comply with a MACT standard in only three years.

CHAPTER IV COAL-FIRED BOILER MERCURY CONTROLS

This chapter discusses mercury controls available to the electric utility coal-fired boiler industry. Information presented at the workshop on Mercury and CO_2 during April 19-21, 2004 is italicized.

INSIGHTS ON ECONOMIC IMPACTS OF UTILITY MERCURY AND CO_2 CONTROLS[37]

Various retrofit controls are possible
"Co-benefits" from PM, SO_2 and NO_x control equipment, especially for bituminous (eastern) coals:

- *Cold-side electrostatic precipitator* (CESP) *–removes ~35% of mercury; FF removes 75-90% of mercury*
- *Wet FGD + CESP removes 60-70% of mercury*
- *SCR with WFGD + CESP removes 85-90% of mercury*

Activated carbon injection (ACI):

- *Cheap to install, expensive to operate, for removals of 60-80%*

ACI with small baghouse:

- *Substantial capital cost, but lower operating costs 85%-90% removal appears possible*

All mercury controls still have uncertain removal potentials
Co-benefits are likely, but magnitude still speculative
ACI still being developed; not "commercialized" yet

PERFORMANCE AND COSTS OF MERCURY CONTROL TECHNOLOGY FOR BITUMINOUS COALS[38]

Status of Technologies for Oxidizing Mercury:

SCRs: DOCUMENTING PERFORMANCE ON FULL-SCALE INSTALLATIONS

- *Better performance on bituminous than subbituminous coals.*

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[37] Insights on Economic Impacts of Utility Mercury and CO2 Controls, Anne Smith Charles River Associates, North Carolina DENR/DAQ Workshop on Mercury and CO2, Raleigh, NC, April 19-21, 2004

[38] Performance and Costs of Mercury Control Technology for Bituminous Coals:, Michael D. Durham, Ph.D.,MBA , ADA-ES, Inc., NC DAQ Mercury and CO2 Workshop April 19-21, 2004 Raleigh, NC

- *Possibility of aging effects.*
- *Possibility of interferences from other chemicals.*
- *Catalysts are being designed to reduce oxidation of SO_3; this may impact oxidation of mercury.*
- *Oxidizing Catalysts: Pilot-scale testing under way.*
- *Oxidizing Chemicals: Some very short-term full-scale tests. Concerns with corrosion.*

SORBENT INJECTION UPSTREAM OF A WET SCRUBBER

- *Injection of AC and capture in ESP will provide an additional mechanism to reduce mercury emissions.*
- *Oxidation of mercury produced by carbon could enhance capture in FGD.*
- *Decreased mercury levels in scrubber could reduce potential for reemission of elemental mercury from scrubber.*
- *Two DOE/Industry full-scale field tests are scheduled:*
    1. *Georgia Power Yates; currently on-going, medium-sulfur bituminous coal, and*
    2. *AEP Conesville; Spring 2005, high-sulfur bituminous.*

ASH ISSUES

- *The mercury captured by PAC, LOI, and ash appears to be very stable and unlikely to reenter the environment.*
- *The presence of PAC will most likely prevent the sale of ash for use in concrete.*
- *Several developing technologies to address the problem:*
    1. *Separation*
    2. *Combustion*
    3. *Chemical treatment*
    4. *Non-carbon sorbents*

5. Configuration solutions such as EPRI TOXECON™

Costs of mercury control depend on plant size not on amount removed.

Costs of mercury control are unrelated to the amount of mercury captured.

CONCLUSIONS ON ACI PERFORMANCE

- *AC injection can effectively capture elemental and oxidized mercury from bituminous coals.*
- *There will be difference in site to site performance of ACI due to differences in coal, equipment, and flue gas characteristics.*
- *Fabric filters provide better contact between the sorbent and mercury than ESPs, resulting in higher removal levels at lower sorbent costs.*
- *Long-term results are promising showing consistent mercury removal greater than 85%.*
- *New COHPAC™ fabric filters will have to be designed to handle higher loadings of PAC to insure high (>90%) mercury removal.*

Commercial Status of Technology: Equipment

- *Similar equipment has been used successfully in the waste industry to inject AC into flue gas.*
- *It has successfully been scaled up for full-scale utility applications.*
- *Operating continuously for nearly a year at Gaston.*
- *Three AC injections systems currently operating.*

Supply of Activated Carbon and Other Sorbents:

- *Sufficient supply available to meet several State regulations.*
- *Additional production needed to meet Federal regulations.*
- *Tremendous progress being made with improved sorbents.*

Performance:

- *Will vary with type of equipment (FF vs. ESP).*

- *Will vary from site to site due to flue gas characteristics (temperature, acid gases).*

WET SO_2 SCRUBBERS

Wet scrubbers are similar to dry scrubbers in that both use an alkaline solution to collect SO_2 and both are located downstream of a particulate air pollution control. However, wet scrubbers saturate the flue gas stream with water, as the complete scrubbing process, including by-products, remains liquid or in a slurry form. They are also referred to as wet FGD scrubbers and normally achieve a SO_2 control efficiency of 90+ percent. In this study it was estimated that wet scrubbers downstream of cold-side ESPs would remove almost 80 percent of total mercury emissions and wet scrubbers downstream of hot-side ESPs would remove nearly 40 percent of total mercury emissions. This decrease in mercury control performance in hot-side ESP is due to the relatively lower amount of mercury oxidized at elevated temperatures. Relative to other air pollution controls, wet scrubbers downstream of cold-ESPs show higher mercury removal performance because the gas temperature favors more oxidized mercury, with the oxidized fraction being more effectively removed in the scrubber. The challenge to improve performance of mercury capture in wet FGD is to find a way to oxidize the elemental mercury vapor before it reaches the scrubber or to modify the liquid phase of the scrubber to cause oxidation to occur. Wet FGD scrubbers are installed on about 15 percent of utility boilers nationwide, most of which are on the larger boilers, as these scrubbers control roughly 25 percent of the US power generating capacity. No wet FGDs are currently installed on any NC boilers, but 22 boilers will have their emissions scrubbed by wet FGDs as a result of the CSA.

SELECTIVE CATALYTIC REDUCTION

The SCR process uses a catalyst with ammonia gas to reduce the nitric oxide (NO) and NO_2 in the flue gas to molecular nitrogen and water. Ammonia gas is diluted with air or steam, and this mixture is injected into the flue gas stream upstream of a metallic catalyst bed composed of vanadium, titanium, platinum, or zeolite. In the reactor, the reduction reactions occur at the catalytic surface. The SCR catalyst bed reactor is usually located between the economizer outlet and the air heater inlet, where temperatures range from 450 – 750 °F. Recent data suggests that SCRs tend to promote additional mercury oxidation, thereby enhancing mercury removal with most existing and emerging particulate / SO_2 control technologies. Eleven SCRs are being installed in North Carolina as a result of the NO_x SIP Call and the CSA.

COLD-SIDE ESP RETROFIT OPTIONS

ADD FLUE GAS COOLING

Lowering the flue gas temperature entering the ESP assists natural fly ash sorption of mercury, improves the performance of any sorbents injected upstream for mercury control, and inherently enhances particulate control performance by reducing gas velocity and lengthening residence time. However, the acid dew point temperature limits the

extent of gas cooling when the flue gas has significant formation potential of hydrochloric acid or sulfuric acid that greatly reduces the service life of steel ducts.

POWDERED ACTIVATED CARBON BASED CONTROL[39]

Conventional Powdered Activated Carbon (PAC)

- *Control requires a fabric filter to achieve acceptable mercury removal efficiency.*
- *Bromated powdered activated carbon (bpac) is much more reactive and has to potential to provide acceptable mercury control with an ESP*

Gaseous mercury can be converted to particle–bound mercury by adsorption onto solid particles in the flue gas. Injecting suitable sorbents into the flue gas upstream of the ESP increases the amount of mercury captured. This modification may also require additional ducting between the injection location and the ESP inlet, and adding a gas absorber / humidifier upstream of the ESP. This approach may be limited to ESPs with a wide compliance margin, as boilers with marginally performing ESPs may have difficulty meeting existing particulate-related emission requirements due to the increased loading of sorbent and likely high resistivity levels.

ADD DOWNSTREAM FABRIC FILTER WITH SORBENT INJECTION

Installing a fabric filter after the ESP allows most of the native collected fly ash in the ESP without reacted sorbent and enhances overall particulate control for marginally performing ESPs. Furthermore, due to the low particulate loading, the filter dust cake porosity is reduced, allowing use of a smaller, less expensive fabric filter with long cleaning cycles and high sorbent and bag life performance.

COHPAC OPTION™

There is a patented variation of adding a downstream fabric filter (baghouse) to a cold- or hot-side ESP known as COHPAC™ (Compact Hybrid Particulate Collector) developed by the Electric Power Research Institute. It involves retrofitting a baghouse either in the space of the last field (or section) of an ESP or in a separate housing downstream of an ESP with a precharger located immediately upstream of the baghouse. In either case, the residual or induced charge on the particulate produces a marked effect in lowering the porosity of the filter dust cake. Such an arrangement allows use of a much smaller, less expensive fabric filter with long cleaning cycles and high sorbent and bag life performance. For example, COHPAC™ units are designed with filtration velocities of 8-12 feet per minute (fpm) as compared to the filtration velocities of 3-5 fpm typically used for pulse-jet fabric filters on coal-fired utility boilers.

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[39] Mercury Monitoring, Barrett Parker, EPA Emissions Measurement Center, Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

HOT-SIDE ESP RETROFIT OPTION.

This entails conversion of a hot-side ESP to a cold-side ESP, and could then include any of the other cold-side ESP retrofit options mentioned above. Several hot-side ESPs in the US, including a few in NC (such as Duke Energy Allen Units 3-5), have been converted to cold-sides to improve particulate collection performance and ESP reliability. Depending on plant layout and design, this may be possible by reconfiguring the ducting, retuning the ESP to operate at lower temperatures, and perhaps installing a SO_3 or NH_3 gas conditioning system to restore performance.

WET FGD SCRUBBER RETROFIT OPTIONS

Previous research has shown that much of the mercury released during coal combustion is either removed with the flyash or can be absorbed in FGD units, if it is in the oxidized form. Oxidation of the gaseous elemental mercury is more readily captured by wet FGDs than gaseous elemental mercury. Several flue gas additives and scrubbing liquid additives are being developed to oxidize more of the gaseous elemental mercury and to prevent any re-conversion of oxidized mercury to gaseous elemental mercury. However, there is the caution that increasing oxidants in the flue gas or in the scrubbing liquid may also oxidize other species such as SO_2 and NO_x to sulfuric acid and nitric acid aerosols. Other options under development include use of oxidizing catalysts upstream of scrubbers, higher scrubber liquid-to-gas ratios, and scrubber tower design changes.

DRY SORBENT INJECTION.

For boilers with dry air pollution controls without FGD, injection of dry sorbents (such as powdered activated carbon [PAC] or less costly alternatives) offer a candidate control technology. Because of the added contact on the filter dust cake, it is estimated that FFs would require 1/10 of the sorbent rate as ESPs. Full scale tests with a small FF downstream of a hot-side ESP showed 90 percent mercury control with PAC injection. Such performance was achieved with a significant increase in bag cleaning frequency (a reliable surrogate indicator for a decrease in bag life and increase in bag replacement cost) with the suggestion of rather high overall cost for the PAC injection system. Further full scale tests have been performed at a Wisconsin electric utility. [Reference: "Full Scale Evaluation of Mercury Control with Sorbent Injection and COHPAC..."] Other tests have/ are being performed with Darco FGD™ carbon injection upstream of ESPs. Results with low sulfur bituminous coal show total mercury capture vary from 20 – 80 percent depending on ESP operating temperature ranging from 220 – 275 °F.

Sorbent collection performance for mercury is expected to depend on 5 key parameters, including sorbent size, sorbent capacity, residence time, type of dry air pollution control, and mercury level. Predicted costs for PAC using representative values for these parameters range from $4-12 million/year for ESPs and from $4-6 million/year for FFs for a 500 MW boiler. (Since these levels are considered prohibitive by some, many other candidate technologies target cost levels as ¼ to ½ of PAC costs.). Title: "Predicted Cost of Mercury Control at Electric Utilities Using Sorbent Injection"

CALCIUM-BASED SORBENT INJECTION

An alternative to PAC is calcium-based sorbent, such as limestone. EPA laboratory tests indicated that injection of calcium-based sorbents into flue gas could result in significant mercury removal and a small amount of SO_2 and SO_3 removal. Further testing by McDermott Technology, Inc. produced results slightly above 50 percent mercury capture. Comparison of these results with PAC results indicate that while PAC is a more effective sorbent than limestone on a mass basis, limestone is a more effective sorbent than PAC on a cost basis.

In summary, there are several emerging potential retrofit mercury control technologies at various stages of investigation and development. Further efforts to study and validate full-scale performance are underway, but it appears premature to obtain a complete set of definitive cost data for performing a robust cost analysis for many/most of the competing mercury control technologies.

IGCC: WHAT IS IT?[40]

INTEGRATED COAL GASIFICATION COMBINED CYCLE (IGCC)

- *Chemical conversion of coal to synthetic gas for combustion in a modified gas turbine.*
- *Inherently cleaner process because coal is not combusted and the relatively small volumes of syngas are easier to clean up than the much larger volumes of flue gases at a coal combustion plant.*

IGCC ENVIRONMENTAL IMPACTS - AIR POLLUTION

- *Commercially available IGCC power plant technologies can have much lower air pollution emissions than new conventional coal plants.*
- *Actual air emissions performance will likely depend, at least in part, on what control technology and performance levels are required by regulators.*

Mercury capture at IGCC plants is quite feasible and much less costly than at conventional coal plants and the potential exists to indefinitely sequester mercury captured at IGCC facilities.

Commercially available IGCC power plant technologies produce substantially smaller volumes (about one half) of solid wastes than do new conventional coal plants using the same coal

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[40] Integrated Coal Gasification Combined Cycle (IGCC) Power Plants and Geologic Carbon Sequestration, Joe Chaisson, April 21, 2004, Revised. Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

IGCC solid wastes are less likely to cause environmental damage than fly ash from conventional coal plants because IGCC ash melts in the gasification process, resulting in an ash much less subject to leaching pollutants than is conventional coal combustion fly ash.

COAL GASIFICATION AND MERCURY MANAGEMENT

- *Proven, low cost mercury controls can remove most of the mercury from coal syngas produced (14 years experience at Eastman Chemical).*

- *Mercury is captured in a small volume activated carbon bed. Bed contents are currently managed as hazardous wastes (due to other toxics captured), but could be sequestered in a long-term mercury storage facility or the mercury contained could be economically recycled.*

Thus coal IGCC with a carbon bed plant mercury control is today the only technology that can convert coal to power and capture nearly much of the coal mercury in a form and volume suitable for permanent sequestration.

CHAPTER V TWO MERCURY EMISSION ESTIMATING TOOLS

In 1999, the U.S. Environmental Protection Agency (EPA) conducted the Electric Utility Steam Generating Unit Mercury Information Collection Effort (EU/ICE) to gather information about mercury emissions from the coal-fired electric utility industry. This effort led to the collection of stack test and coal mercury content reports on 80 furnace or boiler units. Two computer tools have been used in this report to estimate mercury emissions leaving the smokestacks of coal-fired electrical utility boilers. Both tools are based on the same data. For this report, the two tools are differentiated as the EPA tool and the EPRI tool.

The EPA tool, "Electric Power", "*EUCFF*" (Version 3.0.1) was developed for EPA by the Research Triangle Institute in June 2001 for estimating mercury emissions from coal combustion at electrical utilities in the United States. *Electric Power* allows permitting authorities and others to evaluate the impact on mercury emissions if certain parameters including type of coal, boiler, or pollution control device are changed.[41] This program does not account for any additional mercury capture if selective catalytic reduction (SCR) equipment is installed in the flue gas stream. Therefore, if an SCR is installed, the actual mercury emissions may be lower (more captured) than emissions otherwise reported. The EPA tool results are more conservative that the EPRI tool results because the EPRI tool program algorithms incorporates the affects of high chlorine in coal combusted in North Carolina. Chlorine combines with mercury to form inorganic molecules that can be captured.

The EPRI tool was used to develop EPRI's technical Report "An Assessment of Mercury Emissions from U.S. Coal-Fired Power Plants," in October 2000. Due in part to the reason cited above, the EPRI tool normally estimated higher mercury capture rates than the EPA tool. However, in light of data variability and other uncertainties that may exist during the massive data collection and testing effort, DAQ believes it prudent to report estimated mercury capture with a range of values instead of exact numbers.

Information presented at the workshop on Mercury and CO_2 during April 19-21, 2004 is italicized.

A SOFTWARE TOOL FOR ESTIMATING MERCURY EMISSIONS AND REDUCTIONS FROM COAL-FIRED ELECTRIC UTILITIES (EU)[42]

- *Tool for evaluating alternatives for mercury control.*
- *Case-by-case MACT is applicable until nationally applicable MACT standard*

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[41] Ref. 21

[42] A Software Tool for Estimating Mercury Emissions and Reductions from Coal-Fired Electric Utilities (EU), Jeffrey D. Cole, C. Clark Allen, Ph.D. Presented at the Mercury and CO_2 Control Options Assessment Workshop Raleigh, NC April 19-21, 2004

- *Tool is not required for a case-by-case analysis.*

Software for Electric Utility Mercury Controls, Sponsored by U.S. EPA.
Coal-burning electric utilities.

- *Predicts the amount of mercury control for conventional electric utility pollution control devices.*
- *Allows the use of site-specific information.*
- *Provides very detailed reports of the results.*

Basis of the Model's Electric Utility Equipment Configurations

- *1999 EPA ICR Part III emission test reports (79 separate units, 80 total [1 tested twice]).*
- *Follow up telephone interviews.*
- *Information provided by the EU company.*
- *Company review and feedback.*

Fuel Usage and Characterization

- *Provided by the EU company throughout 1999.*
- *Fuel characterization.*
- *Fuel type (bituminous, subbituminous, lignite..)*
- *Fuel amount combusted for each unit*
- *Fuel characterization, mercury content, other characteristics*
- *Allows the use of site-specific information.*

Stack Tests for Electric Utility Mercury Controls

- *Sponsored by EU companies.*
- *Different types of conventional pollution controls were evaluated.*

- *Measured mercury rates in coal, in gas going into the control unit, and in the gas leaving the control unit.*

- *Formal reports with quality assurance.*

Types of Furnaces and Conventional Air Pollution Controls Tested

- *Conventional furnace, Fluidized-Bed Combustion (FBC), and Integrated Gasification Combined-Cycle (IGCC).*

- *Particulate controls:*

- *Electrostatic Precipitators (both hot-side and cold-side)*

- *Fabric filters*

Particulate scrubbers

- *Mechanical collectors (multiclone).*

- *Sulfur controls: Wet Flue Gas Desulfurization (FGD), Spray Dryer Absorber.*

- *Nitrogen oxide controls: Selective Catalytic Reduction, Selective Non-Catalytic Reduction.*

Method for Estimating the Effectiveness of the Mercury Controls, II Speciation Method.

- *Evaluate the mercury speciation for the coal type and furnace type: particulate, ionic, and elemental.*

- *Evaluate the control effectiveness of each control type for each mercury species.*

- *Apply these factors to the 1999 site-specific conditions.*

- *Sum the remaining mercury species for the controls you have selected to estimate the total mercury emission rate.*

Uncertainty Analysis for the Result.

- *Expected mercury air emissions from the analysis.*

- *Range of results due to uncertainty.*

- *Detailed report of the statistics.*

ESTIMATED MERCURY EMISSION REDUCTIONS IN NC FROM CSA CO-CONTROL[43]

Mercury Emissions and Control Study for Electric Utilities
Electric Utility Industry Is Primary Mercury Emission Source in NC (75% mercury emissions) Current Statistics

- *48 Utility Boilers with 13,300 MW*
- *Duke Power with 8,200 MW*
- *Progress Energy with 5,100 MW*
- *Variety of Conventional Boilers*
- *No mercury-specific emission controls*

NC Electric Utility Boiler Characteristics:
Current Design and Operation

- *All Eastern Bituminous Low-S Coal*
- *Favorable mercury Controllability Coal*
- *All T-Fired or Wall-Fired Boilers*
- *Most larger units with Cold-side ESPs*
- *Several small Hot-side ESPs*
- *No Wet FGD Scrubbers*

DAQ Estimated Mercury Emissions Based on EPA and EPRI Correlations

- *EPA Estimates*
- *Based on 1999 ICR data (1100 boilers & 80 tests)*
- *Results by category (e.g., bituminous coal, cold-side ESP)*
- *Averaged category data without coal variables*

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[43] **Estimated Mercury Emission Reductions in NC from Co-control as a Result of CSA,** Steve Schliesser, NC Division of Air Quality, Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

- *Used Sound Science*
- *Results applicable for large data sets*
- *Predict 48 tons mercury emissions in USA*

EPRI Estimates:

- *Based on 1999 ICR data (1100 boilers & 80 tests)*
- *Results by category (e.g., bituminous coal, cold-side ESP)*
- *Correlated category data on key coal variables*
- *Used Sound Science*
- *Results applicable for large data sets*
- *Predict 45 tons mercury emissions in USA*

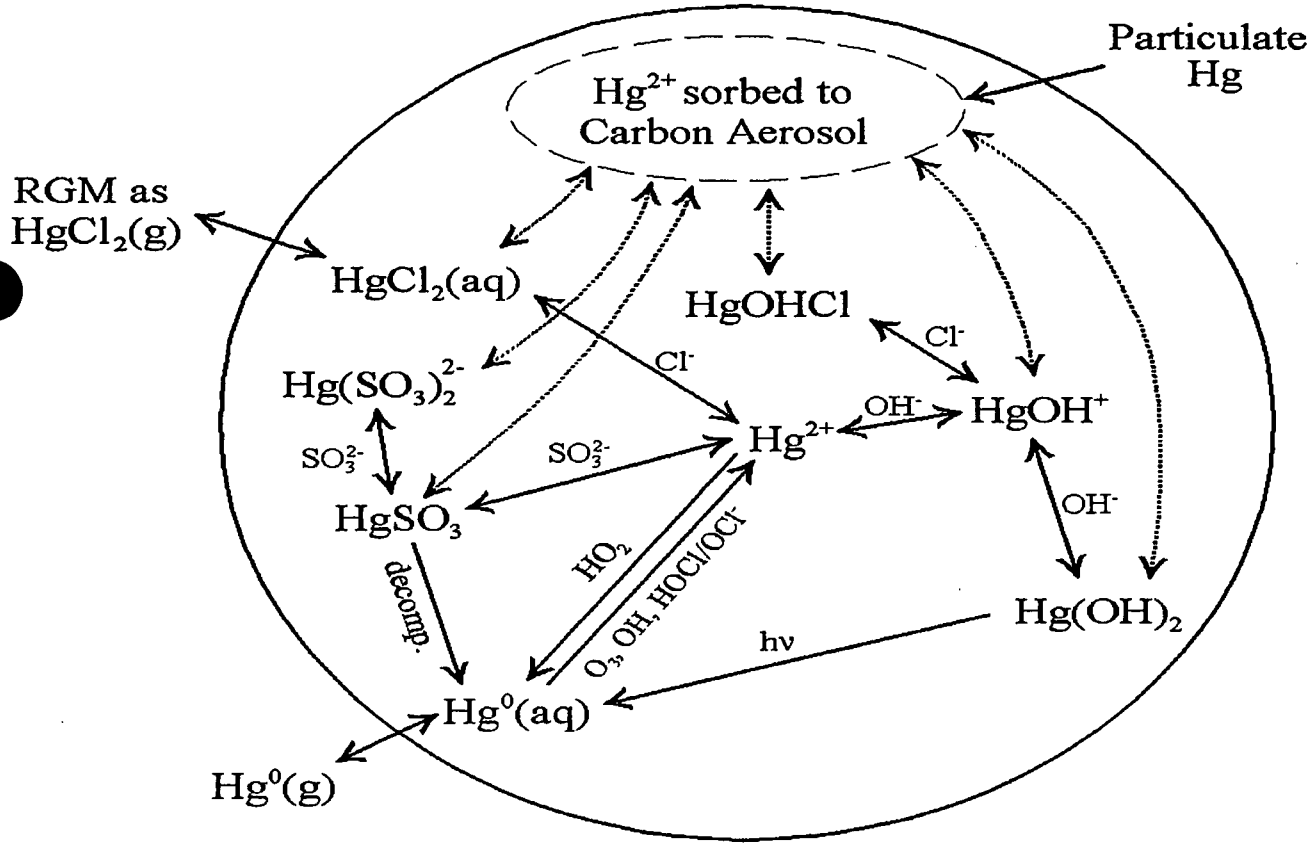
CHAPTER VI LOCAL MERCURY SOURCES AND INFLUENCES

Information presented at the workshop on Mercury and CO_2 during April 19-21, 2004 is italicized.

MODELING ATMOSPHERIC MERCURY DEPOSITION[44]

It is well known that particulate matter deposits from the atmosphere through dry processes, but gaseous constituents also dry deposit. It appears that dry deposition of RGM is especially important near combustion sources. Figure VI-1 graphically illustrates the complex chemical reactions taking place in the atmosphere resulting in dry mercury deposition.

FIGURE VI-1
CLOUD CHEMISTRY MECHANISM FOR THE CMAQ-MERCURY MODEL



[44] Modeling Atmospheric Mercury Deposition to the Sounds and Other Water BodiesO. Russell Bullock, Jr., NOAA Air Resources Laboratory,(On assignment to the U.S. EPA Office of Research and Development), Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

- *The Florida everglades experience provides the best example so far of the likely importance of dry deposition of mercury to total ecosystem impacts.*

- *Atmospheric mercury models are under development at a number of institutions around the world, and a concerted effort of model inter-comparison is being made to identify important uncertainties.*

- *Sparse and incomplete observational data is hampering model evaluation efforts, especially the lack of closure on the total deposition flux.*

- *Atmospheric mercury models will continue to evolve as our understanding of mercury chemistry in air and cloud water evolves.*

The greatest obstacle to discovery is not ignorance - it is the illusion of knowledge.

Daniel J. Boorstin (1914-2004)

ATMOSPHERIC MERCURY: PANDORA'S BOX?[45]

Comparison of mercury inputs to the Everglades, depicted is the Everglades Protection Area, i.e. the remaining 'natural' portions of the Everglades:

- *Two years' monitoring of surface water inflows of mercury from all of the 'into' structures were 1.8 and 3.2 kg/year, during which atmospheric deposition from 4 years of rainfall mercury collection ranged from 125 to 140 kg/year.*

- *Thus, greater than 95% of the annual mercury budget of the Everglades comes from atmospheric deposition via rainfall.*

- *Atmospheric modeling of sources within southern Fla. indicates that dry deposition adds approximately 30% additional mercury load to WCA-3A, not included in these estimates.*

The Bottom Line

- *Reduction of atmospheric sources of mercury from within Florida has led to ~ 60% declines in mercury in Everglades fish and wildlife in less than 15 years since peak deposition.*

- *To the extent that mercury emissions are in the reactive form (RGM) one can expect to see benefits at local or regional scale within years to decades.*

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[45] Atmospheric Mercury: Pandora's Box?, Tom Atkeson, Coordinator Mercury & Applied Science, Workshop on Mercury and CO_2, Raleigh, NC, April 19-21, 2004

- *The main driver of the Everglades mercury problem is mercury load - overwhelmingly from atmospheric deposition.*

- *There is synergy with co-deposition of mercury and sulfate, which combine to exacerbate mercury methylation.*

Figure VI-2 reflects annual mercury deposition rates from approximately 1810 to 1996 that was analyzed from a sedimentary core sample collected in the Everglades. Mercury dropped back to 1980 deposition rates from a high in the early 1990s.

Figure VI-3 shows the reduction of mercury use throughout the world's economy. This decline has been of the order of 80 percent.

Figure VI-2
Mercury Concentrations Over Time
Everglades, Florida

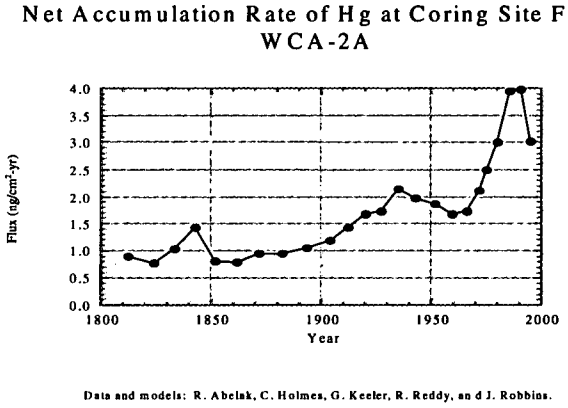
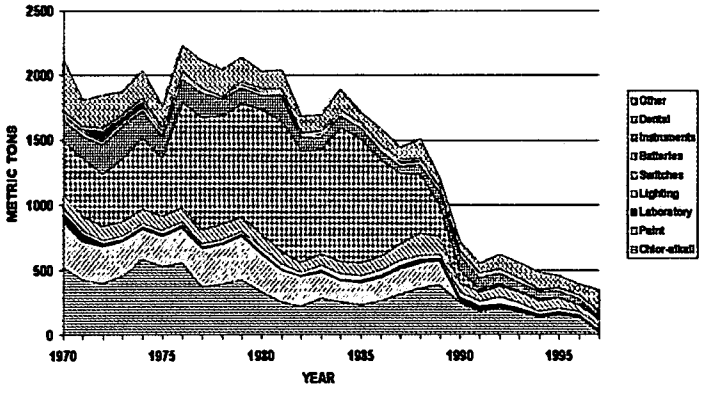


FIGURE VI-3
TRENDS IN WORLD MATERIAL FLOWS OF MERCURY.



Sznopek and Goonan. USGS

THE FLORIDA EVERGLADES STUDY RESULTS[46]

The Florida Everglades study goal was to understand and simulate how changes in local atmospheric mercury emissions in south Florida would influence mercury concentrations in top predator fish, thus demonstrating the potential of combining air and water modeling approaches in Total Maximum Daily Load (TMDL) involving air deposition of mercury. This study focuses on mercury, and incorporates extensive field data into a framework combining atmospheric mercury deposition and aquatic mercury cycling models to demonstrate the feasibility of the approach. The data year studied for this project is from June 22, 1995 to June 21, 1996.

A fundamental question to examine in this pilot TMDL study was the relationship between atmospheric reactive gaseous mercury (RGM) deposition and long term fish mercury concentrations. Once the model was calibrated to the current atmospheric RGM deposition estimate of 35 μg/m2/yr, simulations were also carried out with loadings at 75, 50, 25 and 15percent of current levels. In these simulations, RGM and methylmercury concentrations in inflows were adjusted in proportion to RGM deposition. Atmospheric loadings of methylmercury also were changed proportionally. Predicted fish mercury concentrations were compared after each simulation had run 200 years, producing essentially steady state conditions. Annual cycles of site conditions and mercury deposition were repeated Inorganic mercury throughout the simulation period.

The purpose of including the results of this Florida Department of Environmental Protection study is an attempt to establish a link between airborne mercury emissions and methyl mercury concentrations in top predator fish. The findings point to a linear relationship existing between airborne mercury emissions and methyl mercury concentrations in three-year-old big mouth bass. See Figure VI-4.

A fundamental question to examine in this pilot TMDL study was the relationship between atmospheric inorganic mercury deposition and long term fish mercury concentrations. Once the model was calibrated to the current atmospheric inorganic mercury deposition estimate of 35 μg/m2/yr., simulations were also carried out with loadings at 75, 50, 25 and 15 percent of current levels. In these simulations, Inorganic mercury and methylmercury concentrations in inflows were adjusted in proportion to Inorganic mercury deposition. Atmospheric loadings of methylmercury also were changed proportionally. Predicted fish mercury concentrations were compared after each simulation had run 200 years, producing essentially steady state conditions. Annual cycles of site conditions and mercury deposition were repeated throughout the simulation period. See Figure VI-5

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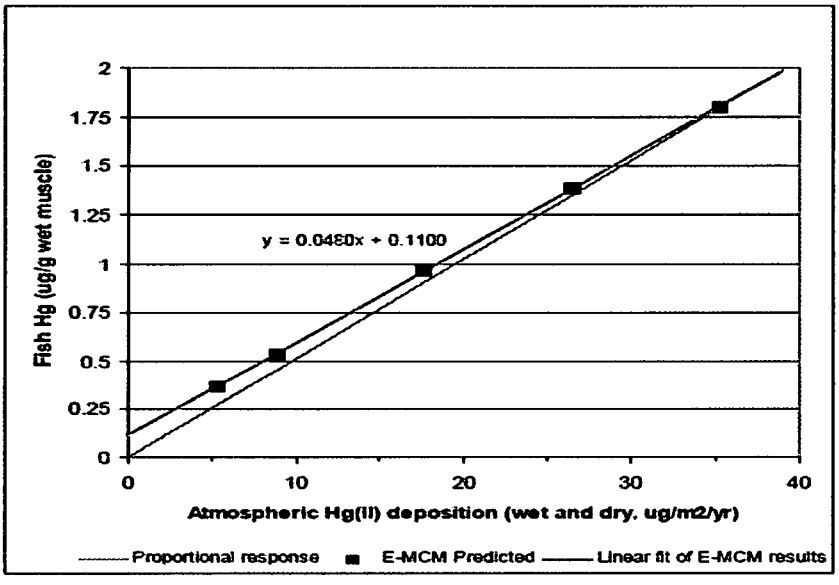
[46] Integrating Atmospheric Mercury Deposition with Aquatic Cycling in South Florida: An approach for conducting a Total Maximum Daily Load analysis for an atmospherically derived pollutant, Florida Department of Environmental Protection, October, 2002, Revised November, 2003

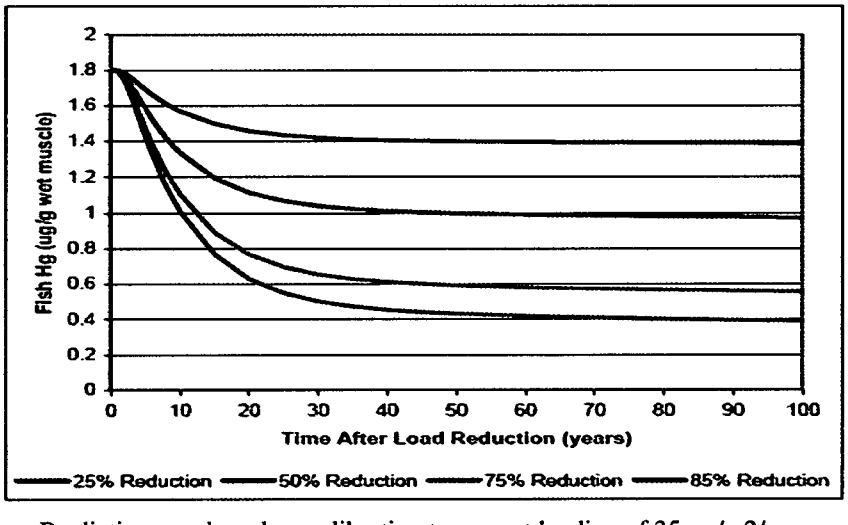
FIGURE VI-4
THREE YEAR OLD LARGEMOUTH BASS PREDICTED MERCURY CONCENTRATIONS (AS A FUNCTION OF DIFFERENT ATMOSPHERIC MERCURY DEPOSITION ANNUAL RATES)



Atmospheric Inorganic mercury deposition (wet and dry, ug/m2/yr)
Fish mercury (ug/g wet muscle)

It is unknown at this time if the results of this study are applicable in North Carolina as a predictive tool. South Florida's metrological experience is very different from that found in this State. There are also major differences in mercury sources, topography, soil structure, and exposure to pollution affects across state borders.

FIGURE VI-5
PREDICTED DYNAMIC RESPONSE OF MERCURY CONCENTRATIONS IN LARGEMOUTH BASS IN WCA 3A-15 FOLLOWING DIFFERENT REDUCTIONS IN RGM DEPOSITION.

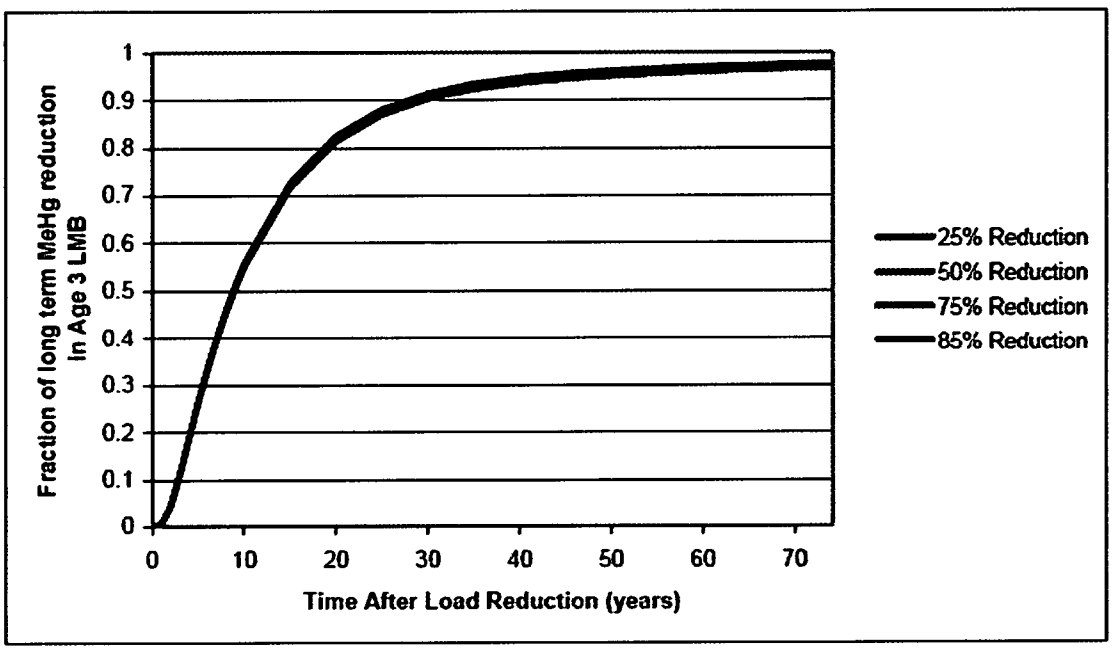


Predictions are based on calibration to current loading of 35 µg/m2/yr.

Figure VI-6 shows that the number of years required for the system to approach a new steady state is effectively independent of the actual magnitude of the change. Two phases are illustrated by the curve: the first is a period of comparatively rapid response driven by the decline of inorganic mercury loading and the hydraulic residence time of the system; the second phase is far slower, and is governed by the turnover rate of labile inorganic mercury in the sediments supporting methylation. Because the simulated concentrations of mercury in largemouth bass ultimately reflect net methylation rates in the sediments, the response of largemouth bass is prolonged. For example, the time required to achieve 50 percent of the ultimate response in fish tissue mercury concentrations is approximately 10 years for all load reduction scenarios tested with the base calibration with atmospheric inorganic mercury deposition at 35 μg/m2/yr. Within 30 years, approximately 90 percent of the ultimate predicted response is projected to occur.

Figure VI-6

Comparison Of The Rate At Which Age 3 Largemouth Bass Concentrations Approach Steady State Following Different Reductions In Inorganic Mercury Deposition



Simulations all based on calibration with current Inorganic mercury deposition = 35 μg/m2/yr.).

The report discusses uncertainties in some detail. Causes of uncertainty are listed to encourage the reader to understand that this report, excellent as it is, may or may not represent the true relationship of atmospheric mercury deposition to methylmercury contamination in fish:

- No simple relationship links mercury concentrations in water and mercury concentrations in fish; the relationship is site specific.

- The average annual precipitation for the study year was 156 cm. The normal precipitation range at the site is 125-140 cm.

- The model indicates a significant seasonal trend in total mercury wet deposition to the area, predicting that over 80 percent of the wet deposition would occur from May through October.

- The program used measured wet deposition (23.1 $\mu g/m^2$/year) and modeled estimate of dry deposition (12.2 $\mu g/m^2$/year). For a total of 35 $\mu g/m^2$/year.

- Assumption that two limiting factors govern methylation and demethylation rates: the supply of available mercury and the rate of activity of the methylating and demethylating microbes.

- Assumption that microbial methylation and demethylation rates were limited only by their respective mercury substrates.

- Assumption that RGM and methylmercury concentrations in inflows would respond linearly to changes in atmospheric deposition.

- Several attempts have been made at construction of global mercury models but all lack key information on the atmospheric reactions of mercury and their rates.

- The understanding of the biogeochemical cycle of mercury has advanced greatly in the past decade but a number of features of that cycle remain obscure. The program was calibrated to a single site in this study.

- Unable to compare model predictions to observations in terms of the effects of different site conditions such as pH, DOC, fish growth rates, sulfate and sulfide levels, and other site conditions that vary systematically across the Everglades.

THE FLORIDA MERCURY REPORT – PUTTING IT IN PERSPECTIVE[47]

EPRI Comments on "Integrating Atmospheric Mercury Deposition With Aquatic Cycling in South Florida"

Recent news coverage of the Florida Mercury Report published on November 6 indicates that the installation of mercury emission control technology on waste incinerators in the early1990s has resulted in a 60-70% decrease in mercury concentrations in fish and birds in the Everglades. Does this mean that placing mercury emission controls on power plants throughout the United States would have a similar effect?

The mercury emissions released by municipal and medical waste incinerators are

[47] *The Florida Mercury Report – Putting it in Perspective,* EPRI • askepri@epri.com • www.epri.com

different from those released by power plants.

- There are two major forms of mercury in emissions – oxidized (or ionic), which is water-soluble, and elemental, which is not water-soluble.

- Most incinerator mercury is in the water-soluble form whereas the form of mercury released from power plants depends upon many factors, such as the type of coal being burned. Recent research has shown that most of the mercury released by utilities (at least 60 percent) is the non-water soluble elemental form, and that a significant amount of the remainder converts to this non-soluble form shortly after leaving the stack.

- The form of mercury emitted is critical as oxidized mercury can be washed into local rivers, lakes, and streams by rainfall whereas elemental mercury is carried away by wind and enters the global mercury cycle.

- Power plant chimneys are typically higher than incinerator chimneys and therefore disperse emissions over a larger area, resulting in less local impact.

The Florida Everglades represents a unique ecological system not typical of, and in fact, strikingly different from other US waterways. Thus, the results from this study are not necessarily applicable to other areas.

- The Everglades are in a tropical zone (no seasons), the water is shallow, and the bottom sediments are much different from those in other water bodies throughout the U.S. Other waterways also have different levels of acidity, biological activity, dissolved oxygen, and turbidity. These differences can dramatically affect mercury cycling and uptake by biological organisms. Thus, it is unlikely that the changes in mercury, both amount and rate of decline, observed in fish would be observed in other US waters.

The claim that changes in mercury emissions result in rapid changes in fish mercury content is not supported by the data or findings.

- The Florida report assumes that mercury deposition in the Everglades originates from local sources (primarily incinerators and power plants). However, while such patterns might be expected, data measurements and long-range transport modeling indicate otherwise.

- In fact, despite decreases in mercury emissions from incinerators, the amount of mercury being deposited in the Everglades overall has not changed significantly.

- Indeed, both EPA and EPRI have modeled mercury transport and concluded that over 60 percent of mercury deposited in Florida originates outside the State.

- Since fish mercury content has apparently fallen, other factors must be involved. Several theories have been suggested involving changing nutrient levels and water flows in the Everglades. Further research is needed to understand this situation.

- An April 2004 researchers' review of the Florida mercury findings concluded that the observed fish mercury trends could not be explained solely by estimated changes in mercury emissions, but needed data on other atmospheric components that might be required to drive such trends.

The atmospheric transport model used by the State of Florida to estimate mercury deposition has limitations.

- The model does not incorporate chemical reactions in the atmosphere. It also does not include global sources of mercury, only local emissions. Thus, it cannot effectively simulate the actual mercury deposition.

EPRI's recent research findings indicate that power plant mercury controls would not significantly change the amount of mercury contained in fish, or the human exposure to it.

- In early 2003, EPRI completed a comprehensive study of US power plant mercury emissions, potential mercury controls, and responses of fish to changes in mercury in their habitat waters. The results showed that reducing mercury emissions from power plants by approximately 50 percent would result in a reduction of mercury in fish of about 1½ percent . This study, combining atmospheric data and models, fish consumption information from US government studies, and an economic model of the US utility industry, relies on more recent information than the two-year-old Florida study report released on November 6.

THE ISSUE OF MERCURY "HOT SPOTS"

MERCURY DEBATE CONCENTRATES ON HOT SPOTS[48]

There's no argument that mercury is a noxious pollutant yet there is widespread disagreement over how or whether to control it. Now the attention is on potential "hot spots," whereby individual power plants could end up not cutting mercury-related emissions under a free market approach espoused by the Bush administration and others. The issue has come to light because of the trading system proposed by the Bush team—the same kind used successfully to help control sulfur dioxide emissions. Simply put, power plants that run afoul of the caps can buy credits from those that exceed their targets. That's the cap-and-trade part of it. The other aspect is that the plan sets a limit of 34 tons of mercury deposits by 2010, or a reduction of 30 percent from today's levels—a number that the Energy Information Administration predicts would be more like 40 percent because of the addition of the trading approach.

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[48] http://www.rppi.org/mercurydebate.shtml

But, many environmental groups oppose such tactics, noting that while national mercury levels may drop, specific places will suffer from hot spots unless maximum allowable levels are set by individual plants. A cap-and-trade program raises the possibility that any utility could choose to buy credits rather than implement modern pollution controls. Individual communities could therefore suffer harm.

ENVIRONMENTAL DEFENSE REPORT NAMES TOP 10 U.S. MERCURY 'HOT SPOTS'[49]

"Mercury hot spots sound the alarm for strong national limits on dangerous mercury pollution," said Michael Shore, Environmental Defense senior air policy analyst. "EPA's weak stance on mercury ignores the agency's own scientific assessment and puts profits of the utility industry ahead of children's health. Affordable technology exists to protect our children from toxic mercury pollution and it is the government's legal and moral responsibility to put those tools to work now."

According to the report, the top 10 states for mercury hot spots (ranked by the most severe hot spot in each state) are Indiana, Michigan, Maryland, Florida, Illinois, South Carolina, North Carolina, Pennsylvania, Texas and Tennessee.

"America's children can't afford for the EPA to get a failing grade on the cleanup of toxic mercury emissions from coal-fired power plants. Other polluters have already been required to reduce their mercury emissions by 90 percent, and coal-fired power plants should not be let off the hook. States with mercury hot spots should vigorously pursue strong standards to protect water quality, ensure fish are fit to eat, and prevent brain damage in children," said Shore.

Somewhere north of Fort Wayne lies an area of nearly 500 square miles considered to be the most mercury-contaminated spot in the country, according to figures from the U.S. Environmental Protection Agency. Environmental Defense, a private non-profit organization, released the figures compiled earlier by the EPA, but never published, in December, listing the 484-square-mile "hot spot" as leading the country in mercury deposits.

Using data from 1998, the Environmental Defense report is based on a complicated computer model that analyzed weather patterns, mercury emissions from area coal-fired power plants and other information, said Michael Shore, a senior policy analyst for Environmental Defense.

The report from Environmental Defense, a national organization of 400,000 members founded in 1967, does not give a source for the contamination. Nor does it specifically define the hot-spot area by county lines or municipal boundaries. Instead, the report used mapping done by the EPA that divided the country into 22-mile-by-22-mile square grids. The checkerboard square with the most mercury deposits was a grid ambiguously described as being north of Fort Wayne, Shore said. "It's not a precise spot," he said.

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[49] http://www.fortwayne.com/mld/fortwayne/news/local/7685703.htm Laura Johnston / Ft. Wayne Journal Gazette 11 Jan 2004

"When you look at the specific sites, when you look at the states in the Midwest and the East, there are hot spots all over. The places where mercury deposition is highest, local sources dominate." Shore blamed the coal-fired power plants in Indiana, as well as plants in northeast Illinois and western Ohio, for the contamination.

The Indiana Department of Environmental Management is aware of the mercury issue, which it considers a national problem, spokeswoman Laura Pippenger said. The agency is working with the EPA to find out how it gathered and interpreted the data that indicated the northeast Indiana hot spot. "This sort of modeling can have discrepancies that can indicate a hot spot like this," Pippenger said. But the Environmental Defense study shows that mercury pollution is caused by power plants nearby, Shore said. "It travels to some extent, but communities that live around the power plants are most at risk to mercury pollutants," said Jones, of the Indiana Public Interest Group. Shore and Jones hope that information will convince the Bush administration to enact tough regulations on power plants. "If we're going to clean up pollution, we need to reduce mercury from local sources," Shore said.

"HOT SPOTS"—MERCURY EMISSIONS AND DEPOSITION PATTERNS[50]

There are concerns about potential mercury "hot spots" in the United States, particularly those that might be associated with power plant emissions and might not diminish, but actually become more numerous or severe, following proposed power plant regulations. EPRI has addressed this issue using computer modeling and data analyses, and concludes that mercury emissions from power plants will not create or intensify any hot spots under regulations proposed by EPA. Indeed, power plants contribute little to the areas of highest deposition in the United States, either currently or in future regulated scenarios.

In its December 2003 proposals to regulate mercury emissions from power plants, the EPA defined mercury "hot spots" as locations where deposition contributed by power plants alone is enough to raise mercury in fish tissue above the level EPA deems safe to consume. This is also the highest permissible level for waterways not to be classified as mercury impaired. In general, mercury hot spots are areas of excessively high mercury deposition compared to national or regional averages. Widely scattered measurements of the amount of mercury depositing in rainfall and other precipitation show no strong gradient from the Midwest to the East that might reflect the greater number of mercury sources in the eastern United States. However, simulations done with some computer models have led to speculation that some unmeasured U.S. locations may experience elevated mercury deposition compared with nearby areas, meeting the general definition of hot spots. There are concerns that a cap-and-trade regulatory approach, one of the alternatives proposed by EPA, will allow some electric utility sources to increase the amount of mercury they emit—or will not require them to reduce emissions as much as a Maximum Achievable Control Technology (MACT) approach would. Thus, there has been speculation that the cap-and-trade approach may have the potential to create or exacerbate mercury hot spots.

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[50] http://www.epri.com/corporate/discover_epri/news/HotTopics/env_HotSpots.pdf. June 2004

EPRI has applied state-of-the-art modeling to evaluate the potential for hot spots under alternative approaches to regulating utility mercury proposed by EPA.
Because it is impractical to look for "hot spots" by measuring mercury deposition at every location in the country, EPRI has run sophisticated, state-of-the-art computer models to simulate deposition of the mercury released from power plants and other emission sources. EPRI's analysis considered the amount and chemical forms of mercury emitted from every coal-fired power plant in the United States under three scenarios: a 2004 Base Case, for current conditions; and EPA's two proposed regulatory approaches, the MACT rule and the Cap & Trade rule. The model simulations of regulatory scenarios are for year 2020, when all emission reduction measures mandated by either rule will be fully implemented. The Base Case simulates mercury emissions from power plants and all other mercury sources, such as municipal and medical waste incinerators. The two regulatory scenarios lower power plant emissions according to requirements of the proposed MACT or Cap & Trade rules, but keep emissions from other sources constant. Holding emissions from other sources constant while varying emissions only from power plants allows researchers to estimate the impacts of EPA's proposed approaches to regulating utility mercury.

To perform the simulations, EPRI used a national economic model to evaluate the amount and chemical forms of mercury emitted from U.S. power plants under each scenario. These emission results were fed into a fine-scale model of mercury chemistry and physics in the atmosphere, which was used to calculate amounts and patterns of deposition throughout the United States under current conditions, the MACT rule, and the Cap & Trade rule.

EPRI's results show that the highest values of modeled deposition in the United States are produced by mercury emitted from sources other than power plants.
According to EPRI's computer simulations, after regulation, the areas of highest mercury deposition in the United States will continue to be those locations chiefly affected by emissions from sources other than power plants. Even with a liberal definition of utility-influenced deposition locations (i.e., where utility-emitted mercury makes up roughly 30 percent or more of the total deposition), only about 2.5 percent of US surface area falls into this category following MACT or Cap and Trade. The leading non-utility mercury deposition locations receive most of their mercury from municipal and medical waste incinerators. Locations affected by these incinerators would continue as the leading areas of mercury deposition in the mid-Atlantic and southern New England states, even after power plants have fully reduced their emissions. This result holds for either the MACT rule or the Cap & Trade rule. While distant non-U.S. mercury sources are the dominant contributors to deposition in much of the United States, non-utility U.S. sources emit mercury at rates and in forms that dominate deposition in their regions. Even after power plant sources are controlled, incinerators will continue to dominate the mercury contributing to deposition in high-deposition areas. Both regulatory approaches proposed by EPA would play an important role in reducing deposition in locations that have substantial deposits from utility sources in 2004. Power plant dominated locations would subsequently fall below the top 55 locations of highest human-caused deposition under either regulatory approach. However, the Cap & Trade approach would produce

markedly lower deposition at utility-dominated locations than would the MACT approach.

Neither proposed regulatory approach would increase deposition in high-deposition areas or create new high-deposition areas compared to current levels. The Cap & Trade rule produces greater mercury deposition reductions than does the MACT rule.

Modeling results for 2020 show that all states in the country will experience overall reductions in deposition due to the proposed mercury rules. But the reduction in mercury deposition is greater under the Cap & Trade rule (an average drop of 7 percent) than under the MACT rule (an average drop of 5 percent). Reductions in deposition vary somewhat by location, with greater reductions occurring in the mid-Atlantic and Southeastern states. This is because the proposed rules incorporate greater incentives for power plants in these regions to pursue mercury controls. Those power plants tend to burn bituminous coal, which emits a relatively higher proportion of divalent mercury, the chemical form most easily captured by currently available NOx and SOx emission control devices, as well as by mercury specific control devices currently under development. Since it is more cost-effective to reduce mercury emissions at these plants, they are more likely to install controls and therefore will have a greater relative impact on reducing mercury emissions and deposition. Finally, neither the Cap & Trade rule nor the MACT rule substantially lowers the highest deposition values that occur at locations in the Middle Atlantic and southern New England states, because the values at those locations are primarily influenced by emissions from municipal and medical waste incinerators.

CHAPTER VII NORTH CAROLINA'S TOTAL AND SPECIATED MERCURY EMISSION ESTIMATES

NC UTILITY BOILER CHARACTERISTICS

North Carolina is one of the leading electricity producing states with 46 coal-fired utility boilers with a total capacity of 13,300 megawatts (MW). Duke Energy and Progress Energy companies own and operate a combined total of 46 boilers at 14 power stations, accounting for 97 percent of NC's electrical generating capacity. In addition, there are eight coal-fired cogeneration boilers at four stations producing nearly 500 MW that are not covered under the CSA, but would be subject to proposed federal EPA requirements.

All the Duke Energy and Progress Energy boilers burn pulverized eastern bituminous coal and currently employ electrostatic precipitators (ESPs) as their only particulate matter (PM) controls. Most of these boilers were built before 1977 and are not subject to EPA New Source Performance Standards. As is typical in other states, there are a wide variety of boiler vintages (1950's to 1980s), boiler manufacturers (Combustion Engineering, Babcock & Wilcox, Riley), boiler design types (tangential-fired, wall-fired), and boiler sizes (40 to 1250 MW). Likewise, the existing ESPs reflect a wide variety of vintages (1950's to 1980s), manufacturers (Research Cottrell, Western Precipitation, Buell, and Environmental Elements), design types (cold- and hot-sides), sizes (sectionalization) from 3 to 6 fields; collection plate areas from 80,000 to 980,000 square feet), and some with, and others without, resistivity conditioning systems (sulfur trioxide or ammonia injection) on cold-side ESPs.

The state's two main electrical utility companies are mandated to significantly reduce NO_x and SO_2 emissions to the caps and schedule stipulated in the NC CSA. Each of the two major utility companies submitted their plans identifying the boilers being retrofitted with NO_x and SO_2 control technologies and the corresponding retrofit schedules. In contrast to the definitive CSA provisions with corresponding NO_x and SO_2 technology plans already made by the utilities, the new State law does not mandate any specific requirements or technology choices for mercury emission reductions. Instead, considerable mercury emission reductions from utility boilers are expected as co-benefits from to the specific reductions of NO_x and SO_2 emissions.

Table VII-1 presents a summary-level profile of the current and planned emission control characteristics of the NC coal-fired boiler population. One change in planned emission control occurred since last year: Progress Energy is not planning to install a FGD scrubber on the Lee Unit 3 boiler as previously intended. The characterization highlights include:

- 99 percent with advanced NOx combustion controls based on generating capacity,
- 79 percent with SO_2 scrubbers based on generating capacity; 87 percent with SO_2 scrubbers based on the amount of coal fired in Btu/yr,

- 68 percent with cold-side ESPs based on generating capacity, and
- 32 percent with hot-side ESPs based on generating capacity.

TABLE VII-1.
GENERATING CAPACITY STATISTICS FOR NO_X AND SO_2 CONTROLS ON NC COAL FIRED ELECTRIC UTILITIES

Utility	Advanced NO_x Control [1]	Generating Capacity and Percent Capacity with NO_x Control	SO_2 Control	Generating Capacity and Percent Capacity with SO_2 Control
Duke Energy (28 boilers with 8,192 MW total)	Total MW with Advanced Control	8,192 MW	Total MW with Scrubbers	6,217 MW
	Percent MW with Advanced Control	100 %	Percent MW with Scrubbers	76 % by capacity (87 % by use factor, trillion Btu/yr coal fired)
Progress Energy (18 boilers with 5,111 MW total)	Total MW with Advanced Control	5,013 MW	Total MW with Scrubbers	4,325 MW
	Percent MW with Advanced Control	98 %	Percent MW with Scrubbers	85 % (88 % by use factor, trillion Btu/yr coal fired)
Statewide (45 boilers with 13,303 MW total)	Total MW with Advanced Control	12,756 MW	Total MW with Scrubbers	10,542 MW
	Percent MW with Advanced Control	99 %	Percent MW with Scrubbers	79 % (87 % by use factor, trillion Btu/yr coal fired)

1. Technologies considered as advanced NOx controls include SCR, SNCR, NH_3 injection, or combustion modification.

Table VII-2 summarizes the NOx and SO_2 control technologies and operational schedules selected for each of the 14 power stations by the two utility companies to comply with the CSA requirements. A few rather minor changes in FGD installation schedules were made. Also included in Table VII-2 are the stations' generating capacity and general type of ESP. To the extent possible, the table reflects the tendency in installing:

- SCRs on some of the largest boilers early in the schedule (2002-2004) and SNCRs on the medium sized boilers later in the schedule (2003-2009), and
- FGD wet and dry scrubbers on the medium and large boilers (200-1250 MW) across the schedule (2005-2012).

These trends tend to maximize cost-effectiveness and accelerate air quality improvement for the affected period (2002-2012).

TABLE VII-2.
NC CLEAN SMOKESTACK COMPLIANCE PLAN WITH SCHEDULE [1]

Facility	Rating (MW)	Existing ESP type[2]	Post-combustion NOx Controls		FGD SO_2 Scrubber Controls	
			Technology[2]	Operation Year	Technology[2]	Operation Year
DUKE POWER						
Allen	1160	Cold (1-5)	SNCR (1-5)	2003-07	Wet (1-5)	2011-12
Belews Creek	2490	Cold (1, 2)	SCR (1, 2)	2003-04	Wet (1, 2)	2008
Buck	370	Hot (3-6)	SNCR (3-6)	2006-09	None	
Cliffside	780	Hot (1- 4) Cold (5)	SNCR (1-4) SCR (5)	2002-09	Wet (5)	2009
Dan River	470	Cold (3) Hot (1, 2)	SNCR (1-3)	2007-09	None	
Marshall	2000	Cold (1- 4)	SNCR (1- 4)	2005-08	Wet (1- 4)	2006-07
Riverbend	970	Hot (4-7)	SNCR (4-7)	2007-08	None	
Subtotal	8,240			2002-09		2006-12
PROGRESS ENERGY						
Asheville	390	Cold (1, 2)	SCR (1, 2)	2009	Wet (1, 2)	2005-06
Cape Fear	320	Cold (5, 6)	ROFA /NH_3 (5, 6)		Wet (5, 6)	2011-12
Lee	410	Cold (1,3) Hot (2)	ROFA (2) SCR (3)	2007, 2010	None	
Mayo	750	Hot (1)	SCR (1)		Wet (1)	2008
Roxboro	2460	Cold (1-3) Hot (4)	SCR (1- 4)		Wet (1- 4)	2007, 2009
Sutton	610	Cold (3) Hot (1, 2)	ROFA (2, 3) NH_3 (3)	2006	Wet (No. 3 only)	2012
Weatherspoon	180	Cold (1-3)	None		None	
Subtotal	5,120					2005-2012

1. Data presented in Duke Power and Progress Energy Compliance Plan 2004 Annual Updates.
2. Number in parenthesis identifies boiler unit(s) equipped with corresponding emission control technology.

PRELIMINARY ESTIMATE OF TOTAL MERCURY EMISSIONS FROM NC UTILITY BOILERS

In 1999, the U.S. EPA conducted the Electric Utility Steam Generating Unit Mercury Information Collection Request (EU/ICR) to gather comprehensive information about mercury emissions from the coal-fired electric utility industry. This effort included collection of speciated Hg (elemental, oxidized, and particle-bound Hg species) emission control tests using the Ontario Hydro measurement method on 80 utility boilers. Recently validated by EPA and the utility industry, the Ontario Hydro method has become the

official method for measuring speciated Hg emissions from coal-fired utilities. The tests measured Hg rates in the coal feed to the boiler, and speciated Hg concentrations in the gas streams entering and exiting the emission control device. In addition, it also collected data on each of the roughly 1100 boilers in the United States of the important coal characteristics affecting Hg emission control. The coal data involved type, quantity burned, heating value, Hg, chlorine, sulfur, ash, and moisture content for the entire year of 1999. DAQ utilized each of the following tools to estimate Hg emissions from the existing and future planned emission control technology configurations for the NC coal-fired power plants.

EPA Hg Emission Estimating Tool

DAQ staff utilized appropriate data to calculate the estimated emissions for each boiler for the corresponding categories of NC utility boilers (see Appendix C). For the case of existing boiler configurations, two categories were utilized: cold-side ESP and hot-side ESP, each with bituminous coal, conventional dry-bottom pulverized boilers (Bins 1 and 4, respectively). For the case of future planned configurations, two additional categories were utilized: cold-side ESP with wet scrubber and hot-side ESP with wet scrubber, likewise each with bituminous coal, conventional pulverized boilers (Bins 10 and 11, respectively). The amount of Hg fed to each boiler was calculated from the 1999 EU/ICR data as the product of the amount of coal burned and the Hg coal content. Then the Hg emission level from each boiler was then calculated as the combined product of the following three factors:

- Amount of Hg fed to each boiler,
- Total Hg collection efficiency, and
- Relative percentage of each Hg species (elemental, oxidized, and PM-bound) in the emissions.

EPRI Hg Emission Estimating Tool

A similar engineering tool to develop *preliminary estimates* of speciated mercury emissions using site-specific information from electric utility boilers is available from the Electric Power Research Institute (EPRI).[51] While similar, the EPRI tool has three primary distinctions relative to the EPA tool.

- First, the EPRI tool sub-divides the 80-boiler EU/ICR emission database into only 11 categories. The data sets were grouped largely by emission control technology configurations, not by coal and boiler types.
- Second, EPRI's analysts concluded that the coal chlorine level was the dominant predictor of total and speciated Hg emission collection performance for all but one emission control technology (see third

[51] Electric Power Research Institute, "An Assessment of Mercury Emissions from U.S. Coal-Fired Power Plants," Final Report 1000608, October 2000.

distinction below). Given this correlation, they used regression analysis techniques to describe the relationship between coal chlorine level and Hg collection performance for 10 of the 11 categories of emission control technologies. This relationship predicts higher Hg emission control performance for increasing coal chlorine content. Coal chlorine is expressed in parts per million (ppm).

- Third, additional analysis indicated that for one emission control technology, namely cold-side ESPs, another chlorine-related factor, coal chlorine-to-SO_2 ratio, provided a better correlation with Hg collection performance than just coal chlorine. This relationship predicts higher Hg emission control performance for increasing coal chlorine/SO2 ratio. In this case SO_2 is expressed in lb/million Btu. [Limited copies of the report containing the EPRI tool are available to borrow from DAQ.]

In summary, EPA and EPRI used sound scientific principles in evaluating the EU/ICR database and in developing their respective engineering tools. DAQ considers both the EPA tool and the EPRI tool as viable means to estimate Hg emissions from the existing and future planned emission control technology configurations for the NC coal-fired power plants. Accordingly, DAQ has applied both tools to gain insight and understanding on the relative performance and emissions of existing and future planned emission controls on NC utility boilers.

NC Coal Composition

Both engineering tools recognize the importance of coal characteristics and emission control technology on the extent and control of mercury emissions. EPA divided up the EU/ICR data into coal types, and accounted for the amount of coal mercury. EPRI took another direction by accounting and correlating mercury control performance on coal chlorine composition or coal chlorine/SO_2 ratio. Table VII-3 presents coal composition data to show the favorable characteristics of the coal burned in NC electric utilities, including:

- Coal mercury content is slightly lower than the national average,
- Coal chlorine content is twice than the national average, and
- Coal chlorine/ SO_2 ratio is over three times more than the national average.

TABLE VII-3.
COMPARISON OF AVERAGE COAL BURNED IN NC AND USA ELECTRIC UTILITIES

Area	Coal Composition		
	Mercury, [1] lb/TBtu	Chlorine, [2] ppm	Cl/SO_2 Ratio [3]
NC	6.5	1400	1000
USA	7.0	700	300

1. Mercury content expressed as pounds of Hg per trillion Btu.
2. Chlorine content expressed as parts per million (ppm).
3. Chlorine to SO_2 ratio expressed as chlorine ppm per SO_2 ppm.

EMISSION ESTIMATES USING THE EPA AND EPRI TOOLS

Based on using input data from the 1999 EU/ICR, DAQ staff calculated the estimated emissions for each boiler for the corresponding categories of NC utility boilers using Excel spreadsheets. Table VII-4 compares the total Hg collection efficiencies delineated by emission control technology produced separately by the EPA and EPRI engineering tools. In three of the four emission control categories for existing and planned configurations, the EPRI tool predicts higher total Hg collection efficiencies than the EPA tool. Only in the case of Cold-side ESP followed by a FGD scrubber did the EPA tool predict a higher total Hg collection efficiency than the EPRI tool. Given the EPA predictions are based on a category average for each coal type, one performance number within a given coal/boiler/emission control type is developed, independent of coal chlorine content. The EPRI predictions are based on coal chlorine content or coal chlorine/SO_2 ratio. Consequently, there is a range of performance numbers developed, depending on the corresponding range of values of these two coal composition factors for the coals combusted in NC. Given that the EPA and EPRI tool developers took different directions in analyzing the available database, it is not surprising that performance levels for comparable control technologies did not turn out exactly the same.

TABLE VII-4.
MERCURY EMISSION CONTROL PERFORMANCE FOR EPA AND EPRI TOOLS

Emission Control Technology	EPA Tool [1]	EPRI Tool [2]
	Percent Total Mercury Removal, percent	
ESP Cold-side	29	40-48
ESP Hot-side	11	22-27
ESP Cold-side / FGD	78	65-70
ESP Hot-side / FGD	40	65

1. EPA prediction based on a category average for each coal type; one performance number within a given coal type is used independent of coal chlorine content.
2. EPRI prediction based on coal chlorine content or coal chlorine/SO2 ratio; a range of performance numbers is used depending on the corresponding values of these two coal composition factors.

Table VII-5 and Figure VII-1 present the results of the statewide mercury emission estimates for the current and future planned emission control configurations produced by using the EPA and EPRI tools. These two graphics show that:

- Nearly the same level of coal mercury feed levels as input to the boiler for both the EPA and EPRI tools of roughly 4,100 lb/yr.

- Modest emission reductions for the current set of emission controls; the EPA tool predicts nearly 3,000 lb/yr Hg emissions and 25 percent emission control, which are considerably higher than the EPRI tool predicting roughly 2,400 lb/yr Hg emissions and 42 percent emission control.

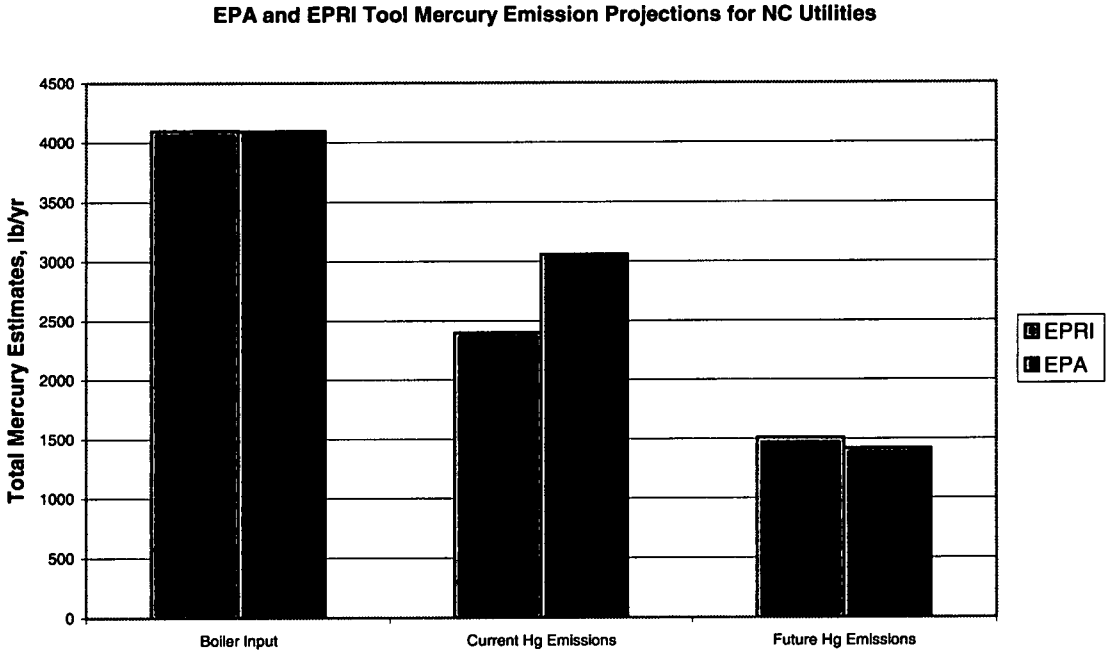
- Significant emission reductions for the future planned set of emission controls; the EPA tool predicts approximately 1,400 lb/yr Hg emissions and 65 percent emission control, comparable to the EPRI tool predictions of approximately 1,500 lb/yr Hg emissions and 64 percent emission control.

TABLE VII-5.
MERCURY EMISSION ESTIMATE PROJECTIONS
USING EPA AND EPRI TOOLS FOR NC ELECTRIC UTILITY BOILERS [1,2]

Tool	Total Mercury Levels				
	Boiler input, lb/yr	Emissions, lb/yr		Removal, %	
		Current	Future	Current	Future
EPA	4094	3057	1417	25	65
EPRI	4096	2397	1487	42	64
Average	4095	2727	1452	34	64

1. Projections assume the same coal supply and electric generation levels as 1999.
2. Estimate reflects average of EPA and EPRI tools.

FIGURE VII-1.
TOTAL MERCURY EMISSION PROJECTIONS FOR NC ELECTRIC UTILITIES
USING EPA AND EPRI TOOLS

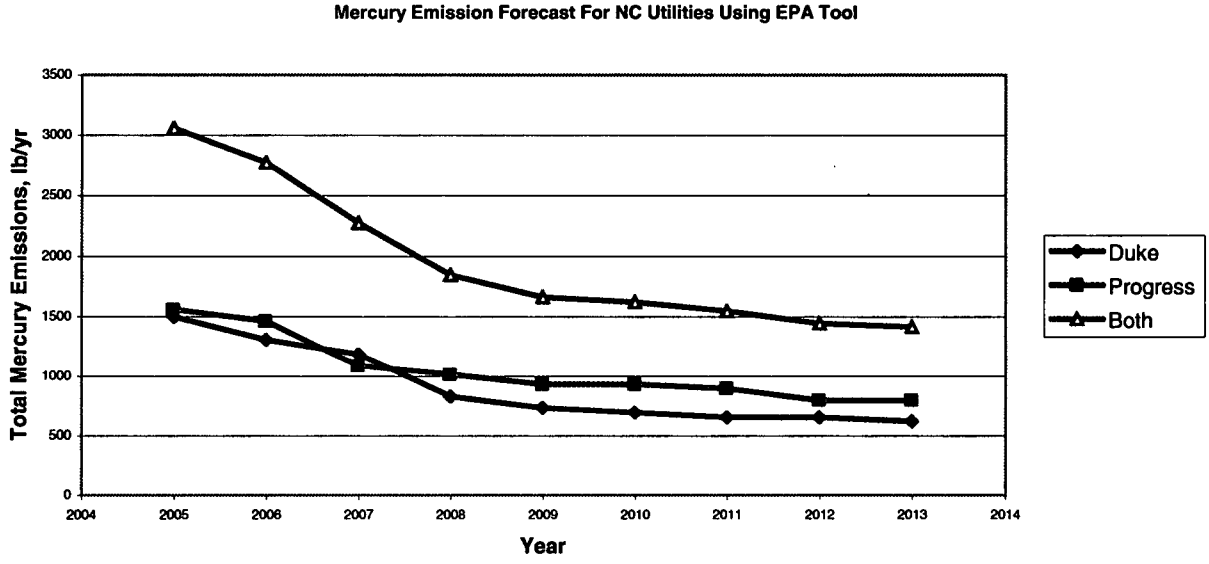


TOTAL MERCURY EMISSION FORECAST

The mercury emission estimate results from utilizing the EPA tool were applied with the SO_2 scrubber operational plans presented in Table VII-2 for forecasting emission reductions from 2005 – 2013. For the purpose of these future projections, it was assumed that the emission reductions from installing scrubbers would be fully effective during the year the utility company planned to install the equipment. This assumption was based on the general prediction that, on balance, the scrubber would become operational near mid-year and the boiler would be non-operational with no emissions for approximately a two-month period during equipment tie-in.

Figure VII-2 shows three graphs illustrating the estimated total mercury emissions for Duke Energy, Progress Energy, and the sum of both utilities. Note there are more emission reductions (reflected by the relatively steeper slope of the emission graphs) during the first half of the period (2005-2009) than in the second half (2009-2013) for all three graphs. Similar to the SO_2 case, this is due to the fact that each utility tends to install scrubbers on their largest units first, thereby achieving the largest emission reductions in the first half of the SO_2 / NOx compliance period.

FIGURE VII-2.
MERCURY EMISSION REDUCTION SCHEDULE FOR
NC ELECTRIC UTILITIES USING EPA TOOL



PRELIMINARY ESTIMATE OF SPECIATED MERCURY EMISSIONS FROM NC UTILITY BOILERS

For the past several years, advancements in the study of mercury have evolved to include examining the three chemical forms or species in which it is released into ambient air. The three species include elemental, oxidized, and particle-bound Hg. Total mercury is the sum of the three species. The term *speciation* is used to denote the relative amounts of these chemical forms of mercury. A related term – *partitioning* -- is similarly used in describing the relative behavior or outcome of the sub-division of these three parts of mercury species. Each mercury species has its unique set of chemical and physical properties leading to distinctive traits in terms of reactivity, toxicity, and collectability in emission controls.

To begin understanding the complex behavior of mercury in and from coal-fired exhaust gas, it is now standard practice to measure the individual mercury species. Given the capture of mercury by emission control equipment is dependent on mercury speciation, virtually all mercury studies for the past 5 years recognize the fundamental importance of focusing on particular mercury species. Research programs now provide information, methods, models, and data to address the key questions dealing with Hg speciation. Studies characterizing collection performance of various emission control technologies, behavior and transport of plumes, and plume deposition entails mercury species. For example, in terms of their contrasting properties and behavior, recent studies show that:

- Bituminous coal produces more oxidized Hg than other coal types;
- Most conventional and emerging control technologies capture oxidized Hg and particle-bound Hg much more effectively than elemental Hg;

- Elemental Hg is relatively stable, stays suspended for long time periods and is the dominant of the three species in ambient airs sheds; whereas

- Oxidized Hg emissions are fairly reactive, become attached to particles or other gases, and tend to be deposited within 25-50 miles of release. Of the three species, it can be argued that oxidized mercury represents the most important species to control from a state perspective because of its tendency to be deposited within a relatively short distance of release.

Given this basic and profound significance, DAQ utilized the available tools to quantify not only total mercury, but also speciated mercury emissions. The additional effort proved worthwhile, as interesting and encouraging information was produced regarding speciated mercury emissions.

Table VII-6 shows average results from the EPA and EPRI tools for the current and future situations delineating total and speciated mercury emission estimates from the NC utility boilers. It depicts the relative collection performance of ESPs in the current case of emission controls. The data in the table confirms that ESPs do not collect any elemental mercury, only collect a small fraction of oxidized mercury, but collect the majority of particle-bound mercury. Similarly, it depicts the relative collection performance of adding wet scrubbers to the majority of the boilers (80 percent by capacity, 87 percent on Btu heat input basis) in the future case of emission controls. The data in the table reflects that scrubbers do not collect any elemental mercury, collect a very high fraction of oxidized mercury, and likewise collect the majority of particle-bound mercury. It also suggests that some of the oxidized mercury collected in the scrubber is converted over to elemental mercury in the scrubber water, and is re-emitted out the stack.

The top half of Table VII-6 reflects a mass balance. For the current case of emission controls, it shows that the:

- Amount of mercury in the coal fed to the boilers is 4,100 lb/yr;

- Total mercury emissions are 2700 lb/yr;

- Oxidized mercury emissions are 1800 lb/yr, comprising most of the total mercury;

- Elemental emissions are 800 lb/yr; and

- Particle-bound emissions are 100 lb/yr.

(In rounded numbers to the nearest 100 for readability purpose and to reflect the nature of estimated numbers)

For the future case of emission controls, it shows some similar and contrasting facts, including:

- The same amount of mercury in the coal fed to the boilers would be 4,100 lb/yr;
- Total mercury emissions would be reduced to 1500 lb/yr;
- Oxidixed mercury emissions would drop to 400 lb/yr;
- Elemental emissions would be expected to *increase* to 1100 lb/yr, accounting for the majority of mercury emissions; and
- Particle-bound emissions would be reduced to 20 lb/yr.

The bottom half of Table VII-6 describes the data in terms of the relative percentage of mercury species for the two time cases. This helps to show how the mercury species are partitioned. In the current case:

- (All percentages presented below are relative to the mercury fed to the boilers):
- Emission controls (ESPs) collect 33 percent of the mercury fed to the boilers;
- The remainding 67 percent are released as emissions:
- Elemental emissions being 20 percent;
- Oxidized emissions being 44 percent, accounting for the majority of mercury emissions and
- Particle-bound emissions account for only 3 percent.

TABLE VII-6.
MERCURY MASS BALANCE AND PARTITIONING FORECAST FOR NC ELECTRIC UTILITY BOILERS [1,2]

Mercury Mass Balance							
Time	Coal Hg, lb/yr		Mercury Emissions, lb/yr				Total
			Total		Elemental	Oxidized	PM	
Current	4095		2727		813	1808	106	
Future	4095		1462		1061	384	17	
Mercury Partitioning [3]								
	Coal Hg, %		Removed in Emission Controls, %		Distribution of Mercury Emissions, %			
					Elemental	Oxidized	PM	
Current	100		33		20	44	3	100
Future	100		64		26	9	0.4	100

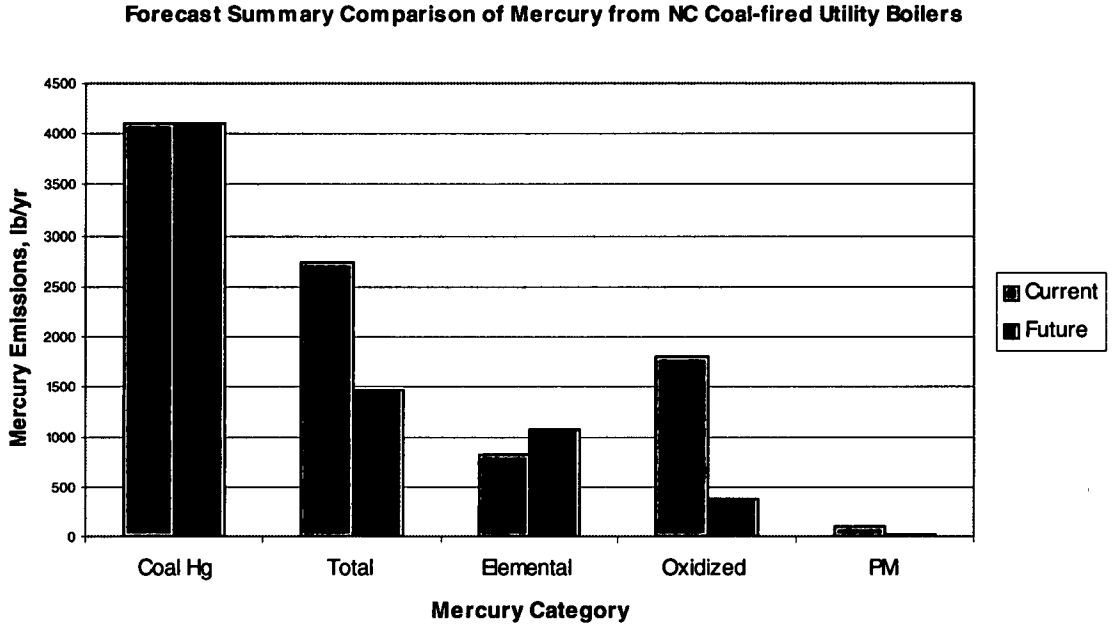
1. Projections assume the same coal supply and electric generation levels as 1999.
2. Estimate reflects average of EPA and EPRI tools.
3. Percentages presented are relative to the mercury fed to the boilers.

For the future case of emission controls, it likewise shows some similar and contrasting facts, including:

- Emission controls (ESPs and scrubbers) collect 64 percent of the mercury fed to the boilers;
- The remaining 36 percent are released as emissions:
- Elemental emissions would be expected to *increase* to 26 percent, accounting for most mercury emissions;
- Oxidixed emissions would drop to only 9 percent, and
- Particle-bound emissions would account for less than 1 percent.
  (All percentages presented above are relative to the mercury fed to the boilers)

Figure VII-3 graphically illustrates the same data as in Table VII-6 and can show the relative trends in total and speciated mercury emissions discussed above more readily for some readers.

FIGURE VII-3.
FORECAST SUMMARY OF TOTAL AND SPECIATED MERCURY EMISSION ESTIMATES FROM NC UTILITY BOILERS (REPRESENTS AVERAGE FROM EPA AND EPRI TOOLS)



Summary

Speciated data adds a new layer of valuable information regarding mercury emissions. Adding SO_2 scrubbers to most of the boiler capacity significantly deceases the amount of total mercury emissions from over 2700 to less than 1500 lb/yr. Of equal or possibly more importance, the addition of scrubbers reduces the amount of *oxidized* mercury emissions from over 1800 to less than 400 lb/yr. This means that only 9 percent of the 4100 lb/yr of mercury fed to the boilers (representing potential *oxidized* mercury emissions) is expected to be emitted in the future, a huge improvement over the current case of nearly 45 percent of boiler-fed mercury being emitted as *oxidized* mercury.

This significant reduction in *oxidized* mercury emissions suggests the possibility of considerable reductions in mercury deposition across NC. The exact amount of reduction in mercury deposition is unknown and considered controversial. The relative contribution of global versus statewide/local mercury emissions to atmospheric mercury deposition is poorly understood and remains an area of scientific debate. In general, there are two conflicting hypotheses:

- Hypothesis A. On one hand, roughly 90% of global mercury emissions come from abroad. Results of simulated modeling indicate that half of the mercury deposited in NC comes from abroad. This would suggest that even if NC could completely eliminate all its mercury emissions, there would only be a 50 percent drop in mercury deposition.

- Hypothesis B. On the other hand, data from the ongoing Florida study indicate a linear relationship between local emission reduction and deposition. This data suggests that any reduction in mercury emissions, especially *oxidized* mercury, will proportionally decrease local deposition and result in local environmental benefits within a few years. Accordingly, there could only be a nearly 2-fold or nearly 5-fold percent drop in mercury deposition, depending on whether the relationship is largely driven by total mercury or *oxidized* mercury.

Given that both engineering tools indicate similar performance levels, there is reasonable level of confidence in the expected emission reductions from adding scrubbers. These tools project emission reductions over current levels by nearly 2-fold for total mercury and nearly 5-fold for *oxidized* mercury. What is uncertain is whether Hypothesis A, B, or something in between applies in NC, and whether the relationship between emission reduction and environmental benefit is largely driven by total mercury or *oxidized* mercury.

CHAPTER VIII MERCURY CONTROL OPTIONS BEYOND CSA

OPTIONS UNDER THE CLEAN SMOKESTACK ACT ON THE DEVELOPMENT AND IMPLEMENTATION OF MERCURY STANDARDS AND PLANS

This report section is in response to Section 12 of the Clean Smokestacks Act (CSA) directing DAQ to study mercury issues. This Second Interim Report section includes a description of options that might be available in terms of standards and plans.

OPTIONS

This chapter discusses the rationale and plans to further study the complex and evolving science on mercury controls and effects. Included are three options with approximate dates for completion. We solicit the input of any and all interested persons concerning these or any other options.

- Option 1. Further study,
- Option 2. Set standards similar to those adopted or being considered by other states, or
- Option 3. Further study and then set standards, or
- Other sugested options.

OPTION 1. FURTHER STUDY; DEFER ANY RULEMAKING ACTION UNTIL A LATER TIME.

RATIONALE FOR FURTHER STUDY

First, as was the case when the CSA was signed in 2002, essentially all scientific information dealing with the benefits and costs of alternative strategies is still evolving, and is expected to continue evolving in the near-term. The federal government, electric power industry, and pollution control industry are advancing the technology and state-of-the-science on the measurement, control, fate, and health effects of mercury emissions.

Second, EPA is scheduled to finalize similar federal standards for controlling mercury emissions from coal-fired power plants in March 2005. The format of the federal requirements may add to the significant mercury emission reductions to be realized from the NC CSA.

Third, the relative impact of mercury deposition from local emission sources versus nearby states and the global "pool" is not fully understood; some data indicate that local sources have a profound effect, while other data suggest that emissions from abroad drive deposition. The different data makes it difficult to accurately predict mercury emission reductions and corresponding deposition from in-state power plants resulting from co-benefits of the NOx and SO_2 control device installations that will result from the CSA. It is also difficult to predict the effects from out-of-state areas from new EPA standards and/or NC's Section 126 petition urging emission reductions in 13 nearby states. In summary, it can be argued that it is too early and untimely at this point in time to

mandate any additional requirements beyond the CSA and the pending EPA standards for controlling mercury emissions from NC coal-fired power plants.

And fourth, NC appears to be the leading, or at least one of the leading, states in reducing mercury emissions from coal-fired power plants. This claim is based on our preliminary conservative projections that total and oxidized mercury emissions will be reduced by 65 percent and 90 percent, respectively, by 2013. These relatively high levels are consistent with the CSA, which stated that "[t]he General Assembly anticipates ... significant reductions in the emissions of mercury."

SCOPE FOR STUDY

There are no "hard" data available that clearly and unambiguously establish the relationship between Hg emission reductions from scrubbed coal-fired power plant and the local Hg deposition impact. Given this data gap and the state's apparent mercury-sensitive environmental properties, a comprehensive study is being planned to determine this relationship. DAQ has the experience for such a study, including speciated Hg ambient air monitoring, meteorological monitoring, wet mercury deposition monitoring, and dispersion modeling. Coincidentally, two NC coal-fired utility boiler stations have started constructing FGD scrubbers for operation in 2005-2007, providing opportunity to collect the above- mentioned set of Hg data before and after scrubber operation. The plants are Duke Power's Marshall Station and Progress Energy's Asheville Station. DAQ will collaborate with the stakeholders in preparing a study plan in the summer/fall of 2004.

Concurrently, it would be beneficial for the NC utilities to collect new, or share any already collected, total and speciated mercury emission data from some of the power plants. This would help better establish their current emission levels and provide sets of data to compare and validate the EPA and EPRI emission estimating tools data. It would also provide additional opportunity to evaluate an evolving list of emission control technology options.

Currently three technology options are considered possibly viable for NC utility boilers:

- Wet FGD scrubbers on boilers only equipped with cold-side or hot-side ESPs. Studies show that FGDs following cold-side ESPs have much higher performance and, therefore are more cost-effective, in mercury removal than those following hot-side ESPs.

- Carbon injection on units equipped with cold-side or hot-side ESPs. Currently, conventional activated carbon injection is considered only applicable on cold-side ESPs, even though carbon injection with fabric filters produce much higher performance than cold-side ESPs. Specially-treated carbons, such as brominated carbon, are the only sorbents currently viable on hot-side ESPs. Duke Power conducted a 1-week long brominated-carbon injection feasibility test at its Cliffside station in 2003;

results were encouraging enough that a 1-month long test is scheduled in 2004 at Duke's Buck Station with the same technology.

- Carbon injection with a fabric filter on units equipped with cold-side or hot-side ESPs. A full-scale continuous demonstration with activated carbon injection and fabric filter treating flue gas from a bituminous-fired boiler with hot-side ESP has shown the capabilities and limitations of the technology since July 2003. Mercury capture results show performance in the 70 – 90 percent range.

Several other mercury and multi-pollutant control technologies offer potential, but the promise of their performance has not yet undergone enough performance and reliability testing.

SCHEDULE

A comprehensive study could be completed in 2007 or 2008 by DAQ, pending resource availability.

OPTION 2. SET STANDARDS LIKE OTHER STATES

Option 2. Set standards like other states requiring mercury emission reductions on a percent basis (such as 40, 80, or 90 percent as in CT, IN, and WI), a thermal release basis (such as 0.6 lb/million Btu as in CT, IN, and MA), or a energy production basis (such as 0.0066 lb/MWhr as in NJ).

RATIONALE FOR RULEMAKING

Five states (CT, IN, MA, NJ, and WI) have mercury emission reduction standards in place or are already planning to propose mercury emission reduction standards. These states take the position that, while the science and technology are not fully developed, they are adequately developed to initiate rulemaking requirements. Federal mercury emission standards have been in effect on waste incinerators using carbon injection (the same control technology being successfully demonstrated at power plants) for several years. [For example, the municipal waste incinerator near Wilmington, NC has been using carbon injection for 3 years.] States with mercury standards believe that, since rulemaking has a history of forcing cost-effective technological developments, rulemaking will again be the engine for development. Rulemaking bodies in these states are convinced they have mercury problems with corresponding health effects. To them, common sense dictates that they must reduce mercury emissions from their largest sources. Lacking federal rules, these states have exercised or are planning to exercise their independence while setting an example for other states to follow.

SCHEDULE

DAQ projects that rulemaking in response to directions from the General Assembly could commence as early as 2006, with implementation occurring at least two or more years thereafter.

OPTION 3. STUDY FURTHER AND THEN SET STANDARDS.

Upon completion of the comprehensive study outlined in Option 1, DAQ would initiate a rulemaking development effort, similar to that described in Option 2.

RATIONALE FOR STUDY FOLLOWED BY RULEMAKING

Some argue that it is simply too premature and untimely to mandate additional requirements beyond the CSA now, based on the nature and extent of complex, evolving science, technology, and pending federal regulations. DAQ's conservative estimates indicate that significant mercury emission reductions are already expected as a co-benefit under the CSA. Further study as outlined in Option 1 is expected to improve understanding of the issues, along with results from many ongoing studies by federal agencies and the industry. It could be beneficial for all stakeholders to wait until additional information is available for additional future mercury control than to propose standards soon that may need to be revised (up or down) later.

SCHEDULE

DAQ anticipates that the studies could be completed in 2007 or 2008, allowing rulemaking to occur in 2008 or 2009, with implementation at least two years thereafter.

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APPENDIX A
SCHEDULE OF PRESENTATIONS

Due to size of electronic files, these presentations are not included in the printed version of this report, but may be seen at DAQ's website: http://daq.state.nc.us/news/leg/2004-04-hg-co2-agenda.pdf

Monday, April 19

Introduction and Welcome
Keith Overcash, Director, NC Division of Air Quality, DENR

Background and Significance of Clean Smokestacks Act
Brock Nicholson, Deputy Director, NC Division of Air Quality, DENR

Purpose and Charge for this Workshop, Logistics, etc.
Jim Southerland, Environmental Engineer, NC Division of Air Quality, Planning Section

Basis for Issues to be Discussed: CO_2 and Mercury
Moderator, Sheila Holman, Planning Chief, NC Division of Air Quality

Review of the Science and Concerns for Climate Change in North Carolina
Ryan Boyles, Associate State Climatologist, State Climate Office of NC at NCSU

History and Transitions of the Global Warming Program and Policies in the US
Wiley Barbour, Environmental Resources Trust

Development, Components and Status of the NC State Energy Plan
Larry Shirley, Director, NC State Energy Office, NC Department of Administration

Health Effects of Methylmercury and North Carolina's Advice on Eating Fish
Dr. Luanne Williams, Toxicologist, NC Department of Health and Human Services

Recent NC Water Quality Mercury Monitoring Results
Michelle Woolfork, Water Quality Engineer, NC Division of Water Quality

Update on DAQ's Air Quality Measurements and Mercury Studies
Steve Schliesser and Todd Crawford, Toxic Protection Branch, NC Division of Air Quality

Lunch Speaker - Importance and Impacts of CSA Sections 12 and 13 and Your Input for the Future of North Carolina
Secretary William (Bill) Ross, NC Department of Environmental and Natural Resources

General Mercury Topics and Issues Session (Hg-1)
Moderator, Michael Abraczinskas, Environmental Engineer/Meteorologist, NC Division of Air Quality

Voluntary Mercury Reductions: NC Champions
Norma Murphy, NC Division of Pollution Prevention (P2), DENR

State of Science/Ability to Measure Mercury in Smokestack Environments
Barrett Parker, USEPA

Developing a Tool for Estimating Mercury Emissions and Reductions from Coal-Fired Utilities
Jeff Cole and C. Clark Allen, RTI International

Atmospheric Modeling and Deposition of Mercury from Stack to Sounds and other Water Bodies

O. Russell Bullock, Jr., Meteorologist, NOAA Air Resources Laboratory (on assignment to the EPA Office of Research and Development)

Historical Scientific Examination of Mercury Deposition to the Florida Everglades over the Past 100 Years or Atmospheric Mercury; Pandora's Box Revisited
Dr. Thomas D. Atkeson, FI DEP, Tallassee, FL, Robert K. Stevens, FL DEP (at US EPA, RTP, NC), and Matthew S. Landis, US EPA, RTP, NC

Tuesday, April 20

NC Specific Mercury Topics and Issues – Session 2 – (Hg-2)
Moderator, Steve Schliesser, Senior Environmental Engineer, NC Division of Air Quality

USEPA's Proposed Mercury MACT and Alternate Proposals for Mercury Reduction Trading Options
A Summary of Options and Schedule for Comments and Final Regulations
Bill Maxwell and Dr. Bob Wayland, USEPA

Performance and Costs of Mercury Control Technology for Bituminous Coals
Dr. Michael Durham, President, ADA Environmental Solutions

Achieving CSA System-wide Reductions in (NOx &SO_2) Emissions at Duke Energy Facilities and Reactions to Achieving EPA's MACT/Trading Proposals for Mercury (Including limited comments on options for new technologies, etc.)
Robert A. McMurry, Duke Energy

Achieving CSA System-wide Reductions in (NOx & SO_2) Emissions at Progress Energy Facilities and Reactions to Achieving EPA's MACT/Trading Proposals for Mercury
Ben White, Progress Energy

Estimated Emission Reductions in NC from Co-control as a Result of CSA, Using EPA Tool to Estimate NC Coal-Fired Power Plant Mercury Emissions
Steve Schliesser & Paul Grable, Environmental Engineers, NC Division of Air Quality

Developing Policy Options That Can Result in Integration of CO_2 and Mercury Reductions and State Implementation Plan Credits
Alden Hathaway, Environmental Resources Trust, Inc., Washington, DC

Lunch Speakers – Mercury and CO_2 Emissions from the Power Generation Sector
Dr. C.V. Mathai, Manager for Environmental Policy, Arizona Public Service Company, Phoenix, AZ

Insights from Economic Analyses of the Impacts to the Utility Industry from Mercury and CO_2 Controls, *Dr. Anne E. Smith, Vice President, Charles River Associates, Washington, DC*

Mercury Reduction Programs in Other States
Martha Keating, Air Toxics Scientist, Clean Air Task Force

General CO_2 Topics and Issues (CO_2)
Moderator, Phil Besesi, Project Manager, NC State Energy Office

Potential Impacts for the NC State Energy Plan on Emissions of CO_2 with Technical Procedures and Assumptions Upon Which These Plans Were Developed
Jeff Tiller, Appalachian State University

Technology, Energy Efficiency, and Renewable Energy for Emission Reduction
Ward Lenz, Director, Energy Programs and John Morrison, Vice President, Advanced Energy

The People, the Planet, and the Pocketbook: How a Green Builder Program Can Avoid Emissions Using Solar Energy
Dona Stankus, AIA, NC Solar Center

Potential in NC for Extraction of Wind Energy
Dr. Dennis Scanlin, Professor, Technology Department, Appalachian State University

Past, Present and Projected Participation in Climate Wise by North Carolina Companies
James Haven, Global Warming Initiatives, Inc.

Wednesday, April 21

NC Specific CO_2 Topics and Issues – Session (CO_2-2)
Moderator, Phyllis D. Jones, NC Division of Air Quality

Review of Real/Practical and Projected Options fro CO_2 at a Coal-Fired Generating Unit
Kevin Johnson, URS

Integrated Gasification Combined Cycle (IGCC) Technology; Carbon Sequestration and Cost Implications
Joe Chaisson, (Harpswell, ME), Clean Air Task Force (Boston, MA)

Forestry and Agriculture as Real Options to Increase Carbon Sequestration in Vegetation and Soils
Dr. William H. Schlesinger, Dean, The Nicholas School of the Environment & Earth Sciences, Duke University.

NC Animal Waste as a Potential Resource for Reducing CO_2 and Methane Emissions
Kurt Creamer P.E., Animal and Poultry Waste Management Center, *NC State University*

Industry Experience in Reducing CO2 and GHG Emissions – A Case Study of International Proportions
Bill Bailey, DuPont, Charlotte, NC

What Other States Are Doing or Considering Regarding Reductions of CO2 From Coal-Fired Utilities – With an Update from Milan and Introduction to STAPPA/ALAPCO's Software
Amy Royden, STAPPA/ALAPCO

Lunch speaker – Herding Sheep: The Commons and the Marketplace
Michael Shore, Environmental Defense

Overview of the Southeast Regional Carbon Sequestration Partnership
Gerald R. Hill, Ph.D, Senior Technical Advisor, Southeastern Regional Carbon Sequestration Partnership

Rate Implications Due to Mercury Reductions
Elise Cox, Assistant Director, Public Staff, NC Utilities Commission

Closing Comments by Keith Overcash, Director, NC DAQ

APPENDIX B

LETTERS ADDRESSING PERCEIVED FLAWS IN PROPOSED STANDARDS OF PERFORMANCE FOR NEW AND EXISTING STATIONARY SOURCES: ELECTRIC UTILITY STEAM GENERATING UNITS

STAPPA/ALAPCO Letter

Concerning the "National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units: Proposed Rule,"

June 29, 2004

Docket ID No. OAR-2002-0056
EPA Docket Center (Air Docket)
U.S. Environmental Protection Agency
West (6102T), Room B-108
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Dear Sir or Madam:

On behalf of the State and Territorial Air Pollution Program Administrators (STAPPA) and the Association of Local Air Pollution Control Officials (ALAPCO), thank you for this opportunity to comment on the "National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units: Proposed Rule," which was published in the *Federal Register* on January 30, 2004 (69 *Federal Register* 4652) and the "Supplemental Notice for the Proposed National Emission Standards for Hazardous Air Pollutants; and, in the Alternative, Proposed Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units," which was published in the *Federal Register* on March 16, 2004 (69 *Federal Register* 12398).

It is well known that mercury is a powerful neurotoxin that accumulates in the food chain and can cause damage to the brain and nervous system when ingested. In fact, because of methylmercury contamination, the U.S. Environmental Protection Agency (EPA), the Food and Drug Administration, 45 states throughout the country and other organizations, such as Health Canada, have issued fish consumption advisories to the public due to elevated concentrations of mercury. In January 2003, the Centers for Disease Control and Prevention estimated that nearly 8 percent of women of childbearing age are exposed to mercury levels that are above those considered safe for a developing fetus. More recently, EPA researchers have indicated that, based on examinations of umbilical cord blood, the estimate is closer to 15 percent.

In view of the dangers associated with exposure to mercury and other hazardous air pollutants, STAPPA and ALAPCO believe it is extremely important that EPA take swift and aggressive steps to reduce emissions of these pollutants from utilities and other source categories.

Unfortunately, for the reasons that will be described in these comments, STAPPA and ALAPCO are extremely dismayed with EPA's proposals to regulate hazardous air pollutants from electric utilities. We do not believe the rule will adequately protect public health and the environment, a concern that is shared by many others. For example, the Children's Health Protection Advisory Committee (CHPAC), a panel of experts that EPA formed to advise the agency on issues related to the protection of children's health, has expressed deep concerns with EPA's proposed rule. Specifically, CHPAC stated, "[f]rom our understanding, the unique vulnerabilities of children, infants, and women of child-bearing age were not adequately considered in the development of the EPA's proposed rule." Additionally, CHPAC indicated that the current proposal does not go as far as feasibly possible and "[t]o protect children from mercury exposure, EPA needs to go beyond the minimum required by statute (i.e., the proposed MACT floor)."

In view of our deep concerns and the objections other groups have expressed regarding the proposal, STAPPA and ALAPCO strongly urge the agency to abandon its proposed strategy and, instead, develop final Maximum Achievable Control Technology (MACT) standards, with stringent emission limits and expeditious deadlines, as required by Section 112(d) of the Clean Air Act. We have several major concerns with EPA's proposals, which we will articulate in this comment letter.

Flawed Emission Limits Under Sections 111 and 112

EPA has included several options for addressing emissions of hazardous air pollution from electric utilities, including proposals under Section 111, Section 112(d), and Section 112(n) of the Clean Air Act. We oppose all three options for a variety of reasons; most importantly, each is extremely weak and not sufficiently protective of public health and welfare.

We believe the Clean Air Act clearly calls for emissions of hazardous air pollution from electric utilities to be regulated under Section 112. Therefore, EPA's proposal to regulate those sources under Section 111, instead, is totally inappropriate. Furthermore, the limits contained in the Section 111 proposal are not nearly stringent enough. The proposal calls for an interim emissions cap – expected to be 34 tons per year – to be achieved by 2010 that, in fact, does not require *any* additional control of mercury beyond the co-benefits expected from other programs aimed at reducing emissions of sulfur dioxide and nitrogen oxide, such as the Interstate Air Quality Rule (IAQR). It appears, then, that the interim cap for mercury is wholly dependent upon the IAQR, rather than on any measures specifically designed to address hazardous air pollutant emissions. What would happen if, for some reason, the IAQR does not become final? Would the 2010 cap remain enforceable? Moreover, while EPA specifies a 15-ton final cap to be achieved in 2018, the agency acknowledges in its proposal that mercury

emissions could reach 22 tons (or only a 54-percent reduction from the 48 tons determined in 1999) in 2020, when banking and trading are utilized. Thus, EPA's stated 15-ton cap will not truly be achieved. We believe this does not adequately reflect what is technologically feasible and falls far short of what is needed to provide appropriate public health and environmental protection.

While we support regulating hazardous air pollution emissions from utilities under Section 112, as Congress intended, we believe EPA's proposals under Section 112(d) and 112(n) are seriously flawed. The EPA proposal sets MACT levels that would result in national emissions of 34 tons per year, which is clearly not consistent with the legislative mandate for calculating MACT under Section 112. Astonishingly, these levels are even less stringent than the recommendations made by industry representatives during an EPA-sponsored utility MACT development stakeholder process.

STAPPA and ALAPCO are extremely troubled by the statistical analysis regarding the variability of mercury content that EPA used in developing the proposed MACT standard. We believe the Clean Air Act is clear that EPA should base MACT for existing sources on the average of the top 12 percent of sources. We also believe variability in coal mercury content is adequately addressed in the annual averaging time of the standard. EPA's method for accounting for the variability of mercury content in coal is an inappropriate manipulation of the data. It resulted in emission limits that are far more relaxed than they should have been, based on the appropriate use of available data on well-controlled sources. Several state and local air agencies have conducted a thorough review of EPA's variability analysis and are providing the agency with specific comments regarding its inadequacies. We urge EPA to review those comments carefully. In light of our concern about the inappropriateness of EPA's variability analysis, we strongly urge EPA to develop the final MACT standard *without* the faulty statistical analysis the agency incorporated into the development of the proposal.

In addition to using a flawed variability analysis to develop the MACT standards, EPA failed to consider all available technologies. For example, activated carbon injection is commercially available and is widely recognized as a viable control technology for mercury. It has been demonstrated with pilot and full-scale demonstration projects on coal and has been used for over 10 years on other large combustion sources. Also, states are now requiring that activated carbon injection be installed on new coal-fired units for the control of mercury. In failing to consider available technologies like activated carbon injection, EPA has veered significantly from its past approach for developing mercury emission limits for combustion sources and has provided no justification for this dramatic change in the development of emission limits.

In previous MACT standards, EPA has not required technologies to be in long-term use to be considered "commercially available" and to be evaluated as a potential control method. Specifically, at the time EPA proposed the new source performance standards and emission guidelines for municipal waste combustors, activated carbon injection had been tested at only two facilities in the United States. Nonetheless, EPA justified the proposal to use activated carbon injection to set emission limits for mercury

"beyond the floor" because the tests showed lower mercury emissions to be achievable, and because the incremental costs to control mercury beyond the floor were low (59 *Federal Register* 48198 and 48228). EPA did not indicate that its deliberation was limited to control strategies the agency determined to be in long-term use when developing emission limits. Further, EPA continued to evaluate the applicability and efficacy of activated carbon injection when developing mercury emission limits at hazardous waste and medical waste combustors, even when this technology was rarely used at facilities.

EPA has not provided justification for considering coal-fired power plants in a different light. In fact, EPA has likely significantly frustrated the rapid and wide deployment of mercury control technologies by not considering their use for utility boilers, since the very act of EPA evaluating a technology as a means of developing an emissions limit drives the further development and installation of technologies.

EPA is undoubtedly well aware from its research that sorbent injection technologies, such as activated carbon injection, have been demonstrated to achieve significant mercury emission reductions at coal-fired power plants, regardless of coal-type. For example, a recent study by the Northeast States for Coordinated Air Use Management (*Mercury Emissions from Coal-Fired Power Plants* – October 2003) concludes, based on full-scale demonstration of activated carbon injection technology, that mercury control efficiency of above 90 percent is feasible (at costs similar to those of nitrogen oxide removal).

State and local permitting authorities have been relying on results from these studies to establish mercury emission limits in permits issued for the construction of coal-fired boilers. For example, Wisconsin is preparing to permit a coal-fired electric utility plant, using subbituminous coal, at 83-percent control efficiency.[52] Also, Iowa has issued a permit for a facility that will operate with subbituminous coal. That permit sets a limit of 1.7 lb Hg/TBtu, which is equivalent to an 83-percent reduction for operation with coal from the source with the highest average mercury content.[53]

Clearly, since a coal-fired power boiler operator holding a permit with mercury limits that rely on sorbent injection has commenced construction of a facility under that permit, the technology is clearly in commercial use, and thus must be considered in the development of mercury emission limits.

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[52] Wisconsin Public Service Corporation Weston Unit 4 – 500 MW supercritical pulverized subbituminous coal-fired boiler; 1.7 lb. of Hg./TBtu controlled; 10.0 lb. of Hg./TBtu uncontrolled; 83% mercury control efficiency; sorbent injection/baghouse/dry FGD; sorbent not identified.

[53] MidAmerican Energy Company CBEC (Council Bluffs Energy Center) Unit 4 - 790 MW (estimated net) 7,675 MMBtu/hr heat input supercritical pulverized subbituminous coal-fired boiler; 1.7 lb. of Hg/TBtu (controlled); 10 lb. of Hg/TBtu (uncontrolled); expected control efficiency of 83% on coal with highest average mercury content; activated carbon injection with a minimum feed rate of 10 pounds per million cubic feet of exhaust gas. An optimization study required in which facility is to optimize control and can try other sorbents. Other controls - baghouse/selective catalytic reduction (SCR)/dry flue gas desulfurization (FGD).

Finally, EPA's proposal also includes an alternative MACT scheme that would allow for a cap-and-trade program similar to the proposal under Section 111. The preamble indicates that EPA would institute such a program under the provisions of Section 112(n) of the Clean Air Act. Section 112(n) calls for EPA to conduct a study for Congress describing the public health hazards resulting from utility emissions and describing control alternatives. Section 112(n) also states that "[t]he Administrator shall regulate electric utility steam generating units under this *section...,*" (i.e., Section 112) (emphasis added). It does not indicate that the regulations should be established under that *subsection* (i.e., subsection 112[n]). Sections 112(d), 112(f) and 112(h) of the Clean Air Act are the only subsections of Section 112 under which EPA is authorized to establish National Emission Standards for Hazardous Air Pollutants (see 40 CFR 63.2). Therefore, EPA is not authorized to establish emission standards under Section 112(n).

Recommended MACT Standard

As the Clean Air Act requires, EPA should establish a MACT standard that reflects *at least* "the average emission limitation achieved by the best performing 12 percent of the existing sources" or "the emission control that is achieved in practice by the best controlled similar source." Rather than recommending a specific technology, STAPPA and ALAPCO suggest a performance standard. Also, we prefer a common standard for bituminous and subbituminous coal, but different percent limits can be considered for the coal types, as long as the limits provide for very good controls of mercury emissions and do not promote fuel switching or blending to avoid controls (see discussion below). Accordingly, STAPPA and ALAPCO believe it is reasonable to consider 90-percent control for sources using bituminous coal and 80-percent control for units firing subbituminous coal. These limits would result in a national emission reduction between 85-90 percent, which is much more stringent than the decreases expected from EPA's proposal.

In summary, we do not believe EPA's proposal is appropriate or consistent with the requirements of the Clean Air Act. As we have recommended, the agency should calculate and establish a more stringent MACT level, in accordance with a proper reading of Section 112.

Coal Blending and Switching

We are concerned about the effects of fuel switching and blending under EPA's proposal. The proposed limits for subbituminous coal are so lax – in fact, they are tantamount to no control – that facilities may switch from bituminous to subbituminous coal or blend their fuels simply to obtain a higher allowable limit and escape stricter controls. The result would be higher emission limits and greater emissions of mercury. We recommend that the final rule address this problem by requiring a stricter emission limit for subbituminous coal (i.e., 80 percent). Additionally, EPA should require facilities that blend fuels to meet the most stringent emission limit that applies to whatever types of coal it uses.

Deadlines

We are very concerned that the deadlines in the Section 111 proposal are extremely protracted. While the settlement agreement under which EPA is operating calls for the agency to issue final utility standards for hazardous air pollutants by March 2005 (formerly December 2004), with compliance by December 2007, EPA's proposal postpones final compliance until 2018 and, as mentioned, would allow compliance to be delayed even further, perhaps for many years, due to banking and trading. We believe this extraordinary delay in compliance is inappropriate and counter to the mandate of the Clean Air Act and the settlement agreement.

The Clean Air Act requires that MACT be determined first and be no less stringent than the average of the best 12 percent of sources. The timing of compliance is to be a separate consideration. If, after the MACT determination is complete, it becomes evident that more than three years is required for all facilities to comply, additional time is available under Sections 112(i)(3) and 112(i)(4) of the Clean Air Act. If Congress had intended for EPA to always limit a MACT determination to what could be achieved in three years, it would not have provided these special extensions.

We recognize that the adoption of facility-by-facility controls with the effectiveness we are recommending represents a significant commitment on the part of many sources and may require more time than the traditional three-year compliance time period for MACT sources. Therefore, if needed, EPA can provide the extensions of time for compliance that are already available within the Clean Air Act.

Trading

STAPPA and ALAPCO are extremely concerned that EPA is proposing on a national basis to allow trading of mercury emissions between utilities. Not only do we question the legality of mercury trading, we are also very concerned that trading could lead to serious "hotspot" problems around the country.

While mercury emissions can travel great distances, some of the pollutant can also be deposited near its source. In fact, there is recent evidence that sources of mercury can have significant local impacts. In November 2003, the state of Florida published a study entitled, *Integrating Atmospheric Mercury Deposition with Aquatic Cycling in South Florida*, which estimated how quickly fish tissue levels respond to decreased regional mercury emissions. According to state officials, drastic reductions in the mercury concentrations in fish and wading birds in the Everglades "...are directly linked to the installation of technology that reduced mercury in emissions from industries in South Florida by a 100-fold during the last two decades." Additionally, according to a report of the New Jersey Mercury Task Force, which examined local emissions, models, and other studies, "it is likely that approximately half of the mercury that is deposited in New Jersey comes from relatively nearby sources." Thus, the concern about local sources causing local mercury hotspots must not be dismissed.

In the proposal, EPA has likened the mercury trading proposal to the acid rain trading program that is in place. Such a comparison is not appropriate because of the nature of the pollutants in question. While the acid rain program focused primarily on emissions contributing to welfare effects, the utility proposal focuses on mercury, which is a neurotoxin with serious health impacts. The two programs are not comparable.

EPA has proposed that any hot spots could be addressed through the adoption of more stringent state or local standards. While the adoption of more stringent standards by state and local agencies is a fundamental right that the Clean Air Act provides for almost all of its programs, the reality is not so clear-cut. Implementing more protective air quality measures is often unrealistic, if not impossible, for many areas. According to a survey that STAPPA and ALAPCO conducted, approximately one-half of state air pollution control agencies have restrictions on their ability to adopt programs that are more stringent than those of the federal government. Therefore, there is the very real possibility that EPA's proposal would result in hot spots that would remain unaddressed, endangering the population living in that area and the surrounding environment.

We have reviewed the trading program EPA outlined in both the proposal published in the *Federal Register* on January 30, 2004 and the supplemental notice on March 16, 2004, In light of the concerns we have raised regarding trading of mercury emissions between utilities, we recommend that EPA abandon this approach.

Additional Deficiencies of Proposed Use of Section 111

As stated earlier, STAPPA and ALAPCO believe EPA's choice of Section 111 as the vehicle for regulating emissions of hazardous air pollutants from electric utilities is highly inappropriate. By using Section 111 of the Clean Air Act to regulate mercury and nickel emissions from utilities, EPA has ignored other important statutory obligations under Section 112 of the Clean Air Act. For instance, EPA is disregarding the mandate to examine other hazardous air pollutants including, but not limited to, arsenic, chromium, cadmium, dioxins and hydrogen chloride. We strongly urge EPA to address emissions of other hazardous air pollutants in addition to mercury and nickel and to do so under Section 112.

Furthermore, while Section 112 requires EPA to evaluate and address the risks that remain eight years after a MACT standard is issued, Section 111 circumvents those requirements and does not mandate a future evaluation of residual risk. The Residual Risk program contained in Section 112(f) is a critical element of the Clean Air Act's efforts to protect public health against the dangers of exposure to toxic air pollution and should be applied to utilities, as it is to other sources of hazardous air pollutants.

STAPPA and ALAPCO strongly believe there is no justification for EPA to take such a huge legal risk by regulating mercury under Section 111 of the Clean Air Act when Congress clearly intended that mercury, like other hazardous air pollutants, be regulated under Section 112. Adoption of a Section 111 rule will undoubtedly be the

subject of protracted legal battles, which will further delay the protection of public health and the environment.

Finally, we are concerned that the use of Section 111, rather than Section 112, will result in a process similar to the State Implementation Plan (SIP) system currently used for Criteria Pollutants. That is, each state or local agency will be required to develop a plan, submit it to EPA, and await approval. Rather than a uniform national approach to regulating HAP emissions from utilities, which Section 112 would provide, the result of a Section 111 regulation would be a time-consuming process, a duplication of effort by each state and many local agencies, and an inconsistent set of state-by-state programs.

Process for Developing the Proposals

We feel compelled to comment on the process EPA used to develop these proposed standards. STAPPA and ALAPCO representatives were involved in the formal, one-and-a-half year Federal Advisory Committee Act (FACA) stakeholder process that EPA sponsored to develop the utility MACT. The FACA workgroup consisted of federal, state, local, industry and environmental group representatives, including six members representing state, local and tribal agencies; eight members representing environmental organizations; 14 members representing industry; one member representing control equipment vendors; and two members representing coal interests, producers and unions. This group met 14 times over a period of 18 months and thoroughly analyzed all issues related to the regulation of toxic air pollution from utilities.

In its January 30, 2004, proposal, EPA completely disregarded the stakeholder group's deliberations. For example, during the stakeholder process, the group never considered the possibility of substituting Section 111 for Section 112. In addition, the FACA workgroup dismissed the possibility of trading mercury emissions between utilities. Furthermore, upon completing the process, the workgroup requested that EPA complete integrated planning modeling based on the workgroup's final recommendations. EPA has failed to do this. It is unacceptable that EPA would abandon the efforts of the agency's FACA workgroup and propose a rule that represents such a marked departure from what the stakeholders considered and recommended. In addition to rejecting the expert advice the agency needed, EPA's action undermines and devalues the entire FACA process.

While we were extremely disappointed that the recommendations of the FACA workgroup were ignored, we were absolutely astonished to learn that the proposals EPA issued contained evidence of excessive reliance on industry input. For example, we noted that portions of documents supplied by an industry group and a law firm representing industry clients appeared verbatim or in nearly identical form in the proposals. This does not reflect an open process that takes into account the recommendations of the other stakeholders.

Conclusion

In light of all of these serious concerns with EPA's proposed regulations for limiting hazardous air pollutant emissions from utilities, STAPPA and ALAPCO strongly urge EPA to abandon its proposed strategy, and, instead, develop final MACT standards with stringent limits as required by Section 112(d) of the Clean Air Act. We continue to believe that the adoption of MACT standards for utilities is necessary and appropriate to protect public health and the environment.

Please do not hesitate to contact us if you need additional information.

Sincerely,

James A. Joy, III
President of STAPPA

Dennis J. McLerran
President of ALAPCO

North Carolina Division of Air Quality Letter

June 29, 2004

EPA Docket Center (Air Docket)
U.S. EPA West (6102T)
Room B-108
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460
Attention Docket ID No. OAR-2002-0056

To Whom It May Concern:

On behalf of the North Carolina Division of Air Quality (DAQ), I would like to offer comments on the U.S. Environmental Protection Agency's (EPA's) proposed and supplemental proposed rules addressing national emission standards for hazardous air pollutants (NESHAP) for mercury and nickel which were published in the Federal Register January 30, 2004 and March 16, 2004.

My comments focus on three areas: the health effects of mercury in North Carolina, a comparison of the EPA proposal with existing measures in North Carolina, and a discussion on the relationship between the EPA proposal and future steps required to be taken by North Carolina.

Health Effects of Mercury in North Carolina

Methylmercury levels in fish from eastern North Carolina continue to be elevated above all of the existing toxicological benchmarks provided by the federal government, including benchmarks by the Food and Drug Administration and the Environmental Protection Agency. The North Carolina Department of Health and Human Services has issued fish consumption advisories for three species of freshwater fish that may be caught from waters south and east of Interstate-85; this constitutes more than one half of the state. The Department of Health and Human Services has advised women of childbearing age and small children not to consume these three species of fish when caught from surface waters south and east of Interstate-85. Reduced consumption rates are recommended for the general public. This is a tremendous loss of use of surface waters and natural resources. What makes this all the more important is that the area of greatest concern with respect to methylmercury levels in fish tissue is also the area with the most economic difficulty. Much of eastern North Carolina is economically depressed due to the loss of jobs and many families have resorted to providing their own sustenance through increased fishing and/or hunting.

Studies conducted by the Division of Water Quality suggest that mercury and methylmercury levels in surface waters, and therefore in fish, will not reach benchmark levels without realizing mercury reductions in the atmosphere. Total mercury concentrations in rainwater are at or above levels that water quality agencies would seek

in order to restore the ability to eat locally caught fish without an increased risk of neurological effects. Water quality agencies would typically seek pollutant reductions from wastewater and stormwater when a loss of use occurs. In this case, most municipal wastewater facilities have already installed equipment that would reach the current level of best available technology for mercury removal. This is in spite of the fact that most municipal wastewater facilities also receive and treat rainwater prior to discharging back to surface waters. Clearly this is not a situation to which traditional Clean Water Act controls would apply.

Therefore significant reduction in mercury emissions to the atmosphere is necessary for public health protection. Also, the reduction in a national program must assure that all local problem areas with identified mercury issues benefit from the program.

Comparison of the EPA Proposal with Existing Measures in North Carolina

Recognizing these health concerns, North Carolina is moving forward to control mercury emissions. In 2002, North Carolina passed the Clean Smokestacks Act (CSA), which substantially cuts the state's coal-fired power plants emissions of multiple air pollutants that cause smog, haze and other pollution problems. Under the CSA, North Carolina's 14 coal-fired power plants will reduce their emissions of key pollutants. In particular, the CSA requires power plants to reduce:

Nitrogen oxide (NOx) emissions from 245,000 tons in 1998 to 56,000 tons by 2009 (78 percent).

Sulfur dioxide (SO2) emissions from 489,000 tons in 1998 to 250,000 tons by 2009 (49 percent) and 130,000 tons by 2013 (74 percent).

The pollution controls required under the CSA are projected, as a co-benefit, to reduce mercury emissions in North Carolina by more than 50 percent by 2012. The EPA proposals will not yield comparable reductions. Under the proposed MACT, the reductions projected are 29 percent until 2018 nationally. In addition, there is no guarantee of site-specific reductions due to EPA's proposed Cap-and-Trade system.

Relationship Between the EPA Proposal and the Future Steps Required to be taken by North Carolina

In addition, the CSA requires the DAQ to conduct a study of mercury emissions in the state, including "the development and implementation of standards and plans to implement programs to control emissions of mercury from coal-fired generating units." Attached to these comments is a copy of the first interim report, "Mercury Emissions and Mercury Controls for Coal-Fired Electrical Utility Boilers", dated September 1, 2003. DAQ's final findings and recommendations are due to the NC legislature no later than September 1, 2005.

We would encourage EPA to consider in its final rule the process North Carolina already has in motion for evaluating the health needs and available technologies for achieving additional mercury reductions. Given the significant early reductions from implementation of the CSA, North Carolina hopes EPA will pass regulations that require similar reductions in other States. Regional reductions in mercury are required to ensure speedy return to safe consumption of local fish by populations at risk.

To summarize my comments: (1) mercury is a significant health problem in North Carolina, (2) the speed and amount of reduction of EPA's proposal are less than those for North Carolina's own requirements, and (3) the EPA rule needs to offer explicit right and authority for States to deal with residual local issues and to avoid preempting State programs.

Thank you for the opportunity to comment and for your consideration of these comments in the development of the final rule. Should you have any questions on the comments, please contact Sheila Holman of my staff at (919) 715-0971.

Sincerely,

B. Keith Overcash, P.E.

Attachment

cc: Secretary Bill Ross
Alan Klimek, P.E.

Appendix C
Electrical Generating Boiler
Mercury Emission Estimates
EPA Emission Estimating Tool Estimates

DUKE POWER	US EPA Mercury Emission Estimating Tool Data			Hg In Combusted Coal	Existing Hg Emissions		Clean Stacks Hg Emissions		Project
Plant	Unit	Plant	Location	Lbs/year	Percent Reduced	Lbs/year	Percent Reduced	Lbs/year	Completion Date
Allen	1	Allen	Belmont	43	29	31	69	10	2011
Allen	2	Allen	Belmont	20	29	14	69	4	2011
Allen	3	Allen	Belmont	80	29	56	69	18	2011
Allen	4	Allen	Belmont	82	29	58	69	18	2012
Allen	5	Allen	Belmont	82	29	58	69	18	2012
			TOTAL	**308**		**218**		**69**	
Belews Creek	1	Belews Creek	Walnut Cove	420	29	298	69	94	2008
Belews Creek	2	Belews Creek	Walnut Cove	314	29	222	69	70	2008
			TOTAL	**734**		**520**		**163**	
Buck	5	Buck	Salisbury	6	11	5	0	5	None
Buck	6	Buck	Salisbury	6	11	5	0	5	None
Buck	7	Buck	Salisbury	7	11	6	0	6	None
Buck	8	Buck	Salisbury	43	11	38	0	38	None
Buck	9	Buck	Salisbury	43	11	39	0	39	None
			TOTAL	**104**		**93**		**93**	
Cliffside	1	Cliffside	Cliffside	3	11	3	0	3	None
Cliffside	2	Cliffside	Cliffside	3	11	3	0	3	None
Cliffside	3	Cliffside	Cliffside	7	11	6	0	6	None
Cliffside	4	Cliffside	Cliffside	7	11	6	0	6	None
Cliffside	5	Cliffside	Cliffside	121	29	86	69	27	2009
			TOTAL	**141**		**104**		**45**	
Dan River	1	Dan River	Eden	9	11	8	0	8	None
Dan River	2	Dan River	Eden	9	11	8	0	8	None
Dan River	3	Dan River	Eden	22	29	16	0	16	None
			TOTAL	**41**		**32**		**32**	
Marshall	1	Marshall	Terrell	119	29	84	69	26	2007
Marshall	2	Marshall	Terrell	132	29	93	69	29	2007
Marshall	3	Marshall	Terrell	172	29	122	69	38	2006
Marshall	4	Marshall	Terrell	219	29	155	69	49	2006
			TOTAL	**642**		**455**		**143**	
Riverbend	4	Riverbend	Mount Holly	32	11	28	0	28	None
Riverbend	5	Riverbend	Mount Holly	11	11	10	0	10	None
Riverbend	6	Riverbend	Mount Holly	11	11	10	0	10	None
Riverbend	7	Riverbend	Mount Holly	30	11	27	0	27	None
			TOTAL	**84**		**75**		**75**	
		Duke Energy	**Total**	**2054**		**1498**		**621**	
		NC State	**Total**	**4,094**		**3,056**		**1,416**	

Appendix C
Electrical Generating Boiler
Mercury Emission Estimates

PROGRESS ENERGY	US EPA Mercury Emission Estimating Tool Data		Hg In Combusted Coal	Existing Hg Emissions		Clean Stacks Hg Emissions		Project
Plant	Unit	Location	Lbs/year	Percent Reduced	Lbs/year	Percent Reduced	Lbs/year	Completion Date
Ashville	2	Arden	105	29	74	69	23	2006
		TOTAL	**196**		**139**		**44**	
Cape Fear	5	Moncure	53	29	38	69	12	2012
Cape Fear	6	Moncure	73	29	51	69	16	2011
		TOTAL	**126**		**89**		**28**	
Lee	1	Goldsboro	25	29	18	0	18	None
Lee	2	Goldsboro	24	11	21	0	21	None
Lee	3	Goldsboro	89	29	63	0	63	None
		TOTAL	**138**		**102**		**102**	
Mayo	1A	Roxboro	128	11	115	32	78	2008
Mayo	1B	Roxboro	128	11	115	32	78	2008
		TOTAL	**257**		**229**		**156**	
Roxborro	1	Semora	171	29	121	69	38	2009
Roxborro	2	Semora	296	29	210	69	66	2007
Roxborro	3A	Semora	163	29	115	69	36	2007
Roxborro	3B	Semora	163	29	115	69	36	2007
Roxborro	4A	Semora	132	11	118	32	80	2007
Roxborro	4B	Semora	132	11	118	32	80	2007
		TOTAL	**1056**		**797**		**337**	
L V Sutton	1	Wilmington	33	11	30	11	30	None
L V Sutton	2	Wilmington	31	11	28	11	28	None
L V Sutton	3	Wilmington	152	29	108	69	34	2012
		TOTAL	**216**		**165**		**91**	
Wspn	1	Lumberton	15	29	11	0	11	None
Wspn	2	Lumberton	15	29	11	0	11	None
Wspn	3	Lumberton	23	29	16	0	16	None
		TOTAL	**53**		**37**		**37**	
		State Totals lbs/year	**4,094**		**3,056**		**1,416**	

Appendix C
Electrical Generating Boiler
Mercury Emission Estimates
Speciated Mercury Emissions Using EPA Mercury Emission Tool

EPA Mercury Emission Estimating Tool Data			Existing						Clean Stacks				
		Hg in Coal	Total Hg		Hg Species Emissions				Total Hg		Hg Species Emissions		
Plant	Unit	Lbs/year	Percent Reduced	Emission Lbs/year	Elemental Lbs/year	PM	Oxidized		Percent Reduced	Emission Lbs/year	Elemental Lbs/year	PM	Oxidized
Duke Power (North Carolina)													
Allen	1	43.42	29.10	30.77	7.91	1.88	20.99		77.70	9.68	8.91	0.02	0.75
Allen	2	20.01	29.10	14.18	3.65	0.87	9.67		77.70	4.46	4.11	0.01	0.35
Allen	3	79.64	29.10	56.44	14.51	3.45	38.51		77.70	17.76	16.34	0.04	1.38
Allen	4	82.42	29.10	58.41	15.02	3.57	39.85		77.70	18.38	16.91	0.04	1.43
Allen	5	82.16	29.10	58.22	14.97	3.56	39.72		77.70	18.32	16.86	0.04	1.43
Subtotal		307.65		218.02	56.06	13.32	148.75			68.61	63.12	0.15	5.34
Belews Cre	1	419.95	29.10	297.60	76.52	18.18	203.05		77.70	93.65	86.16	0.20	7.28
Belews Cre	2	313.66	29.10	222.28	57.15	13.58	151.66		77.70	69.95	64.35	0.15	5.44
Subtotal		733.61		519.88	133.67	31.76	354.70			163.59	150.51	0.36	12.73
Buck	5	5.68	10.70	5.23	1.89	0.25	2.93		10.70	5.07	1.89	0.25	2.93
Buck	6	5.68	10.70	5.23	1.89	0.25	2.93		10.70	5.07	1.89	0.25	2.93
Buck	7	7.06	10.70	6.31	2.35	0.31	3.65		10.70	6.30	2.35	0.31	3.65
Buck	8	42.54	10.70	38.01	14.15	1.86	21.97		10.70	37.99	14.15	1.86	21.97
Buck	9	43.28	10.70	38.67	14.40	1.89	22.35		10.70	38.65	14.40	1.89	22.35
Subtotal		104.24		93.45	34.68	4.56	53.84			93.09	34.68	4.56	53.84
Cliffside	1	3.22	10.70	2.88	1.07	0.14	1.66		10.70	2.88	1.07	0.14	1.66
Cliffside	2	3.40	10.70	3.04	1.13	0.15	1.76		10.70	3.04	1.13	0.15	1.76
Cliffside	3	6.52	10.70	5.83	2.17	0.29	3.37		10.70	5.82	2.17	0.29	3.37
Cliffside	4	7.24	10.70	6.47	2.41	0.32	3.74		10.70	6.47	2.41	0.32	3.74
Cliffside	5	120.91	29.10	85.69	22.03	5.23	58.46		77.70	26.96	24.81	0.06	2.10
Subtotal		141.29		103.91	28.81	6.13	68.99			45.16	31.59	0.95	12.62
Dan River	1	9.12	10.70	8.15	3.03	0.40	4.71		10.70	8.14	3.03	0.40	4.71
Dan River	2	9.44	10.70	8.43	3.14	0.41	4.88		10.70	8.43	3.14	0.41	4.88
Dan River	3	22.38	29.10	15.86	4.08	0.97	10.82		29.10	15.87	4.08	0.97	10.82
Subtotal		40.94		32.44	10.25	1.78	20.41			32.44	10.25	1.78	20.41
Marshall	1	118.65	29.10	84.08	21.62	5.14	57.37		77.70	26.46	24.34	0.06	2.06
Marshall	2	131.65	29.10	93.29	23.99	5.70	63.65		77.70	29.36	27.01	0.06	2.28
Marshall	3	172.41	29.10	122.18	31.41	7.46	83.36		77.70	38.45	35.37	0.08	2.99
Marshall	4	219.02	29.10	155.21	39.91	9.48	105.90		77.70	48.84	44.94	0.11	3.80
Subtotal		641.73		454.76	116.93	27.78	310.28			143.10	131.66	0.31	11.13
Riverbend	4	31.66	10.70	28.29	10.53	1.39	16.35		10.70	28.27	10.53	1.39	16.35
Riverbend	5	11.04	10.70	9.87	3.67	0.48	5.70		10.70	9.86	3.67	0.48	5.70
Riverbend	6	11.36	10.70	10.15	3.78	0.50	5.87		10.70	10.14	3.78	0.50	5.87
Riverbend	7	30.29	10.70	27.07	10.08	1.33	15.65		10.70	27.05	10.08	1.33	15.65
Subtotal		84.35		75.38	28.07	3.69	43.57			75.32	28.07	3.69	43.57
Duke Energy		2050.01	26.94	1497.84	408.46	89.02	1000.53		69.69	621.32	449.88	11.80	159.64
Progress Energy (North Carolina)													
Asheville	1	91.27	29.10	64.71	16.63	3.95	44.13		77.70	20.35	18.73	0.04	1.58
Asheville	2	104.52	29.10	74.10	19.04	4.52	50.54		77.70	23.31	21.44	0.05	1.81
Subtotal		195.79		138.82	35.67	8.48	94.66			43.66	40.17	0.10	3.40
Cape Fear	5	53.24	29.10	37.75	9.70	2.30	25.74		77.70	11.87	10.92	0.03	0.92
Cape Fear	6	72.51	29.10	51.41	13.21	3.14	35.06		77.70	16.17	14.88	0.04	1.26
Subtotal		125.75		89.16	22.91	5.44	60.80			28.04	25.80	0.06	2.18
Lee	1	25.27	29.10	17.92	4.60	1.09	12.22		29.10	17.92	4.60	1.09	12.22
Lee	2	23.66	11.00	21.13	7.87	1.04	12.22		11.00	21.13	7.87	1.04	12.22
Lee	3	88.67	29.10	62.87	16.16	3.84	42.87		29.10	62.87	16.16	3.84	42.87
Subtotal		137.60		101.91	28.63	5.97	67.31			101.91	28.63	5.97	67.31
Mayo	1A	128.31	11.00	114.58	42.69	5.62	66.27		39.20	78.01	61.39	0.49	16.13
Mayo	1B	128.31	11.00	114.58	42.69	5.62	66.27		39.20	78.01	61.39	0.49	16.13
Subtotal		256.62		229.16	85.38	11.23	132.55			156.02	122.79	0.98	32.26
Roxboro	1	171.03	29.10	121.26	31.16	7.40	82.69		77.70	38.14	35.09	0.08	2.97
Roxboro	2	295.73	29.10	209.67	53.88	12.80	142.99		77.70	65.95	60.67	0.14	5.13
Roxboro	3A	162.62	29.10	115.30	29.63	7.04	78.63		77.70	36.26	33.36	0.08	2.82
Roxboro	3B	162.62	29.10	115.30	29.63	7.04	78.63		77.70	36.26	33.36	0.08	2.82
Roxboro	4A	131.90	11.00	117.79	43.89	5.77	68.13		39.20	80.20	63.11	0.50	16.58
Roxboro	4B	131.90	11.00	117.79	43.89	5.77	68.13		39.20	80.20	63.11	0.50	16.58
Subtotal		1055.80		797.10	232.08	45.83	519.19			337.01	288.71	1.39	46.90
L V Sutton	1	33.08	11.00	29.54	11.01	1.45	17.09		11.00	29.54	11.01	1.45	17.09
L V Sutton	2	30.98	11.00	27.67	10.31	1.36	16.00		11.00	27.67	10.31	1.36	16.00
L V Sutton	3	152.08	29.10	107.82	27.71	6.58	73.53		77.70	33.91	31.20	0.07	2.64
Subtotal		216.14		165.03	49.02	9.39	106.62			91.12	52.52	2.88	35.73
Weather spc	1	15.07	29.10	10.68	2.75	0.65	7.29		29.10	10.68	2.75	0.65	7.29
Weather spc	2	15.29	29.10	10.84	2.79	0.66	7.39		29.10	10.84	2.79	0.66	7.39
Weather spc	3	22.53	29.10	15.97	4.11	0.98	10.89		29.10	15.97	4.11	0.98	10.89
Subtotal		52.89		37.50	9.64	2.29	25.57			37.50	9.64	2.29	25.57
Progress Energy		2040.59		1558.68	463.34	88.63	1006.70			795.27	568.26	13.66	213.35
State Totals		4094.40	25.34	3056.69	871.81	177.65	2007.24		65.40	1416.58	1018.14	25.46	372.98

Appendix C
Electrical Generating Boiler
Mercury Emission Estimates
Speciated Mercury Emissions Using EPRI Mercury Emission Tool
Duke Power

		Hg in	Cl in	Cl/SO2	Existing					Clean Stacks				
EPRI Mercury		Coal	Coal	Ratio	Total Hg		Hg Species Emissions			Total Hg		Hg Species Emissions		
Emission Estimating Tool Data		Lbs/year	ppm		Percent Reduced	Emission Lbs/year	Elemental	PM	Oxidized	Percent Reduced	Emission Lbs/year	Elemental	PM	Oxidized
							Lbs/year					Lbs/year		
Allen	1	43	1153	904	45	23	8	0	16	67	14	12	0	2
Allen	2	18	1153	904	45	10	3	0	7	67	6	5	0	1
Allen	3	78	1153	904	45	43	14	1	28	67	26	21	0	4
Allen	4	78	1153	904	45	43	14	1	29	67	26	21	0	4
Allen	5	78	1153	904	45	43	14	1	29	67	26	21	0	4
Subtotal		295				162	52	2	108		97	81	0	16
Belews Creek	1	424	1197	965	46	230	73	3	154	68	137	114	1	23
Belews Creek	2	309	1197	965	46	167	53	3	112	68	100	83	0	17
Subtotal		734				397	125	6	266		237	197	1	39
Buck	5	6	823	599	22	4	2	0	2	22	4	2	0	2
Buck	6	6	823	599	22	4	2	0	2	22	4	2	0	2
Buck	7	7	823	599	22	5	2	0	3	22	5	2	0	3
Buck	8	45	823	599	22	35	16	0	19	22	35	16	0	19
Buck	9	46	823	599	22	36	16	0	19	22	36	16	0	19
Subtotal		109				85	38	1	46		85	38	1	46
Cliffside	1	3	1479	1103	27	2	1	0	1	27	2	1	0	1
Cliffside	2	3	1479	1103	27	3	1	0	2	27	3	1	0	2
Cliffside	3	7	1479	1103	27	5	2	0	3	27	5	2	0	3
Cliffside	4	8	1479	1103	27	6	2	0	4	27	6	2	0	4
Cliffside	5	122	1479	1103	48	64	18	1	45	70	37	30	0	6
Subtotal		143				79	24	1	54		52	35	0	16
Dan River	1	11	1183	922	25	8	3	0	5	25	8	3	0	5
Dan River	2	12	1183	922	25	9	3	0	5	25	9	3	0	5
Dan River	3	29	1183	922	45	16	5	0	10	45	16	5	0	10
Subtotal		52				33	12	0	21		33	12	0	21
Marshall	1	119	1062	810	44	67	22	1	44	66	40	34	0	6
Marshall	2	132	1062	810	44	74	25	1	48	66	44	37	0	7
Marshall	3	165	1062	810	44	93	31	1	61	66	56	47	0	9
Marshall	4	218	1062	810	44	123	41	2	80	66	74	62	0	12
Subtotal		634				357	118	5	233		214	179	1	34
Riverbend	4	11	924	626	23	8	4	0	5	23	8	4	0	5
Riverbend	5	11	924	626	23	8	4	0	5	23	8	4	0	5
Riverbend	6	30	924	626	23	23	10	0	13	23	23	10	0	13
Riverbend	7	31	924	626	23	24	10	0	13	23	24	10	0	13
Subtotal		83				64	28	1	36		64	28	1	36
Duke Energy		2050			43	1177	397	17	763	62	782	570	5	208
State Totals		4096			41	2397	29	1	69	63.2	1508	1105	9	394

Appendix C
Electrical Generating Boiler
Mercury Emission Estimates
Speciated Mercury Emissions Using EPRI Mercury Emission Tool
Progress Energy

					Existing					Clean Stacks				
		Hg in	Cl in	Cl/SO2	Total Hg		Hg Species Emissions			Total Hg		Hg Species Emissions		
EPRI Mercury Emission Estimating Tool Data		Coal	Coal	Ratio	Percent Reduced	Emission	Elemental	PM	Oxidized	Percent Reduced	Emission	Elemental	PM	Oxidized
		Lbs/year	ppm			Lbs/year	Lbs/year				Lbs/year	Lbs/year		
Asheville	1	91	970	612	40	54	19	1	35	65	32	27	0	5
Asheville	2	106	970	612	40	63	22	1	41	65	37	31	0	6
Subtotal		197				118	40	2	75		69	57	0	11
Cape Fear	5	53	1776	1108	48	28	7	0	20	70	16	13	0	3
Cape Fear	6	73	1776	1108	48	38	10	1	28	70	22	18	0	4
Subtotal		126				66	18	1	48		38	31	0	7
Lee	1	25	1468	954	46	14	4	0	10	46	14	4	0	10
Lee	2	24	1468	954	27	17	6	0	11	27	17	6	0	11
Lee	3	88	1468	954	46	48	14	1	33	46	48	39	0	8
Subtotal		137				79	24	1	54		79	49	1	29
Mayo	1A	127	2186	2124	27	93	27	1	65	65	44	32	0	12
Mayo	1B	127	2186	2124	27	93	27	1	65	65	44	32	0	12
Subtotal		254				185	54	2	129		89	65	1	24
Roxboro	1	171	1482	1022	47	92	26	1	64	70	51	42	0	9
Roxboro	2	297	1482	1022	47	159	46	2	110	70	89	73	0	15
Roxboro	3A	165	1482	1022	47	88	25	1	61	70	49	41	0	9
Roxboro	3B	164	1482	1022	47	88	25	1	61	70	49	40	0	9
Roxboro	4A	134	1482	1022	27	97	28	1	68	65	47	38	0	8
Roxboro	4B	134	1482	1022	27	97	28	1	68	65	47	38	0	8
Subtotal		1064				621	179	9	432		333	273	1	58
L V Sutton	1	33	1818	1240	27	24	8	0	16	27	24	8	0	16
L V Sutton	2	30	1818	1240	27	22	7	0	15	27	22	7	0	15
L V Sutton	3	152	1818	1240	49	78	20	1	56	70	46	37	0	8
Subtotal		215				124	35	2	87		92	52	1	39
Weather spoon	1	15	1717	1105	48	8	2	0	6	48	8	2	0	6
Weather spoon	2	15	1717	1105	48	8	2	0	6	48	8	2	0	6
Weather spoon	3	23	1717	1105	48	12	3	0	8	48	12	3	0	8
Subtotal		53				28	8	0	20		28	8	0	20
Progress Energy		2046			40	1220	357	18	845	65	726	535	4	187
State Totals		4096			41	2397	29	1	69	63.2	1508	1105	9	394

APPENDIX D

2002 REPORTED NC MERCURY EMISSIONS

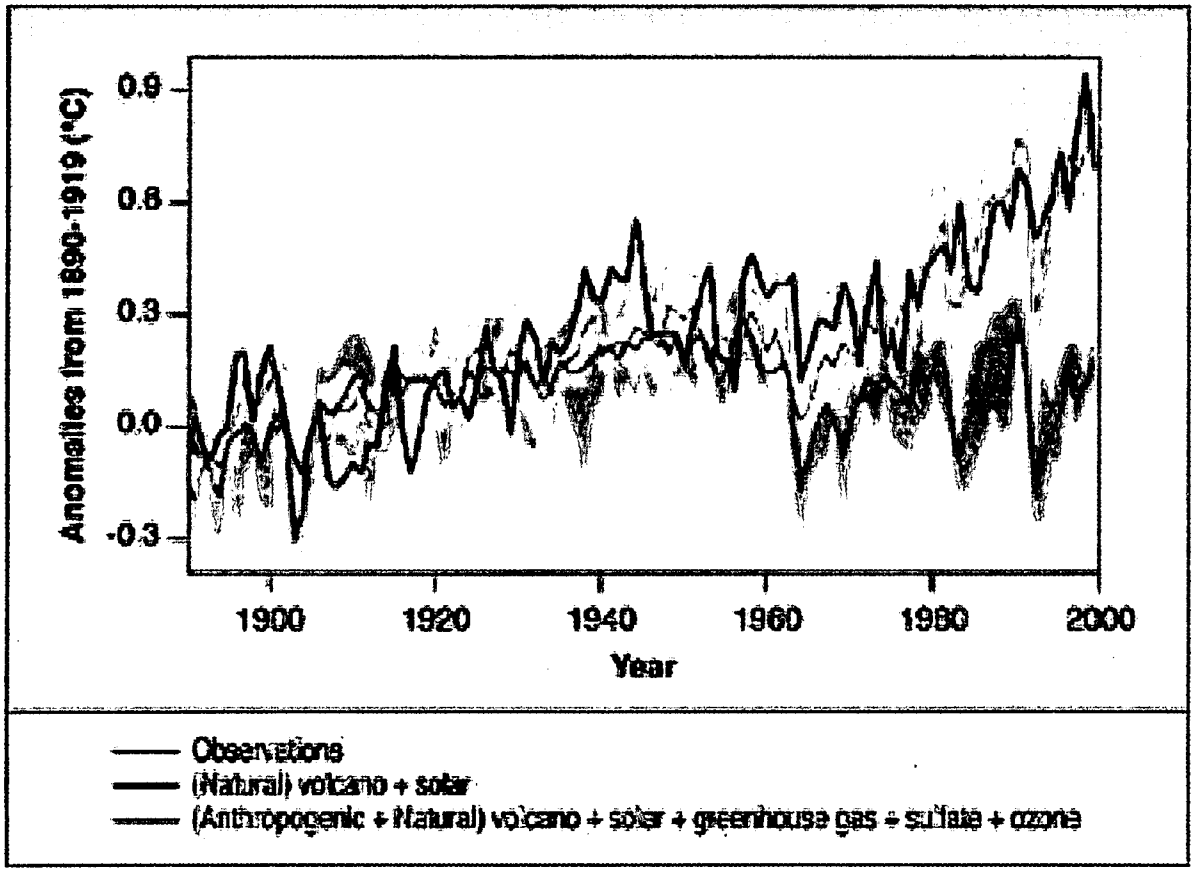
Location Name	Pounds/Year	Percent
Duke Energy Corp - Belews Creek Steam Station	**730.5448**	**14.04**
Nucor Steel	679.0190	13.05
CP&L - Roxboro Steam Electric Plant	**666.2140**	**12.80**
Duke Energy Corporation - Marshall Steam Station	**620.9031**	**11.93**
PCS Phosphate Company Inc. - Aurora	267.6866	5.14
CP&L - Mayo Facility	**258.0166**	**4.96**
Duke Energy Corporation - Allen Steam Station	**237.6020**	**4.57**
New Hanover County WASTEC	172.2500	3.31
Duke Energy Corporation - Cliffside Steam Station	**136.6129**	**2.62**
L V Sutton Steam Electric Plant	**132.0304**	**2.54**
Duke Energy Corporation - Riverbend Steam Station	**110.6019**	**2.13**
Progress Energy - F Lee Plant	**109.2136**	**2.10**
Duke Energy Corporation - Buck Steam Station	**88.9013**	**1.71**
Progress Energy Carolinas - Cape Fear Plant	**78.7800**	**1.51**
Cleveland Regional Medical Center	61.0000	1.17
University of North Carolina at Chapel Hill	45.4924	0.87
Blue Ridge Paper Products - Canton Mill	45.0843	0.87
DAK Monomers LLC	42.5850	0.82
Progress Energy Carolinas, Inc., W.H. Weatherspoon Plant	**38.0100**	**0.73**
Weyerhaeuser Company - Plymouth	36.5900	0.70
Ecusta Business Development Center LLC	34.2000	0.66
Cogentrix of Rocky Mount	33.2009	0.64
Stericycle Inc	27.7725	0.53
Duke Energy Corp - Dan River Steam Station	**27.7024**	**0.53**
Duracell Global Business Management Group	27.0000	0.52
Invista, Incorporated	24.7900	0.48
Duke University	24.5000	0.47
Marine Corps Air Station	19.5416	0.38
Miller Brewing Company - Eden Plant	19.5000	0.37
Cogentrix of North Carolina Inc - Southport	17.7602	0.34
Union Mem Regl Medcenterinc **inactive**	16.7000	0.32
Carolina Stalite Company	16.2728	0.31
Forest City Tool	16.0000	0.31
Frye Regional Medical Center	15.6720	0.30
International Paper	14.1332	0.27
Elementis Chromium	14.1200	0.27
Leesona Co John Brown Div**inactive**	12.0000	0.23
Cargill Inc - Fayetteville	11.3664	0.22
Tyson Foods Inc Harmony	10.5470	0.20
Cape Fear Valley Med Center	10.2000	0.20
Onslow Memorial Hospital	8.0120	0.15
Cogentrix of North Carolina Inc	7.0902	0.14
Craven County Wood Energy	6.9100	0.13
Total Mercury Emissions in Pounds Per Year	4972.1291	

* List is truncated from original

CO_2 Emission Reduction Options For Coal-fired Electrical Utility Boilers and Other Stationary Sources

September 1, 2004
Second Interim Report Pursuant to Clean Smokestacks Act

NCDENR



Source: CCSP/Meehl

North Carolina
Department of Environment and Natural Resources
Division of Air Quality

The Requirement: Excerpted from the Act

[Title: An Act to Improve Air Quality in the State by Imposing Limits on the Emission of Certain Pollutants from Certain Facilities that Burn Coal to Generate Electricity and to Provide for Recovery by Electric Utilities of the Costs of Achieving Compliance with Those Limits]

SECTION 13. The Division of Air Quality of the Department of Environment and Natural Resources shall study issues related to the development and implementation of standards and plans to implement programs to control emissions of carbon dioxide (CO_2) from coal-fired generating units and other stationary sources of air pollution. The Division shall evaluate available control technologies and shall estimate the benefits and costs of alternative strategies to reduce emissions of carbon dioxide (CO_2). The Division shall annually report its interim findings and recommendations to the Environmental Management Commission and the Environmental Review Commission beginning 1 September 2003. The Division shall report its final findings and recommendations to the Environmental Management Commission and the Environmental Review Commission no later than 1 September 2005. The costs of implementing any air quality standards and plans to reduce the emission of carbon dioxide (CO_2) from coal-fired generating units below the standards in effect on the date this act becomes effective, except to the extent that the emission of carbon dioxide (CO_2) is reduced as a result of the reductions in the emissions of oxides of nitrogen (NOx) and sulfur dioxide (SO_2) required to achieve the emissions limitations set out in G.S. 143-215.107D, as enacted by Section 1 of this act, shall not be recoverable pursuant to G.S. 62-133.6, as enacted by Section 9 of this act.

GENERAL ASSEMBLY OF NORTH CAROLINA - SESSION 2001 – (SENATE BILL 1078)
Ratified the 19th day of June 2002. (Ch. SL 2002-4 S.13)
Marc Basnight - President Pro Tempore of the Senate
James B. Black - Speaker of the House of Representatives
Michael F. Easley - Governor

CO_2 Emission Reduction Options For Coal-fired Electrical Utility Boilers and Other Stationary Sources

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September 2004: Second Interim Report

Pursuant to the Clean Smokestacks Act of 2002

North Carolina
Department of Environment and Natural Resources
Division of Air Quality

An Invitation from Secretary Ross

TO: Environmental Review Commission
Environmental Management Commission

FROM: William G. Ross, Jr.

DATE: September 1, 2004

SUBJECT: Mercury and CO_2 Reports Required by Clean Smokestacks Act

On March 23, 2004, the United States Environmental Protection Agency recognized North Carolina and the Clean Smokestacks Act for outstanding, innovative efforts in improving air quality through regulatory and policy innovations and presented our state with a Clean Air Excellence Award. I had the privilege of saying a few words at the award ceremony in Washington, D.C., on behalf of our state, Governor Easley, and all the other partners who played vital roles in the passage of the law. It was a pleasure for me to describe the story of the Clean Smokestacks Act as a story about the power of innovation, partnerships, teamwork, and leadership.

The act, in addition to providing for major reductions in $S0_2$ and NOx emissions from NC's 14 coal-fired power plants, directed our Division of Air Quality, over a three year period, to study and make recommendations concerning emissions of mercury and carbon dioxide.

As you know, these are important, controversial issues. For example, Donald Kennedy, the Editor of *Science*, has called climate change "the most serious issue" we face.

Last year, 2003, the Division, working with a broad group of interested parties, put together reports reviewing and summarizing the state of scientific research on mercury and carbon dioxide emissions. This year, 2004, the Division has updated the review of research, and has inventoried options for the recommendations we must make next year (2005). We now ask all interested parties to read this year's report and give us their views, questions and suggestions about it.

> In the upcoming year, as we consider what to recommend, we will evaluate options for action with a number of criteria and principles in mind. As a starting point for those criteria and principles, we plan to use ones suggested in a report of a November, 2003 Aspen Institute policy dialogue chaired by Eileen Claussen and Robert W. Fri. The title of the report is: *A Climate Policy Framework: Balancing Policy and Politics.* As adapted for use in the task that the General Assembly has given us, the criteria and principles are as follows:

1. Environmental effectiveness: How effective is the option in meeting its environmental and public health and welfare target, whether that target is public awareness, information collection and evaluation, or emission reduction?
2. Cost effectiveness: Will the option design allow cost-effective compliance? How will it affect the ability of business to compete?
3. Administrative feasibility: Can the option be administered and does it minimize administrative and transaction costs?
4. Distributional equity: Is the burden of compliance with the option fairly apportioned?
5. Political acceptability: Are there elements of option design that affect its political acceptability?
6. Technology development and diffusion: Will the option help provide a platform for technology development and diffusion?
7. Adaptability: Will the option be able to adapt to changing circumstances and incorporate new information?
8. Monitoring and counting: Will the option include things that can be monitored and are verifiable?
9. Encouraging long term success: Will the option encourage long-term progress and success?

As I mentioned above, we invite your input with respect to whether these are the appropriate criteria and principles and how the various options for recommendations come out when judged against the appropriate criteria and principles. Also, we invite you to suggest options that are not in our inventory and to tell us why such options should be considered.

In the interest of giving every citizen of our State, now and in the future, a reasonable opportunity to live a happy, healthy, and prosperous life, we solicit your input and appreciate your help.

Preface

The North Carolina Clean Smokestacks Act (CSA), Session Law 2002-4 (aka Senate Bill 1078), was passed and signed into law in June 2002. This Act's primary requirements established reductions of SO_2 and NOx emissions from coal-fired power plants within the State. There were also two sections of the Act which require the Division of Air Quality (DAQ) to provide reports to the Environmental Management Commission (EMC) and the Environmental Review Commission (ERC) by September of 2003, 2004 and 2005, regarding the effects of these controls on mercury and CO_2 emissions. These sections also require DAQ to study and make recommendations to these bodies regarding any further actions needed for these two substances. The first reports (first interim) under this requirement were provided in 2003 and are available from DAQ's web page on the Internet at http://daq.state.nc.us/news/leg/. A summary of some of the main findings of that report follows this page.

The information in this Second Interim Report on CO_2 supplements and updates the information in the September 2003 report and attempts to define a range of options for future consideration (and should not be considered recommendations). Recommendations from DAQ will be addressed in the September 2005 report. The DAQ will continue the stakeholder process through the preparation of that final (September 2005) report. It continues to solicit input from stakeholders and all comments will be seriously considered. However, DAQ recognizes that it is responsible for all final recommendations, and reserves the rights to include, exclude, or revise the final documents to reflect its best judgment of facts, science and objectivity.

DAQ held a public workshop April 19-21, 2004 as a means of soliciting the latest available information, providing a forum for their discussion among stakeholders and others, and to generally exchange ideas on both CO_2 and mercury. A wide variety of speakers, many of whom are leading experts in their field, provided presentations. The presentation slides of the main points are provided on DAQ's web page and listed in Appendix A of this report. To view them, go to: http://daq.state.nc.us/news/leg/cleanst_hg_co_prov.shtml on your web browser and this will link you to those resentations. DAQ recognizes each of these speakers for their work and expresses its appreciation to each of them for their time and efforts to make these presentations and share their expertise.

Please note that in a few cases, text from some public domain (government) references may be repeated *verbatim* in this report for efficiency, expediency and accuracy. These situations are indicated. The intent is to give proper credit and use only public (copyright unrestricted) sources in these instances. If any errors or deviations to this intent are found, please immediately bring these situations to the attention of the authors. It is not the intent of the authors or DAQ to take credit for the work of others or disregard copyrights.

The authors and editors of this report express their gratitude for all contributors, stakeholders, reviewers and other interested parties who made it possible to produce this work.

Selected Conclusion Statements Extracted From First Interim Report

(See 2003 Report for further details at http://daq.state.nc.us/news/leg/)[1]

- Leading national and international science and governmental authorities, including the current administration, have concluded that man-made emissions contribute to climate change and that it is prudent to take rapid steps to reduce those emissions. The Bush Administration's "US Climate Action Report 2002"[2] accepts and supports the conclusions of the NAS report alluded to above.
- Despite the strong and growing scientific consensus, many still debate the severity of impacts from increased GHG, including CO_2[3], and what should be done in response to rising GHG levels.
- Climate change is a concern at all levels, from local to global, and must be addressed at local, state, regional, national and international levels, with coordinated leadership.
- Options for reducing GHG emissions include conservation, process changes, development and adoption of new technologies and other approaches at all levels of society.
- CO_2 is only one of several (usually identified as five major[4]) greenhouse gases that affect the climate, but the CSA could be interpreted to only address CO_2.
- The emissions of CO_2 in North Carolina from known sources have been quantified by multiple studies. These studies provide data that are acceptable for purposes of problem assessment. However, for emission trading purposes, the protocols and documentation standards required may cause these estimates to be less than fully adequate.

Other energy savings programs exist that contribute, or have the potential to contribute, to the reduction of GHG emissions. For example, the proposed **NC Energy Plan** is closely aligned and based on similar principles and objectives.

- Currently, substantial reductions in emissions of CO_2 are expected to come from energy efficiency improvements and other measures to reduce fuel consumption, as identified in the State Energy Plan.
- The recognized most effective way to "control" CO_2 is to reduce or refrain from burning of carbon-based fuels.
- Scrubbers that control or reduce NOx or SO_2 emissions are not effective in significantly reducing CO_2 and
- Several DOE (and other) research projects aim to
    - increase efficiency of utility boilers
    - capture/sequester CO_2 from stacks, and
    - control these gases by new and innovative methods (such as injection of captured stack effluent into deep underground coal seams or brine pools).

However, these have not yet been proven fully successful or economically viable.

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[1] North Carolina Division of Air Quality, DENR, *CO_2 Emission Reduction Options for Coal-fired Electrical Utility boilers and Other Stationary Sources, First Interim Report,* September 2003.

[2] Climate Action Report, http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsUSClimateActionReport.html, US Department of State, Washington, DC, May 2002.

[3] Status of the Kyoto Protocol; The United Nations Framework Convention on Climate Change, July 2003.

[4], US DOE, Energy Information Administration, Washington, DC ,*Emissions of Greenhouse Gases in the United States 2001*, DOE/EIA-0573, December 2002.

Acronyms Used in This Report

AEFL - Amine-Enhanced Flue Lean Gas Reburn
CAA – Clean Air Act – Primary federal statute governing clean air requirements
CAFO – Confined Animal Feeding Operation
CAIR – Clean Air Interstate Rule
CAPA – Clean Air Planning Act – Carper Bill
CCAR – California Climate Action Registry
CCSP – Climate Change Science Program
CEM – Continuous Emission Measurement
CHP – Combined Heat and Power
CO_2 – Carbon Dioxide – the major global warming gas
CPA – Clean Power Act - Jeffords-Waxman Bill
CSA – North Carolina Clean Smokestacks Act (See inside cover for full text and title)
CSI – Clear Skies Initiative (or Act) – Proposal for revised CAA legislation by the Bush Administration (also recently referred to as synonymous with the CAIR)
DAQ – North Carolina Division of Air Quality
DENR – NC Department of Environment and Natural Resources
DOA – Department of Agriculture (US or NC)
DOE – The US Department of Energy
EPC – Energy Policy Council
EMC – Environmental Management Commission (NC)
EPICI – Electric Power Industry Climate Initiative
ERC – Environmental Review Commission (NC)
EPA – US Environmental Protection Agency
GHG – Greenhouse Gas(es)
GWP – Global Warming Potential
HFC's - Hydroflurocarbons
HVAC – High Volume Air Conditioning
IGCC – Integrated Gasification Combined Cycle
IPCC - Intergovernmental Panel on Climate Change, international authority on climate change
kWh – Kilowatt hour (1000 watts for one hour)
LNB – Low NOx Burner
LoGESO – Local Government Energy Savings Organization
NAAQS – National Ambient Air Quality Standards
NAS - National Academy of Science
NASA – National Air and Space Administration
NASEO – National Association of State Energy Officials
NC – North Carolina
NCCA – North Carolina Climate Action (Registry)
NCSU – North Carolina State University
NESCAUM - Northeast States for Coordinated Air Use Management
NHCPS – New Hampshire Clean Power Strategy
NSF – National Science Foundation
MOU – Memorandum of Understanding

MW – Mega-watt; millions of watts
NOAA – National Aeronautics and Space Administration
NOx – Oxides of Nitrogen, including NO_2, the primary nitrogen species from combustion
OFA – Overfire Air
PFC's - Perfluorocarbons
PTC – Production Tax credit
RGGI – Regional Greenhouse Gas Initiative (NESCAUM)
ROFA – Rotating Opposed-Fired Air
ROTAMIX – Injection of Ammonia to further reduce NOx (Used in combination with ROFA)
RPS – Renewable Portfolio Standard
SCR – Selective Catalytic Reduction
SCRUB – Wet scrubber for SOx
SEO – State Energy Office of NC
SEP – State Energy Plan of NC
SNCR – Selective Non-Catalytic Reduction
SO_2 – Sulfur Dioxide
SOx – Oxides of Sulfur, including SO_2, the primary combustion product of sulfur
SUV – Sport Utility Vehicle
TFS2000 – Combination Low-NOx Burner/Overfire Air
tpd – tons per day
UNFCCC - United Nations Framework Convention on Climate Change
WIR - Underfire Air

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CHAPTER I EXECUTIVE SUMMARY

Introduction

The Clean Smokestacks Act (CSA) was passed and signed into law in June of 2002 by the North Carolina General Assembly and Governor Easley, respectively. This Act requires the Division of Air Quality (DAQ) to complete studies and make specific recommendations to the North Carolina Environmental Management Commission (EMC) and the North Carolina Environmental Review Commission (ERC) by September of 2003, 2004 and 2005 regarding CO_2 emissions from coal-fired power plants and other stationary sources. DAQ provided the First Interim Report to these two bodies in September of 2003. This Second Interim Report updates, and expands upon, the information presented in that report and begins to outline options that might be considered for recommendations in the 2005 report. Much of the information presented in this report was gained through additional literature searches and reviews and from information presented in a workshop held with stakeholders, national experts and interested parties in April 2004 (See Appendix A). DAQ continues to be open to new ideas and solicits your continuing input.

This Executive Summary is intended to list and highlight the range of options available from which to develop possible recommendations from which to choose for inclusion in the final report in 2005. This report does not make such choices this time. The process for reaching these decisions will include a continuing stakeholder process, expected to be reconvened in the spring of 2005. The remainder of this report provides additional discussion, details and highlights of options available. The intent is for the reader to use this Executive Summary to identify options and areas that they may wish to explore in more detail in other Chapters.

Main Findings in This *Second(2004) Interim Report*:

Some main points or findings summarized in this report are:

- According to the EPA, North Carolina ranks 14th among the states in total CO_2 emissions.[5]
- Our state's CO_2 output has grown steadily along with rises in energy consumption, increasing by more than 30 percent since 1990.[6]
- Currently more than 70 percent of North Carolina's energy comes from fossil fuels[7], and
- Residential energy consumption is expected to increase by about 50 percent by 2020.[8]
- Other GHG continue to be considered important in addition to CO_2.
- "End of Stack" solutions are not viable and practical for removal of CO_2 from stacks of power plants or other stationary sources at this time, but may be available over a longer term of several years.
- Costs of inaction to address climate change for North Carolina are projected by scientists and many others to be significant.

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[5] US EPA, *States Ranked By Total Carbon Dioxide Emissions*, http://yosemite.epa.gov/globalwarming%5Cghg.nsf/ElAStatesRankedbyTotalEmissionsAll?openview&count=52.

[6] US EPA, http://yosemite.epa.gov/oar/globalwarming.nsf/content/EmissionsStateEnergyCO2Inventories.html.

[7] Energy Information Administration, Department of Energy, *Energy Expenditures in North Carolina, 1999; State Energy Profile*, www.eia.doe.gov/emeu/sep/nc/frame.html.

[8] North Carolina Energy Division, *North Carolina Energy Outlook, 2003*, Appendix Table, p. 92. Increase estimated from a 2000 baseline.

- A number of other states continue to take action on climate change in the absence of federal legislation. However, as this document was being finalized, the Bush administration made announcements regarding new affirmation that man's actions are definitely a part of the global climate change problem and that increased efforts to make reductions are appropriate. This announcement may spur new federal actions.
- There are potential benefits to various sectors of North Carolina's economy if the State is adequately prepared for the potential carbon marketplace, subject to the timing and structure of national carbon caps.
- There are also significant potential economic paybacks for non-utility sectors of the economy. Investments in development of an infrastructure to reduce carbon combustion (and other GHG equivalents) in other sectors will also help to assure that North Carolina is a leader in development and manufacture of new technologies. In so doing, industry and other institutions can be prepared to provide research, equipment, expertise and services to facilitate these needed changes occurring state-wide, nationally and globally.
- It is likely feasible to take positive actions to develop North Carolina procedures and processes that will result in a climate change registry process whereby the State will become part of a global solution with relatively minor impact upon public resources.
- Efforts and developments in the national, regional state and global arenas continue, (almost daily) and will necessarily influence choices of the next best and sensible steps for North Carolina.

Potential Option Levels for Satisfying the CSA Requirements

In light of the global and national momentum, and because of the risks and opportunities climate change poses for our state, many are convinced that North Carolina must prepare its economy and its people for a carbon-constrained world. Carbon dioxide and other greenhouse gas (GHG) emissions can be reduced by an array of solutions, including end-of-pipe technologies (now being researched), increased energy efficiency (such as encouraged in the State Energy Plan), greater use of renewable energy, carbon sequestration in trees and agricultural lands and incentives for lower emitting vehicles. Many of these steps can be implemented now. Some may need to be addressed later. Some solutions will likely need to be accomplished by adoption of new governmental policies; some with new State rules based on existing authorities, and others may require new legislation. Policy and legislative changes that are under consideration for the U.S Congress nationally will also likely have important impacts on efforts and steps in North Carolina, especially as needed to avoid redundancy and confusion.

This second interim report examines a wide range of options for reducing our State's GHG emissions and working with others to reduce the U.S. and global emissions. This report is thus intended to serve as an information source to aid DAQ, and stakeholders in developing recommendations for the North Carolina ERC and the EMC, as required by the CSA. Following submittal of this second interim report, the Division will begin developing an initial draft final report outlining proposed recommendations for North Carolina. That draft report is expected to be ready to begin stakeholder review by Spring 2005. Final revisions of that report, including final recommendations, will then follow by September 2005. The final recommendations will likely be developed from the list of options, or combinations thereof highlighted below, under five main groupings:

A. Take no action and default to potential federal and international actions to address the problem of requiring and defining means to achieve "CO_2 controls" (i.e. reductions) at some undetermined time in the future.

B. Commit to future actions, but only after further studies. This option would require the State to first undertake and complete additional studies and pursue more detailed analyses (requires new funding and other resources) involving multiple State agencies and academic institutions to further refine the options and actions.

C. Take a moderately more aggressive approach of accounting and reductions that would be designed with a combination of voluntary and required steps to maximize reductions in GHG, in conjunction with energy efficiency measures that result in a minimum of cost impacts.

D. Develop aggressive plans and take actions to set a cap on all GHG emissions; with reference and focus toward CO_2 from coal fired boilers, other stationary sources (combustion-centered, primarily) and transportation sources. This option would involve a significant mandatory reporting and accounting system to would guarantee that North Carolina does its share of leading and attainment of international goals, using established national and internationally accredited protocols and data storage capabilities.

E. A combination of either, or both, of the two previous options, but developed and implemented as part of an integrated multi-state energy and carbon emission reduction (Climate Action) plan.

Some Candidate Actions to Achieve the Major Options Outlined Above:

The items listed below is not necessarily complete, but helps define a range of actions and programs that may be considered for components of the larger overall options outlined above to develop the final recommendations for September 2005:

1. Develop/implement caps for reducing emissions all GHG pollutants (expressed in carbon equivalents) from all major sectors in the State
2. Develop/implement requirements for improved fuel mileage from motor vehicles owned both by the State and by the public
3. Institute a program and target for across the board reductions in use of energy use by State government in North Carolina, with credits for these reductions being quantified and used for possible "cap and trade" programs within the State
4. Initiate a program and policy resulting in an incremental movement toward shifting all electricity purchased by the State government to be through the NC GreenPower renewable resources program
5. Develop and incorporate applicable GHG-friendly policies and requirements in to the State Implementation Plan revisions for ozone and particulate matter (PM 2.5) to the maximum level that is feasible
6. Develop processes and policies to implement new technologies such as IGCC at the earliest possible stage to maximize reductions and maximize efficiencies over the longer term, especially before anticipated replacement of existing power generation capacity in North Carolina
7. Develop/implement a meaningful and detailed emission registration requirement, eventually with third party verification and salable and tradable carbon credits, including strict tracking and accounting of all areas covered by the State Energy Plan, and including consideration for a sector for quantifying natural emissions
8. Develop policies, incentives and systems/programs to encourage complete conversion for using waste from animal operations to its maximum as an energy resource
9. Develop/implement innovative policies that encourage reductions in utility generation and emissions while providing incentives for utility companies to endorse and aggressively assist in achieving such reductions.
10. Maximize the application and effects of the State Energy Plan with tracking of each sector
11. Develop more extensive plans, policies and incentives for use of forest resources for sequestration and for renewable energy (while avoiding double counting)
12. Revisions in net metering limitations and support of passage of new net metering laws
13. Expand study and potential development of renewable and non emitting energy sources and policies related thereto for such categories as:
    a. NC GreenPower in both private and government sectors
    b. Solar
    c. Wind and "geo-power"
    d. Bio fuels, etc.

14. Develop and participate in implementation of significant multi-state energy and carbon emission reduction (Climate Action) plans, involving stakeholder processes where possible
15. Fund and otherwise encourage programs at North Carolina universities to develop energy efficient and carbon-minimized technologies for North Carolina and world markets
16. Aggressively pursue development and nurturing of energy and carbon minimization technology research and manufacturing developments, along with promoting these research programs and manufacturing industries in the state
17. Develop a North Carolina Climate Action Registry that involves mandatory reporting and targets, recognizes existing reporting avenues, and includes reporting by the State sources, all using State guidance and requirements for submittals, but with the DOE 1605 (b) registry being the depository (with a minimal reporting requirement for largest sources only – not geared toward a "State-run" trading system)
18. Develop a basis for an emission credits (trading) program to be administered by private sector resources and motivation
19. Develop further options and plans to integrate IGCC technologies into future planning for energy generation in the state with a future option for geological sequestration
20. Make major recommendations to the North Carolina General Assembly regarding how to potentially alter the utility planning process to allow or provide for earlier input with the earliest possible identification of opportunities for potential encouragement or requirement of new technologies
21. And other similar policies and processes that may be identified.

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If a man will begin with certainties, he shall end in doubts, but if he will be content to begin with doubts, he shall end in certainties. - Sir Frances Bacon

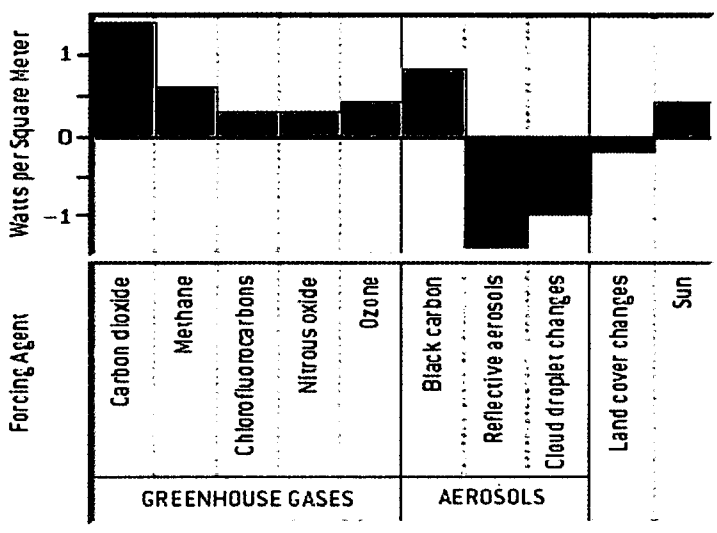
CHAPTER II BACKGROUND - NORTH CAROLINA'S CSA AND CLIMATE CHANGE

The text of the Clean Smokestacks Act (CSA) Section 13 appears on the inside of the cover page of this report, for convenience. The reader may also wish to review the First Interim Report (September 2003) or the summary on page v of this report, for further background and "state of the science" discussions not repeated in this report.

Pollutant Definitions and Other Terminology

The text of the CSA directs the Division to study CO_2, which is by mass or volume, the largest quantity of greenhouse gas (GHG) emitted by coal-fired utilities. It is also the largest effective component of the inventory of GHG emitted from all sources. However, as discussed in the First Interim Report other GHG, such as methane, N_2O, halocarbons, and others exist throughout the atmosphere and are contributory to warming of the oceans and Earth's atmosphere, with substantially more "warming effectiveness" per molecule than CO_2. For example, methane is 21 times more "potent" than CO_2. Other major contributors to atmospheric warming often overlooked and not addressed in these discussions are water vapor and particulate matter. Recent information provides evidence that "black carbon" particulate matter and nitrogen oxides, such as emitted from diesel vehicles, make significant contributors to climate change.[9] The Intergovernmental Panel on Climate Change (IPCC)[10] suggests that the effects of one ton of black carbon could equal that of about 200 to 600 tons of carbon dioxide when translated to temperature impacts. Although this document uses other GHG terms in places, the distinct identity and focus on CO_2 has also been retained for reference and completeness. Figure II-1 provides a pictorial representation of the relative impact of the various major GHG.

Figure II - 1[11]



[9] J. E. Hansen and Miki, Sato. *Trends of measured climate forcing agents.* Proc. Natl. Acad. Sci. 98, 14778-14783, 2001

[10] Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis*, http://www.grida.no/climate/ipcc_tar/wg1/

[11] James E. Hansen, *Climate Forcings, 1850 – Present*, Scientific American, March 2004.

A related terminology question also exists regarding global warming gases, GHG or "climate change gases." The terms are sometimes used almost interchangeably though there are variations in meaning. ["**Climate change**" specifically refers to changes in long-term trends in the average climate, such as changes in average temperatures. Depending on usage, it may mean changes due to natural factors and variability, or as a result of human activity. **"Global Warming"** refers to the progressive gradual rise of the Earth's average surface temperature thought to be caused, in part, by increased concentrations of GHG in the atmosphere.][12] In this document, we use the term "GHG" for convenience, though the more applicable term might be "Climate Change Gases."

In most sections, the CSA is specifically applicable to coal fired power plants. However, in the language of Section 13, the scope includes "other stationary sources." Therefore, the scope of this report and study effort is not limited solely to the utility industry and discussions refer to other major sources generating GHG, such as motor vehicles (which, of course, are not stationary).

Review of Concerns About Global Warming and Climate Change

As was stated in the First Interim Report, evidence has been accumulating that the Earth is warming and that this warming is occurring in close parallel to the levels of CO_2 in the atmosphere.[13]. Man made emissions of CO_2 have been increasing at a significant rate since the Industrial Revolution when the combustion of fossil fuels and other carbon fuels began to accelerate at a very rapid rate. Recent measurements show that atmospheric concentrations of CO_2 have been rising, and continue to rise at a rapid rate. Figure II-2 shows a plot of actual ambient concentrations of CO_2 at one of the most representative sites in the world at a high elevation in Hawaii. Similar relationships have been established with levels of CO_2 and temperature, as discussed in the First Interim Report.

Internationally, scientists have been discussing the growth of the CO_2 and other GHG in the atmosphere for many years and have been drawn into two camps regarding the effects of man made changes to a historic cycle of global warming and cooling. Various international scientific bodies and the National Academy of Sciences have concluded however, that the concerns for the impact of man-made emissions are warranted and that governments must take immediate actions to reduce these emissions. We must consider both the shorter term and the long term impacts of our actions and practices. These concerns and considerations have prompted efforts all over the globe to do something but it has not been well coordinated or orchestrated for these actions to be universal and consistent. It is likely that a leadership role by North Carolina could help make a transition to a more aggressive set of reduction policies and actions, albeit not necessarily focused exclusively on the coal-fired electric power generation units. Even as this document was being prepared for final publication, the President announced additional information and agreement among scientists that man's role in the climate change phenomenon must be revised and further steps taken to mitigate the

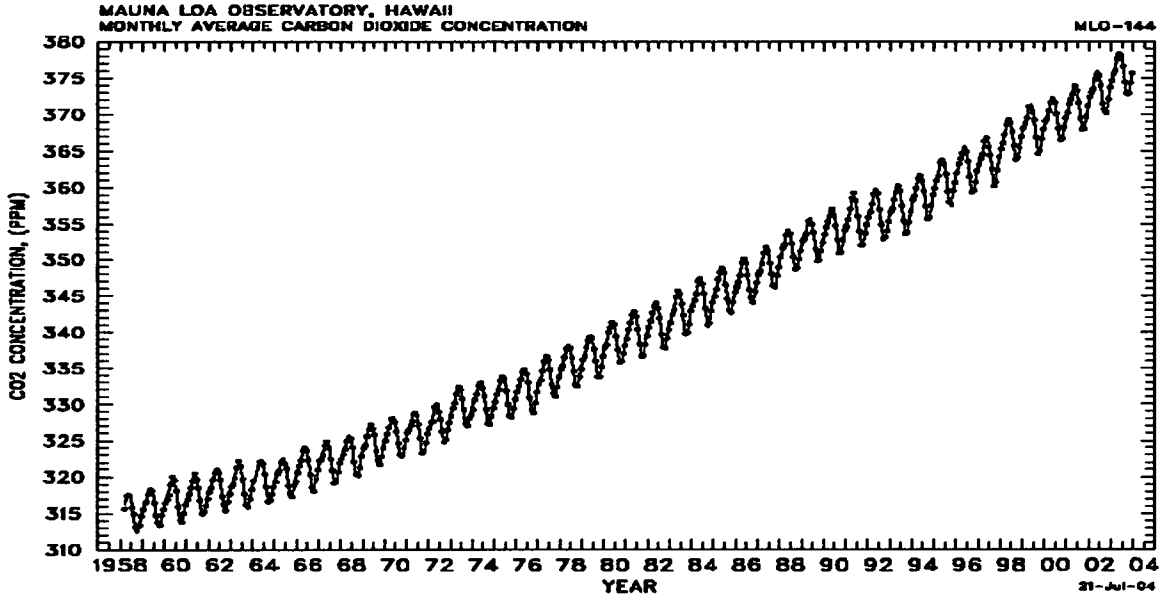
[12] The Pew Climate Change Center, *Global Warming Basics*, http://www.pewclimate.org/global-warming-basics/

[13] Wiley Barbour, *History and Transitions of Global Warming Programs and Policies*, Environmental Resources Trust, Inc., NC DAQ CO_2 and Mercury Workshop, Raleigh, NC, April 19, 2004 (See Appendix A).

emissions of GHG.[14] In addition, new reports out of Europe have also defined more evidence of the changes taking place there and around the globe.[15]

Figure II-2

Atmospheric CO_2 Measurements from Mauna Loa Observatory (Since 1958)



A article by Leonard David, Senior Space Writer with NASA, recently summarized and commented on a National Research Council report: "Abrupt climate changes in the last few thousand years generally have been less severe and affected smaller areas than some of the changes further back in the past. Nonetheless, evidence shows that rapid climate changes have affected societies and ecosystems substantially, especially when the changes that brought persistent droughts occurred in regions with human settlements, there is no reason to believe that abrupt climate changes will not occur again."[16] The NRC report also underscored the importance of not being fatalistic about the threats posed by abrupt climate change. "Societies have faced both gradual and abrupt climate changes for millennia and have learned to adapt through various mechanisms, such as moving indoors, developing irrigation for crops, and migrating away from inhospitable regions." The study group added: "Nevertheless, because climate change is likely to continue and may even accelerate in the coming decades, denying the likelihood or downplaying the relevance of past abrupt changes could be costly. Societies can take steps to face the potential for abrupt climate change."[17] Figure II-3 below (also see

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[14] U.S. Climate Change Science Program, *Our Changing Planet*; a Report by the Climate Change Science Program and the Subcommittee on Global Change Research, Washington, DC, July 2004.

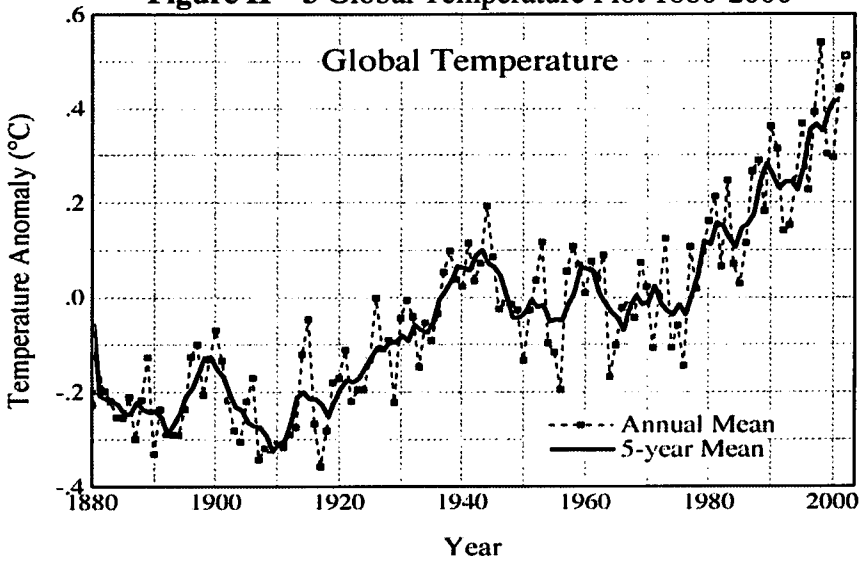
[15] European Environment Agency, *Impacts of Europe's changing climate,* August 18, 2004. http://reports.eea.eu.int/climate_report_2_2004/en/tab_abstract_RLR

[16] Leonard David, Senior Space Writer, NASA, June 2004, http://www.space.com/scienceastronomy/geoengineering_040601.html

[17] *Ibid.*

similar graph on cover), produced by NASA,[18] provides convincing evidence that the global temperature is increasing, even though the increments of change may seem small.

Figure II – 3 Global Temperature Plot 1880-2000



Eileen Claussen, President of the Pew Center on Global Climate Change, recently gave a talk on "Global Climate Change and Coal's Future." In this talk, she said "Warming by itself, of course, is not proof of global warming. Climate conditions vary naturally, as we all know, and I am sure you have heard arguments that such natural variability, whether caused by volcanoes or the sun, can account for the climate change we've seen in recent decades. But when scientists actually take a look at the relative importance of natural vs. human influences on the climate, they consistently come to the same conclusion. And that is this: observed climate change, particularly that of the past 30 years, is outside the bounds of natural variability. Atmospheric concentrations of carbon dioxide are more than 30 percent higher now than they were just a century ago. Despite what you may hear, this increase in carbon dioxide is undeniably human in origin, and it is the only way to explain the recent trends in the global climate."

Review of Sources of CO_2 in the U.S. and in North Carolina

For about a thousand years before the Industrial Revolution, the amount of greenhouse gases in the atmosphere remained relatively constant. Since then, the concentration of various greenhouse gases has increased dramatically. The amount of CO_2, for example, has increased by more than 30 percent since pre-industrial times and is still increasing at a rate of about 0.4 percent per year, mainly due to the combustion of fossil fuels and deforestation. Although natural emissions of CO_2 are significant, we know that this increase is anthropogenic because the changing isotopic composition of the atmospheric CO_2 betrays the fossil origin of the

[18] National Aeronautics and Space Administration, Goddard Institute for Space Studies, *Global Temperature Trends: 2002 Summation*, 2004. http://www.giss.nasa.gov/research/observe/surftemp/

increase. The concentrations of other natural radiatively active atmospheric components, such as methane and nitrous oxide (N_2O), are increasing due to agricultural, industrial and other activities. The concentrations of other nitrogen oxides (NO and NO_2) and of carbon monoxide (CO) are also increasing. Although the latter gases are not directly identified normally as GHG, they play an important role in atmospheric chemistry and GHG concentrations.[19]

Nationally, man-made emissions of GHG continue to grow, in spite of efforts and rhetoric to the contrary[20] (with residential leading the way with a 2.5 % annual growth in emissions). Although Duke Energy and Progress Energy, and other participants in voluntary GHG reduction programs, have proactively reduced their emissions substantially (from what they "would have been"), and are contributing to known reduction scenarios of over 266 tons/year,[21] these reductions do not offset growth. It is obvious that the reduction of statewide emissions in North Carolina will require actions for both transportation and electric generation and other sectors, to achieve success in reversing the slope of the North Carolina emissions trend line. Even then, it is important that the rest of the world follow the same pathways. Due to the large rates of growth of GHG emissions, immediate reductions to former "base case" conditions are not possible without application of new technologies or serious efforts to curtail the consumption (combustion) of fossil fuels. Other sources alone would not be able to achieve reductions on the order needed to reverse the growth trend to the level of 1990 or some earlier date or benchmark. To further exacerbate the situation, countries such as China are growing very rapidly and increasing their usage of, and emissions from, fossil fuels at a very rapid pace and their emissions contribute equally to global increases on a molecule by molecule basis.

Two of the largest source categories of man-made CO_2 in North Carolina are also coal fired power plants and transportation (automobiles, trucks, etc).[22] These two categories each make up in the neighborhood of 30 per cent of the total anthropogenic emissions, and both continue to grow.[23]

According to a recently released report from the DOE, U.S. energy-related CO_2 emissions in 2003 were up 0.9 percent from 2002 levels - from 5,736 to 5,788 million metric tons (MMT) of CO_2. Between 2002 and 2003, energy demand rose by 0.6 percent because high natural gas prices in 2003 resulted in a shift to higher carbon fuels, such as coal and petroleum, and a colder winter than the previous year, with a 3.8-percent increase in heating degree days, required more fuel (primarily natural gas) for home heating. CO_2 emissions in 2003 were below the 2000 level having fallen in 2001 by 1.8 percent and having grown by only 0.8 percent in 2002. [24]

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[19] Intergovernmental Panel on Climate Change (IPCC), ***Climate Change 2001: Working Group I: The Scientific Basis***, 2001, http://www.grida.no/climate/ipcc_tar/wg1/index.htm .

[20] Andrew Freedman, Greenwire - EIA Report,, *U.S. CO_2 Emissions Continue Rise on Strong Residential Growth* , July 2, 2004.

[21] The Center for Energy and Economic Development (CEED), *NC DENR Interim Report on CO_2 - Comments, August 2004.*

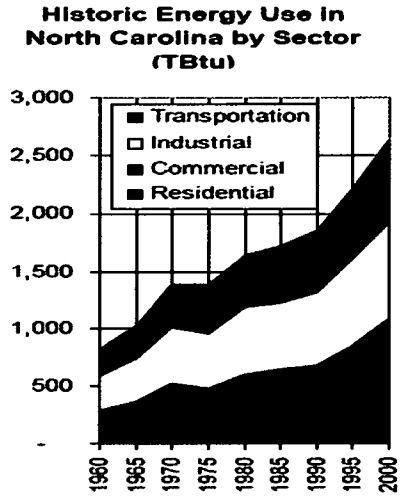
[22] North Carolina State Energy Plan, June, 2003, http://www.energync.net/State%20Energy%20Plan%2003.pdf .

[23] Appalachian State University , Department of Geography and Planning, North Carolina's *$ensible Greenhouse Gas Reduction $trategies*, Boone, NC 28608, January 2000, http://www.geo.appstate.edu .

[24] U.S. Department of Energy, Energy Information Administration, Office of Integrated Analysis & F orecasting, *U.S. Carbon Dioxide Emissions from Energy Sources 2003 Flash Estimate*, June 2004, http://www.eia.doe.gov/oiaf/1605/flash/flash.html

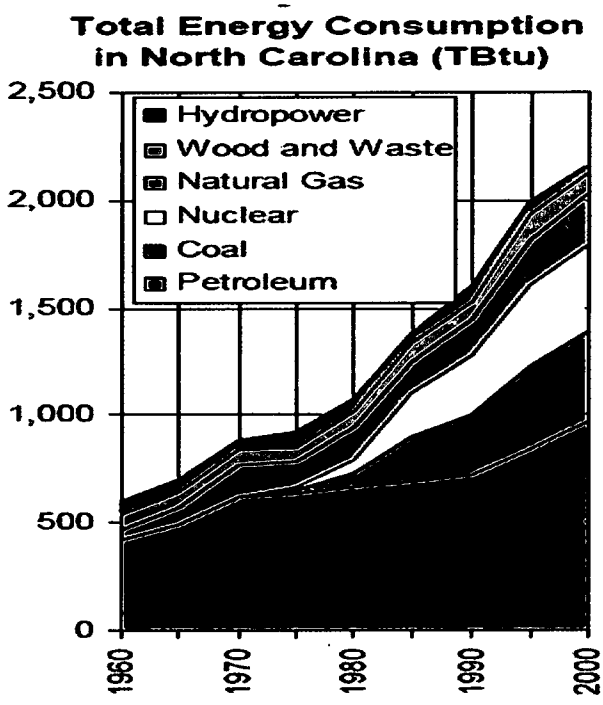
Figures II-4 and II-5 from the State Energy Plan provide graphic presentations of the distribution of energy consumption in North Carolina.

Figure II-4:



The largest single sector in terms of total energy use (including the energy consumed to generate electricity for the sector) is industrial at 31% of the total. Transportation is second largest with 28% of total energy use. The residential (23%) and commercial (18%) sectors, if combined, would demonstrate that the largest energy use in the state is in buildings at 41%.

Figure II-5



[25]

U.S. Energy-Related Carbon Dioxide Emissions

This report also shows that while coal produces the most CO_2 per unit of energy, petroleum produces a greater portion of the U.S. CO_2 emissions due to its larger consumption levels (transportation is a major component). Annual emissions growth from petroleum sources averaged 1.1 percent (1990 to 2003), annual emissions growth averaged 1.3 percent from coal and 1.0 percent from natural gas. In 1999, transportation-related CO_2 emissions overtook industrial emissions and remain the largest source of energy-related CO_2. Between 2002 and 2003, transportation CO_2 emissions grew 0.5 percent. Gasoline demand was up 1 percent, but a 35-percent increase in ethanol consumption helped to moderate direct emissions in the transportation sector. Between 1990 and 2003, transportation CO_2 emissions grew 19 percent (1.3 percent per year). Between 1990 and 2002, highway vehicle miles traveled grew by 32 percent (2.4 percent per year).

Between 2002 and 2003, residential CO_2 emissions grew by 2.5 percent as housing stock was up by 1.1 percent and heating degree-days were up by 3.8 percent. Between 1990 and 2003, residential sector CO_2 emissions grew by 28 percent (1.9 percent per year).

[25] North Carolina State Energy Plan, June, 2003, http://www.energync.net/State%20Energy%20Plan%2003.pdf.

This increase was driven by population growth of 17 percent (1.2 percent per year) and residential electricity demand growth of 39 percent (2.6 percent per year).

Between 2002 and 2003, CO_2 emissions from the commercial sector grew 1.3 percent as the economy grew by 3.1 percent and commercial employment rose 0.3 percent. Between 2002 and 2003, commercial sector electricity sales rose 0.4 percent, but CO_2 emissions rose 1.3 percent due to the higher carbon intensity of generation. Between 1990 and 2003, commercial sector CO_2 emissions grew by 33 percent (2.2 percent per year). This increase was driven by commercial sector employment growth of 32 percent (2.1percent per year) and commercial sector electricity sales growth of 46 percent (2.9 percent per year), again as stated in the DOE report referenced.

Between 2002 and 2003, *industrial energy-related* CO_2 emissions were unchanged; the index of total industrial output increased by only 0.2 percent. Between 1990 and 2003, energy-related industrial sector CO_2 emissions declined by 0.9 percent (-0.1 percent per year), while total industrial output grew by 44 percent and manufacturing output grew by 53 percent. By 2003, energy-intensive primary metals output was 1 percent below 1990 levels, while basic chemicals output was 6 percent below 1990 levels.

The energy quandary, as summarized by Eileen Claussen of the Pew Center for Global Climate Change in a recent speech, boils down to three questions. The first is energy supply (and therefore security) - can we find enough energy to meet our needs from sources that are secure? The second issue is climate change - can we provide the energy we need in ways that do not harm the climate? Last, but not least is the issue of cost or price - can we meet our energy needs in affordable ways that will allow us to continue to grow our economy? Looking across these three issues, it is clear that we need a climate-friendly energy policy on the one hand and an economy-friendly climate policy on the other. Some elements of these policies will be the same, but the important point is that we need to think broadly about how best to achieve the related goals of protecting the climate and meeting America's energy needs affordably in the decades ahead.[26]

For the electric generation sector, despite a 0.2 percent decline in generation, emissions increased by 44 MMT of CO_2 (2.0 percent) in 2003. Higher natural gas prices caused generators to switch to other, higher carbon fuels. Coal-powered emissions increased by 64 MMT (3.5 percent), while emissions from petroleum increased by 19 MMT (24.7 percent), and natural gas-powered emissions fell by 39 MMT (12.8 percent).

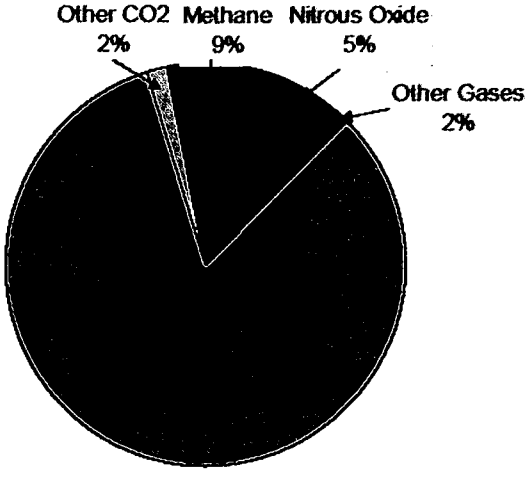
Of course, national statistics and conclusions do not translate on a one to one basis with the specifics for North Carolina, but the general trend and inclinations are similar. The emissions in the country as a whole affect the situation and conditions in North Carolina and the rest of the globe, though not necessarily on a straight line relationship. Figure II-

[26] Eileen Claussen, Pew Center on Global Climate Change, Energy *Efficiency, Climate Change and Our Nation's Energy Future,* June 16, 2004, Washington, D.C.

6 illustrates the relative importance of electric power to total CO_2 emissions in the U.S. Figure II-7[27] summarizes the overall fuel use trends for the U.S.

Figure II-6.

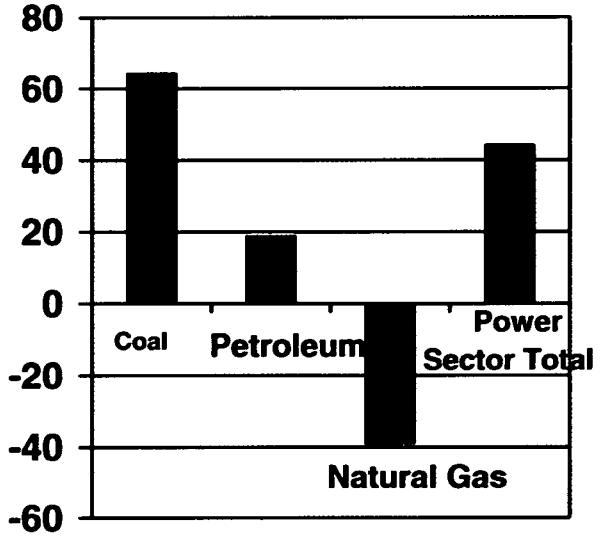
Energy-Related Carbon Dioxide Emissions are the Predominant Source of U.S. Greenhouse Gas Emissic 2002



Source: EIA, *Emissions of Greenhouse Gases in the United States 2002*

Figure II-7

Change in Electric Power CO2 Emissions by Fuel for the Total Power Sector, 2002 to 2003 in Million Metric Tons of CO_2



[27] U.S. Department of Energy, Energy Information Administration, Office of Integrated Analysis & Forecasting, *U.S. Carbon Dioxide Emissions from Energy Sources- 2003 Flash Estimate*, June 2004, http://www.eia.doe.gov/oiaf/1605/flash/flash.html

Weather and Climate Trends in the Southeast

Many climate changes have occurred over geologic history. Evidence of these trends exists in ice cores and other tools used by scientists to look back into the past. Analyses of recent data have shown[28] that temperature trends in the Southeast vary between decades, with a warm period during the 1920s through1940s, followed by a cooling trend through the 1960s. According to the cited reports, since the 1970s, temperatures have been increasing, with the decade of the1990's temperatures being as warm as the peaks in the 1920s and 30s. Annual rainfall trends show very strong increases of 20-30% or more over the past 100 years across Mississippi, Arkansas, South Carolina, Tennessee, Alabama, and parts of Louisiana, with mixed changes across most of the remaining area. There has been a strong tendency for more wet periods in the Gulf Coast states, and a moderate tendency in most other areas. Obviously, not all of these changes are due to human intervention. Changes in climate, by definition, occur over long periods of time, discounting year-to-year variations.

The cited report also summarizes that the Southeast is prone to frequent natural weather disasters that affect human life and property. Over half of the nation's costliest weather-related disasters of the past 20 years have occurred in the Southeast, costing the region over $85 billion in damages, mostly associated with floods and hurricanes. Across the region, intense precipitation events have increased over the past 100 years and this trend is projected to continue. The southern heat wave and drought of 1998 resulted in damages in excess of $6 billion and at least 200 deaths, not to imply that it was the result of or only the result of climate change from global warming.

Human health concerns arise from projected increases in maximum temperatures and heat index in the region. These concerns are particularly great for lower income households that lack sufficient resources to improve insulation and install and operate air conditioning systems. Air quality degradation in urban areas is also a concern associated with elevated air temperatures and increased emissions from power generation, which can increase ground-level ozone. The higher the temperatures, the more air conditioning that is used, further aggravating the situation. Increased flooding in low-lying coastal counties is also likely to adversely impact human health. Floods are the leading cause of death from natural disasters in the region and nationwide.

North Carolina Climate and Perspectives

The State Climate Office at North Carolina State University has studied changes in the state, and in DAQ's April 2004 workshop session, information was provided indicating that they have concluded that changes do occur that are due to human intervention and activities.[29] Even surface reflectivity modification activities such as paving of highways and parking lots cause changes in atmospheric temperature, as do changes in crops and the vegetative cover from agriculture and forestry practices. Actions all over the globe impactson the climate in North Carolina. Conversely, actions in North Carolina similarly

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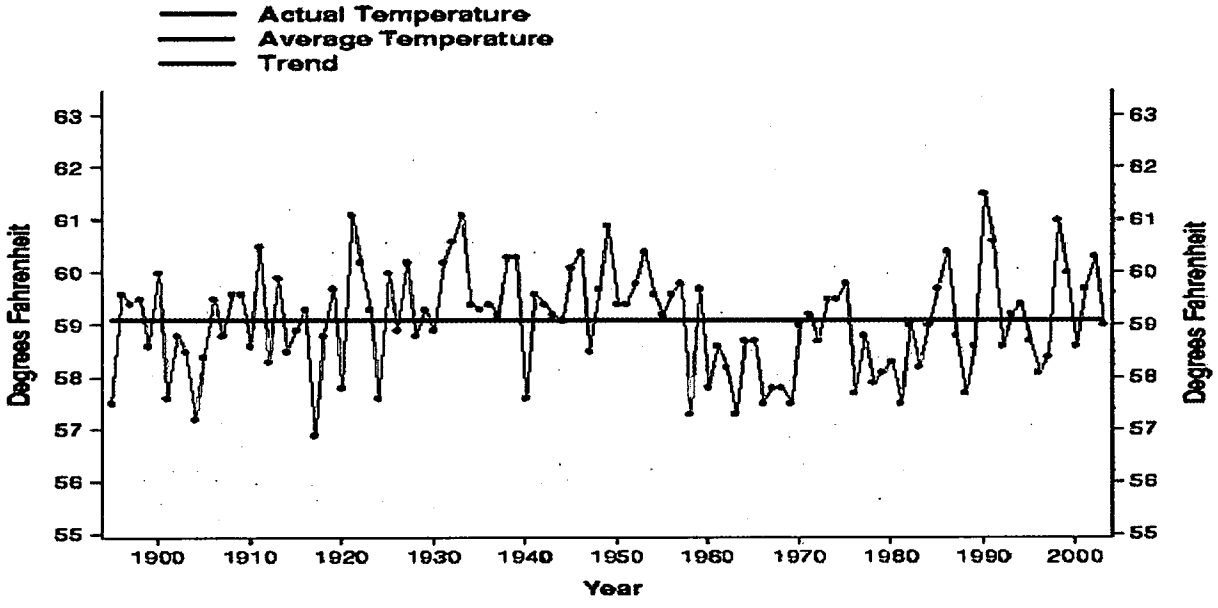
[28] Ezra Millstein, *The Potential Impacts of Global Warming on the Southeast*, World Wildlife Fund, from the First National Assessment of the Potential Consequences of Climate Variability and Change, http://www.climatehotmap.org/impacts/florida.html

[29] Bryan Boyles, Presentation to DAQ Mercury & CO_2 Workshop, April 19, 2004, Raleigh, NC (See Appendix A).

contribute to changes around the world. Very little association between real time changes in North Carolina emissions will be reflected in immediate and traceable change in the state, and little changes relative to the whole problem in the global sense. A 100+-year plot of temperatures in North Carolina from the National Climatic Center database (Asheville, NC) is shown in Figure II-8, showing a trend upward in recent years. Equally important are land use patterns, development, urbanization and changes in GHG.

Figure II-8
Statewide Average Temperature for North Carolina (1885-2004)
Source National Weather Records Center[30]



Implementing the CSA will result in reductions in sulfur dioxide (SO_2), and thus, the reduction of atmospheric sulfates. These sulfates result in formation of small particles in the air that also contribute to the greenhouse effect. As the CSA-required scrubbers are put on line and the reductions in SO_2 occur, the greenhouse effect is expected to be reduced somewhat by this effect. It is not possible to make this relationship quantitative, however.

The State Climate Office also indicates that there are good science reasons for North Carolina to begin to make reductions in GHG, including CO_2, and that it should start now.[31] The known science is represented through models, but the models are not sufficiently refined to be able to reflect all situations. However, the evidence and associations are strong. On the other hand, models and records allow for tracking of global changes over the past several years. These models don't make reliable predictions for the next 100 years, but can be accepted as directionally correct. They also do not do a

[30] National Climatic Data Center, *Climate at a Glance, North Carolina*, http://climvis.ncdc.noaa.gov/cgi-bin/cag3/hr-display3.pl.
[31] Bryan Boyles, Presentation to DAQ Mercury & CO_2 Workshop, April 19, 2004, Raleigh, NC (See Appendix A).

good job on local patterns, but are better for global changes. Precision is not good but general changes are directionally good. The projected numbers will likely continue to change over the next several years and decades.

North Carolina will be most vulnerable in the coastal areas if projections come true. Other changes may occur if warming and climate changes cause a migration of the "sweet spot" for growing various crops and natural vegetation. Some researchers[32] even project an increase in poison ivy, but again, this is speculation and not necessarily agreed to by all scientists and evidence.

If the global community does not reduce emissions of GHG significantly, some project that North Carolina will likely be left with a climate similar to that of central Florida,[33] a dramatically different coastline due to sea-level rise and subsequent inundation[34], an increased occurrence of heat-related asthma and death,[35] and hundreds of millions of dollars in losses from severe weather events.[36] However, it is argued that if sufficient reductions are implemented quickly, and globally, the costs associated with these impacts can be alleviated. At the same time, these actions can stimulate the State's economy, according to some advocates. Innovative, business-oriented policies that create a market for GHG, or equipment for their reduction will potentially align environmental goals with business goals and generate revenue is a strong argument for action.

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[32] William H. Schlesinger, Duke University, Nicholas School of Environment and Earth Sciences, Panel Presentation at the May 2004 NC Climate Education Partnership.

[33] *Ibid.*

[34] Union of Concerned Scientists, *Impacts of Climate Change in the US*, October 2003, http://www.climatehotmap.org/impacts/florida.html. .

[35] Physicians for Social Responsibility, "*Death By Degrees: The Health Impacts of Climate Change in North Carolina*," March 2001.

[36] National Weather Service, Office of Climate, Water, and Weather Services, "*State Summary Statistics 2003*."

CHAPTER III IMPACTS AND ECONOMICS OF CLIMATE CHANGE

It is not possible to provide an original, complete, authoritative discussion and analysis of all physical and economic impacts for North Carolina within the confines and limitations of this report and the information available. However, some general tendencies and observations can be made. That is the purpose and intent of this chapter.

A Backdrop of Growth in Southeastern States

The Southeast "sunbelt" continues to be a rapidly growing region with population increasing by more than 30 percent between 1970 and 1990. Much of this growth occurred in coastal counties with expectation that this growth will continue for the several years. The number of farms in the region decreased 80 percent between 1930 and 1997, but still produces roughly one quarter of US agricultural crops. The Southeast has become America's "wood basket," producing about half of America's timber supplies. The region also produces a large portion of the nation's fish, poultry, tobacco, oil, coal and natural gas. Prior to European settlement, the landscape was primarily forests, grasslands, and wetlands, but by 1920, most of the native forests were converted to managed forests and agricultural lands. Although much of the landscape has been altered, a wide range of ecosystem types exist and overall species diversity is high.[37]

Projected Climate Change Impacts

The United Nation's Intergovernmental Panel on Climate Change (IPCC) projects that, because of elevated concentrations of GHG in the atmosphere, the rate of sea level rise for the next 100 years is likely to be at least double the rate that we have experienced over the last century. The IPCC estimates that sea levels in the Atlantic Ocean are likely to rise 19 inches by 2100, and could rise by as much as 36 inches in the same period if GHG emissions go unchecked. If these projections are experienced, by 2030, there could be a 10-inch sea level rise along the North Carolina coast. The effects of potential further melting of the Greenland and Antarctic ice sheets are not included in these scenarios. Recent research suggests that this melting could have a faster and even more serious impact on sea-level rise than previously thought.[38, 39, 40] Of course, not all scientists are in agreement with these conclusions or projections, but the consensus continues to grow.

Tools such as climate models are often used to integrate the complex interactions and effects to provide a basis for conclusions. Such climate model projections exhibit a wide range of plausible scenarios for both temperature and precipitation over the next century. Two commonly used models are the Hadley Model and the Canadian model.[41] Results of such models, though often challenged, are generally accepted as the best available basis for

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[37] Ezra Millstein, *The Potential Impacts of Global Warming on the Southeast*, World Wildlife Fund, from the First National Assessment of the Potential Consequences of Climate Variability and Change, http://www.climatehotmap.org/impacts/florida.html

[38] H.J. Zwally, Abdalati, W., Herring, T., Larson, K., Saba, J., and Steffen, K., *Surface melt induced acceleration of Greenland ice-sheet flow*, **Science**- 297, 218-222, 2002.

[39] J. Hansen, *Defusing the global warming time bomb*, **Sci. Amer.**, 290, no. 3, 68-77, 2004.

[40] Quirin Schiermeier,. *A Rising Tide*, **Nature**, 421, 114-115, 2004.

[41] Ezra Millstein, *The Potential Impacts of Global Warming on the Southeast*, World Wildlife Fund, from the First National Assessment of the Potential Consequences of Climate Variability and Change, http://www.climatehotmap.org/impacts/florida.html .

projections and have been endorsed by the National Academy of Science.[42] Both of the principal climate models were used in the National Assessment project,[43] and both indicated warming in the Southeast, but at different rates. The Canadian model shows the Southeast experiencing a high degree of warming, which further translates into lower soil moisture as higher temperatures increase evaporation. The Hadley model simulates less warming and a significant increase in precipitation (about 20 percent). Some models suggest that rainfall associated with El Niño and the intensity of droughts during La Niña phases will be intensified as atmospheric CO_2 increases.

In addition to seal level rise, many areas along the North Carolina coast are believed to be sinking by about 7 inches per century. This means that some areas of coastal North Carolina may likely experience an accelerated rate of inundation, regardless of climate effects. A sea level rise (or sinking of the land mass) of less than 14 inches would likely inundate about 770 square miles of the North Carolina coast, an area nearly the size of Great Smoky Mountains National Park.[44] The State's coastal wetlands and other low-lying areas could be flooded, and the Albemarle and Pamlico sounds could become open waters. The North Carolina coastal areas are already some of the most vulnerable to extreme weather events in the U.S., and even low-intensity storms create billions of dollars in damage.[45] The combined effects of rising seas and sinking lands could drastically change much of our coastline and barrier islands, increase vulnerability to storms, and put billions of dollars of coastal property at risk.

Assuming these projections are fulfilled, traditional approaches such as flood levees, elevated structures, and building codes, will not be adequate alone to prevent or even manage damage in the coastal zone as sea level rise would continue to increase the threat of storm-surge flooding in virtually all Southeastern coastal areas. Improvements in risk assessment, coastal and floodplain management, linkage of insurance to policies for mitigating flood damage, and local mitigation planning might help decrease potential economic impact. Changes in climate and sea-level must be integral parts of coastal communities develop strategies for hazard preparedness and mitigation.[46]

Potential Economic Impacts Associated with Climate Inaction

Associating "real" economically defensible costs with any particular inaction is difficult and speculative at best. However, according to a report prepared for the United Nations Environment Program, "Worldwide economic losses due to natural disasters appear to be doubling every ten years, and have reached almost $1 trillion over the past 15 years. If current trends persist, the annual loss amounts as estimated by UNEP, will come close to US $150

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[42] Climate Change Impacts on the United States: *The Potential Consequences of Climate Variability and Change,* A Report of the National Assessment Synthesis Team, U.S. Global Change Research Program, www.usgcrp.gov/ .

[43] U.S. Global Change Research Program , *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change,* A Report of the National Assessment Synthesis Team, www.usgcrp.gov/.

[44] Ben Poulter, Duke University, and Sam Pearsall, *The Nature Conservancy*, 2003.

[45] D.H. Levinson and Waple, A.M, *State of the Climate in 2003*, Bulletin of the American Meteorological Society Vol. 85, No. 6 June 2004.

[46] , U.S. Global Change Research Program, Climate Change Impacts on the United States: *The Potential Consequences of Climate Variability and Change,* A. Report of the National Assessment Synthesis Team, www.gcrio.org/NationalAssessment/.

billion within the next decade.[47] North Carolina's share of this estimate would also be difficult to assess. However, according to one report, in 2002, North Carolina experienced more than $678 million in weather-related losses and government expenditures.[48] This is not to imply a direct relationship with climate change, but there is certainly an expected connection.

Tourism has definite potential for economic impacts if the climate projections hold true, especially with regard to a rising sea level. In 2001, tourism in North Carolina's 20 coastal counties generated an economic impact of nearly $1.8 billion. Accelerated sea-level rise would threaten this revenue and billions of dollars worth of property.[49] The costs of health, agriculture and other related costs would likewise be large.

However, there are also potential benefits and opportunities associated with development of renewable energies, improvements in energy efficiency and related technologies in the state. According to California studies, renewable energy development can generate even more jobs than fossil fuel-based energy production on a common basis of megawatt delivered.[50]

Nothing affects the business climate of a company as much as making a profit, or not. That is a basic reason why the company exists and is in business. If the environmental, such as greenhouse mitigation, effort generate additional income, this tends to get the attention of the management of the company and is likely to lead to further rewarding experiences.

Weather-related Stresses on Human Populations

The US experienced 42 weather-related disasters over the past 20 years that resulted in extensive damage and costs in excess of $1 billion each; 23 of these occurred in the Southeast, mostly in the form of floods and hurricanes. Projected sea-level rise could increase the risk from flooding to low-lying coastal counties from the Carolinas to Texas, which could adversely impact human health, threaten lives and cause extensive economic damage. Heat waves also take their toll; the southern drought of 1998 resulted in damages in excess of $6 billion. The same year, a combination of an unusually wet winter, dry summer and high heat led to wildfires in Florida that burned roughly 500,000 acres of land. Heat waves increase the risks of heat related illness and mortality and increase ozone production affecting primarily the elderly, the young and those who are already suffering from respiratory or other illnesses. While these are natural occurrences, climate induced changes to them can likely increase similar effects.[51] Such increases cause individuals to experience increased economic loss, increased stress from concern and worry over their physical plight and subsequent or related economic security.

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[47] *Climate Change and the Financial Services Industry: Module 1 – Threats and Opportunities*, United Nations Environmental Program and Innovest, http://www.innovestgroup.com/.

[48] Beth Lander, *The Costs of Inaction*, US PIRG Education Fund, 2003.

[49] *The Coastal Zone Management Act in North Carolina*, National Oceanic and Atmospheric Administration, US Department of Commerce, 2003.

[50] Karen Rindge, *Renewable Energy: Good for NC's Economy*, Carolina Sun, Summer, 2004

[51] Ezra Millstein, *The Potential Impacts of Global Warming on the Southeast*, World Wildlife Fund, from the First National Assessment of the Potential Consequences of Climate Variability and Change. http://www.climatehotmap.org/impacts/florida.html.

Climate Change Effects Projected for Southeastern Forests

Evidence from long term monitoring indicates that climate change would likely affect individual growth rates directly by way of overall warming or change in regional moisture balance. Information presented at DAQ's April 2004 Workshop indicates an increased growth rate in trees and other vegetation will occur due to such changes.[52] Climate shifts will also likely affect tree mortality and recruitment rates by altering the frequency and intensity of stand disturbances. Results suggest that disturbance effects are stronger and quicker than growth effects. Because individual trees grow quickly and the species involved are not particularly long-lived, responses to climatic change could be relatively rapid. In natural area preserves, Chinese tallowtree and other non-native woody species (including poison ivy) may become more important if disturbances increase. In commercially managed forests, increasing disturbance rates may result in higher timber losses.

The variety of spatial and temporal influences on forest processes, coupled with uncertainties associated with climate prediction, makes difficult the assessment of the effects of changes in climate on forest dynamics at the ecosystem level. Nevertheless, research at Rice University not only identifies specific climatic effects on particular life stages or processes, but it also provides critical information for improving our understanding of the context within which these effects are likely to occur.[53]

Background on Emissions Trading Programs

In the last two decades, emissions' trading has emerged as a favorable policy mechanism to reduce air pollution. This market-based approach can often cost-effectively reduce selected air pollutants by allowing businesses to buy, trade and sell their "rights to emit" specific pollutants. If companies reduce their emissions below the limits set by government caps, they can sell their surplus reductions to companies who face higher on-site reduction costs. Businesses are thus given financial incentive to reduce emissions, under an overall umbrella of region-wide reduction totals. Such a trading market system already exists for sulfur dioxide (SO_2) and nitrogen oxides (NO_x) under the federal Clean Air Act's Acid Rain Program.[54] CO_2, being a gas, readily mixes globally. A CO_2 molecule emitted anywhere has an effect on climate everywhere. This makes CO_2 an ideal candidate for national and state emissions trading within a scale of an international market place. A national carbon market, which will require national carbon caps, provides a promise to stimulate innovation in the private sector and enable society to make reductions in more cost-effective ways.

Options exist to use the current "lead time" before the caps are established, to begin preparing for such a national and international global carbon marketplace through pilot programs and

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[52] William H. Schlesinger, *The Global Carbon Cycle and the Duke Forest Free-Air CO_2 Enrichment (FACE) Project*, Duke University, Nicholas School of Environment and Earth Sciences, Presentation to DAQ Mercury & CO_2 Workshop, Raleigh, NC; April 21, 2004 (See Appendix A).

[53] Paul A. Harcombe, Rice University, Department of Ecology and Evolutionary Biology, *Effects of Climate Change on Southeastern Forest*, USGS http://www.nwrc.gov.

[54] U.S. EPA, *Acid Rain Program Web Page*, http://www.epa.gov/airmarkets/arp/, August 2004.

other means. Many sectors throughout the state will then more likely have opportunities and motivation to develop greater and more incentives for reducing their greenhouse gas emissions in a more timely fashion.

The Currency of a Carbon Market: Carbon Credit$

The tradable commodity in a carbon marketplace is CO_2 equivalents (tons) or "carbon credits." These carbon credits may be earned by companies and landowners who reduce CO_2 and other greenhouse gas pollutants like methane. Credits can be earned by reducing greenhouse gas emissions directly. Under some scenarios, opportunities to earn credits may also occur through activities that indirectly reduce greenhouse gas pollution, such as renewable energy development or carbon sequestration in forests.

Supply and demand drives the marketplace. To function efficiently, a carbon market needs buyers and sellers. Currently, in North Carolina, many sectors have the potential to supply carbon credits. Possible suppliers include:

- Swine industry: for converting waste and reducing methane for fuel.
- Forestry industry: for sequestering carbon by reducing deforestation and by increasing reforestation projects for both sequestration and for renewable energy.
- Reforestation of agricultural land:
    - Planting agricultural land to trees where tobacco farmers previously grew tobacco and tobacco production is expected to be discontinued, and
    - Tree planting on agricultural lands that were former wetlands converted to agriculture prior to 1976, to create "new" wetlands for Wetland Mitigation Banking or mitigation credit.
- Agriculture industry for sequestering carbon and reducing energy use through no-till farming.
- Renewable energy industry for providing lower GHG impact energy.
- Manufacturers and utilities: for voluntarily decreasing direct emissions of CO_2 before implementation of mandated caps.
- Other Corporations (e.g., universities and business establishments, etc.): for voluntarily decreasing emissions through new energy-efficient building designs and transportation innovations.

Because North Carolina does not have a CO_2 cap, there is no current demand within the state for carbon credits. North Carolina could potentially create an economic engine for the State by implementing GHG emission reductions and establishing a carbon marketplace. Several organizations already exist that could help our State track its carbon credits and trading activity. Preparing North Carolina for the emerging carbon markets could be made possible through one of several policy options to avoid losing any such revenues to other states. Many agree that a national cap on CO_2 emissions is necessary and forthcoming.

As national carbon caps are established, North Carolina will likely need to anticipate and be prepared for the related economic opportunities. Carbon caps will undoubtedly bring a national carbon marketplace, characterized by buying and selling of carbon equivalence

credits. North Carolina should further evaluate the steps required to take advantage of such carbon market and implement evolved policies that prepare our utility, swine, forestry, agriculture and other industries, to sell carbon credits for their emissions reductions or for sequestering carbon in trees and soil. The emergence of new technologies to reduce greenhouse gas emissions from power plants, confined animal feeding operations, and other emission sources presents potential opportunities for North Carolina. By developing and evaluating ways for providing incentives for the use of such innovative technologies, we can potentially reduce our state's greenhouse gas emissions while addressing other environmental problems and even creating jobs.

In addition to capitalizing on economic opportunities, many feel that our state's top decision-makers need to be evaluating mitigation scenarios and planning how to minimize potential climate change threats (such as coastal inundation, lost agricultural revenue and human health issues). In light of the global and national pressures for action, and because of the threats climate change poses to our state, many feel that North Carolina needs to prepare its economy and its people for a carbon-constrained world.

Potential Cost Scenarios

The DAQ workshop in April 2004 (See Appendix A) provided a beginning level of cost analysis of efforts to reduce CO_2, from different viewpoints. Dr. Anne Smith's presentation[55] represented such analyses for both mercury and CO_2 measures from an industry perspective. Related discussions reflected broad reactions and variant perspectives one would expect from this type of analysis, from both environmental and industry sectors. The industry perspective is primarily that economic impacts of North Carolina attempting to address CO_2 unilaterally would be significant and negative arguing that the State needs to await federal action on CO_2, and the environmental advocates perspective is that action needs to begin now and will provide significant economic return and "reimbursements."

Some of Dr. Smith's main points were:

- CO_2 comes from coal, oil and natural gas generation, but coal emits roughly 2x more CO_2 per kwh than natural gas.
- Retrofit controls are the most costly control option with a switch from coal to gas costing about $30-50/ton C for first few %; switching from coal to renewables costing about $100/ton C for first few %; and removal of CO_2 from stack costing about $300/ton C (large reductions).
- On-system controls are expensive even for new generation. For example, she believes that building IGCC with C-sequestration would cost about $100/ton C, with large reductions possible, but likely with decades of lead-time.
- Fuel Switches, according to the analysis, would have various effects and considerations:

[55] Dr. Anne Smith, Charles Rivers Associates, Washington, D.C., ***Insights on Economic Impacts of Utility Mercury and CO_2 Controls,*** Presentation at NC Division of Air Quality Mercury and CO_2 Workshop, April 20, 2004, Raleigh, NC. (See Appendix A).

- **Coal-to-Gas**: A 20% reduction in current coal MWh would require: 1) a 50% increase in current gas generation, 2) more new gas plants to be built, 3) drive natural gas prices up (affecting other industry), and would reduce national CO_2 emissions <3%,
- **Coal-to-Renewables**: A 10% reduction in current coal MWh would require >5-fold increase in renewable capacity, to reduce national CO_2 emissions <3%, and
- **Both** would drive $/ton higher than the estimates above for "first few %" of reductions, and would require a multi-decade approach with on-system reductions costing less than $100/tonne C.

Other "off-line" changes may be more achievable she surmised: such as changes in land use practices, changes in forestry practices, energy demand-reduction projects, and projects in other countries that reduce their CO_2 baseline (a trading option). The presentation concluded that the costs would be much cheaper (<$10/ton C). Some important questions would remain: 1) Are these real reductions from baseline?, 2) Are these permanent reductions?, and 3) Will they remain cheap once there is a real demand for them? She concluded that on-system reductions would cause much higher price increases.

Dr. Smith contends that a unilateral North Carolina policy would result in the potential for power to be brought in from outside states without a carbon cap, that the cost of power and gas would rise to industry in the State, National and global emissions would not be reduced, jobs may be lost and consumers in the State will face losses in living standards. On the other hand, she indicated that as a part of a unified national carbon policy, inter-regional competitive issues would be diminished, competition would be increased with international sources, there would still be 'leaks' in emissions on an international basis, but that this State would then face impacts more similar to the U.S. wide average impacts. These concepts and information need to be debated and resolved before final recommendations are made.

Making analysis of cost impacts even more difficult will be the impact of changes in supplies, or perceived changes in supplies of energy from various sources in the world and how much it will cost. All energy prices, whether for gas, oil or coal (or other) are distinctly interrelated and fluctuate together, with some delays. Recent excursions in prices for crude oil may be temporary, but there are many who project that production of crude will peak in the next few years and begin to fall. Such changes would have a significant impact upon energy costs, but also serve to make it more difficult to determine the true effects and costs of making reductions in consumption. The graphs below in Figures III-1 and III-2 do not reflect more recent dramatic changes in cost and supply resulting to middle eastern and Russian influences on the market, but these recent events only seem to accelerate and exacerbate the issue and provide a backdrop for future discussions and conclusions.

These positions likely will undergo additional analyses prior to release of the final report, but reaching a consensus and a common resolution of the different perspectives will likely be a major effort.

Figure III-1, World Oil Production [56]

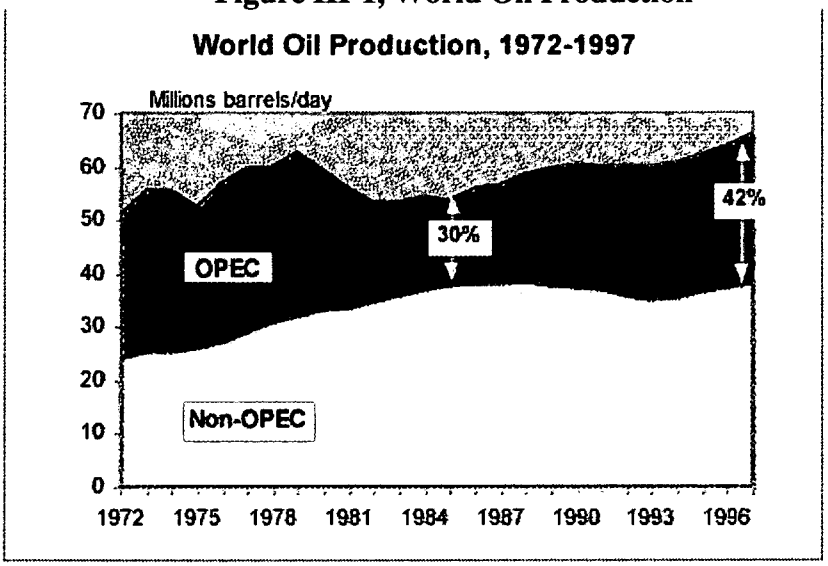
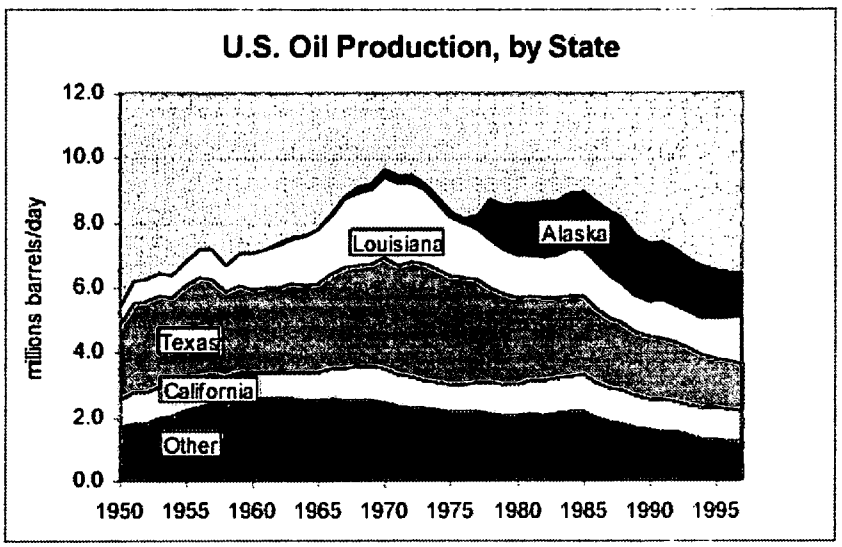


Figure III-2, U.S. Oil Production, 1950-97



[56] National Association of State Energy Officials, *Understanding the Petroleum Industry*, 2004, http://www.naseo.org/Default.htm

CHAPTER IV REDUCTION AND SEQUESTRATION TECHNOLOGIES AND OPTIONS

Over 100 coal-fired power plants have been announced (some since cancelled) for planning and construction in the U.S. in recent years, according to Cinergy CEO Jim Rogers in a recent speech. He interjected that the current energy policy in the U.S. seems to be "find more/use more."[57] "This policy and practice has to change before these alternatives will begin to be viable to replace and reduce emissions," he summarized. Targets are needed that will provide for these advances to be put into practice and result in real and continuing reductions in the carbon limited future.

Since the release of the First Interim Report in 2003, DAQ has continued to review available literature and emerging information. In addition, DAQ hosted a workshop in April of 2004 that involved stakeholders, experts on various related topics and other interested participants. This chapter is primarily a summary and update of pertinent technical and related information on reductions in use of fossil fuels and sequestration of emissions collected from that workshop and other sources since the release of the first report.

Various methods and scenarios have been suggested to prevent emissions by reductions in carbon-fuel consumption and to capture and sequester them post-emission. These proposals cover a wide range of cost and practicality. Some are obviously too expensive or sufficiently impractical, or so energy inefficient, that they may be readily dismissed (for the time being, at least). Others may have promise and be options that may be worth further consideration, maybe in a shorter range of five to ten years. Others may require further technical development and piloting on large scale, such that they may be more likely worthy of further consideration within10 to 30 years. The purpose of this discussion is to identify the most obvious, potentially important and promising of those options and place them in the proper category for future re-evaluation. At this point, none of these options should be viewed as recommendations, but potential options for future consideration for selection of recommendations. Such final recommendations and changes may also require further coordination outside the State with other regional and national groups.[58]

Most action-initiating activity to date seems to be in the government circles. However, in 2003, the federal government and industry organizations representing companies from 12 energy-intensive economic sectors joined in a new voluntary partnership called "Climate VISION." The economic sectors include automobile manufacturers, chemical manufacturers, railroads, the oil and gas industry, the electric power industry, the mining industry, and the cement, iron and steel, aluminum, magnesium, semiconductors, and forest products industries. Joining this initiative were the U.S. Departments of Energy (DOE), Transportation (DOT), Agriculture (DOA) and the U.S. Environmental Protection Agency (EPA). Climate VISION

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[57] James Rogers, CEO of Cinergy Corporation, *Keynote Speaker* at Air & Waste Management Association meeting in Indianapolis, IN, (Personal notes of James Southerland), June 23, 2004.

[58] Gerald R. Hill, Ph.D., Senior Technical Advisor, Southern States Energy Board, Southeast Regional Carbon Sequestration Partnership, Presentation to North Carolina Division of Air Quality Workshop on Mercury and CO_2, Raleigh, NC, April 21, 2004. (See Appendix A).

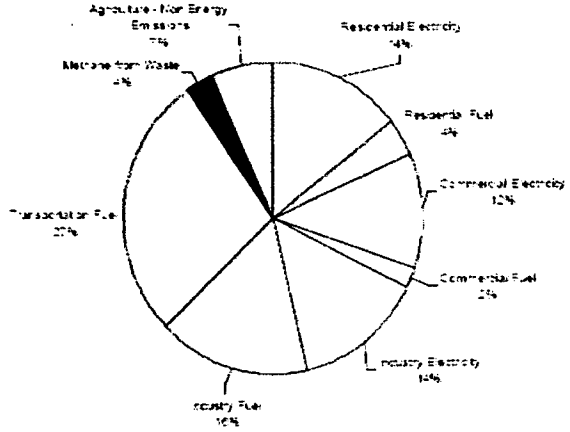
works with industry to identify and pursue cost-effective solutions to reduce emissions using existing technologies; develop tools to calculate and report emission intensity reductions; speed the commercial adoption of advanced technologies; and develop strategies to reduce emissions intensity in other economic sectors.

The electric power sector participates in the Climate VISION program through the Electric Power Industry Climate Initiative (EPICI) and its Power Partners program, with the DOE. The memberships of the seven organizations that comprise EPICI represent 100% of the power generators in the United States. The power sector, through EPICI, plans to finalize its work plan in the form of a Memorandum of Understanding (MOU) with DOE. The MOU will outline proposed implementation actions to reduce greenhouse gas emissions intensity by 2012. The power sector, in conjunction with DOE and other federal agencies, will implement the actions. In North Carolina, Duke Energy and Progress Energy are both participating in this program through their membership in, and participation with, the Electric Power Research Institute (EPRI).[59] Projects proposed or included to date include planting of additional forest for sequestration and other similar programs.

As discussed in the First Interim Report, the Appalachian State University Energy Center produced a report in January 2000[60] that provides an in-depth analysis by sector of their recommendations for a sensible GHG reduction strategy. This document has some parallels to that report and draws upon it to some extent without reproducing the estimates and calculations included in that report. That same Center assisted in a major portion of the tasks associated with development of the State Energy Plan (SEP) as discussed further on the following pages and in Appendix D to this document. The Figure IV-1 below, extracted from that report, gives a good refresher or reference point from which to review the importance of the various sectors toward realizing a potential solution.

Figure IV-1

Figure 1: North Carolina Greenhouse Gas Emissions in 1990, by Sector and by Fuel vs. Electricity
(Total Emissions in 1990: 145 Megatons)



[59] Personal Communications (emails) from George Everett of Duke Energy and Cheryl Vetter of Progress Energy, to James Southerland, NC DAQ, August 2004.

[60] Department of Geography and Planning, Appalachian State University, *North Carolina's $ensible Greenhouse Gas Reduction $trategies*, Boone, NC, January 2000. http://www.geo.appstate.edu.

Energy Efficiency : Use Less - The State Energy Plan

The most obvious way to reduce CO_2 emissions is to burn less carbon-based fuels. This is essentially one of the major goals of the State Energy Plan. For most practical purposes, the reduction of CO_2 and reductions of energy usage are synonymous. Thus, the State Energy Plan (SEP) is closely related to the development and implementation of action plans for the reductions of GHG in North Carolina. Efforts and actions to reduce energy consumption will translate into reductions in GHG emissions, particularly CO_2.

The First Interim Report discussed the SEP in limited detail. The SEP was approved in June of 2003. The State Energy Office (SEO) and other departments are now working on strategies for implementing that plan. For example, the SEP envisions a North Carolina Climate Action registry as one of its products.[61] This is in relative harmony with the implications of programs to reduce greenhouse gases. Some additional tracking mechanisms for the results and progress of reducing emissions through the implementation of the SEP, for example, may be necessary to allow tracking of progress for the overall effort. Thus, the two programs are closely linked and must track closely together. A copy of the NC's SEP may be obtained from the SEO, or may be downloaded from their web site.[62] The SEP provides most of the information discussed in this section of the report.

The SEP indicates that CO_2 emissions will likely continue to increase into the near future and the only viable options currently available for reducing these emissions are increasing efficiency and switching to alternative sources of energy generation, such as nuclear, hydropower, solar, wind and biomass. Although combustion of biomass produces one molecule of CO_2 per molecule of carbon in the material, just as fossil fuels do, the biomass is "re-used" carbon that was not derived from ancient deposits or previously sequestered emissions, and thus does not have the same net impact upon the environment as do the "new" fossil fuels. Large conversion may be unrealistic without wholesale switching to more expensive natural gas combustion with less certainty in supply.

The Secretary (or designated representative) of the Department of Environment and Natural Resources (DENR), represents DENR on the Energy Policy Council (EPC). This facilitates coordination and implementation of the SEP and its integration with parallel actions and plans to reduce GHG. In 2003, the EPC approved 93 measures that meet the plan's objectives. These measures, in the form of policy and program recommendations, primarily address the following sectors and issues in the state:

- Energy, Economics and the Environment
- Fossil and Nuclear Fuels
- Electric Utilities and Energy Use
- Alternative Fuels from Biomass
- Alternative Energy Sources
- Energy Use in the Public Sector
- Energy Use in the Residential Sector

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[61] Larry Shirley, Director, State Energy Office, *Development, Components and Status of the NC State Energy Plan*, Presentation at NC DAQ Mercury and CO_2 workshop, Raleigh, NC, April 19, 2004. (See Appendix A).

[62] *State Energy Plan*, http://www.energync.net/State%20Energy%20Plan%202003.pdf .

- Energy Use in the Commercial Sector
- Energy Use in the Residential Sector
- Energy Use in the Transportation Sector
- Funding for Energy Policies and Programs

Appendix D contains a more extensive listing of SEP recommendations and lists the 15 key legislative, regulatory, and administrative policies the EPC determined would require action in 2003 and 2004. Some of the items discussed in more detail below also relate to elements in that plan. Basic elements of the plan are addressed below.

Programs to Directly Increase Energy Efficiency at Generation Units

Most of the existing coal-fired boilers in North Carolina, and elsewhere, were built many years ago, in the general era between 1950 and 1980, with an expected lifetime of 30 to 50 years. Thus, the population of boilers is aging, many already beyond their originally expected useful life. In the meanwhile, a number of design and technology advances have been made that could potentially make improvements in efficiency if applied to existing facilities. These improvements may only be on the order of a percent or a few percent, but are significant in the economics of running a large power generation unit constantly for several years. The increases in design efficiency generally allow more production of electricity with less fuel and with less emissions of nitrogen oxides, which leaves less to be removed by other means. Due to the costs and the complexity of the regulations (e.g., State/federal new source review and prevention of significant deterioration regulations) many improvements and refinements that might have made have been discouraged or confused in complications. Some efficiency improvements on generation units can be made, but may require consideration of such projects under EPA's new source review (NSR) rules.

In the December 31, 2002 proposed rule on Routine Maintenance, Repair, and Replacement (67 FR 80290), EPA indicated that, "NSR should not impede industry in making energy and process efficiency improvements which, on balance, will be beneficial both economically and environmentally" (57 FR 80301). The State is currently reviewing related rules and policies to determine if any changes need to be made to North Carolina rules and whether there may be any additional latitude resulting to encourage (or not discourage) such projects.

State Agencies, Local Governments, Schools & NPOs

The State's cost of energy and fuel (excluding gasoline) in 2002 was $179 million.[63] The largest share of the State's energy expenditures was for electricity, which was 65 percent of the State's total energy costs. The university system is the largest consumer of energy in North Carolina's state government. Over half (53 percent) of the State government's energy expenditures occur at the universities. New education construction bonds passed in 2000 may further increase energy consumption by the university system if offsetting

[63] *State Energy Plan*, *State Energy Plan*, North Carolina State Energy Policy Council/State Energy Office, http://www.energync.net/State%20Energy%20Plan%202003.pdf., June 2003.

energy efficiency measures are not incorporated into these projects and retrofitted to existing structures.

The North Carolina League of Municipalities, North Carolina Association of County Commissioners, and North Carolina Association of School Boards have formed a collaborative association named LoGESO (Local Government Energy Savings Organization). In 1999 and 2000, LoGESO conducted an assessment focused on what they might do to reduce energy expenditures. They evaluated steps that constituents might take to conserve energy and improve efficiency. The study found fewer than 25 percent of potential energy efficiency expectations had been realized in the sites focused on during the study. This was due, in part, because of the small size of many energy efficiency projects. They did not attract competitive bids from established firms, they concluded, due to the high costs of assembling bids. In addition, few local jurisdictions tracked and reported energy use and expenditures. Based upon the consultant's experience elsewhere, North Carolina local governments could experience a 5-10 percent reduction in purchased energy through an aggressive energy reduction program. This would result in an estimated $50 million in savings over a five-year period.

The cost of energy represents a significant drain on State and local resources. Educational facilities also stimulate fuel use for transport of children to and from schools via both personal vehicles and school buses. The total cost of student transportation is a substantial portion of the total cost of energy for education. Increased adoption of walking and biking, as well as increased bus use by those commuting by private vehicles could save substantially on total energy consumption, and thus related emissions. [64]

Commercial/Industrial

The commercial sector has a high potential for improving efficiency in both existing and new buildings. Insuring energy reliability, promoting wise land use and improving environmental quality are directly related to energy efficient construction codes and techniques. Efficiency strategies for commercial buildings include building energy efficiency, lighting efficiency and increased use of natural daylight, heating and cooling system efficiency, alternative energy options and hot water efficiency.

North Carolina's industrial sector uses about 28 percent of the total energy used in the state (the highest in the state). Energy saving improvements for industry are typically grouped into four primary categories:

- General energy-saving technologies applicable to all manufacturing sectors, such as high-efficiency lighting and computer control of air conditioning.
- Industry-specific energy-saving technologies, such as recovery of "waste" heat.
- Energy management activities, such as energy audits, load control and full-time energy managers.
- Other innovative approaches, such as changing processes or developing new approaches for industrial development.

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[64] *State Energy Plan*, *State Energy Plan*, North Carolina State Energy Policy Council/State Energy Office, http://www.energync.net/State%20Energy%20Plan%2003.pdf ., June 2003.

A study conducted by the national energy laboratories, including Oak Ridge, Lawrence-Berkeley and the National Renewable Energy Lab, concluded that nationwide energy savings of 7.4 percent in the industrial sector could be achieved by the year 2020 by implementing moderate energy saving programs. With a more aggressive approach, savings of 16.5 percent by year 2020 was determined to be possible. These savings excluded the effects of increased combined heat and power (CHP), or co-generation. With moderate implementation of CHP, the national labs' report estimated that national energy savings of 1.1 percent could be achieved by 2020. Under such an aggressive program, an estimated 5.8 percent would be saved. The potential decreases in energy consumption from the policies recommended for the industrial sector of North Carolina total about 8.5 percent in existing industrial facilities and 12 percent in new facilities.

Residential

In 2000, residences in North Carolina accounted for 23 percent of the total energy consumption in the state. Because this sector concerns virtually every citizen of the state directly, energy use in residences remains key for energy efficiency. The residential sector provides tremendous opportunity for reducing energy use. Fortunately, many energy efficiency measures are cost-effective and provide additional advantages to the owner, such as improved comfort and increased home durability and benefits to the state, such as reduced air emissions, lower fuel imports and the economic benefits of direct expenditures for energy-saving products. New homes with greater energy efficiency usually cost just marginally more than comparable less efficient homes. Efficient homes help reduce the costs of home ownership, because the annual energy savings generally exceed the additional annual mortgage costs.[65]

[65] *State Energy Plan*, North Carolina State Energy Policy Council/State Energy Office, http://www.energync.net/State%20Energy%20Plan%202003.pdf., June 2003.

Renewable Energy (Substitution for Fossil Fuels – Also Addressed in SEP)

Although substitution of renewable energy for fossil fuel energy is somewhat inherent in the SEP, it is identified here separately because of its importance in many discussions on the CO_2 topic. There are several promising ways to utilize renewable energy to potentially replace or substitute for the combustion of fossil fuels. One must also keep in mind that some sectors of renewable energy, such as combustion of biomass will also release CO_2 emissions and though they substitute for fossil fuels, this release of GHG must be taken into account in evaluations. Several of the renewable energy sources generate electric current without any combustion or generation of CO_2 or other GHG.

NC GreenPower, included in the SEP, and now in an active process of recruiting members or participants, is an existing (but new) program in North Carolina that provides customers with the option to purchase units of "green" power generated with renewable or other means of substitution for electricity that would be otherwise be generated from coal-fired units. The more participation there is from the customers, the greater the environmental benefits, including reductions in "new" CO_2 from fossil fuels. This program is unique to North Carolina, with all three utilities included, as several co-ops. The program allows most citizens of the state the opportunity to participate (A "reasonable" premium is charged for the option to actually purchase the green power units with these funds being used directly to offset extra costs of procuring that power).

In the United States, we have grown accustomed to very dependable power. When the switch is flipped, it is rare for the lights not to come on. However, one of the potential downsides of renewable energy may be the loss of some of this reliability, according to the "naysayers." A substantial quantity of new infrastructure dispersed among many locations would be required to provide the levels of "replacement" energy needed, and designs of those systems will need to keep reliability as a strong consideration. Some of this proposed capacity would not always be available when needed, which would likely require other generation capacity to be available for back-up when there are periods of rain (solar), low wind, disruptions in the supply of biofuel, etc.. Thus, such plans and changes would need to consider these options and situations holistically so that the system is adequate to cover all situations, at all times, whether by providing excess capacity of other renewable generation or by more conventional means. If the latter, some economic subsidy might be necessary to guarantee that this capacity, otherwise idle, would be available when called upon.

Solar:

The sun's energy can be used in four primary ways:

- solar thermal,
- passive solar heating and cooling,
- day-lighting and
- Photovoltaic.

Solar thermal collectors function relatively well in North Carolina's diffused sunlight. Solar thermal includes using solar energy for heating or cooling of interior spaces and water heating. In addition, solar energy is used for cooling and refrigeration. When concentrated with lenses or mirrors, sunlight can generate boiling water which is used directly or to drive various types of engines. This steam can be used to run steam turbines to produce electricity, much like in coal-fired power plant.

Passive solar includes orienting windows toward the south, and using concrete and other heavy building materials for thermal storage and shading strategies that avoid summer overheating. The SEP reports that "Passive solar buildings can have comparable costs as similar, non-solar structures and yet save significantly on heating and cooling costs while providing improved comport and quality of light. The main constraints are lack of awareness and consumer demand along with inadequate training and interest among residential and commercial designs, builders an developers."

Day-lighting is the practice of paying special attention to the use of natural lighting in the design stages of buildings and can provide an energy and cost savings in buildings if properly conceived and implemented.

Photovoltaic devices provide a newer frontier in capturing and using solar energy. They do not capture sunlight's heat energy directly, but rather use solar radiation directly to stimulate a flow of electrons, thus generating electricity. Photovoltaic energy is cost effective in some remote locations, but further research and technical advances are needed before the cost per peak watt of electricity is economic in typical situations. Some new technologies are dual functioning to make them more cost effective. For example, a roof system could be made of photovoltaic material thus providing electricity and roof protection for a residence.

One of the big advantages of solar energy systems is that they are most effective in producing energy in the summer months, the season with the peak electric utility demand in North Carolina. The very nature of solar energy systems thus cut electrical demand on the electrical grid during peak demand periods.

Wind/Substitution

Wind power generation is the fastest growing electricity generation technology used in the world.[66] Of the 10 wind classes that exist, determined by average annual wind velocities, the continental United States only has sites with the less intensive six classes. Class 5 and 6 sites are abundant in North Carolina's western mountains; with class three and class four sites being located in the mountains and along the eastern coast. Many of the mountain sites could likely generate electricity in the range of $0.03 to $0.04 per kWh - competitive with new coal and natural gas generation. According to the Energy Efficiency and Renewable Energy Network, North Carolina has the capacity to produce 8

[66] Dr. Dennis Scanlin, Appalachian State University,, *Wind Energy in North Carolina*, DAQ Mercury/CO_2 Workshop, Raleigh, NC, April 21, 2004 (See Appendix A)

million MWh, or about 7 percent of current electricity consumption in the State. This would come from using wind technology in Class 3 and higher sites only.

Two tax programs encourage wind energy generation. The federal Production Tax Credit (PTC) provides $0.018 per kWh of wind energy generated, and North Carolina's Renewable Energy tax credit (35 percent, with a maximum of $250,000). In order to compensate for existing development, environmentally sensitive areas, and other land-use conflicts, this estimate excludes 50 percent of total forests, 30 percent of total farmland, and 10 percent of total rangelands. The federal tax credit is in jeopardy of expiration which would be a significant blow to this program and the future of investments in wind energy.

Cost to site wind machines in areas with the greatest wind resources; namely the high ridges in Western North Carolina, is the single largest barrier to wind technology in North Carolina. The Mountain Ridge Protection Act of 1983, also know as the Ridge Law, was designed to prohibit the construction of unsightly structures taller than 35 feet on North Carolina ridges above 3,000 feet in elevation. Although exclusions exist for telecommunications towers, electrical *transmission* facilities, structures of a "relatively slender" nature, "minor" vertical protrusions, and even "windmills," the North Carolina Attorney General stated that electrical *generation* equipment is in violation of the Ridge Law. If upheld, this interpretation effectively prohibits development of many sites with the best wind resources in North Carolina.

Hydroelectric/Substitution

Hydropower currently represents the primary renewable energy supply for utilities in North Carolina. In 1999, hydroelectric plants supplied over 3.5 million MWh of electricity or about 3.5 percent of total state electricity sales. Hydroelectric generation typically requires less initial capital than coal and nuclear facilities, but more than natural gas, while typically providing the most economical source of electricity in terms of actual costs of generation. With a price under $0.025 per kWh, the total cost of hydroelectric generation is the cheapest source of electricity currently available for North Carolina.

The Idaho National Engineering and Environmental Laboratory, under contract with the DOE, assessed North Carolina's undeveloped hydroelectric generation potential. The study found 93 sites in North Carolina with approximately 508 MW of undeveloped generation capacity that might be used to generate electricity. The greatest capacity of any one site was 76 MW but over three quarters of the sites were estimated to be capable of providing less than five MW. According to the Energy Efficiency and Renewable Energy Network, North Carolina possesses roughly 8 million MWh of total new hydroelectric generation potential, which would meet approximately 7 percent of all generation in North Carolina.

A significant barrier to additional hydroelectric power for North Carolina is the drought experienced in recent years and the expiration of avoided cost contracts between electric utilities and owners of hydropower facilities. Hydropower's environmental impact on the ecology of the operation site has also been a significant deterrent to new development. A

shift away from large-scale projects to less intrusive low-head, small and micro-hydro projects has some responsibility. Rapidly growing demand for water for irrigation, industrial processes, cooling water, fish and wildlife considerations, and other human needs pose further limits to expanding hydroelectric development. All these factors will likely be considered when and if licensing or re-licensing events arise.

Biomass Burning/Substitution

Biomass is a carbon-based fuel, often derived from fast growing trees, or bushes, that can be used to fuel utility and other boilers. Though burning of biomass generates CO_2, it substitutes carbon already in atmospheric and biome circulation, for fossil fuels, thus lessening the net impact of "new carbon" on the overall environmental system. Agricultural and waste management sectors provide potential sources of energy for both electrical generation and other direct uses as fuels. Additionally, recent proposals and programs for fire hazard reduction have increased the interest and economics of using small diameter (low economic value) trees, bushes and shrubs for replacement of fossil fuels in electric generation. Efforts to further evaluate and extend such efforts in North Carolina are underway at NCSU and in the DENR Department of Forest Resources.

DOE estimates that 15.8 billion kWh of electricity could be generated from renewable biomass fuels each year in North Carolina. This is enough electricity to potentially supply about 39 percent of the residential electricity demand in the state. Of these sources, 80 percent of the potential biomass fuels would be from wood waste from logging, industrial, yard waste, furniture manufacture and construction. While more biomass as fuel offers a partial replacement for fossil fuels such as petroleum or coal, combustion of the biomass still creates climate change emissions and may provide additional control issues for other pollutants, such as NOx and particulate matter.

The largest potential supply of woody biomass for energy is standing timber or "stumpage." Much of North Carolina's 18.3 million acres of forestland is occupied by low-value trees not well suited for traditional wood markets. Twelve million of these acres are considered as having high potential for wildfire, a danger not only to the forests, but also to the surrounding communities, especially North Carolina's rapidly expanding urban-rural interface. On December 3, 2003, President Bush signed into law the Healthy Forests Restoration Act. This act targets forests presenting wildfire danger and calls for reductions in low-value standing fuels, restoration of healthy forests, and development of woody biomass energy. Development of a woody biomass energy market in North Carolina can help reduce fire danger while improving forest health.

Wood chips have not worked well as a fuel for co-firing with coal in utility boilers except in gasification applications. However, woody biomass has been used successfully for distributed generation across the U.S.,[67] and to the extent this occurs, current and future load requirements of fossil-fired power plants are reduced.

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[67] Dennis Hazel, NC State University, Forestry Department, *Written Comments on Draft 2nd Interim Report*, August 9, 2004.

Use of biomass has secondary advantages of using damaged and depleted soils and aiding in their restoration. There is a benefit of sequestering more CO_2 (albeit somewhat temporarily) in soils in the process of adding organic matter to these soils. Since the Southeast has a long warm season and substantial water, it is well suited to growing biomass "crops.

Biofuels, including ethanol, biodiesel and mixtures, are made from various agricultural crops and residues. However, the resulting fuels are usually interchangeable with conventional fossil fuels in regular vehicles without modifications, especially in diesels. Ten tons of biomass can yield ~1000 gallons of biofuel, resulting in emission reduction from their use in vehicles due to the clean burning nature. Particularly, there is little or no sulfur emitted from these fuels, in contrast to petroleum-based fuels.

North Carolina has abundant biomass, such as landfill gas, mill residues, animal waste, forest residues, energy crops and urban wood. These fuels have a potential to supply up to ~20 percent of North Carolina's electric needs. Thus, high growth is predicted in this economic sector over the next decade. These fuel sources have the economic potential to create more local jobs, particularly in rural areas than many other types of projects. In addition, existing infrastructure (yards, trucks, rail sidings, etc.) uniquely positions the North Carolina wood industry to procure and deliver bulky biomass crops in a timely and efficient manner.

Biofuel conversion facilities are currently planned for construction in North Carolina.[68] However, EPA has specifically listed fuel switches from coal to natural gas, and from coal to wood, as pollution control projects that would be presumptively environmentally beneficial in the Final Rules on Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR) issued on December 31, 2002 (67 FR 80186). DAQ is currently evaluating rule options and these will be implemented whenever they are final rules.

NC GreenPower, discussed earlier, provides an example of the use of renewable fuels to replace fossil. A recent summary of the NC GreenPower program appeared in the DENR's newsletter.[69] Survey and practice have indicated that the public is willing to invest additional premiums on their electric bills to insure the use of additional renewable energy, but the program is still in its early stages and will provide further indication of this factor as time passes and experiences accumulate.

There are additional issues that arise from considering biomass sequestration as a potential partial solution to the atmospheric carbon burden. There is a potential for biomass and carbon sequestration to work at cross purposes. Forestland planted for the specific purpose of carbon sequestration cannot be used as a source of biomass and then counted as sequestration. To do so would negate the benefit of the sequestration, and incidentally, any carbon credits earned.

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[68] Karen Rindge, *Renewable Energy: Good for NC's Economy*, **Carolina Sun**, Summer 2004

[69] DENR News, http://www.enr.state.nc.us/upclose/pages/greenpower.html, July 2004.

Capture and Use of Underutilized Energy Sources/Substitution

Energy capture includes such activities as recovery of methane from landfills and from animal manure. Confined Animal Feeding Operations (CAFO's) are of particular importance in North Carolina. The State is nationally number two in ranking for hog production and has a swine population of about ten million (Iowa is number one with approximately fourteen million) out of a national total of approximately sixty million. Poultry operations, particularly chickens and turkeys are also important in the State, with dairy and beef cattle being important, but contributing to the waste "resources" with a much lesser quantity. If one does look at these wastes as a resource awaiting development, the potential impact becomes significant.

Research has been underway in this area for several years in North Carolina at the North Carolina Animal and Poultry Waste Management Research Center on the North Carolina State University (NCSU) campus and at several other agricultural campuses throughout the country. They have been attempting to develop better means of disposal of animal waste, many targeting recovery of resource value. In 2000, Smithfield Foods and the North Carolina Attorney General's Office entered into agreements to fund and study "promising new technologies" with expectation that these would provide solutions to the ammonia and odor problems in particular, and to waste disposal problems in general.

Results of this program have been recently unveiled. The reports are just recently available, but some of the promising technologies studied included methods and processes to turn the carbon in the waste into fuels for distribution as an energy source. This program will continue to pursue many of the technologies and make them more economically viable, but the conversion options, in particular, may hold promise for supplementing the fuel supply at no large expense on the CO_2 budget, providing another source of carbon fuel that does not depend on fossil fuels. At the DAQ Mercury and CO_2 workshop, Kurt Creamer, P.E., one of the researchers from NCSU, who has been working on this project with Dr. Mike Williams, Director of the Smithfield Agreement Project, discussed these efforts.[70] Reports from the research currently being released will be available soon and the studies will likely result in several papers and other technical documents over the next several months and few years.

Recovery of methane from other decomposing "bio-materials" such as found in landfills and wastewater treatment facilities, has been increasing and provides additional potential for added use. Several operations in North Carolina utilize these operations to "mine" methane mixtures from the natural anaerobic decomposition and utilize them in boilers and other combustion equipment with the eventual production of steam and electricity. In fact, EPA first research on this potential was first conducted on landfills in North Carolina and the technology proven as economically viable. Electricity may be used by the generating entity or sold to a neighbor (if legally allowed in the circumstance). Steam may be used directly or sold for process heat, agricultural production (e.g. greenhouse crops) and other uses.

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[70] Kurt Creamer, *NC Animal Waste as a Potential Resource for Reducing CO2 and Methane Emissions*, Presentation at DAQ Workshop, Raleigh, NC , April 21, 2004 (See Appendix A), www.cals.ncsu.edu/waste_mgt/.

One factor that may need additional discussion and actions within the Legislature related to these type operations is the legal constraints and implications regarding the sale of electricity to the grid (net metering) or to a neighboring industrial, commercial or residential area. Laws pertaining to their being a regulated monopoly protect the electric utilities and these laws may require evaluation for change. Some energy developments such as the production of electricity from animal waste, land fills and other operations that may need to sell electricity to their potential customers may raise issues regarding the legalities and limits of such operations with regard to these same laws and regulations. They may not constitute impenetrable barriers, but further evaluation and possible legislative actions will likely be needed before it is possible to fully adapt some of these energy sources.

Post-Emission Capture and Sequestration

This section is primarily to address the capture and sequestration of CO_2 after already emitted by the combustion of carbon fuels by biological or technology and hardware.

Agricultural and Forest Sequestration

Growth of plants and other organisms that utilize CO_2 in their natural metabolic processes, remove CO_2 from the atmosphere. If this were not the case, the atmospheric concentrations would be much higher. As discussed by Dr. Schlesinger of Duke University in his presentation at the April 2004 DAQ workshop,[71] forests increase their growth when exposed, or immersed, in elevated levels of CO_2. Thus, the growth of any forest or crop is likely to increase uptake, just "because it is there." However, it is evident that this increase in uptake is not sufficient to offset the rate of increase of release of CO_2 that is encountered globally today. Increases in biomass and organic matter in all U.S. forests in the past 40 years have only offset ¼ of the national emissions during that period.[72] However, these emissions can be offset to a significant degree[73]. Therefore, many efforts and proposals have been advanced to increase the sequestering efficiency and quantity of crops and forests that can uptake and provide "sequester-able" carbon in the form of wood for paper, building materials or fuel. One must be careful to maintain a separate accounting for carbon sequestered that will again be burned or otherwise oxidized and those that will likely remain in the unburned state for decades or even centuries and effectively remove that carbon from circulation on a permanent basis.

One of the most significant threats of climate change to North Carolina is the loss of the State's rich biodiversity. Policies to sequester, decrease or offset CO_2 emissions must be evaluated with consideration for biodiversity protection consistent with other environmental programs and policies. Storage and sequestration of carbon in forests can

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[71] William H. Schlesinger, Dean, Nicholas School of the Environment and Earth Sciences, ***The Global Carbon Cycle and the Duke Forest Free-Air CO_2 Enrichment (FACE) Project***, Presentation at the DAQ C Mercury and CO_2 Workshop, April 21, 2004, Raleigh, NC. (See Appendix A).

[72] USDA, Forest Service, Southern *Forest Resource Assessment* 2002, p: 444-447, http://www.srs.fs.usda.gov/sustain/products/.

[73] The Washington Advisory Group, LLC, *Sequestering Carbon Emissions in the Terrestrial Biosphere* May 2002' http://www.theadvisorygroup.com/PDF2/publications/Carbon%20Sequestration%20Paper.pdf.

potentially provide North Carolina an additional productive mechanism to sequester CO_2. Existing North Carolina forests currently store roughly 416 million tons of aboveground carbon. Planting new forests could sequester substantial additional carbon.[74,75] Programs for added permanent carbon sequestration through forestry thus provide a serious option to mitigate CO_2 emissions from power plants and other sources.

Carbon Storage Trends for North Carolina's Forests:

As North Carolina's forests diminish, so does their use as long-term storage of carbon. North Carolina lost more than 1 million acres of forests over the last 12 years, largely due to urban sprawl. North Carolina's forests now occupy 18.3 million acres, even less than in the 1930s, following an era of agricultural conversion.[76] Many forest communities have been especially hard hit, most notably the state's natural pine. Longleaf pine declined 30% since 1990, [77] and shortleaf pine declined by 38% in the same time period.[78] This trend of forestland loss is projected to continue for at least the next four decades[79]. Steady decline in the state's forests means a decrease in the amount of CO_2 stored. In fact, the loss of forestland over the past decade resulted in the loss of roughly 17 million tons of aboveground carbon.

Older forests store more carbon than younger forests but North Carolina's forests are getting younger. Since 1990, forests younger than ten years old increased by 15% and forests between 11 and 20 years old increased by 35%.[80, 81] Younger forests provide less suitable habitat for wildlife and have much less capacity for carbon storage than older age classes. Forests harvest rates have overtaken growth rates. Timber harvests have increased 30% since 1990, following another large jump in harvest rates during the late 1980s. Of harvested acres, 76% were clear-cut, which increases runoff, sedimentation and water quality concerns if not properly managed and impact the ability of forests to retain sequestered carbon.

Complexity of Carbon Sequestration

When considering carbon sequestration, the total amount of carbon sequestered should be the greatest priority and measure of effectiveness. Fast-growing trees accumulate carbon more quickly than slower growing trees, but this only accounts for a portion of the carbon that may be stored in a forest. When considering carbon sequestration comprehensively, it is important to also account for forest types, soils, management activities and stand age. Many generation and sequestration activities are occurring simultaneously in this complex situation, as illustrated in Figure IV-1. All the variables in this figure can have impact on the effective sequestration process.

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[74] Mark Brown, *Forest Statistics for North Carolina, 2002*, Table 9.

[75] USDA Forest Service, *Southern Forest Resource Assessment*, p. 45, Table 18.4.

[76] Environmental Defense,. *North Carolina Forests at a Crossroads: Selected Results of the 2002 Forest Statistics of North Carolina*, 2004.

[77] Mark Brown. *Forest Statistics for North Carolina*, 2002. January 2004. Table 9.

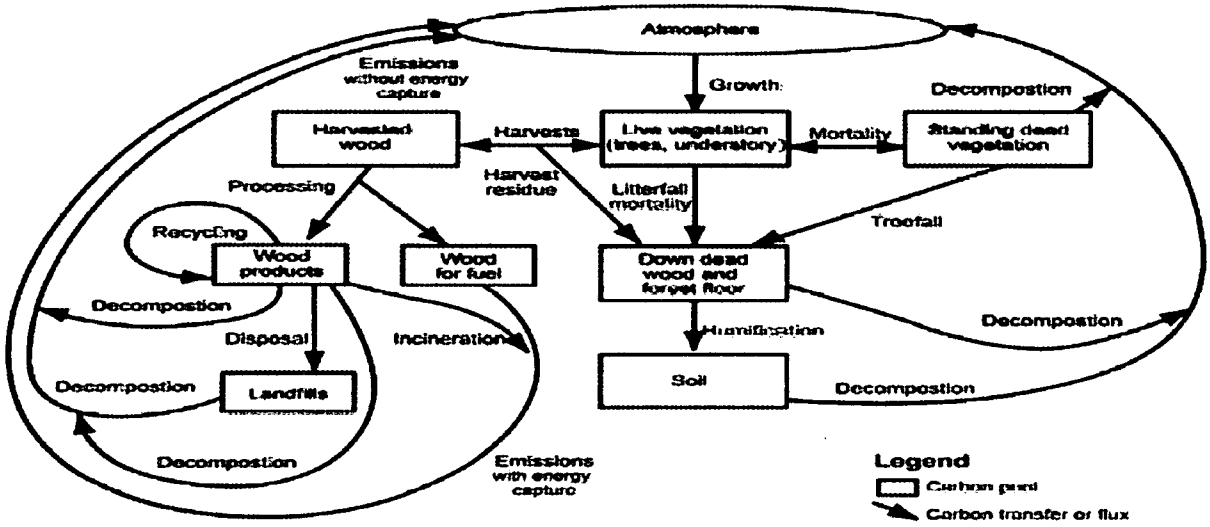
[78] Tony Johnson. *Forest Statistics of North Carolina, 1990*. July 1991. Table 10.

[79] USDA Forest Service, *Southern Forest Resource Assessment* (SFRA), GTR-SRS-53.

[80] Mark Brown. *Forest Statistics for North Carolina*, 2002. January 2004. Table 12.

[81] Tony Johnson. *Forest Statistics of North Carolina* (SFRA), 1990. July 1991. Table 13.

Figure IV-1
Summary diagram of forest carbon stocks and carbon transfer among stocks



Source: Adapted from USEPA (2003a), and Heath and others (2003)

In general, southern hardwood forests store more carbon than pine forests. Southern forests average 25 tons per acre of above ground carbon, but this figure varies widely by forest type. Southern pines (loblolly, longleaf, slash, etc) average 14-19 tons per acre of aboveground carbon. By comparison, bottomland hardwood forests and Appalachian hardwoods average 32 tons per acre of stored carbon.[82, 83] Loblolly pine can sequester 3.2 tons CO_2 annually compared to rates of 2.3 – 3.4 tons CO_2 annually for hardwood forests on old agricultural lands.

Forest soils account for some 50 – 60% of the total carbon in temperate forests.[84] Converting intensively managed agricultural fields to forests would be expected to begin the process of rebuilding soil carbon pools. Several studies have documented the CO_2 sequestration potential of forests in the Southeastern US. One study[85] reported that a 35 year-old loblolly pine stand had removed 345 tons per acre of CO_2 as plant carbon and 176 tons per acre as soil carbon. Another study[86] reported average annual sequestration rates of between 1.7 and 2.2 tons per acre of carbon over the first 15 years and as many as 110 metric tons total in 90 years in many parts of the Southeast.

Forest management affects both the growth rate of woody biomass and the soil carbon (as described above). When forests are managed for "maximum financial yield, they will

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[82] SFRA, p. 445.

[83] **Journal of Forestry**, 9/00, Vol. 98, No. 9, p. 23

[84] SFRA, p. 443.

[85] U.S. Department of Energy. *Carbon Sequestration, State of Science, Draft Report. Ch. 4: Carbon Sequestration in Terrestrial Ecosystems*. 1999.

[86] Birdsey, R.A. 1996. "Regional Estimates Of Timber Volume And Forest Carbon For Fully Stocked Timberland., Average Management After Cropland Or Pasture Reversion to Forest," Appendix 3 in *Forests and Global Change, Vol. 2, Forest Management Opportunities for Mitigation Carbon Emissions* (R.N. Sampson and D. Hair, ed.) **American Forests**, Washington, D.C.

rarely contain more than approximately one-third of the carbon stored in a forest grown to maximum biomass."[87] Similarly, forests that are publicly owned have the highest rates of above ground storage per acre, while more intensively managed forest industry lands have the lowest carbon storage rates. Family-owned forests fall between these two groups.[88] Harvesting forests releases carbon into the atmosphere for many years. In fact, after a forest stand is harvested, the land serves as a carbon source for the next 15 or so years.[89] In addition, some 53% of the carbon in harvested wood is lost through emissions and energy use.[90] Wood that is used in permanent construction provides the net sequestration, creating positive entries in the carbon balance ledger. Sequestered carbon that is then burned does not add to the net sequestration.

Recent Developments in Georgia and California

In **Georgia,** a new law[91] has established a registry for offsetting reductions in greenhouse gases obtained by carbon sequestration relating to forest resources and other plant life. This law provides for development of purposes, function, procedures, protocols, etc. for a voluntary reporting on standardized forms and software, and other requirements, to stimulate and track sequestered carbon emissions from forests and agricultural activities in the state. This new law is rather unique, but reflective of the role sequestration may be able to play in lowering net emissions of GHG to the atmosphere.

The Georgia law is specifically directed at direct human-induced land use change or forestry activities, additional human-induced activities related to removal by sinks in land use change and forestry categories, additional human-induced activities related to removal by sinks in agricultural soils, additional human-induced activities related to removal by sinks in products in use from harvested timber or agricultural crops and other human-induced activities related to removals by sinks. This legislation may be of interest for future directions in other states, but being voluntary, it is not ideally formulated to provide a significant role in a comprehensive program for reductions of GHG in the atmosphere.

California's Climate Action Registry (SB812),[92] passed Fall 2002, allows landowners to register increases in their forests' carbon stocks derived from stewardship forestry and conservation. SB 812 is the third in a series of significant state legislative initiatives to combat global warming, and follows on the heels of AB 1493, which calls for the regulation of automobile CO_2 emissions. SB 812 ensures that including the forestry sector in registries, and crediting forest activities to reduce emissions, will make a significant difference in carbon dioxide levels. For carbon stocks to qualify for the California Registry, the bill requires that:

- Forest practices must exceed legal and regulatory requirements, thus preventing carbon dioxide emissions and achieving reductions of carbon dioxide in the atmosphere beyond those that would take place otherwise.

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[87] SFRA, p. 444.

[88] SFRA, p. 445.

[89] SFRA, p. 443.

[90] SFRA, p. 446.

[91] Georgia SB 356 (*Carbon Sequestration Registry Act; provide Information system of registry*), Georgia General Assembly, passed and sent to the Governor on April 24, 2004.

[92] California SB812, *California Governor Signs Nation's First Law To Fight Global Warming With Forest Conservation*, Sept. 9, 2002, http://pacificforest.org/, http://www.climateregistry.org/docs/PROTOCOLS/Forestry/04.06.14_Final_Forest_Protocols_Board_Overview.pdf.

- Forest carbon benefits must be permanent, making a permanent difference for global warming and conservation.
- Forest practices must promote and maintain native forests, while avoiding the environmental harm that could result from the planting of non-native species.

Creating an Effective Carbon Storage and Sequestration Program

Carbon sequestration has gained favor as a viable option for reducing CO_2 levels in the atmosphere. Currently these sinks handle about 15 percent of the manmade emissions.[93] The USDA currently has a global change research budget of about $71 million per year which is among other things, evaluating effectiveness of various agricultural and forest potentials.

A carbon sequestration program must have an accurate system of measuring and recording carbon stocks if it is to ensure long-term atmospheric benefits.[94].. Carbon can be stored over very long time horizons, but land use changes can rapidly reverse gains. An effective carbon sequestration and storage program must include mechanisms to ensure that users of stored carbon are fully responsible and liable for replacing carbon that is lost in the future. Creating such mechanisms will likely foster innovative solutions to manage risks, such as carbon insurance.

This discussion of carbon sequestration and storage raises additional issues for the use of biomass as a potential (partial) solution to reduce the atmospheric carbon burden. Policy considerations for the use of biomass as a fuel are similar to those for permanent sequestration. The potential for biomass fuels and carbon sequestration to work at cross-purposes must be recognized and incorporated into such an effort. Forestland planted for the specific purpose of permanent carbon sequestration should not be turned into biomass for fuels. To do so negates the benefits and any carbon credits earned.

A forest carbon sequestration program must create additional reductions in greenhouse gases to be effective. These reductions must go beyond those reductions that would have occurred without the carbon sequestration program. This concerns both on-the-ground practices and utilization of harvested wood products. Only carbon that would otherwise not be sequestered should be credited. An agricultural field planted to trees represents the simplest accounting situation. How to credit existing forests or forest products that would have been created anyway presents a greater challenge. Current planning should consider sequestration as an integral factor in the overall plan for GHG reductions.

Carbon sequestration provides an excellent yet challenging opportunity for North Carolina to address sequestration of some of the atmospheric CO_2. The most ideal scenario might be the development of policies that provide the greatest opportunities for reducing emissions and protecting other conservation goals such as biodiversity. Developing policies consistent with existing policies and programs to protect the State's

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[93] William Hohenstein, USDA Global Change Program Office, *USDA Global Change Activities*, August 2, 2002,. http://www.climatescience.gov/Library/agency-briefings-jul2002/USDA/USDA_Introduction%20and%20Overview.ppt .

[94] Adapted from Environmental Defense. "A Bridge to Climate Protection: Slowing Global Warming by Marketing Carbon Stored in Farms and Forests," 2003.

diverse natural resources will ensure the greatest benefits, and will be an option to consider in addressing this issue further.

End-of-Pipe Hardware/Technologies

Several methods to reduce emissions directly from the stacks of fossil fueled power plants (primarily coal) have been proposed and are being researched by the DOE. Though some of these may be useful in the future, they are still in the development and proving stages and not ready for practical and "off the shelf" application. Some of these are discussed below for completeness and planning purposes and complete recommendation options. The DOE Global Climate Change Initiatives[95] stated goal is to achieve a 90 percent CO_2 capture with less than a 10 percent increase in cost of energy services (net of any value-added benefits, e.g., CO_2 credit trading, etc.). This can be adopted as "rule of thumb" criteria for assessing the practicality of various technologies available, or under development. Further discussion on individual technologies is presented below. The rather extended discussion of approaches and research is not intended to imply that many, or any, of these technologies are likely to be available for "off shelf" use in any near term period.

CO_2 Capture Options

A second approach to reduction of emissions of CO_2 into the atmosphere from coal fired boilers and other large facilities is by capturing them by some means and converting the CO_2 chemically or physically into a form or substance that can be stored indefinitely. This may be through "end of pipe" hardware approaches or by other means. At the DAQ workshop in April of 2004, Kevin Johnson provided an excellent overview[96] of means that might be feasible to capture the CO_2 that has already been formed (i.e. exhaust from a smokestack) and permanently sequester it. The capture technologies being most enthusiastically evaluated or developed fall into basic categories described below.

Conventional Amine Absorption

Conventional amine absorption is the only technique used commercially, to date, to capture CO_2 from flue gas. Essentially, a chemical compound (amine) is injected into a flue, by way of a variation of a scrubber-like device that maximizes chemical contact and reaction. This device captures the compounds in a form that is sufficiently stable to be handled without special precautions, such as specific limits on temperature, pressure, etc. The amine degrades via oxidation and reaction with SO_2 and other flue gas constituents to lessen its performance over time. Lower amine concentration results in larger equipment, higher solvent circulation rates, and increased energy requirements for CO_2 regeneration from the rich amine stream. Only a few small plants (<1000 tpd CO_2 removal, or about 50 - 100 MW) are in commercial operation. Currently, this approach of 'conventional' amine absorption/stripping is estimated to increase electricity costs by over 50 percent, and consume 30 percent, or more, of plant's

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[95] Bob Kane, USDOE, Climate Challenge Program, ***The Administration's Global Climate Change Initiative And Enhanced Opportunities for Carbon Sequestration On Minded Lands***, USDOE, , http://www.mercc.osmre.gov/PDF/Forums/MarketBasedReforest/1-1.pdf.

[96] Kevin Johnson, URS Corp, ***Some Projected Add-On Control Options for CO_2 Reductions at a Coal-Fired Generating Unit,*** DAQ Mercury and CO_2 Workshop, Raleigh, NC, April 21, 2004 (See Appendix A).

output.[97] Though technically feasible, this sort of penalty does not appear to offer a practical solution at this time.*Advanced Amine Absorption*

Advanced amine absorption uses proprietary oxidation inhibitors and other additives with specially designed membranes, custom solvent and amine formulations with a similar basic approach. Various commercial vendors have been pursuing process improvements, including Fluor, Praxair, Kvaerner, MHI, ABB, Lummus and Crest. Currently, costs are reported to be in the range of about $30 to $40 per ton of CO_2, with R&D development goals set at about $20/ton CO_2. Advanced amine absorption processes may hold promise for intermediate-term CO_2 capture, with incremental (i.e., not breakthrough) reductions in costs. There is a critical need for large-scale pilot plant demonstration(s) on SO_2/NO_X-laden, coal-fired flue gas before more definitive projections can be made. Research breakthroughs and innovation in applications can certainly be significant, but are do not yet appear to be within the range of practicality.

Gas Separation Membranes

Gas separation membrane technology uses gas-liquid or catalyzed liquid membrane separators or reactors to "pull" the CO_2 gas from the exhaust stream. They may potentially use unique physical solvents, often still of a proprietary nature. Several potential vendors are currently actively involved in development of this concept or technology. These include Kvaerner, Carbozyme (catalyzed enzyme) and Electrocore (natural enzyme).

Temperature Swing Adsorption

Temperature swing adsorption concepts are similar in the use of custom-designed sorbents that adsorb CO_2 at lower temperatures, and then desorb CO_2 at higher temperatures. They include zeolites, synthetic zeolites, activated carbon (Adsorption Research, Inc./DOE). Though this technology holds promise for some time in the future, it is not ready for practical application today.

Regenerable CO_2 Sorbents

Regenerable CO_2 sorbent technology involves an absorption step for CO_2 removal, followed by a sorbent regeneration step where CO_2 is off-gassed. The process generally uses alkali and alkaline-earth metals (e.g., K_2CO_3 and CaO) deposited on a substrate. This technology is the focus of several ongoing research experiments. Advantages over amine-based liquid systems include: a) no large quantities of water involved in capture step and b) there are additional energy savings due to lower gas/solid pressure drop. RTI International (of RTP, NC) currently has efforts underway to develop this technology with support from DOE. Costs remain high with large energy use penalties.

The DOE has funded several such research projects that address the collection of CO_2 from stack gases of a coal-fired power plant. Except for amine absorption technologies, all CO_2 capture technologies still at the laboratory, bench-scale development level. Based on lab results, several vendors (Carbozyme, ARI) "claiming" projected full scale cost performances on the order of $5-15/ton CO_2 at some time in the future. These, and

[97] National Coal Council, "R&D Needs and Deployment Issues for Coal-Related GHG Management", May 2003.

other, potential "breakthrough" CO_2 capture technologies warrant further investigation and research investments but do not provide immediate promise or answers.

Geological Sequestration

The discussions immediately preceding relate to the capture of the gas in some form. This does not include transforming it to a stable and neutral element of the environment. One of the most promising means of disposal being researched is that of injection into geological strata such as subsurface coal mines, oil seams or deep underground brine "pools." Injection into oil or coal seams may also have some added benefit from production (release from strata) of methane that can be tapped and used in the utility boiler or for other purposes.

Obviously, these technologies require access to the proper strata for disposal of the waste stream before they might likely be considered viable. Eastern North Carolina may have some limited deep brine strata near the coast, but the state has no mines that would likely provide an opportunity for using this technology. Also, if such practical formations exist and prove feasible, there are currently no coal-fired (or other) boilers in that area, meaning that there would be additional transport costs to consider. The DOE recently announced the intent to develop an Environmental Impact Assessment of several brine strata. One of the potential formations to be assessed could be in Northeastern North Carolina. The proposal and Environmental Impact Assessment processes are time consuming, but prospects of information to be gained from evaluation of these formations is viewed as positive for the State. If the capture technology proves viable at some time in the future, it would be imperative to have a place to sequester the waste stream to render it harmless. The proposed DOE action would likely help answer these questions and a portion of the disposition puzzle for North Carolina. Such technologies might also influence location of future power generation units. Even with such an alternative available, the costs of collection and disposal would remain high and would very likely result in large reductions in the efficiency and generation of useful power at any such plant.[98]

[98]Kevin Johnson, *Some Projected Add-On Control Options for CO_2 Reductions at a Coal-Fired Generating Unit*, URS Corporation, DAQ Mercury and CO_2 Workshop, Raleigh, NC, April 21, 2004 (see Appendix A).

Other Technologies and Emerging Options

Many technologies have been developed, or are in an advanced state of development, such that they fall into a gray area of categorization. Some may be feasible to apply almost immediately, yet others are still on the shelf for one reason or other. Some of these technologies could easily move to a more advanced stage with little time and notice.

Conversion of Coal Units to Gas Units

A few years ago, many industry experts believed that coal-fired electric generating plants were "dinosaurs."[99] Coal was under attack; natural gas was cleaner burning, plentiful and "inexpensive." Improvements in combined cycle gas burning units had increased their efficiency. Natural gas units were generally less expensive in terms of capital investment. However, as natural gas units began to come on line, the price of natural gas went up in response to the decline in supply. The price of gas rose almost 175 percent over five years. With current natural gas prices even the more efficient new gas plants can operate economically only during the very infrequent periods of peak demand. Use of natural gas should not be dismissed out of hand for future expansion, but it probably is not a top candidate just because of reduced air quality impacts. Demand, alternate uses of the fuel, price and questionable net impacts make it necessary to look very closely at options and alternatives before implementing any significant expansion of conversion from coal as a fuel to natural gas.

Coal Gasification

Though direct use of natural gas may not be the answer for coal replacement, use of coal gasification may provide a partial answer. Integrated Gasification Combined Cycle (IGCC) is a process[100] for converting coal partially or completely to combustible gases. It is not a new technology (from the early 1800's through the 1940's most fuel gas used for residential and commercial applications was fuel gas from gasification of coal or coke), but is undergoing renewed interest, research and development, especially following recent successful demonstrations of practical applications. Eastman Chemical has used the technology routinely and has now licensed many of their developments, as a "chemical engineering process." IGCC is billed as the next generation of the technology of choice.

Coal can be gasified in a number of ways. After conversion, the resulting gases - carbon monoxide, carbon dioxide, hydrogen, methane and nitrogen - can be used as fuels or as raw materials for chemical or fertilizer manufacture. Gasification is inherently a cleaner process because coal is not combusted and the relatively small volumes of "syngas" are easier to clean up than the much larger volumes of flue gases at a coal combustion plant.[101]

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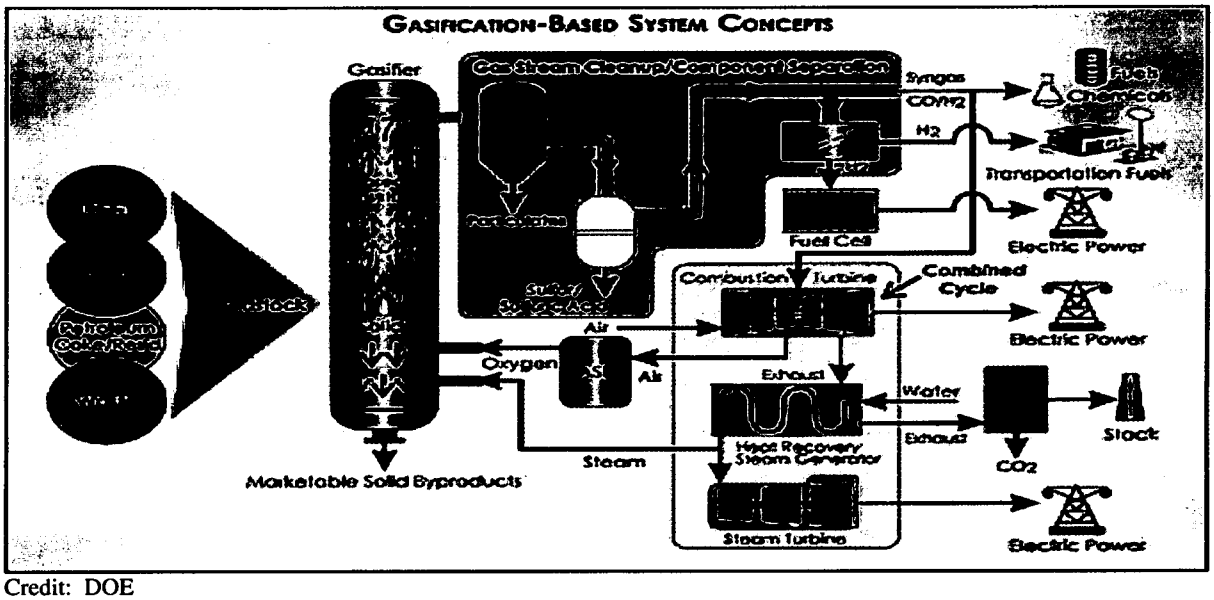
[99] Cinergy Corporation, *2003 Annual Report.*

[100] E. L. Clark., ***Coal Gasification***, http://www.zetatalk.com/energy/tengy11a.htm.

[101] Joe Chaisson, Clean Air Task Force, ***Integrated Coal Gasification Combined Cycle (IGCC) Power Plants and Geologic Carbon Sequestration***, DAQ Mercury and CO_2 Workshop, Raleigh, NC, April 21, 2004 (See Appendix A).

The first pioneering coal gasification electric power plants are now operating commercially in the United States and in 49 other nations. [102] Many experts predict that coal gasification will be at the heart of the future generations of clean coal technology plants for several decades into the future. Rather than burning coal directly, gasification breaks down coal, or virtually any carbon-based feedstock, into its basic chemical constituents. In a modern gasifier, coal is typically exposed to hot steam and carefully controlled amounts of air or oxygen under high temperatures and pressures. Under these conditions, carbon molecules in coal break apart, and set chemical reactions into motion that typically produce a mixture of carbon monoxide, hydrogen and other gaseous compounds. Gasification may be one of the best ways to produce hydrogen for future automobiles and power-generating fuel cells. Hydrogen and other coal gases may also be used to fuel power-generating turbines or as the chemical "building blocks" for a wide range of commercial products. DOE's Office of Fossil Energy is working on coal gasifier advances that enhance efficiency, environmental performance, and reliability as well as expand the gasifier's flexibility to process a variety of feedstock (including biomass and municipal and industrial waste).

Figure IV-2: Schematic of Gasification Process



Credit: DOE

Environmental Benefits of Gasification

The environmental benefits of gasification of coal and other carbon-based fuels result from the process's capability to cleanse as much as 99 percent of the pollutant-forming impurities from coal-derived gases.[103] Sulfur for example, emerges as hydrogen sulfide and can be captured by processes routinely used today in the chemical industry. In some alternatives, the sulfur is extracted in an elemental form that can be sold commercially. IGCC plants can achieve low NOx emissions as the substantial amount of nitrogen

[102] DOE, Office of Fossil Energy, *Coal Gasification*, http://www.fe.doe.gov/programs/powersystems/gasification/.
[103] Ibid, *Coal Gasification.*

contained in coal is readily removed in the syngas clean-up process. Thus, NOx formation at an IGCC plant is primarily the result of thermal NOx produced at high temperatures in a combustion turbine.

The DOE Office of Fossil Energy is also exploring advanced syngas cleaning and conditioning processes that are even more effective in eliminating emissions from coal gasifiers. Multi-contaminant control processes are being developed that reduce pollutants to parts-per-billion levels and are effective in cleaning **mercury** and other trace metals, in addition to other impurities. Coal gasification may offer a further environmental advantage in addressing concerns over carbon dioxide. If oxygen is used in a coal gasifier instead of air, carbon dioxide is emitted as a concentrated gas stream, making it more viable and inexpensive to capture for ultimate disposition in various sequestration approaches. (By contrast, when coal burns or reacts in air, 80 percent of which is nitrogen, the resulting carbon dioxide is much more diluted and more costly to separate from the larger mass of gases flowing from the combustor or gasifier.)

Efficiency Benefits

Coal gasification also results in significant efficiency gains. In a typical coal combustion plant, heat from burning coal boils water, to make steam that drives a steam turbine-generator. Only about *a third* of the energy value of coal converts to electricity by most combustion plants. The rest is lost as waste heat. A coal gasification power plant typically gets dual duty from the gases that it produces. First, the coal gases, cleaned of their impurities, are fired in a gas turbine, much like natural gas, to generate one source of electricity. The hot exhaust of the gas turbine is then used to generate steam for a more conventional steam turbine-generator. This dual source of electric power, called a "combined cycle," converts much more of coal's inherent energy value into useable electricity. The fuel efficiency of a combined cycle power plant using gasified coal can thus be boosted to about 50 percent or more. Future concepts that incorporate a fuel cell or fuel cell-gas turbine hybrid will likely achieve even higher efficiencies, perhaps in the 60 percent range, or nearly twice today's typical coal combustion plants. With remaining waste heat being channeled into process steam or heat, perhaps for nearby factories or district heating plants, greenhouses, etc. the overall net fuel use efficiency of future gasification plants could possibly reach 70 to 80 percent.

Higher efficiencies translate into more economical electric power and potential savings for ratepayers. A more efficient plant also uses less fuel to generate power, meaning that proportionally less CO_2 is produced. Coal gasification power processes under development by DOE could cut the formation of CO_2 by 40 percent or more compared to today's conventional coal-burning plant. The capability to produce electricity, hydrogen, chemicals, or various combinations while virtually eliminating air pollutants and greatly reducing generation of GHG emissions makes coal gasification one of the most promising technologies for the energy plants of tomorrow. Many contend that its day has come and can be used as off-the-shelf technology, with continuing improvements.[104]

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[104] Joseph Chaisson, Integrated ***Coal Gasification Combined Cycle (IGCC) Power Plants and Geologic Carbon Sequestration***, DAQ Mercury and CO_2 Workshop, Raleigh, NC, April 21, 2004 (See Appendix A).

Carbon Capture

From a climate perspective, a significant advantage of IGCC is that technology exists to remove carbon from syngas at a reasonable cost. Once captured, carbon can be compressed and transported to an appropriate site for injection into a suitable geologic formation for indefinite sequestration from the atmosphere as discussed earlier. All parts of this "carbon capture and sequestration" technology are in commercial practice today, but would need to be "up-scaled" to meet the requirements for a commercial IGCC utility plant.

Combined Cycle Turbines

Combined cycle turbines[105, 106] are relatively large stationary turbine units that are most frequently fueled by natural gas and used as intermittent peaking capacity for high load times. Some of the same, or similar, efficiency enhancements that were described above for IGCC can apply to these units. Combined cycle systems are capable of breaking the 60 percent efficiency barrier. They integrate the gas turbine, steam turbine and heat recovery steam generator into a seamless system, optimizing each component's performance. These units use higher efficiency and output to reduce the cost of electricity of this gas-fired power generation system.

Most existing units are open loop air-cooled gas turbines that have a significant temperature drop across the first stage nozzles, which reduces firing temperature. The combined cycle or closed-loop steam cooling systems allow the turbine to fire at a higher temperature for increased performance, without increased combustion temperatures with their usual increased emission levels of NOx. This closed-loop steam cooling enables them to achieve 60percent fuel efficiency capability while maintaining strict low NOx standards and reducing CO_2 emissions. Additionally, closed-loop cooling minimizes parasitic extraction of compressor discharge air, thereby allowing more air to flow to the head-end of the combustor for fuel premixing. They also offer a greater than 40 percent reduction in land area per installed megawatt, compared to other combined cycle systems, which helps reduce the overall cost of producing electricity. This technology is already in use at several plants in the State. Progress Energy's Cape Fear plant, for example, has two combined cycle units that power turbines from the original boilers at the site.[107] Several other new combined cycle units have also been built in the State and should be considered strongly in reviews and evaluations of new or modified units in the future.

Distributed Generation

Distributed generation applies to various schemes and methods whereby fuel, such as pipeline natural gas (locally generated methane from animal waste, etc), is distributed to small electrical generating units which then do not necessarily have to be connected to the electrical grid to satisfy the need of the individual customer. These generating units may be in the form of fuel cells, turbines or reciprocating engines (spark or diesel) and

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[105] General Electric, *GE Power Systems Gas Turbine and Combined Cycle Products,* http://www.gepower.com/prod_serv/products/gas_turbines_cc/en/downloads/gasturbine_cc_products.pdf.

[106] Siemens- Westinghouse, *Combined Cycle Plant Ratings,* , http://www.siemenswestinghouse.com/en/plantrating/index.cfm.

[107] Cheryl Vetter, Progress Energy- *Comments on the Draft CO_2 Emissions Reduction Options for Coal-fired Electrical Utility Boilers and Other Stationary Sources, Second Interim Report,* August 6, 2004.

generally eliminate much of the line losses associated with the current distribution system (on the order of 10 percent of electricity generated is lost in line losses). However, these "small" units are generally not as efficient as a central unit with larger output, may be noisy, may be prone to abandonment or low maintenance practices, have the limitations of releasing their emissions (most likely NOx as the major pollutant of concern) at ground level, are not amenable to reliable emission controls and may have other environmental shortfalls. In addition, to function most efficiently there may need to be connections to the grid anyways for dependability of service and sale of excess production to the grid, when/if net metering legalities are resolved.

The potential for distributed generation is quite large. Some distributed generation sites, such as an animal waste fuel facility, could potentially become economic development zones where a single generator could serve the electrical needs of multiple facilities within that zone, or perhaps a nearby residential neighborhood.

For distributed generation to reach its potential in North Carolina, a change in the current utility territorial law may be required. At the current time, an entity wishing to sell the output from a distributed generation system to an end-use customer may, possibly, not be able to do so without becoming a regulated utility in NC, unless the entity is either an electric cooperative or a municipal electric system. It is unlikely that an entrepreneur will want to become a regulated utility subject to the various reporting requirements.

Hydrogen Fuels & Fuel Cells

A fuel cell uses the chemical energy of hydrogen to produce electricity and water, cleanly and efficiently. Fuel cells are unique in terms of the variety of their potential applications; they can provide energy for systems as large as a utility power station and as small as a smoke detector.

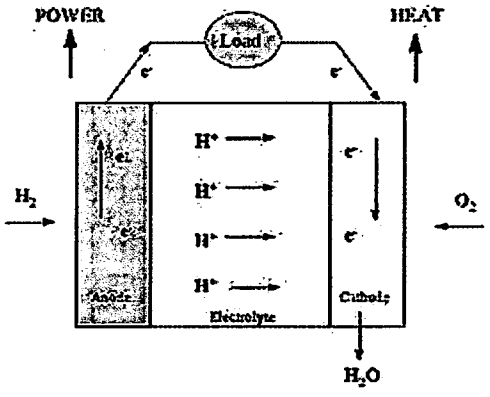
Hydrogen production and its combustion either in fuel cells or in "open flame" technologies have the potential to solve several major challenges facing America today: dependence on petroleum imports, poor air quality, and GHG emissions. DOE's Hydrogen, Fuel Cells & Infrastructure Technologies Program[108] is working to accelerate the development and successful market introduction of these technologies. The IGCC process referenced above is a potential building block for production of hydrogen from coal. In addition, work is progressing for direct use of coal in fuel cells. Some of this work was pioneered in the National Aeronautics and Space Administration (NASA) work preliminary to space travel. Research and developments of both hydrogen production technologies and those that provide for its effective uses as a clean burning fuel are "almost accessible" and the expectations for their application are high in the next few years. As noted above, IGCC technologies can easily provide a hydrogen stream for use to fuel these devices or other purposes needing hydrogen.

Fuel cells have several benefits over conventional combustion-based technologies currently used in many power plants and passenger vehicles. They produce much smaller

[108] U.S. DOE, Hydrogen, Fuel Cells & Infrastructure Technologies Program, http://www.eere.energy.gov/hydrogenandfuelcells/ .

quantities of GHG that contribute to global warming and none of the air pollutants that create smog and cause health problems. If pure hydrogen is used as a fuel, fuel cells emit only heat and water as a byproduct, though higher temperature applications have the potential to generate some NOx. Obviously, this technology is not yet available off the shelf for replacement of coal fired electrical generation but seems to have promise. Also, the cost factors are somewhat elusive at this point. As the technologies develop further, one can reasonably expect that these factors will be better defined and a sensible and reliable analysis of their potential (cost) impact on the market place can be developed. A simple rendering of how a fuel cell works is shown in Figure IV-3.

Figure IV-3
How a Fuel Cell Works[109]



Recovery of Fuel Value from Animal Waste at CAFOs

Confined animal feeding operations (CAFO's) generate huge quantities of waste high in carbon, and usually ammonia. Research underway for several years in North Carolina at the North Carolina Animal and Poultry Waste Management Research Center on the North Carolina State University (NCSU) campus and at several other agricultural campuses throughout the country is attempting to develop better means of disposal of animal waste, with recovery of resource value. North Carolina is the second largest hog producer in the US, with approximately 10 million pigs, thus at NCSU, the focus of these activities has been primarily on swine operations. In 2000, Smithfield Foods and the North Carolina Attorney General's Office entered into agreements to fund and study "promising new technologies" with expectation that these would provide solutions to the ammonia and odor problems in particular, and to waste disposal problems in general.

Results of this program have been recently unveiled. The reports will soon be available, but some of the promising technologies studied included methods and processes to turn the carbon in the waste into fuels for distribution as an energy source. This program will continue to pursue many of the technologies and make them more economically viable, but the conversion options, in particular, may hold promise for supplementing the fuel supply at no large expense on the CO_2 budget, providing another source of carbon fuel that does not depend on fossil fuels. At the DAQ Mercury and CO_2 workshop, Kurt

[109] NASA, *How a Fuel Cell Works*, http://www.grc.nasa.gov/WWW/Electrochemistry/doc/fuelcell.html.

Creamer, P.E., one of the researchers from NCSU, who has been working on this project with Dr. Mike Williams, Director of the Smithfield Agreement Project, discussed these efforts.[110] Reports from the research are currently being released and the studies will likely result in several papers and other technical documents soon. As for other potential electric sources, the net metering and other related legalities may need to be addressed before all the roadblocks are removed.

Nuclear Power

Despite other environmental and social impacts, nuclear does have substantial air quality and CO_2 benefits. Nuclear power is basically a clean (air pollution-wise), non-CO_2-emitting source of electric power. A new nuclear power plant has not been built in the U.S. in the last couple of decades, but DOE is currently in the process of "dry-run" permitting new nuclear capacity. Finland, Japan and Taiwan have also recently announced new nuclear plants. Reluctance to build such capacity has been largely due to fear of or potential for releases of nuclear radiation and because of the lack of long-term, safe storage and disposal facilities for "spent" nuclear fuels. The more recent fear of, or actual potential, for some of these fuels falling into the hands of terrorists and others has not helped enhance the chances of new plants being constructed. Many design improvements for safety have been made in reactors since the last units were built here, and reactors continue to operate and be built in other countries. Whether, or when, these units may enjoy serious further consideration in North Carolina is uncertain, but that uncertainty does not dismiss this option from being on this list.

Industrial Initiatives

The private sector often has motivation and commitment to make reductions on their own. Though the point here is not to show a complete cross-section of such efforts, several companies have developed a strong environmental reputation by "going the extra mile" and demonstrating their good citizenship. Two examples that operate in North Carolina are mentioned below:

- DuPont has become a leader in safety issues as well as several environmental areas. For CO_2 reduction results, it has undergone massive programs to revamp the way it does business and manufactures products. For example, the company as a whole, used nine percent less total energy in 2002 than it did in 1990, despite an almost 30 percent increase in production. The resulting energy savings were nearly $2 billion. Mr. William Bailey of DuPont made a presentation at the DAQ Mercury and CO_2 Workshop in April 2004 and his presentation slides are available that summarize their efforts and results.[111]

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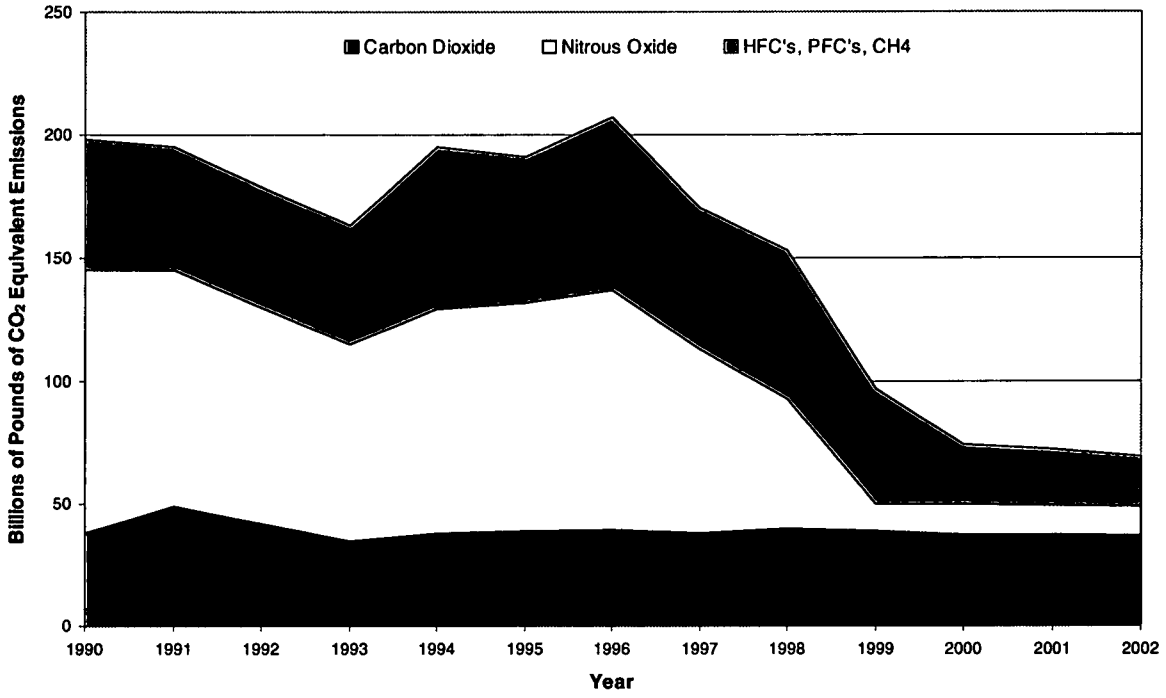
[110] Kurt Creamer, *NC Animal Waste as a Potential Resource for Reducing CO2 and Methane Emissions,* Presentation at DAQ Workshop, Raleigh, NC , April 21, 2004 (See Appendix A), www.cals.ncsu.edu/waste_mgt/ .

[111] William Bailey P.E., Principal Consultant E. I. DuPont de Nemours and Co., Inc. Charlotte, NC, *Reducing Greenhouse Gas Emissions in DuPont,* Presentation at DAQ Mercury and CO_2 Workshop, Raleigh, NC, April 21, 2004. http://daq.state.nc.us/news/leg/2004-04-hg-co2-agenda.pdf . (See Appendix A)

Figure IV-4: Emission Reductions at DuPont 1990-2002



- IBM provides another example of such an environmentally forward-looking company. Between 1990 and 2002, IBM's energy conservation measures resulted in savings of 12.8 billion kilowatt hours of electricity, avoiding nearly 8 million tons of CO_2 emissions and saving the company $729 million in reduced energy costs.

Other Potential Policy Options for North Carolina

Although already covered to some degree by the SEO's energy plan discussed above, several particular energy related policies seem appropriate for further discussion and added emphasis. These policy options do not necessarily relate to hardware or technologies so much as to a means to an end different from what is now in place.

Renewables Portfolio Standards:

One way to encourage increased use of renewable sources of energy as already discussed in this report, is to establish a Renewables Portfolio Standard (RPS). The RPS is a flexible, market-driven policy that can help ensure that the public benefits of wind, solar, biomass and geothermal continue to be considered for their maximum contributions toward using less energy and the accompanying reductions in CO_2 emissions as electricity markets become more competitive. RPS can help ensure that some minimum amount of renewable energy is included in the portfolio of electricity resources serving the State, and, by increasing the required amount over time, the RPS can put the electricity industry on a path toward increasing their sustainability. Because RPS is a market standard, it relies almost entirely on the private market for implementation.

Market implementation will normally result in competition, efficiency and innovation that will deliver renewable energy at the lowest possible cost.

Renewable Energy Credits, or "Credits," are central to RPS. A "credit" is a tradable certificate of proof that a specific number of kilowatt-hours (kWh) of electricity have been generated by a renewable-fueled source. Credits are denominated in "kWh," and are a separate commodity from the power itself. The RPS requires all electricity generators (or electricity retailers, depending on policy design) to demonstrate, through ownership of credits, that they have supported an amount of renewable energy generation equivalent to an established percentage of their total annual kWh sales. For example, if the RPS is set at 5 percent and a generator sells 100,000 kWh in a given year, the generator would need to possess 5,000 credits at the end of that year.

With RPS, investors and generators make all decisions about how to comply, including: the type of renewable energy to acquire, the technologies to use, the renewable developers to do business with, the price to pay and the agreeable contract terms. Generators decide whether to invest in renewable energy projects and generate their own credits, enter into long-term contracts to purchase credits, or renewable power along with credits, or simply to purchase credits on the 'spot' market. Only the bottom line is enforced, i.e. possession of a sufficient number of credits at the end of each year. The credit system provides compliance flexibility and avoids the need to "track electrons." Because the RPS applies equally to all generators, it is competitively neutral.

Government involvement in RPS is usually limited to certifying credits, monitoring compliance and imposing penalties if necessary. The credit certification process applies to renewable producers who wish to certify their renewables output. Monitoring compliance requires each generator to demonstrate ownership of a sufficient number of credits relative to electricity sales.

Fourteen states have adopted RPS requiring that a certain percentage of their electricity be generated by renewable energy. These are Arizona, California, Connecticut, Iowa, Maine, Massachusetts, Minnesota, Nevada, New Jersey, New Mexico, New York, Pennsylvania, Texas and Wisconsin.[112] Although North Carolina has not adopted a full RPS, the NC GreenPower program is essentially an adaptation of the concept which may serve to demonstrate how other similar actions on a broader scale might work in the State.

Net-Metering

"Net Metering" is a special metering and billing agreement between utilities and their customers that facilitates the connection of small energy generating systems (conceivably both renewable and conventional) to the power grid. These programs encourage small scale renewable energy systems, ensure that customers always have a reliable source of energy from the grid during times when their generators are not producing energy, and provide substantial benefits to the electric system, the economy and the environment.

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[112] Amy Royden-Bloom, ***Reducing CO_2 from Coal-Fired Utilities: State and Local Initiatives***, DAW Mercury and CO_2 Workshop, April 21, 2004, Raleigh, NC. (See Appendix A).

When a customer's renewable generator is producing, more power than is being consumed, the customer's meter runs backward, generating credits. When a customer uses more power than is being produced, the meter runs forward in a normal manner. The customer is charged only for the "net" power used from the electricity service provider over a designated period.

Distributed generation is also discussed later in this report and is closely associated. For distributed generation to reach its maximum potential in North Carolina, changes in the utility territorial law may be required. Now, an entity wishing to sell the output from a distributed generation system to an end-use customer may not be able to do so without becoming a regulated utility in NC, unless the entity is already an electric cooperative or a municipal electric system. By revising these laws and adopting net metering laws, states encourage the installation and use of renewable energy generators such as those produced from animal waste. Such systems may help lessen our dependence on domestic and foreign fossil fuels, add to the diversification of our current energy portfolio and help lessen the environmental footprint associated with electricity generation and consumption. Customers with net metering systems are likely to be more aware of their energy consumption and consume less energy than the average customer. Net metering is also a way to increase the energy in the power grid to keep up with increases in demand during peak power-use times, which is particularly of interest to states facing power shortages.

Currently, 37 states require at least some utilities to offer net metering for small wind systems, although the requirements vary considerably. In recent years many states have enacted net metering laws, including California, Connecticut, Delaware, Massachusetts, Montana, Nevada, New Hampshire, New Jersey, Ohio, Oregon, Vermont, Virginia, and Washington. North Carolina is one of only 11 states without some form of net metering.[113] In most states with net metering statutes, utilities are required to offer net metering for renewable systems, although many states limit eligibility to small systems.

State Energy Plan Priority # (6) is a recommendation that the General Assembly should consider adopting net metering for all utilities. **Status**: Discussions are underway on net metering and interconnection issues between utilities, renewable energy advocates and generators. A NCUC docket, related to NC GreenPower program, is being developed.[114]

NC Climate Action Registry

Much discussion has occurred in North Carolina on a climate change or climate action registry that would establish and supplement existing voluntary reporting programs. Such a registry would provide a mechanism to track all GWG emissions. However, a registry alone will not necessarily accomplish any major reductions. Without inclusion of all emitting sources in the inventory and registry to determine and track the true rate of increase (or decrease) of emissions from activities within the state, a complete and

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[113] Rusty Haynes, North Carolina Solar Center, *Database Empowers Economic Development*, Carolina Sun, Summer 2004.

[114] Larry Shirley, Director, State Energy Office, *Development, Components and Status of the NC State Energy Plan*, Presentation at NC DAQ Mercury and CO_2 workshop, Raleigh, NC, April 19, 2004 (See Appendix A).

accurate assessment of the total is impossible. The two major contributing sectors (coal fired power generation and transportation) are otherwise already reporting or can be tracked independently of a traditional registry. The EPA National Acid Precipitation Program already mandates continuous measurement and annual reporting of their emissions, and these are available from the national database. In addition, North Carolina utilities are reporting to DOE's 1605 (b) voluntary registry. Emissions from transportation sectors can be reasonably estimated by tracking fuel usage and translation of these data into CO_2 by simple chemical reaction calculations.

There are already several competing registries (World Resources Institute, 1605b, the Greenhouse Gas Protocol, a developing ISO standard, Climate Leaders) all with different thresholds, methods and requirements. Sources are likely to participate in a voluntary registry only if it provides them with an indication of success while other facilities that are not able to paint such a picture of their situation are less likely to voluntarily report. Thus, a national registry should be revised so that it will provide an overall program of complete assessment and tracking of all sources.

A draft discussion plan for a North Carolina registry and intermediate steps toward reaching the goals of such a program are outlined in **Appendix C**. This plan is <u>not a recommended plan</u> but is provided to point out some of the needs, and requirements to be defined, and choices to be made, before implementing such a program. The reader should review the plan and arguments, and provide comments upon a better design and means for implementation of such a proposed registry, should it become determined as a requirement or need. The draft plan in **Appendix C** will no doubt be further revised to reflect comments from reviewers of this document. Such comments will hopefully include response to the basic concept of further development of a more "Comprehensive North Carolina Plan for GHG Mitigation," or other some other multi-state integrated programs suggested in this draft. Many of the components of this draft are speculative and dependent upon future developments outside of the control of DAQ.

CHAPTER V WHAT ARE OTHERS DOING

In a democratic society, the people, through their elected officials, may set policies based upon what they feel is most important. These policies will be reflected at all levels, from international, national, down through state and local. The actions of other jurisdictions may provide insights, or perhaps clues, as to where these directions may take us, at least in context to what is done in North Carolina related to these other jurisdictions. This section reviews some of the existing situations and policies.

Update on International Developments

There are few recent international milestones. The Kyoto treaty[115] was being considered in 1997 and at that time, the Senate passed the Byrd/Hagel Resolution stating that the United States should not sign on to any international agreement on limiting greenhouse gases if developing nations would not be required to adhere to limitations, or the agreement would cause harm to the U.S. economy. In 1999, the Clinton Administration agreed to legally binding, numerical limits on GHG as prescribed by the Kyoto Treaty. The Bush. Administration continues to agree with general principles of the climate change efforts and needs for action, but opposes the Kyoto Protocol. In 2002, President Bush directed the Department of Energy[116] to improve its guidelines for voluntary reporting of GHG emissions, reductions and avoidance in an effort to appease some of the criticisms of its policies. A history and more details on the international situation are included in Appendix B.

Another major world leader in a similar situation to the U.S. is Russia. It initially signed the protocol,[117] but later decided not to ratify it and recently again reversed its stance. Though a large number (122 as of April 15, 2004) of countries have accepted, ratified, or otherwise approved, the Protocol, and it remains open for additional signatures in the UN in New York City, it appears a major event and redirection will be needed to keep this Protocol from a slow continuing march toward death. In addition, in the past several months, the international bodies met in Italy for their periodic general conference and continued discussions.

Federal Actions and Status

The Bush Administration continues to agree that global warming is a major problem and that we must take action, but continues to oppose the Kyoto Protocol. Just as this report was being finalized, new announcements were made about how the Administration was recognizing that emissions of CO_2 and other GWG are "the only likely explanation for global warming over the last three decades."[118] However, the directions to date and proposals extended for the future, are aimed at slowing the pace of growth, instead of reversing the phenomenon. The U.S. Congress plays a key role in how the U.S. responds

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[115] United Nations Framework; Convention on Climate Change, http://unfccc.int/resource/docs/convkp/conveng.pdf.

[116] World Watch Institute, http://www.worldwatch.org/features/climate/activities/#1.

[117] Russia: Kyoto pact harms economy, CNN.com, December 2, 2003, http://www.cnn.com/2003/WORLD/europe/12/02/russia.kyodo.reut/.

[118] Andrew C. Revkin, *U.S. Report Turns Focus to Greenhouse Gases*, Greenwire, August 26, 2004.

to the challenges of global climate change. Legislation will be necessary to reduce GHG in any significant way. In addition, the Senate must ratify any treaty made by the U.S. This gives the Senate a major role in any international agreements and action plans. The budgets of all federal agencies, which include funding for programs to curb U.S. emissions, are established in the agencies' annual spending (or appropriations) bills. Congress then conducts hearings on these proposals.[119]

International climate change agreements must be ratified by the U.S. Senate for the United States to be a party, giving the Senate major influence over the U.S. negotiating position. The budgets of all federal agencies, which include funding for programs to curb U.S. emissions, are established in the agencies' annual spending (or "appropriations") bills, enacted by Congress. Congress conducts hearings that focus attention on global climate change and shape the national debate over how best to address it. With climate change, as with other issues, congressional action can differ significantly from that recommended by the U.S. President.

Members of both the Democratic and Republican Parties have offered climate change measures. As the scientific evidence of climate change has mounted, so has congressional activity. The number of climate change related legislative proposals increased from seven introduced in the 105th Congress (1997 - 1998) to twenty-five in the 106th Congress. Legislative proposals to require reporting and disclosure of GHG emissions and to protect companies from future penalties for reductions taken early seem to dominate. Many proposals are also aimed at carbon sequestration. An eventual program that is more comprehensive and possibly including a mandatory reduction of emissions, while allowing trading emission credits and rewards for increases in efficiency, may be slowly evolving. The forty-five bills, resolutions and amendments specifically addressing global change and GHG emissions introduced to date in the 108th Congress are listed in Appendix B.

Interest appears to be growing in certain legislative proposals, including measures to require the reporting and disclosure of GHG emissions, protect companies reducing GHG emissions from being penalized under a future GHG reduction program, and to promote carbon sequestration. Two bills have had bipartisan support. In the Senate, the *McCain-Lieberman Climate Stewardship Act of 2003* proposed capping GHG emissions of the electricity, manufacturing, commercial and transportation sectors of the economy (representing 85 percent of U.S. emissions) at their 2000 level, by 2010, and their 1990 level by 2016. Emitters would be able to trade GHG emissions credits and get credit for pre-enactment GHG reductions, carbon sequestration and international GHG reductions, up to a limit. The bill lost by a vote of 55 to 43, but Senator McCain has vowed to continue pushing this legislation until the Senate passes it. In March 2004, 20 members of the House (10 Republicans and 10 Democrats) introduced *Gilchrest-Olver Climate Stewardship Act of 2004* that echoes language of the McCain-Lieberman bill. It would require U.S. industries to reduce emissions of six primary GHGs from four sectors to 2000 levels, by 2010.

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[119] Worldwatch Institute, *Climate Change: Reducing the Threat of Climate Change in the U.S.: A Survey of Activities*, 2004. http://www.worldwatch.org/features/climate/activities/#1

In addition, two bills and several amendments were introduced to set up GHG registries. *The National Greenhouse Gas Emissions Inventory and Registry Act of 2003* was introduced in both the House and Senate, and would require large GHG emitters to report and disclose their emissions. Entities could also register their GHG reductions. *The Energy Policy Act of 2003*, which won approval by a vote of 84-14 in the Senate, includes three climate change titles. Title XI would establish a voluntary National GHG Registry. It also conditions that if, five years after enactment, less than 60 percent of U.S. anthropogenic GHG emissions had been reported voluntarily, reporting would be mandatory for large GHG emitters. The title also would encourage any future Congress to consider registered reductions as applicable towards future GHG reduction requirements. The bill establishes a *National Climate Change Strategy* with the goal of stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. It would also establish an Office of National Climate Change Policy within the White House, and a research and development program toward the goal of stabilization of GHG concentrations. A similar bill awaits passage in the House.

Addressing the challenge of climate change may ultimately include a more comprehensive set of approaches, possibly including a mandatory program to reduce GHG emissions and allow the trading of GHG emissions credits, and efficiency standards to promote the use of efficient products and technologies. Enacting such policy may be a longer-term proposition.

Pursuant to existing federal legislation and programs, several named efforts and programs are underway. These include Climate VISION, Climate Leaders, Climate Wise, the DOE 1605 (b) Registry and several others that cross Cabinet and Agency lines among EPA, DOE, USDA, NOAA, NASA, etc. Some are research oriented, some are mitigation oriented. Many of these programs are discussed in more detail in a separate context elsewhere in this document.

State and Regional Activities

The Pew Center for Global Climate change lists 28 different states with 44 state and local programs that reduce greenhouse gas emissions. Some programs were designed specifically to address climate change, but many were designed for other purposes: for example, to improve energy efficiency or to promote water conservation. All, however, directly or indirectly result in greenhouse gas reductions. During 2003 alone, at least 24 states introduced 90 bills to build frameworks to regulate GHG emissions. One-quarter of all U.S. states have enacted Renewables Portfolio Standards (RPS), which mandate an increase in the states' share of electricity generated with renewable energy. About half of all U.S. states have established renewable energy funds to provide subsidies for installation of renewable energy projects, or for the production of renewable electricity, for energy efficiency projects, and for energy education and awareness programs.

A few multi-state efforts exist. In 2003, the governors of California, Oregon, and Washington began efforts to draft recommendations on ways to collaborate regionally in reducing emissions in several sectors of their economies, including using more efficient

vehicles, increasing the share of renewables in electricity generation, and creating emissions accounting systems and inventories. Also in 2003, New York invited the governors of 10 other states to participate in the development of a regional program to cap and trade CO_2 emissions. Design for this Regional Greenhouse Gas Initiative is planned for completion in 2005.

In some relation to this effort is that by the North East States for Coordinated Air Use Management (NESCAUM) with many of the same states. The NESCAUM has initiated significant efforts toward their objectives through their Regional GHG Initiative (RGGI). The goal of their efforts is to develop the framework for a power sector GHG cap and trade system. They also plan to have a model rule in place by April 2005. Nine states are officially participating as members in this effort; with two states officially 'observing' and others invited. North Carolina is evaluating whether to become an official observer, but in the meantime is an unofficial observer.[120]

Option for Joint Actions Harmonizing With Other States

North Carolina provides only a small part of the global emissions of GHG, making it rather obvious that this State cannot solve the global problem alone. The State must work in consonance with other states in the region and United States, and even with other countries over the entire globe. We must take into account some perspective of what other states and groups of states are doing to address the problem. It is imperative that we be in harmony with them and with the international community in order to develop and utilize a "currency" for exchange and record keeping that is universal and does not impose unneeded hardships on reporting and controlling facilities.

The development of ways to reduce GHG and establish North Carolina as a truly important "part of the global solution" is not simple or something that can be done in isolation. Perhaps, the development of an integrated regional, multi-state, multi-departmental approach encompassing climate change, air quality and energy could assist in arriving at a solution that would do the job and be accepted as credible. A means for doing such planning and implementation would likely require some strong initiatives from the top levels of state governments, appropriation of resources, development of a motivated group of stakeholders, plus time, leadership and patience. Three recent reports provide some insights, guidance and information on experiences and how such large-scale options might be exercised.[121,122,123] The further development of this concept may harmonize well with a "Comprehensive North Carolina Plan for GHG Mitigation" mentioned later in this report under the GHG Registry discussions. It is definitely a concept that warrants further study and evaluation.

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[120] Amy Royden-Bloom, *Reducing CO_2 from Coal-Fired Utilities: State and Local Initiatives*, NC DAQ Mercury and CO_2 Workshop, April 21, 2004, Raleigh, NC. (See Appendix A)

[121] Southern Alliance for Clean Energy, Southern Environmental Law Center and Environmental Defense, Jointly authored *Blueprint for Breathing Easier, Southeast Energy Strategy for Clean Air*, 2002.

[122] *State Policy Solutions to Climate Change; Midwest Workshop Proceedings*, Pew Center on Global Climate Change, November 4-5, 2003.

[123] Tom Peterson, Center for Clean Air Policy, *Climate Change Mitigation: Process and Policy Options for State Greenhouse Gas Plans*, November 26, 2003, www.ccap.org.

APPENDIX A *APRIL 19-21, 2004 DAQ WORKSHOP PRESENTATIONS (CO_2 ONLY) TITLES, SPEAKER NAMES AND AFFILIATION*

DUE TO SIZE OF ELECTRONIC FILES, THESE PRESENTATIONS ARE NOT INCLUDED IN THIS VERSION OF THIS REPORT, BUT MAY BE SEEN AT DAQ'S WEBSITE:
http://daq.state.nc.us/news/leg/2004-04-hg-co2-agenda.pdf

Monday, April 19 Opening Session

Introduction and Welcome: Keith Overcash, Director, NC Division of Air Quality, DENR

Background and Significance of Clean Smokestacks Act: Brock Nicholson, Deputy Director, NC Division of Air Quality, DENR

Basis for Issues to be Discussed: CO 2 and Mercury:

Moderator, Sheila Holman, Chief, Planning Section NC Division of Air Quality

Review of the Science and Concerns for Climate Change in North Carolina: Ryan Boyles, Associate State Climatologist, State Climate Office of NC at NCSU

History and Transitions of the Global Warming Program and Policies in the US: Wiley Barbour, Environmental Resources Trust

Development, Components and Status of the NC State Energy Plan: Larry Shirley, Director, NC State Energy Office, NC Department of Administration

Lunch Speaker - Importance and Impacts of CSA Sections 12 and 13 and Your Input for the Future of North Carolina: Secretary William (Bill) Ross, NC Department of Environmental and Natural Resources

Tuesday, April 20

Environmental Leadership: The Pursuit of Clean Air: *Ben White, Progress Energy*

Renewable Energy as a Mechanism for Reducing Pollution: *Alden Hathaway, Environmental Resources Trust, Inc., Washington, DC*

Lunch Speakers

Mercury and CO_2 Emissions from the Power Generation Sector *: Dr. C.V. Mathai, Manager for Environmental Policy, Arizona Public Service Company, Phoenix, AZ*

Insights from Economic Analyses of the Impacts to the Utility Industry from Mercury and CO_2 Controls*: Dr. Anne E. Smith, Vice President, Charles River Associates, Washington, DC*

General CO_2 Topics and Issues:

Moderator, Phil Bisesi, Project Manager, North Carolina State Energy Office

Potential Impacts for the NC State Energy Plan on Emissions of CO_2 with Technical Procedures and Assumptions Upon Which These Plans Were Developed: *Jeff Tiller, Appalachian State University*

Technology, Energy Efficiency, and Renewable Energy for Emission Reduction: *Ward Lenz, Director, Energy Programs and John Morrison, Vice President, Advanced Energy*

The People, the Planet, and the Pocketbook: How a Green Builder Program Can Avoid Emissions Using Solar Energy: *Dona Stankus, AIA, NC Solar Center*

Potential in NC for Extraction of Wind Energy : *Dr. Dennis Scanlin, Professor, Technology Department, Appalachian State University*

Past, Present and Projected Participation in Climate Wise by North Carolina Companies: *James Haven, Global Warming Initiatives, Inc.*

Wednesday, April 21 : NC Specific CO 2 Topics and Issues–

Moderator: Phyllis D. Jones, NC Division of Air Quality

Review of Real/Practical and Projected Options fro CO_2 at a Coal-Fired Generating Unit: *Kevin Johnson, URS*

Integrated Gasification Combined Cycle (IGCC) Technology; Carbon Sequestration and Cost Implications : *Joe Chaisson, (Harpswell, ME), Clean Air Task Force (Boston, MA)*

The Global Carbon Cycle and the Duke Forest Free-Air CO_2 Enrichment (FACE) Project: *Dr. William H. Schlesinger, Dean, Nicholas School of the Environment & Earth Sciences, Duke University.*

NC Animal Waste as a Potential Resource for Reducing CO_2 and Methane Emissions: *Kurt Creamer P.E., Animal and Poultry Waste Management Center, NC State University*

Industry Experience in Reducing CO2 and GHG Emissions – A Case Study of International Proportions: *Bill Bailey, DuPont, Charlotte, NC*

Reducing CO_2 from Coal-Fired Utilities: State and Local Initiatives: *Amy Royden, STAPPA/ALAPCO*

Lunch speaker – Herding Sheep: The Commons and the Marketplace; Michael Shore, Environmental Defense

Overview of the Southeast Regional Carbon Sequestration Partnership: Gerald R. Hill, Ph.D, Senior Technical Advisor, Southeastern Regional Carbon Sequestration Partnership

Summaries:

Integrated Gasification Combined Cycle (IGCC) Technology; Carbon Sequestration and Cost Implications : *Joe Chaisson, (Harpswell, ME), Clean Air Task Force (Boston, MA)*

IGCC: WHAT IS IT?

- Chemical conversion of coal to synthetic gas for combustion in a modified gas turbine.
- Inherently cleaner process because coal is not combusted and the relatively small volumes of syngas are easier to clean up than the much larger volumes of flue gases at a coal combustion plant.

IGCC Environmental Impacts –

General

- IGCC plants are more efficient in converting coal to electricity than conventional coal plants and thus produce less CO2 per unit of electricity generated.
- Near-term IGCC plants would produce about 20% less CO2 - per unit of electricity produced - than would the average existing coal plant.
- The longer term potential could be for IGCC plants to produce about one-third less CO2 - per unit of electricity produced - as would the average existing coal plant.
- IGCC plants can potentially capture and geologically sequester up to 90% (or more) of coal fuel carbon content.

Air Pollution

- Commercially available IGCC power plant technologies can have much lower air pollution emissions than new conventional coal plants.
- Actual air emissions performance will likely depend, at least in part, on what control technology and performance levels are required by regulators.

Waste

- Commercially available IGCC power plant technologies produce substantially smaller volumes (about one half) of solid wastes than do new conventional coal plants using the same coal.
- IGCC solid wastes are less likely to cause environmental damage than fly ash from conventional coal plants because IGCC ash melts in the gasification process, resulting in an ash much less subject to leaching pollutants than is conventional coal combustion fly ash.

Mercury Management

- Mercury capture at IGCC plants is quite feasible and much less costly than at conventional coal plants and the potential exists to indefinitely sequester mercury captured at IGCC facilities.
- Proven, low cost mercury controls can remove most of the mercury from coal syngas produced (14 years experience at Eastman Chemical).
- Mercury is captured in a small volume activated carbon bed. Bed contents are currently managed as hazardous wastes (due to other toxics captured), but could be sequestered in a long-term mercury storage facility or the mercury contained could be economically recycled.
- Thus coal IGCC with a carbon bed plant mercury control is the only technology today that can convert coal to power and capture most of the coal mercury in a form and volume suitable for permanent sequestration.

APPENDIX B *SUMMARY OF RECENT INTERNATIONAL, FEDERAL, REGIONAL, STATE AND LOCAL ACTIONS RELATED TO CLIMATE CHANGE*

International Actions, Treaties and Negotiations:

Framework Convention on Climate Change (Rio Climate Treaty)

Signed at Rio de Janeiro, Brazil in June 1992 by over 150 nations including the United States of America, the Rio Climate Treaty came into force in March 1994 and has been ratified or acceded to by virtually every nation including all populous countries except Turkey. The Rio Climate Treaty came out of the Rio Earth Summit and was signed by over a hundred heads of state and government including US President George Herbert Walker Bush. The Rio Climate Treaty sets an overall framework for climate protection and identifies as an objective for "stabilization of greenhouse gas concentrations in the atmosphere at a level that would produce dangerous anthropogenic interference with the climate system."

The Rio Climate Treaty does not set any binding emission limitations. It does, however, call for developed countries to adopt national policies and take measures "with the aim of returning individually or jointly" their net greenhouse emissions to 1990 levels. By the mid-1990s it was apparent that the voluntary measures of the Rio Treaty were not stopping the upward emissions trend in most industrialized countries so the parties to the Rio Climate Treaty began looking toward an emissions protocol with binding limitations on developed country parties. After two-and-a-half years of negotiations such a protocol was agreed to in December 1997 in Kyoto, Japan.

Kyoto Protocol

Even before the protocol was negotiated in final text in Kyoto, opponents in the US Senate sealed its doom with a 97-0 resolution expressing the sense of the Senate that the US should not sign an agreement which would either threaten the economic health of the US or which would impose binding requirements on the US without also imposing binding requirements on developing countries. While the first requirement might be met, there was no way that the Kyoto Protocol could meet the second requirement since developing countries had been guaranteed that they would be exempt from binding limitations.

The Kyoto Protocol ultimately set requirements for developed countries which, if agreed to and successfully implemented, would produce an overall reduction of just over 5% below developed country 1900 emissions by the 2008-2012 time frame that was set in the protocol as the first commitment period. In the absence of any international controls it is estimated that global emissions might rise about 40% by 2012. With Kyoto implemented by all developed countries it is anticipated that global emissions might rise by 30% over the same period.

G-8 Renewable Energy Initiative

In July 2000 at their Okinawa Summit the G-8, at the urging of British Prime Minister Tony Blair, agreed to create a Renewable Energy Task Force to address the challenge of two billion people lacking access to electricity. The Task Force drafted a Report that calls for G-8 member countries to support renewable energy actions in developing countries and to complement this with efforts in their domestic markets to scale up use of renewable energy. Prime Minister Tony Blair vowed that his country would seek to reduce its emissions of carbon dioxide by 60 percent by 2050.

Small Island States Clean Energy Initiative

In October 1998 the Climate Institute and Counterpart International organized a Symposium on Sustainable Energy Options for Small Island States. Present were the Foreign Minister of Jamaica, the UNDP administrator and senior staff, several USAID representatives and Permanent representatives from UN missions. An immediate outgrowth of this was the decision of the Caribbean nation of St. Lucia to become the world's first Sustainable Energy Demonstration Country. This was announced by the Government of St. Lucia at a press conference held jointly with the Climate Institute in November 1999 at the Bonn climate conference. Before making this announcement St. Lucia began steps to remove tariffs on renewable energy technologies and support equipment. In November 2000 St. Lucia's Prime Minister Dr. Kenny Anthony called on other countries at the Hague climate conference to follow St. Lucia's lead. In July 2001 the St. Lucia government approved a 10-year Sustainable Energy Plan.

Global Sustainable Energy Islands Initiative

Seeking to expand the Sustainable Energy Demonstration Country concept to other island nations, the Climate Institute and four partners — Counterpart International, Winrock International, Forum for Energy and Development and the Organization of American States — formed a consortium to support the interest of all small island states and potential donors by bringing renewable energy and energy efficiency projects, models, and concepts together in a sustainable plan for small island nations. At this time the two island states closest to joining St. Lucia in an effort to de-carbonize their energy systems are Grenada and Dominica, both in the Caribbean.

Iceland's Effort to Become First Hydrogen Based National Economy

Iceland whose per capita greenhouse emissions are among the highest in the world is now moving aggressively to become the world's first hydrogen-based economy. The country of about 270,000 has embraced a vision first put forth in the 1970s by Bragi Arnason, a professor at the University of Iceland. To reach its goal of becoming the world's first hydrogen-based national economy Iceland seeks to leverage its access to plentiful inexpensive hydro and geothermal power to speed commercialization of fuel cells for transport and power generation.

Federal Actions from the 108TH Congress Relative to Climate Change

The U.S. Congress plays a key role in determining how the United States responds to the challenge of global climate change. Legislation, enacted by Congress, will be necessary to reduce U.S. emissions of greenhouse gases substantially. International climate change agreements must be ratified by the U.S. Senate for the United States to be a party, giving the Senate major influence over the U.S. negotiating position. The budgets of all federal agencies, which include funding for programs to curb U.S. emissions, are established in the agencies' annual spending (or "appropriations") bills, enacted by Congress. Congress conducts hearings that focus attention on global climate change and shape the national debate over how best to address it. With climate change, as with other issues, congressional action can differ significantly from that proposed by the U.S. President.
As the scientific evidence of climate change has mounted, so has congressional activity. The number of climate change-related legislative proposals increased from seven introduced in the 105th Congress (1997-1998) to 25 in the 106th Congress (1999-2000), to over 80 in the 107th Congress (2001-2002). Forty-five such legislative proposals have been introduced to date in the 108th Congress (2003-2004), as are delineated below. [124]

There appears to be growing interest in certain legislative proposals, including measures to require the reporting and disclosure of greenhouse gas (GHG) emissions, protect companies reducing GHG emissions from being penalized under a future GHG reduction program, and promote carbon sequestration. In the Senate, the **McCain-Lieberman Climate Stewardship Act of 2003** proposed capping GHG emissions of the electricity, manufacturing, commercial and transportation sectors of the economy (representing 85% of U.S. emissions) at their 2000 level by 2010 and their 1990 level by 2016. Emitters would be able to trade GHG emissions credits and get credit for pre-enactment GHG reductions, carbon sequestration, and international GHG reductions, up to a limit. The bill lost by a vote of 55 to 43, but Senator McCain has vowed to continue pushing this legislation. In March 2004, 20 members of the House (10 Republicans and 10 Democrats) introduced **Gilchrest-Olver Climate Stewardship Act of 2004** that echoes language of the McCain-Lieberman bill. It would require U.S. industries to reduce emissions of six primary GHGs from four sectors to 2000 levels by 2010.

In addition two bills and several amendments were introduced to set up green house gas registries. **The National Greenhouse Gas Emissions Inventory and Registry Act of 2003** was introduced in both the House and Senate, which would require large GHG emitters to report and disclose their emissions. Entities could also register their GHG reductions. **The Energy Policy Act of 2003**, which won approval by a vote of 84-14 in the Senate, includes three climate change titles. Title XI would establish a National Greenhouse Gas Registry and allow entities to report voluntarily their GHG emissions and emission reductions to the registry. If, five years after enactment, less than 60% of U.S. anthropogenic GHG emissions had been reported voluntarily, reporting would be required of large GHG emitters. The title also would encourage future Congresses to consider registered reductions as applicable towards future GHG reduction requirements. The bill would establish a National Climate Change Strategy with goals of 1) stabilizing

[124] World watch, http://www.worldwatch.org/features/climate/activities/#1

GHG concentrations in the atmosphere; 2) establishing an Office of National Climate Change Policy within the White House; and 3) a research and development program with a goal to stabilize GHG concentrations. A similar bill must is awaiting passage in the House.

The 45 bills, resolutions, and amendments specifically addressing global climate change and GHG emissions introduced to date in the 108th Congress are listed here:

Greenhouse Gas Reduction

S.17: The Global Climate Security Act of 2003, includes several climate change measures, including a provision establishing a commission to review measures necessary to prevent a doubling of GHG concentrations in the atmosphere, a provision to require large emitters to report and disclose their GHG emissions (see S.194), and a resolution urging U.S. participation in international climate change negotiations (see S.925 under "International Negotiations"). Sponsor: **Sen. Thomas A. Daschle** (D-SD) (17 cosponsors)

S.139: McCain-Lieberman Climate Stewardship Act of 2003, would cap the GHG emissions of the electricity, manufacturing, commercial and transportation sectors of the economy (representing 85% of U.S. emissions) at their 2000 level by 2010 and their 1990 level by 2016. Emitters would be able to trade GHG emissions credits and get credit for pre-enactment GHG reductions, carbon sequestration, and international GHG reductions, up to a limit. The 2003 bill lost by a vote of 55 to 43, but Senator McCain has vowed to continue pushing this legislation until the Senate passes it.
Sponsor: **Sen. Joseph Lieberman** (D-CT) (6 cosponsors)

H.R. 4067 Gilchrest-Oliver Climate Stewardship Act of 2004 – In March 2004, 20 members of the House (10 Republicans and 10 Democrats) introduced a bill that echoes language of the McCain-Lieberman bill. It would require U.S. industries to reduce emissions of six primary GHGs from four sectors to 2000 levels by 2010.

Global Warming Amendment to the Energy Policy Act (H.R.6) offered during markup in the House Energy and Commerce Committee, which would require the President, using existing authority, to establish a voluntary program to reduce the carbon intensity of the United States by 18% by 2012 (as announced by President Bush). (See H.R.6 E.H. under "Energy Policy."). Sponsor: **Rep. Henry A. Waxman** (D-CA) – **Action**: 4/2/03: Not accepted by the House Energy and Commerce Committee by voice vote.

Greenhouse Gas Reporting

S.194: The National Greenhouse Gas Emissions Inventory and Registry Act of 2003, which would require large GHG emitters to report and disclose their emissions. Entities could also register their GHG reductions. (See S.17 under "Greenhouse Gas Reduction.")
Sponsor: **Sen. Jon Corzine** (D-NJ) (2 cosponsors)

Energy and Climate Change Amendment to the Energy Policy Act (S.14) filed during markup in the Senate Energy Committee, which would require large GHG emitters to report and disclose their emissions and register their GHG reductions. The amendment would establish a National Climate Change Strategy, a White House Director of Climate Change Policy, an Office of Climate Change Policy at the Department of Energy, and a Forest Carbon Program at the Department of Agriculture. (See S.14 and H.R.6 E.A.S. under "Energy Policy.")
Sponsor: **Sen. Jeff Bingaman** (D-NM) – **Action**: 4/29/03 The amendment was filed but not offered during markup.

H.R.1245: **The National Greenhouse Gas Emissions Inventory Act of 2003**, which would require large GHG emitters to report and disclose their emissions. Entities could also register their GHG reductions.
Sponsor: **Rep. John W. Olver** (D-MA) (49 cosponsors)

National Greenhouse Gas Emissions Inventory Amendment to the Energy Policy Act (H.R.6) filed during markup in the House Energy and Commerce Committee, would require large emitters of GHGs to report and disclose their emissions and allow entities to register their GHG reductions (language identical to H.R.1245). (See H.R.6 E.H. under "Energy Policy.")
Sponsor: **Rep. Diana L. DeGette** (D-CO) – **Action**: 4/2/03 The amendment was filed but not offered during markup.

(See also H.R.6 E.A.S. under "Energy Policy," and S.17 under "Greenhouse Gas Reduction.")

International Negotiations

Sense of Congress on Climate Change Amendment to the Energy Policy Act (H.R.6) offered during markup in the House Energy and Commerce Committee, urges the U.S. to participate in international negotiations with the objective of securing U.S. participation in a future binding climate change treaty. (See H.R.6 E.H. under "Energy Policy.")
Sponsor: **Rep. Henry A. Waxman** (D-CA) – **Action**: 4/2/03: Not accepted by the House Energy and Commerce Committee by a vote of 18 – 34. 4/9/03: Rep. Waxman filed the amendment with the intent of offering it during debate on H.R.6 on the House floor, but was not allowed to bring it to a vote.

S.925: **The Foreign Relations Authorization Act, Fiscal Year 2004**, among other things, includes a Sense of the Congress Resolution urging the U.S. to participate in international negotiations, with the objective of securing U.S. participation in a future binding climate change treaty.
Sponsor: **Sen. Richard G. Lugar** (R-IN) – **Action**: 4/9/03: During markup in the Senate Foreign Relations Committee, **Sen. Joe Biden** (D-DE) and **Sen. John F. Kerry** (D-MA) offered the climate change resolution as an amendment, and it was accepted by voice vote. The bill was then reported out of committee by a vote of 19 – 0. The bill has been debated but not passed by the full Senate.

H.R.1950: **The Foreign Relations Authorization Act, Fiscal Year 2004**, as reported by the House International Relations Committee, included a Sense of the Congress Resolution urging the U.S. to participate in international negotiations, with the objective of securing U.S. participation in a future binding climate change treaty.
Sponsor: **Rep. Henry J. Hyde** (R-IL) (2 cosponsors) – **Action**: 5/2/03: During markup in the House International Relations Committee, the climate change resolution was offered as an amendment by **Rep. Robert Menendez** (D-NJ) and accepted by a vote of 21 – 18. 7/9/03: During markup in the House Energy and Commerce Committee, the climate change resolution was struck by a vote of 28 – 17.

(See also S.17 under "Greenhouse Gas Reduction" and H.R.6 E.A.S. under "Energy Policy.")

Energy Policy

H.R.6 E.A.S.: **The Energy Policy Act of 2003 as passed by the Senate**, is identical to H.R.4 E.A.S. in 2002, the Senate-passed Energy Policy Act of 2002. The bill includes three climate change titles. Title XI would establish a National Greenhouse Gas Registry and allow entities to report voluntarily their GHG emissions and emission reductions to the registry. If, five years after enactment, less than 60% of U.S. anthropogenic GHG emissions had been reported voluntarily, reporting would be required of large GHG emitters. The title also would encourage future Congresses to consider registered reductions as applicable towards future GHG reduction requirements. Title X would establish a National Climate Change Strategy with the goal of stabilization of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system; an Office of National Climate Change Policy within the White House; and a research and development program with a goal of stabilization of GHG concentrations. Title X also includes a Sense of the Congress Resolution urging the U.S. to participate in international negotiations, to secure U.S. participation in a future binding climate change treaty. Title XIII would authorize various climate change research activities. (See Energy and Climate Change Amendment under "Greenhouse Gas Reporting.")
Sponsor: **W.J. "Billy" Tauzin** (R-LA) – **Action**: 7/31/03: Passed by the Senate by a vote of 84 – 14, in lieu of S.14 (see below).

H.R.6 E.H.: **The Energy Policy Act of 2003 as passed by the House**, among other things, would direct the Department of Energy to research technologies for ultra-deepwater and unconventional natural gas and other petroleum resource exploration and production, including for the reduction of GHG emissions and sequestration of carbon. The bill would also establish a research program in genetics, protein science, and computational biology of microbes and plants, one goal of which would be to develop technologies and methods based on the biological functions of microbes and plants to convert carbon dioxide to organic carbon. The bill would authorize carbon capture and sequestration research and development. (See H.R.1213 under "Clean Coal," H.R.238 and H.R.1645 under "Carbon Sequestration, Genomes," the Global Warming Amendment under "Greenhouse Gas Reduction," the Sense of Congress on Climate

Change Amendment under "International Negotiations," and the National Greenhouse Gas Emissions Inventory Amendment under "Greenhouse Gas Reporting.")
Sponsor: **W.J. "Billy" Tauzin** (R-LA) (4 cosponsors) – **Action**: 4/11/2003: Passed by the House by a vote of 247 – 175.

H.R.318: **The Biofuels Air Quality Act**, among other things, would require consideration under the congestion mitigation and air quality improvement program of the extent to which a proposed project or program reduces atmospheric carbon emissions.
Sponsor: **Rep. John M. Shimkus** (R-IL) (15 cosponsors)

H.R.1644: **The Energy Policy Act of 2003**, would authorize clean coal research relating to the separation and capture of carbon dioxide. (See H.R.6 E.H.)
Sponsor: Rep. Joe Barton (R-TX) – Action: 4/10/03: Incorporated into H.R.6 E.H.

S.14: The Energy Policy Act of 2003, would establish a Hydrogen Fuel Initiative directing research into the production of hydrogen from fossil fuels, in conjunction with carbon capture and sequestration. The bill would authorize Clean Coal Power Initiative funding for projects that include the separation and capture of carbon dioxide. The bill would also establish a Genomes to Life Program, one long-term goal of which would be the advancement of science and technology regarding the conversion of carbon dioxide to organic carbon. (See S.582 and S.727 under "Clean Coal," and S.682 under "Carbon Sequestration, Genomes.")
Sponsor: **Sen. Pete V. Domenici** (R-NM) – **Action**: 4/30/03: Reported out of the Senate Energy Committee. The bill was debated on the Senate floor, but not passed by the Senate. H.R.6 E.A.S. (see above) was passed instead.

Appropriations

H.J.RES.2: **The Consolidated Appropriations Resolution 2003** provides $175 million to support policies and programs in developing countries and countries in transition that directly: (1) promote energy conservation, energy efficiency and clean energy; (2) measure, monitor, and reduce GHG emissions; (3) increase carbon sequestration activities; and (4) enhance climate change mitigation and adaptation programs. Also, the President must submit a report to the Appropriations Committees on federal agency obligations and expenditures, domestic and international, for climate change and technology transfer programs in fiscal year 2003. Also provides that funds may be used to support tropical forestry and biodiversity conservation activities and energy programs aimed at reducing GHG emissions.
Sponsor: **Rep. C.W. "Bill" Young** (R-FL) – **Action**: 2/20/2003: Became Public Law No: 108-7.

H.R.2800: **The Foreign Operations, Export Financing, and Related Programs Appropriations Act, 2004** would allow appropriated funds to support tropical forestry and biodiversity conservation activities and energy programs aimed at reducing GHG emissions. (See S.1426.)
Sponsor: **Rep. Jim Kolbe** (R-AZ) – **Action**: 7/24/03 Passed by the House by a vote of 370 - 50

S.1426: **The Foreign Operations, Export Financing, and Related Programs Appropriations Act of 2004** would appropriate $5.6 million for the Intergovernmental Panel on Climate Change/United Nations Framework Convention on Climate Change, and $185 million to support policies and programs in developing countries and countries in transition that, among other things, would measure, monitor, and reduce GHG emissions, increase carbon sequestration activities and enhance climate change mitigation and adaptation programs. Also, the bill would allow appropriated funds to support tropical forestry and biodiversity conservation activities and energy programs aimed at reducing GHG emissions. In addition, the bill would require the President to report on all Federal agency obligations and expenditures for climate change programs and activities in fiscal year 2004; as well as fiscal years 2003 and 2004 obligations and estimated expenditures, and fiscal year 2005 requested funds by the United States Agency for International Development for a variety of climate change activities. (See H.R.2800.)
Sponsor: **Sen. Mitch McConnell**, (R-KY) – **Action**: 7/17/03: Reported out of the Senate Appropriations Committee.

Power Plants

S.366: **The Clean Power Act of 2003**, would require reductions of CO_2, as well as SO_2, NO_X, and mercury emissions, from electric power plants. CO_2 emissions would be reduced to 1990 levels by 2009. (See H.R.2042.)
Sponsor: **Sen. James M. Jeffords** (I-VT) (19 cosponsors)

S.485: **The Clear Skies Act of 2003**, would require reductions of power plant emissions of SO_2, NO_X, and mercury, but not CO_2, and would exempt new power plants from the current requirement that they disclose their CO_2 emissions. (See H.R.999.)
Sponsor: **Sen. James M. Inhofe** (R-OK) (1 cosponsor) Introduced at the request of the Administration.

S.843: **The Clean Air Planning Act of 2003**, would require reductions of CO_2, as well as SO_2, NO_X, and mercury emissions, from electric power plants. CO_2 emissions would be reduced to 2006 levels by 2009 and to 2001 levels by 2013.
Sponsor: **Sen. Thomas R. Carper** (D-DE) (3 cosponsors)

H.R.999: **The Clear Skies Act of 2003** would require reductions of power plant emissions of SO_2, NO_X, and mercury, but not CO_2, and would exempt new power plants from the current requirement that they disclose their CO_2 emissions. (See S.485.)
Sponsor: **Rep. Joe Barton** (R-TX) (1 cosponsor) Introduced at the request of the Administration.

H.R.2042: **The Clean Smokestacks Act of 2003** would require reductions of CO_2, as well as SO_2, NO_X, and mercury emissions, from electric power plants. CO_2 emissions would be reduced to 1990 levels by 2009. (See S.366.)
Sponsor: **Rep. Henry A. Waxman** (D-CA) (86 cosponsors)

Transportation

S.788: The Second Century of Flight Act would direct the Federal Aviation Administration to research emerging aircraft technologies to minimize the effects on climate change, and would direct NASA to research technologies enabling commercial aircraft to reduce carbon dioxide emissions. (See H.R.2271.)
Sponsor: **Sen. Ernest F. Hollings** (D-SC) (7 cosponsors)

S.824: The Aviation Administration FY2004-2006 Authorizations Act would develop a research and implementation plan for the application of emerging aircraft technologies that would minimize the effects on climate change per unit of production of thrust and flight speed. (See H.R.2115.)
Sponsor: **Sen. John McCain** (R-AZ) (3 cosponsors) – **Action**: 6/12/03: The Senate incorporated this measure in H.R.2115 as an amendment, which passed the Senate by a vote of 94 – 0. 7/25/03: Conference report on H.R.2115 filed.

S.1072: Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 would establish a multimodal energy and climate change program to study the relationship of energy, transportation, and climate change, and call for the development of strategies to reduce GHG emissions from transportation. (See H.R. 2088)
Sponsor: **Sen. James Inhofe** (R-OK) (3 cosponsors) Introduced at the request of the Administration.

H.R.2088: The Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003, which, among other things, would establish a multimodal energy and climate change program to study the relationship of energy, transportation, and climate change, and call for the development of strategies to reduce GHG emissions from transportation. (See S.1072)
Sponsor: **Rep. Don Young** (R-AK) (3 cosponsors) Introduced at the request of the Administration.

H.R.2115: The Aviation Administration FY2004-2006 Authorizations Act as in the conference report, which, among other things, would develop a research and implementation plan for the application of emerging aircraft technologies that would minimize the effects on climate change per unit of production of thrust and flight speed. (See S.824. The House-passed version of H.R.2115 did not include the climate change-related provision.)
Sponsor: **Rep. Don Young** (R-AK) (3 cosponsors) – **Action**: 7/24/03 Conference held. 7/25/03 Conference report filed.

H.R.2271: The Second Century of Flight Act would require the Federal Aviation Administration to develop a research plan for emerging technologies that minimize the effects on climate change per unit of production of thrust and flight speed; and require NASA to develop a research plan to enable commercial aircraft to significantly reduce CO_2 emissions. (See S.788.)
Sponsor: **Rep. Todd Tiarht** (R-KS) (1 cosponsor)

Hydrogen

S.821: **The Hydrogen and Fuel Cell Energy Act of 2003** would seek to reduce the life cycle pollution and GHG emissions from energy use by promoting, e.g., hydrogen R&D, federal purchasing of stationary fuel cells, and tax incentives for hydrogen and fuel cell vehicles and related infrastructure.
Sponsor: **Sen. Tom Harkin** (D-IA)

H.R.1299: **The Hydrogen Fuel Act of 2003**, includes a finding that it is in the national interest to support the development of a light duty vehicle fleet that is free or near free of GHG emissions.
Sponsor: **Rep. Sherwood Boehlert** (R-NY)

H.R.1395: To provide for the establishment of research, development, demonstration, and commercial application programs for fuel cell and hydrogen production, delivery, and storage technologies for transportation and stationary applications. The bill would require the Department of Energy, to award projects for hydrogen production and capture of associated carbon dioxide.
Sponsor: **Rep. John B. Larson** (D-CT)

H.R. 1777: A bill to provide for the establishment at the Department of Energy of a program for hydrogen fuel cell vehicles and infrastructure. The bill would require DOE to address the production of hydrogen from fossil fuels, which may include carbon capture and sequestration.
Sponsor: **Rep. Sherwood Boehlert** (R-NY)

Clean Coal

S.582: The Coal Energy Research Development and Demonstration Act of 2003, would authorize carbon capture and sequestration research and development, and provide tax credits for advanced clean coal technology units that meet certain carbon emission rate standards. (See S.14 under "Energy Policy.")
Sponsor: **Sen. Jim Bunning** (R-KY) (8 cosponsors)

S.727: **The National Coal Research, Development, and Demonstration Act of 2003** would authorize carbon capture and sequestration research and development, and provide tax credits for advanced clean coal technology units that meet certain carbon emission rate standards. (See S.14 under "Energy Policy.")
Sponsor: **Sen. Robert C. Byrd** (D-WV) (13 cosponsors)

S.1149: **The Energy Tax Incentives Act of 2003** would provide tax credits for advanced clean coal technology units that meet certain carbon emission rate standards.
Sponsor: **Sen. Charles E. Grassley** (R-IA) – **Action**: 5/23/03: Reported by the Senate Finance Committee.

H.R.1213: **The Clean Coal Power Act of 2003** would authorize carbon capture and sequestration research and development, and provide tax credits for advanced clean coal

technology units that meet certain carbon emission rate standards. (See H.R.6 E.H. under "Energy Policy.")
Sponsor: **Rep. Ed Whitfield** (R-KY) (18 cosponsors)
H.R.1269: **The Coal Energy Research, Development, and Demonstration Act of 2003** would authorize carbon capture and sequestration research and development.
Sponsor: **Rep. Jerry F. Costello** (D-IL) (5 cosponsors)

Carbon Sequestration, Genomes

S.682: **The Genomes to Life Research and Development Act** would establish a research and development program in systems biology and proteomics (a proteome is a protein complement to a genome), one long-term goal of which would be to stabilize atmospheric levels of carbon dioxide to counter global warming, and one specific goal of which would be to understand the Earth's natural carbon cycle and to create strategies to stabilize atmospheric carbon dioxide. (See S.14 under "Energy Policy.")
Sponsor: **Sen. Pete V. Domenici** (R-NM) (3 cosponsors)

H.R.238: **The Energy Research, Development, Demonstration, and Commercial Application Act of 2003** would direct the Department of Energy to research technologies for ultra-deepwater and unconventional natural gas and other petroleum resource exploration and production, including for the reduction of GHG emissions and sequestration of carbon. (See H.R.6 E.H. under "Energy Policy.")
Sponsor: **Rep. Sherwood L. Boehlert** (R-NY) (1 cosponsor) – **Action**: 5/22/03 Reported out of the House Science Committee

H.R.1645: To establish a research, development, and demonstration program in genetics, protein science, and computational biology of microbes and plants to support the energy and environmental mission of the Department of Energy. One goal of the program would be to develop technologies and methods based on the biological functions of microbes and plants to convert carbon dioxide to organic carbon. (See H.R.6 E.H. under "Energy Policy.")
Sponsor: **Rep. Sherwood Boehlert** (R-NY)

H.R.1904: **The Healthy Forests Restoration Act of 2003** would direct the Department of Agriculture to establish a healthy forests reserve program, one goal of which would be to enhance carbon sequestration.
Sponsor: **Rep. Scott McInnis** (R-CO) (137 cosponsors) – **Action**: 5/20/03 Passed by the House by a vote of 256 – 170.

Climate Science

S.1164: The Abrupt Climate Change Research Act of 2003 would establish within the National Oceanic and Atmospheric Administration (NOAA), a program of scientific research on abrupt climate change.
Sponsor: **Sen. Susan M. Collins**, (R-ME) (4 cosponsors)

HR 984: National Oceanic and Atmospheric Administration Act of 2003 would authorize the Commerce Department to establish joint or cooperative institutes with qualified colleges and nonprofit research organizations to collaborate on long-term climate change research.
Sponsor: **Rep. Wayne T. Gilchrest** (R-MD)

H.R.1578: The Global Change Research and Data Management Act of 2003 would promote and coordinate global change research.
Sponsor: **Rep. Mark Udall** (D-CO) - Action: 5/1/2003: The House Science Committee voted against reporting the bill by a vote of 17 - 19.

State, Regional, Local and Private

In the United States, laws to address climate change—such as mandated emissions reductions or policies to promote renewable energy—are easier to pass at the state and local levels than at the federal level, where coal, oil, and auto industry can concentrate lobbying efforts to affect such laws. In the absence of Federal laws or regulations, states, communities, and businesses are leading the way to address climate change. Several noteworthy efforts are listed below:

Regional Activities

California, Oregon, and Washington – In 2003, the governors of these states directed their staffs to draft recommendations on ways to collaborate regionally in reducing emissions in several sectors of their economies—including by using more efficient vehicles, increasing the share of renewables in electricity generation, and creating emissions accounting systems and inventories.

New England and Canada's Eastern Provinces – In 2001, governors of New England states and premiers of Canada's Eastern provinces approved a comprehensive regional Climate Action Plan that aims to reduce GHG emissions to 1990 levels by 2010.

11 Northeastern States – In spring 2003, Governor Pataki of New York invited the governors of 10 other states to participate in the development of a regional program to cap and trade CO_2 emissions. Program design for this Regional Greenhouse Gas Initiative is expected to be complete by April 2005.

Pressing for Federal Regulations – In July 2002, the attorneys general of 11 states (Alaska, California, Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont) sent a letter to the Bush Administration pressing for strong federal measures to limit U.S. national GHG emissions.

State Legislation and Programs

The Pew Center for Global Climate change lists 28 different states with 44 state and local programs that reduce greenhouse gas emissions. Some programs were designed

specifically to address climate change, but many were designed for other purposes: for example, to improve energy efficiency or to promote water conservation. All, however, directly or indirectly result in greenhouse gas reductions. During 2003 alone, at least 24 states introduced 90 bills to build frameworks to regulate GHG emissions. One-quarter of all U.S. states have enacted Renewables Portfolio Standards (RPS), which mandate an increase in the states' share of electricity generated with renewable energy. About half of all U.S. states have established renewable energy funds to provide subsidies for installation of renewable energy projects, or for the production of renewable electricity, for energy efficiency projects, and for energy education and awareness programs.

Maine and New Jersey have set greenhouse gas reduction targets. Maine has set a statewide target for reducing greenhouse gas emissions to 1990 levels by 2010, to 10% below 1990 levels by 2020, and by as much as 75-80% over the long term. New Jersey has established a goal to reduce its greenhouse gas emissions by 3.5 percent from 1990 levels by 2005. The state draws upon voluntary agreements with public- and private-sector organizations as well as regulatory initiatives in order to reduce emissions.

Massachusetts has established a multi-pollutant cap that requires six older power plants to reduce their CO_2 emissions by ten percent relative to 1997-1999 levels by 2006 or 2008, depending on the method of compliance chosen. This represents 40 percent of the state's electricity.

Some northwest states have established programs requiring offsets in emissions for new power plant construction. In **Oregon**, the Climate Trust is a nonprofit organization that funds development of projects that counter 17 percent of new power plant CO_2 emissions. This can be done through improvements in energy efficiency of buildings, investments in renewable energy, reforestation, and other types of projects that result in emissions reductions or carbon sequestration. **Washington** as recently as June 2004 began requiring new power plants planned in the state to offset or mitigate 20 percent of their expected carbon dioxide emissions. Companies can comply with the new law by undertaking mitigation efforts such as planting trees (which sequester carbon dioxide), retrofitting diesel buses with cleaner-burning fuel, or investing in energy conservation. Alternatively, companies can pay third parties approved by the state at a rate of $1.60 for each metric ton of carbon per 30 years to undertake mitigation activities. Third parties must submit reports to the state and allow their mitigation efforts to be inspected and audited by the state.

City and Community Efforts and Commitments:

In October 2003, 155 mayors, representing more than 46 million people, issued a statement calling on the Federal government to join them in efforts to reduce the threat of climate change. (See www.iclei.org/us/mayors_statement/) The statement notes that "Global warming poses significant threats to communities across the country. We are already feeling impacts in the form of heat waves, shrinking water supplies and snow pack, increased rates of asthma, floods and storms, and coastal erosion. This issue requires an effective response from the U.S. Federal Government." The statement also

notes the economic, health and security benefits of reducing emissions through conservation, efficiency, and the use of cleaner, more sustainable technologies. Signatories include mayors of **Atlanta, Boston, Boulder, Dallas, Honolulu, Houston, Louisville, Las Vegas, Minneapolis, Newark, New Haven, Sacramento, and San Diego**. Throughout North America, 249 cities (most in the U.S.) have joined Cities for Climate Protection, a program of the International Council for Local Environmental Initiatives that commits them to inventory and create detailed action plans for reducing their GHG emissions. As of April 2004, 579 cities worldwide had joined this effort.

Private and Corporate Targets and Achievements:

Many companies have taken initiative to voluntarily set targets for greenhouse gas emissions. See the details below:

Dupont – Has already achieved its target of reducing GHG emissions 65 percent below 1990 levels; the original target date was 2010. Dupont plans to derive 10 percent of the energy it uses worldwide from renewable sources by 2010.

Silicon Valley – Hewlett-Packard, Oracle, Calpine, Lockheed, ALZA, Life Scan, and PG&E announced in March 2004 a plan to reduce CO_2 emissions in Santa Clara County, California, to 20 percent below 1990 levels by 2010. This is triple the goal that the Kyoto Protocol set for the United States as a whole (a 7 percent reduction below total U.S. 1990 emissions levels by 2012). Companies plan to curb their emissions by retrofitting buildings with more efficient heating and cooling systems and insulation; shifting auto fleets to hybrid vehicles; replacing light bulbs with compact fluorescent bulbs; and installing motion detectors. They expect all of these changes to be cost-effective. The city of San Jose will also take part, improving public transportation, enacting more energy efficient building codes, and converting its vehicle fleet to hybrids.

Alcoa – Has committed to reducing its GHG emissions to 20 percent below 1990 levels by 2010.

Bank of America – In May 2004, the corporation announced unprecedented targets and timetables for reducing its greenhouse gas emissions, with an initial goal to reduce emissions 7 percent by 2008, and pledged to stop funding projects that involve oil and gas exploration, among other things.

Power Companies

Five U.S. power companies committed in early 2004 to reducing their GHG emissions and to supporting a mandatory federal cap on CO_2 emissions. As part of the **PowerSwitch Challenge** initiated by the World Wildlife Fund, **Austin Energy (Texas), Burlington Electric Department (Vermont), FPL Group (Florida), Sacramento Municipal Utility District (California), and Waverly Light and Power (Iowa)** have committed to undertaking at least one of the following by 2020: increasing the share of electricity they sell that is generated by renewables to 20 percent; increasing energy

efficiency by 15 percent; and/or retiring the least-efficient half of their coal generating capacity.

Shaw's Supermarket – Now sells renewable electricity in several New England cities, and at least 3 of its stores are purchasing renewable energy to meet 25 percent of their electricity needs. Shaw's was the first supermarket chain in New England to offer green power to its customers. The renewable energy is generated on the rooftops of BJ's Wholesale Club stores.

Green Power – An estimated 10,000 U.S. businesses (and 110,000 households) are now using certified "green" electricity that is generated with renewable resources.

APPENDIX C *DRAFT PLAN FOR A NORTH CAROLINA CLIMATE ACTION REGISTRY*

This plan has been developed by the North Carolina Department of Environment and Natural Resources (DENR), Division of Air Quality (DAQ) with input and views from the DENR Division of Pollution Prevention and Environmental Assistance (DPPEA), the State Energy Office (NCSEO) and many others such as stakeholders, national forums, federal agency information and various internal and external information sources. This draft is provided as a "straw man" to stimulate discussion. It is not provided as a recommended plan at this time. However, since there has been substantial discussion of such a registry in the State for the past few years, this draft proposal is included here for further information and generation of ideas and reactions as to what the best options to proceed might be at such a time as it is deemed necessary.

Background

Summary of NC and Federal Historical Activities

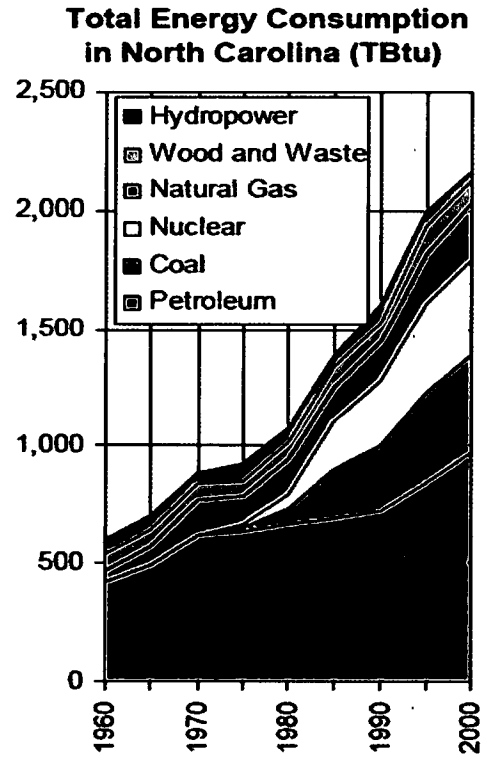
North Carolina does not have, and has never had, a stand-alone registry for GHG emissions. However, the state, through various venues has participated in many related or complementary activities over the past decade. This summary is intended to provide the essence of some of the historical and ongoing efforts that have occurred, and how they relate to today's situation and underlying thoughts on approaches to take and why. This discussion is not intended to be inclusive of all background and actions, but primarily those that relate to the development of North Carolina's plans for the future.

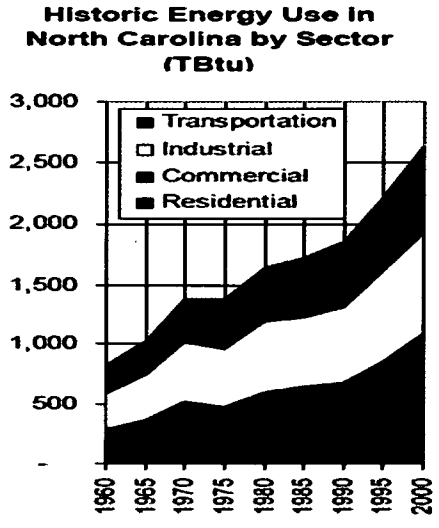
Registry of GHG's alone is not a productive end product, but could readily provide an integral tool, and be part of a larger process, to actually help generate reductions in GHG emissions. For a program to be viable to support trading, sale, etc., it must provide mechanisms for universal participation, consistent accountability among the emitters and the registration process. It must maintain a method for verification of emissions and be credible on national and international exchanges so that the "currency" is validated and interchangeable with that in other jurisdictions. In addition, the process must assure that companies or other entities are required to show all their releases, not just for those situations and jurisdictions where the results will appear more favorable to their position. It should be clearly understood at the outset that coal-fired utilities are already, in fact, reporting to the National Acid Rain Program, annually, and using continuous emission monitors (CEMs) for their CO_2 emissions, which are much more accurate and provide more complete and verified data than for other fuel combustion facilities, or other generators of GHG. In addition, generally these facilities voluntarily participate in the DOE 1605 (b) voluntary registry and any registry developed should reflect the availability of these verified and accurate data and not "re-invent this wheel." Any North Carolina Climate Change Registry should focus on other (to include "all") sources in the State, as discussed in the next section. The reader is reminded here also, of the

distinction between the GHG and CO_2, the latter of which is the literal subject of the CSA requirement.

Sources and Emissions in North Carolina

The figures below from the North Carolina SEP present a graphic view of the distribution of fuel consumption in the state. The combustion of fuel is not the only source of GHG's but is a substantial portion and for many purposes may be considered the same. Note that the predominant source of CO_2 in the State is from Petroleum fuels, which includes automobiles, trucks, trains, planes, construction equipment and various other forms of power generation. Note also that growth has been fairly consistently in all areas, but the predominant largest sector has been residential, followed by industrial. These factors need to be considered in the development of a system of registry such that the entire source population is included and that the "efforts" for the registry are productive and fruitful in comparison with the efforts and expenses involved.





The largest single sector in terms of total energy use (including the energy consumed to generate electricity for the sector) is industrial at 31% of the total. Transportation is second largest with 28% of total energy use. The residential (23%) and commercial (18%) sectors, if combined, would demonstrate that the largest energy use in the state is in buildings at 41%.

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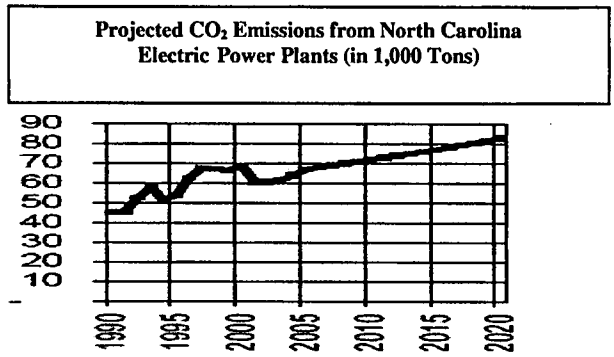
125 North Carolina State Energy Plan, June, 2003, http://www.energync.net/State%20Energy%20Plan%2003.pdf



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The discussion above is not intended to suggest that the coal fired power plants in the State are of trivial impact on the State's CO_2 or GHG emissions "burden." Approximately one third of the annual CO_2 in the state comes from the generation of electric power, and as the figure above indicates, that contribution is not expected to decrease, without some decisive actions to reduce (efficiency or reduction programs) or to substitute other sources of electricity for that generation capacity.

U.S. DOE and U.S. EPA Registries and Related Programs

GHG efforts at the federal level have been primarily under the auspices of the DOE and the EPA. A brief reflection of what prior efforts have been, and what is currently being done nationally/globally, are provided here as a backdrop for information on North Carolina's past and likely or proposed future roles.

US DOE 1605 (b)

The DOE, acting under the requirements of the Energy Policy Act of 1992[127], established the *National Inventory and Voluntary Reporting of Greenhouse Gases*, also known as the 1605 (b) Registry. This mechanism provides a means for facilities to voluntarily report their emissions and/or reductions in emissions of GHGs to a centralized national repository. NC facilities have a relatively good record of reporting and listing in this registry. NC has consistently been a national leader with participation of up to 39 facilities (generally assisted in NC by the DOE-funded pilot 'Climate Wise' program, which has since lost this federal funding support). The 1605 (b) Registry has been operating since about 1994 and continues as the primary repository of reported GHG emissions and reductions data for the US, even though it does not meet many of the desired criterion for its ultimate success.

On November 26, 2003, DOE released proposed revised General Guidelines for the voluntary reporting of greenhouse gas emissions and emission reductions under this program.[128] DOE accepted comments through February 17, 2004. DAQ and State Energy Office (SEO) staff attended the DOE's public workshop on these proposals of the policy guideline revisions and submitted formal comments. DOE has also expressed

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[126] North Carolina State Energy Plan, June, 2003, http://www.energync.net/State%20Energy%20Plan%2003.pdf

[127] Section 1605(b) of the Energy Policy Act of 1992 (EPACT), 42 U.S.C.13385(b)

[128] Department of Energy, 10 CFR Part 300, General Guidelines for Voluntary Greenhouse Gas Reporting, http://www.pi.energy.gov/pdf/library/Formatted1605%28b%29GeneralGuidelinesfinal.pdf

intention to make further revisions to the proposed *General Guidelines* available for public comment, simultaneously with the issuance of proposed *Technical Guidelines* during "the late spring or early summer of 2004." To date, these proposals have not been released. NC DAQ expects to comment on these technical proposals whenever they are released. The 1605 (b) program remains a most viable repository for North Carolina GHG data. However, for this information to be useful and credible on a National/International accounting and/or trading basis, parallel technical procedures that are uniform and accepted must be developed and adopted and the reporting by all major emitters must become mandatory.

US EPA Climate Leaders

Climate Leaders[129] is a voluntary industry- government (EPA) partnership initiated in February 2002[130] at EPA, that encourages companies to develop specific long-term comprehensive climate change strategies and set (GHG) emissions reduction goals. One part of this program is GHG registration. However, there is no direct link to the DOE 1605 (b) Registry and data submittal from one agency/registry to the other is not required or automatic. This does not encourage companies to participate in multiple programs and will not likely result in their efforts being interchangeable. Several companies with operations or facilities in NC have opted to participate in this program.

The partners listed below (Spring 2004), were compiled from the EPA web page:
3M, Advanced Micro Devices, Inc., American Electric Power, Baxter International, Cinergy Corp, Eastman Kodak Company, FPL Group, Inc., General Motors Corporation, Holcim (US) Inc., IBM Corporation, Interface, Inc., International Paper, Johnson & Johnson, Miller Brewing Company, National Renewable Energy Laboratory, Norm Thompson Outfitters, Inc., Pfizer, Inc., PSEG, S.C. Johnson & Son, Inc., St. Lawrence Cement, and United Technologies Corporation.

Only a limited number (21) of the possible thousands of companies in the US had committed to this voluntary program at that time. However, the companies participating represent many large individual and collective operations. Without mandatory reporting and clearly established reduction goals, the benefit of this effort as a national or international registry is limited. As a minimum, it should feed data automatically to the DOE1605 (b) registry.

EPA's Acid Rain Reporting

The overall goal of the Acid Rain Program, as established by the Clean Air Act Amendments of 1990, is to "achieve significant environmental and public health benefits through reductions in emissions of sulfur dioxide (SO_2) and nitrogen oxides (NOx), the primary causes of acid rain." To achieve this goal at the lowest cost to society, the program employs both traditional and innovative, market-based approaches for controlling air pollution. In addition, the program has elements to encourages energy efficiency and pollution prevention.

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[129] USEPA, Climate Leaders, http://www.epa.gov/climateleaders/

[130] EPA Administrator Launches Climate Leaders Program Charter Members Commit to Greenhouse Gas Inventories and Emissions Reduction Targets (2/20/2002)

Under the Acid Rain Program, each utility unit must continuously measure and record its emissions of SO_2, NOx, and CO_2, as well as volumetric flow and opacity. In most cases, a continuous emission monitoring (CEM) system is required. There are provisions for initial equipment certification procedures, periodic quality assurance and quality control procedures, recordkeeping and reporting, and procedures for filling in missing data periods. Units report hourly emissions data to EPA on a quarterly basis.

Phase I of the NOx program began on January 1, 1996 and has continued to expand and improve since. Data reported are recorded in the Emissions Tracking System, which serves as a repository of emissions data for the entire utility industry, for major boilers and boiler types, but not some peaking (e.g. internal combustion turbine) operations. There is no automatic link or data transfer mechanism currently established (or plans for such known) that results in the CO_2 (utilities/combustion emissions are limited primarily to CO_2 and not some of the other GHGs) data reported via this program to be automatically translated to the DOE 1605 (b) or other central registry. Many utilities (including NC utilities) however, do participate in the 1605 (b) Registry by "re-reporting" their emissions and/or emission reduction efforts to that registry, even though it is not required. Even then, this reporting may not be carried out consistently and with the same purpose or data presented for facility-wide and company-wide emissions.

Climate Wise in NC

As mentioned above, the Climate Wise program operated in NC for several years (with DOE funding) as a pilot program to initiate and support reporting to the DOE 1605 (b) Registry. After funding support from DOE expired, the state budget did not support the program. Thus, it ceased to be effective. However, a non-profit (501 c-3) company, *Global Warming Initiatives, INC*, was formed to search for private funding and to carry on the efforts to assist former registrants and potential new participants. That company continues to assist former participants in Climate Wise and others who are interested. However, dependable funding is lacking and it is dependant upon grants and donations from the participating companies. The future of this effort may well depend upon the infusion of additional public and private grant or other funds to continue the assistance and consultation.

Climate Leaders in NC

As identified above, several companies in North Carolina participate in EPA's Climate Leaders program. However, those that have participated have done so directly with EPA without significant input or support from NC agencies. This is the manner in which the program is likely to continue unless a specific agency in NC is identified and funded with the purpose of supporting and assisting this program. This program may identify specific interested facilities within the state, but does not necessarily result in emissions or reductions being reported to any centralized national and internationally accepted database as is necessary for a viable program with real reductions to global totals of GHG emissions.

Climate Vision in NC

In 2003, the federal government and industry organizations representing thousands of companies from 12 energy-intensive economic sectors joined in a voluntary partnership called Climate VISION. Those economic sectors include automobile manufacturers, chemical manufacturers, railroads, the oil and gas industry, the electric power industry, the mining industry, and the cement, iron and steel, aluminum, magnesium, semiconductors, and forest products industries. Joining in this presidential initiative were DOE, DOT, DOA and EPA. Climate VISION works with industry to identify and pursue cost-effective solutions to reduce emissions using existing technologies; develop tools to calculate and report emission intensity reductions; speed the commercial adoption of advanced technologies; and develop strategies to reduce emissions intensity in other economic sectors.

The electric power sector participates in the Climate VISION program through the Electric Power Industry Climate Initiative (EPICI) and its Power Partners program, which is being developed in cooperation with the Department of Energy. The memberships of the seven organizations that comprise EPICI represent 100% of the power generators in the United States. The power sector, through EPICI, plans to finalize its work plan in the form of a Memorandum of Understanding (MOU) with DOE. The MOU will outline proposed implementation actions to reduce greenhouse gas emissions intensity by 2012. The power sector, in conjunction with DOE and other federal agencies, will implement the actions. In North Carolina, Duke Energy and Progress Energy are both participating in this program through the Electric Power Research Institute (EPRI).[131]

Environmental Performance Track

EPA's *Environmental Performance Track* program is a voluntary program beyond their current requirements. A new component of the program, Challenge Commitments,[132] encourages facilities within the program to commit to regional environmental priorities as one of their performance goals. Each EPA region establishes regional environmental priorities with input from the states within the region. DENR's Division of Pollution Prevention and Environmental Assistance (DPPEA) program staff has established activities with this program which is expected to likely become more directly associated with climate change initiatives.

NC Environmental Stewardship Initiative

North Carolina's Environmental Stewardship Initiative (ESI) is a voluntary program that establishes incentives and recognizes facilities using pollution prevention and innovative approaches to meet and exceed regulatory requirements. DENR's DPPEA[133,134] manages the ESI. This program seeks to reduce the impact on the environment beyond measures required by any permit or rule, producing a better environment, conserving natural resources and resulting in long-term economic benefits. The program will educate and encourage the use of voluntary reporting of GHG.

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[131] Personal Communications (emails) from George Everett of Duke Energy and Cheryl Vetter of Progress Energy, to James Southerland, NC DAQ, August 2004.

[132] http://www.epa.gov/performancetrack/events/challenge_commitment_policy_details.pdf

[6] http://www.p2pays.org/

[134] http://www.p2pays.org/esi/

State Energy Plan Interfaces

The State Energy Office (in the Department of Administration) is North Carolina's lead agency for energy programs and serves as the official source for energy information and assistance for consumers, businesses, government agencies, and policy makers. In addition, North Carolina's General Assembly established the Energy Policy Council in 1975 as a means of addressing state-specific energy issues and concerns. The Energy Policy Council's role is periodic examination of energy use, energy production, and environmental concerns in our state.

As State and national energy issues change, and it is deemed productive, the Council is charged with revising or producing a new State Energy Plan. For the most recent plan, the Energy Policy Council started with the formation of a working group composed of members representing key energy and environmental interests, with a charge to develop an updated energy policy and program recommendations. North Carolinians from various sectors provided input to the Energy Policy Working Group[135] and the Group then produced a new State Energy Plan in 2003.

The **State Energy Plan**[136] provides a major review and an analysis of what the energy consumption patterns are in NC and a series of recommended actions that form a 'blueprint' to assist the state to achieve its energy goals. This plan shares consistent goals of reductions of use of energy, which will assist in the reduction of CO_2 emissions, as identified for potential reductions in the CSA. These complimentary legislations provide a tandem approach to different aspects of the same problems and must be carried out in parallel. One of the stated goals of the Energy Plan is to develop a GHG or Climate Change Gases Registry. Though no specifics are given, the development of these plans are envisioned to be completed cooperatively with other departments, including the DENR and its component divisions, and is substantially consistent with the CSA's intent.

Previous NC Legislative Involvement and Analysis of Proposals

In the 2002 Session of the NC General Assembly, Bills were introduced into both Houses[137] to initiate a "voluntary" Climate Action Registry (House Bill 1045 -Short Title: NC Climate Action Registry). The Bill's introductory language directed: "The State's tradition of environmental leadership should be recognized through the establishment of a registry to provide documentation of those greenhouse gas emissions reductions that are voluntarily achieved by sources in the State."

Furthermore, the language indicated that it was to be in preparation for mandatory greenhouse gas emissions reductions that "may be imposed on North Carolina sources at some future point." In view of this, the Bill stated that, the "State has a responsibility to use its best efforts to ensure that organizations that voluntarily reduce their emissions receive appropriate consideration for emissions reductions made prior to the implementation of any mandatory programs."

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[135] http://www.ncenergy.appstate.edu/index.php

[136] http://www.energync.net/State%20Energy%20Plan%2003.pdf

[137] http://www.ncleg.net/html2003/bills/CurrentVersion/house/hbil1045.full.html

The House Bill also stated that guidelines and the rules developed should include : programs to establish emissions baselines and to monitor and track greenhouse gas emissions, systems to verify emissions and reductions of emissions, the adoption of a uniform format for reporting emissions baselines and reductions in order to facilitate their recognition in any future regulatory scheme, and maintain a record of all emissions baselines and reductions."

This session ended without passage of any version of a **Climate Action Registry Bill**, nor were any expectations or provisions defined that would quantify the resources to be provided and the expectations of how these requirements would be fulfilled.

The draft Bills and surrounding discussions seemed to recognize that before a Climate Action Registry could become effective in achieving reductions that it had to

- Cover all sources, including all states in the US, and all countries contributing significantly to the global emissions of GHG's (or CAG's in the Bill's terminology) in order to be able to define and track the total contributions and to assure that transfer of emissions out of one area to another did not occur.

- Be mandatory, because if it is not mandatory, the total emissions and of the emissions from various sectors can not be determined.

- Be associated with a reduction goal (e.g., "xx% below the levels emitted in 1990").

- Be recognized as a database of information to serve as a "valid currency" around the world, through a process of documentation, certification and verification, such that uniform procedures were always followed and in a consistent manner.

- And, ultimately be amenable to interstate and international carbon or GWG trading programs that would allow facilities to find innovative and cost saving means to reduce their emissions in view of a global target.

These features are also consistent with the assessment of the DAQ as to what would be needed to actually achieve reductions in GHG's in North Carolina, or elsewhere.

Range of DAQ Options and Concerns/Issues for Planning a NC Registry

Overview/Introduction

Various levels of effort for development and implementation of a registry are possible. The choices however, involve resources required to implement that program, level of accuracy and transparency (documentation and public display) of information, level of quality assurance and certification, size of facility, treatment of "secondary reductions" such as consumer reductions of electric power usage, treatment of non-point sources, frequency of update and other such practical and resource-related considerations. Details and resource requirements need to be determined in consideration of what the major sources are and how they may ultimately provide for emission reductions, and the impact of costs of their control.

Basis for Program to Fit Needs/Requirements

DAQ is supportive of efforts for control/reduction of GHG and has evaluated several options and discussed several issues. These discussions have taken into account the needs and desires expressed in various NC reports and legislative efforts, national and international considerations for long term achievement of successful reductions in GHG and other practical issues such as resources to support such efforts. Some related points and facts from those discussions, both internally at DAQ and with other Divisions and Departments, are summarized below:

- It is prudent to take action to reduce GHG emissions and DAQ supports this goal.
- DAQ currently has no mandates or resources for GHG/CO_2 beyond the required reports for the Clean Smokestacks Act, and resources were not appropriated for these studies.
- The development of a registry is on the top 15 list of priorities in the NC **State Energy Plan.**
- USEPA does not currently consider CO_2 to be a "pollutant" (by their interpretation of the Clean Air Act), falling under the same procedures and processes that DAQ has historically implemented.
- CO_2 from coal-fired utilities (the largest emitting point source sector) is already continuously measured and reported to EPA (Acid Rain program from continuous measurements) and DOE (mandatory) for coal-fired power plants.
- Other fuel-burning industries are important, but not so much as the coal-fired utilities which already report.
- Other sources such as transportation (mobile on road and off road) emit about the same magnitude (as a group) as coal-fired utilities and should be included in such periodic compilation of estimates as well.

Though DAQ is supportive of a GHG/CO_2 registry, there are concerns and reservations that need resolution:

- A greenhouse gas registry by itself would not reduce Greenhouse gases (GHG) but could be a key tracking tool in an overall integrated program.
- To meet ultimate usefulness and be productive, a Climate Action registry should be coupled with reduction goals and complete coverage of sources.
- Adequate resources should be provided such that such a registry could be expected to accomplish the level of program that is desired.
- It would be difficult to establish and maintain a "limited" voluntary effort and its usefulness would be questionable.
- North Carolina governmental facilities and fleets, and programs addressing the emissions from these sectors should be included and their emissions tracked, perhaps as a pilot effort in the beginning of any such broader program.
- For a Registry to meet likely expectations and needs, it should:
  - Be widely accepted (Interchangeable in NC, Nationally and Internationally)
  - Be mandatory of the emitting sources (Currently ~3100 facilities in NC hold an air permit, with majority of them burning fuel of some sort; ~400 of these are larger Title V sources, including coal-fired power plants)

- Be coupled with other emitting sectors, in addition to NC's air permitted population
- Be used as the yardstick for gauging future mandatory reductions coupled with an action plan for the reductions and tracking (If one does not know the whole picture, it is difficult to act appropriately with a portion of the total)
- Be based on emission estimates that are complete, compatible and interchangeable with similar estimates from other jurisdictions up to and including other countries (Requiring going beyond project-level programs with state monetary investments in protocols, software and external coordination)
- Be administered by an organization that has sufficient funding and staffing/expertise to accomplish the tasks of
    - ✓ Outreach
    - ✓ Technical assistance
    - ✓ Protocol development and harmonization with other state and national or international protocols
    - ✓ Provide for third party certification
    - ✓ Enforcement against failures to comply with requirements
    - ✓ Provide automated output to National and International databases
    - ✓ Provide authority for speaking on behalf of state interests in national and international forums

Options Assessed

DAQ's assessments of options have covered a wide range; from "doing nothing" to an extensive stand alone program. For purposes of brevity, but to demonstrate some of these options evaluated, three levels are discussed briefly below before providing more detail of a recommended option. These levels originally evaluated fell into three general groups: "minimal," "intermediate," and "major stand-alone."

Minimal Effort-Low Benefit

A **minimal first step** toward a Climate Action Registry could be a simple "registration" of emissions accomplished by adding the GHG pollutants to the existing air emission inventory done in NC. This would require notification, and education of DAQ and facility staff, possible rule changes and some data processing system changes. It would take several months and require appropriation of additional resources and would not be certifiable nor necessarily follow complete and detailed protocols as would be needed to insure that the emissions identified are 'tradable' in the future, useful for baseline certification nor be necessarily compatible with various protocols used in other states, the nation or internationally. No resources are currently available for this option, though it is relatively minimal **compared to more comprehensive registry alternatives.**

Intermediate Commitment Option – Limited Benefits

Intermediate options could cover a wide range of levels and be pursued beyond the 'minimal registration' effort outlined above to a full scale certified, mandatory, state-wide inventory with automated reporting/participation with national/global efforts and registries is possible. One such intermediate scenario is outlined below, primarily to indicate the elements and their interactions. It would

- be a NC Voluntary Program
- require commitment to reductions state-wide, without teeth or ability and commitment to track all activities contributing
- actively support solicitation of voluntary participation in national efforts and
- require addition of GHG's to routine DAQ emission inventory

This level of program and support would involve industry workshops and more active or intensive information exchanges and education for a voluntary state program and continued efforts to support and promote the mandatory national efforts. In addition, the option could develop and provide a "third party" verification program in the future. The routine DAQ inventory would require modification to add GHG's. No efforts to provide a third party review, or for DAQ to have a strong role to get the data entered into the national registries would necessarily be involved in a base case, but the third party review and certification could be an add-on if/when additional needed funding were available.

Resources estimated for this level of activity would be in the range of over $100,000. per year with an additional $150,000 or more for contract support for a Third Party Validation program, if included.

Legislation Required: – Fee requirements and authorizations and/or funding appropriations would be necessary for such a program. Authority for program of collection of information may not be technically require legislation but would be supportive, especially if coupled with a state target for reductions.

Other considerations- This option would provide elementary base program with substantial effort and product to estimate and track GHG's but would not insure reductions without a state target and some mandatory requirements, both for reporting and needed reductions.

Concerns:

- Not mandatory-not oriented to success of an identified and measurable objective
- Not funded by guaranteed short or long term funding

Major Stand-alone Program – High Costs but Higher Benefits

It would be possible, with time, funding and continued support to develop a mandatory reporting for most major sub-sets of the emitting population; including tracking of all sectors of area and mobile sources, to fully provide a picture of the GHG emissions and the success of any reduction strategies. Such a program would need to be provided with or able to establish a regulatory enforceable target and authorizations to "own" public assets in a global trading environment such that funds could be raised and utilized to achieve reductions. Such a program is not fully fleshed out in this narrative. However, DAQ estimates that such an effort would require resources on the order of at least ten or more staff, with funding of several hundred thousand dollars. California, is a much larger state than North Carolina, but with less

registered sources in DOE's 1605 (b) Registry. It has spent large sums of money developing their program but the program does not yet have all the required elements (e.g. mandatory for all with a reduction target) to insure its long term success in achieving reductions in GHG. Since this step does not seem likely in NC at the current time, this option is not fully detailed here. However, if the need arises, further analysis and related plans could be developed and provided.

A Sensible Skeleton for Building a NC Registry

If a registry were to be established in North Carolina, the discussions and options outlined below could provide a basic skeleton upon which to build positive steps toward a sensible GHG or Climate Change Registry in NC compatible with managing future mandatory reductions and targets:

Element 1: Encourage Interfaces with DOE, EPA and Other agencies

NC would continue a strong commitment to efforts to convince federal officials and offices of the need to provide positive and certain links between the DOE 1605 (b) Registry and the EPA Climate-Wise and Climate Leaders programs and that they should be cast in a background of an overall mandatory program with specific reduction targets. Through continued technical comment with DOE and EPA and by pursuing alternate options to have an enhanced registry to track companies in NC in a nationally and international recording system to record their emissions and reductions in an accredited manner, all related programs and offices in NC should continue to assert the need and help facilitate the changes needed. Political forces are likely important in the realization of the appropriate role, so education and provision of factual information to the officials throughout the State may be an important element to realize this aspect of the program.

NC would need to develop and expand programs to provide technical assistance to potential registrants and provide them with the information on how to report emissions into the existing and developing programs. A monitoring function is also proposed whereby activities in one program automatically trigger the request and assistance function to assure this cross-reporting among the existing programs is complete. Some enhanced electronic ties may even be possible as the reporting details unfold.

The efforts under this element would include continuing to try to get an independent verification process incorporated into the federal programs, if not incorporated into the pending 1605 (b) technical revisions. The reader is reminded that these important elements already exist for coal-fired utilities.

Element 2: Informal "Registration" of GHG via Existing Procedures

Each year, the Division of Air Quality inventories all (approximately 400) Title V facilities in the state for criteria and hazardous air pollutants (HAPs) as addressed by the Clean Air Act. The annual emissions reported for these point source facilities generally include all coal-fired utilities and other major burners of carbon fuels in the state. In addition, on a five year rolling cycle, the smaller facilities report their criteria and HAP emissions.

DAQ recommends that as quickly as the identified GHG's can be added to the pollutant table [presumably to begin with Calendar Year (CY) emissions for 2005 or 2006, reported in 2006 or 2007] and the inventory instructions (as a defined "air pollutant") so that the facilities begin "registering" their emissions annually. This level of effort does not envision a detailed and prescribed formal protocol, but reference to other available

calculation procedures, protocols and software available. It would not involve third party validation. There would be a preliminary and rather cursory review by DAQ engineers as part of the routine review of the annual inventory.

Amendments and revisions to the data system would result in the generation of annual reports and listings of emissions by facilities but would not be considered a formal and legally certified "register" for cap and trade or other refined monetary or legal purposes. It would be used as a resource for future prioritization and to assist buyers and sellers to independently find a potential counterpart. If a facility wished to purchase, sell or trade emissions with other facilities, this would be done as a private exchange not involving the State. This would also allow for further assessment of cut-off points to try to simplify and keep simple procedures involving the minimum of facilities with the maximum of pay-back in terms of future reductions.

In this context, the registration process would first be targeted at the Title V facilities as these are likely to cover the vast majority of the emissions (for most criteria pollutants, the Title V facilities account for 90% or more of the emissions from point sources within the state). Coal fired utilities would be required to continue to report to the Acid Rain Program, but also provide a copy of the reports to the DAQ within the existing data system, but also include any other fuel combustion sources not covered by the Acid Rain Program. The facilities would be encouraged to voluntarily report to other EPA, DOE and International programs as further identified below, following the rules and protocols that apply to those programs.

Even this level of support within DAQ will not be without resource impact. A minimum of one full time employee (by staff or contract) with identified continuing funding would be required to establish this effort and to keep it moving toward a reasonable target.

Element 3: A Program to Encourage and Facilitate Voluntary Reporting

It will be necessary for reporting to be required, eventually, before reliable targets and inventories can be established; and thus targets developed with plans for achieving the program envisioned in these recommendations. However, the first step relies on voluntary reporting to national databases, such as the 1605 (b), with the motivation that

- Company management is generally of good conscience as far as performing toward the public good.
- Future baselines cannot be established and maintained without participation in the initial registration process; therefore, it is in the economic interest of facilities to get their emission base established as quickly as possible.
- North Carolina government entities should be full participants and track emissions and make all efforts to reduce that other private sector participants undergo.

Thus, North Carolina DENR would initiate a strong effort to encourage both mandatory and voluntary efforts through all existing and new programs that are germane to the desired

results. An inter-departmental working group would be instrumental in planning and executing such efforts such that the results are productive.

Element 4: Harmony With State/Regional/Federal/International Aspects

It is obvious that NC is a small part of a global mechanism that must be considered as a whole; on the national and international scale. What is done in NC is important and will set a good direction and example. However, the part the state will play cannot accomplish significant gains on the global or total problem alone. It is not cost effective and does not guarantee future compatibility and ability to trade/sell emissions credits etc. without the registration being recorded in a national or international registry. Although the DOE 1605 (b) Registry is grossly deficient, it is a recognized national repository. With supplemental NC specifications and guidance from NC agencies, this mechanism has the capacity to serve the repository purposes of NC and its potential reporting entities. This may change as expected technical changes in procedures are issued (soon) by DOE which may require this to be reevaluated.

Environmental Stewardship Initiative

The DPPEA implements the Environmental Stewardship Initiative (ESI) already. This program provides a means for facilities to voluntarily apply for recognition at three levels of environmental stewardship within their activities in the state. There are a number of criteria that the candidates are judged against before being declared a Steward or other level. This plan/proposal includes using this ESI as a means for promotion, and education of facilities of the CA Registry efforts.

Continue Support and Participation for Existing State/Federal Programs

The several state and federal voluntary programs should continue to be supported in some fashion through encouragement and education. These include those mentioned below.

- **DOE's** (Past) climate change efforts carried out in NC in the past (previously **Climate-Wise**) should be continued in some fashion) Such efforts on the part of NC should result in facilities submitting their GWG data to the DOE Registry.

- **EPA's Climate Leaders** program should be acknowledged and supported, with emphasis on trying to convince the EPA and DOE to integrate their programs and meet additional requirements.

- **EPA's Environmental Performance Track** may provide a means for DENR to enrich contacts with this EPA Region 4 office and include green house gas reporting and reductions via EPA's Challenge Commitment initiative, adding to the ability to encourage reporting emissions to DOE's1605 (b).

- The President's Climate Vision program is somewhat redundant and focused on energy intensity as opposed to positive overall reductions, but is a means to encourage and demonstrate reductions that are possible.

Joint DAQ Efforts With DPPEA and other State Offices in NC

The above activities will require communication and coordination across multiple NC agencies. The DAQ, DPPEA and SEO appear to be the key actors in these efforts now,

but as the program and implementation are involved, many other (if not all) state programs may have some role. Even within DENR, additional discussions and developments are envisioned whereby the planting and tracking of forest and agriculture products would be done with new goals, a sensitivity and tracking of sequestration aspects of these areas could be managed within the framework of their overall program objectives. At some point in the (short term) future, it may be appropriate to develop an inter-agency task force or council to develop, review and coordinate state-wide activities for the common goals of this program within the State.

Coordination and Harmonization with State Energy Plan Objectives

The Energy Policy Council's far reaching State Energy Plan (SEP) shares focus with many of the goals and facilities encompassed by a North Carolina Climate Action (NCCA) Registry, as energy use is a common factor in most cases. This plan for NC's role in a NCCA Registry is supportive of, and endorses, the goals and conclusions of the SEP. It is important, however, to be able to define the goals relative to overall reductions in GWG and track progress. Therefore, the plan for this registry is to develop means and procedures whereby each element within the SEP has a defined baseline and a tracking function that follows it both in terms of absolute changes in emissions, but also in terms of reductions relative to what they "would have been" had there been no reductions attributable to the SEP. This documentation and tracking function would be an important part of the NCCA Registry's overall emphasis. It would likely also provide information needed for more effective management of emission reduction programs, priorities and resources in the future.

Promotion/Assistance & Education Efforts

DAQ and DPPEA already have an infrastructure of reporting entities or other facilities that would be candidates for participation in the NCCA Registry. This contact community is the target for additional information distribution and education activities on a periodic basis. Each facility would be informed and reminded of the opportunities available and updated on what assistance and advice are available to assist them to participate in the programs.

Element 5: Update the GHG emissions inventory for the State

It is difficult to keep a proper assessment of the effects of actions and growth without the existence of an inventory of current, past and continuing emission trends for the state and for various sectors within the State. An inventory of 1990 was developed in 1994 by an effort at Appalachian State University. This inventory needs to be reviewed and updated so that it becomes a better overall management tool and a means to track emission trends more authoritatively. This effort requires approximately $200,000 over a two-year period for the initial update and a periodic supplement to that for following years (3-5 year intervals are envisioned). This is an important part of this plan. Appropriations for this would be necessary before it can begin, but it may be possible to get some private support and participation in this effort from the NC utilities or others who may also have a need for the information/data. The results of this effort would be useful both to DAQ, other parts of DENR, and the State Energy Office, and would help track performance of programs and assess future priorities.

Element 6: NC DAQ Coordination with other (Outside NC) State Programs

North Carolina is certainly no "island" surrounded by other states that do not share the problem. Whatever is done in this State must be done in concert with (all) other states and within the same context as other nations in the world. This is critical if the aspirations of making a program for trading and selling credits is to work. Otherwise, the "currency" has a very questionable value and is subject to counterfeiting. Several efforts with others are planned or already underway, in parallel.

Southeastern States and Other Atlantic/Gulf Coast States

The coastal states from Virginia through Texas have a common tie to the same bodies of water, the Atlantic and Gulf of Mexico. Since these areas seem to be most at risk in terms of direct and obvious likelihood of potential impacts from climate change, there is a common tie. One of the objectives of this plan would be to initiate involvement and development of a Southeastern/Gulf States group that either works among themselves or as an adjunct to the NESCAUM efforts (below). Development of such ties takes staff time and resources and likely extensive input and discussions with other states and groups. Therefore, this will be developed over time on a schedule governed by staff time and resources and the willingness and reactions of other state offices.

NESCAUM

The Northeast States for Coordinated Air Use Management (NESCAUM) has undertaken the development of a Regional GHG Registry Collaborative effort among the eight Northeastern States. Over the last year, several Northeast states have taken firm actions toward registering and reducing GHG emissions, laying a foundation for possible GHG trading. In support of Northeast states looking to develop their own GHG action programs, their Demo Project has worked to support changes in the policy landscape that would encourage emissions reductions and lay the foundation for emissions trading at the state and regional level.

NC has been a constant observer and participant (listener) on calls and some aspects of this ongoing effort. NESCAUM invites representatives from other states to observe or participate at some level. There is the 'unofficial observer' level, the observer and the participant. NC by virtue of being on mail lists and invited to listen in to the calls, etc. is an unofficial observer and has been for several months, monitoring the discussion of founding decisions, various issues and problems, with their solutions; technical and administrative procedures, data system issues and decisions, etc. The major limitations to becoming recognized a full level observer is the matter of available personnel time and travel costs associated with attending various meetings in person. In spite of limitations, observers are provided opportunity to work on a more active level in sub-committees and work groups, which then involves more time and resources.

The effort also recognizes full partners which is much more significant. The full partners are included in final decision-making, as well as expected to provide more time and resources for meeting general obligations and responsibilities for the management and sponsorship of these activities. These states get to weigh in on ways that the process could better encourage all states to participate officially.

As this effort becomes more advanced, and as resources become available in NC, it may be productive for NC representatives to be elevated to an official observer level. At this level, one of the objectives would be to make North Carolina's program develop in a manner that it could provide outputs in harmony with those of NESCAUM. This could further its use this as a mechanism to organize Southeastern coastal states to unite both as a separate group, and also with the NESCAUM states in a more unified front of data harmony and usefulness for future trading programs.

California

California has one of the most extensive programs that has been developed, in terms of detail and sophistication. However, it is still voluntary and short of funding for future years. In some aspects, NC can make use of information and experiences from California, but in a direct interaction, little is expected to be directly transferable. However, the NESCAUM efforts are also extracting some of the usefulness from the California efforts and extending that to their work and NC can benefit from being a part of that group and its findings.

Other Legislative Interactions & Expectations Relative to This Proposal

The Legislature/General Assembly has raised the issue and need for a NC Registry in previous times. By default, the budget shortfall was partially responsible for the cut of funding for Climate Wise (the only NC Climate Action effort) from the budget. Interim bills and discussions have indicated that there should be a NC Climate Action Registry of some description. It is not clear how such efforts will be seen in the committees and on the floor of either body of the Legislature, but will likely be a subject of significant debate and compromises. Most recently, a Bill has been introduced that would provide funding for efforts similar to Climate Wise through support of Global Warming Initiatives, Inc., to the proposed sum of $400,000/year. This bill was not passed during the 2004 session of the Legislature.

Potential Comprehensive GHG Mitigation Plan for North Carolina

Several states who have been unable to advance the recognition and actions within their legislative bodies have take action through proposals, plans and actions within the executive branch to the level that can be accomplished without legislation. These efforts stand out as signs of movement in a positive direction. They also serve to bring public and legislative attention and needed debate to the topic. A "Comprehensive GHG Mitigation Plan for North Carolina" exists only in an initial concept stage, but may be further discussed and drafted over the next several months as feedback, interest and resources allow. Such a plan would likely encapsulate many of the ideas and concepts in this plan and further define a concrete set of steps for statewide actions that can, or should, be followed within North Carolina, and perhaps others, to accomplish the proper management and reductions in GHG.

Summary of Needs for a Practical Level of a Climate Action Registry in NC

This proposal contains several important and succinct points summarized below:

- Provide support for continued and expanded technical interfaces and political efforts with congress, DOE, EPA and other national and international agencies for a clear and strong national program.
- Implement an "informal" registration process with existing procedures for Title V permit holders in NC ($$-Continuing).
- Expand efforts to encourage voluntary reporting to federal and international registries.
    - Incorporate GWG "points" into Environmental Stewardship Program.
    - Encourage Continuation of Climate Wise Program and Reporting to DOE 1605 (b) Registry.
    - Encourage participation in EPA's Climate Leaders Program.
    - Incorporate GHG reduction principles into environmental education efforts.
    - Initiate/expand support of EPA's environmental Performance Track in NC with inclusion of Climate Change objectives.
- Joint DAQ Efforts With DPPEA, SEO and other State offices in North Carolina
    - Coordination and mutual assistance efforts with SEO and the SEP.
    - Mutual promotion and assistance efforts in conjunction with DPPEA, Small Business Office and Office of Environmental Education.
- Update the North Carolina GHG inventory, within resource constraints, and set an automatic update process into motion ($$-Continuing).
- Establish and maintain cooperative working relations with other states, regions and international bodies.
    - Work with others to establish a South Atlantic States GHG or Climate Change Group with mutual goals and expectations.
    - Observe and participate with NESCAUM on a continuing but informal basis, within resource limits.
    - Keep up to date on activities regarding the California Registry.
    - Stay attuned to changes and actions on the national (legislative) issues that might influence efforts in North Carolina.
    - Maintain cognizance of other state and national programs that would provide maintenance of a "State of the Art" knowledge within DENR.
    - Maintain efforts to keep informed on international developments, particularly as relate to international standardization of calculation and trading issues.
- Maintain an information base sufficient to keep the AQC, EMC, ERC, Legislature and Governor's Office well informed, and be responsive to questions and issues.
- Develop and coordinate a more "Comprehensive GHG Reduction Plan" for North Carolina that would encompass a broader focus on responding to national and international developments supporting a mandatory GHG reporting and reduction process.

APPENDIX D *EPC-RECOMMENDED ACTION ITEMS FROM THE NORTH CAROLINA STATE ENERGY PLAN (2003)*

The Energy Policy Council (EPC) reviewed the entire list of 93 policies and programs to determine which measures would require action by the Governor, North Carolina General Assembly, North Carolina Utilities Commission, or other regulating or administrative agency. From the entire list, the Energy Policy Council recommended the following 15 key legislative, regulatory, and administrative policies for action in 2003 and 2004:

Energy, Economic, and Environmental Issues

Exec-1 The North Carolina Department of Commerce and the State Energy Office should encourage and support economic development of energy-related enterprises whose products are intended to increase energy efficiency or use renewable resources, such as providers of specialized insulation and window products, heating and air conditioning equipment and controls, distributed generation equipment, solar and wind energy equipment, and fuel cells.

Exec-2 The State Energy Office should communicate the energy research being performed in the state to the North Carolina Department of Commerce for its recruiting and economic development strategy.

Exec-3 The North Carolina Department of Environment and Natural Resources should create a greenhouse gas registry to track emissions of carbon dioxide and other greenhouse gases, to establish baseline greenhouse gas emissions, and to demonstrate reductions in greenhouse gas emissions for potential greenhouse gas trading systems depending upon the availability of funding.

Alternative Fuels from Biomass

Exec-4 North Carolina should support the development of an alternative fuel industry through dedicated funding and grant matching of promising alternative fuel projects. These efforts should include agricultural waste processing facilities, biodiesel and ethanol refineries, fueling stations for alternative-fueled vehicles, production incentives for farmers and refiners, incentives for highly efficient or alternative-fueled vehicles, and education and awareness programs. Developmental efforts should focus on raising feedstock production levels and insuring all 100 counties in the state have alternative fueling infrastructure by 2007. In particular, the Energy Policy Council supports a state program to pay for alternative fuels development via a $1 to $2 fee applied to annual vehicle registration fees.

Exec-5 Based on the results of ongoing research and development studies, the North Carolina General Assembly should pursue strategies that convert animal waste into environmentally sound energy sources.

Alternative Energy Sources

Exec-6 The General Assembly should consider adopting net metering for application to all electric utilities in the state.

Exec-7 The General Assembly should evaluate a renewable portfolio standard (RPS) that complements the NC GreenPower program and fosters the development of a renewable electricity market. The RPS would require that all electric utilities increase the percentage of total distributed electricity that comes from renewable sources, such as hydroelectric, wind, solar, wastederived fuels, and agricultural fuels.

Exec-8 The General Assembly should reexamine the Mountain Ridge Protection Act as it pertains to wind energy while still protecting North Carolina's natural beauty.

Exec-9 The State Energy Office should assess and propose incentives and regulatory or administrative measures for development of renewable electricity generation facilities, solar water heating, passive and active solar space heating, and daylighting.

Exec-10 The General Assembly should require that all electric utilities in North Carolina provide generation disclosure of fuel mix percentages and emissions statistics on sulfur dioxide, nitrogen oxides, carbon dioxide, and mercury annually by bill insert and via website. The disclosure information should clarify to the consumer the environmental impact of residential electricity use.

Energy Use in the Public Sector

Exec-11 State agencies and universities, with coordination by the North Carolina Department of Administration, should reduce energy consumption in existing state buildings to save 20% by 2008, 4% per year or more for the next 5 years. The State Energy Office should submit an annual report to the Energy Policy Council, the Governor's Office, the State University System and other major energy users in North Carolina that provides data on energy saved in state buildings and universities by source and cost, energy efficiency activities undertaken in these buildings, the approximate investment in energy efficiency measures, and the overall economic costs and benefits of the program.

Exec-12 Working in conjunction with the State Construction Office, the State Energy Office should monitor, analyze, and report on the energy savings attributed to the new requirements on life-cycle cost analyses of the $3.1 billion higher education building program currently underway across the state, as well as future projects. The State Energy Office should be responsible for maintaining records that track the consequences of subjecting new public facilities to the newer life-cycle cost procedure.

Exec-13 North Carolina should facilitate efforts of local governments to finance energy efficiency and renewable energy projects; specifically, allow bundling of multi-jurisdictional energy efficiency projects to achieve economies of scale and improve opportunities for financing, restructure the underwriting provisions of the State Energy

Office's low-interest energy loan program, and provide training in energy efficiency measures to building managers in local government buildings.

Energy Use in the Residential Sector

Exec-14 North Carolina State Government should continue to support a strong low-income weatherization program. The state should review the effectiveness of energy conservation programs conducted through the weatherization program and analyze opportunities for improvements. The State Energy Office should develop programs, in addition to weatherization, to address energy-efficient housing in the low-income sector.
Funding for Energy Programs

Exec-15 The General Assembly should review options, such as a Public Benefits Fund or other means, to enable funding of the basic services provided by the State Energy Office and the recommendations in the State Energy Plan.

List of all 93 action items from the North Carolina State Energy Plan 2003

The measures above, with the prefix "Exec" are action items given high priority for 2003 to 2004.
The other actions are numbered by the chapter where they appear in the Energy Plan (e.g., 2-1 is in chapter 2).

Policies and Programs for Energy and the Environment

The Council also has a number of recommendations related to economic development, which are included in Chapter 10: Energy Use in the Industrial Sector.

Exec-3 The North Carolina Department of Environment and Natural
Resources should create a greenhouse gas registry to track emissions of carbon dioxide and other greenhouse gases, to establish baseline greenhouse gas emissions, and to demonstrate reductions in greenhouse gas emissions for potential greenhouse gas trading systems depending upon the availability of funding.

2-1 North Carolina should study opportunities for carbon sequestration in the agricultural, forestry, and other sectors. The immediate encouragement of these efforts will also insure these North Carolina industries will be ready to participate in national or international carbon trading programs as they are developed.

Energy Supply Policies and Programs

The following recommended policies and programs are related to the supply of conventional energy sources – primarily fossil fuels and nuclear energy. Many of the policies regarding energy supply are national in scope and thus beyond the purview of North Carolina. The Energy Policy Council has only included policies that the state could undertake.

3-1 The State Energy Office should work with propane dealers, the natural gas industry, electric utilities, key members of the agricultural sectors, and others concerned with alternative fuels to assess each fuel's role in the future of alternative-fueled vehicles in the state and consider how to improve the support structure via fuel supply stations.

3-2 The state should insure high priority for fuel supply by NC Department of Transportation emergency crews during weather and other emergencies – especially for strategic snow removal.

3-3 North Carolina should develop reciprocal agreements between state agencies in adjoining states (departments of motor vehicles, state energy offices, and state emergency response teams) on allowable hours of service for tanker and truck drivers during emergency situations (with clear definition of an emergency situation).

Electric Utility Policies and Programs

The following policies and programs are recommended by the Energy Policy Council regarding the electric utility industry. Several other chapters also contain policies relevant to the utility industry.

4-1 The North Carolina Utilities Commission is encouraged to promote policies that create diversity in energy supply such as natural gas, solar energy, wind energy, biomass, and hydrogen from renewable sources with particular emphasis on in-state energy development.

4-2 The North Carolina Utilities Commission is encouraged to consider increasing the availability of real-time pricing.

4-3 In determining the real costs of fuels, the North Carolina Utilities Commission is encouraged to consider the cost of externalities in economic analysis of supply resources.

4-4 The State Energy Office should explore the development of combined heat and power (CHP) technologies.

4-5 Because the December 2002, ice storm raised public interest in use of distributed generation (i.e., in facilities used as public shelters, residential housing, etc.), the State Energy Office should study distributed generation and appropriate applications.

Alternative Fuels Policies and Programs

The following policies and programs are recommended by the Energy Policy Council regarding alternative fuels for North Carolina.

Exec-4 North Carolina should support the development of an alternative fuel industry through dedicated funding and grant matching of promising alternative fuel projects. These efforts should include agricultural waste processing facilities, biodiesel and ethanol refineries, fueling stations for alternative-fueled vehicles, production incentives for

farmers and refiners, incentives for highly efficient or alternative-fueled vehicles, and education and awareness programs. Developmental efforts should focus on raising feedstock production levels and insuring all 100 counties in the state have alternative fueling infrastructure by 2007. In particular, the Energy Policy Council supports a state program to pay for alternative fuels development via a $1 to $2 fee applied to annual vehicle registration fees.

Exec-5 Based on the results of ongoing research and development studies, the North Carolina General Assembly should pursue strategies that convert animal waste into environmentally sound energy sources.

5-1 The State Energy Office should establish a panel to lead a detailed assessment of the potential for an alternative fuels industry in NC. The assessment should focus on the realistic potential for each type of alternative fuel, the economic and environmental costs and benefits, and recommendations for developing the industry.

5-2 The State Energy Office and other relevant state agencies should develop and implement a pilot project converting hog waste to methane or other fuels for the production of electricity.

5-3 The State Energy Office, Attorney General's Office, and Department of Environment and Natural Resources should assess and propose incentives for farmers to convert animal and crop wastes into energy.

5-4 The State Energy Office, Department of Agriculture, and Department of Environment and Natural Resources should support landfill methane gas projects through direct grants and loans based on need, as well as technical assistance.

Alternative and Renewable Energy Policies

Alternative and renewable electricity issues are complex because of the required linkage with the existing utility network. However, many states have adopted highly successful measures to foster development of in-state renewable electricity resources.

Exec-6 The General Assembly should consider adopting net metering for application to all electric utilities in the state.

Exec-7 The General Assembly should evaluate a renewable portfolio standard (RPS) that complements the NC GreenPower program and fosters the development of a renewable electricity market. The RPS would require that all electric utilities increase the percentage of total distributed electricity that comes from renewable sources, such as hydroelectric, wind, solar, wastederived fuels, and agricultural fuels.

Exec-8 The General Assembly should reexamine the Mountain Ridge Protection Act as it pertains to wind energy while still protecting North Carolina's natural beauty.

Exec-9 The State Energy Office should assess and propose incentives and regulatory or administrative measures for development of renewable electricity generation facilities, solar water heating, passive solar heating and cooling, active solar space heating and cooling, and daylighting.

Exec-10 The General Assembly should require that all electric utilities in North Carolina provide generation disclosure of fuel mix percentages and emissions statistics on sulfur dioxide, nitrogen oxides, carbon dioxide, and mercury annually by bill insert and via website. The disclosure information should clarify to the consumer the environmental impact of their electricity use.

6-1 A Solar Schools Program should be developed and incorporate renewable electricity generation, solar water heating, and daylighting to reduce fossil fuel use by schools, improve the quality of education, provide a real-world energy training lab, and make our citizens more aware of the potential for renewable resources.

6-2 The State Energy Office should work with the state's professional licensing boards to develop a certification program for renewable energy installers.

Public Sector Recommended Policies and Programs

The public sector is of key importance to the State Energy Plan for several reasons, including: (1) substantial potential exists for saving energy, (2) energy savings will help reduce the state budget shortfall and decrease the cost of government, (3) a firm commitment to improving the energy efficiency of state government will show that the state means to lead by example, and (4) reducing energy consumption will help improve the state's environmental quality. The Energy Policy Council recommends the following policies and programs for North Carolina's public sector.

Exec-11 State agencies and universities, with coordination by the North Carolina Department of Administration, should reduce energy use in existing state buildings to save 20% by 2008, a reduction of 4% per year or more for the next 5 years. The State Energy Office should submit an annual report to the Energy Policy Council that provides data on energy saved in state buildings and universities by source and cost, energy efficiency activities undertaken in these buildings, the approximate investment in energy efficiency measures, and the overall economic costs and benefits of the program.

Exec-12 Working in conjunction with the State Construction Office, the State Energy Office should monitor, analyze, and report on the energy savings attributed to the new requirements on life-cycle cost analyses of the $3.1 billion higher education building program currently underway across the state, as well as future projects. The State Energy Office should be responsible for maintaining records that track the consequences of subjecting new public facilities to the newer life-cycle cost procedure.

Exec-13 North Carolina should facilitate the efforts of local governments to finance energy efficiency and renewable energy projects; allow bundling of multi-jurisdictional energy efficiency projects to achieve economies of scale and improve opportunities for

financing, restructure the underwriting provisions of the State Energy Office's low-interest energy loan program, and provide training in energy efficiency measures to building managers in local government buildings.

7-1 North Carolina statutes should require that designers of all new public buildings provide estimates of projected energy consumption and energy costs for the building prior to construction.

7-2 The State Energy Office should work with the North Carolina Department of Public Instruction to review prototype school designs listed on the Department of Public Instruction's Web page and determine how best to integrate improved, more efficient designs.

7-3 The North Carolina Department of Administration should implement high performance building guidelines developed for North Carolina in all new public buildings and also develop and implement high performance guidelines for new public housing.

7-4 The North Carolina Department of Administration should develop performance contracting procedures and other ways to finance energy efficiency projects for state and local governments, university and public school systems, and public housing. The Department of Administration should provide technical support to implement performance contracting projects and provide quality assurance.

7-5 State agencies should lead by example by establishing a certain minimum level of electricity to be derived from renewable sources, such as the North Carolina GreenPower program, or via installation of state-owned renewable energy projects.

7-6 North Carolina Department of Administration should require that all state facilities with motors larger than 5 horsepower to develop a motor maintenance program.

7-7 Local governments should be encouraged to implement the above actions and other energy efficiency programs.

Residential Energy Policies and Programs

The following policies and programs for the residential sector are recommended by the Energy Policy Council for implementation in North Carolina. While these policies alone will not achieve the level of savings depicted in the high efficiency scenario shown above, they will provide a starting point for improving the efficiency of residences in the State.

- Low-Income *W*eatherization

Exec-14 North Carolina State Government should continue to support a strong low-income weatherization program. The state should review the effectiveness of energy conservation programs conducted through the weatherization program and analyze opportunities for improvements. The State Energy Office should develop programs in addition to weatherization to address energy efficient housing in the low income sector.

- *Energy Codes in New Construction*

8-1 The State Energy Office should conduct a study on current compliance levels of residential and commercial buildings with the North Carolina state energy code. The study should make recommendations for improvements in compliance procedures and for energy code changes that are in the best interests of the state.

8-2 The State Energy Office should create an Energy Code Enforcement Assistance Program to provide additional energy code enforcement and outreach officials to serve across the state. The state should consider whether adding a state surcharge on all local building permit fees to support the program is feasible.

- *Manufactured Homes*

8-3 The State Energy Office should investigate technologies, incentives, financing options, and regulatory issues regarding minimum efficiency requirements for manufactured housing. At a minimum, the State Energy Office should encourage new manufactured homes to comply with the critical components of the state energy code for site-built residential units and promote Energy Star manufactured homes. The program should include a comprehensive statewide training program on the benefits and details of higher efficiency units.

- *High Performance Homes*

8-4 The State Energy Office should organize a statewide effort to develop criteria for a high performance building program to reduce the life cycle cost of new and existing buildings. The criteria should utilize provisions from other successful high performance programs, including Energy Star, programs developed by Advanced Energy Corporation, Southface Energy Institute's Earthcraft Home Program, the U.S. Department of Energy's Building America program, and others.

8-5 The State Energy Office should develop a comprehensive, statewide promotional campaign for high performance buildings.

8-6 The State Energy Office should continue its work to formulate and advance mortgage-based incentives for high performance new homes.

♦ *Training*

8-7 The State Energy Office should provide training on high performance buildings to builders, subcontractors, architects and engineers, landscape architects, code enforcement officials, utility representatives, building investors, developers, financial institutions, real estate professionals, appraisers, home inspectors, renovation contractors, educators, and prospective homeowners.

8-8 The State Energy Office should provide training for building professionals on specific targeted technologies including residential daylighting, solar water heating, heat pump water heaters, new insulation products, and advanced HVAC systems and controls.

Commercial Energy Policies and Programs

The following policies and programs for the commercial sector are recommended by the Energy Policy Council for implementation in North Carolina.

9-1 The State Energy Office should work with appropriate state agencies to provide a design review service that focuses on energy-efficient components and holistic, high-performance, design strategies for new commercial buildings. The design review procedure should include a systematic life-cycle cost analysis of a variety of energy technologies and strategies for each project. The service should seek to upgrade new buildings to meet high performance building guidelines developed statewide.

9-2 The State Energy Office should promote and develop guidelines for performance contracts, conduct workshops, and provide technical assistance on developing performance contracting documents.

9-3 The State Energy Office should research current and proposed incentive programs in North Carolina and other states and develop a state commercial energy incentive program for consideration.

9-4 The State Energy Office should promote the use of and provide training for commercial building energy analysis software to assist building owners with evaluating the best energy efficiency measures to implement in existing state buildings and other commercial structures.

9-5 The State Energy Office should develop an energy audit program for existing commercial buildings to assist building managers with implementing the most energy efficient and cost effective improvements for commercial renovation projects.

Industrial Energy Policies and Programs

The following policies and programs are recommended by the Energy Policy Council for the industrial sector.

♦ *Industrial Energy Assessment and Efficiency Programs*

10-1 The State Energy Office should increase funding for industrial efficiency programs to enable the Industrial Extension Service, Industrial Assessment Service, Advanced Energy Corporation's industrial efficiency programs, and other similar programs in the state to expand technical assistance and analysis efforts to reduce energy use by the industrial sector in North Carolina. Funding should also be provided for follow-up efforts to facilitate implementation of cost effective technologies, including making contacts with vendors to procure bids, assisting with performance contractors, developing sample specifications, and providing other technical assistance. The State Energy Office should investigate and analyze alternative incentives to increase the implementation of industrial efficiency and renewable energy measures, including low interest loans, performance contracts, and incentive payments. The outreach and technical assistance program should support ongoing efforts to reduce water usage in industrial and municipal operations.

10-2 The State Energy Office should fund an Industrial Demonstration and Testing Program aimed at developing more efficient products and processes for North Carolina's industries. In addition, the Energy Office should convene industrial energy experts and industrial facility operators to create energy efficient solutions to targeted industrial processes that consume substantial energy in the state. Finally, the Energy Office should continue and expand its involvement in the federal Industries for the Future program.

10-3 North Carolina should evaluate whether facilities that repair or rewind motors should be certified or otherwise meet a state efficiency requirement.

- Incentives and Financing

10-4 The State Energy Office should develop rules for and conduct training programs on Performance Contracting for energy-related projects in industrial facilities.

10-5 North Carolina should create investment tax credits and other incentives for new and/or retrofitted manufacturing equipment to encourage modernization and efficiency improvements.

10-6 North Carolina should create tax credits for meeting high performance standards, including NEMA premium motors.

10-7 The State Energy Office should create a statewide voluntary challenge for industrial energy efficiency improvements.

10-8 North Carolina should create policies and regulations for distributed generation in the state, including incentives for deployment of "clean" distributed generation.

- Industrial Energy Technology Training

10-9 The State Energy Office should sponsor workshops on industrial energy efficiency around the state directed at industrial facility operators, design and process engineers, and owners. The workshops will describe the state-of-the-art in efficient technologies and describe the results of ongoing research efforts. The training effort should also address water-conserving practices around the state.

- Economic and Industrial Development Practices

Exec-1 The North Carolina Department of Commerce and the State Energy Office should encourage and support economic development of energy-related enterprises whose products are intended to increase energy efficiency or use renewable resources, such as providers of specialized insulation and window products, heating and air conditioning equipment and controls, distributed generation equipment, solar and wind energy equipment, and fuel cells.

Exec-2 The State Energy Office should communicate the energy research being performed in the state to the North Carolina Department of Commerce for its recruiting and economic development strategy.

10-10 The Department of Commerce should develop an industrial recruitment strategy to target appropriate industries to fit in resource efficient industrial developments (sometimes called industrial ecosystems).

10-11 In its recruitment efforts, the North Carolina Department of Commerce should give preference to industries that contribute to a more beneficial load curve and have minimal impact on the environment.

Transportation Energy Policies and Programs

The overall goals of the State Energy Plan's transportation policies are to increase the use of efficient vehicles and alternative fuels. The state's fleets can have higher efficiency and increased use of alternative fuels. Incentives may move employees and their employers to favor use of mass transit, as well as more efficient fleet vehicles. Incentives and publicity programs that are practical and affordable can encourage consumers to select vehicles that provide higher miles per gallon. It should be a priority of the State Energy Office to work in concert with North Carolina Department of Transportation to insure that policies and programs pertaining to alternate fuel use, mass transit, and transportation planning are implemented as soon as possible. Additionally, the State Energy Office should take the lead as a catalyst for bringing together the variety of plans and policies already drafted by numerous agencies and entities in the state of North Carolina.

11-1 The State Energy Office, Department of Revenue, and North Carolina Department of Transportation should assess and propose financial incentives for public and private employees who regularly ride mass transit systems and/or for their employers.

11-2 State agencies should convert at least 10% of their entire fleet to high efficiency (over 40 miles per gallon) or alternative-fueled vehicles by 2005 and 20% by 2010.

11-3 The North Carolina Department of Transportation should provide fueling capability for compressed natural gas, ethanol, biodiesel, and other alternative fuels at all state fueling stations by 2005.

11-4 North Carolina should implement light rail systems to serve transportation needs and direct development along higher population and employment corridors.

11-5 The State Energy Office should develop a statewide voluntary transportation efficiency program that rewards companies who qualify through a publicity and promotion program. The program would have the goals of increasing mass transit use and pedestrianism, increasing efficiency of commuter vehicles, increasing efficiency of company fleets, increasing use of alternative-fueled vehicles by company fleets, and allowing smaller parking facilities for those who demonstrate success.

11-6 The State Energy Office should provide technical assistance for local authorities to increase ridership on local transit systems.

11-7 The State Energy Office and the North Carolina Department of Transportation should become involved in ongoing statewide efforts to develop Smart Growth community design and redesign programs that increase pedestrianism, reduce personal vehicle miles traveled, and increase mass transit use. Smart Growth and Smart Roads programs also provide other benefits such as reduced urban and suburban congestion, lower commuting times, decreased air emissions, and increased productivity.

11-8 The State Energy Office should develop information resources on Smart Growth and energy efficiency that emphasizes the many advantages of the Smart Growth concept. The goal is to require developers, planners, and designers to consider energy use when evaluating future development projects. The information resources should also describe the concept of Smart Roads that seeks to relieve congestion by promoting the safe flow of traffic at increased average speeds.

11-9 The State Energy Office should conduct a statewide consumer campaign designed to encourage the purchase of more efficient vehicles or alternative-fueled vehicles, improve maintenance to increase vehicle efficiency, increase pedestrianism, and reduce vehicle miles traveled. The program should be coordinated with the state's automotive retailers' associations.

11-10 The North Carolina Department of Administration should work with the Department of Transportation to develop a coordinated set of strategies intended to reduce vehicle miles traveled (VMT) and increase the operating efficiency of vehicles within state government. The agencies should set specific target goals for VMT reductions.

Energy Education and Research Policies and Programs

The Energy Policy Council recommends the following programs and policies regarding energy education and research for implementation in North Carolina:

12-1 The State Energy Office should develop and sponsor training programs for community colleges and universities in fields related to energy efficiency and high performance buildings.

12-2 The State Energy Office should assist in the coordination of energy education programs with museums and help create an energy museum "on wheels" using existing resources, such as the Science House at NCSU or the Museum of Life Science, wherever possible.

12-3 The State Energy Office should sponsor regional "renewable demonstration centers" or, whenever possible, use existing ones (e.g. demonstration centers such as the North Carolina Solar House and the Energy Xchange, museums such as the Museum of Life and Science, and science centers such as Discovery Place).

12-4 The State Energy Office should create energy internships or apprenticeships for graduating college students and high school students to create the next generation of energy professionals.

12-5 The State Energy Office should provide a statewide award (e.g., a college scholarship) for the most outstanding energy-related science demonstration/experiment at the state science fair.

12-6 The State Energy Office and the UNC System should help the Education Departments of colleges and universities develop coursework for junior and senior undergraduates and graduate students in energy education.

12-7 The State Energy Office and the state's colleges and universities should help Community Colleges and other vocational schools develop coursework in energy efficiency and renewable energy to help spur the industry; such as training carpentry students in energy efficient, passive solar building design and construction. Include this training in voc-tech courses in high schools.

12-8 The State Energy Office should provide training to licensed professionals in the homebuilding industry focusing on energy efficiency and renewable energy sources to promote industry awareness and implementation of these technologies.

12-9 The State Energy Office should support development of a comprehensive information outreach program for consumer questions about saving energy and using renewables in their homes and businesses; information hotline via a toll-free telephone number; informative Web Page containing a wide array of publications available on-line; resources that include up-to-date information on renewables and energy efficient buildings, industrial facilities, and vehicles, as well as data on energy sources in the state; information on energy-producing facilities; environmental information related to energy consumption; and other energy-related information.

12-10 North Carolina should encourage schools to reduce school operating budgets by installing energy efficiency and renewable energy systems.

12-11 The State Department of Public Instruction should consider reinstituting its energy budget program, which provided guidelines for energy use per square foot by type of school.

12-12 The State Energy Office should work in partnership with the State Department of Public Instruction to plan school energy related initiatives and include a representative for energy-use in school facilities on the Energy Policy Council.

12-13 North Carolina should require that K-12 students learn about energy. Energy issues should be incorporated into the end-of grade tests.

12-14 The State Energy Office should sponsor a program to install solar equipment or other sustainable energy technologies on school buildings in every school district in the state.

12-15 The North Carolina Community College System should require that the community colleges' curricula provide a building science course, an energy design course for drafting programs, and a solar/renewable energy technology class.

12-16 The State Energy Office should establish a central repository for energy information. This energy data and policy analysis center should develop baseline information on energy consumption by state and local governmental entities. The center should also provide policy analysis for existing and proposed state energy policies.

12-17 The State Energy Office should conduct a comprehensive analysis of the existing Renewable Energy Tax Credits and determine if these credits should be expanded to include efficiency measures.

12-18 The North Carolina Energy Policy Council should update the State Energy Plan every five years and conduct a review of implementation of the plan on an annual basis.

12-19 State government departments and public universities should report their energy consumption and expenditures by fuel type on an annual basis to the State Energy Office.

12-20 Every two years, the State Energy Office should complete an assessment of energy use in public buildings to determine whether efficiency programs are having a significant impact on energy consumption.

12-21 Working in conjunction with the State Construction Office, the State Energy Office should monitor, analyze, and report on the energy savings attributed to the new requirements on life-cycle cost analyses of the $3.1 billion higher education building program currently underway across the state, as well as future projects. The State Energy Office should be responsible for maintaining records that track the consequences of subjecting new public facilities to the newer life-cycle cost procedure.

12-22 The State Energy Office should take the lead in conducting a statewide inventory of each public facility owned or leased by county and municipal government including K-12 schools and community colleges.

Funding Energy Policies and Programs

The Energy Policy Council recommends the following policy regarding funding of energy programs in North Carolina.

Exec-15 The General Assembly should review options, such as a Public Benefits Fund or other means, to enable funding of the basic services provided by the State Energy Office and the recommendations in the State Energy Plan.

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NCDENR

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross, Jr., Secretary

November 19, 2004

TO: Environmental Review Commission Members

FROM: William G. Ross, Jr., Secretary

SUBJECT: Annual AFV Incentives Report

G.S. 143-215.107C(c) requires the Department of Environment and Natural Resources to report to the Environmental Review Commission each year on incentives to increase the use of alternative fuel vehicles. Attached is this year's report. If you have any questions, please contact Vicki Chandler at 919-715-0972.

WGR/ko

cc: Keith Overcash

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One North Carolina Naturally

Incentives to Increase the Use of Alternative-Fueled Vehicles in Privately Owned Fleets in North Carolina

2004 Report to the Environmental Review Commission N.C. General Assembly

North Carolina Department of Environment and Natural Resources
Division of Air Quality

Legislative Background

Section 4.5 of Session Law 1999-328 (Senate Bill 953) states:

"The Department of Transportation, the Department of Commerce, and the Department of Environment and Natural Resources shall jointly develop recommendations for incentives to increase the use of alternative-fueled and low emission light duty cars and trucks in privately owned fleets. The Department of Environment and Natural Resources shall submit these recommendations to the Environmental Review Commission on or before 1 February 2000. The Department of Environment and Natural Resources shall report on progress in increasing the use of alternative-fueled and low emission light duty cars and trucks in privately owned fleets to the Environmental Review Commission on or before 1 October of each year beginning 1 October 2001."

A report jointly prepared by DOT, DOC, and DENR was presented to the ERC on March 16, 2000 which included a loan program to provide low-interest loans for construction of refueling stations; tax credits to allow private fleet operators to recoup the incremental costs incurred for changing fleets to alternative fuels; tax incentives for the public that provide additional incentives to purchase AFVs, and tax incentives to fuel providers to encourage investments in alternative fuel infrastructure. Representative Joe Tolson introduced House Bill 1213, "Alternative Fuel Vehicle Rebate and Infrastructure Grant Program", on April 12, 2001. Due to budget issues the bill was withdrawn. A similar bill was introduced in 2003 (H806), but had not passed when the General Assembly adjourned.

2004 Report

The following discussion highlights the Alternative Fueled Vehicle activities since the 2003 report.

2004 Legislation: House Bill 1636, Renewable Fuel Tax Credits

S.L. 2004-153 (HB 1636) provides two new income or franchise tax credits for construction of renewable fuel facilities effective beginning in 2005: 15% for a facility for dispensing renewable fuel and 25% for a facility to produce renewable fuel. Renewable fuel is defined as biodiesel or ethanol. Like the other credits in Article 3B, the new credits may be claimed against income tax or franchise tax. Each credit is limited to 50% of the amount of tax liability against which it is claimed. Any excess may be carried forward for up to five years. Although Article 3B is set to sunset January 1, 2006, the sunset for these two new credits would be 2008. This act became effective for taxable years beginning on or after January 1, 2005.

Triangle Clean Cities Coalition

In spring of 1999, the State Department of Commerce's Energy Division asked the Triangle J Council of Governments (TJCOG) to coordinate a Clean Cities program in the

Triangle. On March 19, 2001, the U.S. Department of Energy Clean Cities Program officially designated the Triangle Clean Cities Coalition (TCCC) as the 80th US Clean Cities Coalition.

At the 10th Annual National Clean Cities Conference in Ft. Lauderdale, Triangle Clean Cities (TCC) was recognized as one of the top ten Clean Cities coalitions in the country. The Triangle Coordinator, Anne Tazewell, received the 2004 Southeast Region Coalition Excellence Award on behalf of the coalition's legislative efforts and success in increasing the use of alternative fuels and AFVs by 121% in 2003. The City of Greensboro, a TCC member, also received an award for Excellence in Advancing Biodiesel. Greensboro had switched its entire fleet of over 750 diesel vehicles to biodiesel and used more than one million gallons of B20 (20% biodiesel 80% diesel) in 2003. Three other TCC stakeholders were acknowledged by the U.S. Department of Energy for their alternative fuel leadership – the NC Department of Administration for ethanol use, NC Department of Transportation for biodiesel use and Duke University for the use of compressed natural gas.

Centralina Clean Cities Program

The Centralina Clean Fuels Coalition (CCFC) program has been awarded the prestigious Clean City designation by the U.S. Department of Energy's National Clean Cities Program. Upcoming USDOE CC designation is planned for October 15, 2004 at the Adam's Mark in Downtown Charlotte. CCFC is sponsored by the North Carolina State Energy Office and has been supported by the Centralina Council of Governments (COG) for the past two years. Their new website is http://www.4cleanfuels.com.

The Clean Cities Program takes a unique, voluntary approach to AFV development, thriving on strong local initiatives and a flexible approach to building markets for domestically produced alternative fuels. CCFC stakeholders include local governments and State agencies as well as businesses such as major fuel providers and vehicle manufacturers. The following are just some of the current local initiatives underway:

- Bank of America, in conjunction with the Honda and Fuelmaker corporations, will sponsor a pilot program this fall to provide natural gas vehicles for bank associates to test drive.
- The City of Monroe expects to begin using biodiesel in over 70 of its fleet vehicles this year.
- The City of Charlotte and Mecklenburg County have committed to Clean Cities' program components including idle reduction strategies, hybrid gas/electric vehicle technology, and fuel economy initiatives.
- The first Biodiesel Refueling site is located at the BP station in Monroe (US 74/NC 200). The City of Monroe has switched to biodiesel for all of its on and offroad fleet operations.

Clean Cities designation means that CCFC stakeholders will be eligible for grants and federal funding to advance the usage of alternative fuels and vehicles. Nationwide, only

85 other local/regional groups have achieved this designation. CCFC in partnership with South Carolina's Palmetto State Clean Fuels Coalition and Sustainable Environment for Quality of Life (SEQL) will utilize an $18 k Fuel Economy grant to develop outreach and awareness activities and materials for their region.

2004 Biofuels Program

As part of the Triangle Clean Cities' biofuels program, nine grants were funded in the second round, including two ethanol projects (Durham and Wake Counties), two commercial B20 refueling stations (Durham and Cary), and one private fleet usage of B20 (Wolfline buses at NCSU). Additional funding was made possible for previous grantees including Duke University, the Town of Cary, Raleigh Durham Airport, Wake County, and the Garner BP station. The Biofuels Program has displaced almost 190,000 gallons of petroleum diesel with alternative fuels to the unregulated community. It is projected that this program will continue to displace about 63,000 more gallons, for a total of more than 6,000 barrels of oil.

Municipalities represent the biggest user of alternative fuels in the Triangle region although private fleets do sustain the necessary demand for B20 fuel at three commercial biodiesel stations. The following are a few of the private fleets utilizing B20: Shimar Recyling, Connex TCT, (NCSU Wolfline buses), and Duke University. Three alternative refueling stations have been added to the Triangle this year. Two commercial stations have biodiesel (B20), and the City of Raleigh has installed a compressed natural gas station (CNG) that is open to the public. There is also a B100 station open to Piedmont Biofuels Cooperative members in Pittsboro.

2004 Alternative Fueled Vehicle Incentive Grant

NC Department of Administration State Energy Office provided $100,000 to Triangle Clean Cities to fund the Alternative Fuel Vehicle (AFV) Incentive Project. Five projects received awards ranging from $8,550 to $25,000 to help buy down the incremental costs of the fuel, vehicle purchase, or to construct an alternative refueling site. The project goals are to displace petroleum use through the use of alternative fuels as well as to educate the public about the benefits of these fuels and technologies.

Project profiles:

- The City of Raleigh will purchase five dedicated CNG vehicles as well as E85 for their expanding fleet of E85 capable flex-fuel vehicles (FFVs). The City currently owns ten FFVs and is planning to purchase ten more in FY 04-05. The City has made arrangements with the State's Motor Fleet Management Division to purchase E85 at their downtown Peace and Person Street station and at their Blueridge Road site. Fuel keys will be issued to the City's FFV drivers that will only allow refueling with E85.
- Duke University Facilities Management Division (FMD) will purchase at least four GEM Neighborhood Electric Vehicles for use on campus. These zero emission vehicles will replace gasoline vehicles and are easily recharged using 110v outlets.

The university will be installing two new 110v outlets at its Facility Center and providing mechanic training for the new vehicles.

- Orange County is partnering with Orange County Schools to install a Fuel Maker CNG fast-fill fueling station at the Orange County School Maintenance Facility on Old 86 in Hillsborough. With a location between two major interstate corridors, I-40 and I-85, the intention of making this refueling site publicly available is very important. Orange County expressed intent to include B20 at the site, though no funds were requested for this purpose.
- The Department of Public Instruction will help offset a portion of the incremental cost of purchasing biodiesel for Chatham Public School's fleet of buses during the 2004-2005 school year. The fleet covers about 1.2 million miles each year and has already started testing a low blend of the fuel. During the 2003-2004 year DPI assisted the Durham Public Schools to begin using B20 in all 284 school buses and will continue with financial assistance for biodiesel use in 2004-2005 school year, as well.
- Piedmont Biofuels, Inc. is purchasing six 500-gallon tanks, pumps and fuel filters to be leased at no cost to various businesses and organizations in the region for on site biodiesel fueling. The tanks will be filled by Piedmont Biofuels, which recently purchased a 1,600-gallon tanker truck for biodiesel distribution. Piedmont Biofuels will also support the project by providing educational outreach and murals on the refueling tanks.

Sustainable Environment and Quality of Life (SEQL)

Centralina Council of Governments was awarded a $275,000 grant from the US Environmental Protection Agency to implement and expand regional efforts to protect the quality of life in the bi-state metro Charlotte region. This program brings together environmental, business and community stakeholders into a process of integrated planning and is administered by Centralina Council Governments in collaboration with Catawba Regional Council of Governments. SEQL is working to enhance local and regional decision-making through the development and implementation of Action Items relating to air quality, sustainable growth and water resources. Staff serves as a technical resource for communities and assists in seeking grants and developing educational resources.

The US DOE Clean Cities program recently expanded their program to have a more of a technology neutral focus on petroleum displacement which has opened the door to various fuel blends, hybrid vehicles, fuel economy measures and idle reduction strategies. NC Division of Air Quality (DAQ) along with partnering states of South Carolina and Georgia were awarded a $1.5 million dollar grant to deploy three Advanced Travel Center Truckstop Electrification (ATE) project along the Interstate 85 corridor. DAQ selected the Petro Stopping Center at Exit 157 on Interstate 85/40 near Mebane, which now offers 58 parking spaces where truckers can rest for the mandatory 11 hours without needing to idle their engines. SEQL has submitted a similar grant application under US EPA's "National Transportation Idle Free Corridors" solicitation and are hopeful that the Derrick Travel Plaza in Rowan County will become North Carolina's second ATE site.

Mobile Source Emissions Reduction Grant Program

The purpose of the Mobile Source Emissions Reduction Grants (MSERG) is to achieve actual reductions from mobile source related emissions in North Carolina to assist the State in maintaining the National Air Quality Standards for primarily ozone and carbon monoxide. In 1993, the North Carolina General Assembly passed Clean Air Legislation, which provided that beginning on January 1, 1995; certain portions of those taxes on the sale of gasoline in North Carolina would be used to fund portions of the State Air Quality Program. Funding for these grants is provided by a tax of 1/64 of a cent per gallon of gasoline sold, which currently generates about $800,000 annually.

Grants are awarded by DENR with the assistance of the Grant Review Committee. Each year the Grant Review Committee selects a focus for the upcoming grant year. Although other projects may be submitted and funded, priority is placed on projects addressing the goal for that particular year. The goal for the 2004 grants was to retrofit existing diesel school buses with diesel oxidative catalysts that will reduce the particulate emissions. The following applications were awarded funds in 2004 to purchase and install DOC technology on school buses:

Wake County Public School System - $100,000 for 100 buses
Guilford County Schools - $100,000 for 100 buses
Mecklenburg County Air Quality - $50,000 for 50 buses
Fayetteville MPO - $50,000 for 50 buses serving Ft. Bragg
Iredell-Statesville School District - $50,000 for 50 buses

In 2003 two MSERG grants were awarded for natural gas refueling stations in Asheville and Greenville. The City of Asheville received $400,000 for the construction of a publicly accessible compressed natural gas (CNG) fueling stations, training of mechanics on the new technology, and to purchase CNG vehicles. Partners in the grant include Mission St. Joseph Hospital and Buncombe County government. Asheville intends to install public access credit/debit card system for public use. Mission St. Joseph is investigating applicability related to local use of administrative vehicles including ambulances and courier services. Buncombe County is considering switching to CNG for their administrative vehicles and half and 3/4 ton pick-ups trucks. The City of Asheville is investigating applicability for administrative vehicles, half and 3/4 ton pick-ups as well as large vehicles if the technology is available.

Greenville Utilities was awarded $291,000 in 2003 to construct a fast-fill, publicly accessible CNG refueling station and to purchase CNG vehicles. Project completion was been delayed in 2004 but is expected to resume in 2005.

Southeast Alternative Fuels Task Force

In 2001, the Governors of Georgia, North Carolina, South Carolina and Tennessee entered into a Southern Air Principles agreement, which recognized that regional air quality problems must be addressed through regional approaches. Much work has been

accomplished including a final report in 2002 with recommendations for a joint multi-pollutant strategy to address ozone pollution, acid deposition to the problems with reduced visibility. Mobile strategies included innovative transportation options like alternative fuels and vehicle technologies. The Southeastern Alternative Fuels Task Force (SEAF task force) formed three work groups following a Forum held in Asheville, North Carolina. The subcommittees are: Infrastructure, Outreach, and Vehicles/Fleets with representatives from state agencies and the private sector.

The Outreach committee has plans to conduct a bi-annual workshop in each state to encourage broader use and availability of biofuels in the Southeast. The target audience includes fleet managers, fuel providers, and other interested stakeholders. Three regional workshops are planned for April 2005, 2007 and 2009. Another product this committee plans to create by April 2005 is a brochure that will encourage participation by public and private fleets, vehicle manufacturers, fuel producers and suppliers, retail marketers, and private individuals.

Important for the success of the SEAF is the need to compile state specific alternative fuel activity information and to serve as a clearinghouse and education center. The Infrastructure and Vehicle and Fleets committees are developing a comprehensive database and series of maps of alternative fuel stations. The 2010 plan will focus on biofuel refueling development along major highways in the four states. A list of AF fleets and potential fleets are being identified. SE state partners have a particular interest in finding suitable biodiesel additives that are designed to reduce NOx emissions.

North Carolina Solar Center Alternative Fuels Incentive Project

Every year the Department of Energy offers SEP grants for alternative fuel projects. Total funds of $98,000 were provided through the North Carolina Department of Administration State Energy Office. The North Carolina Solar Center (NCSC) received Statements of Interest in August 2004 with the purpose of increasing the use of alternative transportation fuels such as biodiesel (B20-B100), electricity, ethanol (E85), natural gas and propane. All vehicle and fleet operators and fuel providers in North Carolina, except those with project proposals in the Triangle region, are eligible to apply. Priority will be given to funding non-Energy Policy Act (EPAct) mandated fleets and can cover the incremental price of fuel, refueling related equipment and infrastructure, and/ or the incremental cost of purchasing an alternative fuel vehicle (AFVs). The maximum single award for any one project is $25,000.

2005 Model Year AFV/Advanced Technology Vehicles

Alternative fuel vehicles are widely available for public and fleet purchase. For more details on the availability as well as information related to these vehicles, go to the Alternative Fuel Data Center website:
http://www.eere.energy.gov/afdc/afv/afvehicles.html

The list of 2005 model year AFVs is available at
http://www.eere.energy.gov/afdc/pdfs/my2005afv_atv.pdf

For additional information related to this report, contact DAQ's Vicki Chandler at ***vicki.chandler@ncmail.net*** *or 919-715-0972.*

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

1501 MAIL SERVICE CENTER, RALEIGH, N.C. 27699-1501

LYNDO TIPPETT
SECRETARY

November 12, 2004

The Honorable Charles W. Albertson
The Honorable Daniel G. Clodfelter
The Honorable Pryor A. Gibson, III
The Honorable Daniel F. McComas
Environmental Review Commission
North Carolina General Assembly
Raleigh, North Carolina 27603

Gentlemen:

I am pleased to submit to you, pursuant to N. C. G. S. §136-200.0, a report of the decennial review and recommended adjustments of the metropolitan planning organization boundaries, structure, and governance.

We greatly appreciate the continuing support and assistance being provided by your Commission. Please let us know if additional information is needed.

Sincerely,

Sharon Rypinski for

Roger E. Sheats, Jr.
Deputy Secretary for Environment,
Planning and Local Government

RES/efh

cc: Susan Coward, Deputy Secretary
George Givens, Commission Counsel

PHONE 919-733-2520 FAX 919-733-9150

A Review of Boundaries, Structure & Governance for the Metropolitan Planning Organizations in North Carolina

As Required by N.C.G.S. §136-200.2

October 2004

Prepared By:

North Carolina Department of Transportation

In Cooperation with the Metropolitan Planning Organizations

Definitions and Glossary of Terms

CRAFT: The Charlotte Regional Alliance for Transportation

FHWA: Federal Highway Administration

FTA: Federal Transit Administration

LRTP: Long Range Transportation Plan

MAB: Metropolitan Planning Area Boundary

MOA: Memorandum of Agreement

MOU: Memorandum of Understanding

MPO: Metropolitan Planning Organization

PART: The Piedmont Authority for Regional Transportation

TAC: Transportation Advisory Committee.
TAC is the governing policy board for the MPO. Membership includes: elected officials, members of local governments, N.C. Board of Transportation, an advisory non-voting member from FHWA, and other members as designated by the MOU

TCC: Technical Coordinating Committee.
It is comprised of staff representatives of various member governments, NCDOT, FHWA, transit providers, etc.

TIP: Transportation Improvement Program

3-C Planning Process: Cooperating, Coordinating, and Continuing planning process

UZA: Urbanized Area Boundary.
The Census designated boundary based on population of 50,000 or greater and population density of more than 1000 per square mile

MPO Evaluation Report

N.C.G.S. §136-200.2, Decennial review of the metropolitan planning organization boundaries, structure, and governance:

(a) Following each decennial census, and more frequently if requested by an individual metropolitan organization (MPO), the Governor and the Secretary of Transportation, in cooperation with the affected metropolitan planning organizations, shall initiate an evaluation of boundaries, structure and governance of each MPO in the State. The goal of the evaluation shall be to examine the need for and to make recommendations for adjustments to MPO boundaries, structure and governance in order to ensure compliance with the objectives of 23 U.S.C. 134. The Secretary of Transportation shall submit a report of the evaluation process to the Governor and to the Joint Legislative Transportation Oversight Committee.

Pursuant to the requirements of the G.S. 136-200.2, the North Carolina Department of Transportation (NCDOT) in cooperation with the Metropolitan Planning Organizations (MPOs) has conducted an evaluation of MPO boundaries, structure and governance. The Transportation Planning Branch of NCDOT has been coordinating the evaluation process and has on file the completed evaluation reports for all MPOs, which includes consideration of all factors prescribed by G.S. 136-200.2.

The following report is a summary of the review of and recommendations for each of North Carolina's seventeen MPOs. Based on this report, no special MPO funding and staff assistance is requested at this time as none of the contiguous MPOs are considering consolidation.

1--Capital Area (CAMPO):

Area: Wake County. Contiguous to the Durham-Chapel Hill-Carrboro (DCHC) MPO.

Evaluated: 2000 Census Urbanized Area (UZA) Boundary Map, Metropolitan Area Boundary (MAB) Map, Thoroughfare Plan, Long Range Transportation Plan (LRTP), and the MPO Memorandum of Understanding (MOU).

Recommended Changes or Modifications:
Boundaries: Yes, in progress
Structure: None
Governance: None

CAMPO, in cooperation with the DCHC MPO, completed an MPO Organization Study, in 2003. The Capital Area and DCHC MPO's are determining what changes to the MPO boundary, governance and structure, if any, are needed in order to adequately plan for the year 2025.

The DCHC MPO and CAMPO are actively discussing the formation of various joint committees and other regional structures with which to better plan for the year 2030.

2--Durham-Chapel Hill-Carrboro (DCHC):

Area: Durham County, portions of Orange and Chatham Counties and is contiguous to the Capital Area MPO.

Evaluated: The 2000 Census Urbanized Area Boundary Map, DCHC MAB, Thoroughfare Plans, and the MPO Bylaws and Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes, in progress
Structure: None
Governance: None

The DCHC and CAMPO MPO's are actively discussing the formation of various joint committees and other regional structures with which to better plan for the year 2030.

3--High Point:

Area: Davidson, Forsyth, Guilford and Randolph Counties and is contiguous to the Greensboro and Winston-Salem MPO.

Evaluated: The 2000 Census Urbanized Area Boundary Map, High Point MAB Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: None
Governance: None
Based on the findings of this evaluation, there will be changes to the MPO boundary in order to adequately plan for the future year of 2030.

4--Winston-Salem:

Area: Davidson, Forsyth, Davie and Stokes Counties and is contiguous to the Greensboro and High Point MPO.

Evaluated: The 2000 Census Urbanized Area Boundary Map, MAB Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes

Structure: None
Governance: None

The Winston-Salem Urban Area Transportation Advisory Committee (TAC) approved the expansion of the Metropolitan Area Boundary (MAB) map on November 21, 2002 to include portions of Davie, Davidson, and Stokes Counties, the City of King and the Town of Bermuda Run. The High Point MPO also expanded into the southeast corner of Forsyth County.

With the expansion of the Metropolitan Area Boundary, and the inclusion of new municipalities and counties within the expanded MAB, the Winston-Salem Urban Area TAC is studying several options for possible changes to the voting structure of the MPO.

5--Greensboro:

Area: Located in Guilford County and is contiguous to the High Point, Winston-Salem and Burlington-Graham MPOs.

Evaluated: The 2000 Census Urbanized Area Boundary Map, MAB Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: None
Governance: None

The Greensboro Urban Area MPO is a member of the Piedmont Authority for Regional Transportation (PART). PART is a regional transportation authority among the four Triad MPOs (Greensboro, Winston-Salem, High Point, and Burlington –Graham) and numerous local governments within Alamance, Davidson, Forsyth, Guilford, Randolph, and Rockingham Counties. Presently, PART's role consists of the following emphasis areas: to plan for and operate a regional public transportation system, to operate a regional rideshare and vanpool program, to administer a regional out-of-county medical transportation program, coordinate the implementation of land use and transportation planning policies, and to serve as a forum for cooperative regional transportation planning. Through PART, the Greensboro MPO engages in an ongoing process of regional consultation and collaboration on issues regional significance. PART supports and coordinates these efforts as part of its mission to promote regional multi-modal transportation and land use planning.

The MPO's Metropolitan Area Boundary (MAB), where contiguous with the High Point Metropolitan Area boundary, has been amended to coincide with roadways, or in some instances, with the City of Greensboro corporate limits. Expansion of the MAB is not warranted at this time.

Institutionalization of existing cooperative regional planning structures and further development of certain regional planning functions are envisioned as enhancements in this area.

6--Burlington-Graham:

Area: Alamance and Guilford Counties. The Greensboro MPO is located to the west.

Evaluated: The 2000 Census Urbanized Area Boundary Map, Burlington-Graham MPO MAB Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: None
Governance: None

7--Mecklenburg-Union:

Area: MUMPO (Mecklenburg-Union MPO) is located in Mecklenburg County and the western urbanized portion of Union County. Both the Gaston MPO and the Cabarrus-Rowan MPOs are contiguous to the Mecklenburg-Union MPO.

Evaluated: The 2000 Census Urbanized Area Boundary Map, Mecklenburg-Union Metropolitan Area Boundary Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: Yes
Governance: Yes

The Charlotte Regional Alliance for Transportation (CRAFT) is an organization established to integrate the 3-C concept into the transportation planning process for those projects and programs of a regional scope. The ultimate goal is to ensure that regional transportation planning in the Charlotte metropolitan bi-state region is conducted in such a manner that is beneficial to the public good. CRAFT is currently comprised of members from the Mecklenburg-Union, Cabarrus-Rowan, and Gaston MPOs, Rock Hill-Fort Mill Area Transportation Study (RFATS), and the Lake Norman and Rocky River Rural Planning Organizations (RPOs).

The CRAFT structure will permit transportation planners in the region to work closely on matters of regional significance, while still being able to deal with those more localized issues that are vitally important to the community. CRAFT will also permit those making transportation planning decisions the opportunity to come together to discuss regional transportation issues. Those issues of regional significance include, but are not limited to

the following: air quality; regional travel demand modeling; regional transit issues; transportation improvement projects of regional significance, etc.

A memorandum of agreement (MOA) has been adopted that lays out the organizational structure of CRAFT. This structure is modeled after the basic MPO structure. CRAFT is governed by an Executive Committee made up of TAC chairs of the member organizations, the Metropolitan Transit Commission (MTC) chair and one representative each from the NC Board of Transportation and the SC Highway Commission. A Technical Committee of staff representatives from the urban areas guides the Executive Committee by providing technical support.

In addition to CRAFT, the Metrolina MPOs, RPOs and State Departments of Transportation have established a formal structure to guide the development of the regional travel demand model, long-range transportation plans and air quality conformity determination. This structure includes an oversight committee to guide the development of the regional model, long-range plan and conformity analysis and an executive committee to resolve issues that cannot be resolved by the oversight committee and to make the personnel and financial commitments required for the completion of these items.

Based on the findings of this evaluation there will be changes to the MPO Boundary in order to adequately plan for the 2030-planning horizon. The MPO Governance and Structure will be modified due to added jurisdictions.

8--Gaston:

Area: The Gaston MPO is located in Gaston County and is bounded by York County, South Carolina to the south, Cleveland County to the west, Lincoln County to the north, and Mecklenburg County to the east. The Mecklenburg-Union MPO (MUMPO) is contiguous to the Gaston MPO.

Evaluated: The 2000 Census Urbanized Area Boundary Map, Gaston MAB Map, the 2025 Multi-Modal Long Range Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:

Boundaries: None
Structure: None
Governance: None

9--Cabarrus-Rowan:

Area: The Cabarrus-Rowan MPO is located in Cabarrus and Rowan Counties and contiguous to the Mecklenburg-Union MPO.

Evaluated: The 2000 Census Urbanized Area Boundary Map, Cabarrus-Rowan MAB Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: Yes
Governance: Yes

Based on the findings of this evaluation there will be changes to the MPO boundary in order to adequately plan for the 2030-planning horizon. The MPO Governance and Structure will also be modified due to the addition of new jurisdictions.

10--Fayetteville Area:

Area: The Fayetteville Area MPO is located in portions of Cumberland, Harnett, and Hoke Counties and there are no other MPO's contiguous to the Fayetteville Area MPO.

Evaluated: The 2000 Census Urbanized Boundary Map, Fayetteville Area MAB Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: Yes
Governance: Yes

Based on the findings of this evaluation there will be changes to the MPO boundary in order to adequately plan for the year 2030.

The MPO Governance and Structure has been expanded to include Hoke County. The MOU has been updated to include representatives from Hoke County on the TCC and TAC. Transportation planning data has been gathered for this new area.

11--Wilmington:

Area: The Wilmington MPO is located in New Hanover and Brunswick Counties. There are no other MPOs contiguous to the Wilmington MPO.

Evaluated: The 2000 Census Urbanized Boundary Map, Wilmington Metropolitan Area Boundary (MAB) Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: Yes, the structure of the TCC and TAC changed and the MOU changed
Governance: Yes

Based on the findings of this evaluation there will be changes to the MPO boundary in order to adequately plan for 2030.

12--Jacksonville:

Area: The Jacksonville MPO is located in Onslow County and there are no other MPO's contiguous to the Jacksonville MPO.

Evaluated: The 2000 Census Urbanized Boundary Map, Jacksonville Metropolitan Area Boundary (MAB) Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: None
Governance: None

Based on the findings of this evaluation there will be changes to the MPO boundary in order to adequately plan for the year 2030.

13--Rocky Mount:

Area: The Rocky Mount Urban Area MPO is located in portions of Edgecombe and Nash Counties and there are no other MPO's contiguous to the Rocky Mount Urban Area MPO.

Evaluated: The 2000 Census Urbanized Boundary Map, Rocky Mount Urban Area MAB Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: Yes
Governance: Yes

Based on the findings of this evaluation there will be changes to the MPO boundary in order to adequately plan for the year 2030.

The Rocky Mount Urban Area MPO Governance and Structure has been expanded to include the Town of Nashville. The MOU has been updated to include a representative from the Town of Nashville on the TCC and TAC. Transportation planning data has been gathered for this new area.

14--Goldsboro:

Area: The Goldsboro MPO is located in Wayne County and there are no other MPO's contiguous to the Goldsboro MPO.

Evaluated: The 2000 Census Urbanized Boundary Map, Goldsboro MAB Map, Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: None
Governance: None

Based on the findings of this evaluation there will be changes to the MPO boundary in order to adequately plan for the year 2030.

15--Greenville:

Area: The Greenville Urban Area MPO is located in Pitt County and there are no other MPO's contiguous to the Greenville Urban Area MPO.

Evaluated: The 2000 Census Urbanized Boundary Map, Greenville Urban Area MAB Map, Transportation Plan, and the MPO Memorandum of Understanding.
Recommended Changes or Modifications:
Boundaries: Yes
Structure: Yes
Governance: Yes

Based on the findings of this evaluation there will be changes to the MPO boundary in order to adequately pan for the year 2025.

The MPO Governance and Structure will be changed or modified to include the Town of Ayden and Village of Simpson.

16--French Broad River (Asheville):

Area: The French Broad River MPO, formerly known as the Asheville Area MPO, is located in parts of Buncombe, Haywood, and Henderson Counties.

Evaluated: The 2000 Census Urbanized Boundary Map, French Broad River Metropolitan Area Boundary (MAB) Map, the 2025 Asheville Area Long Rang Transportation Plan (LRTP), and the MPO Memorandum of Understanding (MOU).

Recommended Changes or Modifications:
Boundaries: Yes
Structure: Yes

Governance: Yes

Based on the findings of this evaluation there will be changes to the MPO boundary in order to adequately plan for the 2030 horizon year. The 2000 Census expanded the MPO area to include eight new member governments: Henderson County, Haywood County, Hendersonville, Waynesville, Canton, Clyde, Flat Rock, and Laurel Park. Though not in the census, Maggie Valley and Mills River were invited to join the MPO area. Therefore, the MAB, as determined by the Asheville Area MPO Transportation Advisory Committee (TAC), included these two additional municipalities. For this reason, the MOU will be substantially altered.

17--The Greater Hickory MPO:

Area: The Greater Hickory MPO is located in the heart of the Hickory-Morganton-Lenoir Metropolitan Statistical Area, which is comprised of Catawba, Alexander, Burke and Caldwell Counties.

Evaluated: The 2000 Census Urbanized Boundary Map, Hickory-Newton-Conover MAB Map, the 2025 Multi-Modal Hickory-Newton-Conover Long-Range Transportation Plan, and the MPO Memorandum of Understanding.

Recommended Changes or Modifications:
Boundaries: Yes
Structure: Yes
Governance: Yes

Based on the findings of this evaluation, the MPO boundary and the MPO Governance and Structure will be changed and modified.

North Carolina
Department of Environment and Natural Resources

Michael F. Easley, Governor
William G. Ross, Jr., Secretary

October 15, 2004

MEMORANDUM

To: Environmental Review Commission Members

From: William G. Ross, Jr.

Subject: Status Report on Individually Permitted Discharging Systems
Beginning July 1, 2003 and Ending June 30, 2004
Fiscal Year 2003-2004

Pursuant to General Statutes 143-215.9A, the Department of Environment and Natural Resources submits the subject fiscal year report.

If any additional information or clarification is needed, please contact Vanessa Manuel at 919/733-5083, extension 532.

ATTACHMENTS

Cc: Alan W. Klimek, P.E.

Status Report on Individually Permitted Discharging Systems For the Period Beginning July 1, 2003 and Ending June 30, 2004.

Summary

North Carolina General Statute (N.C.G.S.) 143-215.9A requires the Department of Environment and Natural Resources to report to the Environmental Review Commission and the Fiscal Research Division on the status of facilities discharging into surface waters during the previous fiscal year. Facilities discharging into surface waters are required by N.C.G.S. 143-215.1 to first apply for and secure a permit from the Environmental Management Commission. As a result, the data provided within this fiscal report is captured for those facilities individually permitted with National Pollutant Discharge Elimination System (NPDES) permits.

The enclosed report details the inspections completed and the enforcement actions taken in North Carolina during fiscal year 2003-2004 by the Division of Water Quality. In addition, information on Special Orders by Consent is included. The report also includes a table showing the number of permits issued by region.

The enclosed tables list totals for each of the Department's regional offices as well as State totals. The regional offices are noted as follows:

- ARO – Asheville Regional Office
- FRO – Fayetteville Regional Office
- MRO – Mooresville Regional Office
- RRO – Raleigh Regional Office
- WARO – Washington Regional Office
- WIRO – Wilmington Regional Office
- WSRO – Winston-Salem Regional Office

If any additional information or clarification is needed, please contact Vanessa Manuel at 919/733-5083, extension 532.

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Table 1	Enforcement actions taken, Civil Penalties assessed and collected, and Remissions Requested from July 1, 2003 through June 30, 2004.
Table 2	Permits Issued and Inspections completed from July 1, 2003 through June 30, 2004.
Table 3	Special Orders by Consent (SOCs) active and pending from July 1, 2003 through June 30, 2004.
Addendum	Support information

Table 1
Status of Civil Penalty Assessments
For the Period Beginning July 1, 2003 and Ending June 30, 2004*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total Number Of Enforcement Actions Assessed	**52**	**56**	**89**	**138**	**18**	**133**	**148**	**634**
Total Number Of Enforcement Actions Assessed By The Director	0	2	1	14	0	0	1	**18**
Total Number Of Enforcement Actions Assessed By The Regional Supervisors	52	54	88	124	18	133	147	**616**
Enforcement Actions Generated From Limit &/or Monitoring Violations	42	53	81	124	16	132	143	**591**
Enforcement Actions Generated From Other Permit Condition Violations	10	3	8	14	2	1	5	**43**
Total Civil Penalties Assessed	$64,084.46	$52,501.93	$108,829.49	$139,559.49	$23,087.40	$102,586.93	$212,710.48	**$703,360.18**
Total Civil Penalties Collected	$43,405.13	$78,551.53	$87,737.96	$148,451.12	$22,232.92	$51,184.35	$204,576.51	**$636,139.52**
Remission & Contested Case Responses to Enforcement Actions								
Total Number Of Remission Requests	8	14	27	37	0	21	27	**134**
Total Number Of Enforcement Actions With Partial Or Full Remission By The Director	3	1	14	8	0	9	9	**44**
Total Number Of Remission Requests Pending The Director's Decision	7	17	37	38	0	23	31	**153**
Total Number Of Remission Requests Pending The EMC's Final Agency Decision	11	17	39	56	1	21	36	**181**
Total Number Of Contested Cases (known at this time)	0	0	0	0	0	3	0	**3**

* Fiscal Year numbers are reported as of 09/13/2004 and may vary from actual due to delays in data entry.

Table 2
Status of Individually Permitted Facilities
For the Period Beginning July 1, 2003 and Ending June 30, 2004*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total Number Of Individually Permitted Facilities	**296**	**91**	**266**	**196**	**139**	**131**	**279**	**1398**
Major Municipal Permitted Facilities	19	18	28	31	15	12	25	**148**
Major Non-Municipal Permitted Facilities	16	10	22	8	11	13	8	**88**
Minor Municipal Permitted Facilities	25	22	26	16	24	16	25	**154**
Minor Non-Municipal Permitted Facilities	236	41	190	141	89	90	221	**1008**
Number Of NPDES Permits Issued	**56**	**11**	**90**	**90**	**57**	**22**	**95**	**421**
Major Municipal Permits Issued	6	2	6	15	5	2	11	**47**
Major Non-Municipal Permits Issued	6	1	6	2	3	2	1	**21**
Minor Municipal Permits Issued	9	5	9	5	9	3	9	**49**
Minor Non-Municipal Permits Issued	35	3	69	68	40	15	74	**304**
Total Number Of Compliance Evaluation Inspections Completed	158	77	164	154	25	109	236	923
Total Number Of Other Inspections Completed	30	12	53	48	4	2	25	174

Table 3
Status of Special Orders By Consent (SOCs)
For the Period Beginning July 1, 2003 and Ending June 30, 2004*

	ARO	FRO	MRO	RRO	WARO	WIRO	WSRO	State Totals
Total Number of Individually Permitted Facilities With Active SOCs	0	3	3	4	9	2	18	**39**
Total Number of Individually Permitted Facilities Requesting New or Amended SOCs	1	3	9	3	3	4	4	**27**

* Fiscal Year numbers are reported as of 09/13/2004 and may vary from actual due to delays in data entry.

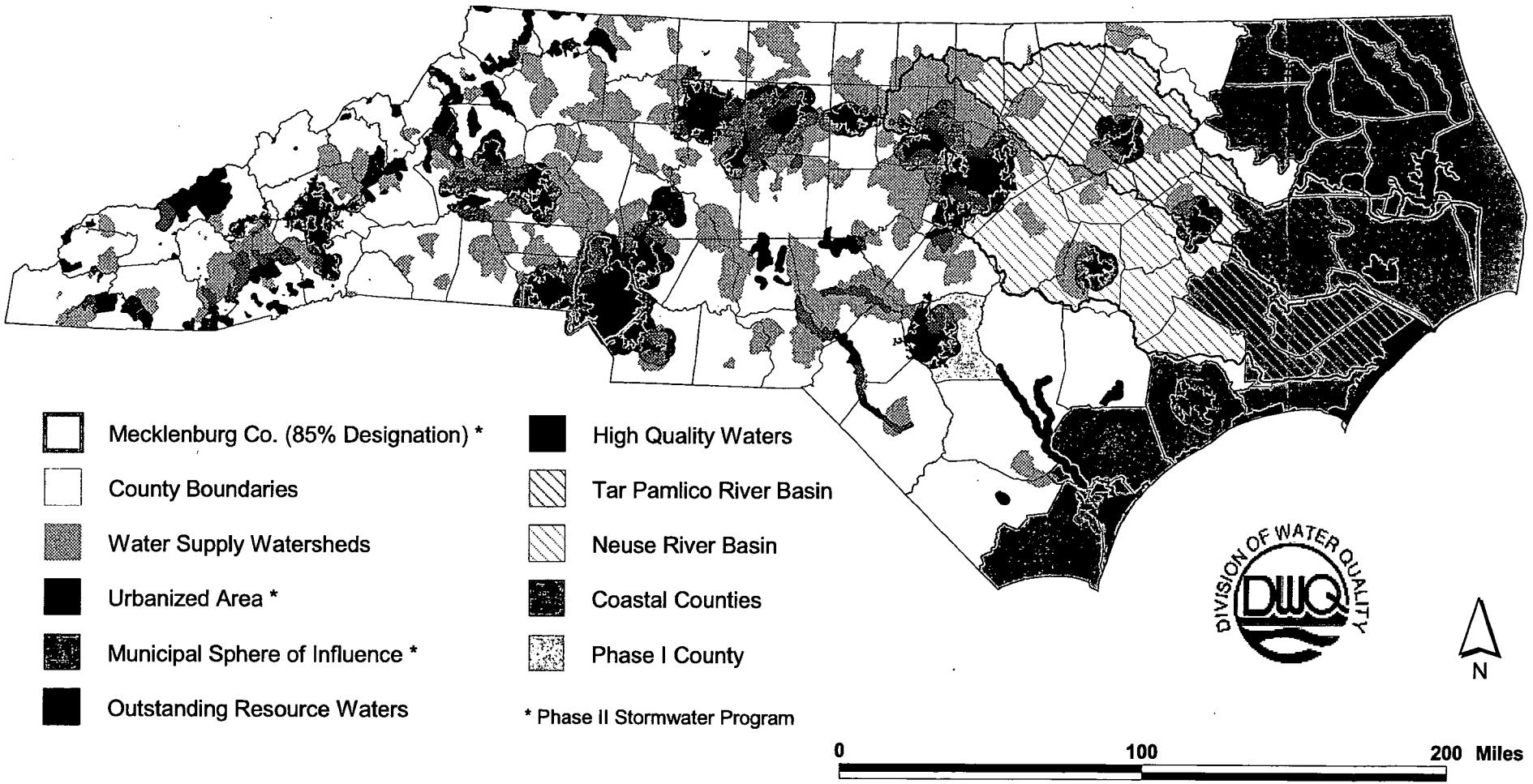
ADDENDUM

The following is provided to support the information in the above status report.

- The Division of Water Quality does not have the data or management system in place to currently track information on the number of violations found during each inspection, the date of the violation, or the nature of the violation. A Basinwide Information Management System is, however, under development to address these needs. Funding has been allocated for the initial development phase. Completion of the system will require further funding. Therefore, at this time, the Division is unable to provide such information as requested in the amended G.S. 143-215.9A(a)(3).
- As found in Table 2, "Other Inspections" include:
  - **Audit Inspections**, a comprehensive review of all elements of a municipal's pretreatment program including a records review & an inspection of an industrial facility conducted once every 5 years;
  - **Bioassay Compliance Inspections**, evaluates the biological effect of a permittee's effluent discharge on test organisms using acute and chronic toxicity testing;
  - **Compliance Sampling Inspections**, a sampling inspection designed to verify the permittee's compliance with applicable permit self-monitoring requirements -- analytical results from representative samples collected during the inspection are used to evaluate the permittee's compliance;
  - **Diagnostic Inspections**, focuses on Publicly Owned Treatment Works that have not achieved permit compliance – the purpose is to identify the causes of noncompliance, suggest immediate remedies, and support current or future enforcement action;
  - **Operation & Maintenance Inspections**, focuses on the operation and maintenance aspect of a facility;
  - **Performance Audit Inspections**, inspections that include actual observation of the permittee performing the self-monitoring process from sample collection and flow measurements through laboratory analyses, data work-up and reporting;
  - **Pre-Treatment Inspections**, an annual inspection of a municipal's pretreatment program; and
  - **Toxicity Sampling Inspections**, same as CSI – however, increased emphasis is placed on toxic substances regulated by the NPDES Permit.
- Effective July 1, 1998, the Director of the Division of Water Quality delegated each Regional Water Quality Supervisor the authority to sign all Civil Penalty Assessments for fast-track enforcement actions for violations of NPDES Permit effluent limitations and/or monitoring frequencies in accordance with NCGS 143-215.6A.
- As found in Table 1, "Other Permit Condition Violations" may include
  - discharge violations (resulting from collection system overflows);
  - submitting late Discharge Monitoring Reports;
  - submitting late Toxicity Tests; and
  - permit condition violations (examples, violations of pre-treatment program, improper operation & maintenance of treatment works, or by-pass of treatment works)
- Due to the length of the post assessment process, total civil penalties assessed and total civil penalties collected will not coincide.

NC Water Quality Protection Strategies

November 19, 2004 ERC Meeting
EXHIBIT E



Division of Water Quality 2004 Organizational Chart

http://h20.enr.state.nc.us/
"About DWQ"
"DWQ Organizational Chart"

Division of Water Quality
30000
ENVIRONMENTAL MGMT DIR
KLIMEK, ALAN W.
1630-6301 S

Administrative Support
30001
EXECUTIVE ASSISTANT I
JONES, LINDA M.
1630-6301 S

30002
OFFICE ASSISTANT IV
THOMAS, LOIS C.
1630-6301 S

30004
PROCESSING ASSISTANT III
YARBOROUGH, ELIZABET
1690-6902 F

Budget Office
30008
ADMINISTRATIVE OFF III
STUTTS, LISA B.
1630-6301 S

30009
ACCOUNTING TECHNICIAN IV
BULLOCH, CONNIE B.
1630-6301 S

30010
ACCOUNTING CLERK IV
*** VACANT ***
1630-6301 S

30012
ACCOUNTING CLERK IV
GLAUM, LORRAINE R.
1630-6301 S

31596
ACCOUNTING CLERK IV
MCPHERSON, FRANCES W
1695 R

30663
ACCOUNTING CLERK IV
MITCHELL, HELENA
1690-6901 S

30740
ACCOUNTING CLERK IV
ALLEN, CHESTER L.
1690-6901 S

Deputy Director
30021
ENVIRONMNTL MGMT DEP DIR
SULLINS, COLEEN H.
1630-6301 S

Asst. Director, Personnel, Training, IT Management
31000
ENVIRONMENTAL PROG MGR II
MOUBERRY, ARTHUR
1655-6551 S

Laboratory Section
30100
ENVIRONMENTAL SUPV IV
WIGGINS, JOSEPH K.
1635-6351 S

Construction Grants and Loans Section
30050
ENVIRONMENTAL PROG MGR I
BLOWE JR, JOHN R.
1685 F

Planning Section
31502
ENVIRONMENTAL SUPV IV
*** VACANT ***
1690-6902 F

Surface Water Protection Section
31500
ENVIRONMENTAL PROG MGR II
*** VACANT ***
1690-6901 S

Aquifer Protection Section
31002
ENVIRONMENTAL SUPV IV
BUSH JR, THEODORE L.
1655-6551 S

Environmental Sciences Section
31504
ENVIRONMENTAL SUPV IV
OVERTON, JIMMIE R.
1690-6901 S

Asst. Director for Regional Operations
31624
ENVIRONMENTAL PROG MGR II
*** VACANT ***
1690-6901 S

Water Quality Budget Planning and Analysis
31519
ENVIRONMENTAL SUPV II
ZOUFALY, STEPHEN E.
1690-6901 S

31513
ENVIRONMENTAL SPEC III
LIEBER, MARCIA E.
1695 R

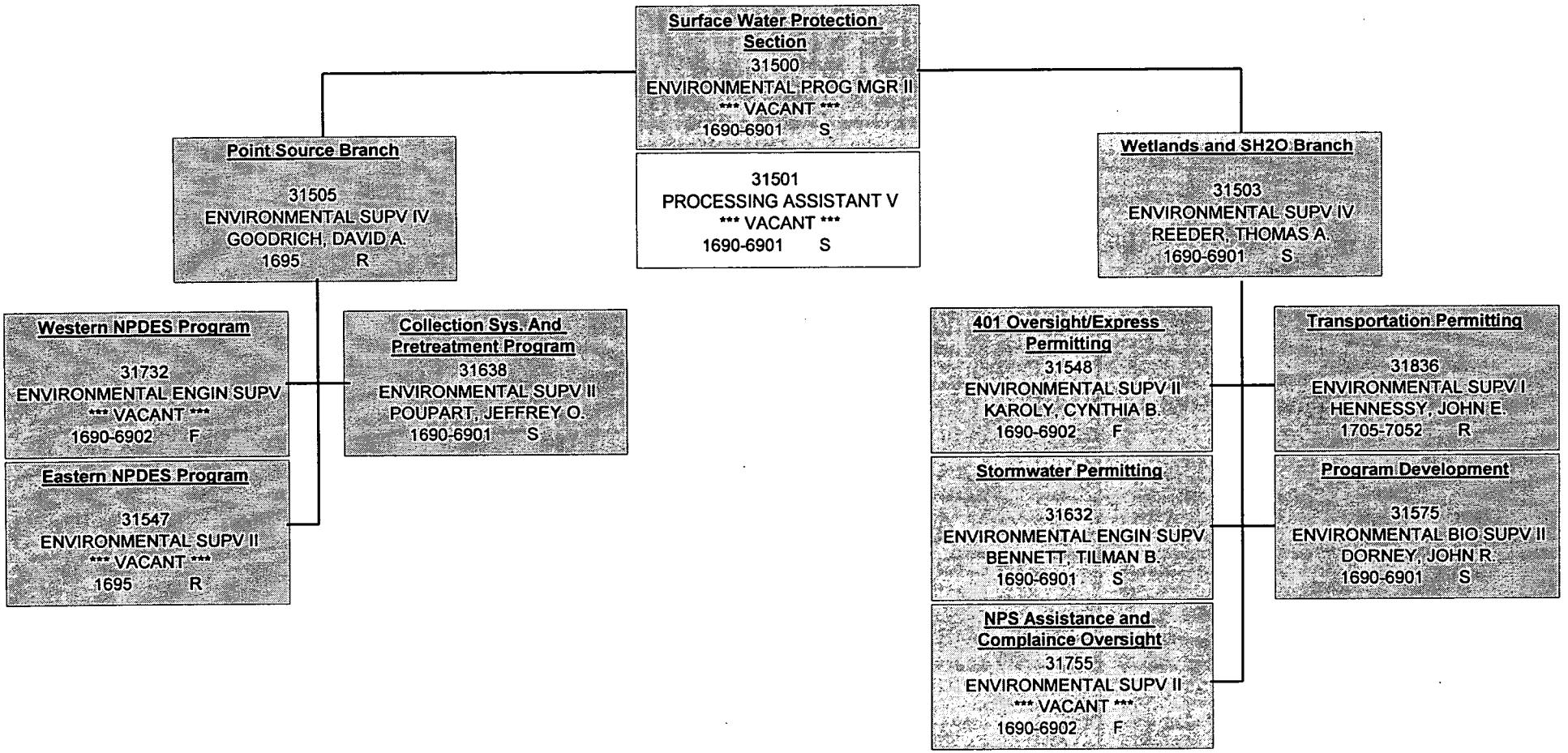
31038
ADMINISTRATIVE OFFICER II
*** VACANT ***
1710-7102 F

31507
OFFICE ASSISTANT III
BRASWELL, CHARLENE
1690-6902 F

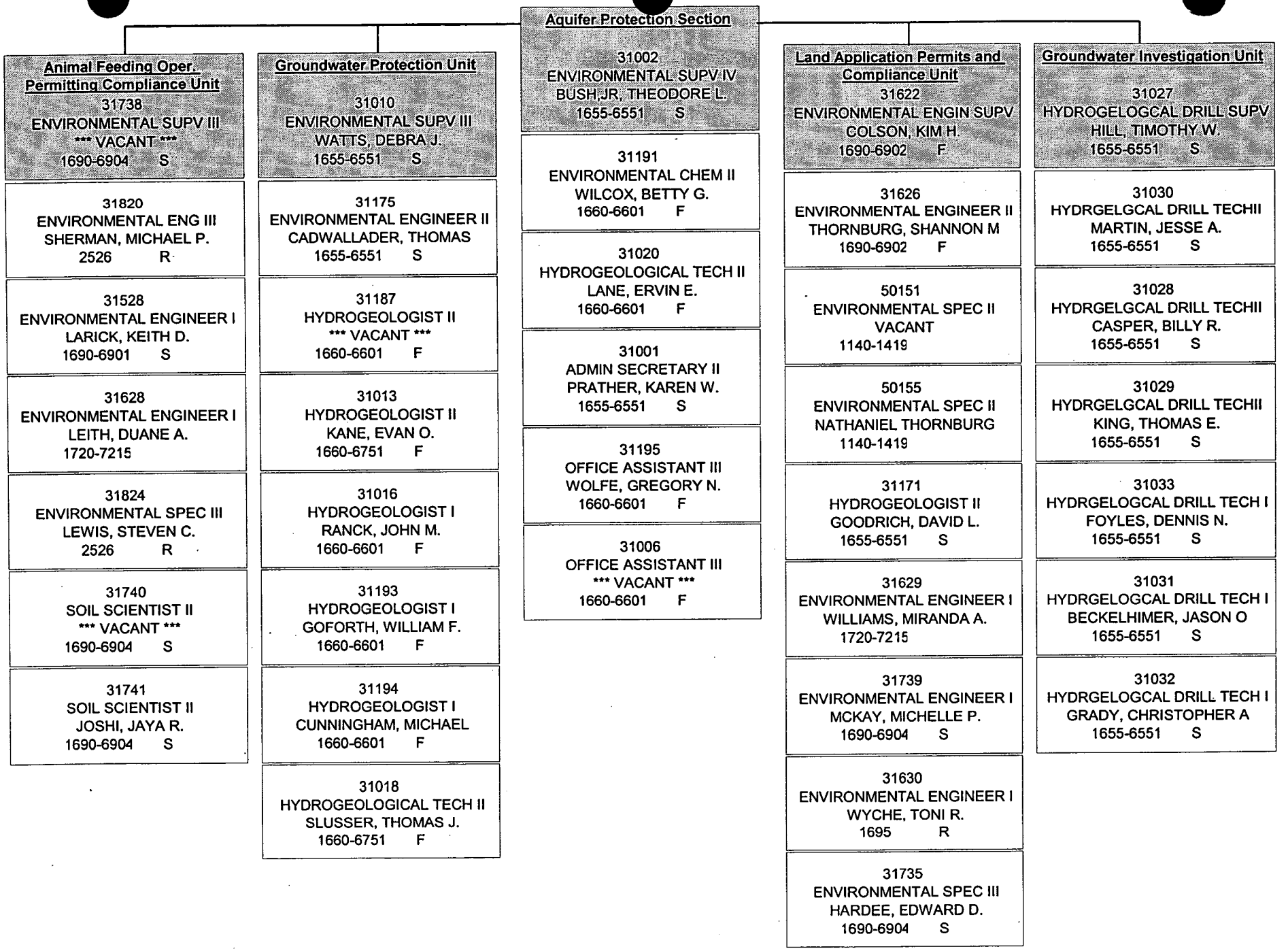
Public Information
31690
INFO/COMMUNICAT SPEC III
MASSENGALE, SUSAN L.
1695 R

EXHIBIT F
November 19, 2004 ERC Meeting

ORG CHART - 2004 SURFACE WATER PROTECTION SECTION Part 1
View by Branch/Unit



ORG CHART - AQUIFER PROTECTION SECTION



ORG CHART 2004 - PERSONNEL, TRAINING AND INFORMATION MANAGEMENT

Asst. Director, Personnel, Training, IT Management
31000
ENVIRONMENTAL PROG MGR II
MOUBERRY, ARTHUR
1655-6551 S

31795
ENVIRONMENTAL SPEC II
MIZE, WILLIAM W.
2130 R

31186
ENVIRONMENTAL SPEC II
RUTKOFSKE, JOANNE K.
2130 R

31567
PROGRAM ASSISTANT V
BARBOUR, SYLVIA L.
6342 R

31005
OFFICE ASSISTANT III
MCGARRY, SARAH R.
2130 R

31566
OFFICE ASSISTANT III
WILSON, STEPHANIE T.
6342 R

Technical Assistance and Certification Unit
31516
ENVIRONMENTAL SUPV I
RIMMER, JERRY F.
6342 R

31768
EXT EDUC TR SPEC III
PUGH, JAMES L.
6342 R

31568
SOIL SCIENTIST II
BUFFINGTON, DOROTHY
1695 R

31767
EXT EDUC TR SPEC II
REID, STEVEN D.
6342 R

31569
WTR TREATMENT PLT CONSULT
*** VACANT ***
6342 R

31571
WTR TREATMENT PLT CONSULT
*** VACANT ***
6342 R

31572
WTR TREATMENT PLT CONSULT
*** VACANT ***
6342 R

31565
OFFICE ASSISTANT IV
HAYWOOD, SANDRA Y.
6342 R

31549
OFFICE ASSISTANT III
*** VACANT ***
1690-6902 F

Staff Services Office
30016
PERSONNEL TECHNICIAN III
JOHNSON, KATHLEEN M.
1630-6301 S

30031
SAFETY CONSULTANT II
KAASA, STEPHEN J.
1630-6304 S

31699
STAFF DEVELOP SPCLIST I
DALTON, FRANKLIN D.
1690-6901 S

30020
ADMINISTRATIVE ASST I
STRICKLAND, HAZEL B.
1630-6301 S

30019
PERSONNEL TECHNICIAN I
PULLEY, DORA G.
1630-6301 S

30018
PERSONNEL TECHNICIAN I
MOSES, KIMBERLY J.
1630-6301 S

Information Processing Unit
30007
ADMINISTRATIVE ASST I
*** VACANT ***
1690-6901 S

30006
PROCESSING UNIT SUPV IV
RAGAN, MONICA L.
1630-6301 S

31558
INFO PROCESSING ASST I
PHILLIPS, MICHELE E.
1630-6301 S

31770
INFO PROCESSING ASST I
CAMPBELL, LISA S.
6342 R

31557
INFO PROCESSING ASST I
JONES, THELMA W.
1630-6301 S

31559
DATA ENTRY OPERATOR II
WILLIAMS, KENDALL N.
1690-6902 F

31794
DATA ENTRY OPERATOR II
*** LWOP-VAC ***
1690-6902 F

31556
COMPUTER OPERATOR
DICKENS, ERICA L.
1690-6902 F

Environmental Technologies Unit
31531
APPLICATIONS DEV PROJ SUP
*** VACANT ***
1690-6901 S

31760
APPLIC ANALYST PROG II
POLLETTA, LOUIS P.
1690-6916 S

31758
COMPUTING CONSULTANT IV
BLASBERG, MICHAEL R.
1690-6916 S

31759
SYSTEMS PROGRAMMER I
HE, YIQIN H.
1690-6916 S

31534
APPLIC ANALYST PROG I
ROBERTS, CHAD M.
1690-6901 S

31011
APPLIC ANALYST PROG I
PRILLAMAN, KENNETH R
1660-6601 F

31537
COMPUTING CONSULTANT III
DICKE, DAVID W.
1695 R

31769
COMPUTING CONSULTANT II
GUILFORD, MICHAEL D.
1690-6902 F

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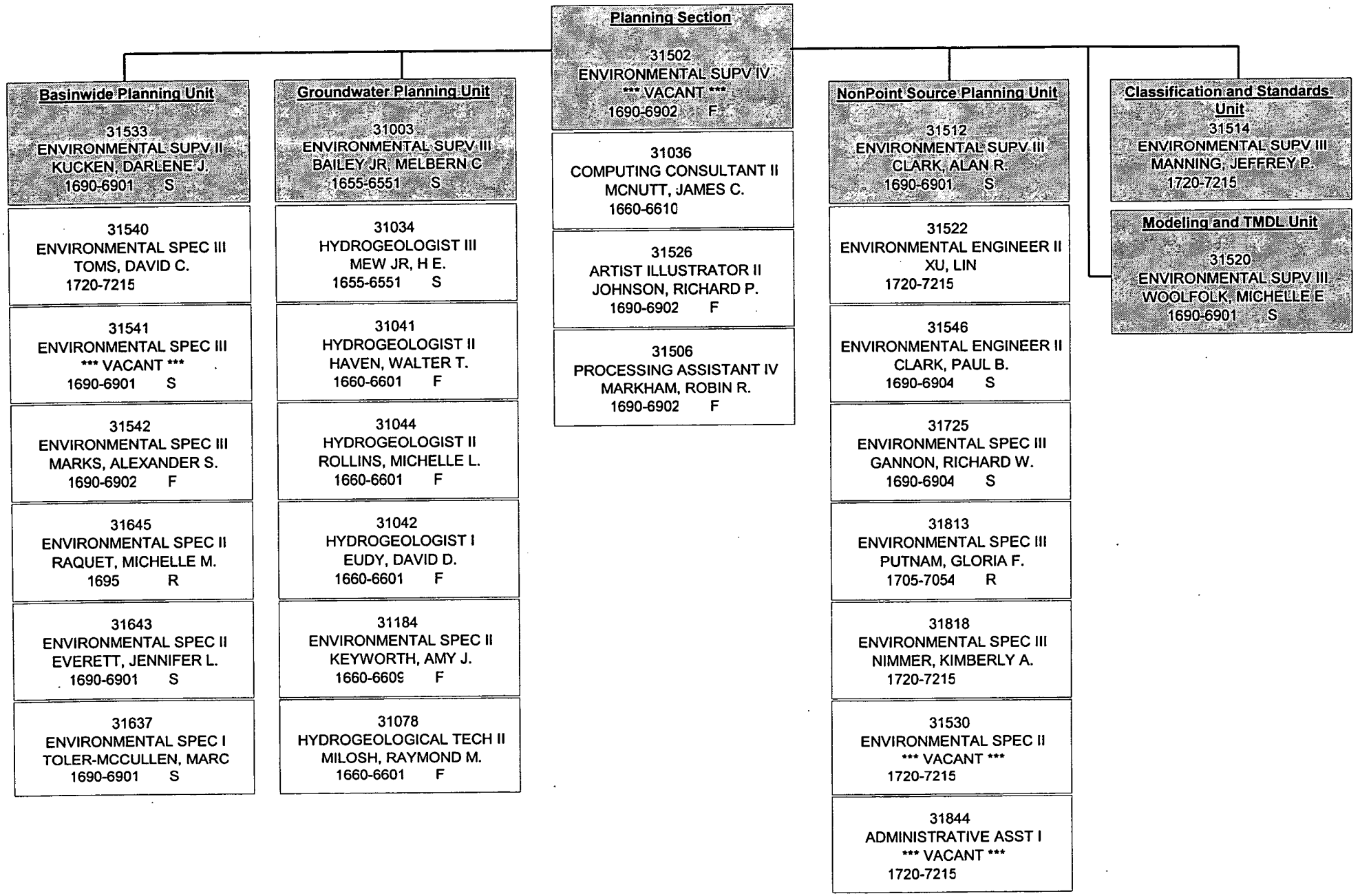
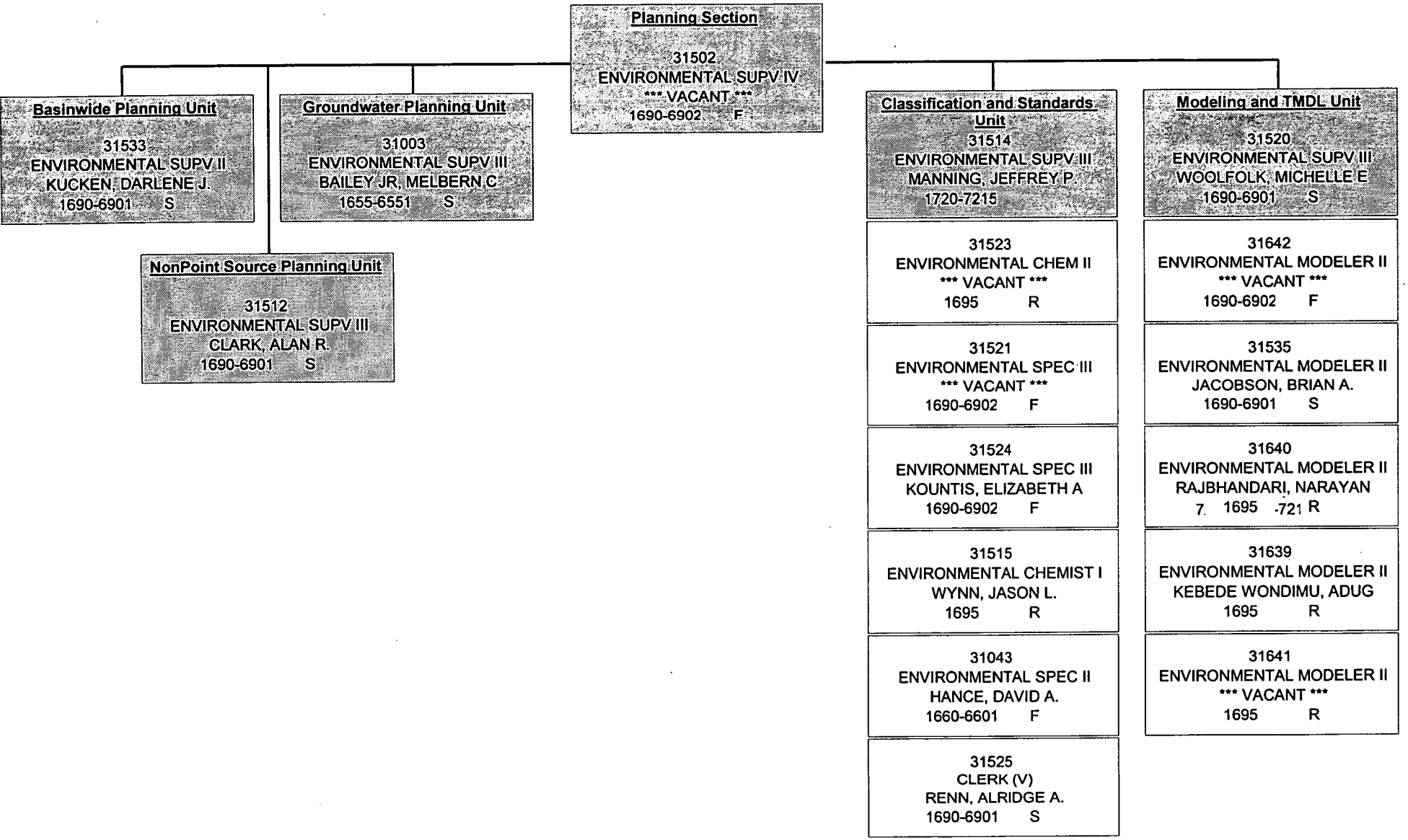
INFO SYSTEMS LIAISON I
PHILLIPS, JEANNE K.
1695 R

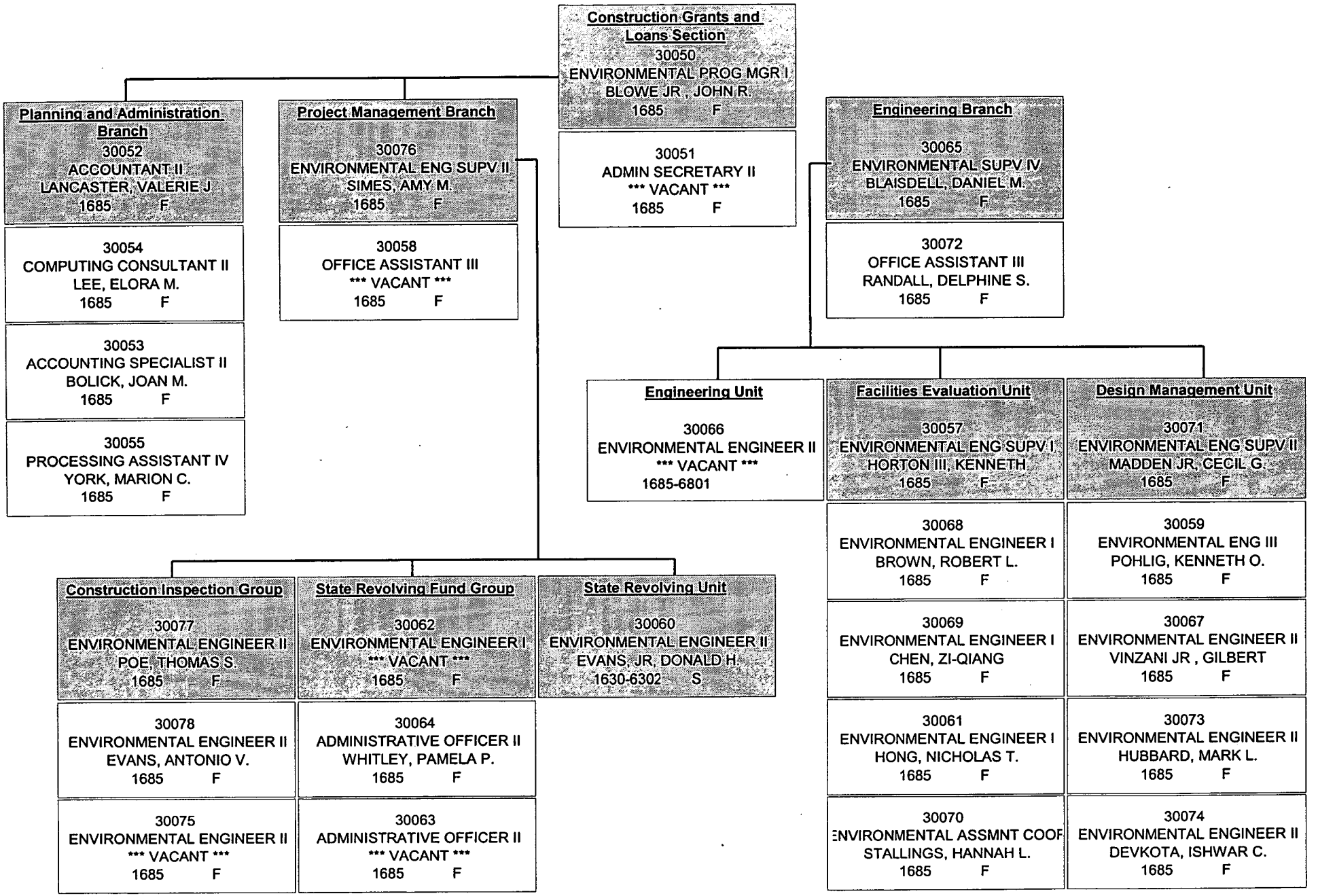
ORG CHART - PLANNING SECTION Part 1
Organization of Planning Units



ORG CHART - PLANNING SECTION Part 2
Organization of Standards and Modeling



Org Chart - Construction Grants and Loans



ORG CHART - ENVIRONMENTAL SCIENCES SECTION Part 1

Environmental Sciences Section
31504
ENVIRONMENTAL SUPV IV
OVERTON, JIMMIE R.
1690-6901 S

31509
PROCESSING ASSISTANT IV
CIBOTH, ANN M.
1690-6902 F

31510
PROCESSING ASSISTANT IV
HELLWIG, ARLENE C.
1690-6902 F

Ecosystems Unit
31518
ENVIRONMENTAL SUPV III
SAUBER, JAY H.
1690-6901 S

31573
COMPUTING CONSULTANT III
KEAN, DONALD K.
1695 R

31595
ENVIRONMENTAL BIOLGST III
OLINGER, JOSEPH L.
1690-6901 S

31587
ENVIRONMENTAL BIOLOGST II
VANDERBORGH, MARK A.
1695 R

31598
ENVIRONMENTAL BIOLOGST II
GALE, SUSAN M.
1695 R

31609
ENVIRONMENTAL SPEC II
ELMORE, LAUREN E.
1695 R

31589
ENVIRONMENTAL BIOLOGIST I
FENSIN, ELIZABETH E.
1695 R

31608
ENVIRONMENTAL TECH III
THOMAS, ANDREA S.
1720-7215

Aquatic Toxicology Unit
31590
ENVIRONMENTAL BIO SUPV II
MATTHEWS, II , DAVID
1690-6901 S

31586
ENVIRONMENTAL BIOLGST III
MORT, SANDRA L.
1690-6902 F

31591
ENVIRONMENTAL BIOLOGST II
FERRELL, TERRY L.
1695 R

31592
ENVIRONMENTAL BIOLOGST II
BOWDEN, MAURICE K.
1695 R

31593
ENVIRONMENTAL BIOLOGIST I
ZHANG, CHENG
1695 R

31594
ENVIRONMENTAL BIOLOGIST I
GIORGINO, JOHN D.
1695 R

31597
ENVIRONMENTAL BIOLOGIST I
MEADOWS, SUSAN P.
1695 R

31599
ENVIRONMENTAL TECH III
BURLEY, JOEL A.
1695 R

Intensive Survey Unit
31600
ENVIRONMENTAL BIO SUPV II
REID, DIANNE M.
1690-6901 S

31601
ENVIRONMENTAL BIOLGST III
OWEN, DEBRA A.
1690-6902 F

31605
ENVIRONMENTAL SPEC II
QUIDLEY, HAROLD A.
1695 R

31607
ENVIRONMENTAL SPEC II
WILLIAMS, EDWARD M.
1710-7102 F

31602
ENVIRONMENTAL SPEC I
BUTZ, TONY R.
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31603
ENVIRONMENTAL SPEC I
TRUMBOWER, KURT S.
1690-6901 S

31604
ENVIRONMENTAL SPEC I
FISHER, JAMES T.
1695 R

31606
ENVIRONMENTAL TECH III
*** VACANT ***
1690-6901 S

Biological Assessment Unit
31574
ENVIRONMENTAL BIO SUPV II
MACPHERSON, PATRICIA
1690-6901 S

Tar-Pamilico Rapid Response
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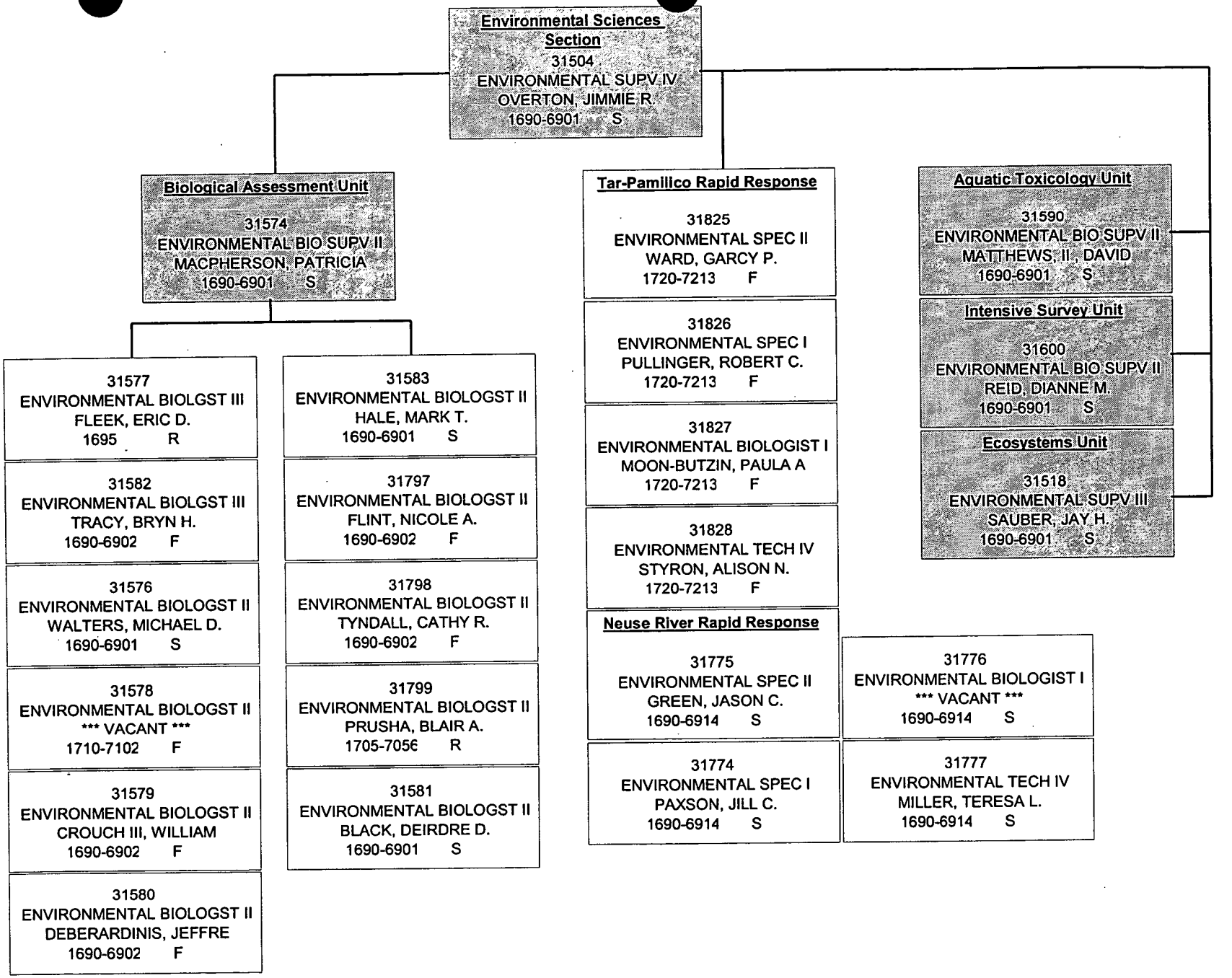
WARD, GARCY P.
1720-7213 F

ORG CHART - ENVIRONMENTAL SCIENCES SECTION Part 2



ORG CHART - LABORATORY SECTION Part 1

Laboratory Section
30100
ENVIRONMENTAL SUPV IV
WIGGINS, JOSEPH K.
1635-6351 S

30147
ADMINISTRATIVE ASST II
GOODWIN, DONNA S.
1635-6351 S

30101
PROCESSING ASSISTANT IV
CARTER, JEANNE M.
1635-6351 S

30149
PROCESSING ASSISTANT III
SAUNDERS, DONNA M.
1635-6351 S

30148
STOCK CLERK II
WILLIAMS, HAROLD M.
1635-6351 S

Organic Chemistry Branch
30115
CHEMISTRY SUPERVISOR IV
KELLING, RAY E.
1635-6351 S

Semi-Volatile Organics/Pesticides
30116
CHEMIST III
DONNELLY, PATRICK T.
1635-6351 S

30117
CHEMIST II
GOOD, NORMA T.
1635-6351 S

30133
CHEMIST II
YOUNG, CHERYL G.
1690-6902 F

30134
CHEMIST I
HAYES, JANET S.
1635-6351 S

30120
CHEMISTRY TECHNICIAN III
STYLES, JOAN A.
1660-6601 F

30118
CHEMISTRY TECHNICIAN III
MICKENS, BRENDA L.
1635-6351 S

30119
CHEMISTRY TECHNICIAN III
CAMPBELL, PEGGY L.
1635-6351 S

Volatile Organics
30128
CHEMIST III
CHANDLER, ANNE L.
1635-6351 S

30129
CHEMISTRY TECHNICIAN III
TERRY, ANGELA N.
1690-6901 S

30131
CHEMISTRY TECHNICIAN III
JOHNSTON, DONNA C.
1635-6351 S

30136
CHEMISTRY TECHNICIAN III
ANDREWS, VICTOR
1635-6351 S

30132
CHEMISTRY TECHNICIAN III
PARK, JOHN A.
1635-6351 S

30137
CHEMISTRY TECHNICIAN III
BARRETT, DENA J.
1635-6351 S

Microbiology and Inorganic Chemical Branch
30139
CHEMISTRY SUPERVISOR IV
AUSLEY, LARRY W.
1635-6351 S

QA/QC Coordinator
30109
CHEMIST III
SATTERWHITE, DANA B.
1635-6355 R

Laboratory Certification Unit
30107
CHEMIST II
GOOD, JR, NORMAN L.
1635-6355 R

30114
CHEMIST I
HENDERSON, EDITH M.
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30110
CHEMIST I
SPRINGER, TONJA F.
1635-6355 R

30105
CHEMIST I
HATCHER, TONY
1635-6355 R

30112
CHEMIST I
BOLING, VERNON R.
1635-6355 R

30108
CHEMIST I
LIVINGSTON, DAVID G.
1635-6355 R

Certification Branch
30103
CHEMISTRY SUPERVISOR III
MEYER, JAMES W.
1635-6355 R

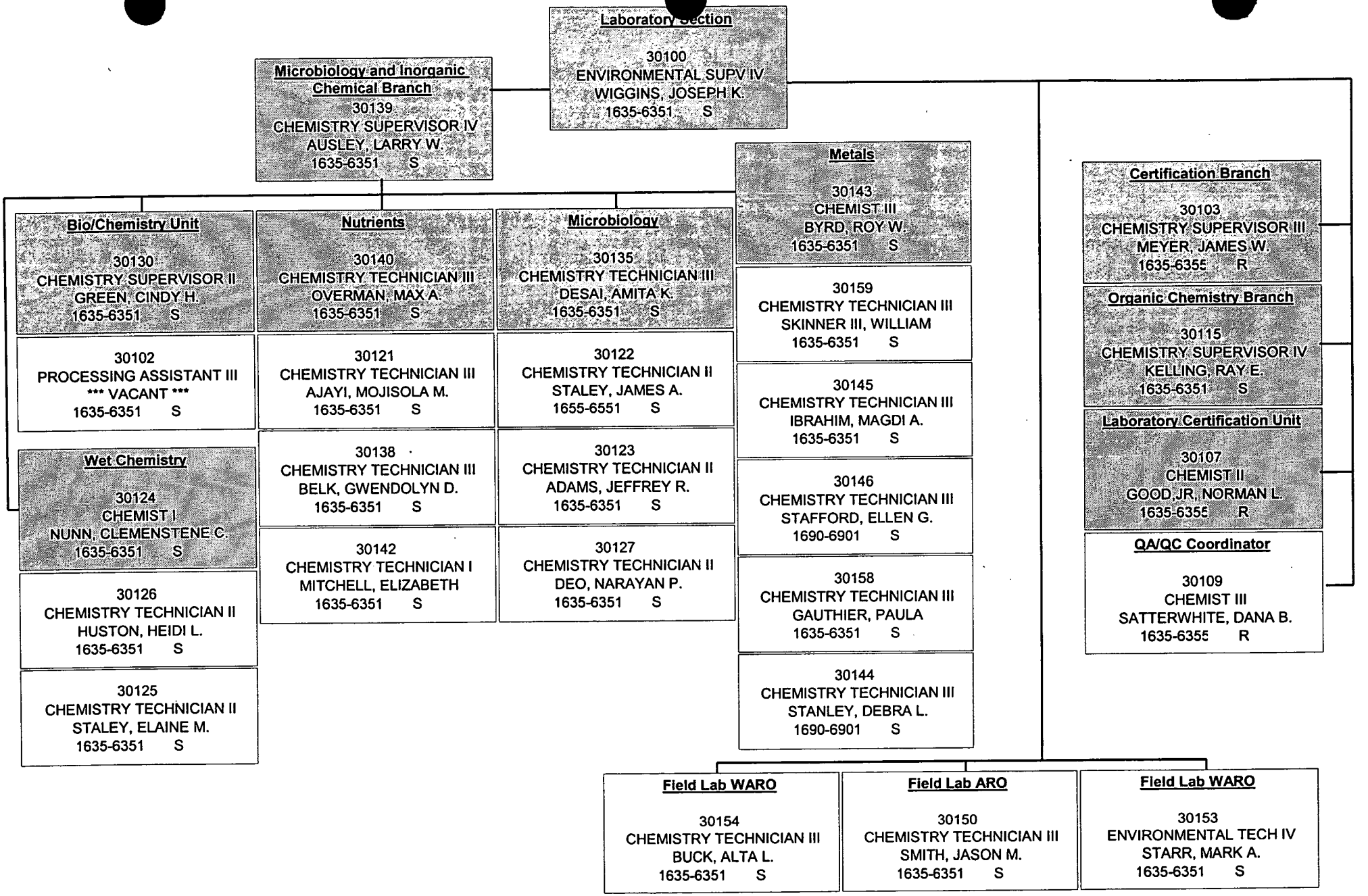
30104
PROCESSING ASSISTANT IV
RIDLEY, ALBERTA
1635-6355 R

Region Offices - ARO
30111
CHEMIST I
FRANCIES, GARY W.
1635-6355 R

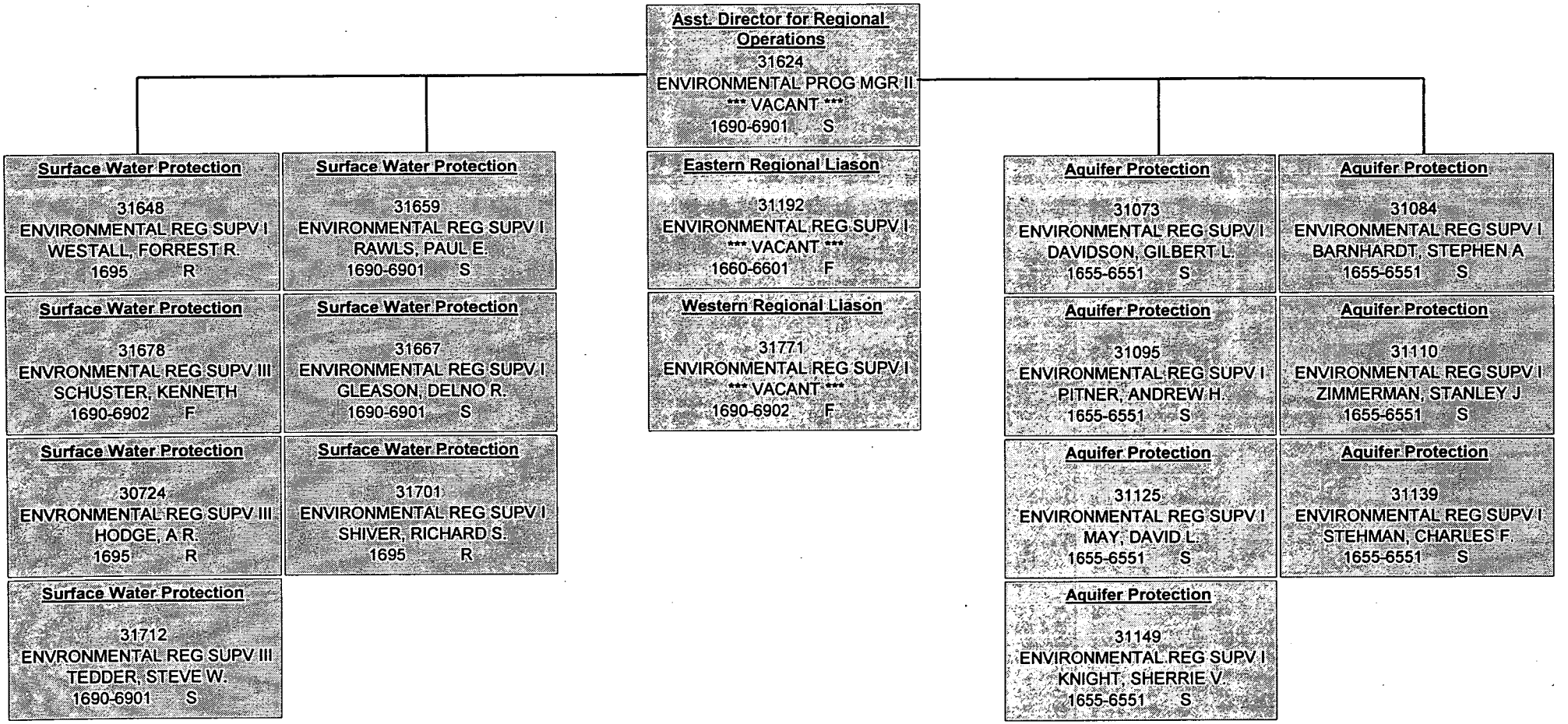
Region Offices - MRO
30152
CHEMIST I
WHITING, CHESTER E.
1635-6355 R

30106
CHEMIST I
BONE, FREDERICK L.
1671-6710 R

ORG CHART - LABORATORY SECTION Part 2

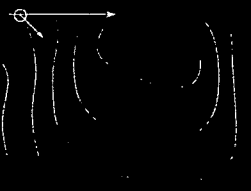


Org Chart - Regional Office Operations



N.C. Division of Air Quality Issues Update

Environmental Review Commission Meeting



November 19, 2004

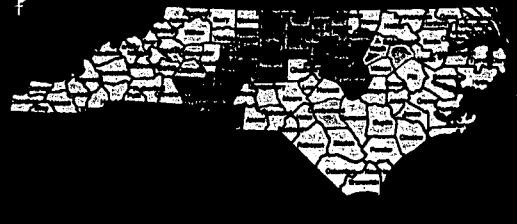
Keith Overcash, P.E.
Director,
Division of Air Quality

N.C. Status Relative to the Ozone Standard

Background

- New standard for ozone promulgated in 1997
- Standard challenged and litigated in the courts
- Upheld by the courts
- Standard is 0.08 ppm, maximum 8-hr. average
- Based upon the 4th highest reading at a monitor in each of 3 years Averaged over those 3 years
- EPA established three-year period for determination of attainment status to be 2001-2003

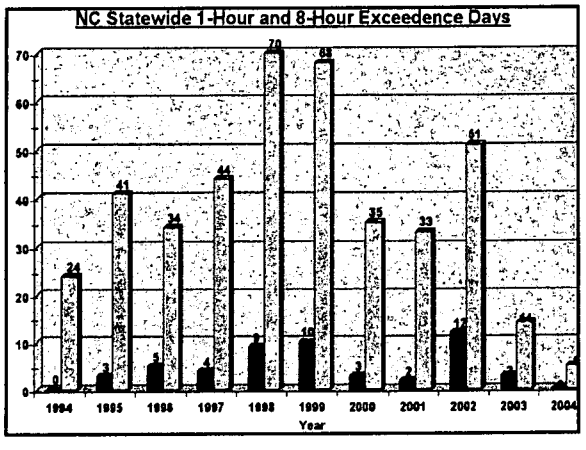
EPA's Boundary Designations for 8-Hour Ozone Standards for North Carolina



Not To Scale
November 19, 2004

"Nonattainment" Designation Timeline

- Immediate (June 15, 2004)
  - New source review for major emitters in the area
- One year
  - Transportation conformity
- Three years
  - State implementation plan (SIP)
- Five to six years
  - Attain standard



Ozone Monitoring Data Update

- Hickory/Unifour Area
- Fayetteville/Cumberland County
- Edgecombe/ Nash County
- Triad/Triangle/Charlotte-Mecklenburg Area

EAC Timeline *(cont.)*

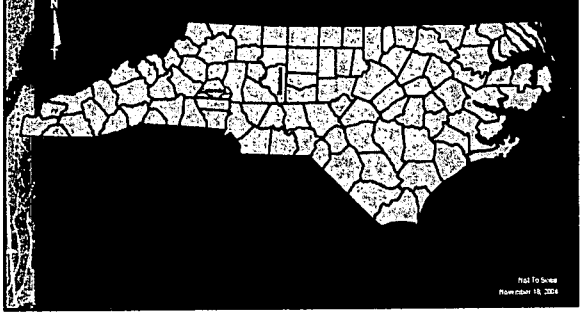
- December 31, 2004 – State adopts control measures into SIP & submits to EPA for approval
- 2005 – Areas implement local control measures
- June 30, 2006 – Progress assessment and report to EPA
- December 2007 – Areas must attain 8-hr ozone standard

N.C. Status Relative to the PM-Fine Standard

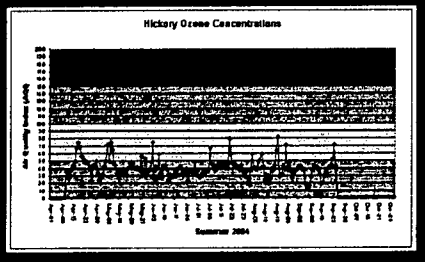
Background

- Similar history to ozone standard
- Standard is 15 micrograms per cubic meter (ug/M^3) annual arithmetic mean concentration over a 3-year period; 65 ug/M^3 24-hour concentration
- EPA established the 3-year period of 2001-2003 for determination of attainment status

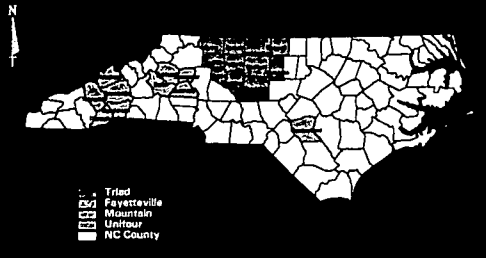
North Carolina's Recommendations on Boundaries for $PM_{2.5}$ Nonattainment Areas



Hickory Ozone Concentrations



State of North Carolina EAC* Areas

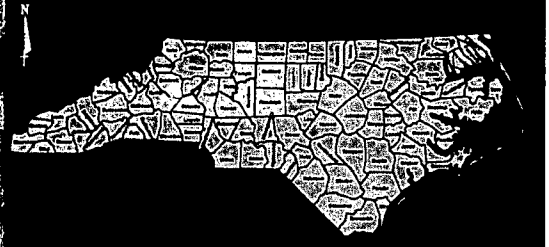


* Early Action Compacts

EAC Timeline

- December 31, 2002 - Compact signed by all parties in MSA (local officials, state air quality agency, and EPA Region)
- June 16, 2003 – Submit list of local control measures being considered
- March 31, 2004 - Local plan submitted to the State
- April 2004 - EPA designates "Compact Areas" as nonattainment, but defers effective date for these areas

EPA's Proposed Designation Areas for $PM_{2.5}$ Nonattainment Areas



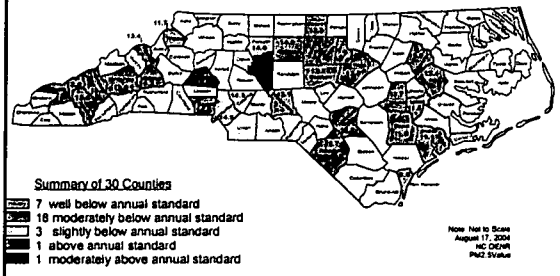
N.C. Comments to Support Recommendations (September 2004)

- Monitors in Guilford & Forsyth Counties are measuring attainment
- Emissions in Randolph County are primarily from Mobile Sources
- Emissions from power plant in Stokes County would not normally impact Davidson County monitor

Supporting Comments (*cont.*)

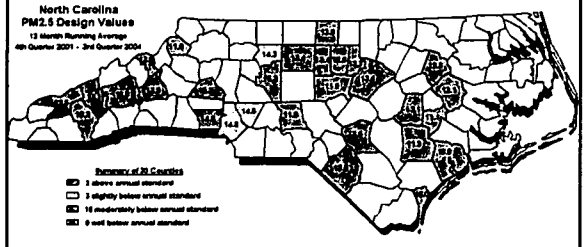
- Emissions in Caldwell/Burke Counties primarily mobile
- Catawba/Hickory monitor almost certain to be in attainment if 2004 data are included (Not likely now based upon latest data)
- Measures already taken by N.C. (CSA, I/M Program) and EPA (Mobile Source Initiatives)

North Carolina
PM2.5 Design Values, 2001-2003



Summary of 30 Counties
- 7 well below annual standard
- 18 moderately below annual standard
- 3 slightly below annual standard
- 1 above annual standard
- 1 moderately above annual standard

North Carolina PM2.5 Design Values
12 Month Running Average 4th Quarter 2001 – 3rd Quarter 2004



PM2.5 - *What Next?*

- EPA to make designations by the end of 2004
- Following a nonattainment designation, the PM2.5 SIP would be due 3 years later
- Attainment of the standard would be required 5 years later

New Source Review (NSR) Permit Rule Changes

- EPA has proposed two major changes to the rules
- December 31, 2002 - final rules made changes to applicability requirements
- August 2003 rule (equipment replacement provision or ERP) proposed a cost factor to determine whether modifications triggered review
- The ERP has been stayed by the Courts

December 31, 2002 NSR Final Rules

- Stakeholder process to develop State Rule
  - December 31, 2002 rule only
- 1st Meeting in Raleigh in September 2003
- 2nd Meeting in Hickory in October 2003
- Follow-up meeting with a Draft Rule on March 17, 2004
- Draft Rule to Air Quality Committee in April 2004

NSR Rule (*cont.*)

- EMC approval to go to Hearings at May meeting
- Hearings in August
- Results of Hearings – well attended, many comments
- Hearing Officer recommendations to EMC for approval of Final Rule in December

Construction Without on Air Permit

- New statute signed into law in 2003
- Allows existing permitted facilities to request construction of source before a permit is issued
- Requires Public Notice of Proposed Action in local newspaper

Construction Without Permit (*cont.*)

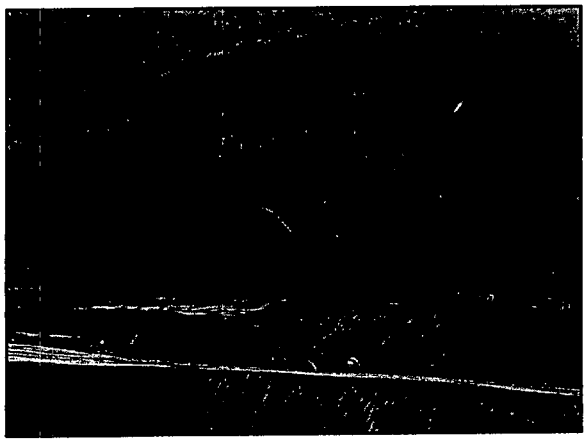
- Requires action by DAQ within 15 days of receipt
- 24 requests received to date
- Average turnaround time of 10 days

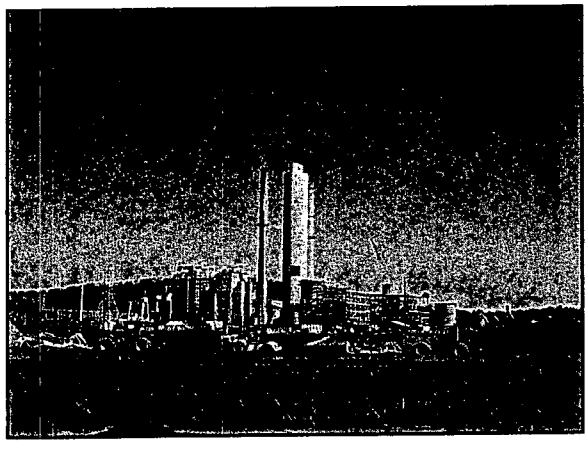
North Carolina Clean Smokestacks Act (CSA)

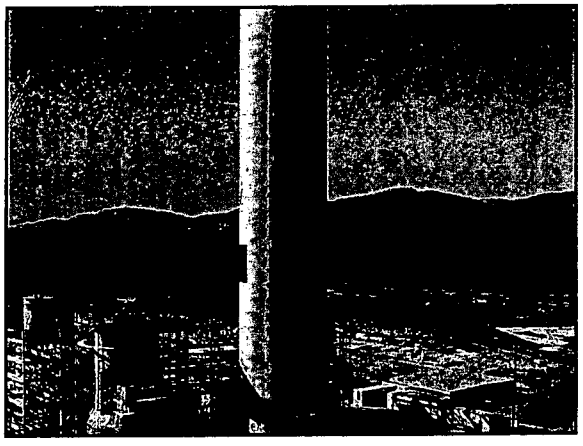
- NOx & SO_2 caps on emissions
  - -Tons/Year
  - -Caps per company – they decide on controls
- Phased compliance; 1 Jan. '07, '09, '13
- Actual reductions in N.C.
- Unique cost recovery feature
- Recommendations on Hg & CO_2; September '05
- Reduction credits held by the State

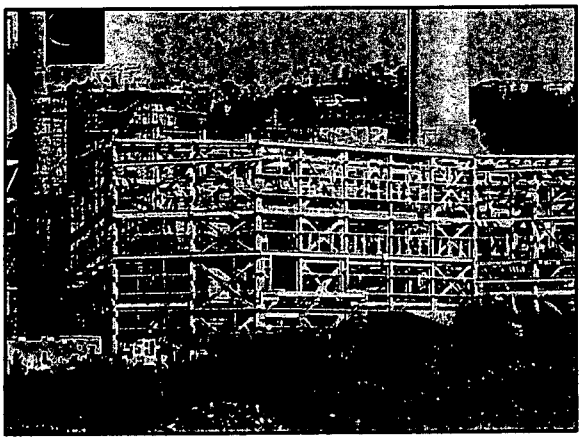
Utility Company Plans

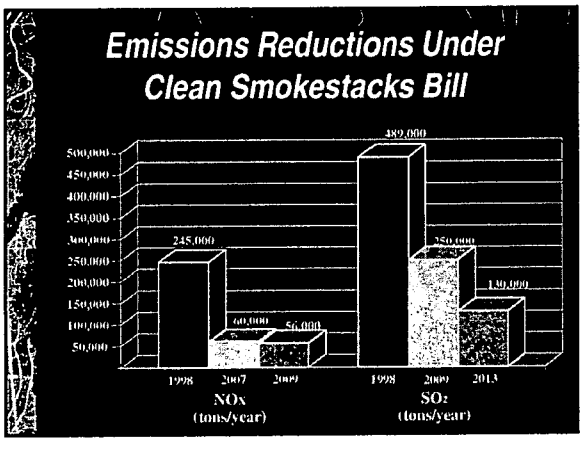
- Compliance plans submitted
- 22 SO_2 scrubbers
- 36 SCR / SNCR units
- Most with combustion controls at least
- NOx controls in place starting in 2001
- SO_2 scrubbers scheduled to be in starting in 2005










Emissions Reductions Under
Clean Smokestacks Bill
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
245,000
60,000
56,000
489,000
250,000
140,000
1998
2007
2009
1998
2009
2013
NOx
(tons/year)
SO2
(tons/year)

2004 CSA (Second Interim) Reports

- Carbon Dioxide & Mercury
- Three-day conference to Solicit Information & Participation
- Stake-Holders encouraged to give Input
- Reports Provided to Environmental Review Commission (General Assembly) & the Environmental Management Commission on September 1

Mercury Report

- State of science updated
- Stated rule of leadership for N.C.
- Desire for N.C. Health Protection stated
- Range of options:
  - Continue study and defer rules
  - Follow lead of other states and require broad controls
  - Further study with specific targets for future rules

Mercury

- Important points pending:
  - EPA under order and has stated that revised standards (from existing – and other – multiple proposals – by March 15, 2005. THIS WILL BE PIVOTAL TO N.C. DAQ RECOMMENDATIONS)
  - No emission measurements have been made in N.C. Thus far (all estimated) nor are they currently required

Mercury – Other Points

- Existing CSA NOx Controls & SO_2 Scrubbers (Required) Result (Est.) in ~64% removal from base case coal fired power plants
- Removal at some scrubbed N.C. plants may range in the high 90%'s
- Some (Smaller/Older) plants will have no Hg removal
- Some concerns for local impact
- Some technologies may reduce Hg-only for relatively low cost – uncertainties exist
- Some testing of Hg removal technologies underway in N.C. and planned

CO_2 Report

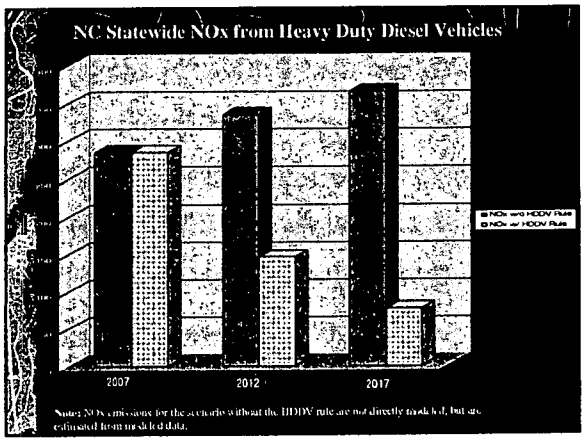
- State of science updated
- Role for desired N.C. leadership stated
- Range of options:
  - Default to future Federal Actions
  - Study further then act
  - Mid-road voluntary and required actions
  - Aggressive plans with mandatory caps and tracking

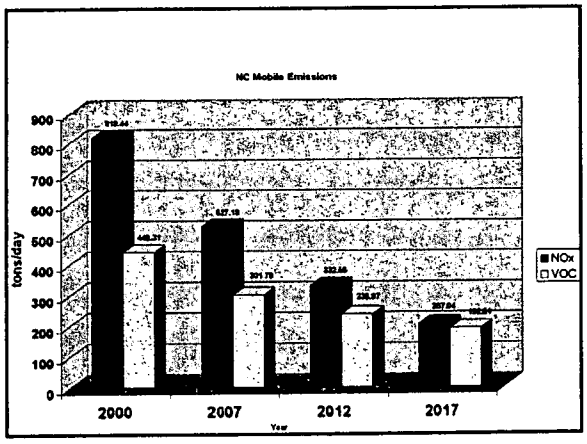
CO_2 – Important Points

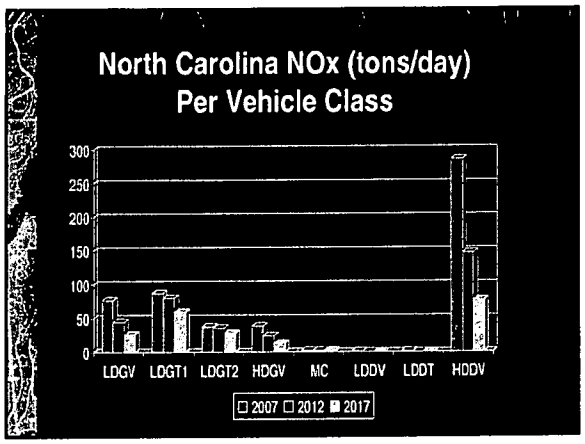
- CO_2/GHG are global
- N.C. is a relatively small emitter on global scale but a slice of the total
- US ~25% contribution of world's total
- Motor vehicles are on the same order as utility boilers for N.C.

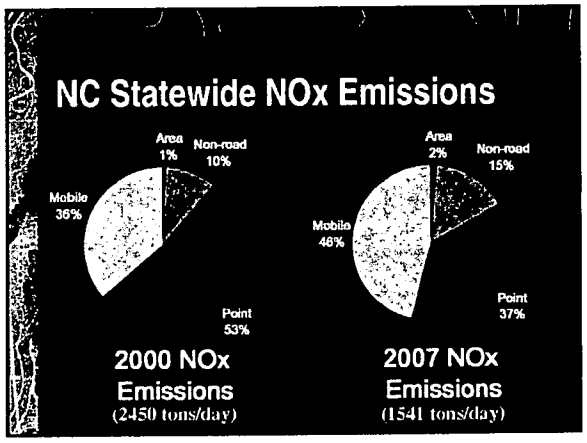
Next Steps – Planned

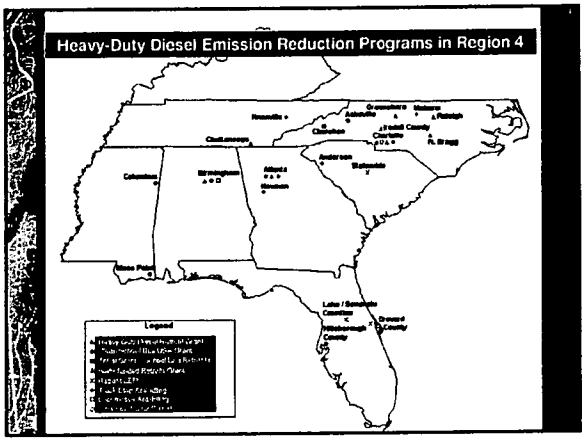
- Continue to monitor national and global changes in information, requirements, and other actions
- DAQ prepare 2005 draft (this winter)
- Convene stakeholder meetings (2-3 each -Hg + CO_2) in spring of 2005
- Finalize in July/August and present to ERC & EMC by September 2005






North Carolina NOx (tons/day)
Per Vehicle Class
300
250
200
150
100
50
0
LDGV LDGT1 LDGT2 HDGV MC LDDV LDDT HDDV
2007 2012 2017


NC Statewide NOx Emissions
Area 1%
Non-road 10%
Mobile 36%
Point 53%
2000 NOx Emissions
(2450 tons/day)
Area 2%
Non-road 15%
Mobile 46%
Point 37%
2007 NOx Emissions
(1541 tons/day)


Heavy-Duty Diesel Emission Reduction Programs in Region 4

Miscellaneous

- 126 petitions
- I/M OBD expansion continues
- Open Burning outreach

The miracles of science

DuPont, Climate Change and Sustainable Growth

North Carolina Environmental Review Commission
November 19, 2004

William F. Bailey, Principal Consultant
E. I. DuPont de Nemours and Co., Inc.
Charlotte, NC

An Overview of DuPont Today

- A 202-year old global science company, solving problems in ways that makes people's lives better, safer and easier
- 135 manufacturing plants, 80 R&D facilities in 70 countries
- 60,000 employees
- Major business segments
  - Agriculture and Nutrition
  - Coatings and Color Technologies
  - Electronics and Communications
  - Performance Materials
  - Safety and Protection

DuPont Tyvek© Housewrap

DuPont is Transforming Itself

- Since ranking 15th in the Fortune 500 in 1997, DuPont has
  - Spun off its Conoco petroleum unit
  - Sold its pharmaceuticals and textile fibers businesses
  - Acquired two leading agriculture and biotechnology companies
- DuPont is recreating itself to achieve "sustainable growth"
  - Increasing shareholder and societal value...
  - While decreasing the environmental footprint of our operations...
  - Along the value chains in which we operate

Making "Sustainable Growth" Practical

- Our goal: grow profits while reducing our impact on society
- To do this, our manufacturing plants must
  - Reduce operating costs, energy use and emissions
- How will we reduce our costs and our emissions?
  - Use Six Sigma and other methodologies to improve productivity
- How do we know we're doing it?
  - Measure our progress versus an established baseline
- How do our shareholders and society know we're doing it?
  - Commit to meet a publicly-stated level of performance

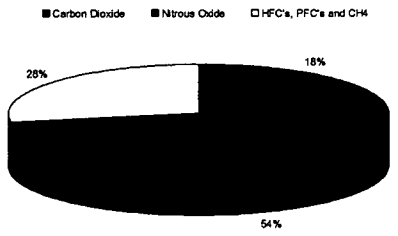
DuPont's Public Commitment on Energy

- We have committed to achieve the following by 2010
  - Reduce greenhouse gas emissions by 65% versus 1990
  - Hold total energy use flat versus a 1990 baseline
  - Supply 10% of total energy needs from renewable resources at a cost competitive with best available fossil derived alternatives

Greenhouse Gas Emissions in DuPont

- Most of our CO_2 emissions come from energy use
- But CO_2 is not our only Greenhouse Gas (GHG) emission
  - The manufacture of some refrigerants create HFC's
    - 1 pound of HFC-23 is equivalent to 11,700 pounds of CO_2
  - The manufacture of adipic acid creates N_2O
    - 1 pound of N_2O is equivalent to 310 pounds of CO_2
- These other GHG's dwarfed our CO_2 emissions

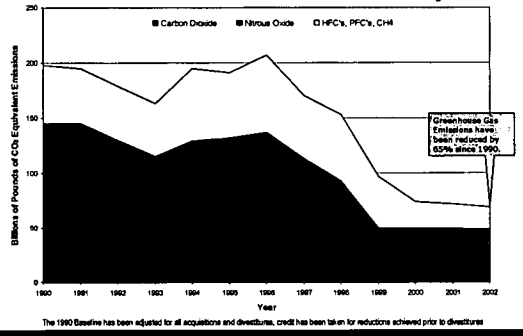
1990 GHG Emissions (CO_2 Equivalent)



Reducing Non-CO_2 GHG Emissions

- To reduce GHG emissions by 65%, we had to change the way we make two profitable products, nylon and HFC's
- We worked hard to develop innovative and cost-effective abatement methods for both HFC-23 and N_2O
- These changes cost over $50MM but they were worth it...

We Met Our GHG Goal 8 Years Early



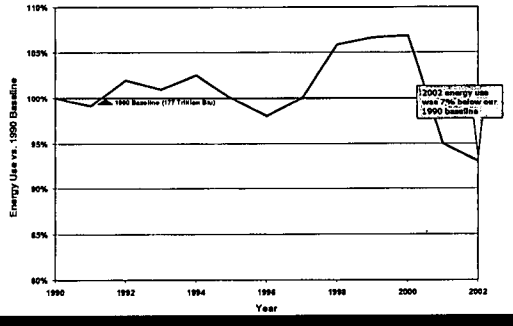
But What Are We Doing About CO_2?

- CO_2 emissions are driven primarily by energy use
- Energy use is largely a function of production
  - The more "stuff" you make, the more energy you use
- To grow earnings, you have to make more stuff, right?
- DuPont's approach to sustainable growth says "No"
  - We are striving to develop new, less energy-intensive products
  - We want to generate income from our knowledge + our products
  - We are using Six Sigma to improve yields and energy efficiency in our existing operations

Making the Case for Energy Efficiency

- Additional work is required to improve energy efficiency
- This work must represent an attractive value proposition
  - Potential benefits must outweigh cost of resources to work on it
- This is a complicated issue for most of our sites
  - Site may not have resources or knowledge to reduce energy use
- Our approach to improving energy efficiency
  - Uses Six Sigma to standardize improvement methodology
  - Leverages knowledge of the few to help the many
- We're making good progress here also...

DuPont Energy Use, 1990-2002



Key Elements of our Program

- Clear and measurable goals
  - Goals drive action and accountability
- Flexibility to find the lowest cost reductions
- Necessary measurement and tracking systems
- Public reporting of our progress
  - Corporate totals reported annually to the public via the DuPont Sustainable Growth Progress Report [1605(b) report to EPA]

NICHOLAS SCHOOL OF THE ENVIRONMENT AND EARTH SCIENCES
DUKE UNIVERSITY

Testimony before the
Environment and Resources Committee
North Carolina State Legislature
19 November 2004

William H. Schlesinger
Dean, Nicholas School of the Environment
and Earth Sciences
Duke University

Thank you for the opportunity to speak before you today. I am Dean of the Nicholas School of the Environment and Earth Sciences at Duke University—the nation's first school wholly focused on professional graduate education in environmental science and policy. We have 50 faculty and more than 400 students who, every day, study critical problems of the environment, including climate change.

It is, of course, the issue of climate change that brings me before you today. Despite a few nay-sayers, I have never before seen a scientific consensus that is stronger than that which accompanies predictions of future climate change. Earlier this year, the American Geophysical Union, the premier society of more than 10,000 earth scientists, issued a new statement on the climate change, which says, "Human activities are increasingly altering the Earth's climate. These effects add to natural influences that have been present over Earth's history. Scientific evidence strongly indicates that natural influences cannot explain the rapid increase in global near-surface temperatures observed during the second half of the 20th century."

Scientists from North Carolina are broadly in agreement with this statement, predicting a rise in the average annual temperature in this state between 4 and 10° F by the end of this century. The actual rise in temperature is not as alarming as its speed; we see little precedent for such a rapid change in temperature in any geologic record of the Earth's past. The most important cause of climate change is the emission of carbon dioxide during the burning of fossil fuels.

There is less consensus about predictions for changes in rainfall, but no doubt that a hotter North Carolina will be a drier North Carolina. Increased rates of evaporation will leave lower quantities of moisture in the soil, lower levels of groundwater, and less flow in surface streams and rivers.

What are the consequences and necessary responses of government and our citizens? Nearly every model of global climate change shows increased melting of the ice packs in Greenland and Antarctica and a rise in sea level. North Carolina will feel that impact. We can expect 18" of sea level rise this century, leading to the disappearance of the Outer Banks and inundation of much of our coastal areas. If not under water under calm conditions, these areas will be subject to catastrophic overwash during hurricanes, which themselves are predicted to be more frequent and severe with global warming.

We can expect large changes in what grows in North Carolina—the crops that feed us and the forests that form such an important part of our economy. More than one model shows increases in the productivity of hardwood forests, at the expense of conifers. North Carolina will not be treeless, but if I were a corporate executive in the forest products industry, I would seriously question whether I was planting the right trees today for harvest tomorrow. The rising levels of carbon dioxide in our atmosphere that cause global warming are known to increase the growth of trees, but also the growth of poison ivy and the production of pollen—a problem for all of you that may suffer from summertime respiratory problems.

We can expect other impacts on the health of North Carolina citizens. Looking globally, there is a strong correlation between climate and the occurrence of disease. A warmer North Carolina will certainly be more likely to harbor some diseases now confined to and associated with the tropics. The health community in this state can expect a greater epidemiology of diseases, such as dengue and malaria, along with a greater occurrence of direct heat-related deaths such as by stroke.

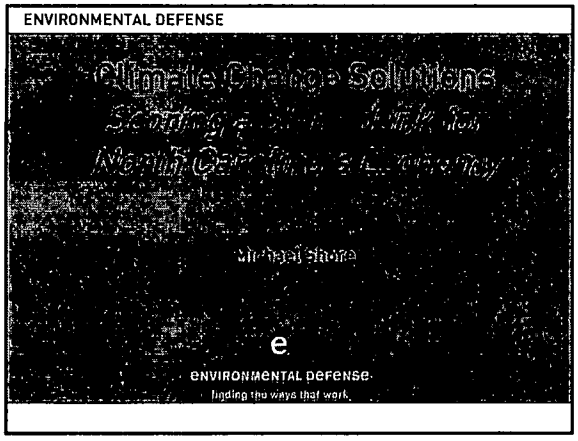
As I mentioned earlier, it is not so much the actual rise in temperature as the rate of rise that is of greatest concern. Humans live in hot places, and they can adjust their habitation to the realities of the coastline. People will live in North Carolina in the future, but it will be a very different North Carolina from today, and we are getting there very rapidly. An ounce of preparation and prevention would seem judicious. The potential disruption to our traditional society could be disastrous.

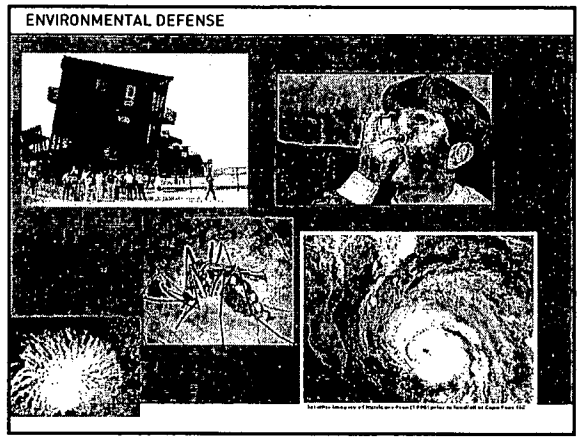
The citizens of North Carolina will not solve the global warming problem on their own. A molecule of carbon dioxide added to the atmosphere is the same whether it is from Raleigh or Rangoon. Conversely, the Earth will not avoid the problem of climate change unless all its citizens act together.

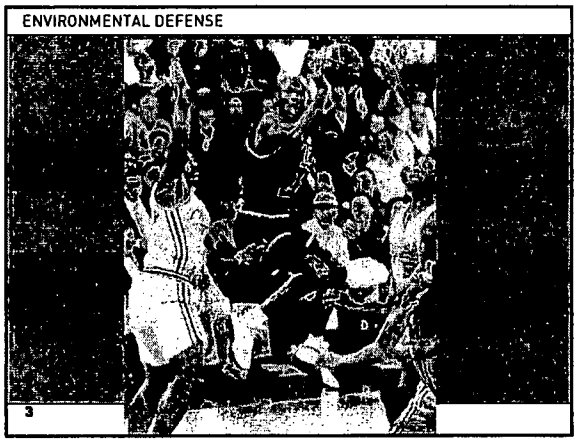
With its Clean Smokestacks legislation, North Carolina was a national leader in measures to clean up regional air pollution. We must do the same now with our response to climate change. Conservatives may believe that the evidence for global climate change is weak and the costs of action much too high, but to do nothing in the face of rapid change is not a conservative thing to do.

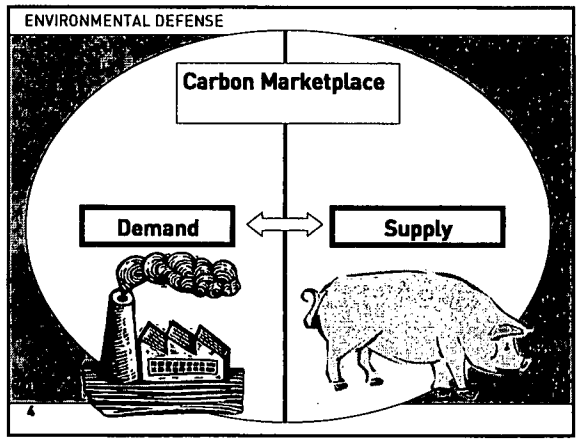
Thank you.

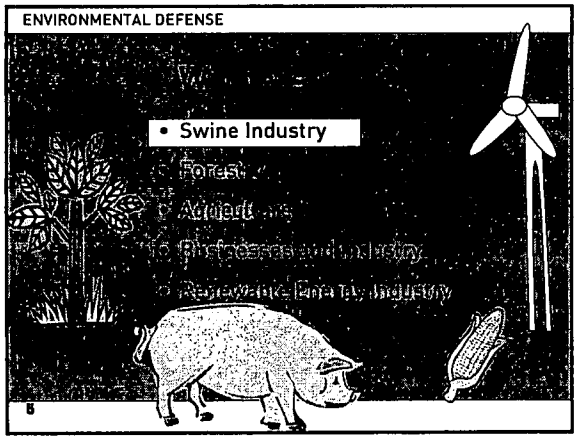
November 19, 2004 ERC Meeting
EXHIBIT J

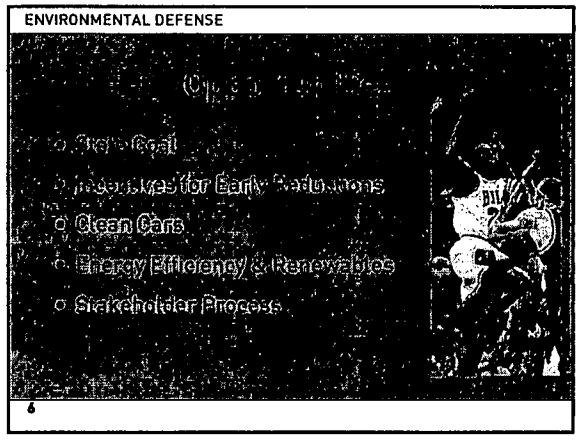












ENVIRONMENTAL DEFENSE

If NC is asleep at the wheel. . .

7

ENVIRONMENTAL DEFENSE

8

ENVIRONMENTAL DEFENSE

9

November 19, 2004 ERC Meeting
EXHIBIT K

DENR Response to Western North Carolina Flooding
Environmental Review Commission – 544 LOB – Friday, November 19, 2004 9:30AM

- My name is Jimmy Carter. I work as Assistant Secretary for Operations and Development in the Department of Environment and Natural Resources.

- I am the first of a four-part presentation today on issues related to the storms that hit the western part of the state during September.

- Two storms had a major impact on the western part of the state – Frances came through on September 8 and Ivan followed on September 16, just 8 days later.

- It seems appropriate to treat the storms together as one big response, because our activity was nearly continuous from one storm to the next.

- Tropical Storm Frances released heavy rainfall and was quickly followed by Ivan – who came through causing more extensive wind damage, more widespread power outages and higher flooding levels.

- Our staffs in the affected region were on alert in advance of a disaster, and called to action during the disaster. Many of our programs have had a continuing role during the recovery period.

- DENR responded to the storm on several fronts. I'll give a brief rundown of activities from each program area:

Parks Department – Public Safety and our own park facilities

- Within 24 hours of the first impacts of Frances, 20 state park rangers were deployed as part of the State Emergency Response Team to assist the Asheville Police Department with patrols. Other rangers from all districts were placed on alert status, in case needed.
- In anticipation of Frances, thirteen parks were closed. In anticipation of Ivan, eleven parks were closed.
- The division's incident command team had already planned for the safe evacuation of the parks by ranger staff – and it paid off – so that no visitors or park staffs were injured and no visitor property was damaged through the evacuation and storm period.
- With Frances, we did have damage at South Mountains State Park [Burke Co.] – the entrance road and bridge approaches were eroded and a system of pedestrian bridges was destroyed.
- Park staff have been heavily involved in debris removal and aiding DOT in repair to bridge approaches. We've also developed a safe alternate route to the park's most visited feature – High Shoals Falls.
- South Mountains State Park is ready to reopen as soon as DOT replaces a guardrail.
- With Ivan, significant damage occurred at Mount Mitchell State Park [Yancey Co.] – The visitor center, the restaurant and a maintenance building suffered wind and water damage. Park staff along with workers from other parks in the West District performed emergency repairs to secure the buildings and reopen the park.

- Except for these two examples – South Mountains and Mt. Mitchell – where visitor safety was a concern – all state parks and recreation areas reopened within 24 – 48 hours after the storms.
- Parks staff also provided assistance to others in the area too. a five-man crew helped the National Park Service reopen a portion of the Blue Ridge Parkway between Asheville and the park. We contributed approximately 150 resource-hours and the use of division equipment.

Waste Management – Storm Debris Staging

- About 19 storm debris staging sites have been approved and activated by the Solid Waste Section. They all remain open and active at this time in various counties. [Avery (1), Cleveland (3), Henderson (2), Macon (3), Madison (1), McDowell (1), Mitchell (2)]
- The Solid Waste Field Staff in affected areas continue to provide technical assistance to local governments about removal, separation, staging and disposal of debris.
- They are also providing health and safety guidance for deconstruction operations associated with flooded mobile homes.
- This is an issue that has come up within the last week.
- There are aspects of dealing with these damaged homes such as separating household hazardous waste, white goods, asbestos and recyclable metals.

- During the storms, our Division of Forest Resources had an incident management team of about 40 people in Conover and a team of 25 in Butner to react quickly as needed.
- Forest Resources personnel assisted with emergency operations centers in each affected county.
- At one time, Forest Resources had six chainsaw crews assisting with road clearing and debris removal.
- We provided portable bridges (bridge mats) as temporary replacements for vehicle access at damaged stream crossings.
- Several crews from the BRIDGE program and teams of Forest Resources personnel constructed bridges for pedestrian access to stranded homeowners. [The name is a coincidence. BRIDGE program is our young offender rehabilitation program in Morganton and stands for Building, Rehabilitating, Instructing, Developing, Growing, Employing.]
- There was some damage to Forest Resources facilities – Two bridges that provide access to Gill State Forest (Marion, McDowell Co.) and the Mountain Training Facility at Crossnore (Avery Co.) were compromised by floodwaters of the Linville River.
- Heavy erosion at Linville River State Nursery in Crossnore damaged roads and seedling beds. Repair on those structures is almost complete. The Nursery is an integral part of the Western North Carolina Christmas tree industry. [a $125M industry]
- Numerous trails and roads at DuPont State Forest and some at Holmes Educational State Forest (Henderson Co.) were damaged and repair is ongoing with DFR personnel and equipment.

Dam Safety – Inspections of High Hazard Potential Dams

- The Dam Safety Program worked closely with the state Division of Emergency Management and local emergency managers before the hurricanes to identify known high hazard potential dams and after the storms to respond to emergency calls.
- High Hazard Dams are those that could threaten human life and cause greater than $200K in economic loss.
- Land Quality personnel from Swannanoa and Winston-Salem regional offices made over 150 emergency inspections within a short time period to determine if flood flows were endangering or had weakened dams.
- We know of seven dam failures, five of those were too small to fall under state jurisdiction. [Henderson Co.] One was a low hazard potential. [Transylvania Co.]
- The only high hazard potential dam that failed released water slowly enough that it did not do significant damage. [Avery Co.]
- Three other dams had the potential to fail, but Land Quality personnel provided onsite technical assistance for excavating emergency channels adjacent to two high hazard potential dams in Henderson County and one in McDowell County to relieve the overtopping spillways.
- Without intervention, these three dams would have likely failed, causing severe damage downstream.
- Our folks also monitored several other high hazard dams and advised if downstream evacuations were necessary.

- Evacuation was required for residents below Lake Susan in Buncombe Co. – They actually were evacuated twice – once during Frances and once during Ivan.
- Starnes Cove Lower in Buncombe Co. was evacuated.
- We had someone on site all night for both storm events to monitor these high-risk situations.
- We have a large number of dams in western North Carolina – many have been designed and constructed or repaired in recent years to current standards. They held up relatively well, even though the rainfall exceeded design standards in some cases. [762 dams in Asheville region – 294 are high hazard]

Water Quality – Tank releases and WWTP upsets

- Through the storm, several large petroleum tanks, over 100 home heating oil tanks and several hundred 55-gallon drums and propane tanks were recovered from local streams.
- The EPA came in to help us and set up an incident command post in our Swannanoa Regional Office. They took a lead role for the safe removal of containers. We also had a Coast Guard strike team in to assist in a coordinated fashion.
- During the height of the storm, staff estimate that as many as 100 of the wastewater treatment plants in the region were experiencing upsets.
- An upset is an incident beyond the reasonable control of the permittee causing temporary noncompliance.
- Situations causing upsets included operators unable to reach the facilities due to road closures, infiltration (from flooding) causing hydraulic overload, and there were power outages and equipment damage.

- There were problems with collection systems including: overflows, uncovered lines or lines washed away in some cases. Some lines were filled with debris, and equipment was destroyed.

Environmental Health – Drinking Water Systems

- Immediately after Ivan, 251 drinking water systems had service interruptions because of flooding or power outages.
- Each day, this number decreased as staff visited systems and took samples showing no contamination.
- We issued Boil Water Advisories and Use Restrictions in isolated areas of 10 counties [Buncombe, McDowell, Burke, Caldwell, Transylvania, Haywood, Avery, Mitchell, Yancey and Madison]. Most systems were returned to operational within 1 to 2 days.
- Our Division of Environmental Health issued temporary emergency authorization to county environmental health specialists in unaffected counties so they could provide assistance to flooded counties with reopening facilities such as restaurants and child care centers, and to inspect flooded septic systems.

North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

TO: Environmental Review Commission

FROM: Robin W. Smith, Assistant Secretary
Policy and Planning

RE: Stream Clearing Activities

DATE: November 19, 2004

Since Hurricanes Ivan and Jeanne, the Department has gotten a number of questions about removal of debris – including accumulated sediment – from mountain streams. Attached is some basic information about the environmental permits required for stream-clearing activities. In the western counties affected by the hurricanes, the United States Army Corps of Engineers is the primary permitting agency. The Division of Water Quality in DENR has a secondary role because a project requiring a federal permit must also get a certification from the Division of Water Quality that the project will not violate state water quality standards.

The attached information was developed specifically for counties outside the coastal area. In the coastal counties, the lead permitting agency is often DENR's Division of Coastal Management.

N.C. Dept. of Environment and Natural Resources
November 18, 2004

REMOVAL OF SEDIMENT AND DEBRIS FROM STREAMS

Summary: The U.S. Army Corps of Engineers should be contacted about the need for a federal permit if the activity involves: 1. Excavation of sediment or removal of rocks from a streambed; 2. Use of equipment that will be operated in the streambed; 3. Disturbance of the stream bank; or 4. Placement of sediment, rocks or other debris in or near surface waters or wetlands.

- Removing debris (such as tree limbs or objects washed into the water) from a stream does not require an environmental permit as long as there is no disturbance of the streambed or stream bank. Debris cannot be placed, either directly or indirectly, in waters or wetlands.

- Activities that result in debris, sediment or other material being placed in surface waters or wetlands will require a Clean Water Act (Section 404) permit from the Corps of Engineers.

- Activities that will disturb the stream bank or the stream bottom, such as excavation or removal of rocks in the streambed, may require a federal permit from the United States Army Corps of Engineer (COE).

- Activities that require a federal 404 permit (under the Clean Water Act) or a Section 10 permit under the Rivers and Harbors Act of 1899 also need a certification (called a Section 401 Certification) from the State of North Carolina that the activity will not result in a violation of any state water quality standard.

- Trout streams receive special protection under both federal and state environmental laws. To prevent high levels of suspended sediment in the water when trout are spawning, there is an October 15-April 15 moratorium on work in trout streams. The Corps of Engineers and the Division of Water Quality consult with the N.C. Wildlife Resources Commission on permits for projects affecting trout streams. If streambank erosion is already creating sediment problems in the stream and the proposed work would improve conditions, the agencies may waive the moratorium and allow a permit to be issued.

- The N.C. Sedimentation Pollution Control Act prohibits land-disturbing activity within a 25-foot buffer on either side of a trout stream, but allows for the issuance of waivers from the trout buffer if the impacts will be temporary and minimal. The Director of the Division of Land Resources in DENR has the authority to approve waivers from the trout buffer.

Permitting

The COE has a nationwide permit -- the Nationwide Permit for Maintenance (NWP 3) -- that covers some stream-clearing activities, including a limited amount of sediment removal. There is also a COE nationwide permit (NWP 13) that specifically covers stream restoration activities undertaken with federal funds from the Natural Resource Conservation Service (NRCS). Applications for coverage under a nationwide permit must be submitted to the COE. The Corps decides whether the activity qualifies for coverage under NWP 3, NWP 13 or another nationwide permit. Stream-clearing activities that go beyond the scope of any applicable nationwide permit require an individual permit from the COE and require a longer permit review.

DENR's Division of Water Quality has general Section 401 Water Quality Certifications for activities covered by NWP 3 and NWP 13; applicants should contact DWQ for information about coverage under a general 401 Certification.

Contact Information

U.S. Army Corps of Engineers (Asheville Field Office) Scott McLendon (828) 271-7980

Division of Water Quality (Asheville Regional Office) Forrest Westall (828) 296-4500

N.C. Geological Survey - Hazards

Landslides from Hurricanes Frances & Ivan

November 19, 2004 ERC Meeting

EXHIBIT M

Geologic hazards — Landslides related to Hurricanes Frances and Ivan

The remnants of Hurricanes Frances and Ivan tracked across western North Carolina on September 8, and September 16-17, 2004. These storms resulted in loss of life. In addition to flooding, property damage and interruption of transportation corridors occurred from at least 75 landslides triggered by intense rainfall.

Other landslides have occurred in the past and will occur in the future in the North Carolina mountains. Hurricanes triggered widespread landslides in the North Carolina mountains in 1916 and again in 1940. A strong tropical depression in 1977 also triggered numerous landslides. Although many landslides occurred in remote areas, landslides caused fatalities in 1916, 1940 and 2003. Increased development in the mountains exposes more people to hazards from landslides.

Counties affected by landslides — Western North Carolina

The following western North Carolina counties were affected by landslides from hurricanes Frances and Ivan: Allegheny, Avery, Buncombe, Cherokee, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Swain, Transylvania, Yancey and Watauga.

North Carolina Geological Survey Provides Assistance

Geologists in the Asheville Regional Office provided onsite technical assistance to state and local emergency managers, consultants and residents at the White Laurel community in Watauga County, Bear Rock Estates and Old CCC Road in Henderson County, and Peeks Creek in Macon County where landslides had destroyed houses, roads, caused fatalities. The geologists advised about the safety of the areas after the landslides for the rescue workers and what was generally needed to stabilize the areas. They have served on technical advisory committees to help determine the causes of the landslides and the potential for future landslides. The geologists also assisted the Blue Ridge Parkway in analyzing the landslides along the parkway. Post hurricane presentations have been made to local governments, the National Weather Service and interest groups.

Geologists in Raleigh also participated in the fieldwork and provided liaison with State Division of Emergency Management and the media. Additionally, helpful information was posted on the division's web page, which had over a thousand hits during this period. Geologists from both the Raleigh and Asheville offices helped to compile and update a GIS based landslide location database of the new landslides and post on the web page (http://www.geology.enr.state.nc.us/news.htm).

Peeks Creek Landslide — Heavy rains triggered the Peeks Creek landslide, sometime around 10:00 p.m. on Sept. 16, 2004. The path, or track, of the landslide on Peeks Creek on Fishhawk Mountain is about 2 miles long from near the confluence of Peeks Creek and the Cullasaja River.

NCGS . 1612 Mail Service Center . Raleigh, NC 27699-1612 . 919.733.2423 x403 . E-mail

N.C. Geological Survey - Hazards

Landslides from Hurricanes Frances & Ivan

Geologic hazards — Landslides related to Hurricanes Frances and Ivan

Examples of landslide damage from Hurricane Frances

The following shows selected examples of landslide damage from Hurricane Frances. Other examples of landslide damage are at http://www.geology.enr.state.nc.us/news.htm.

Watauga Co. — White Laurel subdivision — This image of a landslide was taken at the White Laurel subdivision located near Boone. This landslide appears to be related to an embankment failure. One home was destroyed, and eight condemned for occupancy. This image was taken September 9, 2004, by a North Carolina Geological Survey staff geologist.

Blue Ridge Parkway, NC — Sections are closed after rains from Hurricane Frances caused the roadway to give away in four places between Mount Mitchell and Linville Falls. The area in this image is near Milepost 348. Damage to the parkway is estimated to be $11 million. Some sections of the road could be closed for a year. This image is from the the National Park Service/Asheville Citizen Times.

NCGS . 1612 Mail Service Center . Raleigh, NC 27699-1612 . 919.733.2423 x403 . E-mail

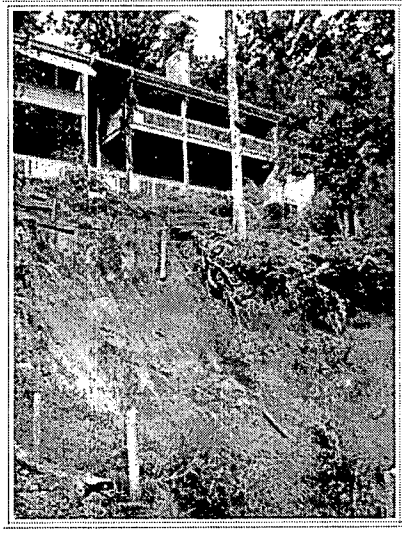
N.C. Geological Survey - Hazards

Landslides from Hurricanes Frances & Ivan

Geologic hazards — Landslides related to Hurricanes Frances and Ivan

Examples of landslide damage from Hurricane Frances (*continued*)

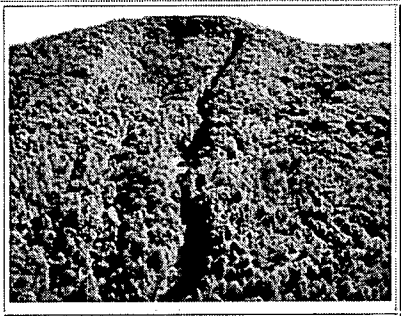
The following shows selected examples of landslide damage from Hurricane Frances. Other examples of landslide damage are at http://www.geology.enr.state.nc.us/news.htm.



North Fork of the Catawba River near Linville Falls — Landslide threatening residential structure. Image by North Carolina Geological Survey staff geologist on September 15, 2004.

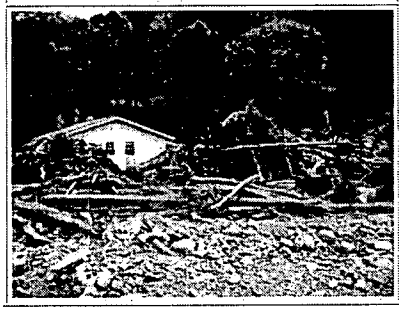
Examples of landslide damage from Hurricane Ivan

The following shows selected examples of landslide damage from Hurricane Ivan. Other examples of landslide damage are at http://www.geology.enr.state.nc.us/news.htm



Macon Co. — Peeks Creek Community — This view was taken from a helicopter by a North Carolina staff geologist on Sunday, September 19, 2004. Only the upperthird of the over two-mile-long landslide track is shown.

Image taken by North Carolina Geological Survey staff geologist on September 19, 2004.



Macon Co. — Peeks Creek Community — This view shows a destroyed home located in the lower third of the landslide track.

Image taken by a North Carolina Geological Survey staff geologist on September 28, 2004.

NCGS . 1612 Mail Service Center . Raleigh, NC 27699-1612 . 919.733.2423 x403 . E-mail

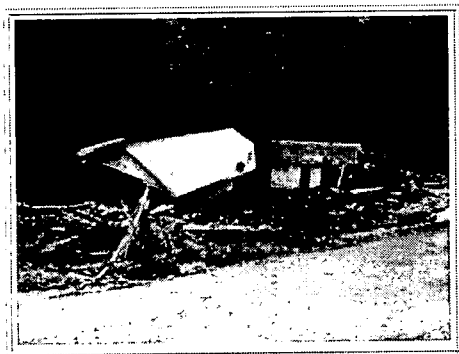
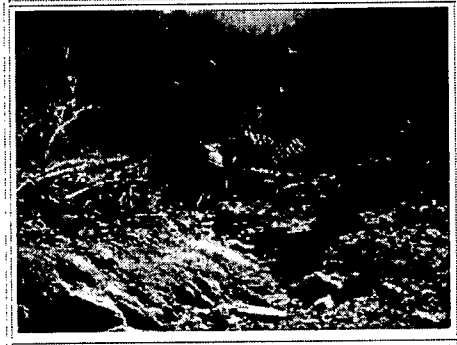
N.C. Geological Survey - Hazards

Landslides from Hurricanes Frances & Ivan

Geologic hazards — Landslides related to Hurricanes Frances and Ivan

Examples of landslide damage from Hurricane Ivan (*continued*)

The following shows selected examples of landslide damage from Hurricane Ivan. Other examples of landslide damage are at http://www.geology.enr.state.nc.us/news.htm

	Macon Co. — Peeks Creek Community — This view shows two structures damaged by the landslide. These homes were located in the lower third of the landslide track. Image taken by a North Carolina Geological Survey staff geologist on September 28, 2004.
	Macon Co. — Peeks Creek Community — This view shows one structure damaged by the landslide. This structure is located in the lower third of the landslide track. Image taken by a North Carolina Geological Survey staff geologist on September 28, 2004.
	Madison County, NC — Little Pine Road — Landslide damaged a home and destroyed a barn about 6.5 miles southwest of Marshall, NC. Geologist (small figure in front of damaged structure) examines landslide material. Image taken by North Carolina Geological Survey staff geologist on November 10, 2004.
	Buncombe County, NC — Starnes Cove — Home destroyed by a landslide. Courtesy of Asheville Citizen-Times on-line edition of September 18, 2004.

NCGS . 1612 Mail Service Center . Raleigh, NC 27699-1612 . 919.733.2423 x403 . E-mail

Western North Carolina Landslide Fact Sheet

N.C. Geological Survey – 2004
www.geology.enr.state.nc.us (919) 733-2423
Division of Land Resources, DENR
N.C. Division of Emergency Management
www.ncem.org (919)733-3867

I. Areas susceptible to landslides

- Natural or manmade steep slopes - usually greater than 30 degrees
- Areas below steep slopes, especially those near streams.
- Areas on hill or mountainsides where runoff accumulates.
- Disturbed or modified slopes on mountainsides.
- Where roads cross drainages or streams on mountainsides.

II. What to do if your house is threatened by a landslide

- Leave the house and evacuate the area immediately.
- Stay away from streams, creeks and drainages.
- If you cannot leave the house, move to an upper floor.
- Notify emergency response personnel or the fire department.

III. Indicators that more movement is likely following a landslide – especially following heavy rains

- Unstable material such as loose, wet soil remaining in the landslide scar area. Exposed, in-place bedrock in the scar and along the landslide path, however, may indicate most of the material may have already moved, and the scar area is more stable.
- Cracks in the ground allow water to infiltrate the soil and make the slope more unstable.
- Leaning or tilted trees or utility poles around the scar area.
- Water seeping or flowing from the landslide scar area.
- A terraced ("stair-stepped") ground surface around the scar area.
- Culverts, roads or blocked culverts directing runoff toward the unstable area.

IV. Different Types of Slope Movements/ Some Criteria for Recognizing Potential Slope Movements Landslides

Of utmost concern in the mountains of western North Carolina are landslides and rockfalls. Indicators for potentially unstable ground include the following:

- Open cracks in the surface above or on a slope.
- Cracking of the foundation of a building, retaining wall or other structure.
- Doors and windows out of plumb, or that stick or will not open and close properly.
- New cracks or bulges in pavement in roadways and sunken roadbeds.
- Soil moving away from foundations, decks or patios of a building.
- Broken or leaking water, gas or other utility lines.
- Leaning utility poles and street signs.
- Leaning, tilting or dying trees, tree roots stretched across cracks or areas of previous sliding.
- Springs, seeps or saturated ground in areas that have not typically been wet before.

Geohazards in North Carolina

N.C. Geological Survey – 2004
www.geology.enr.state.nc.us (919) 733-2423
Division of Land Resources, DENR
N.C. Division of Emergency Management
www.ncem.org (919)733-3867

Overview

North Carolina has significant geologic hazards that affect public safety and cause substantial economic loss. The primary geologic hazards facing North Carolina include:

1. Landslides occur primarily in the mountains, but also in the Piedmont and Coastal Plain along highway right-of-ways and river valleys. While it is difficult to predict when and where a landslide will occur and how big the event will be, field investigations and research can identify potential landslide areas and past landslide events. Landslides are likely to reoccur in the same places. Therefore it is important to know where previous landslides have occurred.

2. Coastal erosion and flooding from hurricanes, tropical storms, and nor'easters have tremendous impact along the 330-mile coastline of North Carolina. Current research suggests that ice-age buried river valleys, now under the ocean, may be a significant control on coastal erosion. Isabel Inlet, which cut through Hatteras Island in 2003, may have formed in such a geologic setting.

3. Ground collapse and subsidence above abandoned mines are a threat in the Piedmont and mountains. This type of hazard exists where development occurs over abandoned underground mine workings, the mine tunnels and shafts, which may extend for hundreds of feet underground. Although once relatively rare, the potential for damaging subsidence will increase as urban growth spreads into once sparsely populated areas where underground mining occurred.

4. Sinkholes mainly occur in the central to southeast Coastal Plain. Sinkholes result from dewatering of voids in the underlying limestone. Natural and human-induced changes in the surface and groundwater flow can lead to the formation of sinkholes.

5. Earthquake (seismic) risk within North Carolina is relatively low. However, three nearby seismically active areas that include the Charleston, S.C., the Eastern Tennessee, and the New Madrid seismic zones could pose an earthquake risk to North Carolina. A magnitude 5 or greater earthquake in these zones would not only cause structural damage in western North Carolina, but would likely generate landslides that would block major transportation routes.

6. Other hazards include:
    - acid-producing rock

- naturally occurring contaminants in groundwater, soil, and bedrock (e.g., arsenic, radon, uranium, and asbestos minerals)
- high shrink-swell soil.

North Carolina Geological Survey Work in Geohazards

- The State Geological Survey provides technical assistance in emergency situations when requested by emergency management agencies.
- The State Geological Survey is presently inventorying geohazards for a database of geohazards in North Carolina.
- This information on geohazards and critical infrastructure, once available in an integrated GIS format, can be used by state, local, and federal government agencies to prepare emergency response plans commensurate with the risks these hazards pose for their respective jurisdictions.
- In addition to emergency response planning, this geohazards inventory can be integral to zoning, construction permitting, and siting critical facilities in order to avoid potential problems and unnecessary risks.
- Funding for limited geohazards work in FY 04-05 is provided by a cost share grant from the Division of Emergency Management.
- Funding for future geohazards work is uncertain.

November 19, 2004 ERC Meeting
EXHIBIT N

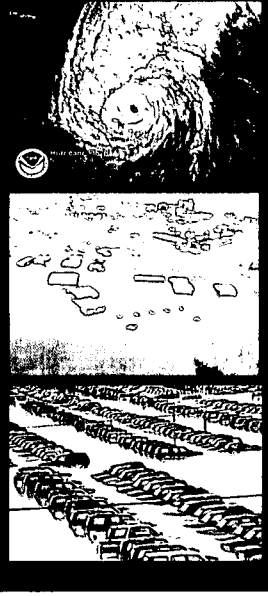
Floodplain Mapping in North Carolina

A New Generation of Maps

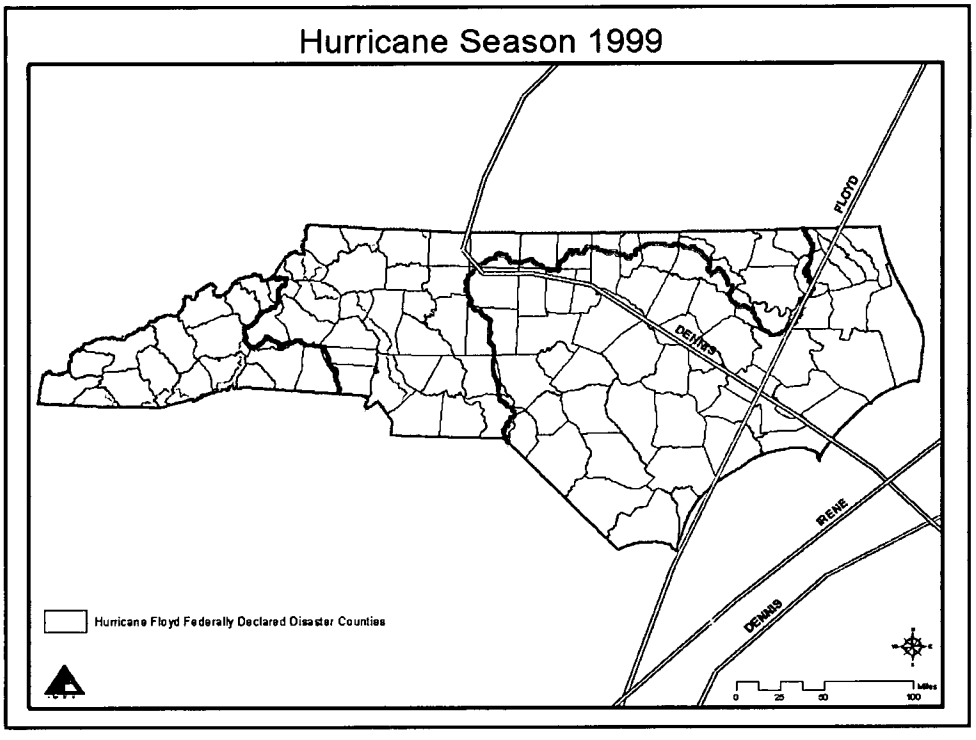
November 19, 2004 – Environmental Review Commission

Why is NC Undertaking the Project?

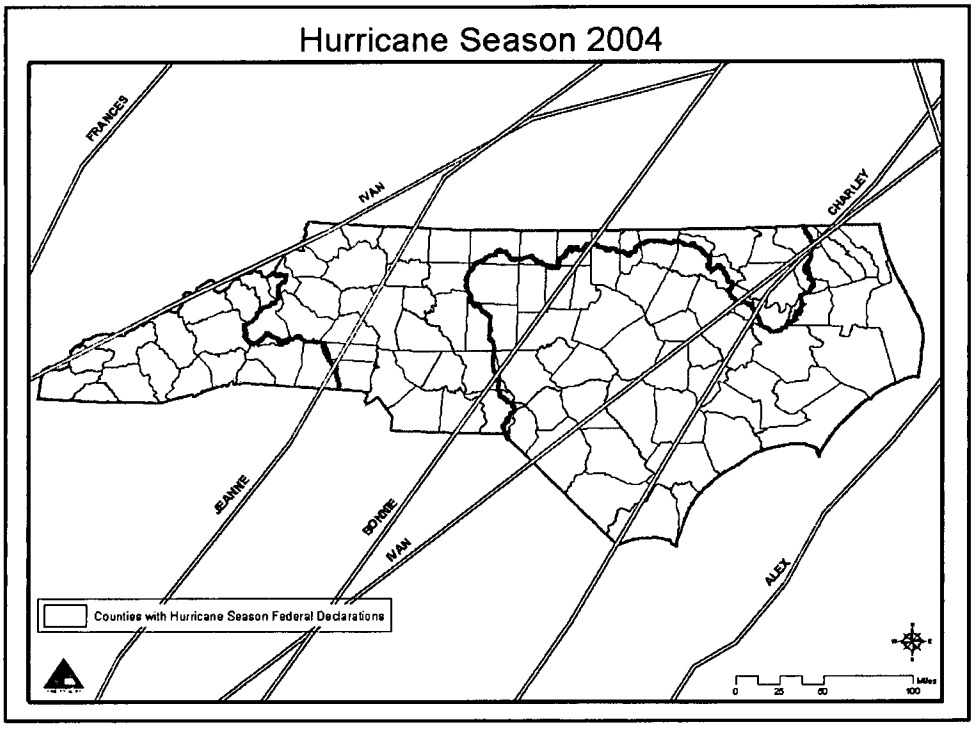
- 20+ Federally declared disasters in NC since 1989
- Majority of disasters have been due to flooding
- Hurricane Floyd revealed flood hazard data and map limitations
- 55% of NC FIRMs – at least 10 yrs old
- 75% of NC FIRMs – at least 5 yrs old
- 80% of properties damaged or destroyed during Floyd were not shown in SFHA
- $56M cost avoidance annually from flooding with new, accurate maps
- B:C Analysis of 7:1 - 3.5:1
- Many counties & communities have indicated a lack of resources to take on the responsibility



Hurricane Season 1999



Hurricane Season 2004

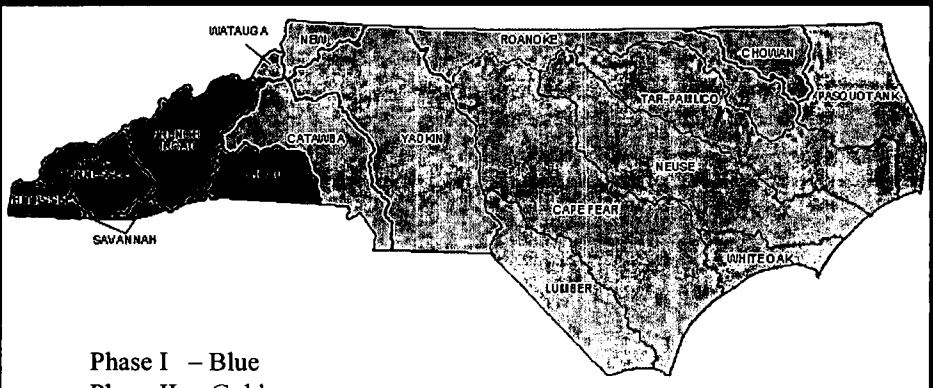


State Response / Strategies

- Strategy 1 - Establishment of a [illegible] to acquire, process and disseminate current, accurate, and detailed elevation data, flood hazard studies, reports, and maps (hard copy and digital).
- Strategy 2 - Establishment of North Carolina as a [illegible] through the FEMA Cooperating Technical Partners Program. This designation would establish North Carolina as the primary custodian for all Flood Insurance Rate Maps in NC.
- Flood Warning Strategy - Establish capability to determine and display what roads and bridges are currently inundated by flood waters and which ones will be in the near future (forecast).

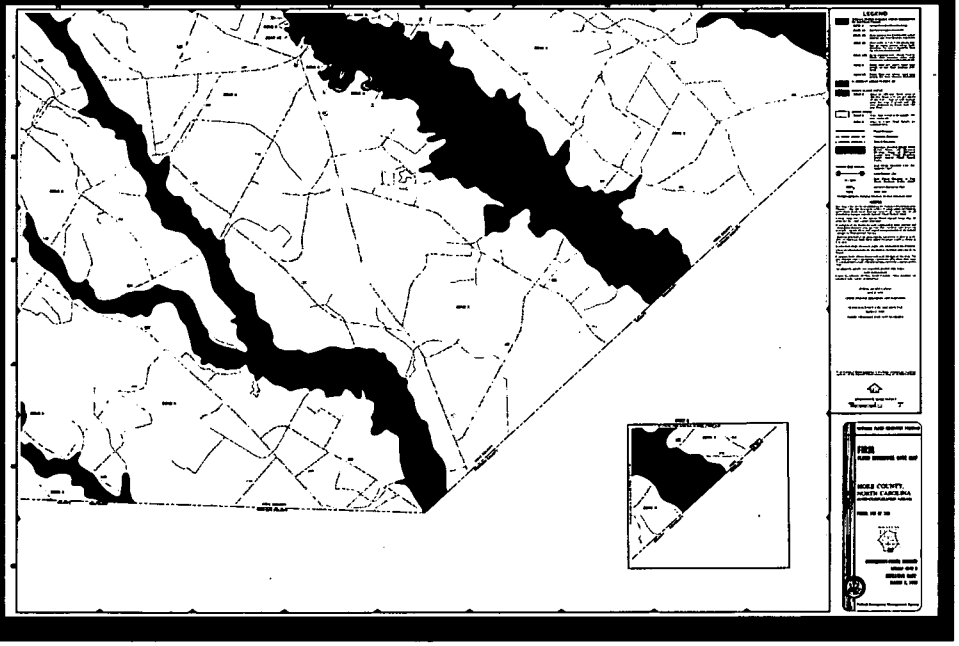
North Carolina Floodplain Mapping

Implementation Phases

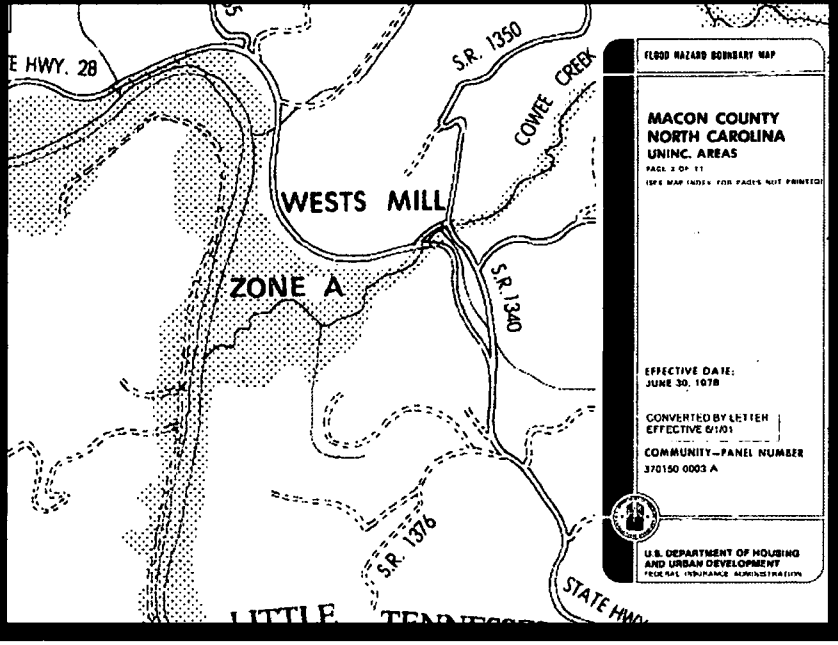


Phase I – Blue
Phase II – Gold
Phase III – Green

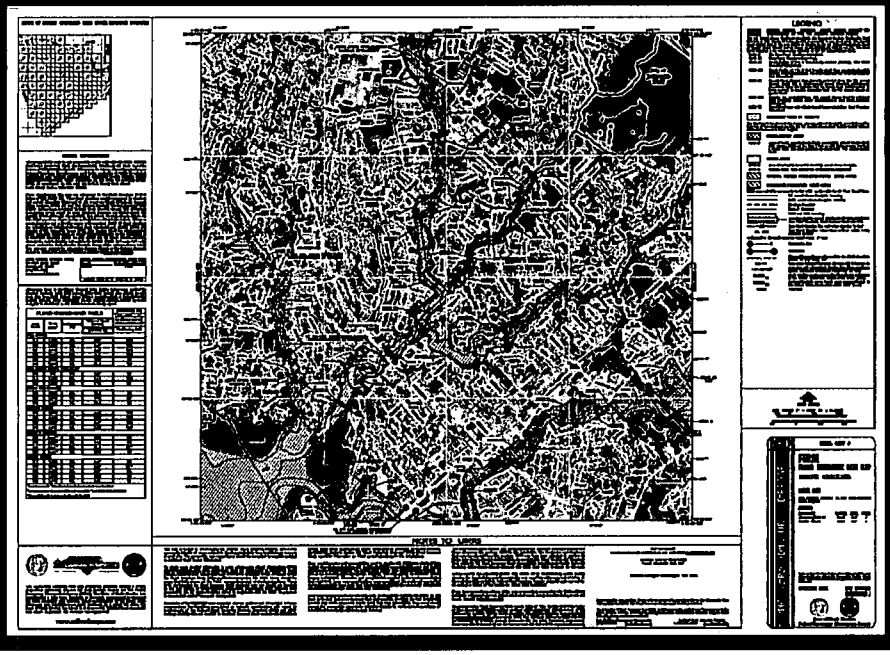
Current Panels – Countywide



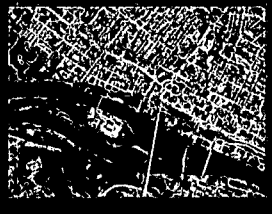
NC Effective FEMA Floodplain Maps – Macon County



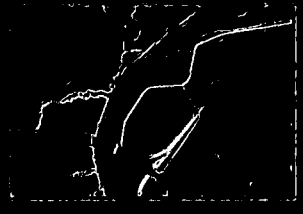
New Panels - Statewide



Key Components of the New Maps - Production



Base Data +



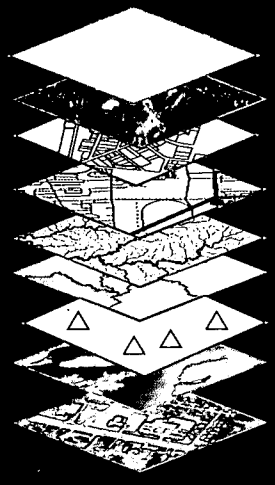
Topography +

Flood Hazard Data

=

Digital FIRM

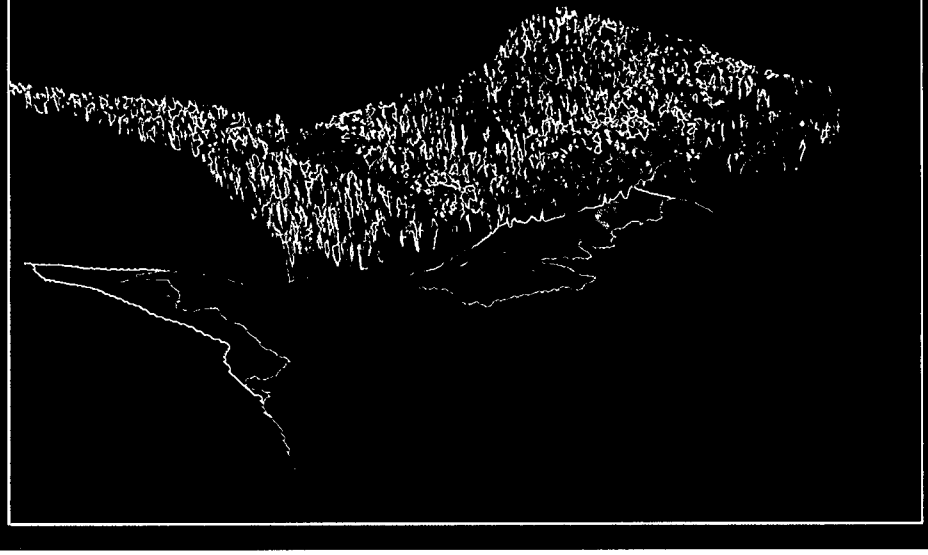
Floodplain Mapping – Terabytes of Digital Data

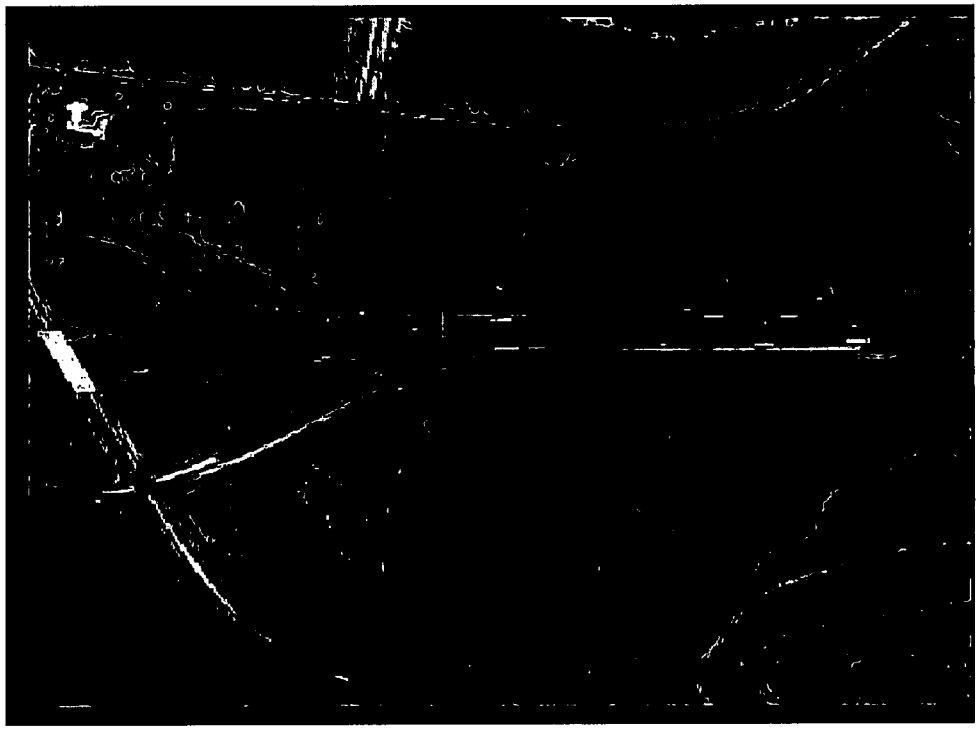


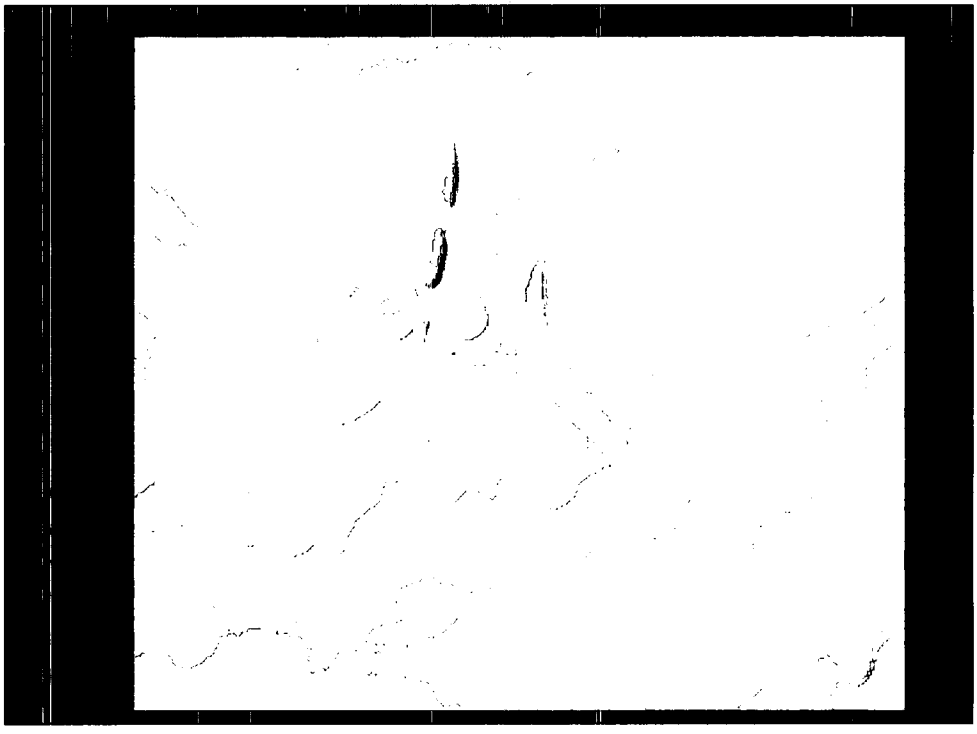
- Special Flood Hazard Areas
- Soils
- Land Ownership
- Transportation
- Surface Waters
- Boundaries
- Geodetic Control
- Elevation
- Aerial Imagery

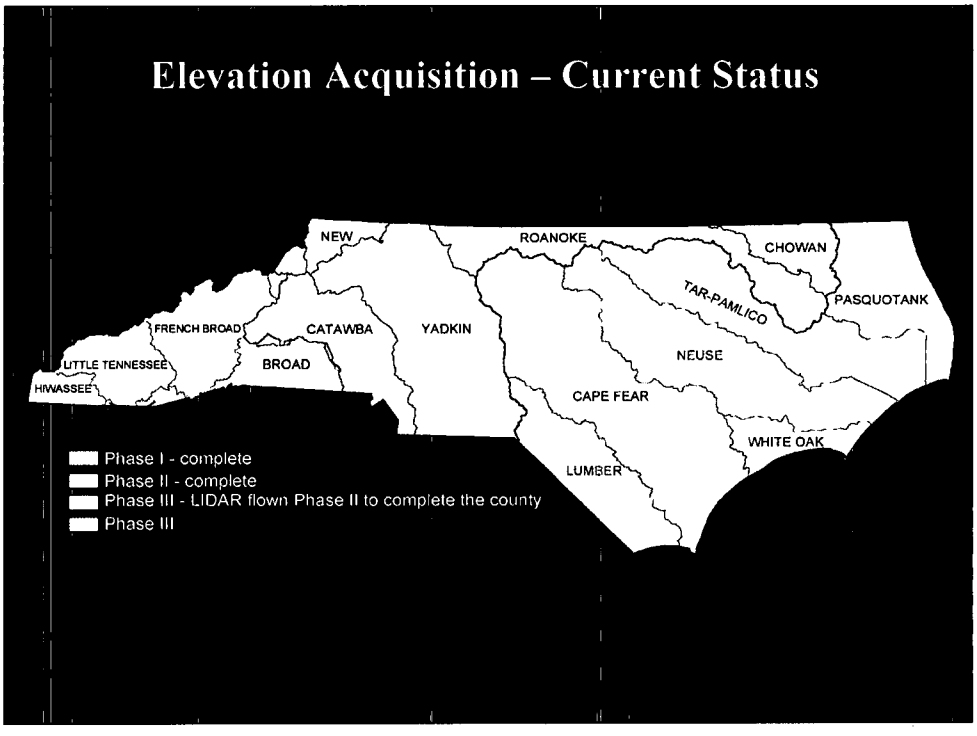
Elevation Data – LIDAR Acquisition Simulation

Elevation Data – Bare-Earth Post Processing

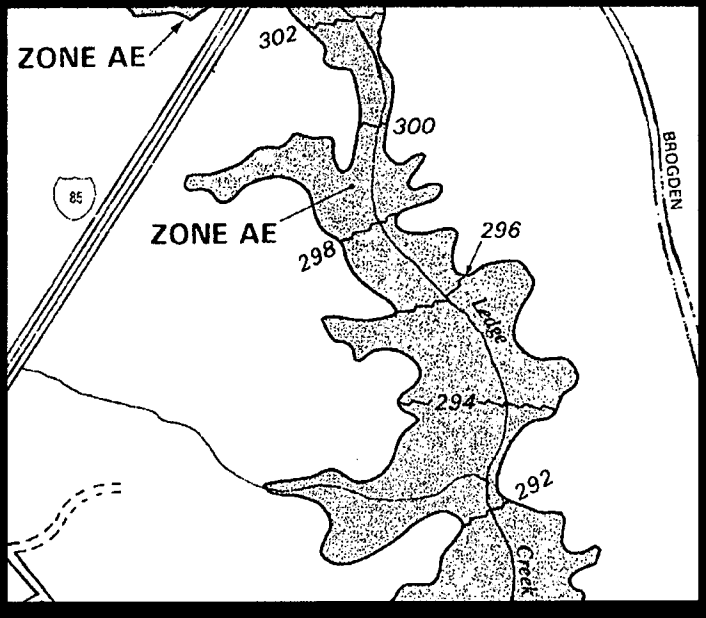




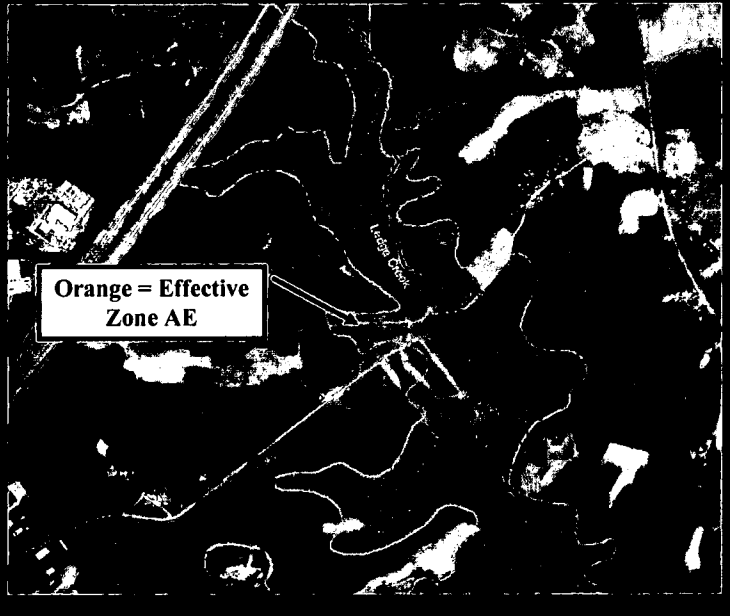



Elevation Acquisition – Current Status
NEW
ROANOKE
CHOWAN
TAR-PAMLICO
PASQUOTANK
FRENCH BROAD
CATAWBA
YADKIN
NEUSE
LITTLE TENNESSEE
BROAD
HIWASSEE
CAPE FEAR
WHITE OAK
LUMBER
Phase I - complete
Phase II - complete
Phase III - LIDAR flown Phase II to complete the county
Phase III

Redelineated Methods – Effective Mapping

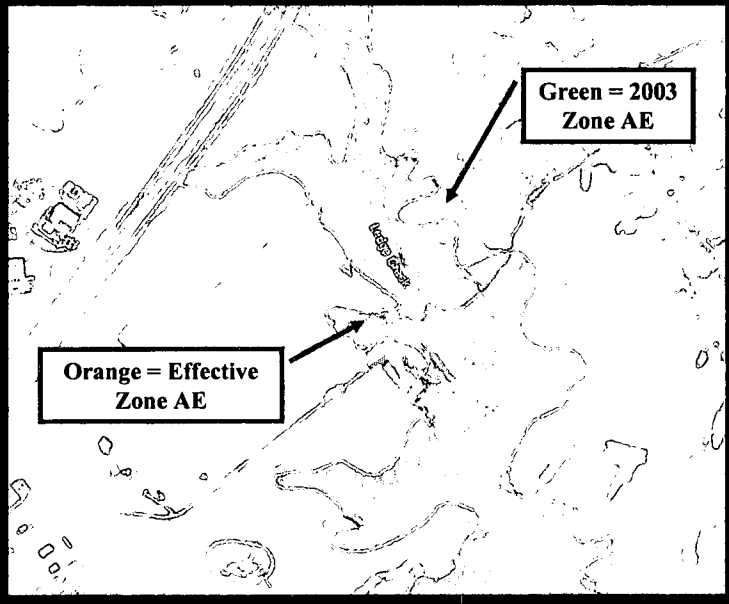


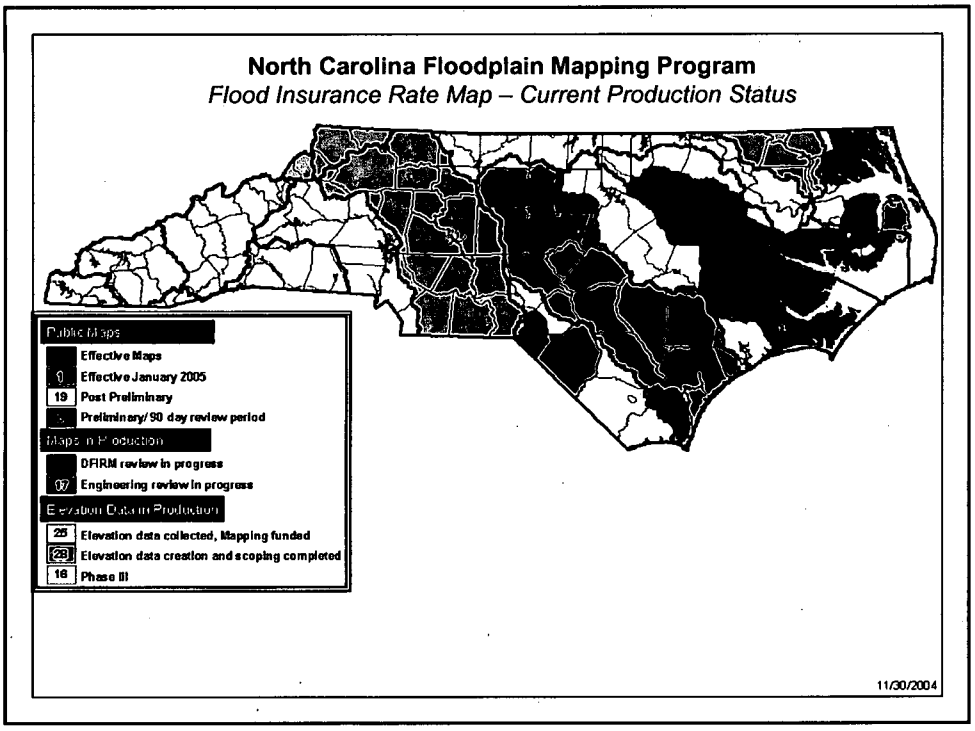
Redelineated Methods - FEMA Q3



Redelineated Methods - 2003 Mapping

Redelineated Methods- FEMA Q3 vs. 2003 Mapping





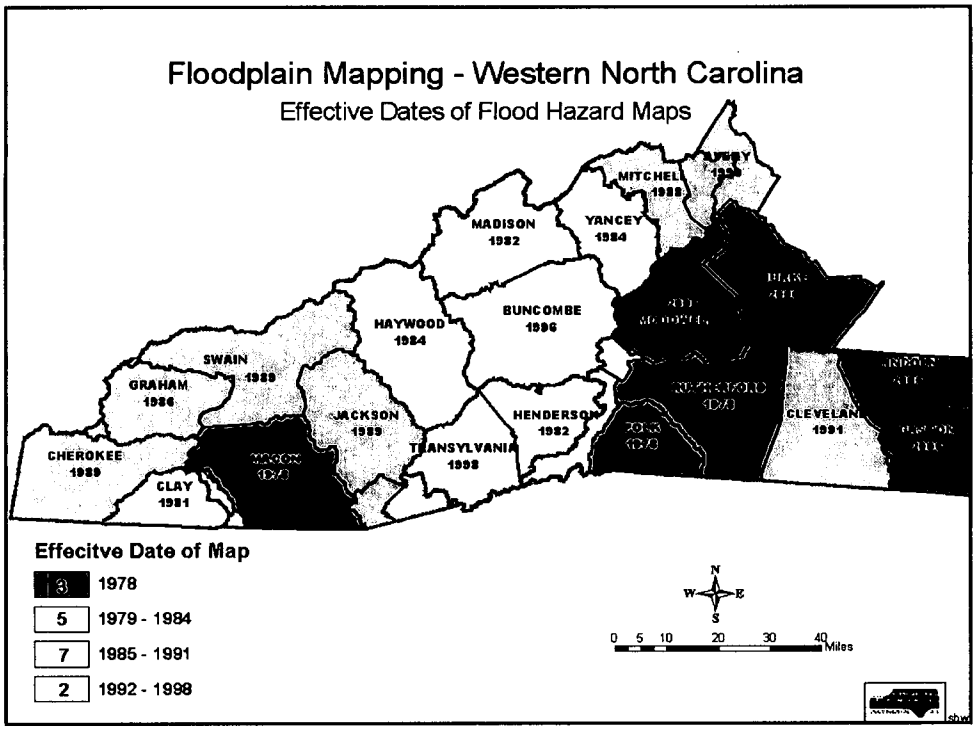
Flood Hazard Maps – Western North Carolina

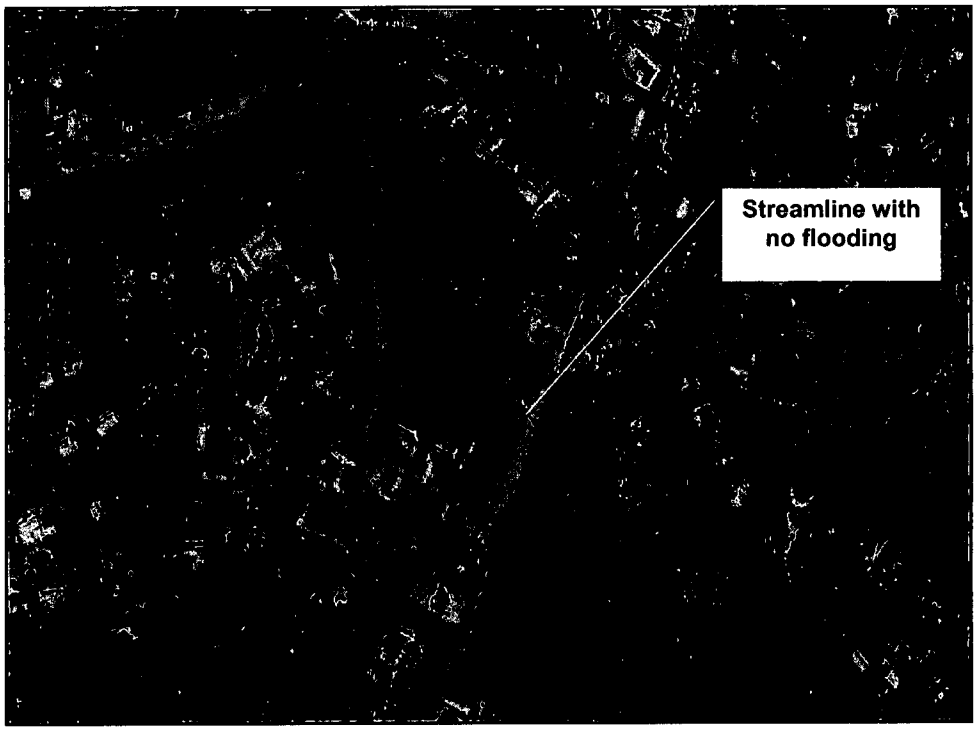
Current Characteristics

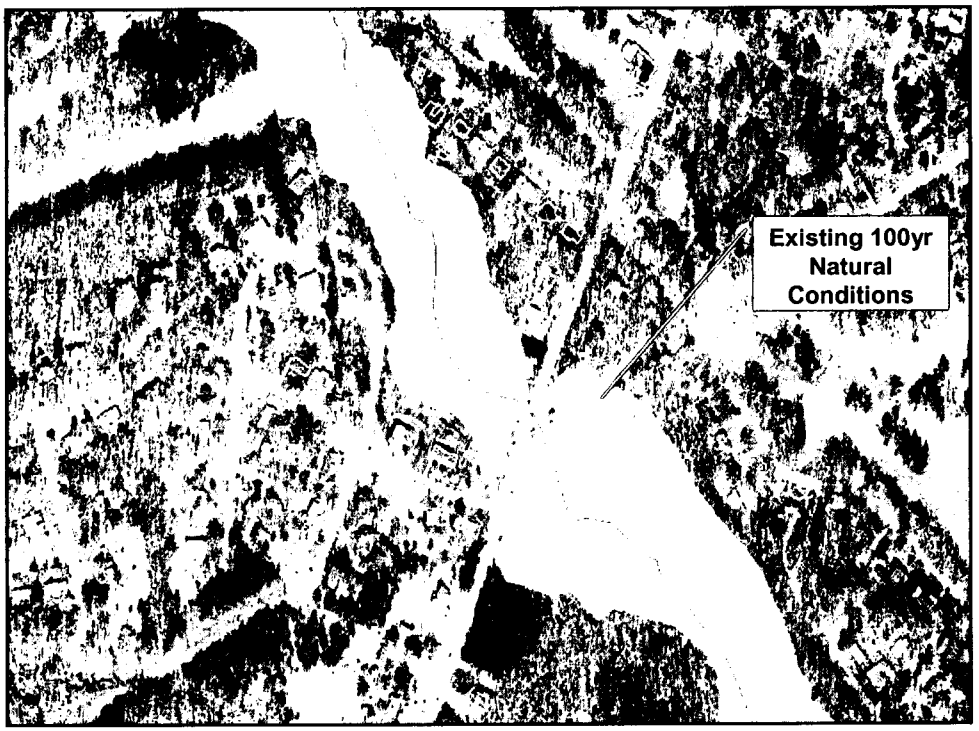
Age of Maps - (16 Counties in the 5 Western River Basins)

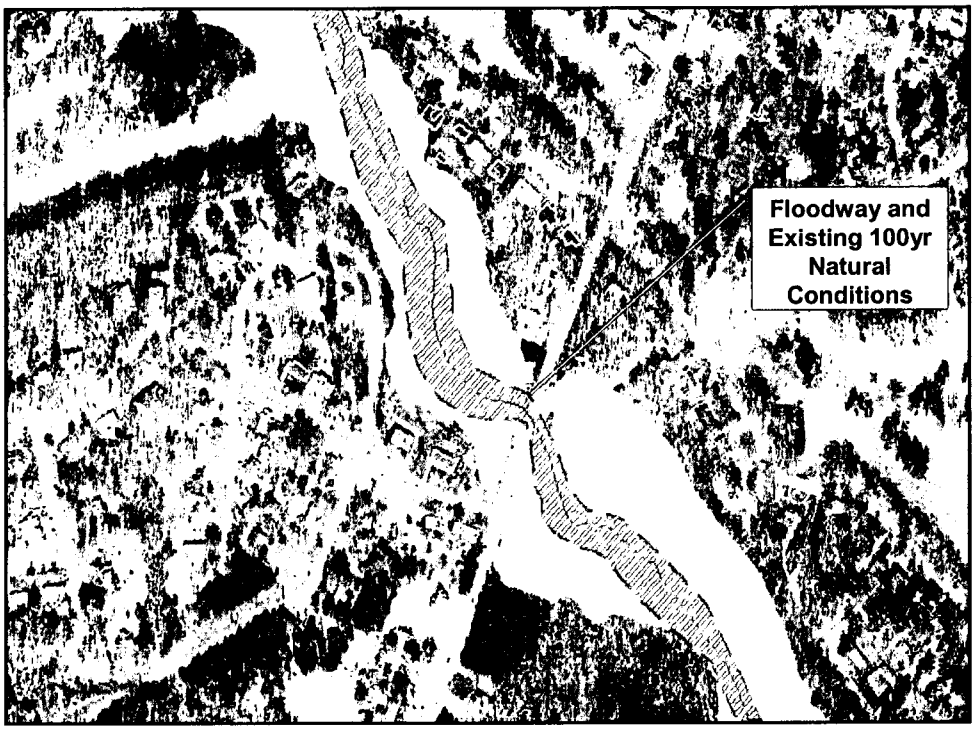
0%	Less than 5 Years Old
12%	5 – 10 Years Old (2 Counties)
38%	11-20 Years Old (6 Counties)
50%	20+ Years Old (8 Counties)

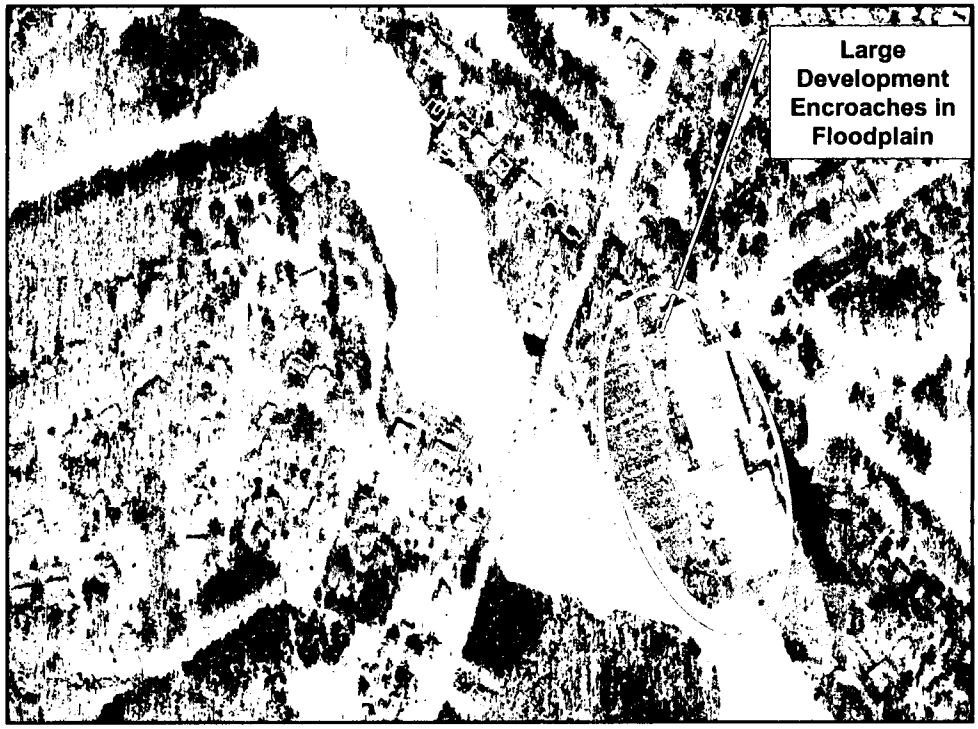
- Map scales range from 1'=2,000 feet to 1'=1,000 feet
- Majority of Maps use 10M to 30M Digital Elevation Models
- Four (4) Counties Have No prior Flood Studies – No BFEs


Floodplain Mapping - Western North Carolina
Effective Dates of Flood Hazard Maps
MITCHEL
1988
MADISON
1982
YANCEY
1984
HAYWOOD
1984
BUNCOMBE
1996
SWAIN
1989
GRAHAM
1986
JACKSON
1989
HENDERSON
1982
TRANSYLVANIA
1998
CHEROKEE
1989
CLAY
1991
CLEVELAN
1991
Effecitve Date of Map
3 1978
5 1979 - 1984
7 1985 - 1991
2 1992 - 1998
N
W
E
S
0 5 10 20 30 40 Miles


Streamline with
no flooding


Existing 100yr
Natural
Conditions

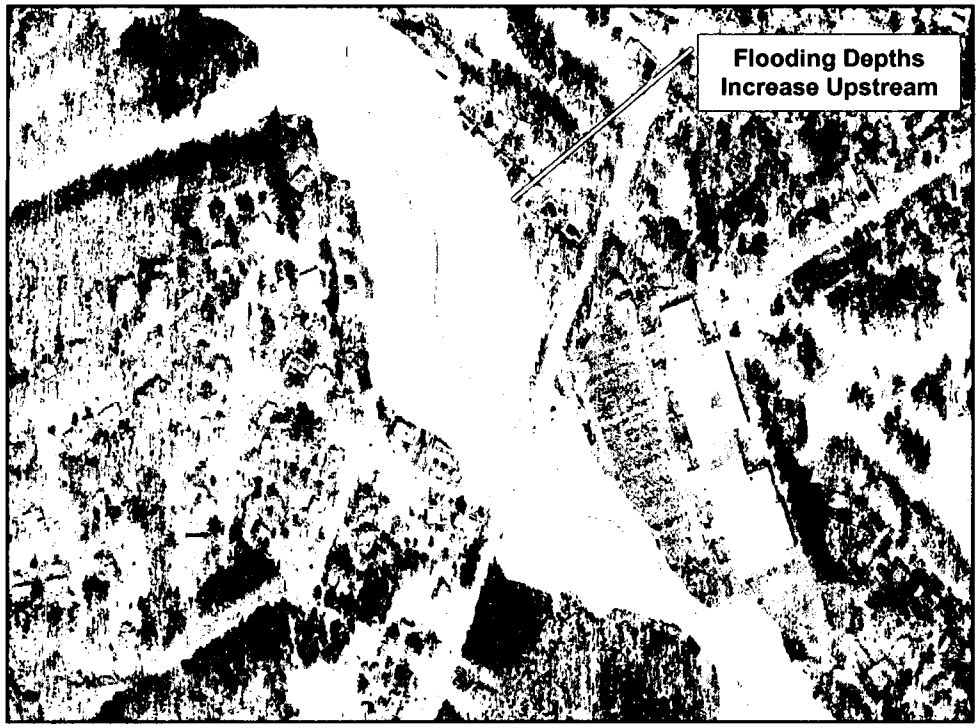

Floodway and
Existing 100yr
Natural
Conditions

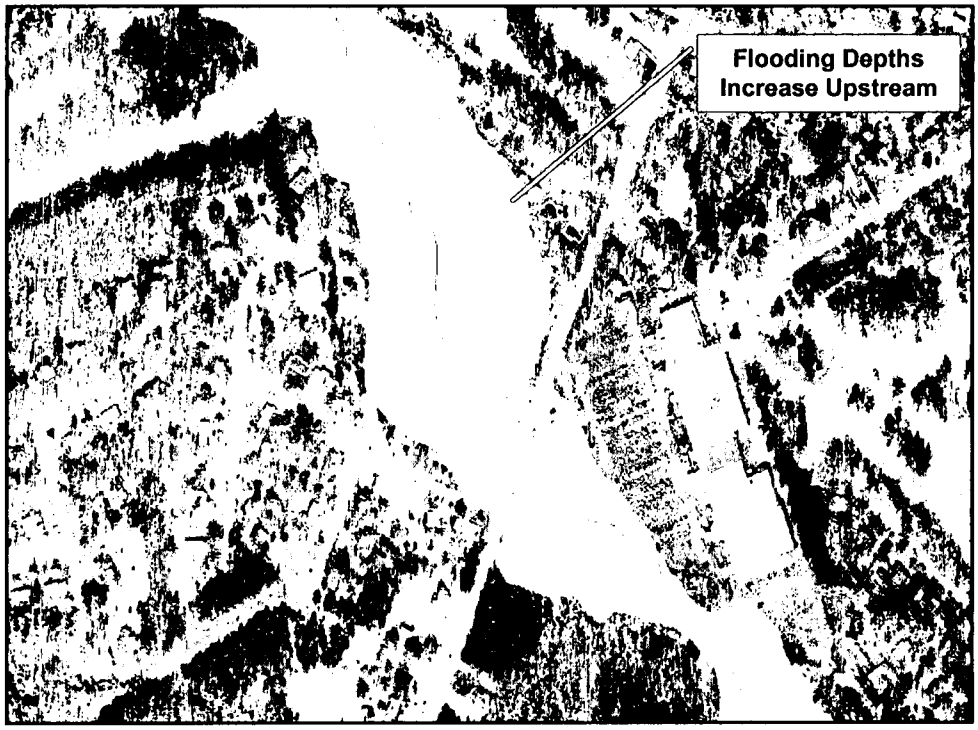

Large
Development
Encroaches in
Floodplain

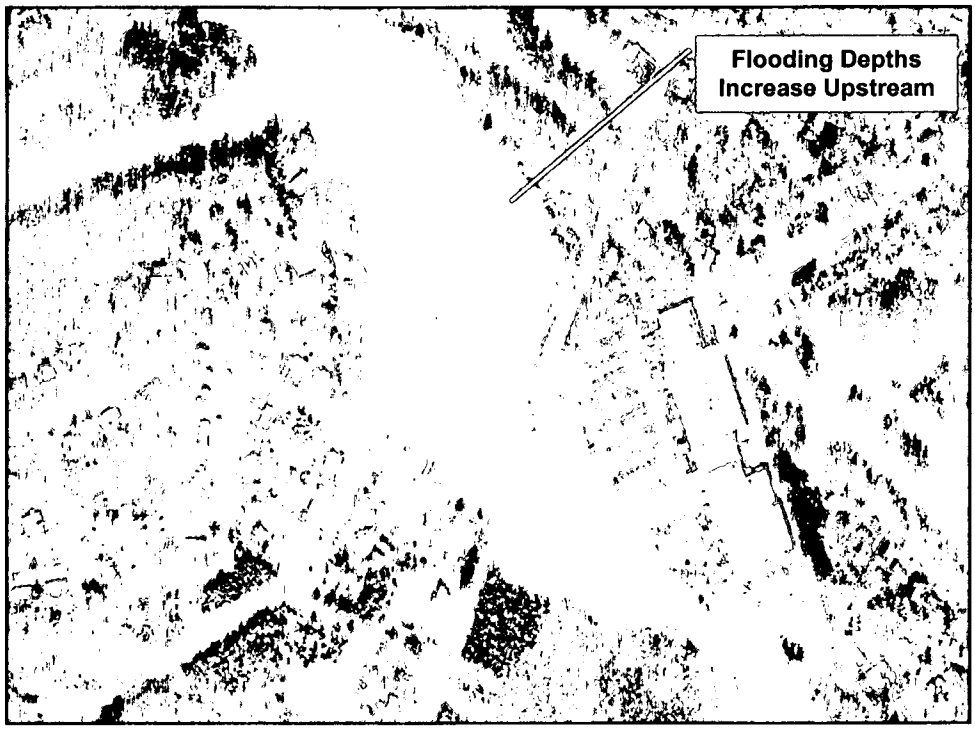
Flooding Depths
Increase Upstream

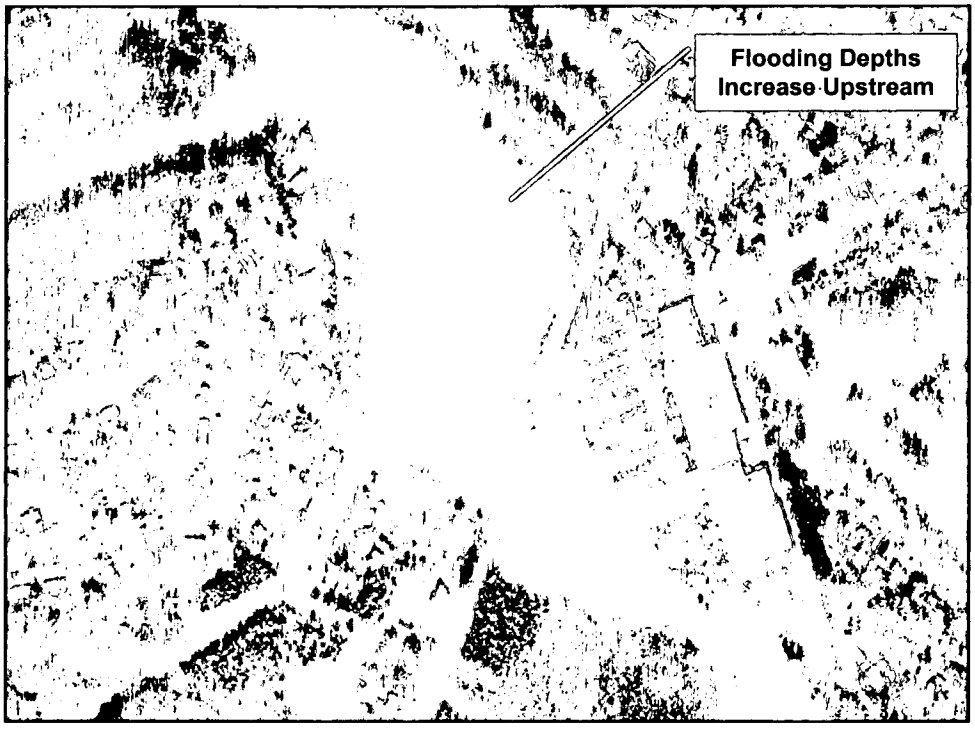
Flooding Depths
Increase Upstream

Flooding Depths
Increase Upstream


Flooding Depths
Increase Upstream

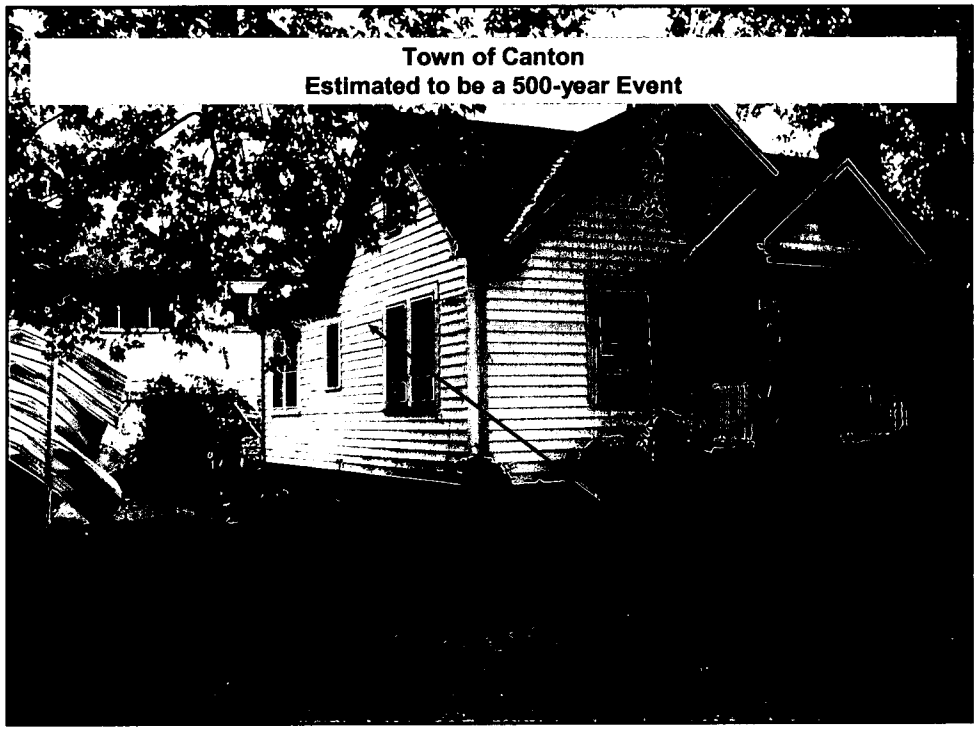

Flooding Depths
Increase Upstream

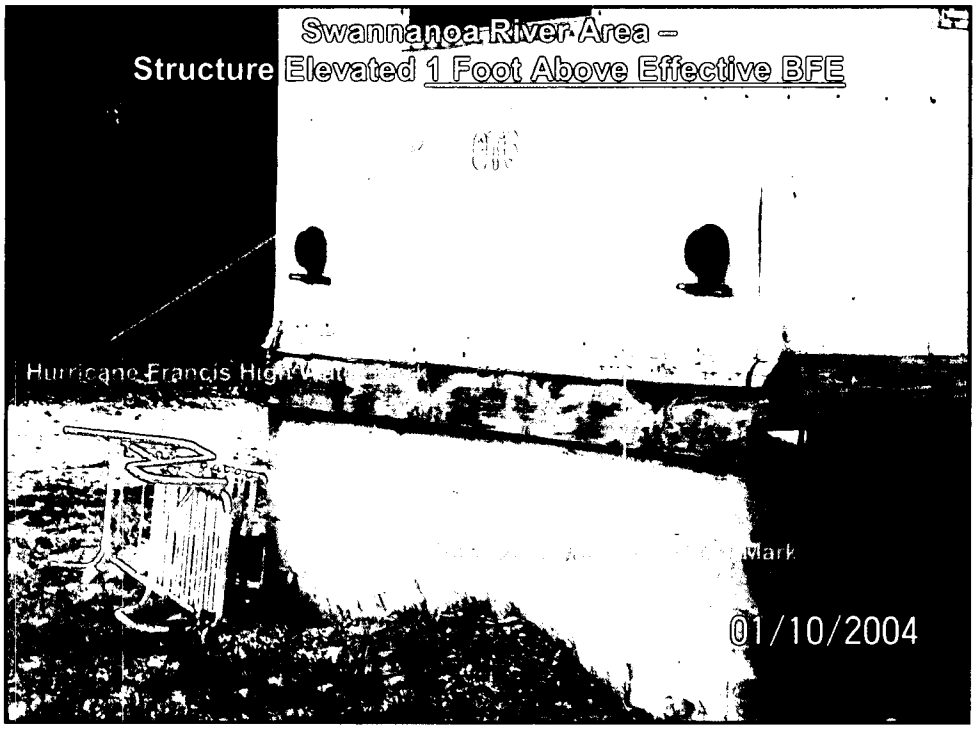

Flooding Depths
Increase Upstream


Flooding Depths
Increase Upstream

Town of Clyde
Structures were Built 2 1/2 Feet Above the Effective Base Flood Elevation on FIRMs

Town of Canton
Estimated to be a 500-year Event





Data Requirements /Associated Costs - Phase II and III

Phase II

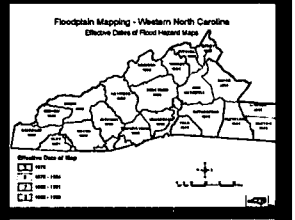
- Digital Orthophotos – Alexander, Avery, Burke, Granville, Martin, McDowell, Northampton, Watauga, Alleghany, Anson, Ashe, Richmond (No additional state funds needed)
- Engineering Studies / Mapping – ($19.8 million – FEMA funds)

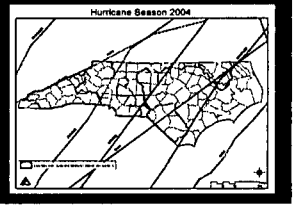
Phase III

- Elevation Data – Five Western River Basins / 16 counties
  ($ 5.2 million – State funds)
- Digital Orthophotos – Avery, Mitchell, Swain, Yancey
  ($ 236,000 – State funds)
- Engineering Studies / Mapping – ($9.8 million – FEMA funds)

New Generation of Maps – Phase III

- North Carolina is well under way with new statewide Flood Insurance Rate Maps
- The FIRMs are being generated digitally using state, county and municipal GIS layers (through partnering and leveraging of existing data)
- Hurricane Francis and Ivan demonstrated flooding hazards exist in Western part of North Carolina (Phase III)
- Existing FIRMs in Western North Carolina are outdated or inaccurate
- Phase III FIRM generation will require new elevation data ($5.2M) and new orthophotography for select counties ($236K)
- State funding will leverage FEMA funding for engineering and mapping - $9.8M





Visit the State's Web Site:

www.ncfloodmaps.com

Thank You.

DRAFT

MINUTES
ENVIRONMENTAL REVIEW COMMISSION
December 7, 2004

The Environmental Review Commission (ERC) met on Tuesday 7 December 2004 at 9:30 a.m. in Room 544 of the Legislative Office Building.

Senator Daniel Clodfelter presided over the 7 December 2004 meeting. The following members were present: Senators Albertson, Clodfelter, Dorsett, Horton, Swindell and Weinstein, and Representatives Fox, Gibson, Hackney, LaRoque, Weiss and Williams. Mr. George Givens, Commission Counsel, Jeffrey Hudson, Assistant Commission Counsel, Susan Iddings, Assistant Commission Counsel, Jennifer McGinnis, Assistant Commission Counsel, Tim Dodge, Research Assistant, and Mary Watson, Commission Clerk were also present.

On 23 November 2004, notice was sent to members and interested parties via e-mail and regular mail. A copy of the notice is included in the attachments to these minutes as **Exhibit A**. A copy of the visitor registration and the agenda for the meeting are included in the attachments as **Exhibits B and C**.

Senator Clodfelter called the meeting to order and called on co-chairs for their remarks.

George Givens, Commission Counsel, was asked to explain the agenda.

Mr. Givens said the public staff planning meeting for this meeting was held on Wednesday 1 December 2004.

Mr. Givens said that staff is in the process of writing thank you letters to the faculty and staff of Duke University Marine Laboratory, the Institute of Marine Sciences at UNC, the Rachel Carson Estuarine Preserve, the Division of Marine Fisheries, the Division of Coastal Management in DENR, Dr. Michael Orbach and others who helped put together an excellent coastal site visit for the Environmental Review Commission.

Mr. Givens said that ERC may have longer meetings in January and is looking for feedback from members on whether a work through lunch meeting, with lunch being paid for by members, is feasible. He asked members to give their feedback to either him or one of the co-chairs.

Mr. Givens said that on 12 January 2005, ERC would meet jointly with the Joint Legislative Commission on Seafood and Aquaculture to discuss the saltwater fishing license. On 13 January 2005, the regular monthly business meeting will be held, and the Joint Meeting with Transportation oversight is scheduled for 20 January 2005.

Mr. Givens said that 25 January 2005 is being held for legislative proposals or wrap-up business with ERC.

Mr. Givens said that the staff planning meeting for the January 2005 meetings would be held on 5 January 2005 at 10:00 a.m. in Room 605.

Mr. Givens asked guests to sign the visitor registration forms and asked members to sign and send forward their reimbursement forms.

Mr. Terry L. Pierce, Director, Division of Environmental Health, DENR, gave a report on the resources needed to phase-in a statewide expansion of the Wastewater Discharge Elimination Program (WADE). A copy of Mr. Pierce's slides is listed as **Exhibit D**.

Mr. Pierce said that the WADE program is based out of Asheville and serves 26 western North Carolina counties. The program works with local health departments to identify straight piping and to keep discharges out of the streams, particularly those that serve water supplies.

Mr. Pierce said that when the WADE program began, it was assumed that straight piping was probably worse in the 22 western counties of North Carolina. The program has now expanded to 26 counties; however the impact of straight piping does not fall only on those 26 counties, it is a statewide problem.

Mr. Pierce said that straight piping presents a threat to public health and to the environmental quality of North Carolina waterways and communities across the state.

Mr. Pierce said that for the WADE program to expand to all 100 counties would take over $2 million. At present, there are no formal plans to expand statewide; however, there is a small amount of money that would be included in situations for low-income individuals to repair systems.

Senator Clodfelter asked Mr. Pierce if the EPA 319 Grants required a match from the State.

Mr. Pierce said that was correct.

Mr. Pierce next gave a report on the programs, activities, and priorities of the Division of Environmental Health. A copy of his slides is included in a handout listed as **Exhibit E**.

Mr. Pierce said that one of the areas that falls under the Environmental Health Section services is Methamphetamine Labs which are becoming an increasing problem in North Carolina.

Mr. Pierce said that new rules put into place for January 2005 to clean up meth labs. These new rules do not require that individuals be certified to do the cleanup and is left up to the property owner to do the assessment and cleanup.

Mr. Pierce said that Environmental Health Services would be working with other state agencies and personnel to help the state and local employees to be aware of potential hazards as they encounter meth labs.

Mr. Pierce said that cleanup and assessment would involve a lot of divisions within DENR and law enforcement in the cleanup of hazardous chemicals.

Mr. Pierce said that the Shellfish Sanitation and Recreational Water Quality Section is responsible for assuring water quality.

Mr. Pierce said that storm waters that settle into coastal waters carry sediment and pollutants, which can cause disease either through, skin contact or ingestion of water or consumption of raw shellfish.

Mr. Pierce said that coastal counties rely on revenue from tourists and also shellfish consumption. When shellfish harvesting areas are closed, harvesters and local economies face hundreds of thousands of dollars in losses.

Mr. Pierce said that an average of 18 percent of the 2.1 million acres of potential shell fishing waters are closed annually. The Shellfish Sanitation and Recreational Water Quality Section uses rainfall amounts to manage these additional closures. Some of these waters are high in bacteria with fecal contaminant after it rains and the waters remain closed until testing confirms satisfactory results.

Mr. Pierce said that most of the storm drains, which are major contributor to shellfish closures, have not been mapped.

Senator Clodfelter asked Mr. Pierce what percentage of the coastal and sound areas have been mapped.

Mr. Pierce called on Mr. Wayne Mobley, Section Chief for Shellfish and Recreational Waters, to answer Senator Clodfelter' question.

Mr. Mobley said that the GIS mapping has recently been started with most of the storms drains being mapped in relation to the recreational water quality program; however, for the shellfish areas, they are not very far along. Hopefully, this mapping will be completed in the near future.

Representative Gibson asked Mr. Pierce, that if there were no humans on the coast and the amount of suspended material, sedimentation and runoff were "x", when and how and where can we start evaluating what the storm systems being put into place would improve what is happening naturally.

Mr. Givens asked Mr. Pierce if the stormwater discharges were being mapped on the Oceanside as well as stormwater or is it just the Oceanside.

Mr. Pierce said they are trying to GIS a lot of the potential sources of pollution. He called on Mr. Mobley to answer Mr. Givens questions.

Mr. Mobley said that they are GISing the entire storm drains in the ocean. Some of the drains they do not have are some that discharge into the shellfish waters.

Mr. Givens asked if the efforts were on the Oceanside or just the estuarine side.

Mr. Mobley said that the effort has been with the recreational water quality program first because that is where the grant money was allocated. Most of those have been completed and the sound side drains are now being mapped.

Mr. Givens asked Mr. Mobley if their resources would be adequate to accomplish this.

Mr. Mobley said they would be.

Mr. Givens asked Mr. Mobley if they were responsible for monitoring water for swimming purposes.

Mr. Mobley said that was within his division.

Mr. Givens asked Mr. Mobley how well coordinated this monitoring is with the shellfish sanitation aspect.

Mr. Mobley said that it was very well coordinated. They use some of the same resources and equipment to sample both of these areas.

Senator Albertson asked Mr. Pierce where we are in the process of shellfish closures and would we see an additional increase in closures.

Mr. Mobley said that he did not have any graphs to show this information right now but they have seen a marked deterioration in water quality. One of the concerns is that the shellfish waters, which are managed by rainfall, are not reopened following a heavy rainfall as they were in the past.

Senator Horton asked Mr. Mobley if there were less harvestable shellfish waters in North Carolina than 10 years ago.

Mr. Pierce answered in the affirmative.

Senator Horton said that apparently our efforts to clean up the shellfish waters is not working and asked for an explanation of where we have failed and what we need to do to correct the problem.

Mr. Mobley said that one of the things that have taken place on the coast is a tremendous amount of development that creates freshwater runoff and larger impervious areas, which goes into our shellfish waters.

Mr. Mobley said that North Carolina produces very little shellfish for exporting. Most of the shellfish we eat in North Carolina is from Louisiana or the Gulf Coast.

Senator Horton asked how many acres of shellfish waters we have lost in the past ten years.

Senator Clodfelter said that this information was included in the Coastal Habitat Protection Plan.

Mr. Givens said that staff would be sure to get that information for Sen. Horton.

Senator Albertson asked Mr. Mobley if we have an adequate plan in place to protect this resource.

Mr. Mobley said that from the program standpoint, one of the most important things that are going to help protect the resource are the Phase II stormwater rules.

Senator Swindell added that when the shellfish season opened up, areas were closed to oystering at that time. The decision to close some of those areas was made just prior to the opening of the season and he was wondering was it was made without giving enough time to notify the fishermen.

Mr. Mobley said that they are required by FDA to do a triennial survey by collecting water samples over a three-year period. A permanent closure is not made until after all of the data is in. It is unfortunate that the data was released just prior to the opening of the shell fishing season and the area had to be closed.

Representative Weiss asked staff if legislation passed last year included language to strengthen coastal protections.

Mr. Givens said that the permanent Phase II stormwater rules, as adopted by the Environmental Management Commission and now in litigation, included a provision that limited impervious surface to 12 percent in areas that drain into Class SA waters. This provision is tied up in litigation over the permanent rules.

Mr. Givens added that when the legislature attempted to break the impasse through the ERC, it was decided to place into force the temporary rule adopted by the EMC. The temporary rule does not contain the 12 percent impervious limit.

Senator Clodfelter added that the legislation Representative Weiss referred to was stop-gapped to deal with the problems of 63 municipalities that were in non compliance. It did not, however, address the issues we are talking about today.

Mr. Givens said that he believed that the legislature would have to readdress that issue because the entire bill is scheduled to sunset in a ten-year timeframe.

Representative Weiss asked if this means we will wait 10 years before we address this issue or would some language be proposed to try to improve the quality of the water on the coast.

Mr. Givens said that this would be a relatively simple drafting exercise to amend last year's bill to include a provision.

Representative Williams asked what the current law is for impervious surfaces.

Ms. Robin Smith, Deputy Secretary, DENR, said that the current law for impervious surface threshold is 24 percent. What was purposed in the EMC's permanent rules was that the threshold for requiring engineered stormwater would be 12 percent. Again, this is not a limit; it is the threshold at which stormwater controls need to be used.

Representative Williams asked what the threshold is for the Triangle area.

Ms. Smith said that in the stormwater legislation that was adopted for those communities subject to Phase II stormwater, the threshold is 25 percent. There is now virtually the same threshold in the coastal area on essay waters as in any of the inland communities that are subject to Phase II stormwater controls.

Representative Williams said that we not only have a problem on the coast with stormwater runoff but we have a problem throughout the State. This problem needs to be addressed statewide.

Senator Albertson said that we have not been responsible with protecting water quality. If we are going to be responsible, we have to be about the business of fixing this situation.

Representative Fox asked why the shellfish situation in Louisiana is so much better than in North Carolina.

Mr. Mobley said that said that North Carolina has had oyster diseases in the last several years that wiped out our oyster crop. In Louisiana, they have tremendous acreage where the folks work together with the state, which allows them to lease large bodies of water to grow their own shellfish. Also, Louisiana's oysters grow year round where North Carolina's grows only a few months of the year.

Senator Clodfelter added that he thought this was a worthwhile format to remind us that we have a lot of work to be done on this issue throughout the state, not just on the coast. He suggested that co-chairs take this discussion under advisement and see what suggestions they may want to make to the ERC for further action.

Mr. Pierce continued with a report on the Public Water Supply in North Carolina.

Mr. Pierce said that there are over 7,000 regulated water systems in the state and 89 percent of them serve fewer than 500 people.

Mr. Pierce said that the Source Water Assessment Program, also known as SWAP, provides information on the condition of all drinking water sources in the state. The major highlight of this is a new online tool called SWAP info.

Mr. Pierce said that treatment of public water supply facilities is tightening federal standards ratcheting down puts compliant systems out of compliance.

Mr. Pierce that 44 percent had a monitoring and reporting violation and six percent violated contaminant standards in FY 2004.

Mr. Pierce said that as the monitoring compliance improves, it is expected that the detection of contaminants will increase as well. According to EPA, public water supply is doing a good job in tracking and issuing violation notices.

Mr. Pierce said that enforcement has not proven to be an effective means of bringing systems into compliance.

Mr. Pierce said that over $260,000 in federal monies has been passed along to water systems for risk management.

Senator Clodfelter asked Mr. Pierce is bottled water had to meet the same standards as public drinking water.

Jessica Miles, Section Chief, Public Water Supply Section, answered Senator Clodfelter's question by saying that bottled water is regulated through the Food and Drug Administration (FDA). The standards for contaminants they have to meet are pretty much the same as the drinking water standards; however the frequency of monitoring is a little different.

Senator Clodfelter said that bottled water may or may not be inspected; just as meat packing plants may or may not be inspected.

Ms. Miles said this was correct.

Senator Dorsett asked Mr. Pierce what the penalty is for violations and is follow-up done to make sure corrections have been made.

Ms. Miles said there is no set penalty for noncompliance. When a water system is in violation, a notice of violation (NOV) is issued. If they continue noncompliance and become a significant non-complier, they are put on a list and enforcement action is taken. The amount of the penalty for a violation of monitoring is based on the type of violation they have.

Senator Dorsett asked if anything more is done based on the seriousness of the violation.

Ms. Miles said that there is a public notice component of the drinking water standards and that is an enforceable item if systems do not provide the public notice as prescribed by law.

Senator Clodfelter asked Ms. Miles to name the most common violation for which an NOV is given.

Ms. Miles said that the most common violation is for failure to monitor.

Senator Clodfelter asked Ms. Miles what the most common cause of bad water is.

Ms. Miles said that the most common contaminant in water is fecal coloform or bacterial contamination.

Senator Horton asked how does the public know when the drinking water is bad and what are some types of fines that are issued.

Ms. Miles said that the public notice is different for different types of contaminants. For an acute contaminant, such as bacterial contamination, the public water system would need to notify the public within 24 hours.

Ms. Miles said that for failure to monitor, a penalty would more likely be issued than for a contaminant violation. Penalties can range up to $25,000 per day.

Senator Horton asked Ms. Miles that monitoring violations were more likely to be issued a fine than water that is contaminated.

Ms. Miles said that if a system fails to do monitoring sufficient to get on the chronic non-compliance list, a monetary fine would be issued designed to make noncompliance more expensive.

Senator Clodfelter asked Ms. Miles is a stop-service is ever issued because of contamination.

Ms. Miles said that they have the authority to revoke their operating permit, but when you have people without water, it poses a greater health risk for people not to have water at all.

Senator Horton asked if an issues problem is when there is water that is not fit to drink.

Ms. Miles said that the ability for people to drink the water is based on the type of contaminant that might be present in the water.

Senator Horton asked if fines are issued in these cases or just expect the problem to be fixed.

Ms. Miles said this was correct. If they do not take action to fix the problem, penalties are issued.

Mr. Givens asked Ms. Miles what she meant by problematic. He also added that his impression was that this particular program was one that EPA exercises a great deal of oversight and gives some type of evaluation of the state implementation.

Mr. Givens asked Ms. Miles what EPA says about our program.

Ms. Miles said that EPA has had good things to say about the program. They are focused more on the administrative details of administering the program. Do we properly track compliance, do we properly account for violations and do we promptly send the proper paperwork as a response.

Ms. Miles added that EPA is also interested in the overall quality of the water that is being provided to the citizens and the public notice parts but there is much less oversight on that part of the program.

Senator Clodfelter said he felt that EPA's primary interest should be in the quality of the water and not the accounting.

Mr. Givens asked what was problematic with the program.

Mr. Pierce said that the program was problematic in getting corrections through enforcement.

Ms. Miles said that 44 percent of the systems in 2004 had some kind of monitoring and reporting violation, failure to conduct the required testing. This is problematic in getting these systems to understand the requirements for testing and to do that on the frequency needed.

Ms. Miles said there is a higher level of contamination in larger systems now with the introduction of the disinfection byproduct rules.

Senator Clodfelter asked Ms. Miles if the contamination rate is six percent.

Ms. Miles said that six percent have some exceedance of a maximum contaminant level standard.

Senator Clodfelter asked Ms. Miles if the episodes were isolated or were they repeat offenders.

Ms. Miles said that for the contaminant based standards; it would tend to be repeat offenders. For monitoring violations, there are ones who forget an occasional sample and very chronic non-compliers who haven't taken a sample for years and are tied up in the Attorney General's office and the court system.

Senator Clodfelter asked Ms. Miles if we target whatever federal or state assistance might be available for corrected action and is it targeted to those repeat offenders.

Ms. Miles said that it is not targeted to repeat offenders; they basically keep up with the minimum requirements and don't have the resources to go back later and provide targeted effort.

Mr. Pierce continued his report on radiation protection. He said that the role of the Radiation Protection Section (RPS) is authorized by the Radiation Protection Act to consult, advise and cooperate with public and private agencies to respond to any emergency, which involves a possible actual release of radioactive materials.

Mr. Pierce said that the RPS monitors and inspects facilities from nuclear power plants to tanning beds and x-ray units as well as homeland security issues.

Mr. Pierce said that RPS's role is to provide advice to the incident commander and first responders in order to protect them from unnecessary radiation hazards.

Mr. Pierce added that RPS's goal is to provide education to law enforcement and first responders to assist them in performing their duties in a safe manner.

Mr. Pierce said that the Onsite Wastewater Section (OWS) established the Innovative and Experimental On-site Systems Committee in January 1999.

Mr. Pierce said the innovative systems are those approved for use by the Department. Accepted systems are those who have had a good track record for five or more years.

Mr. Pierce said that the Chamber Trench Systems and the Polystyrene Aggregate Trench Systems are currently being considered for the accepted status.

Mr. Pierce said that control demonstrations are systems that have no track record in North Carolina and may or may not have it in another state and are approved by the Department for testing or trial under actual field conditions in the State.

Mr. Pierce said that the Division is currently performing a survey to determine how the two systems compare to a conventional system.

Senator Clodfelter asked Mr. Pierce how tire chips work as an innovative wastewater system.

Mr. Pierce said that tire chips are used as an aggregate in lieu of stone.

Mr. Pierce said that experimental systems are developed to research new ideas and have no track record and must undergo further testing before being considered as an innovative system.

Mr. Pierce said that Peat On-Site Systems are primarily used on the coast. The coastal soils allow the advantage of being able to install a bed type system that is directly beneath the peat modules.

Mr. Pierce said the peat systems are the most frequently used treatment system. There are now over 300 systems currently in use.

Mr. Pierce said that the Studies Act of 2004 mandated that the State evaluate the desirability and feasibility of developing and implementing a pilot program prescribing the use of innovative peat based wastewater systems.

Mr. Pierce said that the on-site wastewater section is currently working with the Commission for Health Services to develop recommendation for the legislature.

Mr. Pierce said that the peat systems have encountered some problems such as fire ant infestation, which makes the operation maintenance difficult and causes damage to the peat.

Mr. Pierce said that while these problems exist, the Commission for Health Services has established a subcommittee to complete the mandated evaluation of the General Assembly and to review the rulemaking petition. The subcommittee will consider the desirability and feasibility of the revision and adoption of new rules and report the findings and recommendations to the Commission for Health Services at the February 2005 meeting.

Senator Dorsett asked Mr. Pierce if there is a formal relationship between the state and local governments as it relates to homeland security and if so, what is that relationship.

Mr. Pierce said that the Radiation Protection Section does not do that.

Senator Clodfelter told Senator Dorsett that he believe the Division of Crime Control and Public Safety has overall responsibility for coordinating the State's interaction of local governments with regard to homeland security.

Senator Horton asked Mr. Pierce how many employees the Division of Environmental Health has.

Mr. Pierce said the Division of Environmental Health employs 280 people.

Mr. James D. Simons, State Geologist and Director, Division of Land Resources (DLR), DENR, gave a follow-up presentation on the resources needed to expand the State Geologic Hazards Mapping Program. A copy of Mr. Simons presentation and a letter from Fred Allen, Executive Director of the North Carolina Aggregates Association, recommending additional appropriations for expanding the NCGS's Geologic Hazards Program, are listed as **Exhibit F**.

Mr. Simons said that he is proposing a hazard mapping program and database of geohazards throughout the State. This would provide public developers, local governments and state agencies a better database to make informed decisions with regard to building.

Mr. Simons said that landslides are not the only geohazards but the most dangerous and most prevalent one at the moment.

Mr. Simons said that they propose a five-year program but don't expect to have it solved in five year. The plan is to map several counties a year.

Mr. Simons said that DLR would cooperate and utilize to the extent possible the resources already available within the State. They plan to work with DOT and Emergency Management to pool resources.

Mr. Simons said that many of the mapping program costs are one-time costs. The costs would go down after the initial purchases of software to perform the actual mapping.

Senator Clodfelter said that the ERC doesn't often make recommendations on appropriations but it is within our statutory charge to do so.

Senator Clodfelter suggested to members that the information provided would be discussed among the co-chairs and a decision would be made as to whether this issue would be considered at one of the January 2005 meetings.

Mr. Simons gave a report on the programs, activities, and priorities of the Division of Land Resources. A copy of an outline of his presentation is listed as **Exhibit G.**

Mr. Simons said that North Carolina was the first state to have a State Geodetic Survey. It was authorized in the 1930s and became a reality in 1959.

Mr. Simons said that the geodetic survey is in great demand to share their knowledge with other professionals. Global positioning stations have been added to allow surveyors to better utilize the satellite surveying techniques currently available.

Mr. Simons said that North Carolina's geological survey is also the oldest in the nation, going back to 1825.

Mr. Simons said that since 1825, there have only been twelve state geologists and he has held the title for North Carolina for 30 years.

Mr. Simons said that North Carolina also produced the first state geologic map.

Mr. Simons said that one of the core jobs of the Geological Survey is geologic mapping. They have mapped approximately 215 square miles, primarily around the Triangle area and Asheville.

Mr. Simons said that subsurface mapping of the outer banks is being done in conjunction with the U.S. Geological Survey.

Mr. Simons said that the biggest challenge facing the geological survey is funding.

Mr. Simons said that the land quality section handles safety of dams, mine reclamation and erosion and sediment control.

Mr. Simons said that the field offices are cross-trained in all three programs. This also allows flexibility for shifting people from one end of the state to the other in the event of disaster such as the landslides from the hurricanes.

Mr. Simons said that a better database has been developed for the dam safety and mine sites and one for sediment control is being developed.

Mr. Simons said most of the mines in North Carolina are related to the construction industry. The number of permitted mines has tripled in the last 15 years although there is the same number of people with the mining program.

Mr. Simons said that there are approximately 8,000 active construction sites in the sediment control program.

Mr. Simons said there is a need for emphasis on preventing erosion rather than trapping sediment, and to improve current erosion and sediment control measures.

Senator Horton said he was concerned that a lot of good will can be squandered through the form letters currently being used. He asked Mr. Simons if he would review the form letters and make the necessary corrections to ensure that we are not judge and jury. He suggested saying "may" instead of "are".

Mr. Simons told Senator Horton that his point was well taken.

Representative Weiss asked Mr. Simons if he is suggesting we try legislation again in improving sedimentation.

Mr. Simons said that the sedimentation control commission did appoint a subcommittee to look at the amendments, starting with last year's bill. The subcommittee consists of members of the development, engineering and environmental communities.

Mr. Simons said they have come out with a recommendation to present to ERC. The most important thing that needs to be added is a sentence directing the developers to follow the approved erosion sedimentation control plan. Somewhere there is a quirk in the law that does not specifically state that. That minor fix would help immensely.

Mr. Simons said there are other issues such as self-inspection that would require the owner or its representative to report installation. Other suggestions would be to grant local programs to partial delegation.

Senator Clodfelter asked Mr. Givens if we have Mr. Simons' recommendations.

Mr. Givens said that he did not have any recommendations and asked Mr. Simons to provide him with the recommendations.

Senator Clodfelter asked Mr. Simons if there is enough demand for the mapping products that would warrant a higher fee schedule to expand the scope of the mapping and surveying activities.

Mr. Simons called on Mr. Tyler Clark, Chief Geologist for the State Geological Survey, who said there was a very high demand for geologic information. They typically receive inquiries on a daily basis for someone wanting a map for some portion of the state.

Mr. Clark said that only 14 percent of the state is currently mapped with detailed geologic mapping. There are regional maps available for the rest of the state. They could improve on the number of square miles covered if they could seek the grant funding to do that.

Senator Clodfelter asked Mr. Clark if they had every done a cost recovery study to figure out what kind of charges they may have to impose in order to recover the existing costs and what additional revenue could be generated to expand the mapping beyond the 14 percent.

Mr. Clark said they have just started to look into this to see what type of limitations they have on cost recovery for the products they produce. There are certain limits on what the public can be charged and what the market will bear.

Senator Clodfelter said that survey maps can be purchased in bookstores in the UK and this finances the whole mapping and survey system for the country.

Mr. Simons said there are some limitations for us to do this but that would certainly be looked into.

Mr. David S. Vogel, Director, Division of Soil and Water Conservation, DENR, gave an update on the identification and closure of inactive and abandoned animal waste management lagoons. A copy of his remarks given in his report is listed as **Exhibit H.**

Mr. Vogel said that 133 inactive lagoons have been closed since 2000, with an added 79 scheduled to be closed this program year. An added 56 operations have gone inactive since 2004 and 9 have been reactivated.

Mr. Vogel said that 36 percent of the high-risk lagoons are closed or are under contract to be closed.

Mr. Vogel said that lagoon closures are funded through the Agriculture Cost Share Program, USDA Environmental Quality Incentive Program, Smithfield Agreement/NC Foundation for Soil and Water Conservation, and the Clean Water Management Trust Fund (CWMTF).

Mr. Vogel said that after Hurricanes Floyd, Dennis and Irene, a new program was developed to purchase conservation easements and buyout certification for swine farms in the 100-year floodplain. There is a prohibition for putting new swine farms in the 100-year floodplain and this program was developed as a voluntary option for those landowners impacted by flooding to get out of the business.

Mr. Vogel said that this program is focused on active farms.

Mr. Vogel said that two phases of funding have been approved by the CWMTF totaling $12 million. They have gone through closing operations on 32 lagoons, on 15 farms in Phase I. In Phase II, there are 30 lagoons on another 15 farms that are being worked on.

Mr. Vogel said that approval has been received from the trustees of the CWMTF for a third phase of funding and they are awaiting a contract for another $3.9 million.

Mr. Vogel said that they have been able to tap into some of the federal farm bill funds to help close some of the lagoons. That allows the use of state money toward conservation easements for the landowners.

Mr. Vogel said the standard for closing a lagoon is a federal USDA standard. The Natural Resource Conservation Service (NRCS) has a standard for closing of waste lagoons, which is what everyone uses in North Carolina.

Mr. Vogel said the local Soil and Water Conservation District or a technical specialist that is certified by the Soil and Water Commission closes the lagoons under a lagoon closure plan as developed.

Mr. Vogel said the NRCS standard was changed a few years ago to allow some alternative lagoon closure methods.

Mr. Vogel said the nutrient management standard has changed with regard to land application.

Mr. Vogel said that it is costly to close a lagoon. The cost in 2000 was $42,000 per acre. With the buyout, the cost has been reduced to $34,000 per acre.

Mr. Vogel said that with the phosphorous requirements, they are beginning to see the costs go up for a lagoon closure.

Mr. Vogel said that it is estimated that it will take $1 million to complete closure of the remaining 26 high-risk lagoons.

Mr. Givens asked Mr. Vogel what the terminology is for an inactive lagoon.

Mr. Vogel said that an inactive lagoon is one that has not received waste for one year.

Mr. Givens asked Mr. Vogel how many of the 1,000 inactive lagoons have a responsible party that can close them or would the state have to close all of them.

Mr. Vogel said it was his understanding that for sites that are under permit, the permittee has to maintain the lagoon even if it is no longer in production.

Mr. Givens asked how many of these lagoons are going to be closed by the people who own them and how many are going to be closed through some combination of state funding.

Mr. Vogel said that they would either have to be closed or maintained.

Mr. Givens asked how many of them are abandoned or orphaned in the sense that there is no permit holder or the permit holder is noncompliant.

Mr. Vogel said that he believed it would be a small number.

Mr. Givens asked on average, how much it cost to close a lagoon.

Mr. Vogel said that for the buyout, they are spending about $84,000 to close a lagoon.

Mr. Givens said that he would like to work with Mr. Vogel to receive more information regarding lagoon closures and costs involved.

Senator Albertson asked Mr. Vogel if the owner of a permit is responsible for maintaining the integrity of a lagoon, regardless of whether it is in operation.

Mr. Vogel said this was correct.

Mr. Givens asked Mr. Vogel to provide him with the projection for future inactive lagoons, how many of the lagoons already in the system will have to be closed at state expense and at what cost, and how many owners and operators cannot comply with the requirements.

Representative Weiss ask every single lagoon that is closed is eligible to have cost sharing and would only be paying a maximum of 25 percent of the cost.

Mr. Vogel said the only restriction on the state side is the Soil and Water Commission will not use cost share money to close a lagoon but will use money to construct new ones.

Mr. Givens said if it was cost-share constructed, then someone else would have to pay for closure.

Mr. Givens asked Mr. Vogel what the annual cost for a permit is.

Mr. Paul Sherman, Division of Water Quality, answered Mr. Givens by saying the cost ranges from $50 to $300. For most of the facilities that have inactive lagoons the permit fee would be $50.

Mr. Vogel said that when the state permits shifted to NPDES, they anticipated more requests for lagoon closures.

Senator Albertson asked Mr. Vogel if an inactive lagoon is inspected twice a year as active lagoons are.

Mr. Vogel said that the inactive lagoons do not get the level of inspection that active lagoons do.

Senator Clodfelter asked Mr. Vogel what level they do get.

Mr. Sherman answered by saying that if the inactive lagoon is covered under a permit, the Division of Water Quality does a compliance inspection once a year.

Mr. Vogel said that the Division does not do its operation reviews on inactive farms.

Representative Gibson asked if it was fair to say that the inspectors know where most all of the inactive lagoons exist.

Mr. Sherman answered by saying that they have a good idea of where all of them are, based on the 2000 survey. As far as the percent inspected each year, he was not prepared to give an answer.

Representative Gibson asked if most of the inactive sites had been dewatered.

Mr. Givens said that any of these sites would accumulate water because of rainfall.

Senator Horton asked what would happen if a lagoon was left unattended.

Mr. Vogel said that maybe nothing would happen; however, it is a structure that has the potential to breech if the lagoon walls are not managed. Some of them have to be pumped because they accumulate.

Senator Horton asked what the worst-case scenario is with a lagoon.

Mr. Vogel said that a breech is the worst-case scenario.

Senator Horton asked what the consequence would be.

Mr. Vogel said that nutrients would be added to groundwater.

Representative Gibson said that he believes DENR has done a good job with these inactive sites and should be commended.

Mr. William D. Gilmore, Director, Ecosystem Enhancement Program, DENR, gave a report on implementation of the Wetlands Restoration Program (Ecosystem Enhancement Program) and use of funds in the Wetlands Restoration Fund. A copy of his slide presentation and a one sheet executive summary are listed as **Exhibit I**.

Mr. Gilmore said that the Ecosystem Enhancement Program has been in existence about 17 months. A program advisory group under the Wetlands Restoration program and a program assessment and consistency group under the DOT program are watching the program from a regulatory standpoint.

Mr. Gilmore said that one issue with the program has been in expediting their capacity.

Mr. Gilmore said that EEP does not do any in-house work and everything is done through private enterprise.

Mr. Gilmore said that no independent wetland projects were produced last year; however, there were a number of projects where wetland and stream restoration were combined.

Mr. Gilmore said the existing rates for non-riverine restoration appear to be appropriate. They are seeing an escalation for the riverine wetland systems.

Mr. Gilmore said that the Wetlands Trust Fund Restoration Account currently has $75,315 and the Compensatory Mitigation Account has $29,194,488. The Riparian Buffer Restoration Account has a balance of $10,004,576.

Mr. Gilmore summarized by saying that the program has grown, there have been a number of visitors to the program, and production has been increased.

Mr. Gilmore said that next year, they would be working with the regulatory committees and groups to meld a comprehensive report showing the entire status of the Ecosystem Enhancement Program.

Representative Gibson asked Mr. Gilmore to provide information for ERC members on what was done to increase the number of permits in the last year.

Mr. Gilmore said the best thing would be no need to have permits. As a general trend there are a couple of new responsibilities they are accepting under the program. They are providing impacts for Corps of Engineers permits and there has been some significant activity in nutrient offset with the Division of Water Quality.

Representative Gibson asked Mr. Gilmore if it is fair to say that we are still seeing the majority of dollars going to road projects.

Mr. Gilmore answered in the affirmative.

Representative Gibson asked for a matrix showing a trend.

Representative Gibson asked Mr. Gilmore to give us the high spots of the program and the low spots that may need correcting.

Suzanne Klimek, Director of Operations for EEP, said they have a very good relationship with the Corps of Engineers and the compliance rate is increasing.

Representative Gibson asked Mr. Gilmore to provide a snapshot of how we did it before and how we can do it better in the future and if we are still using the same techniques for restoration.

Ms. Klimek said that there were no new completed wetlands restoration projects to add to the cost evaluation for this last fiscal year.

Representative Gibson asked Ms. Klimek if $100,000 for design on a $600,000 project and $123,000 for design on a $500,00 project the best we can do or have we reached the zenith of cost savings.

Ms. Klimek said she did not have the answer to his question but she could say the program works consistently to manage costs through their projects.

Representative Gibson asked if it was fair to say in a comparable state managed program that we were close.

Ms. Klimek said she thought we were lower in comparison.

Representative Gibson asked Mr. Gilmore if the drop in the number of projects completed last year was due to a bad year.

Mr. Gilmore said he believed it was because of where they fell in the cycle. There are some projects in production, which take two to three years to complete.

Representative Gibson asked Mr. Gilmore to provide where we are today as a cost per unit.

Mr. Gilmore said he would get this information to staff.

Mr. Givens added that he hoped Mr. Gilmore would come forward with the information on cost of roads and scheduling and completion of road projects.

Representative Gibson added Mr. Gilmore to include the forecast on where we need to go to do better.

Mr. Gilmore said that his program does have a forecasting tool, which comes from the Department of Transportation. They will provide a seven-year forecast on February 1, 2005. You will see the Wetlands Restoration Program dollars come down over the years. The funds will change to the DOT program.

Mr. Givens said this is a scheduled agenda item for the 20 January 2005 meeting.

Mr. Donnie D. Redmond, Assistant Chief, Planning Section, Division of Air Quality, DENR, gave a report on air quality issues and innovative approaches to reduce air pollution from mobile sources.

Mr. Redmond's report included information on the modification of the current highway use tax so that all or a portion of the highway use tax paid on a private passenger vehicle is based on the fuel efficiency rating of the vehicle, and information on modification of the current vehicle registration fee so that all or a portion of the annual vehicle registration renewal fee for a passenger vehicles is based on the vehicle miles traveled by the vehicle. A handout outlining his report is listed as **Exhibit J**.

Senator Clodfelter said that the next two presentations are topics for potential study and came from a serious of ad hoc public meetings the Senate had on mobile source air pollution and water conservation issues.

Mr. Redmond said that North Carolina currently charges a three percent tax on new and used vehicles when they are purchased. The idea behind this item would be to get people to buy more fuel-efficient vehicles.

Mr. Redmond said that the second item was to look at the annual vehicle registration fee to see if it should be changed based on how much the car is driven each year. The standard fee is $20 a year. Cars driving more a year would pay a higher registration fee each year than those that are driven fewer miles.

Mr. Redmond said that the third item is to look at both of these fees and determine whether they should be revenue neutral or revenue generated from the fees.

Mr. Redmond said that research is currently being done and a final report is expected by January 2005.

Senator Albertson asked Mr. Redmond if this would unnecessarily affect the lower income people.

Mr. Redmond said that they may be buying the lighter, more fuel-efficient care and would more likely be receiving a rebate.

Senator Dorsett said it would be useful if there were some consumer or focus groups to get their feedback before they complete their report.

Representative Weiss said that she would like to see what impact it would have on lower income folks. She also said she thought they should look beyond AAA and look at folks who advocate for people with low incomes.

Representative Weiss said that she would also like them to consider putting this into a Clean Air Trust Fund where people could apply for grants.

Mr. Givens said that one of the items to be studied by ERC is a Clean Air Trust Fund. He hopes there will be an agenda item on this in January 2005.

Mr. Larry E. Shirley, Director, State Energy Office, Department of Administration, gave a report on the expansion of the guaranteed energy savings contracts program to include contracts that provide for the conservation of water and sewer usage. A copy of Mr. Shirley's slide presentation is listed as **Exhibit K.**

Mr. Shirley said that the state has a major initiative underway now called the Utility Savings Initiative to try and save energy and water costs in state and university buildings.

Mr. Shirley said this is an outgrowth of the Governor's Efficiency Commission in 2002 and has a goal of four percent reduction in energy consumption each year for the next five years, adjusted for increases in fuel prices and square footage.

Mr. Shirley said that strategic utility plans are required and we now have 96 percent of the state's square footage underneath a plan of some kind or another.

Mr. Shirley said that they have run into poor accounting practices in the state in the sense that we have not had a handle on how much we were spending on water or energy.

Mr. Shirley said that one program within this initiative is called guaranteed energy savings contracts, often referred to as performance contracting.

Mr. Shirley said that we have been trying to include water in the efforts. Looking at the State Government's water usage, we spend about $28.5 million each year and consumer 15.6 million gallons per day.

Mr. Shirley said that sewer costs now include stormwater fees.

Mr. Shirley said that DENR and Crime Control and Public Safety have been charge with a lot of the training in the performance contracting. The drought brought about HB 1215, which mandated a 10 percent reduction in water use in state facilities.

Mr. Shirley said that the Governor also mandated Executive Order 26, which banned nonessential use of water. Water plans have been required of the agencies and submitted to DENR.

Mr. Shirley said there have been some major successes in state government with regard to water billing refunds and errors. DHHS and NC A&T both found billing errors totaling $135,000.

Mr. Shirley said that the North Carolina Zoo has saved $200,000 per year just by installing a sewer meter so they are not charged for the water they use that does not go into the sewer.

Senator Clodfelter asked Mr. Shirley if municipalities allow this or was this optional.

Mr. Shirley said this is negotiated on a case-by-case basis.

Senator Horton asked Mr. Shirley to explain how a sewer meter works.

Mr. Shirley asked Mr. Vince Throop, Program Manager, Utility Savings Initiative to answer that question.

Mr. Throop said that the way sewer charges are done is through the water meter reading. With the sewer meter, you can put a special meter in your sewer line to actually measure what goes down the sewer and then negotiate with the water utility to charge for that.

Mr. Shirley said that a law was passed in 2002, which allowed the State to engage in performance contracting or guaranteed energy savings contracts. The bill was amended in 2003 and the rules were written thereafter.

Mr. Shirley said that there are no upfront capital costs involved. The state started with setting a $50 million limitation on what could be put out in the way of contracts with 12-year maximum contracts.

Mr. Shirley said that the state's water bill is about 11 percent of the total state utility bill of $256 million.

Senator Clodfelter asked if this was just a savings for the State and did not include local governments.

Mr. Shirley said this was correct.

Mr. Shirley said that the recommendations are to amend the statute that governs these guaranteed savings contracts to specifically include water saving measures, to increase the cap from $50 million to $75 million, or remove the cap altogether.

Mr. Shirley said they also recommend including water measures in the general statutes, to make sure that when we approach this issue, we approach energy and water together.

Representative Hackney asked Mr. Shirley to tell about the gray water project at UNC-Chapel Hill at the power plant and the projected savings.

Mr. Shirley said he was not aware of what the projected savings are. Chapel Hill is using gray water in their co-generation plant. Chapel Hill generates about one-third of its electricity from a co-generation plant. They have been able to use gray water.

Senator Clodfelter asked how this project is being financed and could we use this financing technique to make it easier for others to do similar projects.

Representative Hackney said that he did not have an answer.

Senator Albertson asked what the reason was for the wide variation in what water users pay.

Senator Clodfelter said that the largest part of the reason is that most large water systems are municipally owned and operated in North Carolina and are not subject to rate regulation in any way.

Mr. Shirley said that one example is UNC-Pembroke, whose water bill rate is ten times what the state average is, by municipality.

Representative LaRoque asked Mr. Shirley if the $50 million contract money we are spending to find out the efficiencies or the savings.

Mr. Shirley said the $50 million is the total contracting authority that the State of North Carolina can enter into with the exception of finance costs. There are two different ways to finance these projects, both at the State Treasurer's discretion.

Mr. Shirley said the State Treasurer can issue certificates of participation (COPS) to finance the project or the energy service company can come to the table with financing.

Senator Clodfelter if the contractor has to guarantee the savings.

Mr. Shirley said the contractor has to guarantee the savings and most have some security instrument acceptable to the State Treasurer.

Representative LaRoque asked what the minimum rate of return to the taxpayer.

Mr. Shirley said that the contracts have to be within a twelve-year period. A lot of expensive items such as boilers and chillers need to be replaced and their actual payback is a longer return.

Representative LaRoque asked if there was a minimum rate of a 6 percent rate of return over 12 years for this to come to parity.

Mr. Shirley said this was correct.

Senator Dorsett asked if the savings are guaranteed and they don't meet the standards, what are the conditions for termination.

Mr. Shirley said that if they don't meet the savings, they have to write the state a check.

Mr. Throop said that he believed that the contract could be cancelled if the standards are not met.

Representative Hackney said that the savings are supposed to survive the contract.

Representative Gibson asked Senator Dorsett if she had a perspective on this.

Senator Dorsett said she believes it is an excellent beginning.

Senator Clodfelter asked Mr. Shirley to work with Mr. Givens on some of these recommendations to be presented at the 25 January 2005 meeting.

The meeting was adjourned at 1:15 p.m.

Senator Daniel Clodfelter
Presiding Co-Chair

Mary R. Watson
Commission Clerk

ATTACHMENTS:

EXHIBIT A:	Meeting Notice
EXHIBIT B:	Visitor Registration
EXHIBIT C:	Meeting Agenda
EXHIBIT D:	Report on the resources needed to phase-in a statewide expansion of the Wastewater Discharge Elimination Program (WADE) Terry L. Pierce
EXHIBIT E:	Report on the programs, activities, and priorities of the Division of Environmental Health – Terry L. Pierce
EXHIBIT F:	Follow-up presentation by James Simons on the resources needed to expand the State Geologic Hazards Mapping Program and a letter from Fred Allen, Executive Director of the North Carolina Aggregates Association, recommending additional appropriations for expanding the NCGS's Geologic Hazards Program
EXHIBIT G:	Report on the programs, activities, and priorities of the Division of Land Resources – James Simons
EXHIBIT H:	Update on the identification and closure of inactive and abandoned animal waste management lagoons – David Vogel
EXHIBIT I:	Report on implementation of the Wetlands Restoration Program (Ecosystem Enhancement Program) and use of funds in the Wetlands Restoration Fund and a one sheet executive summary – William Gilmore
EXHIBIT J:	Report on air quality issues and innovative approaches to reduce air pollution from mobile sources – Donnie Redmond
EXHIBIT K:	Report on the expansion of the guaranteed energy savings contracts program to include contracts that provide for the conservation of water and sewer usage- Larry Shirley

December 7, 2004 ERC Meeting
EXHIBIT A

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
Raleigh, North Carolina

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23 November 2004

TO: Members of the Environmental Review Commission
Interested Parties

FROM: George F. Givens, Commission Counsel
Mary R. Watson, Commission Clerk

RE: **Notice of Commission Meeting**
Notice of Planning Meeting
Schedule of Future Meetings
Meetings of Interested Parties (605 Working Groups)
Additional Information

COMMISSION MEETING:

The Environmental Review Commission (ERC) will meet at 9:30 a.m. Tuesday 7 December 2004 in Room 544 of the Legislative Office Building in Raleigh. At this meeting, the ERC will begin or continue studies for which the ERC is responsible, hear reports from State agencies, discuss topics to be considered at future meetings, and attend to other matters. Listed below are potential agenda topics for this meeting and for future meetings. More specific information regarding the agenda for the 7 December meeting of the ERC will be developed at the staff planning meeting discussed below.

STUDY TOPICS:

Air Quality:

1) Modification of the current highway use tax so that all or a portion of the highway use tax paid on a private passenger vehicle is based on the fuel efficiency rating of the vehicle (S.L. 2004-161, Sec. 19.10(1))

2) Modification of the current vehicle registration fee so that all or a portion of the annual vehicle registration renewal fee for a passenger vehicle is based on the vehicle miles traveled by the vehicle (S.L. 2004-161, Sec. 19.10(2))

Miscellaneous:

3) Effectiveness of the State's efforts to protect the environment and conserve the natural resources of NC (S.L. 2004-161, sec. 19.2)

4) Development of a plan to share floodplain mapping information (S.L. 2004-161, Sec. 19.3)

5) Efforts to stimulate renewable energy production in the State

6) Issues related to water and sewer infrastructure in the State and resources needed to maintain and upgrade the infrastructure systems

7) Results of the conservation needs assessment conducted by the Land for Tomorrow Coalition

Water Quality:

8) Approaches to prevent and reduce stormwater pollution throughout the State (S.L. 2004-161, Sec. 19.11)

9) Issues related to the Leaking Petroleum Underground Storage Tank (UST) Cleanup Program (S.L. 2003-352, Sec. 12)

10) The role of the State and DENR in implementing the Leaking UST Cleanup Program (S.L. 2004-124, Sec. 30.10.(f)) (joint study with the Joint Legislative Transportation Oversight Committee)

11) Identification and closure of inactive or abandoned animal waste management lagoons

12) Issues related to the proposed permit modification for the John Umstead Wastewater Treatment Plant located in Butner, and the associated adjustment of its effluent limitations for Total Nitrogen to reflect the purchase of nitrogen allocations

Water Quantity:

13) Water restriction guidelines created by DENR and implemented by local governments, including an evaluation of economic impacts and recommendations for establishing consistency across the State with respect to classes of water use (S.L. 2004-161, Sec. 19.4)

14) Development and funding of regional water supply systems (S.L. 2004-161, Sec. 19.5)

15) Water conservation measures being implemented in the State and incentive programs and other voluntary programs that can help foster water conservation and reuse

16) Expansion of the guaranteed energy savings contracts program for governmental units to include contracts that provide for the conservation of water and sewer usage

REPORT TOPICS:

Air Quality:

17) Annual report on development and implementation of a plan to reduce vehicle miles traveled by private sector employees and vehicle emissions resulting from job-related travel, including commuting to and from work (G.S. 143-215.107C(e))

18) Annual report on development and implementation of a plan to reduce vehicle miles traveled by State employees and vehicle emissions resulting from job-related travel, including commuting to and from work (S.L. 1999-328(4.6))

19) Annual report on promotion of telework/telecommuting for State employees and achieving the goal of reducing State employee vehicle miles traveled in commuting by 20% without reducing total work hours or productivity (S.L. 1999-328(4.8))

Parks and Recreation / Land Conservation:

20) Parks and Recreation Trust Fund Annual Report, Fiscal Year 2003-2004 (G.S. 113-44.15(c))

21) North Carolina Natural Heritage Trust Fund Award Report, Fiscal Year 2003-2004 (G.S. 113-77.9(e))

22) Annual report on progress towards attaining the State's goal of protecting one million acres of farmland, open space, and conservation lands (G.S. 113A-241(c))

23) Annual report on implementation of the Conservation Easements Program and inventory of all conservation easements held by DENR (G.S. 113A-235(c))

Water Quality:

24) Issues related to the evaluation of alternative animal waste management technologies to determine whether those technologies are environmentally superior and economically feasible

Wetlands:

25) Implementation of the Wetlands Restoration Program and use of funds in the Wetlands Restoration Fund (G.S. 143-214.13)

PLANNING MEETING:

To facilitate development of the agenda for the 7 December meeting of the ERC, to plan for subsequent meetings of the ERC, and to receive input from interested persons regarding the work of the ERC, the Commission Counsel will hold an informal planning meeting at **10:00 a.m. on Wednesday 1 December 2004 in Room 605 of the Legislative Office Building**. Persons who wish to participate in the development of the agenda for meetings of the ERC, or who are interested in any matter before the ERC, are invited to attend.

SCHEDULE OF FUTURE MEETINGS:

Below is a schedule of meetings of the ERC for January 2005. This schedule is tentative and subject to adjustment. For planning purposes, please reserve these dates.

Commission Meeting	**Staff Planning Meeting**
Wednesday 12 January 2005	Wednesday 5 January 2005
Thursday 13 January 2005	
Thursday 20 January 2005	
Tuesday 25 January 2005	

MEETINGS OF INTERESTED PARTIES (605 WORKING GROUPS):

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Limit Liability for Environmental Cleanups Working Group (HB 1603/SB 1222)
10:00 a.m. Thursday 2 December 2004 – 605 Legislative Office Building

ADDITIONAL INFORMATION:

If you have questions related to the Commission, please feel free to contact the Commission Counsel or other Commission staff at (919) 733-2578.

December 7, 2004 ERC Meeting
EXHIBIT B

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 12.07.04
Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Rick Zechini	NC Assoc. of REALTORS
Kathy Hawkins	Progress Energy
John McHugh	COU OFFICE
Paul Meyer	NC Assoc. City Comrs
Kim Hibbard	NCLM
Jim Simons	DENR - Land Res
Tyler Clark	"
Gary W. Thompson	"
Richard Wooten	"
Angie Harris	Maupin Taylor
Adam Schneider	Enterprise RAC

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 12.07.04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Suzanne Klimek	Ecosystem Enhancement Prog
Johanna Reese	DENR
Nancy Reed	SELC
Amy Pickle	South. Env. Law Center
Tad Boggs	Ecosystem Enhancement Program
Chris McAdams	NC-DOT Research & Analysis
Doug Lassiter	NC STA
Lucius Pullen	Counsel NCMA
Tom Bean	NC Environmental Defense
Jimmy Johnson	NCDA+CS
Bill Gilmore	NCEEP

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 12.07.04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Tommy Stevens	NCPC
Taylor McCawhorn	Clean Water Management Trust
Preston Howard	MCIC
Bill Pate	NC DHHS
Ann Chelminski	NC DHHS
Mina Shehee	NC DHHS
Christine Wunsche	NCPIRG
J.D. Potts	NC-DEH
Wayne Mobley	NC-DEH
Sheryl Stephens	OSBM
Jessica Miles	DENR DEH - PWS

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 12.7.04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
Laura Leonard	DENR - Div of Env. Health
Beth Warren	AG's office
Jim Stanfill	DENR - Ecosystem Enhancement Program
Mina Shehee	DPH - Occupational/Env. Epi Branch
Ann Chelminski	DPH - "
Fred Bone	Bone & Asso.
Gordon McLeod	NC Conservation Network
David Vogel	DENR - Soil + Water Conservation
David Williams	DENR - "
Robin Smith	DENR
David Barnes	Poyner + Spruill

VISITOR REGISTRATION SHEET

ENVIRONMENTAL REVIEW COMMISSION — 12.07.04

Name of Committee — **Date**

VISITORS: PLEASE SIGN IN BELOW AND RETURN TO COMMITTEE CLERK

NAME	FIRM OR AGENCY AND ADDRESS
DONNIE REDMOND	NAQ
Michael Nelson	CC NC
Vernon Cox	DSWQ
Amy Pullen	Hunton & WMS
Fred Allen	NCAA
John Goodman	Alley Assoc
John Sandlowski	MVA

December 7, 2004 ERC Meeting
EXHIBIT C

General Assembly of North Carolina
Environmental Review Commission
State Legislative Building
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AGENDA
9:30 a.m. Tuesday 7 December 2004
Room 544 Legislative Office Building

1. Call to order
   Senator Daniel G. Clodfelter, Presiding

2. Introductory remarks by Cochairs
   Senator Daniel G. Clodfelter
   Senator Charles W. Albertson
   Representative Pryor A. Gibson
   Representative Daniel F. McComas

3. Report to the Commission and explanation of agenda items
   George F. Givens, Commission Counsel

4. Follow-up discussion of the resources needed to phase-in a statewide expansion of the Wastewater Discharge Elimination Program
   Terry L. Pierce, Director
   Division of Environmental Health, Department of Environment and Natural Resources (DENR)

5. Report on the programs, activities, and priorities of the Division of Environmental Health
   Terry L. Pierce, Director
   Division of Environmental Health, DENR

6. Follow-up discussion of the resources needed to expand the State Geologic Hazards Mapping Program
   James D. Simons, State Geologist and Director
   Division of Land Resources, DENR

7. Report on the programs, activities, and priorities of the Division of Land Resources
   James D. Simons, State Geologist and Director
   Division of Land Resources, DENR

8. Update on the identification and closure of inactive and abandoned animal waste management lagoons

   David S. Vogel, Director
   Division of Soil and Water Conservation, DENR

9. Annual report on implementation of the Wetlands Restoration Program (Ecosystem Enhancement Program) and use of funds in the Wetlands Restoration Fund (G.S. 143-214.13)

   William D. Gilmore, Director
   Ecosystem Enhancement Program, DENR

10. Discussion of air quality issues and innovative approaches to reduce air pollution from mobile sources

    Modification of the current highway use tax so that all or a portion of the highway use tax paid on a private passenger vehicle is based on the fuel efficiency rating of the vehicle (S.L. 2004-161, Sec. 19.10(1))

    Donald D. Redmond, Assistant Chief
    Planning Section, Division of Air Quality, DENR

    Modification of the current vehicle registration fee so that all or a portion of the annual vehicle registration renewal fee for a passenger vehicle is based on the vehicle miles traveled by the vehicle (S.L. 2004-161, Sec. 19.10(2))

    Donald D. Redmond, Assistant Chief
    Planning Section, Division of Air Quality, DENR

11. Information item on the expansion of the guaranteed energy savings contracts program to include contracts that provide for the conservation of water and sewer usage

    Larry E. Shirley, Director
    State Energy Office, Department of Administration

12. Commission discussion and announcements

13. Adjourn

SCHEDULE OF FUTURE MEETINGS:

Below is a schedule of meetings of the Environmental Review Commission for January 2005. This schedule is tentative and subject to adjustment. For planning purposes, however, please reserve these dates.

Wednesday 12 January 2005	Joint meeting with Joint Legislative Commission on Seafood and Aquaculture
Thursday 13 January 2005	Regular business meeting
Thursday 20 January 2005	Joint meeting with Joint Legislative Transportation Oversight Committee
Tuesday 25 January 2005	Regular business meeting; consideration of legislative proposals (tentative)

STAFF PLANNING MEETING:

To facilitate development of the agenda for the January meetings of the ERC, the Commission Counsel will hold an informal public staff planning meeting at **10:00 a.m. on Wednesday 5 January 2005 in Room 605 of the Legislative Office Building**. Persons who wish to participate in the development of the agenda for meetings of the ERC, or who are interested in any matter before the ERC, are invited to attend.

OTHER MEETINGS:

The Commission Counsel will hold meetings of interested parties on specific topics as indicated below:

Limit Liability for Environmental Cleanups Working Group (HB 1603/SB 1222)
10:00 a.m. Friday 7 January 2005 – 605 Legislative Office Building

Wastewater Discharge Elimination Program (WaDE)

Program Update from Nov. 19 ERC Meeting

December 6, 2004

Terry Pierce, DEH Director

Highlights

- Purpose
- Goals
- Collaborative efforts
- 2001 Expansion
  - CWMTF and EPA grants
  - Hired new staff
  - Stats and Figures

Future Directions

- Geographical Scope
  - Currently serves 26 western counties
- Impact of straight-piping seen across N.C.
  - Public health
  - Environmental impact

Expanding WaDE Statewide

	Currently for 22 Counties (annually)	Expanded to 100 Counties (annually)
Appropriations:	$126,488	$574,854
CWMTF Grant:	$149,000	$677,419
EPA 319 Grant:	$166,656	$757,527
TOTALS:	**$442,144**	**$2,009,800**

Questions?

Terry Pierce, Director
Div. of Environmental Health
Terry.Pierce@ncmail.net

Division of Environmental Health

Update for the Environmental Review Commission

Dec. 7, 2004

Terry Pierce,
Division Director

DEH Sections

- Environmental Health Services (EHSS)
- Onsite Wastewater (OSWW)
- Public Health Pest Management (PHPM)
- Public Water Supply (PWS)
- Radiation Protection (RPS)
- Shellfish Sanitation and Recreational Water Quality (SS&RWQ)

Environmental Health Services Section

Meth Labs

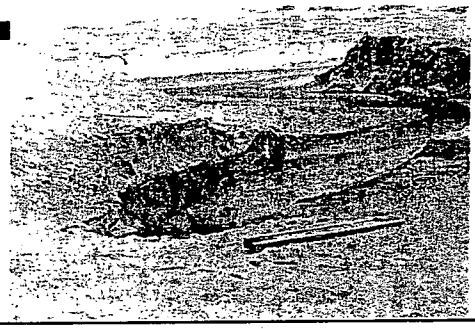
- New rules effective Jan. 1, 2005
  - Limited LHD involvement required
- Assistance from DEH
  - DEH, PHRST Teams, SOP, other divisions meet and discuss roles
  - Resource, info on waste disposal, onsite and public sewage disposal, groundwater contamination
  - Optional investigations by LHD
- Staff safety
  - Lead investigations
  - Hotel & motel inspections

Shellfish Sanitation & Recreational Water Quality Section

Stormwater: Basics

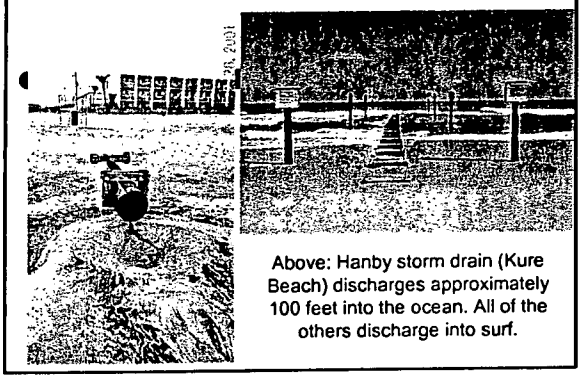
- Relates to shellfishing and recreational waters
- Outfalls directly onto beaches or into ocean
- Affects all shellfish growing area waters and interior recreational waters
- Causes
  - Development
  - Impervious surfaces

Stormwater Drains



Stormwater: Impact

- County impact
  - Ex: Brunswick and New Hanover Counties have more than 50 percent of shellfish waters closed.
- Loss of revenue
  - Shellfish harvesters
  - Local economy
- Increased development + increased stormwater = increased contamination

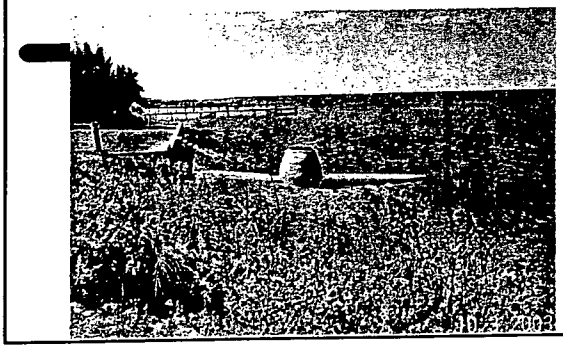


Above: Hanby storm drain (Kure Beach) discharges approximately 100 feet into the ocean. All of the others discharge into surf.

Stormwater: Shellfish Waters

- Of the 2.1 million acres of potential shellfishing waters, 365,000 are closed.
  - Approximately 18 percent of shellfish waters are closed.
- Conditional management of shellfish waters.
- Impervious surfaces from coastal development increases the stormwater into the shellfish waters.
  - Interferes with the natural processes to clean stormwater

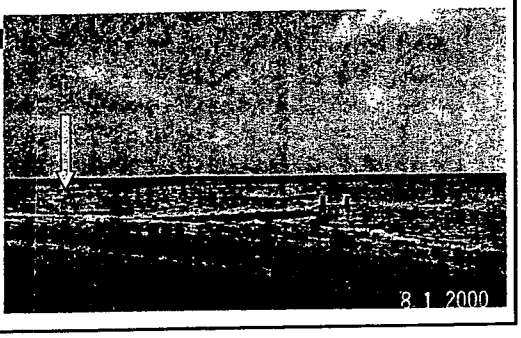
Sound-side storm drain to ORW and SA shellfish waters



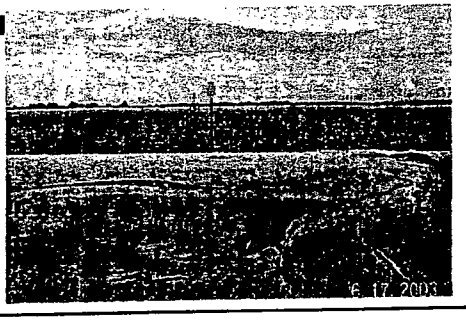
Stormwater: Recreational Waters

- Affected areas
  - Internal waters
  - Sound-side beach areas with little tidal exchange
  - All ocean storm drains that discharge to the surf
- Interagency efforts to assess storm drain issues
  - Stormwater (Rule) Work Group
- Future solutions
  - Remove storm drains from oceans whenever possible.

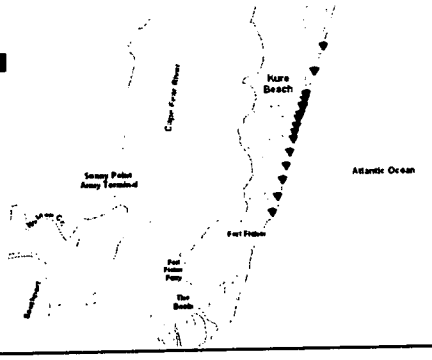
People swim beside storm drains.



Radio Island swimming area



GIS Mapping of
Storm Drain Discharge



Stormwater Work Group

- Cape Fear Council of Govts.
- Outer Banks Business Bureau
- Town of Kure Beach
- Town of Emerald Isle
- Town of Nags Head
- Town of Kill Devil Hills
- UNC Institute of Marine Sciences
- NC Coastal Federation
- UNC Coastal Studies Institute
- Pier Owner, Emerald Isle
- Commission for Health Services
- Environmental Mngmt. Commission
- NCDENR, DEH
- DEH Shellfish & Rec. Water Quality
- DHHS, Div. of Public Health
- Div. of Water Quality
- N.C. DOT Roadside Env. Ops
- N.C. DOT Division I County Maintenance/Currituck & Dare Counties
- N.C. DOT Hydraulics Project Engineer for Maintenance Studies
- N.C. DOT State Hydraulics Engineer
- N.C. DOT Project Engineer for Storm Water & Preliminary Studies

Public Water Supply Section

Public Water Supply

- Mission
- Program components
  - 6 basics
- Multi-barrier approach to protecting public health

Public Water Supply: Protection

- Protection the sources of drinking water
- Protection programs
  - Site investigations and approvals
  - SWAP
  - Wellhead protection

Source Water Assessment Program (SWAP)

- Purpose
- SWAP Info
  - Web site:
    - www.deh.enr.state.nc.us/pws/SWAP
  - Aspects
- Future Uses
  - Local planning and educational outreach tool

Public Water Supply: Treatment

- Treatment
  - Tightening federal standards ratcheting down- puts compliant systems out of compliance
  - Simultaneous compliance – tough to hit and operate on such a tight mark.

Public Water Supply: Testing/Monitoring

- Violations – unresolved issues
- Database management system – SDWIS
- Honor system implementation
  - Problems
- Public education for transient systems
  - Brochure for churches
- Formal enforcement
  - Issues: resource intensive, slow, lack of strong incentives to comply

Public Water Supply: Planning

- Risk management
  - Drought, limited supply, back up power
- Asset management
  - Who should pay?
  - Sufficient infrastructure investment
- Water system security

Radiation Protection Section

Homeland Security

- Role of Radiation Protection
  - Respond
  - Technical Assistance
- Dirty Bomb Exercise
  - Objective: to test the State Government Infrastructure Security Plan
  - Assist with scenario development and provide participants for exercise deployment

Onsite Wastewater Section

Innovative and Experimental On-site Systems

- Establishment of I&E Committee – Jan. 1999
  - 11 Volunteer Members
- Web site
  - www.deh.enr.state.nc.us/oww
  - All system approvals located on-line.

Innovative Systems: Description

- Must perform equal to or better than a system in the on-site wastewater rules.
- Materials must follow guidelines dictated in the rules with respect to physical properties and chemical durability.
- Able to withstand loads and conditions as required by the rules

Examples of Approved Innovative Wastewater Systems

- Drip Irrigation
- Chamber Trench Systems
- Tire Chips
- Multi-Pipe Systems
- Polystyrene Aggregate Trench Systems
- Sand Filter Pretreatment Systems
- Peat Filter Pretreatment Systems
- Trickling Filter Systems

Examples of Approved Innovative Wastewater Components

- Polyethylene Septic and Pump Tanks
- Fibermesh Reinforced Tanks

Experimental Systems: Description

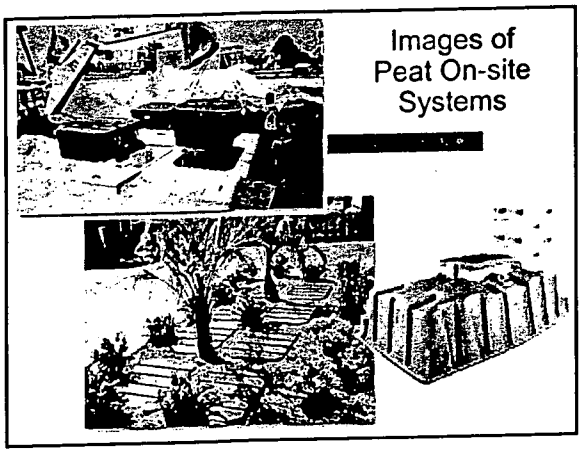
- Needs third party testing as a research project
- Reasonable likelihood of meeting project objectives
- Once the State determines that the standards of an innovative system have been met, the system will be removed from the experimental status and approved as an innovative system

Examples of Approved Experimental Wastewater Systems

- Wetlands Research Project
- High Organic Wastewater Pretreatment
- Sand Filter Modular Design Research Demo

Peat On-site Systems

- Two approved Peat systems:
  - Bord na Mona's "Puraflo" system
    - approved for use as Innovative in 1998
  - Premier Tech Environment's "Ecoflo"
    - approved for use as Innovative in 2000



Monitoring and Maintenance

- Owners of these peat systems must have an operator
  - At least 2 visits per year
  - Must be available to handle incidental needs.
  - Includes sampling of effluent annually

Problems and Issues

- Consistently meeting the effluent performance standards.
  - Causes
    - excessive flows
    - high strength wastewater
    - representative sample
- Operators not providing appropriate operation and maintenance services.
- Fire ant infestations

Questions?

Terry L. Pierce, Director
Div. Environmental Health
Terry.Pierce@ncmail.net

December 7, 2004 ERC Meeting
EXHIBIT F

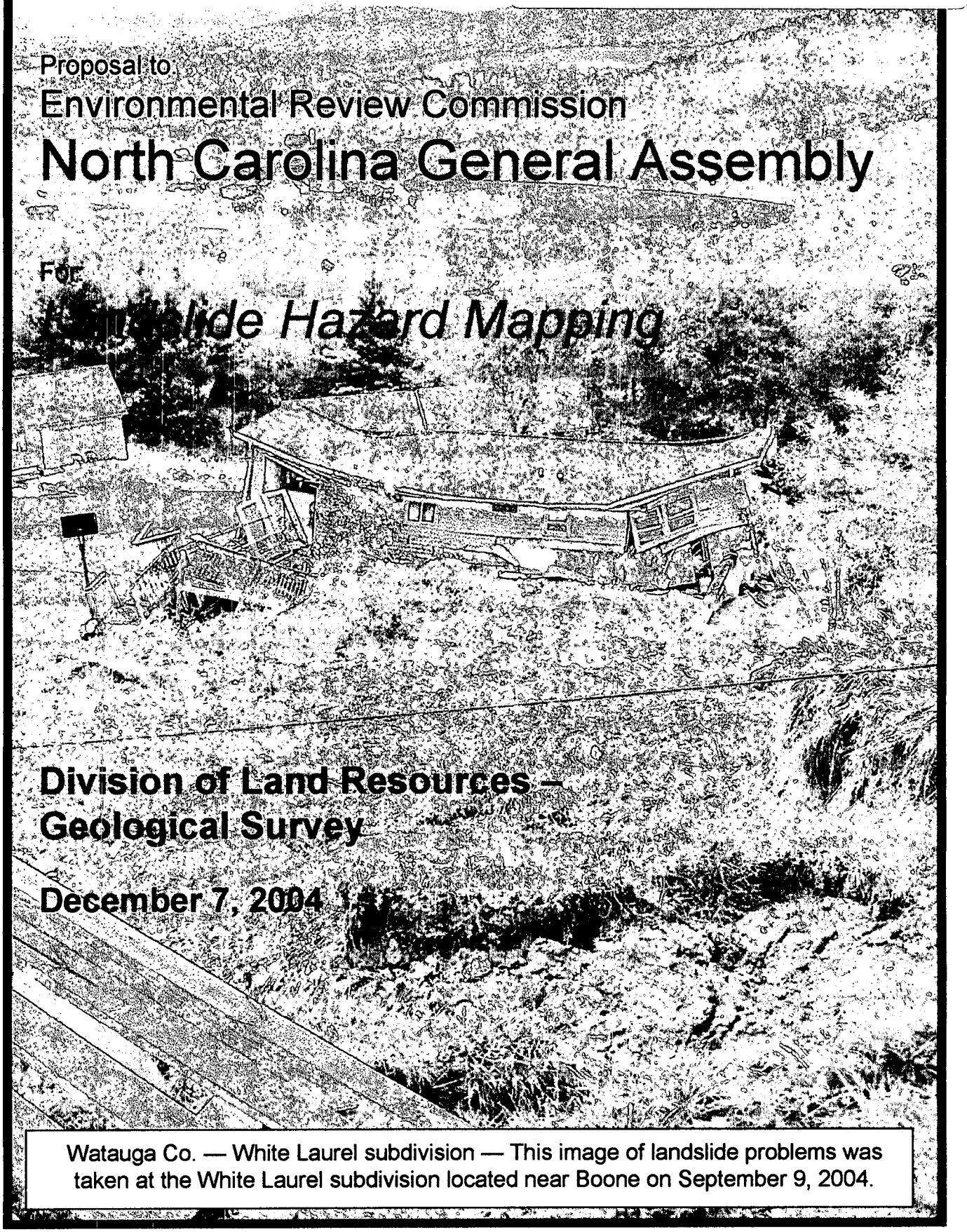
Proposal to:

Environmental Review Commission

North Carolina General Assembly

For:

Landslide Hazard Mapping



Division of Land Resources – Geological Survey

December 7, 2004

Watauga Co. — White Laurel subdivision — This image of landslide problems was taken at the White Laurel subdivision located near Boone on September 9, 2004.

1.0 Overview

The following proposal is in response to a request by the Environmental Review Commission of the North Carolina General Assembly. The main purpose of this proposal is to create a Landslide Hazard Mapping Program in North Carolina. This proposed work would also accelerate the production of a geographic information system (GIS) based geologic hazards atlas for North Carolina.

The state has significant geologic hazards that affect public safety and cause substantial economic loss. The primary geologic hazards facing North Carolina include:

1. Landslides (primarily in the mountains, but also in the Piedmont and Coastal Plain along highway right-of-ways and river valleys);
2. Coastal erosion and flooding from hurricanes and storms;
3. Ground collapse and subsidence above abandoned mines (especially in the Piedmont and mountains) and limestone sinkholes (along the highly populated coast, and to a lesser extent in the western part of the state);
4. High hazard dams (statewide near population concentrations);
5. Earthquake risk (mainly from the Eastern Tennessee, Charleston, S.C., and New Madrid, MO earthquake zones); and
6. Other hazards including acid-producing rock, and naturally occurring contaminants in groundwater, soil, and bedrock (e.g., arsenic, radon, uranium, and asbestos minerals) and high shrink-swell soil.

Landslides are especially dangerous geohazards because they usually occur without warning, can reach speeds in excess of 30 miles per hour, and move boulders that weigh more than 16 tons. Hazards and environmental impacts related to landslides include the threat to public safety, damage to roads and water supply facilities, and degradation of water quality from sedimentation.

This proposal concentrates on developing landslide hazard maps for western North Carolina as key components of the geologic hazards atlas. The information and maps produced by this program will be delivered to the counties, regional planning councils, and the N.C. Division of Emergency Management (NCDEM).

The program will improve information that North Carolina citizens, industry, and state, local, and federal governments can use to better ensure public safety. The program also supports Smart Growth and the DENR strategic targets of Clean Water, Stewardship of Natural Resources, Sustainable Development, and Environmental Awareness/ Outreach, as well as the mission of the North Carolina Geological Survey.

2.0 Landslides

Background. Whereas, the back-to-back tropical storms in western North Carolina during September 2004 that caused over 75 landslides are rare, landslides are not unusual in this part of the state. In fact, landslides occur annually in western North Carolina. Along transportation corridors alone, costs related to landslides average in the

range of $1-3 million annually. Fatalities from landslides occurred in 1916, 1940, 2003, and 2004. Direct costs associated with large landslides (i.e., the 1997 rockslide along I-40) can reach $10 million. Increased population and development on, and below, steep mountainous slopes over the last few decades has increased the risk to public safety from landslides.

Widespread major flooding and landslide events occurred in western North Carolina in 1901, 1916, 1940, 1977, and most recently in 2004, when hurricanes or tropical depressions tracked over the Blue Ridge Mountains and dropped large amounts of rainfall on steep mountain slopes. Prior to 2004, loss of life and significant property damage resulted from these events, even though the area was more sparsely populated at the time. The 1940 hurricane affected most of the southeast and resulted in 26 deaths from flooding and landslides in North Carolina alone. Aerial photographs taken shortly after the hurricane indicate that it triggered well over one hundred landslides. Hurricanes Frances and Ivan triggered over 75 landslides in western North Carolina. These landslides resulted in 5 deaths and 26 damaged or destroyed homes. At least three major landslides occurred along I-40, temporarily blocking the road.

Localized heavy rainfall not associated with tropical storms can also trigger landslides. A December 1990 landslide in Swain County destroyed the chlorinator for the Bryson City municipal water system. A May 2003 storm in Swain and Haywood Counties produced only 6-15 inches of rain over a three-day period, but triggered flooding and over 25 landslides that resulted in costs exceeding $2.5 million.

Landslide Hazard Mapping. Maps that show areas prone to landslides do not exist for western North Carolina. Much of the information that goes into making landslide hazard maps exists (e.g., geologic maps and soil maps), but at different scales, formats, and levels of detail. Information on individual landslides and landslide deposits collected by the North Carolina Geological Survey over the past year is helping to identify some general areas and mountainside conditions susceptible to landslides. New geographic information system (GIS) technology, coupled with field studies can be used to integrate existing data, identify landslide-prone terrain, and develop county-based landslide hazard maps.

Landslide hazard maps show where landslides have occurred in the past, and delineate general areas that are prone to landslide activity and susceptible to landslide damage. Emergency managers can use landslide hazard maps for emergency response planning. Local planners, developers, and homeowners can use landslide hazard maps to make better-informed decisions about the location and design of critical facilities, homes, and developments. Landslide hazard maps will help identify those areas that need an on-the-ground investigation to minimize the potential damage from future landslides.

Hillside stability depends on many interrelated factors including ground slope, shape of the ground surface, soil type and thickness, surface water and groundwater, the underlying bedrock structure, and vegetation among others. There is much variability and uncertainty in all of these factors from site to site in the landscape. Changes in any of these factors can alter the stability of a slope. For these reasons, landslide hazard maps

can show where landslides are more likely to occur, but the maps are not a substitute for an on-the-ground assessment by qualified engineers and geologists.

An important aspect of the work will be to show where landslides and other geologic hazards occur with respect to critical transportation facilities and networks, high hazard dams, and associated infrastructure. Making this information available in an integrated GIS framework will facilitate land use planning, and emergency response and planning.

3.0 Technical Plan and Deliverables

The Geological Survey proposes to develop landslide hazard maps in a GIS format for mountain counties over a five-year period. Years 1-5 will concentrate on landslide hazard mapping, but studies will continue on other geohazards (coastal flooding and erosion, arsenic in groundwater, sinkholes, underground mine collapse, acid-producing rock, shrink-swell soil).

- **Year 1** – Ramp-up year to acquire the needed staff and resources, and produce a pilot study for one county to refine the proposed process and final products.
- **Years 2-5** – Produce landslide hazard maps for 2-3 counties per year.
- **Year 5+** – Produce landslide hazard maps for remaining mountain counties, and applicable Piedmont and Coastal Plain areas, and refine and update existing landslide hazard maps. Redirect efforts to other geohazards.

Landslide hazard maps will consist of the following GIS data layers produced in formats compatible with the needs and requirements of individual counties:

- Landslide susceptibility showing high, moderate, and low landslide potential.
- Landslide and landslide deposit locations.
- Geology (where available).
- Critical soils (where available).
- Slope map.

Inventorying past and recent landslides will be continued statewide, but mainly in western North Carolina. These studies are important for several reasons.

1. To determine what specific geologic conditions make certain areas more prone to landslides;
2. To help identify areas prone to landslides and determine mapping priorities - landslides are likely to reoccur in the same general areas; and
3. To help calibrate GIS-based landslide models - landslides locations should correspond with areas predicted to be unstable.

Landslides identified and mapped, as part of the Geological Survey's Blue Ridge Parkway project will also be incorporated into landslide hazard maps. Landslides occur nearly every year along the Blue Ridge Parkway in North Carolina. The Blue Ridge Parkway is the most visited Park unit in the National Park System, and landslides are a continual threat to public safety and adversely affect local economies.

COUNTY LANDSLIDE HAZARD MAPPING PLAN

	Month 1	Month 2	Month 3	Month 4	Month 5
Determine Mountain County Priorities					
Analyze county population growth data and NCGS landslide database.					
Compilation Phase - Bring Existing Data into GIS Environment					
Consult with County on GIS requirements.					
Assemble existing landslide, geologic, soil, remote sensing, topographic, and critical infrastructure data.					
Data Integration Phase					
Convert data to compatible GIS formats.					
Terrain Analysis Phase					
Preliminary GIS landslide susceptibilty modeling - initial identification of unstable areas.					
Analyze and interpret existing maps and data to guide field verification work.					
Consult with County and other agencies on known problem-special interest areas.					
Field Verification Phase					
Field verify observations made in Terrain Analysis Phase.					
Collect field data on landslides to update database.					
Refine GIS Model Parameters.					
FINAL Map Production Phase					
Rerun GIS models udated and calibrated with field data.					
Delineate downslope areas potentially affected by landslides.					
Produce final landslide hazard map layers (landslide susceptibility; geology; critical soils; slope).					
Management and Peer Review.					
Education - Outreach					
Deliver landslide hazard maps to State and Local Governments - conduct workshops.					
Post maps on NCGS website.					

SCHEDULE NOTES: Month 1 of next county to be mapped overlaps with month 5 of county being mapped.

Year 1 Ramp-up and produce 1 prototype County landslide hazard map.

Years 2-5 Produce 2-3 county landslide hazard maps per year.

Year 5+ Prepare landslide hazard maps for lower priority Piedmont and Coastal Plain counties.

Table 1. Proposed timeline and general sequence of tasks to produce landslide hazard map and accompanying GIS layers for 1 county.

4.0 Cooperation and Coordination with Other Agencies

Funding is included in this proposal to contract with the North Carolina Center for Geographic Information and Analysis (CGIA) for GIS support. Funds are also included to cooperate with the North Carolina Division of Water Quality – Aquifer Protection Section, U.S. Forest Service – Coweeta Hydrologic Laboratory, and the U.S. Geological Survey in the Piedmont-Mountain Resource Evaluation Program. This program involves installing and monitoring groundwater wells at the Coweeta Hydrologic Laboratory in Macon County. Groundwater data from these wells coupled with the long-term weather and hydrologic monitoring data at Coweeta will aid in providing rainfall and groundwater data to use in slope stability modeling of mountain watersheds.

The Geological Survey will coordinate with the N.C. Division of Emergency Management and county emergency management and planning units. We will also coordinate with the Division of Water Quality, N.C. Dept. of Transportation, U.S. Geological Survey, U.S. Forest Service, U.S. Park Service. The Geological Survey will also coordinate with the National Weather Service in issuing landslide advisories in certain weather conditions.

New, high-resolution topographic data programmed to be available through the North Carolina Floodplain Mapping Program will significantly enhance the production of landslide hazard maps. The topographic data produced by the floodplain mapping program will be used where available.

5.0 Schedule and Cost

The attached schedule and budget table summarizes proposed expenditures. It includes staffing, salary, travel, and supplies including computer hardware and software, contracting, and other items needed to accomplish the proposed scope of work.

Year 1 - Ramp Up Under 2004-05 Expansion Budget Request	
	Get Needed Resources
	Arrange for office space
	Hire staff
	Purchase computer resources
	Conduct training
	Continue updating NCGS landslide database
	Conduct statistical analysis on existing landslide data
	Conduct literature review of methods used by other states, countries
	Determine County Priorities
	Conduct Pilot Study for 1 County
	Refine procedure for remaining priority 1 counties
	Publish A Citizens Guide to Landslide Hazards in North Carolina
	Continue Ongoing Geohazards Work Statewide
	Coastal erosion and flooding
	Ground Collapse Above Abandoned Mines
	Sinkholes
	Acid Producing Rock
	Arsenic in Groundwater
	Earthquakes
	Shrink-Swell Soil

Year 2-5 - Make Landslide Hazard Maps for Priority 1 Counties	
	Map 2.5, contiguous Priority 1 counties per year (24 counties @ 2.5 counties/yr)
	Conduct Workshops on using maps at county and state level
	Continue Ongoing Geohazards Work Statewide
	Coastal erosion and flooding
	Ground Collapse Above Abandoned Mines
	Sinkholes
	Acid Producing Rock
	Arsenic in Groundwater
	Earthquakes
	Shrink-Swell Soil

Year 5+	
	Make landslide hazard maps for Priority 2 and 3 counties
	Refine Priority 1 county maps w/ more detailed geologic mapping and analysis
	Maintain database
	Redirect efforts to other Geohazards Statewide
	Coastal erosion and flooding
	Ground Collapse Above Abandoned Mines
	Sinkholes
	Acid Producing Rock
	Arsenic in Groundwater
	Earthquakes
	Shrink-Swell Soil

ACCOUNT TITLE	Actual 2003-04	Authorized 2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
SALARY APPROPRIATED	59,765	61,259	166,576	166,576	279,419	279,419	279,419
FRINGE BENEFITS	10,048	10,162	36,257	36,257	61,823	61,823	61,823
CGIA CONTRACTUAL SERVICES	0	0	0	0	12,000	12,000	12,000
BOREHOLE LOGGING & MONITORING	0	0	0	0	2,500	2,500	2,500
TRAVEL AND SUPPORT	0	0	16,500	16,500	32,900	32,900	32,900
SATELLITE IMAGERY	0	0	0	0	34,000	34,000	34,000
SAT. IMAGERY INTERPRETATION EQPT.	0	0	0	0	13,000	0	0
MISC. SUPPLIES, GASOLINE, ETC.	0	0	4,700	4,700	9,800	9,800	9,800
MISC. OFFICE EQUIPMENT	0	0	8,000	8,000	14,000	2,000	2,000
COMPUTERS/PRINTERS	0	0	10,000	10,000	52,500	17,500	17,500
SOFTWARE	0	0	8,000	8,000	11,100	5,000	5,000
4x4 FIELD VEHICLE	0	0	0	0	30,000	0	0
REGIONAL FIELD OFFICE RENT	0	0	10,000	10,000	47,350	47,350	47,350
Requirements	69,813	71,421	260,033	260,033	600,392	504,292	504,292
Number of FTE*	1.00	1.00	4.00	4.00	7.00	7.00	7.00

CLASSIFICATION/EFFECTIVE DATE:	**GRADE**	**Number of Positions**				
		2005-06	2006-07	2007-08	2008-09	2009-10
Geologist III	75	1.00	1.00	1.00	1.00	1.00
Geologist II	73	3.00	3.00	4.00	4.00	4.00
Geologist I	70	-	-	2.00	2.00	2.00
TOTAL Number of FTE		**4.00**	**4.00**	**7.00**	**7.00**	**7.00**

NORTH CAROLINA
AGGREGATES ASSOCIATION

P. O. Box 30603, Raleigh, NC 27622
Representing Producers and Suppliers in the Aggregates Industry

November 23, 2004

RECEIVED
NOV 29 2004
RESEARCH DIVISION

Mr. George F. Givens
NC General Assembly
Research Division
Legislative Office Building
Raleigh, NC 27603-5925

Dear George:

To follow up with discussions by the Environmental Review Commission on November 19, I'm writing to support additional staff positions for the NC Geological Survey's Geologic Hazards Program. The Commission, having heard State Geologist and DENR-DLR Director, Jim Simons, is now informed of the severe budget constraints facing the Survey and its important programs.

We understand that DENR administrative staff has approved an expansion budget request for the Survey. It is my hope that the Environmental Review Commission could include, as a part of its package of bills for the 2005 Session, a recommendation for additional appropriations with which to expand the NCGS's Geologic Hazards Program in accordance with recommendations from the NC Geological Advisory Committee and consistent with recommendations from DENR administrative staff.

Thank you for consideration.

Sincerely,

Frederick R. Allen
Executive Director

Cc: Jim Simons
Tyler Clark

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Department of Environment and Natural Resources

Division of Land Resources

Presentation to the Environmental Review Commission

December 7, 2004

Jim Simons, Director
(919) 733-3833

I. Overview of Division Responsibilities

A. Geodetic Survey

- Establish and maintain the State Plane Coordinate System
- Establish vertical control (benchmarks)
- Boundary surveys for the State and counties
- Floodplain mapping
- Provide education outreach in land surveying, geodesy, and new mapping and positioning technologies

B. Geological Survey

- Examines, surveys and maps the Geology of the State
- Provides education outreach in Earth Science
- Collaborates with USGS & EPA on effects of geology on coastal processes, underground contaminant migration and landslides
- Publishes reports and maps
- Administer the NC Oil and Gas Conservation Act of 1946

C. Land Quality Section

Permitting, Technical Assistance, Inspections, Enforcement

- Dam Safety Program
- Mining Program
- Sediment Control Program

II. Geodetic Survey

A. Year-End Highlights of Accomplishments

- Established or re-established hundreds of horizontal and vertical benchmarks to assist surveying statewide.
- Served as one of three key agencies to produce new Digital Flood Insurance Rate Maps.
- Surveyed 56 miles of county boundaries at the counties' request.
- Revived the NC/SC Boundary Commission and contracted and provided oversight for the surveying of 72 miles of NC/SC and NC/VA state line boundary.
- Conducted 13 technology transfer workshops on Global Position System (GPS), state plan coordinate system, floodplain mapping program and LIght Detection and Ranging (LIDAR).
- Continued to Expand the GPS system real time kinematic network that provides real time GPS data via wireless internet connections.
- Added 11 new GPS base stations to make it easier for surveyors, engineers, contractors, GIS professionals, government agencies and emergency responders to access accurate GPS for boundary surveys and other mapping applications.
- Worked with U.S. Coast Guard, DOT and A and T State University to build a National Differential Global Positioning System tower in Greensboro that provides GPS differential correctors to western North Carolina.
- Implemented the National Height Modernization System in North Carolina using GPS and traditional leveling to obtain accurate elevations.

B. Trends and Issues

- Surveyors, engineers, GIS professionals, contractors, planners, emergency management agencies will benefit from access to more accurate GPS correction information in real time.
- Increased use of Geographic Information System (GIS) has expanded the users of geodetic data. This trend will continue to grow as this technology is expanded to other areas in government and the private sector.
- The use of the National Height Modernization System will continue to expand.
- The re-survey of NC/SC boundary in greater Charlotte/Mecklenburg area. likely to be controversial.

III. Geological Survey

A. Year End Highlights

- Provided emergency technical assistance to local and state emergency management personnel to determine immediate and potential threat to lives and properties of landslides resulting from the severe rainfalls of hurricanes Frances and Ivan. The response included inspection of three landslides that had destroyed or endangered houses, and, in one case, caused fatalities; participated in technical review committees to determine causes of landslides and where other landslides may happen; presented information on landslides to local government and interest groups; prepared several reports on the landslides causing damage and fatalities; posted locations of known landslides and useful public safety information to news media and Division's web page.
- Completed geologic mapping of approximately 215 square miles in the north central piedmont and in the Asheville vicinity. Also mapped the geology of the central part of the Blue Ridge Parkway.
- Started initial work on a geologic hazards atlas of North Carolina.
- Continued work with the U. S. Geological Survey on determining subsurface geology of Outer Banks and Cedar Island and completed draft of geomorphic map of Cape Hatteras.
- Continued work with the U. S. Geological Survey and the Division of Water Quality to determine ground water pollution potential of animal waste nutrients through the aquifer in the central coastal plain.
- Participated with the Office of Environmental Education's Earth and Environment Science Institute in Randleman working with over 25 high school teachers on curriculum-based environmental concepts.
- Answered public inquiries and performed public outreach through a number of presentations; received hundreds of requests for information; and received over 2.4 million hits on the Geologic Survey's web page.

B. Trends and Issues

- Geohazards, such as landslides, sinkholes, mine subsidence and toxic trace elements, will become more of a problem as population grows into areas previously considered not suited for development.

- Collaboration with Geodetic Survey, Division of Emergency Management, the Center for Geographic Information and Analysis and others will facilitate database gathering of geohazards.
- Survey must depend upon matching grants from U. S. Geological Survey and other federal agencies for funding for staff travel, equipment, supplies, rent, etc.
- Federal grants do not generally provide funding for publishing or other distribution of their funded projects.
- Grants are based on federal priorities and not necessarily state priorities.

IV. Land Quality Section

A. Year End Highlights

- Provided dam safety emergency response to hurricanes Frances and Ivan, including over 150 inspections, technical oversight of three emergency dam breaches, round the clock monitoring of several potentially dangerous dams, providing dam safety inventory information to emergency management personnel and staffing the Emergency Operations Center.
- Conducted workshops on erosion and sediment control for several hundred contractors, design professionals and local government personnel.
- Performed over 1,760 inspections of dams to determine the potential threat to public safety and initiated corrective actions, where necessary.
- Performed over 14,000 environmental inspections of construction sites and over 650 inspections of mines, and initiated compliance actions, if necessary.
- Issued approvals for over 3,020 erosion and sedimentation control plans, 300 mining permits and 199 dam safety permits.
- Implemented the Express Permitting Program for sedimentation plan approvals in the Wilmington and Raleigh Regional Offices.
- Released 4,323 acres of reclaimed mine land.
- Developed an Internet based, statewide database of permitted mines and dams.
- Assisted the Division of Emergency Management in a risk assessment plan for geohazards.
- Responded to hundreds of public inquiries on erosion and sediment control, dam safety and mining.

B.Trends and Issues

Dam Safety

- 5,000 dams under state jurisdiction and growing, including 1,000 considered in high hazard potential classification (among highest of any state in nation).
- Dams are becoming more dangerous over time as man made components deteriorate and more development occurs downstream.
- Experience has shown public safety can be improved by proper dam construction/repair, routine dam inspections and emergency action plans.

Mining

- 950 permitted mines statewide and growing.
- Increasing land use conflicts between mining and development.
- Number of permitted mines has tripled while permitting and inspection staffing has remained the same.
- Increased opportunities for public participation into mine permitting process have increased public awareness, but have also slowed the permitting process and increased public complaints against mining operations.

Sediment Control Program

- Approximately 8000 active construction sites under state program jurisdiction.
- Tremendous amount of land disturbing activities in state.
- More development in areas of high risk for offside sedimentation damage.
- Need for more regular monitoring to ensure erosion and sediment control measures are installed and maintained – including more good local programs, self-inspections, etc.
- Need to put increased emphasis on preventing erosion rather than trapping sediment, and to improve current erosion and sediment control measures.

December 7, 2004 ERC Meeting
EXHIBIT H

Environmental Review Commission
of the North Carolina General Assembly

Report on Inactive Animal Waste Lagoons
NC Division of Soil and Water Conservation
December 7, 2004

Recap 2000 report – Included ranking process and survey; identified 1,142 inactive lagoons on 745 farms in 76 counties. Classified 39 as high-risk; estimated cost for closure of high-risk lagoons ($1.5M) or for assessment of all ($2M). Recommended incentive (100% cost share) approach over 3 years.

Outcome – no new funds appropriated; districts proceeded using normal cost share funds in voluntary programs.

Update 2004 – Closure of inactive animal waste lagoons is being done by local Soil and Water Conservation Districts. Overall, **133** inactive lagoons have been closed since 2000, with an added **79** scheduled to be closed this program year. An added **54** operations have gone inactive since 2004; 9 have been re-activated.

Of **39** high-risk lagoons in 24 counties identified in our 2000 report, **12** have been closed, with another 2 pending, 1 with management plan, and **1** reactivated. Thirty-six percent of the high-risk lagoons are closed or are under contract to be closed.

The remainder of those lagoons closed (about **120**) were from other categories on the 2000 list or from newly inactivated lagoons.

Funding used:

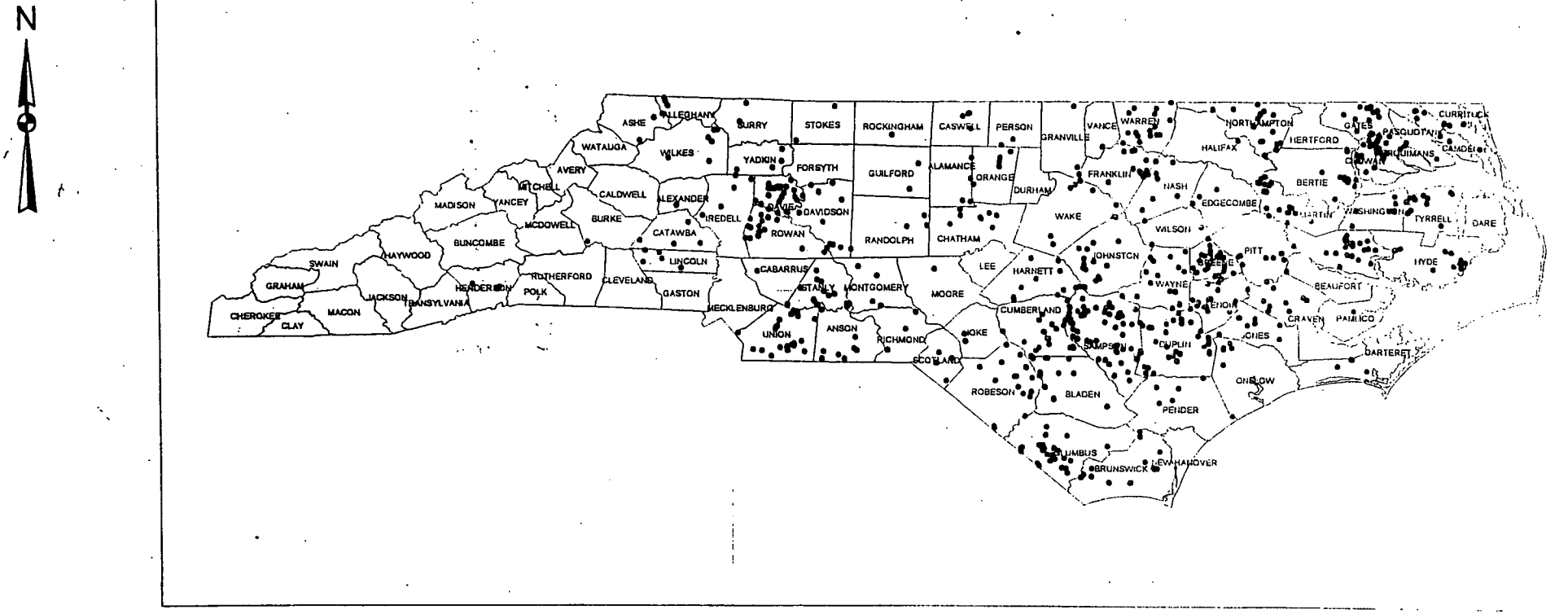
1. North Carolina **Agriculture Cost Share Program** – 69 closed since 1/2000; 6 under contract; includes 35 counties; cost $1M; new provision for limited resource farmers allows up to 90% cost share.
2. USDA **Environmental Quality Incentive Program** (EQIP) – 98 contracts since 2000; now at 50% cost share.
3. **Smithfield Agreement/NC Foundation** for Soil and Water Conservation – two grants (totaling $1M) since 2002; participated in contracts for closure of 45 inactive lagoons (28 closed).
4. **Clean Water Management Trust Fund** – Chowan and Franklin counties participation; some special cases with lack of responsible party/lagoon abandonment.

Note that many lagoon closures are cooperatively funded by multiple sources due to high costs. A single closure may consume a district's entire cost share allocation. Note that lagoon size varies (especially older ones), and cost is variable. Availability of contractors and fees charged also vary.

Cumulative Inactive Lagoon Survey, 2000 - 2003

DISTRICT	2000 INACTIVE	ACTIVATED	CLOSED	TO BE CLOSED	GAINED	DISTRICT	2000 INACTIVE	ACTIVATED	CLOSED	TO BE CLOSED	GAINED
Alamance	4	2	1		1	Johnston	54		2	1	
Alexander	2		1			Jones	14		1		
Alleghany	3	1	2		2	Lee	0				
Anson (Brown Creek)	8		1			Lenoir	36		1		
Ashe (New River)	3		1			Lincoln	7				
Avery	0					Macon	0				
Beaufort	56		1	1	7	Madison	0				
Bertie	17					Martin	31		9	8	2
Bladen	12					McDowell	0				
Brunswick	18		2	2		Mecklenburg	0				
Buncombe	0		1			Mitchell	0				
Burke	3					Montgomery	8			5	
Cabarrus	1		1		2	Moore	1		1	2	
Caldwell	0				1	Nash	15				
Camden (Albemarle)	14		3			New Hanover	0				
Carteret	4					Northampton	23		3	5	4
Caswell	8				4	Onslow	5				
Catawba	6					Orange	8		3		2
Chatham	9		2	5		Pamlico (Bay River)	1				
Cherokee	0					Pasquotank (Albemarle)	2		1		
Chowan (Albemarle)	16		2			Pender	13		3	3	6
Clay	0					Perquimans (Albemarle)	13		5	5	2
Cleveland	2				1	Person	3		3		2
Columbus	36	3	6			Pitt	13			2	2
Craven	15		1			Polk	0				
Cumberland	37					Randolph	4		2	3	
Currituck (Albemarle)	11					Richmond	4				
Dare	0					Robeson	31		2		
Davidson	11		9	1		Rockingham	1		1		
Davie	22	1	6	5		Rowan	17		1		
Duplin	40				2	Rutherford	1				
Durham	0					Sampson	120		5	2	
Edgecombe	4		2			Scotland	8		3		
Forsyth	0					Stanly	19	1	4	3	2
Franklin	24		2			Stokes	2				
Gaston	0		2		2	Surry	5			2	
Gates	24		1	1		Swain	0				
Graham	0					Transylvania	0				
Granville	5			1		Tyrrell	30		1	5	
Greene	38		1			Union	34		2		1
Guilford	4		4	1		Vance	4				
Halifax (Fishing Creek)	2		1	2	2	Wake	14		2		
Harnett	14		4			Warren	19	1		2	
Haywood	3		2			Washington	26				2
Henderson	3		5	2		Watauga	0				
Hertford	0				1	Wayne	22		2	1	
Hoke	2					Wilkes	6		1		
Hyde	31		8	9		Wilson	4		2		2
Iredell	5				4	Yadkin	7		1		
Jackson	0					Yancey	0				
	517	7	72	30	29		625	2	61	49	27
TOTALS:	1,142	9	133	79	56						
	2000 INACTIVE	ACTIVATED	CLOSED	TO BE CLOSED	GAINED						

NORTH CAROLINA INACTIVE ANIMAL WASTE LAGOON SITES



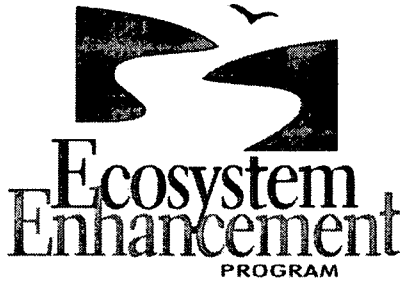
NORTH CAROLINA INACTIVE ANIMAL WASTE LAGOON SITES

- INACTIVE LAGOONS
- NORTH CAROLINA COUNTY BOUNDARIES

50 0 50 100 Miles

Presentation to
Environmental Review
Commission

December 7, 2004



Program Overview

- Growing in Responsibility
- Increasing Productivity
- Managing Funds/Watching Expenditures

Program responsibility

- EEP
  - Combined mitigation programs of WRP & DOT
- Regulatory Coordination
  - Joint WRP and DOT Regulatory Coordination
- Manages funds as per G.S. 143-214.13

Productivity

(Funds 2980,2981,2982)

- Permits provided for
  - Since 1998 to date 948
  - Last SFY 362
- SFY 03/04 Breakdown (No. payments)
  - Private Sector 63%
  - NCDOT 25%
  - Other 12%
- SFY 03/04 Payments ($)
  - Private Sector 19%
  - NCDOT 78%
  - Other 3%

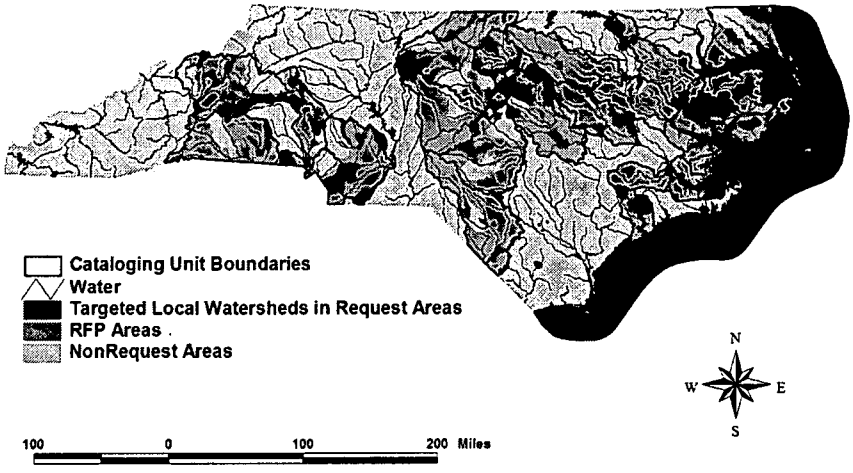
Productivity

	Total Accepted 6/30/04	Total Due 6/30/04	Total Produced 6/30/04	Recently awarded	Total To date
Streams (Feet)	319,650	227,834	253,550	64,710	318,290
Wetlands (Acres)	367	305	402	69	471
Buffers (Acres)	369	244	193	75	268

Primary Mitigation Procurement Methods

- Full Delivery Providers
- Design-Bid-Build
- Watershed-based Project Development
- Inter-agency cooperative efforts

2004 EEP Request For Proposal Areas



Solicitations Underway

Basin	Stream	Wetland	Cst'l Marsh	Buffer
Broad	35,000	70		
Cape Fear	178,000	222		90
Catawba	115,000	235		
F. Broad	5000	5		
Lumber	20,000			
Neuse				250
Pasquotank	3,000			
Roanoke	20,000	225	1	
Tar-Pam	48,000	125	11	55
White Oak		26		
Yadkin	26,000	25		
Total	450,000	933	12	395

Costs factors and fund standing

Stream Restoration

Rural Project Example: Little Bugaboo

Purchase	$ 4,125
Design	$ 103,889
Construction Mgmt.	$ 83,310
Site Restoration	$ 399,400
Long-Term Mgmt./ Monitoring	$ 66,280
Length (feet)	6,600
Cost per linear foot	$ 100
Total Cost	$ 657,004

Stream Restoration
Urban Project Example: Hominy Swamp

Id & Purchase	$ 4,950
Design	$ 123,903
Construction Mgmt.	$ 12,600
Site Restoration	$ 322,618
Long-Term Mgmt./ Monitoring	$ 54,000
Length (feet)	2232
Cost per linear foot	$ 232
Total Cost	$ 518,071

Stream Restoration FY 03-04

- EEP Completed 27 stream restoration projects
- Restored 115,312 linear feet of stream
- Ave. cost per linear foot: $139.28
- Cost vary for urban and rural projects

Average per linear foot cost:

- Urban projects: $182.47
- Rural projects: $112.62

Urban Projects – *Why the Added Expense?*

- Must work with roads, existing utilities
- Shorter stretches of stream for restoration
  - Higher density of land ownership
  - Smaller parcel size
- No "economies of scale" with smaller projects
  - Initial mobilization of equipment is significant portion of costs

Wetland Restoration Costs

- No independent wetland projects produced last SFY
- Existing rates for non-riverine appear appropriate
- Evaluating data for riverine wetland systems, latest awards indicating upward adjustment needed

Wetlands Trust Fund
Restoration Account 2980

Balance 7/1/03		**$1,978,457**
Revenue (FY03-04)		$61,011
Interest	$61,011	
Expenditures		$148,434
Design/Construction Management	$148,434	
Balance 6/30/04		**$1,891,034**
Current Contractual Encumbrances		**$1,815,719**
Balance of Unencumbered Funds		**$75,315**

Wetlands Trust Fund
Compensatory Mitigation Account 2981

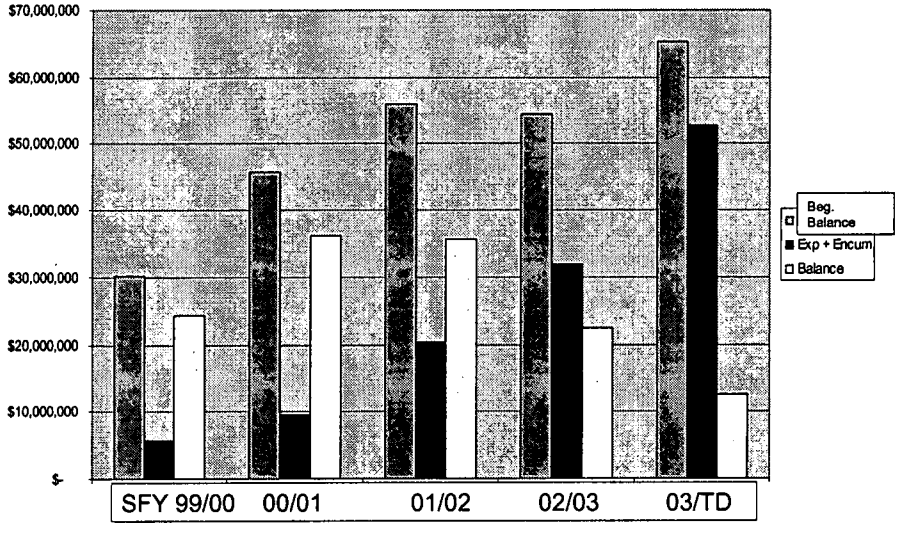
Balance on 7/1/03		**$40,452,387**
Revenue		$20,541,392
Compensatory Mitigation Payments	$17,342,162	
Nutrient Offset Payments	$1,685,752	
Interest	$1,513,478	
Expenditures (FY03-04)		$14,150,989
Balance on 6/30/04		**$46,842,790**
Current Contractual Encumbrances		**$17,648,302**
Balance of Unencumered Funds		**$29,194,488**

Wetlands Trust Fund
Riparian Buffer Restoration Account 2982

Balance 7/1/03		**$5,513,590**
Revenue		$5,494,285
Compensatory	$5,235,823	
Interest	$258,462	
Expenditures		$325,017
Balances 6/30/04		**$10,682,858**
Current Contractual Encumbrances		**$678,282**
Balance of Unencumbered Funds		**$10,004,576**

Beginning Balance-Obligations-Balance

Funds (2980-2981) To Date



Summary

- Last year was significant in terms of activity
- We have increased production
- Rely heavily of private sector for the work
- Comprehensive report next year to include a increased DOT responsibilities

www.nceep.net

Ecosystem Enhancement PROGRAM

The North Carolina Ecosystem Enhancement Program Annual Report On In-lieu Fee Programs

Executive Summary: July 1, 2003 – June 30, 2004

Introduction

The past fiscal year was significant for the NC Wetlands Restoration Program (NCWRP). During that time, the NCWRP combined forces with the compensatory mitigation resources of the NC Department of Transportation to form the Ecosystem Enhancement Program (EEP). This year's annual report to the Environmental Review Commission (ERC) presents the EEP's progress in meeting the goals and requirements of the NCWRP's enabling legislation but does not present details on the EEP. It is the Department of Environment and Natural Resource's intent to provide the ERC with an annual report in late 2005 that presents a comprehensive characterization of the EEP in its entirety, not just those components related to the NCWRP legislation.

Watershed Planning

The EEP continues to place restoration project implementation in watersheds with demonstrated need of attention. To ensure that program projects will generate the greatest environmental benefit, EEP develops plans at the river basin scale and at the local scale to target restoration activities. During fiscal year 2003 – 2004 (FY 03-04) the EEP completed Watershed Restoration Plans for the Lumber, Tar-Pamlico, and Catawba river basins in accordance with the NC Division of Water Quality's basinwide planning schedule. In addition, development of Watershed Restoration Plans for the French Broad, New and Cape Fear river basins were initiated. The EEP also has 20 detailed planning initiatives (Local Watershed Plans) underway all across the state to identify what specific actions are necessary to restore and protect small local watersheds. These studies allow the program to more precisely locate the most environmentally beneficial and cost effective restoration projects.

Project Implementation

At the end of FY 03-04, 70 projects were at or beyond the initial design phase. Twenty-five projects have been completed, resulting in the restoration, enhancement or preservation of 462.7 acres of wetlands, 66,832 linear feet of streams and 156.5 acres of riparian buffer. The remaining projects are currently in the design phase and will be constructed during FY 04-05. Collectively, these 70 projects will result in the restoration, enhancement and preservation of 960.2 acres of wetlands, 208,730 linear feet of streams and 342.4 acres of riparian buffer.

These projects are located throughout North Carolina in 11 different river basins and 34 counties. Seventy-three percent of these projects are located within Targeted Local Watersheds that have been identified by the EEP's planning process as watersheds in need of restoration activities.

Trust Funds

By mandate of the NCWRP enabling legislation, the EEP manages three accounts within the Wetlands Trust Fund: Account 2980 – Wetland Restoration; Account 2981 - Compensatory Mitigation; and Account 2982 – Riparian Buffer.

During the last fiscal year, the EEP has continued to accelerate expenditures of

funds toward the identification and implementation of restoration projects. Expenditures and encumbrances from funds 2980 and 2981 were in excess of $54 million for the fiscal year, the largest expenditure reported since the establishment of the NCWRP.

During FY 03-04, the EEP received 98 payments for compensatory mitigation associated with Section 404/401 permits, permitted riparian buffer impacts and nitrogen offset payments. Sixty-two of the payments (63 percent) were received from the private sector, 24 payments (25 percent) were received from NCDOT and 12 payments (12 percent) were received from other state, federal and local government agencies.

Project Costs

The EEP continues to track the costs of stream and wetland restoration projects and compares them to the fees established in rule 15ANCAC 02R .0402. Data for completed projects indicate that the average cost of stream restoration per linear foot is $182 for projects in urban settings and $112 for projects in rural settings. Though these results differ from the recently revised fee schedule of $200 per foot, the discrepancies lie in the program's ability to encourage donations of property. Because the established in-lieu fees must account for costs associated with land acquisition and many of the program's projects will be in the urban setting to maintain proximity to the impacts that are being offset, the EEP believes that the current fee schedule for stream restoration is appropriate.

No additional cost information related to wetland restoration through the in-lieu fee program became available during this past fiscal year. Data from projects external to the program and additional requirements for pre-monitoring of restoration sites suggests that the existing fee of $24,000 per acre may be too low. EEP staff intend to collect applicable cost data and evaluate whether a revision to the fee for riparian wetlands is necessary.

Highway Use Tax Based on Efficiency/ Vehicle Registration Based on Vehicle Miles Traveled

Preliminary Report on ERC Study

December 7, 2004

Background

- S.L. 2004-161, Sec. 19.10 requires that the Commission study three issues:
  - Whether the State should modify the current highway use tax so that all or a portion of the highway use tax paid on a private passenger vehicle is based on the fuel efficiency rating of the vehicle.
  - Whether the State should modify the current vehicle registration fee so that all or portion of the annual vehicle registration renewal fee for a passenger vehicle is based on the vehicle miles traveled by the vehicle.
  - Whether the modifications should be made on a revenue-neutral basis or should be made so as to generate additional revenue to be used to fund initiatives designed to improve air quality and the efficiency of the transportation system in the State.

Today's presentation

- Describes the process by which staff plans to gather information for ERC consideration
- Receive ERC concurrence on the approach, or guidance on preferred directions

Basic approach

- Identify affected/interested State agencies and other parties
- Identify the options
  - Identify pros and cons of each option
- Identify considerations for implementation
- Present this information to the ERC for its consideration/decision

Affected/interested State agencies and other parties

- DENR
- DOT/DMV
- Revenue
- Energy
- Car dealers
- AAA
- Environmental groups
- Others?

Identify the options

- Meeting with stakeholders, talking with out-of-state peers, searching the web for previous efforts

(continued on other side)

    - Include benefits and costs
        - Environmental, energy conservation, transportation efficiency
    - Which options are feasible for near-term implementation
    - How significant must the modifications be to influence motorist behavior
- Discussions among NC stakeholders to identify pros and cons of each option

Identify considerations for implementation

- "Assume" that any of the options might be implemented
- What would be the challenges for implementation
    - Identify hurdles to success and efficiency
    - Primarily focused on State agencies with implementation roles
    - Examples
        - How to determine the fuel efficiency rating for a specific vehicle
            - Prefer automated approach rather than a clerk manually searching tables and making judgement calls
            - How to determine historical ratings
        - How to determine the vehicle miles traveled
            - Emissions inspections record mileage electronically
            - Safety-only counties record mileage manually
            - In neither case is the data currently QA'd
        - What are the unintended consequences
            - Highway use fee structure itself might be revenue neutral, but improved fuel efficiency would decrease fuel tax receipts
            - If highway use fee is too high, it could delay fleet turnover
- How would any increase in revenue be used?

Schedule

- Initial meetings have already been held
- Between now and the Holidays
    - Research on available options and first draft of report
- Jan 2005
    - Finalize report
    - Present to ERC

Presented by:

- Donnie Redmond, Division of Air Quality
- 919-733-1481
- donnie.redmond@ncmail.net

(continued on other side)

State Facilities Water Savings Projects

Environmental Review Commission

December 7, 2004

Larry Shirley
Director
State Energy Office

12-7-04

State Energy Office ENERGY

State Government Water Usage

- **2004 Water-Sewer expenditures = $28.5 million**
- **Estimated daily usage 15.6 MGD**
- **46 gallons per day per occupant**

12-7-04

State Energy Office ENERGY

State Water-Sewer Rates

- **100+ different local & municipal water companies**
- **Widely varying statewide rates, water & sewer, irrigation**
- **Sewer cost typically multiplier of water rates:**
  sewer cost = 1.5 to 2.5 times water cost
- **Commercial water-sewer rates vary $3.00 - $28.00 per Kgal.**

Source: League of Municipalities

12-7-04

State Energy Office ENERGY

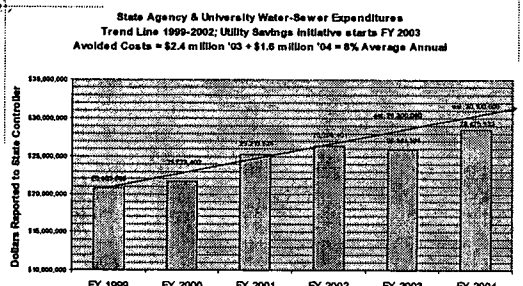
New Cost Increase: Stormwater Fees

- **Approximately seven municipalities charge stormwater fees**
- **Virtual "property tax" based upon square feet of impermeable space: parking lots, buildings**
- **Added to water bills: increases total water cost**
- **Possible savings via rainwater catchment- grey water and irrigation systems**

12-7-04

State Energy Office ENERGY

State Government Water-Sewer Usage: Bucking the Trend



12-7-04

State Energy Office ENERGY

Utility Savings Initiative Conservation Awareness Training

- **Joint statewide training 2002-2004 DENR/Water System Protection Team DENR/CC&PS**
- **2002 Drought: HB 1215 10% reduction in water use; Exec Order 26 non-essential ban; long term water plans**
- **Conservation Awareness Teams established in partnership with Sustainability/NC Project Green teams per Executive Order 156-1999**

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Water Conservation Measures

- Water conservation measures:
  - Leak reporting
  - "Don't be a drip- turn it off!" stickers
  - Facilities personnel training
    - Cooling Tower efficiency
    - Boiler condensate return
  - Shower and faucet flow reducers
  - Waterless urinals (UNC)

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Successes in State Government

- Water Billing refunds
  - DHHS $60,000 refund
  - NC A&T $75,000 refund
- Only pay sewer on water that ends up in the sewer
  - Zoo saving $200,000 per year with sewer meter
- Irrigation meters: Install water meters for irrigation only, or drill irrigation wells and/or use drought-tolerant plants and grass

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Successes in State Government

Cooling Tower Sewer Cost Credit

- Approximately 50% water evaporates in a cooling tower- doesn't go to sewer
- Requires agreement with municipal water company
- Dept. of Correction metered one tower saving $7,200 annually, cost approximately $1,000

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Successes in State Government

- **DHHS John Umstead Hospital, Butner**
- **Piped cooling water from 4 water-cooled ice machines from drain to cooling tower: reused cooling water**
- **Saved 429,000 gallons and $2,016 annually**

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New for 2004

Performance Contracting

"Energy Savings Contracts for Governmental Units"

- **General Statute G.S. 143-64.17 (2002)**
- **Amended 2003**
- **Previously K-12 and Community Colleges**
- **No Capital Costs/Guaranteed Savings**
- **$50 million to start, 12 year max. contracts**
- **List of 15 Qualified Energy Service Companies**

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Performance Contracting Activity Local Government, K-12, Community Colleges

- **1998 - $ 4.1 million in contracts**
- **1999 - $ 1.6 million " "**
- **2000 - $ 0.8 million " "**
- **2001 - $ 5.9 million " "**
- **2002 - $10.6 million " "**
- **2003 - $13.2 million " "**

Total $ 36.2 million

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Performance Contracting Activity State Government and Universities

- UNC-Greensboro
- Museum of Art
- Downtown Complex and Central Chiller Loop
- Values range $2.5 million to $10 million
- $20 million total proposed contracts
- $250+ million in potential performance contracts
- Not all proposals included water measures

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Potential State Water Savings

- Total State Water-Sewer Bill $28.5 million
- 11% of Total State Utility Bill of $256 million

(electric, gas, fuels, water-sewer)

- $5.8 million of potential water savings under performance contracting

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Recommendations

- Amend Performance Contracting statute GS 143-64.17 to specifically include water savings measures
- Increase current total contract cap of $50 million to $75 million, or remove altogether
- Include water measures in GS 143-64.10-16, Energy and Water Conservation in Public Facilities

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